Island wide Construction Raw Material Survey

Report on Gampaha District

Starin Fernando

Geologist

Report No. MR/CRM/18/2018

Geological Survey and Mines Bureau

569, Epitamulla Road,

Pitakotte

May 2018
# CONTENT

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>04</td>
</tr>
<tr>
<td>2. Objectives</td>
<td>05</td>
</tr>
<tr>
<td>3. Area, Boundaries and Accessibility</td>
<td>05</td>
</tr>
<tr>
<td>4. Climate</td>
<td>07</td>
</tr>
<tr>
<td>4.1. Rainfall</td>
<td>07</td>
</tr>
<tr>
<td>4.2. Temperature</td>
<td>08</td>
</tr>
<tr>
<td>5. Physiography, Drainage Pattern and Vegetation</td>
<td>08</td>
</tr>
<tr>
<td>6. Outline Of Geology</td>
<td>08</td>
</tr>
<tr>
<td>7. Previous Studies and Method of Study</td>
<td>12</td>
</tr>
<tr>
<td>8. Field Investigations</td>
<td>13</td>
</tr>
<tr>
<td>9. Preparation of the Construction Material Map</td>
<td>13</td>
</tr>
<tr>
<td>10. Construction Materials</td>
<td>14</td>
</tr>
<tr>
<td>10.1. Building Materials</td>
<td>14</td>
</tr>
<tr>
<td>10.1.1. Rock</td>
<td>14</td>
</tr>
<tr>
<td>10.1.1.1. K-feldspar granite (rose color rock quarries)</td>
<td>14</td>
</tr>
<tr>
<td>10.1.1.2. Rock Quarries in Mirigama (NE Gampaha District)</td>
<td>16</td>
</tr>
<tr>
<td>10.1.1.3. Rock Quarries in Dompe Area (SE Gampaha District)</td>
<td>17</td>
</tr>
<tr>
<td>10.1.2. Gravel</td>
<td>21</td>
</tr>
<tr>
<td>10.1.2.1. Lateritic Gravel</td>
<td>21</td>
</tr>
<tr>
<td>10.1.2.2. Quartzitic Gravel</td>
<td>24</td>
</tr>
<tr>
<td>10.1.2.3. Gravelly soil</td>
<td>25</td>
</tr>
<tr>
<td>10.1.3. Construction Sand</td>
<td>28</td>
</tr>
<tr>
<td>10.1.3.1. River Sand</td>
<td>28</td>
</tr>
<tr>
<td>10.1.3.2. Inland Sand</td>
<td>29</td>
</tr>
<tr>
<td>10.1.3.3. Manufactured Sand</td>
<td>30</td>
</tr>
<tr>
<td>11. Conclusion</td>
<td>31</td>
</tr>
<tr>
<td>12. Recommendation</td>
<td>31</td>
</tr>
<tr>
<td>Acknowledgement</td>
<td>31</td>
</tr>
<tr>
<td>References</td>
<td>32</td>
</tr>
</tbody>
</table>
Annexures

1. Construction Raw Material Resources Map of Gampaha District
2. The Details of newly identified Rock Quarries in Gampaha District
3. The Details of newly identified Gravel and Soil Deposits in Gampaha District
4. The Details of working rock quarries, Gravel and Soil pits and sand deposits in Gampaha District
5. MRG/73/2012 Data
Island wide Construction Raw Material Survey
Report on Gampaha District

1. Introduction

Over the past two decades, state as well as private sector organizations initiated rapid development work throughout the country in a large scale.

Of these projects, Port City development project, construction of expressways (i.e. Northern and Central expressways, extension of Southern expressway to Hambantota and Mattala), extension of Southern Railway line from Matara to Kataragama and construction of a massive building complex for the Ministry of Defense and Three Forces Head Quarters in Pelawatta and other government office complexes in Battaramulla, construction of irrigation and hydro power projects in many parts of the country, construction of multi storied apartment complexes in urban and suburban, etc., are the most significant. For these projects, huge quantities of building raw materials (sand, rock and soil / gravel) are required.

