

MAY -2024

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

SAAR SKY ICON

RESIDENTIAL-CUM-COMMERCIAL BUILDING PROJECT

EMC Pakistan Private Limited

SAAR BUILDERS & DEVELOPERS

SAAR BUILDERS & DEVELOPERS

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

SAAR SKY ICON

Residential-cum-Commercial

Final Report

May 2024

Ref: EIA/05/05/24

EMC PAKISTAN PVT. LTD.

503, Anum Estate, Opp. Duty Free Shop, Main Shahrah-e-Faisal, Karachi.

Phones: 9221-34311466, 34324680, Fax: 9221-34311467.

E-mail: mail@emc.com.pk, info@emc.com.pk

Website: www.emc.com.pk

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Executive Summary

Presented in this report are the findings of the Environmental Impact Assessment (EIA) study submitted to the Sindh Environmental Protection Agency for its approval for construction of residential-cum-commercial building project named **SAAR Sky Icon** located at Plot # 10/1, Sheet CL-9, Civil Lines Quarters, Karachi. The project is proposed by M/s **SAAR Builders and Developers.**

The proposed building project comprises **B+G+44** floors with **Basement Level** (Showroom + Services) + **Ground Floor** (Showroom + Reception + Services) + **1st and 7th Floor** (Parking) + **8th – 44th Floor** (Flats) + **Roof** (Services).

The assessment was conducted with the following objectives:

- Identify the regulatory requirements that apply to project activities in the proposed area, in the context of environmental protection, health and safety;
- Assess proposed project activities in terms of their likely impacts on the environment during the construction & operation phases of the project, in order to identify issues of environmental concern; and
- Recommend appropriate mitigation measures that can be incorporated into the design of the project to minimize any adverse environmental impacts identified.

M/s SAAR Builders & Developers has successfully executed numerous development projects of similar nature and magnitude with a strong track record of putting together a state-of-the-art building and construction technologies. They have, in their business of construction employed modern management tools and work methodology to implement the project on a fast and right track. With professionally qualified and competent staff, efficient work force, flexible organization and a large pool of modern construction equipment & machinery. The proponent has the capability to undertake mixed-use development projects. The design of the proposed project has been undertaken by a multidisciplinary team of consultants to address the aspects of building stability, energy needs, resource management, sustainability, safety & security and compliance of environmental standards.

Following are the salient features of the project:

Table ES-1: Salient Features of the Project

Project Name	SAAR Sky Icon
Category	Residential-cum-Commercial
Proponent	M/s SAAR Builders & Developers
Plot Area	4540.00 SQ YDS (0.9380 acres)
Gross covered area	762,496.97 SQ FT
Storeys	B+G+44
Location	Plot # 10/1, Sheet CL-9, Civil Lines Quarters, Karachi.
Basement Plan (ARS + Project Parking +Services)	Showrooms (5), Air Raid Shelter, UndergroundWater Tank for Potable, Non-Potable, Fire Fighting and Septic, Pump Room and RO plant.

Ground Floor Plan (Shops + Services)	Showrooms (5), KE substation, Electric room, Generator room, and Reception.
1st Floor Plan (Project Parking + Services)	Parking (56 cars and 60 motorcycles), and others services
2nd to 5th Floor Plan (Project Parking + Services)	Parking (224 cars and 240 motorcycles), and others services
6th Floor Plan (Project Parking + Services)	Parking (56 cars and 60 motorcycles), and others services
7th Floor Plan (Project Parking + Services)	Parking (56 cars and 60 motorcycles), and others services
8th Floor Plan (Flats)	Flats (5), Male and Female Gym, Community Hall and other services
9th to 10th Floor Plan (Flats)	Flats (5x2=10), Library, Daycare center, Indoor games and other services.
11th to 21st Floor Plan (Flats)	Flats (11x11=121) and other services.
22nd Floor Plan (Flats)	Flats (8) and other services.
23rd Floor Plan (Flats)	Flats (6) OHWT for Potable, Non-Potable, Fire Fighting and other services.
24th to 44th Floor Plan (Flats)	Flats (6x21=126) and other services.
Roof Plan (Solar Panels + Battery Room + Services)	Solar Panels, Machine room, Overhead Water Tank for Potable, Non-Potable and Fire Fighting, Battery and Machine Room, and Helipad
Total Parking	Total Project Parking: 388 cars and 420 motorcycles
Totals Flats	Total 276 Flats
Total Showrooms	10 showrooms
Height of the Building	494'-6'' Above Ground Level (AGL)

The Project falls in to the appropriate category that permits the designated land-use by the relevant authority. Siting of the SAAR Sky Icon Project, at Plot # 10/1, Sheet CL-9, Civil Lines Quarters, Karachi (having site coordinates 24°50'41.84"N and 67°01'42.08"E), by M/s SAAR Builders & Developers is duly authorized.

The proposed project is planned in the environment of Civil Lines enclosed by Dr. Ziauddin Ahmed Road towards west, Brunton Road towards north, McIver Road towards south and Abdullah Haroon Road (formerly known as Victoria Road) towards east. Major landmarks near the proposed project are Chapal Skymark Tower, Marriott Hotel, Movenpick Hotel, Chief Minister House and Sumya Twin Towers.

Broadly, the project site can be accessed by Shahrah-e-Faisal via Club Road and Abdullah Haroon Road. The major primary roads at the immediate boundary of the project site are Brunton Road and Dr. Ziauddin Ahmed Road, while the project can also be accessed via McIver Road.

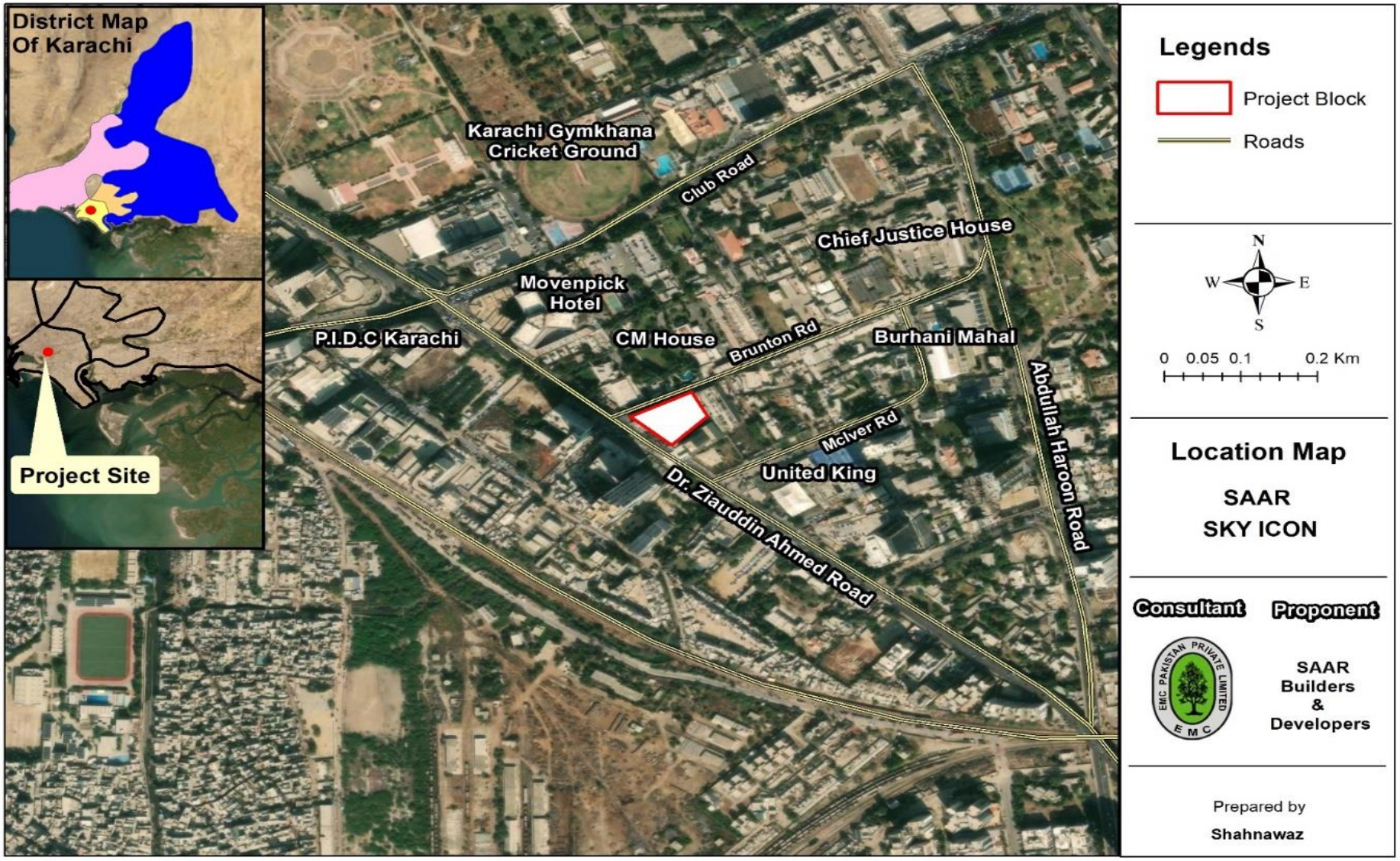


Figure ES.1: Project Location Map

- The Project site falls in the appropriate category that permits the designated land-use by the relevant authority. The site is thus the only and hence the preferred alternative for siting the Project. The ownership of the plot lies with the M/s SAAR Builders and Developers. Since the proponent is the rightful owner of the site/commercial Plot, there is no dispute with regard to siting of the project. To validate their claims on the site and on its being the only and hence the preferred alternative for establishment of the project, the proponent will obtain No Objection Certificates (NOCs) from utility agencies.
- Being the integral part of the EIA study, detailed site survey, monitoring of ambient air and noise was conducted in April 2024. The result shows that ambient air quality and noise reports of the project site are within SEQS.

Ambient Air and Noise Monitoring at Project Site





- Detailed consultations were carried out with the Primary and the Secondary Stakeholders of the Project. Following were the key points raised during the consultations:

  - ✓ The Supervisor of SAAR Heights Mr. Salman Awan told the consultation team that there is no issue regarding the security in the area, police are patrolling the street 24/7. Police often do interrogations and ask for valid registration of construction workers with their CNICs.
  - ✓ Mr. Noor Ud Din is an Associate Architect of the New CM Secretary Building (Under Construction) on the same Brunton road where the proposed project site is located. He suggested to take under consideration health and safety protocols during the construction.
  - ✓ Hazrat Saeed Mehran Shah Bukhari Shrine is situated on Brunton Rd, Mr. Shahzed and Madam Bano are the caretakers of the shrine, their house is right besides the shrine, the consultation team met one of the members of the house and informed him regarding the project activities, the member of the house was satisfied with the project activities.
  - ✓ There are two general stores located side by side Awais General Store and Bukhari General Store both general store owners were satisfied with the project activities and were expecting increase in sale due to the construction of a new building project.
  - ✓ A resident of Railway Colony Mr. Ali Dilbar raised few concerns that high rise building will block light, air and intervene in the privacy of locals as well as the privacy of the CM's House.

- ✓ The Project Manager of Sumya Twin Towers Mr. Ibrahime Shah raised a concern that the proposed project will increase traffic flow on Burnton Rd which is right next to the Chief Minister's House. He further suggested to take care of sheet piling during the construction otherwise it can damage the foundations of other surrounded projects.
- ✓ The Security Incharge of Sumya Sky Tower told that 90% of the construction work is already completed, the building will be soon ready to accommodate offices because it is a commercial building.
- ✓ The residents of the neighborhood said that the majority of people living in the neighborhood are government employees. The maintenance of the local Mosque and the salary of Imam is also accommodated by Sindh Government.

Stakeholders Consultation Pictures



Consultation with the Residents of Railway Colony



Consultation with Project Manager, Sumya Twin Towers, (Under Construction)

- The EIA study has addressed the concerns raised and has proposed corresponding mitigation measures where required.

- The proposed project is located within 200 feet of the Chief Minister House on Dr. Ziauddin Ahmed Road. This building is a protected heritage site designated by the Sindh Cultural Heritage Department. Because of this, Sindh Cultural Heritage (Preservation) Act, 1994 requires the project developer to consult the department before any construction begins.

- The proposed project is a self-contained building having its own compact treatment plant, , and provision of parking space. Option for recycling of the wastewater and regeneration of the potable water from groundwater resources by adequate treatment will be explored.

- For fire and safety, National Fire Protection Association (NPFA) and Building Code of Pakistan standard fill be followed , further the emergency staircase will be provided with a system of pressurization air which is designed in accordance with United States National Fire Protection Association (NFPA) NFPA 92. The Stairwell pressurization and smoke control fans will be linked to the automatic fire alarm system.

- With 24-hour security system all over the building the designers have ensured that the concerns on invasion of privacy are alleviated and eased. The Project would thus achieve its objective of providing a secure and safe residential cum commercial building at an attractive location. This being a positive impact would be an indicator of achievement of the objectives of the Project.

- Realizing that the city has overgrown its sustainability limits, it is imperative that M/s SAAR Builders and Developers takes cognizance of the cumulative effect of the current pace of rapid development. Consequently, each project is required to keep the sustainability principles in view and go an extra mile beyond the present approach which is confined to bare survival.

- Based on the findings of the environmental impact assessment it is concluded that the environmental impacts of the construction and operation of the project are manageable and can be mitigated by implementing the Environmental Management and Monitoring Plan which forms an integral part of EIA document. The screening process has through review of literature, primary as well as secondary baseline data, and expert judgment, made assessment of the potential impacts of said activities on the physical, biological, and socioeconomic environment of the Project. Mitigation measures have been proposed to reduce, minimize or compensate for the identified potential negative impacts and their adoption has been recommended. The study therefore recommends that the Environmental Impact Assessment (EIA) report should be approved with the provision that the suggested mitigation measures will be adopted and the Environmental Management Plan will be followed in letter and spirit.

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Chapter 1 Introduction

1.1 General

This Environmental Impact Assessment (EIA) report presents the assessment of environmental impacts that may arise due to the development of proposed **"SAAR Sky Icon"**, Residential cum commercial project which will be developed by **SAAR Builders & Developers**. This document has been prepared in compliance with the mandatory requirement of Section 17 of Sindh Environmental Protection Act (SEPA) 2014. Compliance with provisions of Section 17 requires that "no proponent of a project will commence construction or operation unless he has filed with the Agency an environmental impact assessment and has obtained from the Agency approval in respect thereof".