Being the regulatory authority on Mines and Minerals Act No. 33 of 1992 and amended Act No. 66 of 2009, it is the responsibility of the GSMB to identify mineral resources in the country, including building raw materials, required for various industries and development projects, initiated by the state as well as the private sector.

In the recent past, the contractors of various development projects have complained about the difficulties faced by them when identifying suitable localities for extracting and supplying building raw materials needed for the major development projects, currently initiated in many parts of the country. This has resulted in delaying construction work of some of the government high priority development projects.

This matter was reported to Mr. R. Paskaralingam, Senior Advisor to the Ministry of National Policies and Economic Affairs by the relevant parties at the progress review meetings of the government development projects, held at the Ministry. Subsequently a request was made to the Director General, GSMB by Mr. R. Paskaralingam, to immediately initiate an island wide survey to identify minable locations of building raw materials (sand, rock and soil / gravel) and to estimate their resources in order to use them as per the requirements of the projects.

Accordingly, GSMB has commenced an island wide construction raw materials survey in early 2017. This report including maps, tables and annexes is the output of the survey conducted in Gampaha District.
2. **Objectives**

The objectives of this survey are as follows.

- Conducting field surveys to identify suitable sites for mining construction raw materials. (sand, gravel and rock)
- Identification of mining related issues and environmental concerns.
- Preparation of construction raw material resource map.
- Assessment of mineable quantities of construction materials in identified locations and their optimum extraction limits.

3. **Area, Boundaries and Accessibility**

Gampaha District has the most active mining area of the Western Province. It is bounded on the south by Kelani River and on the north by MaOya. On the west it is bounded by Indian Ocean and on the east it is bounded by Kegalle District. The total land area of the Gampaha district is about 1341 square kilometers. It is divided into thirteen divisional secretariats namely Negombo, Gampaha, Minuwangoda, Katana, Divulapitiya, Attanagalle, Dompe, Wattala, Kelaniya, Mahara, Mirigama and Biyagama.

Gampaha district has the second highest population in Sri Lanka. Total population of the district is approximately 2,063,684 and the population density is about 1,539/km². The Colombo which is the commercial city and the former capital of Sri Lanka is very close to Gampaha district. Most of the construction materials used in Colombo infrastructure projects are supplied from Gampaha district.
Figure -1: Divisional Secretariat Division in Gampaha District
Gampaha district is well developed compared to most of the districts in Sri Lanka except for Colombo. Two biggest industrial zones are located in the center of the district namely Katunayake and Biyagama free trade zones. The main international Airport and world famous tourist town (Negombo) are also located in this district. As a result its infrastructure facilities such as road network and housing have been developed. Its population has also gone up. These developments have been taken place for more than half a century, therefore compare to other districts there are very few untouched earth resources.

In the eastern side of the district a few hilly areas (e.g. Wilikulakanda) are preserved as forests. The Colombo – Kandy main road (A1) is running from southwest to northeast and Puttam- Colombo main road (A3) is running from north to south along the coastal region. Two main railway lines are also running across the district. Therefore almost all the villages are easily accessible.

4. Climate

Gampaha district is located mostly within the lowest peneplain. It belongs to the wet zone of the country and it has a mild temperature.

4.1 Rainfall

The Southwest and Northeast monsoon winds are the main rainfall source in Sri Lanka. The Southwest monsoon is widespread and brings high rainfall but Northeast monsoon is effective only for few districts. The most part of the Gampaha district receive high precipitation annually which is about 2000 to 3500 mm from both monsoons as well as from inter monsoon.

The high rainfall facilitates intensive rock weathering. As a result thick soil cover or thick lateritic gravel cap can be seen in most part of the district.
4.2 Temperature

The mean annual temperature varies from 26.5 C to 28.5C.

5. Physiography, Drainage Pattern and Vegetation

The western coastal region is characterized by flat and undulating morphology but in the north and east boundaries steep rocky mountainous areas are located. Due to intense weathering and sea level changes very thick lateritic caps were developed towards land from the coast. As a result a lateritic belt could be seen specially from Kaleniya through Ragama, Kandana, Ja-ela, Minuwangoda to Katana.