M/s EMC Pakistan Private Limited has been commissioned by **SAAR Builders & Developers** to assess the project's environmental and social viability through various environmental components like air, water, noise, including land, biological along with the parameters of human interest and to prepare Environmental Management Plan (EMP) for mitigation of adverse impacts along with chalking out of post project environmental monitoring program.

Presented in this report are the findings of the EIA study submitted to the Sindh Environmental Protection Agency for its approval for construction of residential-cum-commercial building project named **SAAR Sky Icon** located at Plot # 10/1, Sheet CL-9, Civil Lines Quarters, Karachi.

1.2 Overview of Proponent: SAAR Builders & Developers

SAAR Builders & Developers has successfully executed numerous development projects of similar nature and magnitude with a strong track record of putting together a state-of-the-art building and construction technologies. They have, in their business of construction employed modern management tools and work methodology to implement the project on a fast and right track. With professionally qualified and competent staff, efficient work force, flexible organization and a large pool of modern construction equipment & machinery. The proponent has the capability to undertake mixed-use development projects. The design of the proposed project has been undertaken by a multidisciplinary team of consultants to address the aspects of building stability, energy needs, resource management, sustainability, safety & security and compliance of environmental standards.

1.3 Project Overview

The proposed building project comprises **B+G+44** floors with **Basement Level** (Showroom + Services) + **Ground Floor** (Showroom + Reception + Services) + **1st and 7th Floor** (Parking) + **8th – 44th Floor** (Flats) + **Roof** (Services).

The salient features of the project are discussed below:

Table 3.1: Salient Features of the Project	
Project Name	SAAR Sky Icon
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Total Parking	Total Project Parking: 388 cars and 420 motorcycles
Totals Flats	Total 276 Flats
Total Showrooms	10 showrooms
Height of the Building	494'-6'' Above Ground Level (AGL)

1.4 Objectives of Project

In launching the Project, the proponent aims to achieve the following objectives:

- To provide an organized residential-cum-commercial structure conducive to the current demand of fast degrading environment;

- To promote development in the Housing Sector which at present is among the worthwhile contributors to the growth of GDP;
- To meet the increasing demand of residential and commercial accommodation in urban Karachi;
- Respond to the need of integrating residential and commercial units in this part of Karachi which has of recent attracted the population from other towns of the city.

1.5 Location of Project

The Project falls in to the appropriate category that permits the designated land-use by the relevant authority. Siting of the SAAR Sky Icon Project, at Plot # 10/1, Sheet CL-9, Civil Lines Quarters, Karachi (having site coordinates 24°50'41.84"N and 67°01'42.08"E), by M/s SAAR Builders & Developers is duly authorized.

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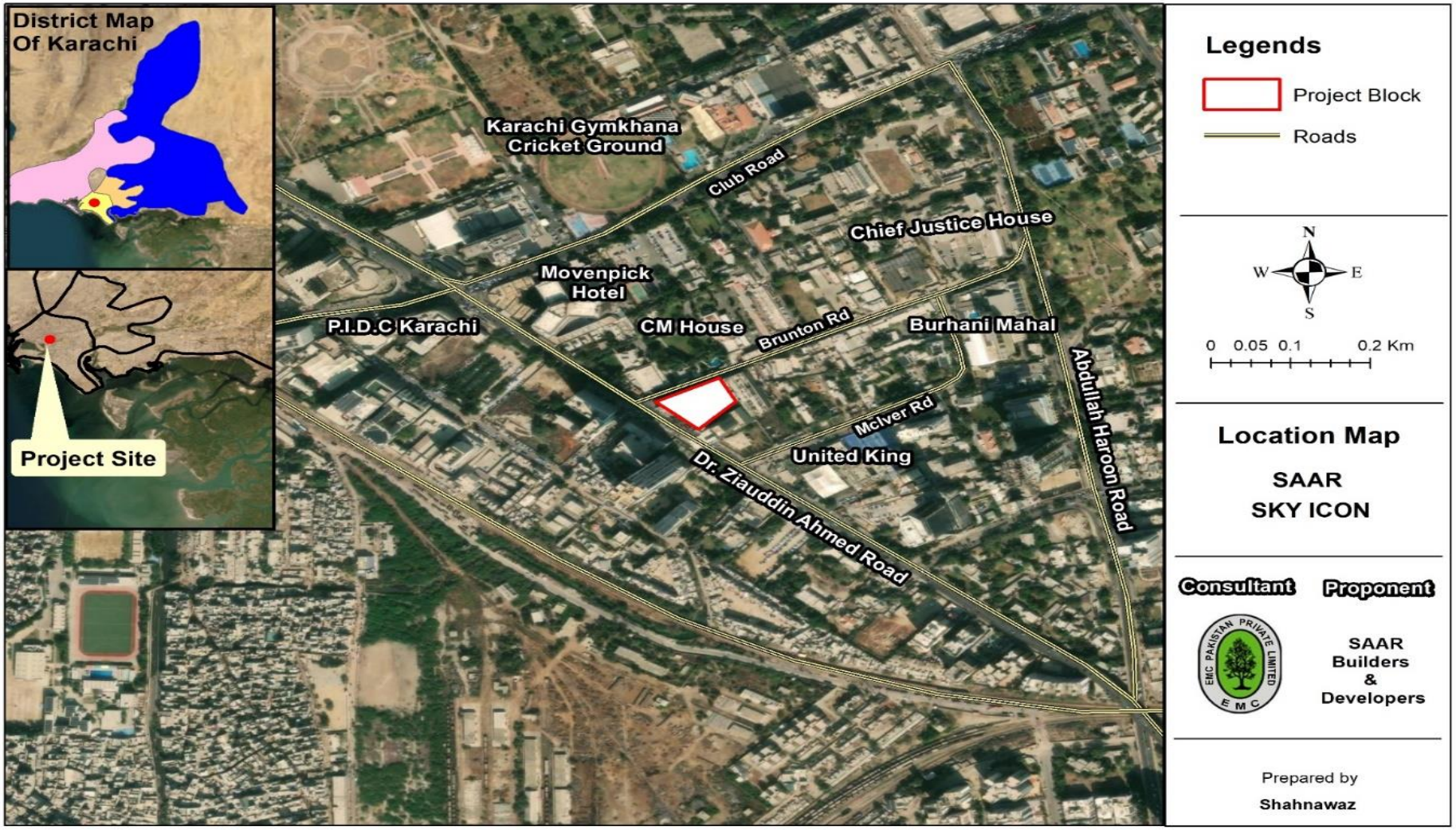


Figure 1-1 Location Map

1.6 Methodology Adopted for EIA

This environmental impact assessment was conducted in the following manner:

1. Scoping

A scoping exercise was undertaken to identify the potential issues that are to be considered in the environmental impact assessment. The scoping exercise included the following tasks:

- **Data Compilation:** A generic description of the proposed activities relevant to this environmental assessment was compiled with the help of the Project Proponent.
- **Review of Published literature:** All available published and unpublished information pertaining to the micro and macro environment of the study area was obtained and reviewed. It included the earlier studies conducted in the study area, environmental & social baseline and impact assessment studies conducted by different consultants in past. Secondary data was very helpful in understanding the issues that were identified by other consultants.
- **Review of applicable Legislation:** Information on relevant legislation, regulations, guidelines, and standards was reviewed and compiled.
- **Identification of potential impacts:** The information collected in the above procedures was reviewed and potential environmental issues identified.
- **Initial site visit:** An initial site visit was conducted to get an overview of site conditions and the surrounding areas.
- **Stakeholder consultation:** A stakeholder consultation was undertaken to document the concerns of the local community & other stakeholders, and to identify issues that may require additional assessment in order to address these concerns.

2. Review of Legislation and Guidelines

National & Provincial legislations, environmental guidelines, and best industry practices were reviewed to set environmental standards that the project will be required to follow during different stages of the project. Sindh Environmental Protection Act 2014, Sindh EPA (Review of IEE and EIA) Regulations, 2021 and Sectoral Guidelines for Housing were the basic guiding documents used during the study.

3. Baseline Data Collection

Detailed environmental baseline surveys were conducted to collect primary data on the Project Area to help identify sensitive receptors. The primary data were examined and compared with secondary data available from earlier environmental studies in the region. The scope of survey included collection of information on following key aspects:

- Climate and Rainfall
- Air Quality
- Noise Quality
- Topography
- Soil
- Geology
- Hydrology
- Vegetation
- Fauna
- Socioeconomic resources

4. Identification of Aspects

Identification of environmental aspects and their significance is fundamentally important for

determination of severity of incidence of impacts at different stages of the project. This step is aimed at obtaining an inventory of the aspects. The aspects identified during this step cover all activities during construction and operation, in order to determine those which, have or can have significant impact on the environment.

5. Impact Assessment & EMP

Environmental experts at EMC analyzed and assessed the anticipated impacts that are likely to arise due to the identified aspects. Each of the potential impacts identified during the scoping session was evaluated using the environmental, socioeconomic, & project information collected. In general, the impact assessment discussion covers the following aspects:

- Present baseline conditions
- Potential change in environmental parameters likely to be affected by Project related activities
- Prediction of potential impacts
- Evaluation of the likelihood and significance of potential impacts
- Defining of mitigation measures to reduce impacts to as low as practicable
- Prediction of any residual impacts, including all long and short-term, direct and indirect, and beneficial and adverse impacts
- Monitoring of residual impacts.

Environmental Management Plan (EMP) was compiled and included in the environmental assessment report to make it more comprehensive & self-sustaining with the specific purpose of providing working guidelines for the project Proponent and Management personnel who shall be responsible for the construction and operations of the project, so as to enable them to maintain the environmental and social conditions in conformity with the SEPA regulations. The management plan outlines the details required to manage environmental, safety and community risks arising from the project activities as well as social issues.

6. Preparation of Report

This EIA report has been prepared in accordance with the guidelines of the Pakistan Environmental Protection Agency (PEPA) and Sindh Environmental Protection Agency (SEPA). All pre-requisites of report writing in structural format, contents and presentation have been considered and met as per the standard format of the EIA document.

1.7 Structure of EIA Report

The EIA report has been structured on the standard format, prescribed by the Sindh Environmental Protection Agency (SEPA). The report has been presented in the following sections:

Section 1 - Introduction to Project and EIA Processes
Section 2 - Overview of National and Provincial Legislation & Guidelines relevant to Project
Section 3 - Description of Project
Section 4 - Description of Environment of Project Area
Section 5 - Stakeholders Consultation
Section 6 - Screening of Environmental and Proposed Mitigation Measures
Section 7 - Environmental Management and Monitoring Plan (EMP)
Section 8 - Conclusion and Recommendations

1.8 EIA Study Team

The study was assigned to Environmental Management Consultant (EMC) Pakistan Private Limited. EMC organized the following team to carry out the study:

Table 1.2: EIA Study Team

S.#	Name	Position
1.	Engr. Syed Nadeem Arif	Project Manager/ Team Leader
2.	Mr. Syed Omar Arif	Environmental Engineer
3.	Mr. Shayan Ansari	Environmental Engineer
4.	Mr. Fahad Afzal	Environmental Scientist
5.	Mr. Imran Khan	Environmental Scientist
6.	Mr. Muhammad Mudassir	Environmental Scientist
7.	Mr. Ali Ahmed	Environmental Engineer
8.	Mr. Raja Nizakat	Sociologist
9.	Mr. Ehtisham Ahmed	Sociologist
10.	Mr. Shahnawaz	GIS Expert

Chapter 2 Policy, Legal & Administrative Framework

This section provides detailed review of policies, legislation, and guidelines that have relevance to the proposed project and review of administrative framework as well as institutional set-up relevant to the environmental and social management of the proposed subproject.

2.1 National Laws and Regulations

Pakistan's statute books contain a number of laws related to the regulation and control of the environmental and social aspects. However, the enactment of comprehensive legislation on the environment, in the form of an act of parliament, is a relatively new practice. Most of the existing laws on environmental and social issues have been enforced over an extended period of time, and are context-specific. After the Eighteenth amendment in the Constitution of Pakistan, many federal subjects devolved to provincial legislation. The Concurrent List in fourth schedule of the Constitution containing entries of subjects wherein federal and provincial legislation could legislate has been abolished. Since project coverage is in province of Sindh; therefore, only those national laws and regulations are discussed here which have application in the project. There are still several federal laws which have not been repealed by the provinces and applicable in provinces with its original titles. The laws relevant to the proposed subproject are briefly reviewed below.

2.1.1 National Environmental Policy, 2005

The National Environmental Policy, 2005 aims to protect, conserve and restore Pakistan's environment in order to improve the quality of life for the citizens through sustainable development. It provides an overarching framework for addressing the environmental issues facing Pakistan, particularly pollution of fresh water bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification, natural disasters and climate change. It also gives direction for addressing the cross sectorial issues as well as the underlying causes of environmental degradation and meeting international obligations.

The National Environmental Policy, 2005 while recognizing the goals and objectives of the National Conservation Strategy, National Environmental Action Plan and other existing environment related national policies, strategies and action plans, provide broad guidelines to the Federal Government, Provincial Governments, Federally Administrated Territories and Local Governments for addressing environmental concerns and ensuring effective management of their environmental resources.

2.1.2 National Conservation Strategy, 1992

The Pakistan National Conservation Strategy (NCS) is the principal policy document for environmental issues in the country. The NCS was developed and approved by the Government of Pakistan in 1992. The NCS works on a ten-year planning and implementation cycle. It deals with fourteen core areas as follows:

- Maintaining soils in cropland;
- Increasing irrigation efficiency;
- Protecting watersheds;
- Supporting forestry and plantations;
- Restoring rangelands and improving livestock;

- Protecting water bodies and sustaining fisheries;
- Conserving of biodiversity;
- Increasing energy efficiency;
- Developing and deploying material and energy renewable;
- Preventing and abating pollution;
- Managing urban wastes;
- Supporting institutions for common resources;
- Integrating population and environmental programs;
- Preserving the cultural heritage

2.1.3 Pakistan Climate Change Act, 2017

The Prime Minister established Pakistan Climate Change Council which coordinates and supervises the enforcement of the provisions of the Act, monitor implementation of the international agreements relating to climate change, approve and monitor implementation of comprehensive adaptation and mitigation policies, strategies, plans, programs, projects and other measures formulated by the authority to meet Pakistan's international obligations, monitor the implementation of National Adaptation Plan and its constituent provincial and local adaptation action plans, approves guidelines for the protection and conservation of renewable and nonrenewable resources, species, habitats and biodiversity adversely affected or threatened by climate change.