There are two major rivers running in the southern and northern margins of the district. The tributaries of these two rivers run across the district, specially the Attanagalu Oya is widely spread over the district. These perennial rivers have a high discharge of water in monsoonal periods often causing floods.

Wide paddy fields are seen in low-lying areas toward land from coast. Coconut plantations are prominent in sandy coastal areas and rubber plantations are more prominent in lateritic hillocks and mountainous areas with thin weathering profile. Wide spread marshy land called “Muthrajawela is also situated in the western boundary of the district.

6. Outline of Geology

Ninety percent of the island of Sri Lanka is underlain by Proterozoic high grade metamorphic rocks with Quaternary sediments being restricted to the NW, N and NE coastal region as a narrow strip (Fig. 2). The Precambrian basement is divided into three major lithotectonic units, namely, Highland Complex (HC), Wanni Complex (WC) and Vijayan Complex (VC) (Fig. 2). Geologically the Gampaha district mainly lies within the Wanni Complex of Sri Lanka. Wanni complex rocks are mainly composed of metamorphosed rocks in amphibolites to granulite facies. A granitic body is well exposed in Gampaha –Kiridiwela road mainly in
Ambegaspitiya area. The origin of these granitic rocks is controversial, however it shows clear features for igneous origin. The general trend of the rock layers are NNE, and two major fracture systems running in NE and EW can be seen. A detailed geological map is given in Annex 01.

The major rock types found in the district are granitoid gneisses charnockitic gneisses, granites, hornblende biotite gneisses and quartzites.

**Figure -2:** Simplified Geological map of Sri Lanka
QUATERNARY - RECENT AND PLEISTOCENE DEPOSITS

- Alluvium, sand, silt or clay
- Silt brown or blue-grey organic rich clay, “puddy clay”
- Beach sand, etc. indicates older Holocene beach ridges
- Beach sand etc. indicates older Holocene beach ridges
- Dune sand
- Beechwood, clay, boulder-rich colluvium, alluvium or ancient beach ridge
- Grey and white Sandy unconsolidated bleached sands, in part dune sands (? for siliceous sand resource)
- Unconsolidated brown and grey coastal sands ~70% grey and white Sands

PROTEROZOIC METAMORPHIC ROCKS (no stratigraphic order implied)

<table>
<thead>
<tr>
<th>Lithology</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granite gneiss</td>
<td>Massive leucocratic quartz-feldspathic gneiss, quartz ~20%, felsic matrix, f characterizes late-stage aplite dikes</td>
</tr>
<tr>
<td>Pegmatite</td>
<td>Pegmatitic quartz-feldspar, distinctive quartz-rich, leucocratic, white or pink, pegmatite, leucocratic gneiss produced by dehydration, usually ridge-forming</td>
</tr>
<tr>
<td>Alkaline granite</td>
<td>Granite gneiss is granitic, alkali-feldspar, medium- to coarse-grained gneiss with quartz ~20%, plagioclase, biotite, garnet, rare, albite, feldspar</td>
</tr>
<tr>
<td>Hornblende-biotite gneiss</td>
<td>Massive to compositionally layered grey gneiss with quartz ~25%, plagioclase, biotite, garnet, rarely, amphibole</td>
</tr>
<tr>
<td>Chlorite-gneisses</td>
<td>Chlorite-gneisses, chlorite, biotite, hornblende, graphitic, chloritoid, quartz, rarely, amphibole</td>
</tr>
<tr>
<td>Gneiss</td>
<td>Gneissic foliation, often biotite, chlorite, graphite</td>
</tr>
<tr>
<td>Breccia, conglomerate</td>
<td>Conglomerate, size varies from pebble to boulder, often biotite, chlorite, graphite</td>
</tr>
<tr>
<td>Meta-sedimentary rocks</td>
<td>Meta-sedimentary rocks, quartz, feldspar, biotite, chlorite</td>
</tr>
<tr>
<td>Meta-silicate rocks</td>
<td>Meta-silicate rocks, quartz, feldspar, biotite, chlorite</td>
</tr>
<tr>
<td>Meta-igneous rocks</td>
<td>Meta-igneous rocks, quartz, feldspar, biotite, chlorite</td>
</tr>
</tbody>
</table>

Pre-Cambrian gneisses: poorly exposed or thick residual soils

Late-stage intrusive (in general, younger than 550 Ma)

- Pegmatite: simple quartz-feldspar pegmatite with magnetite or chlorite
- Vein quartz: usually transparent to milky, high purity, massive to foliated

EXPLANATION OF LINE AND STRUCTURAL SYMBOLS

- Geologic boundary, contact
- Geological boundary, contact
- Fault, inferred from air photos
- Shear zone, inferred from air photos
- Shear zone, inferred from air photos
- Axial trace of antiform and plunge
- Axial trace of synform and plunge
- Overturned antiform
- Overturned synform
- Skolithos and dip of foliation (generally parallel to compositional layering)
- Azimuth and plunge of intrusion
- Azimuth and plunge of minor fold
- Thrust or shear with thrust sense probable
- Thrust inferred
- Structure, form or trend lines, from air photos
- Mineral occurrence
- Extent of mineral resources, i.e. silica sand, gravel (as limits of paybody gravel spread)
- Extent of principal generating area
In year 2012 mineral resource map for Gampaha district was prepared by GSMB in close coordination with several other relevant ministries and government institutions. This project was funded by the United Nation Development Program (UNDP) and United Nations Environmental Program (UNEP). The main role of the GSMB in this study was to find out economic mineral deposits which can be used in the infrastructure development in Gampaha district.

It was carried out by a team of scientist from GSMB( one geologist, one mining engineer and one technical officer). It was a detailed study to cover every economic mineral in Gampaha district

It was named as “Integral Strategic Environmental Assessment (ISEA)”

The field-study was carried out for three months and covered entire district. During the study existing and new possible locations for mining were identified.

The information available in the ISEA report is used in this report. The ISEA report contain information on 450 metal quarry sites, 80 gravel mining sites and 40 river sand mining sites.

In addition to the data obtained from ISEA report, the current data relevant to gravel mining, sand mining and rock quarries were obtained from mining division of the GSMB to prepare the base map for this survey.

There was an urgent requirement for gravel in Gampaha district for the construction of central express way across Gampaha district. Therefore, GSMB has to assign a geologist to assess gravel mining locations within Gampaha district prior to this study.

Construction material surveys were started in other part of the country in early 2017. The Gampaha construction material field survey was started in Mid December 2017 and ended in mid-February 2018 (two months).

The previous studies and case studies reveal a big scarcity of gravel compare to other construction material to fulfill the requirements of the district and national projects. There are thick lateritic-caps in coastal region, but most of the area are highly populated. Therefore this study was mainly focused to locate even the small gravel deposits suitable for mining.

The field work was conducted in all areas except for highly populated cities, townships and industrial zones.
8. Field Investigations

Prior to the field work a desktop study was done to expedite the fieldwork. It took two months, a geologist to do this initial study.

The high elevated areas were selected using contour patterns in 1: 50,000 map sheets. These high elevated areas were the main targets in search of gravel and rock exposures.

Steep contour patterns indicate the possibility of finding out good locations for rock quarries and less steep areas or less elevated and expanded areas are good for locating gravel deposits.

All available roads in those target areas were used to find out new locations. When rock exposures and currently operating rock quarries are found in high elevated areas, those areas were marked in polygons using contour patterns and field data.

The new location may be studied in detail to determine the suitability for quarry development.

9. Preparation of the Construction Material Map

The construction raw material map of the Gampaha district (Annex 02) was compiled merging present field data, ISEA data and mining license data.

Every data according to its source is clearly shown in separate symbols. The sites for rock quarries are shown in polygons and at the same time existing, abandoned and proposed quarries are marked with distinct points. The details related to the points are given in Annex 03. The symbol’s size indicate the expected minable volume for each material.
10. Construction Materials

The type of construction materials and the availability have been described in the following order.