The Act is applicable to proposed project as the proposed project involves the solid waste management activities that may contribute to generation of greenhouse gases.

2.1.4 Pakistan Penal Code, 1860

The Code deals with the offences where public or private property or human lives are affected due to intentional or accidental misconduct of an individual or organization. The Code also addresses control of noise, noxious emissions and disposal of effluents.

The provisions of the Penal Code, 1860 are applicable to the Project in terms of penalties for effecting human lives and public property. It also addresses the control of noise, air emissions and effluent disposal.

2.1.5 Land Acquisition Act, 1894 and Land Acquisition (Sindh Amendment) Act 2009

The primary law for acquisition of land for public purposes in Pakistan is the "Land Acquisition Act (LAA), 1894" (hereinafter referred as the Act). The land acquired under the Act vests in the province and it is only thereafter that the province may transfer it to someone else. The Sindh Amendment 2009 of LAA 1894 specifically related to Section 16, Section 23, Section 24 and Section 28-A.

2.1.6 National Disaster Management Act, 2010

National Disaster Management Act, 2010 was passed by Parliament of Pakistan in 2010. The Act applies to whole Pakistan. The Act was passed in backdrop of 2010 Floods in Pakistan and strengthens Disaster Management system.

2.1.7 Building Code of Pakistan, 2007

The provision of Building Code of Pakistan shall apply for engineering design of building like structure and related components. The construction in violation of the building code shall be deemed as violation of professional engineering work. Moreover, a certificate for the proposed action will be obtained from Provincial Building Control Authority.

These codes shall be used in structural design of building area components constructed under this proposed Project.

2.1.8 Guidelines for the Preparation and Review of Environmental Reports, 1997

These guidelines describe the format and content of IEE/EIA reports to be submitted to EPA for obtaining NOC/approval.

The guidelines present:

- The environmental assessment report format;
- Assessing impacts;
- Mitigation and impact management and preparing an environmental & Social management plan;
- Reporting;
- Review and decision making;
- Monitoring and auditing; and
- Project Management.

These guidelines serve to describe the format, practices, and procedures to be employed when reporting environmental assessments.

2.1.9 Guidelines for Environmental Assessment

Pak-EPA has published a set of environmental guidelines for conducting environmental assessments and the environmental & Social management of different types of development Projects. The guidelines that are relevant to the proposed Project are listed below.

- Guidelines for the Preparation and Review of Environmental Reports, Pakistan Environmental Protection Agency, 1997;
- Guidelines for Public Consultation, Pakistan Environmental Protection Agency, May, 1997; and
- Sectoral Guidelines: Pakistan Environmental Assessment Procedures, Pakistan Environmental Protection Agency, October 1997.

2.2 Sindh Environmental Protection Act, 2014

The Sindh Environmental Protection Act, 2014 (2014 Act) was passed by the Sindh Assembly on February 24, 2014. The 2014 Act is the basic legislative tool empowering the provincial government to frame regulations for the protection of the environment. The 2014 Act envisages protection, improvement, conservation & rehabilitation of environment of Sindh with the help of legal action against polluters and green awakening of communities. It equally lays emphasis for the preservation of the natural resources of Sindh and to adopt ways and means for restoring the balance in its eco-system by avoiding all types of environmental hazards. The 2014 Act is applicable to a broad range of issues and extends to air, water, industrial liquid effluent, marine, and noise pollution, as well as to

the handling of hazardous wastes.

The following provisions of the SEPA 2014 have a direct bearing on the proposed Project:

- Section 11(1): 'Subject to the provisions of this Act and the rules and regulations therein, no person shall discharge or emit or allow the discharge or emission of any effluent, waste, pollutant, noise or any other matter that may cause or likely cause pollution or adverse environmental effects, as defined in Section 2 of this Act, in an amount, concentration or level which is in excess to that specified in Sindh Environmental Quality Standards…'
- Section 11(2): 'All persons, in industrial or commercial or other operations, shall ensure compliance with the Environmental Quality Standards for ambient air, drinking water, noise or any other Standards established under section 6(1)(g)(i); shall maintain monitoring records for such compliances; shall make available these records to the authorized person for inspection; and shall report or communicate the record to the Agency as required under any directions issued, notified or required under any rules and regulations.'
- Section 14 (1): 'Subject to the provisions of this Act and the rules and regulations, no person shall cause any act, deed or any activity', including;
  - (b) disposal of solid and hazardous wastes at unauthorized places as prescribed;
  - (c) dumping of wastes or hazardous substances into coastal waters and inland water bodies; and
  - (d) release of emissions or discharges from industrial or commercial operations as prescribed.
- Section 15 (1): 'Subject to the provisions of this Act, no person shall operate or manufacture a motor vehicle or class of vehicles from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the Sindh Environmental Quality Standards or, where applicable, the standards established under sub-clause (i) of clause (g) of sub-section (1) of section 6'.
- Section 17(1): 'No proponent of a project shall commence construction or operation unless he has filed with the Agency an initial environmental examination or environmental impact assessment, and has obtained from the Agency approval in respect thereof'
- Section 17(2): The agency shall;
  - a) review the initial environmental examination and accord its approval, subject to such terms and conditions as it may prescribe, or require submission of an environmental impact assessment by the proponent; or
  - (b) review the environmental impact assessment and accord its approval subject to such terms and conditions as it may deem fit to impose or require that the environmental impact assessment be re-submitted after such modifications as may be stipulated or decline approval of the environmental impact assessment as being contrary to environmental objectives.
- Section 17(3): 'Every review of an environment impact assessment shall be carried out with public participation and, subject to the provisions of this Act, after full disclosure of the particulars of the project'.
- Section 17(4): 'The Agency shall communicate its approval or otherwise within a period of two months from the date that the initial environmental examination is filed, and within a period of four

months from the date that the environmental impact assessment is filed complete in all respects in accordance with the regulations, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations'.

- Section 20(1): 'The Agency shall from time to time require the person in charge of a project to furnish, within such period as may be specified, an environmental audit or environmental review report or environmental management plan containing a comprehensive appraisal of the environmental aspects of the project'.
- Section 20(2): The report of a project prepared under sub-section (1) shall include:
- (a) analysis of the predicted qualitative and quantitative impact of the project as compared to the actual impact;
- (b) evaluation of the efficacy of the preventive, mitigation & compensatory measures taken with respect to the project; and
- (c) recommendations for further minimizing or mitigating the adverse environmental impact of the project.
- Section 20(3): 'Based on its review of the environmental audit report, the Agency may, after giving the person in charge of the project an opportunity of being heard, direct that specified mitigation and compensatory measures be adopted within a specified time period and may also, where necessary, modify the approval granted by it under section 17'.
- Section 31(1): 'The Agency shall cause relevant details of any proposed project regarding which an Environmental Impact Assessment has been received to be published, along with an invitation to the publish to furnish their comments thereon within a specified period'.
- Section 31(3): 'All comments received under sub-section (1) and (2) shall be duly considered by the Agency while reviewing the environmental impact assessment or strategic impact assessment, and decision or action taken thereon shall be communicated to the persons who have furnished the said comments.

2.3 Sindh EPA (Review of IEE and EIA) Regulations, 2021

The Sindh Environmental Protection Agency (Environmental Assessment) Regulations 2021, revised from the preceding document introduced in 2014, define Schedules (I, II, & III) of projects falling under the requirement of an Environmental Checklist, IEE, or EIA respectively.

Schedule I: The project falls into Schedule I if it is considered as having minimal environmental impact, and the screening of the project through a checklist, documents its environmental compliance.

Schedule II: The project falls in Schedule II if it is likely to have adverse environmental impacts, but of lesser degree or significance and all the mitigation measures to handle the impact is manageable. Such types of projects need IEE report inducing EMP.

Schedule III: Projects are categorized in Schedule III if they generate significant adverse environmental impacts that require a comprehensive management plan, or if the project is located within or passes through: a) Areas declared by the Government of Pakistan as environmentally sensitive (National Parks/Sanctuaries/Game Reserve), b) Areas of international significance (e.g. protected wetland as designated by the RAMSAR Convention), or c) Areas designated by the United

Nations Educational, Scientific and Cultural Organization (UNESCO) as cultural heritage sites.

According to Sindh Environmental Protection Agency Environmental Assessment Regulations, 2021, a project falling in any category listed in Schedule III shall file an EIA with the Sindh Environmental Protection Agency (SEPA). This specific project can be categorized as:

Schedule III: Projects Requiring an EIA

Category (I) Urban Development and Tourism

(2) Residential, Commercial High-rise buildings subject to compliance of building bylaws of relevant organizations more than 500,000 sq. feet

Filing: Regulation 9 requires submission of two hardcopies and two electronic copies

accompanied by an application form (schedule-V), copy of receipt of payment of review fee, NOC from relevant departments (where applicable).

Preliminary scrutiny: Regulation 10 states that at any time after the submission of the report, the agency shall review the report and inform the proponent for submission of the need for any additional information at any time.

Review: The agency shall review the report after issuing confirmation of completeness as per Regulation 9.

Validity: Regulation 15 defines the validity period of approval of an IEE or EIA to be three years from date of construction and must start within three years of report approval. A three-year extension at a time may be granted upon the agency's discretion with or without the submission of a fresh IEE or EIA.

2.4 Guidelines for Public Consultation

Public consultation is mandated under 2014 Act. Regulation 11 of the 2014 Regulations provides the general requirements whereas the sectoral guidelines indicating specific assessment requirements are provided in the Guidelines for Public Consultation 1997 (the 'Guidelines'). These are summarized below:

Objectives of Public Involvement: 'To inform stakeholders about the proposed project, to provide an opportunity for those otherwise unrepresented to present their views and values, providing better transparency and accountability in decision making, creating a sense of ownership with the stakeholders';

Stakeholders: 'People who may be directly or indirectly affected by a proposal will clearly be the focus of public involvement. Those who are directly affected may be project beneficiaries, those likely to be adversely affected, or other stakeholders. The identification of those indirectly affected is more difficult, and to some extent it will be a subjective judgment. For this reason, it is good practice to have a very wide definition of who should be involved and to include any person or group who thinks that they have an interest. Sometimes it may be necessary to consult with a representative from a particular interest group. In such cases the choice of representative should be left to the group itself. Consultation should include not only those likely to be affected, positively or negatively, by the outcome of a proposal, but should also include those who can affect the outcome of a proposal';

Mechanism of consultations: 'Provide sufficient relevant information in a form that is easily understood by non-experts (without being simplistic or insulting), allow sufficient time for

stakeholders to read, discuss, consider the information and its implications and to present their views, responses should be provided to issues and problems raised or comments made by stakeholders, selection of venues and timings of events should encourage maximum attendance';

Timing and Frequency: Planning for the public consultation program needs to begin at a very early stage; ideally it should commence at the screening stage of the proposal and continue throughout the EIA process;

Consultation Tools: Some specific consultation tools that can be used for conducting consultations include; focus group meetings, needs assessment, semi-structured interviews; village meetings & workshops;

Other Important Considerations: The development of a public involvement program would typically involve consideration of the following issues; objectives of the proposal and the study; identification of stakeholders; identification of appropriate techniques to consult with the stakeholders; identification of approaches to ensure feedback to involved stakeholders; and mechanisms to ensure stakeholders' consideration are taken into account'.

As above, the Guidelines for Public Consultation introduces effective ways to inform the contents of the project to the general public during the planning stage and that eventually consensus building toward the implementation of project is reached. However, there are instances where in middle of a project on direction of tribunal or court environmental assessment carried out with public consultation.

Incorporating public involvement into the stages of environmental assessment is explained in the guidelines that public consultation meeting has to be carried out after the works on "developing options and assessing and mitigating impacts" for comments and assessment.

2.5 Sindh Environmental Quality Standards

On January 28, 2016, the Sindh Environmental Industrial Waste Water, Effluent, Domestic, Sewerage, Industrial Air Emission and Ambient Air, Noise for Vehicles, Air Emissions for Vehicles and Drinking Water Quality Standards, 2015 have been notified by Sindh EPA.

Table 2.1 shows SEQS for ambient air.

Table 2.1: Sindh Environmental Quality Standard for Ambient Air

Pollutant	Time-weighted average	Concentration in Ambient Air	Method of Measurement
Sulfur Dioxide (SO_2)	Annual Average*	80 µg/m^3	Ultraviolet Fluorescence Method
	24 hours**	120 µg/m^3	
Oxides of Nitrogen as (NO)	Annual Average*	40 µg/m^3	Gas Phase Chemiluminescence
	24 hours**	40 µg/m^3	
Oxides of Nitrogen as (NO_2)	Annual Average*	40 µg/m^3	Gas Phase Chemiluminescence
	24 hours**	80 µg/m^3	

Table 2.1: Sindh Environmental Quality Standard for Ambient Air			
Pollutant	**Time-weighted average**	**Concentration in Ambient Air**	**Method of Measurement**
O_3	1 hour	130 µg/m^3	Non dispersive UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	360 µg/m^3	High volume Sampling, (Average flow rate not less than 1.1m^3/minute)
	24 hours**	500 µg/m^3	
Respirable Particulate Matter (PM_{10})	Annual Average*	120 µg/m^3	B Ray absorption method
	24 hours**	150 µg/m^3	
Respirable Particulate Matter ($PM_{2.5}$)	Annual Average*	40 µg/m^3 ***	B Ray absorption method
	24 hours**	75 µg/m^3	
	1 hour	15 µg/m^3	
Lead (Pb)	Annual Average*	1 µg/m^3	ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	1.5 µg/m^3	
Carbon Monoxide (CO)	8hours**	5 mg/m^3	Non Dispersive Infra Red (NDIR) method
	1hours	10 mg/m^3	
*Annual arithmetic means of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.			
**24 hourly / 8 hourly values should be met 98% of the in a year. 2% of the time, it may exceed but not on two consecutive days.			
*** or 9 µg/m^3 plus baseline, whichever is low			

Table 2.2 shows the standards for motor vehicle noise.

Table 2.2: The Motor Vehicle Ordinance (1965) and Roles (1969)		
Parameter	**Standards (maximum permissible limit)**	**Measuring method**
Noise	85dB(A)	Sound-meter at 7.5meter from the source

Table 2.3 shows the proposed national environmental quality standard for noise.

Table 2.3: Sindh Environmental Quality Standard for Noise			
S. No.	**Category of Area / Zone**	**Effective from 1st January, 2015**	
		Limit it in dB(A) Leq*	
		Day Time	**Night Time**
1	Residential area (A)	55	45
2	Commercial area (B)	65	55
3	Industrial area (C)	75	65
4	Silence Zone (D)	50	45
Note: 1	Day time hours: 6.00 a. m to 10.00 p. m		

2	Night time hours: 10.00 p. m to 6.00p. m
3	Silence zone; Zone which are declared as such by competent authority. An area comprising not less than 100 meters around hospitals, educational institutions and courts.
4	Mixed categories of areas may be declared as one of the four above-mentioned categories by the competent authority.
***dB(A)Leq**	Time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

The SEQS for effluents are shown in Table 2.4.

Table 2.4: Sindh Environmental Quality Standard for Municipal & Liquid Industrial Effluents

S. #	Parameter	Into Inland Waters	Into Sewage Treatment	Into Sea	unit
1	Temperature or Temp. increase	<3	<3	<3	°C
2	pH value (H^+)	6-9	6-9	6-9	
3	Biological Oxygen Demand $(BOD)_5$ at 20°C	80	250	80	mg/l
4	Chemical Oxygen Demand (COD)	150	400	400	mg/l
5	Total Suspended Solids (TSS)	200	400	200	mg/l
6	Total Dissolved Solids (TDS)	3500	3500	3500	mg/l
7	Oil and Grease	10	10	10	mg/l
8	Phenolic Compounds (as Phenol)	0.1	0.3	0.3	mg/l
9	Chloride (as Cl^-)	1000	1000	SC	mg/l
10	Fluoride (as F^-)	10	10	10	mg/l
11	Cyanide (as CN^-) total	1.0	1.0	1.0	mg/l
12	An-ionic detergents (as MBAS)	20	20	20	mg/l
13	Sulphate (SO_4^{2-})	600	1000	SC	mg/l
14	Sulphide (S^{2-})	1.0	1.0	1.0	mg/l
15	Ammonia (NH_3)	40	40	40	mg/l
16	Pesticides	0.15	0.15	0.15	mg/l
17	Cadmium	0.1	0.1	0.1	mg/l
18	Chromium (trivalent and hexavalent)	1.0	1.0	1.0	mg/l
19	Copper	1.0	1.0	1.0	mg/l
20	Lead	0.5	0.5	0.5	mg/l
21	Mercury	0.01	0.01	0.01	mg/l
22	Selenium	0.5	0.5	0.5	mg/l
23	Nickel	1.0	1.0	1.0	mg/l
24	Silver	1.0	1.0	1.0	mg/l
25	Total toxic metals	2.0	2.0	2.0	mg/l
26	Zinc	5.0	5.0	5.0	mg/l
27	Arsenic	1.0	1.0	1.0	mg/l

28	Barium	1.5	1.5	1.5	mg/l
29	Iron	8.0	8.0	8.0	mg/l
30	Manganese	1.5	1.5	1.5	mg/l
31	Boron	6.0	6.0	6.0	mg/l
32	Chlorine	1.0	1.0	1.0	mg/l

The SEQS for drinking water are shown in Table 2.5.

Table 2.5: Sindh Environmental Quality Standards for Drinking Waters (mg/l)

S.#	Properties / Parameters	Standard Values for Pakistan	S.#	Properties / Parameters	Standard Values for Pakistan
Bacterial			Chemical		
1	All water intended for drinking (E. coli or Thermo tolerant Coliform bacteria)	Must not be detectable in any 100-ml sample	Essential Inorganics (mg/liter)		
			13	Aluminum (Al) mg/l	≤ 0.2
			14	Antimony (Sb)	≤ 0.005
2	Treated water entering the distribution system (E. coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100-ml sample	15	Arsenic (As)	≤ 0.05
			16	Barium (Ba)	0.7
			17	Boron (B)	0.3
3	Treated water in the distribution system (E.coli or thermo tolerant coliform and total coliform bacteria)	Must not be Detectable in any 100-ml sample. In case of large supplies, where sufficient samples are examined, must not be resent in 95% of the samples taken throughout any 12-month period.	18	Cadmium (Cd)	0.01
			19	Chloride (Cl-)	< 250
			20	Chromium (Cr)	≤ 0.05
			21	Copper (Cu)	2
			Organic (mg/L)		
			22	Phenolic compounds	<0.0002
			Toxic Inorganics (mg/liter)		
			23	Cyanide (CN)-	≤ 0.05
			24	Fluoride (F)	≤ 1.5
			25	Lead (Pb)	≤ 0.05
			26	Manganese (Mn)	≤ 0.5
Physical			27	Mercury (Hg)	≤ 0.001
4	Color	< 15 TCU	28	Nickel (Ni)	≤ 0.02
5	Taste	Non-objectionable/ Acceptable	29	Nitrate (NO_3)-	≤ 50

6	Odor	Non-objectionable/ Acceptable	30	Nitrite (NO_2)-	≤ 3
7	Turbidity	< 5 NTU	31	Selenium (Se)	≤ 0.01
8	Total Hardness as $CaCO_3$	< 500 mg/l	32	Residual Chlorine	0.2-0.5 At consumer end 0.5-1.5 at source
9	TDS	<1000			
10	pH	6.5-8.5			
Radioactive					
11	Alpha Emitters bq/L	0.1	33	Zinc (Zn)	5.0
12	Beta emitters	1			

2.6 Sindh Prohibition of Child Employment Act, 2017

Article 11(3) of the Constitution of Pakistan prohibits employment of children below the age of 14 years in any factory, mines or any other hazardous employment. In accordance with this Article, the Prohibition of Child Employment Act (PCEA) 2017 disallows the child labor in Sindh. The PCEA defines a child as a person who has not completed his/her fourteenth years of age, and an adolescent means a person who has completed fourteenth year of age but has not completed eighteenth years of his age. No child shall be employed or permitted to work in any establishment including construction but an adolescent can be employed or permitted to work under strict guidelines provided in the PCEA and rules. An adolescent shall not be employed in any hazardous work included in the schedule to the PCEA.

2.7 Archaeological Relics

After the Eighteenth amendment in the constitution the subject of “Ancient and historical monuments, archaeological sites and remains” the entry No.37 of the concurrent legislative list has also devolved to provincial legislations. There are two laws that are directly relevant for archaeological relics. The first is The Antiquities Act, 1975, which ensures the protection of Pakistan’s cultural resources. The Act defines “antiquities” as ancient products of human activity, historical sites or sites of anthropological or cultural interest, national monuments, etc. The Act is designed to protect these antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the GoP to prohibit excavation in any area that may contain articles of archaeological significance. Under the Act, the Project proponents are obligated to ensure that no activity is undertaken within 61 m (200 ft.) of a protected antiquity, and to report to the GoP’s Department of Archaeology any archaeological discovery made during the course of the project. The second is The Sindh Cultural Heritage (Preservation) Act, 1994, which is the provincial law for the protection of cultural assets. Its objectives are similar to those of the Antiquity Act. Heritage Foundation has catalogued 600 historic buildings

declared heritage sites under the Sindh Cultural Heritage (Preservation) Act, 1994.

Since Chief Minister House is a Protected Building under Government of Sindh notification No OSD/CHC/CLQ-01-49/2017 dater 18th December 2017 and proposed project area is within 200 feet of protected area, hence Sindh Cultural Heritage (Preservation) Act, 1994 is applicable.

2.8 Pakistan Penal Code, 1860 (PPC)

Chapter XIV of the PPC deals with the offences affecting the public health, safety, convenience, decency and morals. Person may be guilty of public nuisance if his act or omission causes common injury, danger or annoyance to the public or results in spread of infection of disease dangerous to life. The chapter also deals with environmental pollution.

2.9 Sindh Solid Waste Management Board Act, 2014

The Sindh Solid Waste Management Board (SSWMB) Act, 2014 was enacted to establish a Board for collection and disposal of all solid waste, to arrange effective delivery of sanitation services, to provide pollution free environment and to deal with other relevant matters. The Board established under the Act headed by the Chief Minister or his nominee and constitutes of thirteen other ex officio members of other relevant departments. Some of the salient features and functions of the Board are; it has the right over the solid waste related issues, assets, funds and liabilities of the Councils and shall possess sole rights on all kinds of solid waste within the limits of all Councils established under the Local Government Act 2013, it has the authority to grant permission to individuals, institutions industries, factories, workshops, furnaces, compost making and power generation from the solid waste, for segregation of the recyclable material from the waste, collection, treatment, sale and purchase, recycling or disposal of any kinds of waste.

Solid waste management of the area falls under the jurisdiction of SSWMB. The condition of solid waste management in the project area is good. The project area is quite clean and the residents are satisfied with the solid waste management in the area.

2.10 Disaster Management Act, 2010

This Act was enacted to provide for the establishment of a National Disaster Management System for Pakistan. Sindh Disaster Management Authority enforces the Act. The Act defines ‘disaster’ as a catastrophe or a calamity in an affected area, arising from natural or man-made causes or by accident which results in a substantial loss of life or human suffering or damage to, and destruction of, property. Disaster management includes preparedness and response. The Act provides establishment of disaster management authorities at national, provincial and district levels. The authorities require preparing and implementing disaster management plan for their area.

2.11 Sindh Drinking Water Policy, 2017

Public Health Engineering & Rural Development Department, Government of Sindh, with the approval of Chief Minister Sindh issue the drinking water policy on 3rd May 2017.

Principles: The main principles of Sindh Drinking Water Policy, adopted from the National Drinking Water policy 2009, and aligned with the Sustainable Development Goals, are as follows:

- Access to safely managed drinking water is a fundamental right of every citizen and that it is the responsibility of the Government to ensure its provision to all citizens,
- Water allocation for drinking purpose shall be given priority over other uses,
- In order to ensure equitable access, special attention shall be given to removing the existing disparities in coverage of safe drinking water and for addressing the needs of the poor and the vulnerable on priority basis.
- Recognizing that inadequate and unsafe water supply and sanitation are a major cause of diarrhea and nutritional deficiency in children, which as a consequence contribute towards child mortality. Safely managed drinking water supply and sanitation shall be integrated in health, nutrition and school health programs.
- Access shall be increased to high quality nutrition-sensitive services, including access to water, sanitation facilities, and hygiene.
- Key hygiene actions (safe drinking water, hand washing with soap, safe disposal of excreta, food hygiene) shall be integrated as essential components in all nutrition programs.
- Realizing the fact that access and availability of safe drinking water affects all aspects of life of a citizen, a multi sectoral approach, involving different departments of the government, shall be adopted to address the issues related to safe drinking water.
- Being cognizant of the fact that women are the main providers of domestic water supply and maintainers of hygienic household environment, their participations in planning, implementation, monitoring and operation & maintenance of water supply systems shall be ensured, and WASH shall be integrated in maternal and neonatal health programs.
- Responsibilities and resources shall be delegated to local authorities to enable them to discharge their assigned functions with regard to provision of safe water supply.
- A supportive policy framework shall be developed that encourages alternate options through private provision, public private partnerships, the role of NGOs and community organizations
- The execution of component-sharing model for government programs and projects shall be promoted to ensure financial sustainability and community and private sector involvement in development and O&M.
- Low-cost technologies in water and sanitation, that are easy and cost-effective to maintain shall be developed and used.

Goals and Objectives:

Overall Goal: The goal of the Sindh Drinking Water Policy is to improve the quality of life of people of Sindh by reducing morbidity and mortality caused by water-borne diseases through provision of safely managed and potable drinking water to the entire population that is located on premises, available when needed, and free from contamination, affordable and of sufficient quantity, and in a way, that is efficient, equitable and sustainable.

Objectives: Introduce legislative measures and regulations to create an enabling framework for safely managed drinking water supply, regulation of water usage, extraction, treatment, transportation and distribution.

- Ensure that all drinking water resources and supply systems are protected with community involvement.
- Develop district level drinking water availability plans for urban and rural areas to ensure improved planning for equitable access.
- Enhance the coverage of safely managed drinking water supply in the province to achieve the Sustainable Development Goals (SDGs) targets of universal access.
- Develop criteria for installation of new drinking water supply schemes and ensure that all new schemes are safely managed, rationalized and constructed through need-based criteria so that all areas and communities are served.
- Develop standardized service delivery models for both urban and rural drinking water supply schemes to improve efficiency, cost-effectiveness, monitoring & sustainability.
- Develop mechanisms for reuse, recycle and recharge of wastewater for other municipal and productive uses.
- Ensure that all drinking water supply systems are designed and constructed in line with the national drinking water quality standards and all municipal discharges comply with National Environment Quality Standards (NEQS).
- Install water treatment plants at existing drinking water supply schemes where required and incorporate water treatment facilities in all new drinking water supply schemes.
- Ensure development of water safety plans for all drinking water supply systems.
- Develop and sustain regular drinking water quality monitoring & surveillance, and institute mechanisms for remedial action.
- Increase public awareness about water borne and water related diseases (including polio), nutrition and hygiene, and enhance the role of communities for household water treatment/storage, water safety and conservation, and safe hygiene practices.
- Ensure that drinking water supply projects are nutrition sensitive and integrated in health, nutrition and school health programs.
- Institutionalize Water, Sanitation & Hygiene (WASH) in schools (infrastructure and 3 starts) and introduce curricular change to incorporate health, nutrition and hygiene and improve safe water and sanitation practices among school children.
- Institute adaptation measures and disaster risk reduction and mitigation strategies to minimize the impact of climate events on drinking water supply system.

The proponent shall ensure supply of clean drinking water to the construction staff.

2.12 Sindh Sanitation Policy, 2017

The goal of the Provincial Sanitation policy is to ensure that the entire population of Sindh has access to a safely managed sanitation service and sanitary environment that is also nutrition- sensitive and hygienic. The motto of the policy was ‘Saaf Suthee Sindh’ (Neat and Clean Sindh).

The key targets of this policy are:

1. To eradicate open defecation from Sindh province by 2025, while 70%villages 0f 13 high priority districts achieve the status of open defecation free by 2020.

2. That 100% household in Sindh have access to and use sanitary latrines by 2025, while 70% of rural households in high priority districts will achieve this by 2020.

3. To strengthen and implement liquid waste management with sewer lanes and covered/improved drains with 85% coverage of urban areas and 60% coverage in rural areas.