10.1. Building materials

10.1.1. Rocks

10.1.2. Gravel
  10.1.2.1. Lateritic Gravel
  10.1.2.2. Quartzitic Gravel
  10.1.2.3. Gravelly soil

10.1.3 Construction sand
  10.1.3.1. River sand
  10.1.3.2. Inland sand
  10.1.3.3. Manufactured sand

10.1. Building Materials

10.1.1. Rocks

Rocky Mountains can be seen in the eastern part of the Gampaha district (NE, E and SE). A large number of rock quarries are being operated in eastern part of the Gampaha district.

10.1.1.1 K-feldspar granite (rose color rock quarries)

Most of the rock quarries operated in eastern side of Gampaha city (i.e. Abagaspitiya, Warana, Yagoda…ect) are composed of pink feldspar granites. These rose color granitic rocks are rich in quartz compare to blackish rock types (e.g. hornblende biotitegneiss). Due to high percentage of quartz in granitic rocks they show high resistance to chemical weathering therefore they form isolated Rocky mountains with almost very thin soil cover (plate 1).
K-feldspar granite as dimension stone

There was a very big demand for dimension stone because of its color and homogeneous texture. Huge quantities were exported especially to Japan from Ambagaspitiya quarries. Since there is no demand for rose color floor titles at present many abandoned rock quarries can be seen in Ambagaspitiya.

K-feldspar granite as rock aggregates

These quartz rich whitish rocks have a lesser demand compared to blackish rocks as rock aggregate, in major construction work. But it is used in small housing construction work. There are only a few operating quarries in Ambagaspitiya area.
There are several working rock quarries in Mirigama area (NE of Gampaha district). The construction of Central Express Way has been started and it is running across Mirigama area. Therefore, large scale rock quarries have been started to cater to the future demand. The prominent rock types are hornblend biotite gneiss, charnockitic gneiss and garnetiferousquartzofeldspathic gneiss. The Akkarawissa rock quarry which is one of the largest among them is being operated for more than a decade. Rock exposures are common in northeast boundary of the Gampaha district and they can be mine without much problem as the area is not densely populated.
10.1.1. 3 Rock Quarries in Dompe Area (SE Gampaha District)

Several operating rock quarries could be seen in Dompe and within a 10 km radius of Dompe (Mapitigama, Mahara, Mitirigala and Biyagama). The prominent rock types are hornblende biotite gneiss, biotite hornblende gneiss, charnockitic gneiss and quartzofeldspathic gneiss. There are medium to small scale working quarries. Due to social issues many rock quarries have been abandoned at present. Some untouched rock outcrops could also be seen. (Forest reservation, houses nearby or temple on top of the hillock). Some of the rock quarries are operated even below the ground level in Dompe area.
Plate III- Small scale abandoned quarry sites in Dompe area
Plate IV – Untouched Rocky Mountains and outcrops (new locations)
Plate V – Untouched Rocky Mountains (new locations)
10.1.2. Gravel

Gravel is used as land filling material in house and road construction work. Gravel formations are the weathering products of underlying bedrock. The thickness of the gravel formations vary due to various reasons (type of bedrock, rainfall and the elevation). Gravel beds are formed as a result of insitu weathering or transporting and deposition. Gravel is a commercial term for filling soils but there are mainly three types of gravel i.e

1. Lateritic gravel
2. Quartzitic gravel and

10.1.2.1. Lateritic Gravel

Lateritic gravel formation could be seen from Ragama to Katana, almost parallel to coastal line. These lateritic gravel formations are very thick and hard at the top but become more clayey and loose at bottom. Again elevated gravel formation could be seen from Minuwangoda to Badalgama. However this lateritic gravel is commonly used for land filling. Presently there is a big demand for lateritic gravel for land filling in Muthurajawell marshy area. The gravel formation in Ragama, Kandana and Ja-ela areas are located above grond and favorable for mining, but the population density is very high in those town areas therefore it is very difficult to find suitable locations for mining. Only small scale localized mining could be done just for small requirements. Large scale lateritic gravel mining could be seen in Minuwangoda, Katana and Badalgama areas.

The physical properties of these gravel formation are not consistent and therefore this gravel may not be used in road construction work.