4. To create and develop wastewater treatment mechanisms to cover 75% of urban areas and 40% rural areas by 2025.

5. To implement integrated solid waste management with 100% coverage in urban area and 60% in rural areas by 2025.

2.13 Laws and Regulations on Urban Development

Sindh Government also has some laws and regulations for building control:

1) Buildings Control Ordinance, 1979
2) Karachi Building Control Licensing Regulations, 1982
3) Sindh Regulation & Control (Use of Plots & Construction of Buildings) Ordinance, 2002

Karachi Building Control Authority (KBCA) has been established under these ordinances, in order to implement and enforce the above regulations. The Government of Sindh on 14th February 2011 notified extension of the jurisdiction of KBCA to the whole of Sindh and renamed the KBCA to Sindh Building Control Authority (SBCA). The SBCA (Karachi region) is responsible to oversee that the land development process & construction activities do not violate the Karachi Building and Town Planning Regulations, 2002.

Karachi Building and Town Planning Regulations, 2002 is the fundamental regulation for 'Building & Town Planning' for the whole City District of Karachi, except for the cantonment areas and the projects of National Security declared by the Federal Government, which supersedes 'Karachi Building and Town Planning Regulations-1979'. Eight (8) public agencies are individually designated as 'Concerned Authorities for respective areas and purposes', following City District Government Karachi (CDGK), such as:

- Cantonment Boards of the Ministry of Defense
- Karachi Port Trust (KPT)
- Pakistan Railways (PR)
- Ministry of Works, Government of Pakistan (GOP)
- Sindh Industrial Trading Estates, Karachi (SITE)
- Sindh Katchi Abadis Authority
- Board of Revenue

For reference, there are many agencies holding lands in Karachi and no dominant ones. An outline of existing condition of land holdings in Karachi is illustrated as follows.

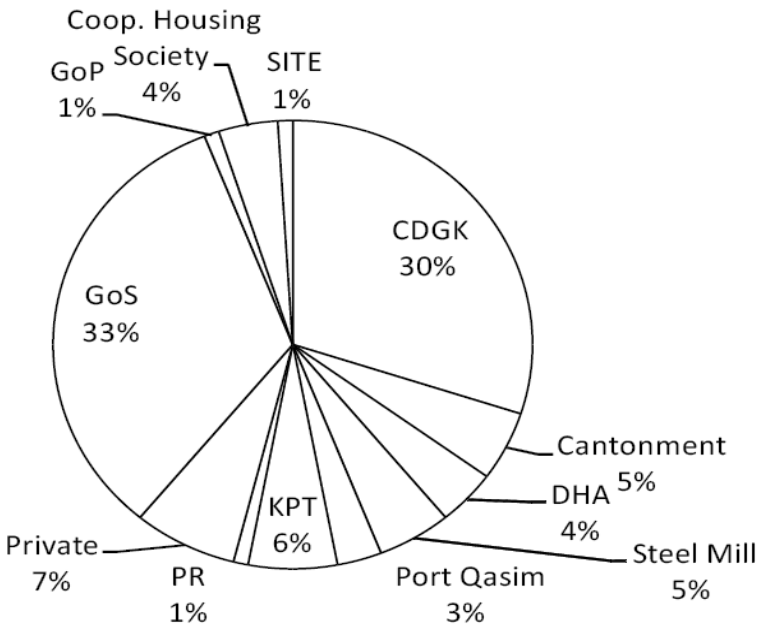


Figure 2.2: Land Holdings by Agency in Karachi (Source: KMP 2020)

The above-mentioned regulations have been quite frequently amended as needs arose, since its commencement, especially among the detailed provisions.

2.14 Civil Aviation Rules, 1994

The Civil Aviation Rules 1994 has mandated it for all the builders and developers to obtain No Objection Certificate (NOC) from Civil Aviation Authority (CAA) under rule 68, section-3 of Civil Aviation Rules, 1994 for “Height Clearance” for projects/buildings within the radius of 25 km of all airports. The rule 68, section 3 (Safe Guarding at Aerodromes (68) Limitation of obstructions) reads as under: “No person shall erect any temporary or permanent structure, nor position a vehicle or other mobile object on or in the vicinity of any aerodrome to which these rules are applicable, that will be within the clearance area, or will protrude through an obstacle limitation surface, at that aerodrome”.

For height clearance of the project, No Objection Certificate (NOC) from CAA will be obtained and submitted in due time.

2.15 Building Code of Pakistan, Fire Safety Provisions 2016

The Building Code of Pakistan-Fire Safety Provisions-2016 provide rules for fire prevention, life safety in relation to fire and fire protection of building and structures as prescribed. All the federal and provincial governments, organizations, authorities, both public and private are mandated to adopt and implement Building Code of Pakistan-Fire Safety Provisions-2016, as notified. Any construction and modification of buildings in violation of Building Code of Pakistan (Fire Safety Provisions-2016) shall be considered as violation of professional engineering works as specified under clause (xxv) of section 2 of the Act.

The implementation and enforcement of this bye-law shall vest with the Authority Having Jurisdiction (AHJ) within their respective jurisdictions and circles as follow:

1) Building Control, Housing and Development Authorities
2) District Administration
3) Tehsil or Town Administration
4) Municipal Administration
5) Station Headquarters (Army, Air Force and Navy)
6) Cantonment Administration
7) Union Council Administration
8) Autonomous Bodies
9) Industrial Estates
10) Directorates of Civil Defense
11) Export Processing Zones
12) Other Federal/Provincial Authorities as and when notified

This Bye-law shall come into force upon being notified and all the concerned AHJs shall implement the same immediately in the prescribed manner.

All relevant AHJs shall ensure compliance and implementations of this Code and accordingly adopt or amend their relevant regulations, Bye-laws or rules as the need be.

This Bye-law shall apply to both new and existing buildings.

a. buildings permitted for construction after the adoption of these Provisions shall comply with the provisions stated herein for new buildings forthwith.
b. existing buildings constructed prior to adoption of these provisions shall comply with the provisions stated herein as soon as possible but not later than three years of notification of these provisions; and
c. minimum fire protection requirements such as provision of fire alarm and detection system, fire extinguishers, emergency response plans and fire drills shall however be in place as soon as possible but not later than one year of notification of these provisions.

Any person who fails to comply with this Bye-law or fails to carry out an order made pursuant to these provisions, or violates any condition attached to a permit, approval, or certificate shall be subject to the penalties in accordance with the regulations of AHJ.

In operational phase, the fire safety provisions will be followed accordingly.

2.16 The Sindh Occupational Safety and Health Act, 2017

The Sindh Occupational Safety and Health Bill 2017 has been approved by the Provincial Assembly of Sindh (Ref. Sindh Bill No. 27 of 2017) and enacted as the Sindh Occupational Safety and health Act, 2017. The Act makes provision for Occupational Safety and Health conditions at all workplaces for the protection of persons at work places against risk of injury arising out of the activities at work

places and the promotion of safe, healthy and decent working environment adapted to the physical, physiological and psychological needs of all persons at work.

During construction and operational phase, the health and safety of workers and the maintenance staff shall be considered in accordance with Sindh Occupational Safety and Health Act 2017.

2.17 IFC General EHS Guidelines

The EHS guidelines published by IFC are technical reference documents that address IFC's expectations regarding the industrial pollution management performance of its projects; however, these guidelines have been benefited from for other projects as well. They are designed to assist managers and decision makers with relevant industry background and technical information. This information supports actions aimed at avoiding, minimizing, and controlling EHS impacts during construction, operation, and decommissioning phase of a project or facility. Environmental issues associated with the construction and maintenance activities may include, among others, noise and vibration, soil erosion, and threats to biodiversity including habitat alteration and impacts to wildlife.

Examples of the impacts addressed in the General EHS Guidelines include:

- Construction site waste generation;
- Soil erosion and sediment control from materials sourcing areas and site preparation activities;
- Fugitive dust & other emissions (e.g. from vehicle traffic, land clearing activities, & materials stockpiles);
- Noise from heavy equipment and truck traffic;
- Potential for hazardous materials and oil spills associated with heavy equipment operation and fuelling activities.

Chapter 3 Project Description

3.1. The Project

The proposed project: "SAAR Sky Icon" is planned to be constructed on Plot # 10/1, Sheet CL-9, Civil Lines Quarters, Karachi, by M/s SAAR Builders & Developers having an area of 4540 SQ YDS with B+G+44 storeys and which will serve as residential cum commercial building project.

3.2. Project Details

Salient Features of the Project are provided below:

Table 3.1: Salient Features of the Project	
Project Name	SAAR Sky Icon
Category	Residential-cum-Commercial
Proponent	M/s SAAR Builders & Developers
Plot Area	4540.00 SQ YDS (0.9380 acres)
Gross covered area	762,496.97 SQ FT
Storeys	B+G+44
Location	Plot # 10/1, Sheet CL-9, Civil Lines Quarters, Karachi.
Basement Plan (ARS + Project Parking + Services)	Showrooms (5), Air Raid Shelter, Underground Water Tank for Potable, Non-Potable, Fire Fighting and Septic, Pump Room and RO plant.
Ground Floor Plan (Shops + Services)	Showrooms (5), KE substation, Electric room, Generator room, and Reception.
1st Floor Plan (Project Parking + Services)	Parking (56 cars and 60 motorcycles), and others services
2nd to 5th Floor Plan (Project Parking + Services)	Parking (224 cars and 240 motorcycles), and others services
6th Floor Plan (Project Parking + Services)	Parking (56 cars and 60 motorcycles), and others services
7th Floor Plan (Project Parking + Services)	Parking (56 cars and 60 motorcycles), and others services
8th Floor Plan (Flats)	Flats (5), Male and Female Gym, Community Hall and other services
9th to 10th Floor Plan (Flats)	Flats (5x2=10), Library, Daycare center, Indoor games and other services.
11th to 21st Floor Plan (Flats)	Flats (11x11=121) and other services.

22nd Floor Plan (Flats)	Flats (8) and other services.
23rd Floor Plan (Flats)	Flats (6) OHWT for Potable, Non-Potable, Fire Fighting and other services.
24th to 44th Floor Plan (Flats)	Flats (6x21=126) and other services.
Roof Plan (Solar Panels + Battery Room + Services)	Solar Panels, Machine room, Overhead Water Tank for Potable,Non-Potable and Fire Fighting, Battery and Machine Room, and other services
Total Parking	Total Project Parking: 388 cars and 420 motorcycles
Totals Flats	Total 276 Flats
Total Showrooms	10 showrooms
Height of the Building	494'-6'' Above Ground Level (AGL)

3.3. Project Location

The Project falls in to the appropriate category that permits the designated land-use by the relevant authority. Siting of the SAAR Sky Icon Project, at Plot # 10/1, Sheet CL-9, Civil Lines Quarters, Karachi, by M/s SAAR Builders & Developers is duly authorized.

The proposed project is planned in the environs of Civil Lines enclosed by (Fig 3.1) Dr. Ziauddin Ahmed Road towards west, Brunton Road towards north, McIver Road towards south and Abdullah Haroon Road (formerly known as Victoria Road) towards east. Major landmarks near the proposed project are CM House, PIDC Karachi, Movenpick Hotel and Karachi Gymkhana.

Broadly, the project site can be accessed by Shahrah-e-Faisal via Club Road and Abdullah Haroon Road. The major primary roads at the immediate boundary of the project site are Brunton and Dr. Ziauddin Ahmed Road.

Whereas, the project conceptual view and site plan is shown in fig: 3.2 and fig: 3.3 respectively.