Due to these physical and textural inhomogeneities, in most cases very irregular mining activities had been taken place. Selective mining behavior is very common due to lack of demand for soft clayey lateritic gravel.
Plate VI: large scale irregular lateritic gravel mining site in Katana

Plate VII: large scale latteritic gravel mining site in Ja-Ela
Plate VIII: Proposed new lateritic gravel mining site in Badalgama

Plate IX: Proposed new lateritic gravel mining site
10.1.2.2. Quartzitic Gravel

Quartzitic gravel is the best material for road construction work. Quartzitic gravel contains small rock fragments mainly quartzite with weathered products of the bed rock (clay minerals and clay size weathered rock components i.e. weathered feldspars). This quartzitic gravel can be compacted properly with its textural properties than lateritic gravel. The laterite is the end products of chemical weathering of crystalline rocks but quartzitic gravel is in the intermediate stage in weathering process. The real quartzite gravel is formed within quartzitic bedrocks. In Gampaha district quartzitic bands are very rare but quartzitic pegmatites are common with in the gneissic rocks. Therefore, if the pegmatic veins are wide enough, good quartzitic gravel formations can be found in their weathering profiles. Pegmatic veins weather intensively compare to its adjacent country rock. In most cases selective mining could be seen because the adjacent country rocks are not weathered enough to mine for gravel.

Plate X- Selective quartzitic gravel mine in Dompe area
Quartzitic gravel is not prominent in Gampaha district therefore the best available option is gravelly soils. These gravelly soil could be found as a weathered product in weathering profile of hard-rock. Sites of environmentally harmed gravel quarries be seen in Mirigama, Dompe and Mahara areas. There was less demand for these gravelly soil, since it contain gravel to pebble size rock fragments and therefore hard to use. This gravelly soil is mined as a byproduct when it is removed for rock quarrying. With the big demand for quartzitic gravel in “Central Expressway Project” the thin overburden on Rocky Mountains have been mined extensively. The rock quarry miners have removed the overburden which could be kept for another 2-3 decades with vegetation. As an adverse effect of this bad mining habit the ground water table would be dropped in the future. With the demand for gravels in express way construction, the relevant authorities have issued permits to mine gravelly soil without much concern on its adverse environmental impacts. The gravelly soils are found as thin layer on top of rocky mountain or as interlayer’s with rock boulders (core-stone) in highly fractured country rocks.
Plate XII- Gravelly soil mining sites close to Mirigama
Plate XIII- Gravelly soil mining sites close to Mirigama. The big boulders are left at the site because removing of them would not be economical for miners.

Plate XIV- Thin weathered overburden in a rock quarry. This gravelly overburden should be removed only when it is necessary for the purpose of rock quarrying
Plate XV- Thick weathered overburden composed of gravelly soil, suitable for environment friendly mining, location in Attanagalla

10.1.3 Construction sand

In Gampahadistrict, the demand for construction sand is mainly met by river sand. Sand deposits in the Kelani and MaOya rivers are the main sources.

10.1.3.1. River sand

The deposition of sand on the river bed is controlled by the morphology of the river bed. The trace and shape of the river change in time. Sand deposition is mainly taken place at the matured stage of the river. At the matured stage the flow velocity decreases and starts to deposit the sand particles in the flowing water. This sedimentation will change river trace progressively with decades of time. The sand grains tend to deposit inner bank of the meanders. Sand deposits are usually occur as pockets or lenses in shape on the river bed. The
nature of the materials beneath the river bed and approximate thickness of the sand layer had been determined in the previous study under ISEA project. A galvanized pipe was inserted down to the river bed to get the thickness of the sand deposition. The minable quantity is taken as 60% of the available sand on river course. The 60% is the sustainable limit since it is replenished with high discharge in monsoonal periods. Only the artisanal sand mining is allowed and sand is transported to the bank using boats.

10.1.3.2. Inland sand

The shape of the river and its trace is changed with time and as a result the ancient river beds may buried under clay and soil cover. This type of buried sand deposits can be identify by studying the morphology and the vegetations. There are several inland sand mining location along MaOya basin mainly in Badalgama and Katana areas. The overlain soil and clay layers which are about 3-4m thick is mined first in order to reach the buried sand layers. The Jamugahawatte is one of the buried meander close to Katana, the families of this area were resettled due to clay and inland sand mining. Almost the entire area is buried under Maoya river.