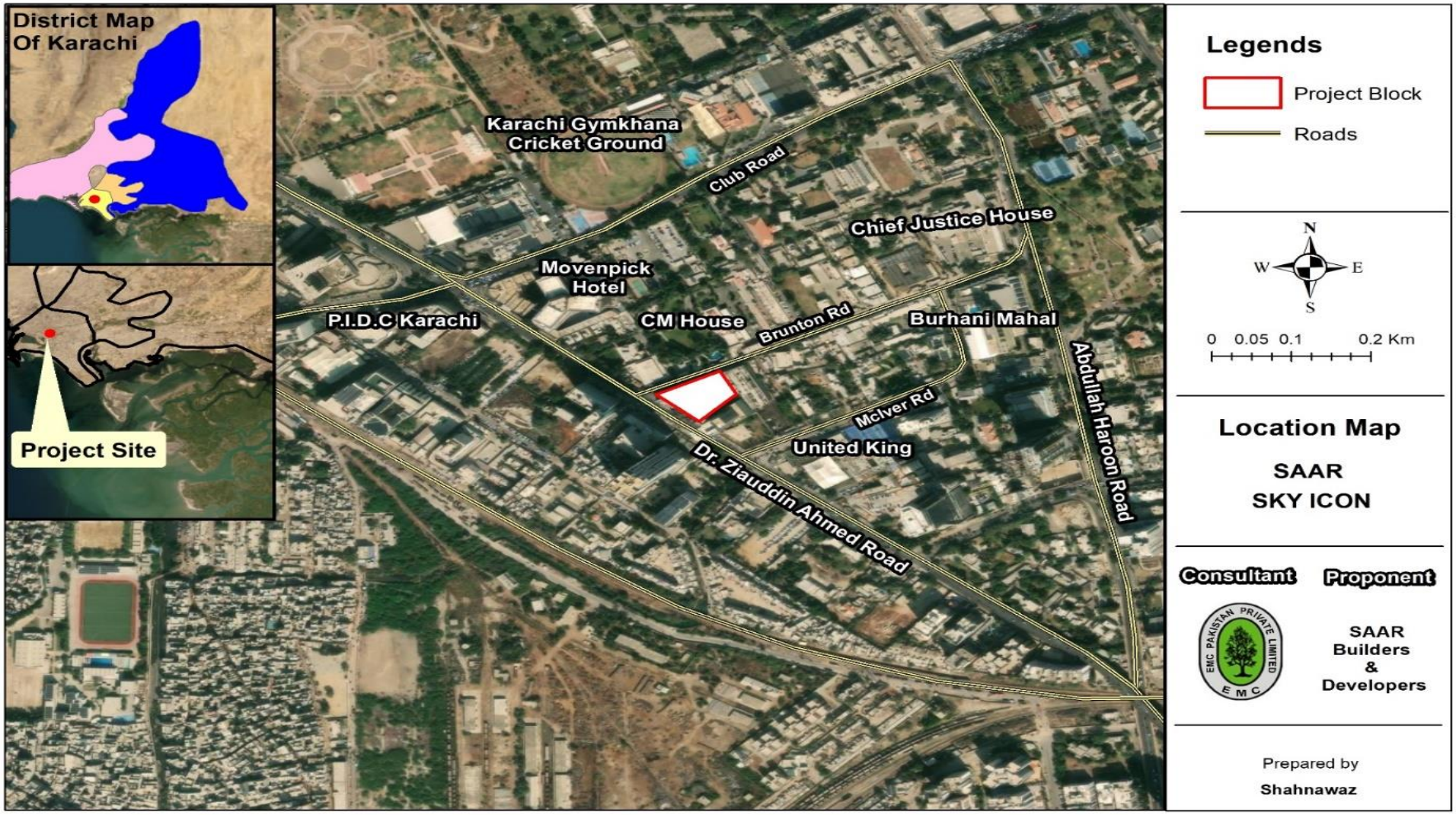


Fig 3.1: Project Location Map



Fig 3.2: Conceptual view of the proposed project

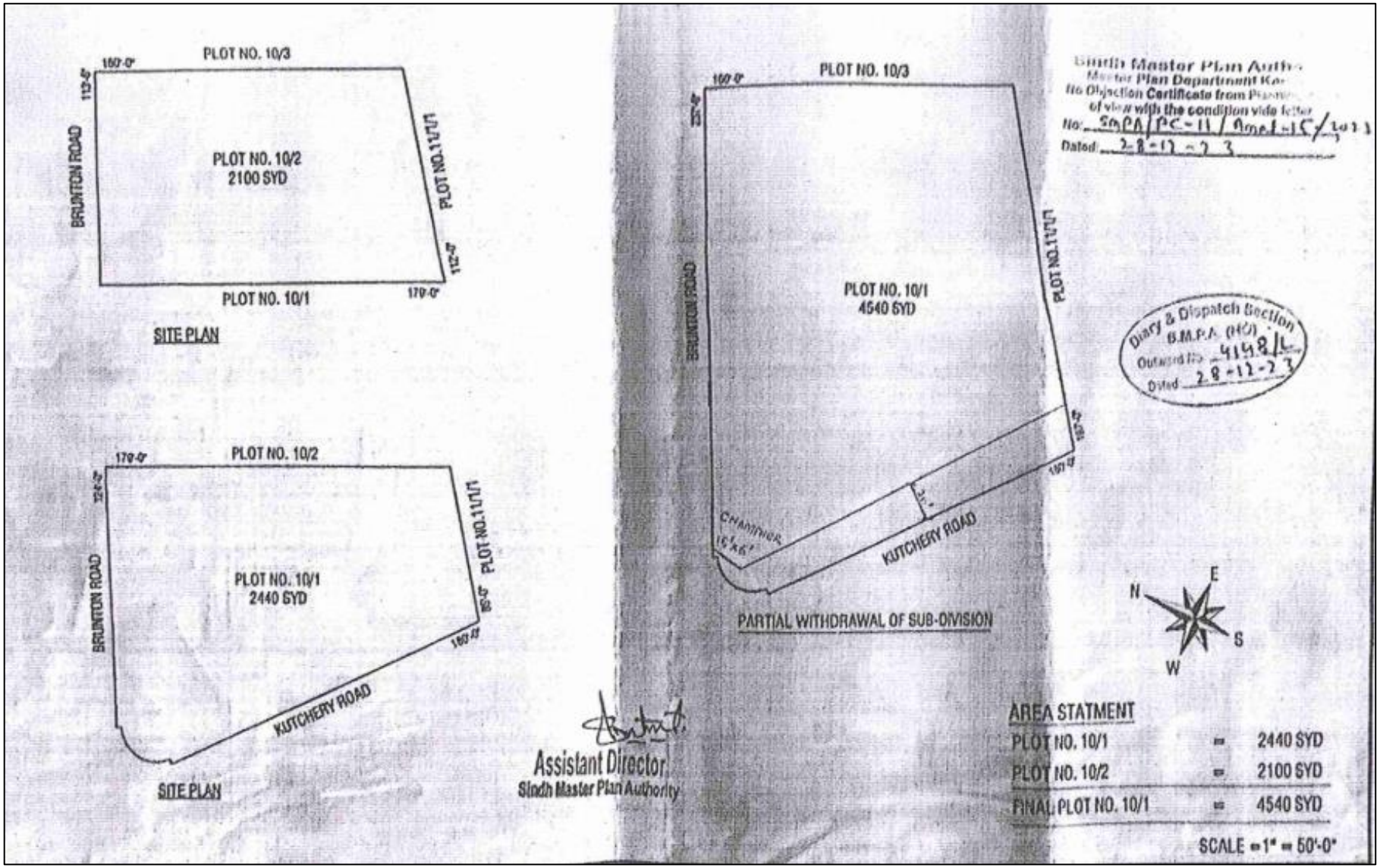


Figure 3.3: Site Plan

3.4. Status of Approvals

The necessary approvals and NOCs have been taken from both the Sindh Master Plan Authority and the Sindh Building Control Authority (SBCA). Additionally, following NOCs/approvals will be obtained and submitted in due time:

1. Karachi Water & Sewerage Board (KW&SB)
2. K-Electric (KE)
3. Sui Southern Gas Company Limited (SSGC)
4. Civil Aviation Authority (CAA)
5. Air Head Quarter (AHQ)
6. Culture, Tourism, Antiquities & Archives Department

Approval from Sindh Environmental Protection Agency will be a major milestone for project because SBCA has made it mandatory for all the builders and developers to obtain approval of EIA/IEE under Section 17 of SEP Act 2014 from Sindh EPA as a pre-requisite of getting final approval of the building plan.

It is important to note here that, EIA study is being undertaken after construction of part of project is started. However, project proponent shall adjourn its construction activities till NOC from SEPA has been granted.

3.5. Construction & Commissioning

3.5.1. Construction Schedule

The construction & commissioning phase will consist of following major activities:

- Construction of campsite including facilities and mobilization of contractors
- Construction of foundations and auxiliary structures (piling, civil works etc.)
- Internal and External finishing
- Mechanical, electrical and other works
- Demobilization and site restoration

3.5.2. Pre-Construction/Design Phase

This, the essential phase provides the basis for the construction program, the methodology to be adopted and the technologies to be involved. The project site has been assessed in terms of its geology, seismicity and seismo-tectonics. The pre-construction activities will involve earthworks & excavations.

3.5.3. Construction Activities

The sequence of construction should be as follows:

- Construction of earth retaining structure (secant pile wall, contiguous pile etc.)
- Drilling and installation of dewatering wells
- Excavation of plot upto groundwater level
- Dewatering
- Excavation upto Raft bottom level
- Construction of raft foundation followed by construction of substructure.

Standard and environmentally compatible construction materials (cement, sand, steel reinforcement, bricks etc.) & techniques/construction practices will be employed besides adopting Standard Operating Procedures (SOPs) set-out in the Environmental Management Plan.

3.5.3.1. Construction office & Camp

The construction contractor will develop his own camp & offices for construction purposes within the project site. Development of campsite will include the following activities:

- Leveling and compaction of the area for office and campsite
- Provision of drainage works in and around the campsite
- Laying and compaction of the gravel topping in the office and campsite
- Construction of fuel storage tank area and water tank
- Provision of fence, access and emergency gates
- Construction of septic tanks
- Installation of membrane liner for fuel storage
- Installation of security guard cabins
- Installation of sewerage pipeline with manholes for the septic system & connecting it with Sewer line
- Provision of signage for each activity center

3.5.3.2. Foundations

Excavation for the foundations work will be made in accordance with the standards. Excavated material will be disposed of off-site via trucks and sent to approve sites. The excavated soil will be sent to road construction contractors for appropriate utilization.

3.5.3.3. Building Shell and Core Construction

Construction of the exterior enclosure or “shell’’ of the building include construction of the building’s framework (installation of beams and columns), floor decks, facade (exterior walls and cladding),and roof construction. These activities require the use of, compressors, personnel and materialhoists, front-end loaders, concrete pumps, on-site bending jigs and a variety of hand-held tools, inaddition to the delivery trucks bringing construction materials to the site. At the same time, infrastructure connections are built. These include lines for water, sewer, storm water, electricity & telecommunications.

3.5.3.4. Interior Construction and Finishing

This stage includes the construction of interior walls, installation of lighting fixtures and interior finishes (flooring, painting, etc.), as well as mechanical & electrical works such as the:

- ✧ Internal and external pipe works
- ✧ Fire protection & Life safety systems
- ✧ Car Park Ventilation
- ✧ Electrical Distribution
- ✧ Emergency Lighting installations
- ✧ Lightning Protection

3.5.3.5. Civil Works

Civil works involves excavation, piling, formwork, reinforcement, concreting, masonry, plastering, painting, and also waterproofing work with gas-flame sticking, construction of light separating walls, hung ceilings, flooring, lining and facing.

3.5.3.6. Construction Equipment & Machinery

Conventional machinery and equipment will be used for construction activities. The equipment and machinery may include dozers, excavators, loaders, mobile crane, lorry, dump trucks, back hoe, bar bending machine, water bowzers, material hoist, passenger hoist, concrete placement booms & power generators.

3.5.3.7. Construction Material and other Supplies

Main construction material to be used during the construction phase will include ready mix concrete that will be sourced through reputable companies. Additionally, paints, glass, wood, tiles,aluminum, PVC/GI pipes, concrete/cement pipes, electric cables, etc. will be used during thedifferent phases of construction. The materials will be transported by trucks to the project site,where they will be stored until moved to different locations as and when required. Materials including paving stone, crush, gravel and sand will be brought from commercial quarries locatedin the Sindh Province.

3.5.3.8. Site Restoration

On the completion of the construction phase, the entire site will be built-up thus no site restorationto original condition is required. External sites are not being used.

3.6. Utilities

3.6.1. Plumbing System

3.6.1.1. Design Codes & Standards:

The plumbing system is based on the following codes & standards:

- ✧ International Plumbing Code 2018.
- ✧ American Society for Plumbing Engineers (ASPE) Handbook – 2010.

- KBCA Bye Laws.

3.6.1.2. Plumbing Fixtures Requirements:

The plumbing system has been designed to meet the minimum plumbing fixture requirements forspace occupancy as per International Plumbing Code.

3.6.1.3. Scope of Plumbing System:

The scope of plumbing services is as follows:

- Domestic Water Supply
- Hot Water Supply
- Soil & Waste Water Drainage
- Storm Water Drainage
- Natural Gas Supply

The storm water drainage system shall be designed keeping in view the developed levels of the project area & shall be terminated from the building up to the road.

Fire protection system shall comprise of building fire hydrants, Fire hose reels, Fire sprinkler and portable fire extinguishers of various type as per appropriate needs and requirements. The firewater shall be provided through a separate pressurized main. The relevant codes and standardhave been being followed in calculation and design of various parameters of the water supply,selection of equipment for the water supply, sanitary / plumbing, sewage disposal and fire protection systems. The related sections of following codes and standards shall be followed in thedesign of the above stated works.

ASTM	American Society for Testing and Material
NFPA	National Fire Protection Association (USA)
NPC	National Plumbing Code
ANSI	American Plumbing Code.
ASME	American Society of Mechanical Engineer
AWWA	American Water Works Association
BCP	Building Code of Pakistan

3.6.2. Water Supply

Water supply system shall consist of underground water storage tanks, water supply network & the internal plumbing works.

3.6.2.1. Source of Water

- Water will be provided from city supply connection. In case of water supply shortage, options to use groundwater and water tankers may be explored.

3.6.2.2. Underground Water Storage Tanks (UGWTs)

- UGWTs are located at Basement Floor.
- The UGWT is sub-divided into parts, to allow tanks to be isolated for maintenance.
    - 2 Underground Water Tanks – Potable: 97234.68 gal
    - 2 Underground Water Tanks – Non-Potable: 99709.06 gal.
    - 2 Underground Water Tanks – Firefighting: 70771.55 gal.
    - 2 Underground Water Tanks – Septic: 56965.31 gal

3.6.2.3. Overhead Water Storage Tanks (OHWTs)

- The supply from the Pump room is routed up to the Roof where Over Head Water Tanks (OHWT) of each tower are automatically filled with these pumps.
- OHWTs are located at Roof.
- The OHWTs comprises:
    - 1 Overhead Water Tanks – Potable: 18811.71 gal
    - 1 Overhead Water Tank – Non-Potable: 9405.85 gal
    - 1 Overhead Water Tanks – Firefighting: 9405.85 gal

3.6.2.4. Design of Water Supply System

- ✧ Pipe material used for water shall be of PPRc for internal plumbing works & G.I for external water supply network, pipe sizes shall be designed on the basis of total fixture units connected to the section.
- ✧ Table used to ascertain maximum numbers of fixture units that can pass through a pipe are adopted from National Plumbing Code USA.
- ✧ Conversion of plumbing fixture unit's ratings applicable to building units is adopted from Fundamental of Plumbing Design Volume.

3.6.2.5. Water Requirement

The estimated water demand for the entire project is about **48,750** Gallons/day.

Water consumption				
S. #	**Nature of Use**	**Minimum Quantity of Water Per User (US Gallons/day)**	**No. of Users/unit**	**Total Quantity of Water (US Gallons/day)**
For Residential Units				
1	Residential Units 276 Nos.	35	5	48,300
For Commercial Unit				
2	Showrooms 10 Nos.	15	2	300
For Recreational Area				
3	Recreational Area (Community Hall / others)	15	10	150
Total				**48,750**

3.6.2.6. Sewerage System

According to the Japan International Cooperation Agency (JICA) Master Plan for Karachi, it is estimated that 60 to 80% of water demand may be utilized for sewage generation. Therefore, assuming 80% of used water is converted into sewage, approximately 39,000 gallons per day of sewage water will be generated.

3.6.2.7. Storm Water Drainage

The storm water drainage shall be achieved through purpose made built-in slopes in the groundall around the structures and shall be terminated on gravity towards the Storm Water catchments/ gully's at the road side.

- ✧ Gravity drainage from building roofs to septic tank.
- ✧ Discharge of septic sank into nearby drain / *nallah*.

Following design criteria shall be adopted in his design of storm water drainage system.

- ✧ Local climate i.e., rainfall rate.
- ✧ Site conditions, elevation, water level and location of other utilities etc.

3.6.3. Fire Detection & Protection Systems

Fire protection system shall comprise of building fire hydrants, fire hose reels, fire sprinkler and portable fire extinguishers of various kind/types. The fire water shall be fed through a pressurizedmain to be installed all around the individual building/ block. Fire hydrant system including fire hoseconnection point hoses and nozzles to provide a readily accessible water supply for fire department or occupants of the project area to combat fire instantly.

3.6.3.1. Fire Detection & Alarm System

Fire detection & alarm system shall be designed as per scope of works & in line with the design requirements and is covered in the electrical system design.

3.6.3.2. Fire Protection Systems:

- ✧ Fixed Fire Protection System
- ✧ Portable Fire Protection System
- ✧ Fire sprinkler system

3.6.3.3. Design Codes & Standards

The following standards have been followed in the design of fire suppression system.

- ✧ NFPA-10 – Standard for Portable Fire Extinguisher.
- ✧ NFPA-13 – Standard for the Installation of Sprinkler Systems.
- ✧ NFPA-14 – Standard for the Installation of Stand Pipe, Private Hydrant, & Hose Systems.
- ✧ NFPA-20 – Standard for the installation of Stationary Pumps for Fire Protection.

- Building Code of Pakistan – BCP 2016

3.6.4. Electrical & Allied Works

The electrical design development of the Project has been carried out in accordance with the prevailing international standards and local regulatory authorities to ensure the ease of maintenance, economy and safety from shock and fire hazards.

3.6.4.1. Scope of Services

- Utility Power Supply from K.E
- Backup Generator Supply
- Power Distribution including Small Wiring and accessories
- UPS / Emergency Supply
- Lighting and Controls
- Earthing & Grounding
- Lightning Protection System
- Fire Alarm and Detection System
- CCTV Surveillance System
- Audio / Audio-Video Intercom System

3.6.5. Electricity Supply

For electricity supply, the source will primarily be Karachi Electric (KE) and solar panels mounted on the building. Additionally, generators are also available to ensure uninterrupted power in case of outages.

3.6.6. Gas Supplies

The gas supply for the project would be provided by the Sui Southern Gas Company (SSGC) Ltd. Approval from SSGCL for gas connection is being obtained.

3.7. Solid Waste Generation

Average garbage (MSW) generation in Sindh is estimated at 0.4 – 0.7 Kg per person per day (SSWMB). It is estimated that approximately 775 kg per day of solid waste will be generated from the project in case of 100% occupancy. The solid waste generate on site will be collected daily by a solid waste contractor who will disposeit off in a responsible manner. Numbers of trash bins will be located inside the building and peoplewill be appointed for collection of solid waste. Provision of garbage chute system is built in theproject design.

Table 3.4: Solid Waste Generation Calculations

S. #	Nature of Use	Average garbage (MSW) generation (kg/person/day)	No. of Users/Flat	Total Quantity of Solid Waste (kg/day)

For Residential Units				
1	Residential Units 276 Nos.	0.55	5	759
For Shops				
2	Showroom 10 No.	0.55	2	11
For Recreational Area				
3	Recreational Area (Landscaping and Open Spaces, Community Hall, Funeral Parlor etc.)	0.55	10	5.5
Total Solid Waste Generation (*estimated*)				**775.5**

3.8. Parking

Residents have designated parking on basement and ground floors. The parking lots are scanned by sensors to ensure appropriate parking spots. Handicap parking spots are kept close to the entrances. In total, there are 429 Car and 420 Motorcycle spots reserved.

Chapter 4 Description of Environment

4.1 Overview

Presented in this chapter of the EIA study are the findings of environmental and social baseline conditions of the project area in terms of its macroenvironment and microenvironment. Information available from literature relevant to baseline of the area, surroundings and Karachi was collected at the outset and reviewed subsequently. This was followed by surveys conducted by experts to investigate and describe the existing status and scenario.

The Project falls in to the appropriate category that permits the designated land-use by the relevant authority. Siting of the **SAAR Sky Icon** Project, at Plot No. 10/1, Sheet CL-09, Civil Lines Quarters, Karachi, (having site coordinates 24°50'42.7"N & 67°01'39.3"E), by M/s **SAAR Builders & Developers** is duly authorized.

The proposed project is planned in the environs of Civil Lines enclosed by Dr. Ziauddin Ahmed Road towards west, Brunton Road towards north, McIver Road towards south and Abdullah Haroon Road (formerly known as Victoria Road) towards east. Major landmarks near the proposed project are Chapal Skymark Tower, Marriott Hotel, Mövenpick Hotel and Karachi Club.

Broadly, the project site can be accessed by Shahrah-e-Faisal via Club Road and Abdullah Haroon Road. The project site is also reachable through Moulvi Tamizuddin (MT) Khan Road by means of Dr. Ziauddin Ahmed Road. The major primary roads at the immediate boundary of the project site are Brunton and McIver Roads. Sit pictures are shown in below figures:









Figure 4.1: Current Status of Project Site

4.2 Description of Physical Environment

4.2.1 Geology

Karachi is the part of major synclinorium stretching from Ranpathani River in the east to Cape Monze in the west, Mehar and Mole Jabal (Mountains) in the north. Within the synclinorium a number of structures such as Pipri, Gulistan-e-Jauhar, Pir Mangho and Cape Monze are exposed. The presence of concealed structures under the Malir River valley, Gadap and Maripur plains can fairly be deduced.

Rock aggregates, sand, limestone and clay are some of the potentials for gainful utilization. The area is underlain by rocks of sedimentary origin ranging in age from Eocene to Recent. Major structural trends and the basin axis strike generally south but with a “bulge” to the east also called Karachi Arc (Bender and Raza 1995).

4.2.2 Geomorphology of Karachi

Karachi is located in the south of Sindh, on the coast of the Arabian Sea. It covers an area of approximately 3,600 km^2, comprised largely of flat or rolling plains, with hills on the western and northern boundaries of the urban sprawl. The city represents quite a variety of habitats such as the sea coast, islands, sand dunes, swamps, semi-arid regions, cultivated fields, dry stream beds, sandy plains, hillocks.

Geomorphologically the urban land of Karachi region has been divided into seven zones based on the nature and origin of the surfaces[1]. These zones are listed and illustrated in below:

- Controlled Relief
- Pediment
- Alluvial Fillings
- Dissected Erosional Surfaces
- Dissected Plateau
- Coastal Area And The

[1] Hamid, G., Hassan, K., Bilal, M., & Siddiqui, S. N. (2019). Soil Classification as a Tool for Evaluating Soil Behavior as Foundation Materials. *International Journal of Economic and Environmental Geology*, 41-46.

- Peripedement

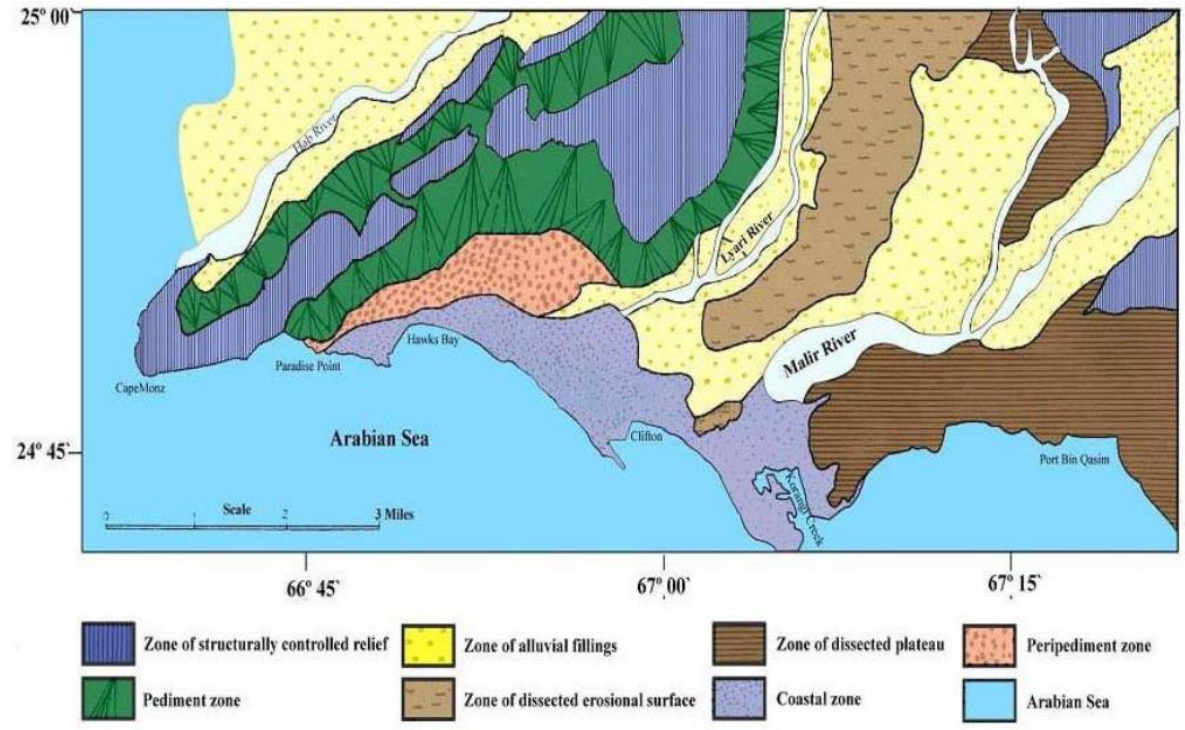


Figure 4.1: Geomorphological Zones of Karachi Region

(Source: Hamid et al., 2019)

In each of these zones the dominant processes of denudation, the relief and the landform assemblages have been distinguished to asses and evaluate the ever-growing effects of population increase and construction of civil structures of varying magnitudes. Each of the above zones are significant geomorphic features and need due consideration to facilitate in assessing the textural characteristics of foundation material for the construction of safe civil structures of various types and laying of other related demographic facilities like sewage, water supply, roads and telecommunication lines on scientific ground and to cope with the existing problems in this connection.

Classified according to physiographic features, Karachi City District can be divided into three broad categories: Hilly Region (Mountain Highland), Alluvial Plain (Piedmont Plain) and Coastal Areas (Valley Floor). The metropolitan area is divided by two non-perennial river streams namely Lyari and Malir Rivers. The Malir River flows from the east towards the south and centre, and the Lyari River flows from north to the south west. Gujjar and Orangi are the two main tributaries of the Lyari River while Thaddo and Chakalo are the main tributaries of the Malir River. The dry weather flow of both rivers carries urban sewage that is ultimately drained in the Arabian Sea. Among the various physiographic features, low flat-topped parallel hills devoid of vegetation, interspersed with widespread plains and dry riverbeds are the main topographic characteristics of the city.

The greatest height of the region is 250 ft that gradually decreases to 5 ft above mean sea level

along the coastline. The Karachi Harbour is a sheltered bay to the south-west of the city, protected from storms by the Sandspit Beach, the Manora Island and the Oyster Rocks.

The Arabian Sea beach lines the southern coastline of Karachi. Dense mangroves and creeks of the Indus delta can be found towards the south east side of the city. Towards the west and the north is Cape Monze, an area marked with projecting sea cliffs and rocky sandstone promontories.

4.2.3 Soil

A program of Sub-Soil investigation was performed at the project site in order to obtain the required geo-engineering information for the design of foundations (soil investigation report is attached in Annexure I). The task of geo-technical investigation was entrusted to Soil Testing Services.

The program of investigation comprised drilling of 05 no. boreholes; 02 up to the depth of 40.0 meters and 03 up to the depth of 30.0 meters below existing ground level soil. Drilling was accomplished by Rotary Method. Standard Penetration Tests (SPTS) were conducted. The SPI's were performed in accordance with ASTM Designation D-1586 on soil.

During the course of sub-soil investigation, samples recovered from Split Spoon Sampler in SPT were preserved in plastic bags. All these samples were marked for the number of boring and depth and carefully transported to soil laboratory. Selected Core samples were waxed to preserve moisture.

Subsurface Characteristics: The subsoil conditions are quite homogeneous, as observed from 05 Bore Holes drilled at site up to a maximum depth of 100 feet. Following stratum was observed:

Layer I:

- Fill Material
- Concrete / Rubble / Gravels sand etc

Layer II:

- Fill Material
- Yellowish Brown, fine silty sand organic / roots / bushes etc

Layer III:

- Grey / Brown, dense to very dense, well
- graded, clayey SAND, fine gravels

Layer IV:

- Brown, very stiff, thin bedded
- SHALE, some sand / gravels
- lenses of Conglomerate

Layer V:

- Grey / Brown, very dense, fine grained
- Cemented SAND / SILT
- lenses of stiff Shale / Conglomerate

Layer VI:

- Grey, friable, fine grained
- SANDSTONE
- lenses of Conglomerate / Shale

Layer VII:

- Grey, medium hard, fractured
- CLAYSTONE / SILTSTONE
- lenses of Sandstone / Conglomerate

Layer VIII:

- Grey, well cemented, fine grained
- SANDSTONE / LIMESTONE
- lenses of Siltstone / Shale

Ground Water Observation: Observations were made in bore holes for determining the position of ground water at the project site. Groundwater was available at 07 – 08 feet depth.

Subsurface Characteristics: The subsoil conditions are quite homogeneous, as observed from 05 Bore Holes drilled at site up to a maximum depth of 100 feet.

4.2.4 Seismicity

Seismotectonic Study for macroenvironment of Project site aims at elucidating the impact of tectonic movement induced seismicity on the microenvironment. Karachi is Pakistan's largest city with population exceeding 18 million and is amongst the top five most congested cities in the world. Karachi has experienced no earthquake related damage in the recorded history of past ~ 175 years. Yet, Karachi is located in a seismically active tectonic setting often compared to Los Angeles with active plate boundary faults and triple junctions within a radius of ~ 150 km. This discrepancy in earthquake history and seismotectonic setting has led to diverse seismic hazard assessments for Karachi ranging from assignment of seismic hazard zones I (least severe) to IV (most severe). The Building Code of Pakistan (2007) assigns an intermediate seismic hazard value of 0.16–0.24 g (Zone IIB) to Karachi, which is broadly accepted but sometimes criticized to be an underestimation. A recent study entitled "*Seismic sources for southern Pakistan and seismic hazard assessment of Karachi*"[2], based on a new

[2] Waseem, M., Khan, M. A., & Khan, S. (2019). Seismic sources for southern Pakistan and seismic hazard assessment of Karachi. *Natural Hazards*, *99*(1), 511-536.

active faults compilation and seismic sources definition together with incorporation of maximum possible information on historical earthquakes (up to 893AD), has led to a re-assessment of seismic hazard for Karachi using probabilistic and deterministic seismic hazard assessment approaches. The main findings of this study are:

- Karachi is assessed to be prone to ground motions ~ 0.25 g with metropolitan areas having hazard values between 0.21 and 0.25 g for 10% probability of exceedance in 50 years (475-year return period).
- The deterministic seismic hazard analysis suggests maximum that peak ground acceleration (PGA) varies from 0.19 to 0.99 g in Karachi and its higher values are concentrated around the Nagar Parker fault that is controlling and hazardous for Karachi.