Plate XVI- Jambugaswatte area in topography map
Plate XVII- The present day image of Jambugaswatte area in Google map

10.1.3.3. Manufactured sand

Quartzitic rocks are not prominent in Gampaha district but few quartzitic bands could be seen in SE of Gampaha district. This quartzite can be crushed into sand size and be used as construction sand. Since river sand mining is very much active in Gampaha district there is little or no demand for crushed sands.

Presently sand is produced by washing sandy soils and removing clay and silt part. Washing plants could be seen in many places throughout the district. The environmental impact of this process is still not studied well. It has been reported the silting of small rivers and paddy fields.

Presently washed offshore sand also has a big demand in the district. The Gampaha district is bounded on the west by Indian Ocean. Offshore sand mining has taken place in Elakanda close to Kelani river mouth. These offshore sand is stock piled for several years to leach its salinity naturally by rain water. Sea sand is used in construction work in Colombo area.

The quarry dust a byproduct of metal crushers is used as a river sand alternative in the manufacture of building blocks and in mortar.
11. Conclusions

- The Gampaha district is rich in construction materials

- Total estimated minable resources within the district are given bellow

  Rock : 216,486,201 m³
  Gravel : 40,294,637 m³

- According to the report MR/G/73/2012 total estimated minable resources within the district are given bellow

  Rock : 33,953,725 m³
  River Sand : 121,236.84 m³
  Inland Sand : 4,627,695 m³

- Sand deposits in river beds may move with time. Therefore the exact location or the volume could not be given. However the river sand quantities were given referring to the area.

- The quantities of the rock given in MR/G/73/2012 were based on the mining license at that time. However present survey gives the quantities which is more relevant to the present day.

<table>
<thead>
<tr>
<th>DS Division</th>
<th>Rock/m³</th>
<th>Gravel/Soil/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attanagalla</td>
<td>1200000</td>
<td>4674285</td>
</tr>
<tr>
<td>Biyagama</td>
<td>192500</td>
<td></td>
</tr>
<tr>
<td>Divulapitiya</td>
<td>7087500</td>
<td>10340085</td>
</tr>
<tr>
<td>Dompe</td>
<td>86056201</td>
<td>2426858</td>
</tr>
<tr>
<td>Gampaha</td>
<td>150000</td>
<td>882246</td>
</tr>
<tr>
<td>Mahara</td>
<td>120650000</td>
<td>3767757</td>
</tr>
<tr>
<td>Mirigama</td>
<td>1150000</td>
<td>13828599</td>
</tr>
<tr>
<td>Ja-Ela</td>
<td></td>
<td>934857</td>
</tr>
<tr>
<td>Katana</td>
<td></td>
<td>1108878</td>
</tr>
<tr>
<td>Minuwangoda</td>
<td></td>
<td>2331072</td>
</tr>
<tr>
<td>TOT</td>
<td>216486201</td>
<td>40294637</td>
</tr>
</tbody>
</table>
12. Recommendations

- Government lands should be identified through District Secretariat, then the most suitable government lands should be selected and reserved.
- Mining should be carried out with minimum damage to environment
- Gravel mining should be limited to small quantities in order to protect the watershed.
- GSMB should promote for mining the resources before the area is densely populate

Acknowledgements

The author is grateful to Dr. C.H.E.R. Siriwardena (Director General), Mr. K.T.U.S De Silva (Senior Director Geology), Mrs. D.P.R Weerakoon (Project Co-coordinator) of Geological Survey and Mines Bureau for readily providing all facilities to carry out the survey successfully, with in the specified time frame.

Finally, Special thanks to Mr. Parakatawella (Trainee geologist) and Miss. Nisansala Sajeewani (GIS Trainee) for database and map preparation and all the geologists of the GSMB are acknowledged for their help in various ways during the entire field survey and compilation of the report.

References


Survey Department of Sri Lanka, (2009). Topographic map series - Sheet no. 67, 68, 74, 75, 76, 80, 81, 82, 87, 88, Scale: 1:50,000.