Despite a safe seismic history spanning past about 175 years, Karachi is located in a tectonic setting, which is considered amongst the most active in the world. The active Chaman transform fault marking plate boundary between the Indian and Eurasian plates is located only 120 NW of Karachi. Karachi itself is located at the southern tip of N–S trending Kirthar active foreland thrust-fold belt at the western deformed edge of the Indian plate. The triple junction between the Indian, Arabian and Eurasian Plates is located 110 km to the SW of Karachi.

Seismic activity in the region is the result of the triple junction as well as the Karachi Arc, located in southeastern Pakistan, as a large fold and thrust belt that shows Neogene thin-skinned eastward movement. Seismic activity in and around the region shows that the Karachi Arc has been active since long in prompting the eastward movement of the delta. It is possible that the movement is related to the rebound that takes place after mass shift. Sarwar has suggested that the eastward creep of Karachi Arc is directly related to active subsidence of the Hyderabad graben that underlies it and also defines the northern and southern limits of the Karachi Arc.[3]

It may be added that subsidence such as that on Southern coast of Sindh, occurs naturally as a result of plate tectonic activity above active faults, and in places where fluid is expelled from underlying sediments and is common at river deltas that may have receded. Earthquakes arise and result from the release of the force along the growth fault plane. As a result, many different growth faults are created as sediment loads shift basin ward and landward.

4.2.4.1 Seismic Coefficient

According to uniform building code (1997) the soil profile type of the project falls in category "Sc" corresponding to "Soft Rock/Very Dense Soil". Details are annexed in Subsoil Geotechnical Investigation Report. Following parameters can be adopted:

Seismic Zone	= 2B
Zone Factor	= 0.2
Soil Profile Type	= Sc
Seismic Coeff. "Ca"	= 0.24

[3] Sarwar, G., 2004. Earthquakes and the Neo-Tectonic Framework of the Kutch-Hyderabad-Karachi Triple Junction Area, Indo-Pakistan. Pakistan Journal of Hydrocarbon Research, 14, 35-40.

Seismic Coeff. "Cv" = 0.32

4.2.4.2 Earthquakes

Historically the coastal region has suffered a number of earthquakes. Detailed review of the geological history including the modern time reveals the occurrence of deep-sea earthquakes at different times, throughout history in the North Arabian Sea, as presented below:

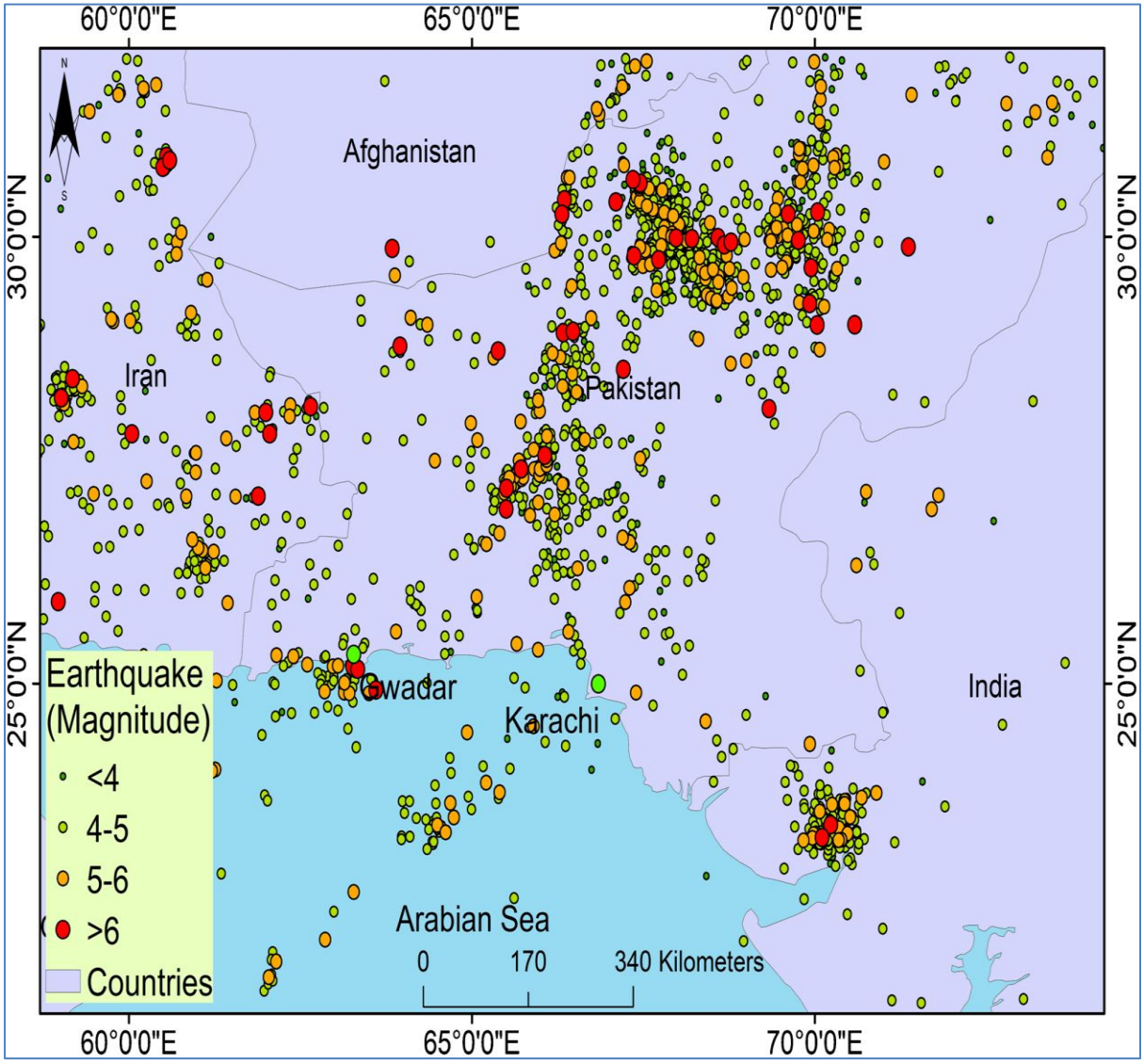


Figure 4.2: Earthquake recorded (1950–2019) in the Arabian Sea and its surroundings[4]

4.2.4.3 Seismicity of the Site

According to the Uniform Building Code (1997), Karachi and its adjoining areas fall in Seismic

[4] Aslam, B., Ismail, S., & Maqsoom, A. (2020). Geospatial mapping of Tsunami susceptibility of Karachi to Gwadar coastal area of Pakistan. *Arabian Journal of Geosciences*, *13*(17), 1-12.

Zone-2B.

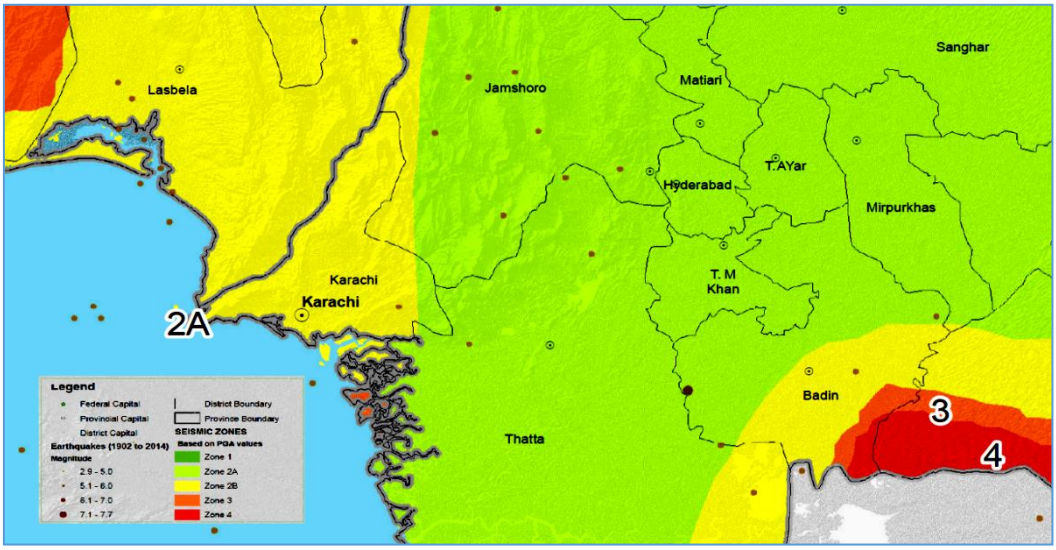


Figure 4.3: Seismic Zones in Karachi[5]

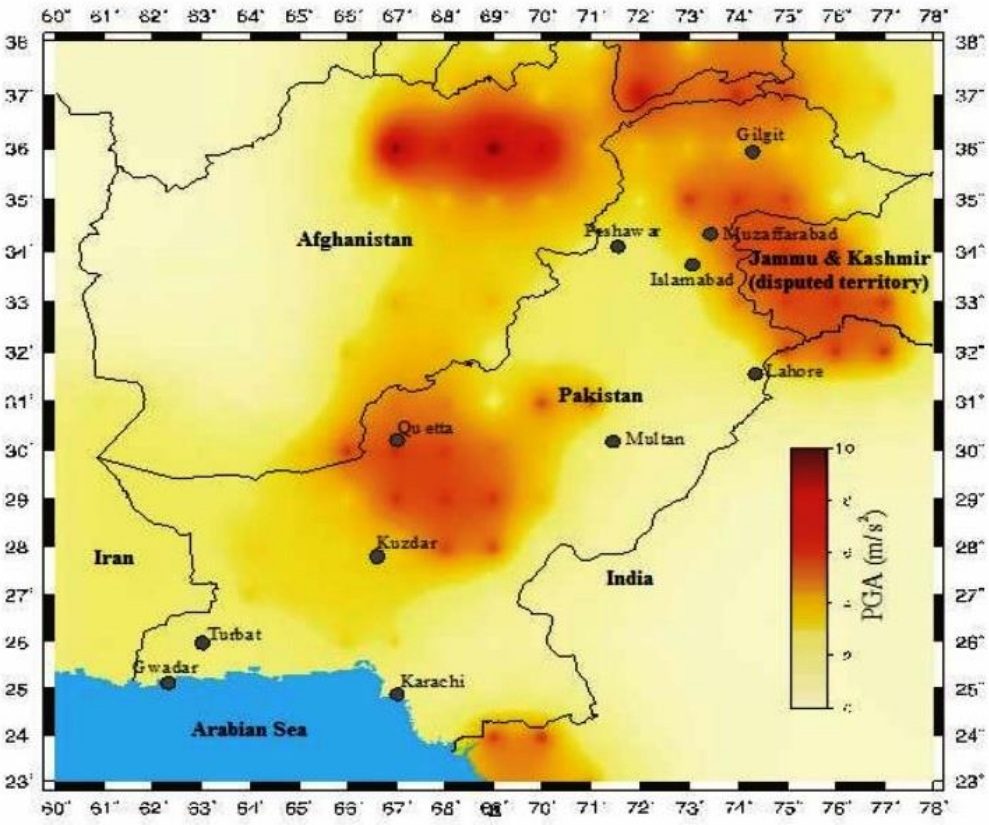


Figure 4.4: Seismic Hazard for Pakistan in terms of Peak Ground Acceleration (PGA)[6]

4.2.4.4 Liquefaction Features Caused by Earthquake

Liquefaction is a total loss of strength due to undrained restructuring. Disturbance, by shearing or vibration, destroys soil skeleton, with loss of grain contact and decrease of porosity, soil load is transferred to pore water, water pressure>normal stress=0, and soil acts as a liquid.

[5] Map data source(s): PMD, GSP, Pakistan Engineering Council – Prepared by Al Hasan Systems Private Ltd.
[6] PMD Seismic Monitoring and Early Tsunami Warning Centre - http://seismic.pmd.gov.pk/seismicnew/map2.html

Drainage reduces pore water pressure, allows grain contact and thixotropic recovery of strength[7]. Strong shaking produces liquefaction in the fine sands and silts during the earthquake. This causes the mineral grains to settle and expel their interstitial water to the surface. If the pore-water pressure rises to a level approaching the weight of overlying soil, the granular layer behaves as a viscous liquid rather than a solid and leads to collapse of even engineered structures. Liquefaction has been abundant in areas, where groundwater lies within 10 meters of the ground surface[8]. Investigators typically have designated sites as "Liquefied" on the basis of the presence of surficial liquefaction features, such as venting of sediment to the surface (i.e., sand boils), ground cracking associated with liquefaction (e.g., lateral spreading), or surface settlements. Other evidence of liquefaction includes tilting or settling of overlying structures and floating of underground structures[9]. A study investigated the "sinking" of a water tower in 2006 near Clifton area and speculated about liquefaction due to mild earthquakes[10].

4.3 Meteorology and Climate

Karachi has an arid climate (Köppen Climate Classification: BWh) dominated by long summer season but moderated by marine influence from the Arabian Sea[11]. There is a minor seasonal intervention of a mild winter from mid-December to mid-February followed by a long hot and humid summer extending from April to September, with monsoon rains from July to mid-September. The characteristic climatic feature of the four seasons of Karachi is presented in Table 4.1.

Table 4.1: Seasonal Characteristics of the Climate of Karachi

Season	Temperature	Rainfall	Wind
Summer (Mid-March to Mid-June)	The summer is hot with temperature increasing from 26.2 °C in March, rising up to 40 °C in June.	There are less frequent rain showers in summer with no more than 1 or 2 rainy days in summer. Average total amount of rain in summer is around 10 mm	The wind speed in summer is variable. It is around 2.5 m/s in March and rises up to 18 m/s in April and drops to 4 m/s for the rest of the season. The direction mostly remains blowing from West
Monsoon (Mid-June to mid-September)	The temperature in monsoon remains high but relatively lower than summer	Almost 80 % of the yearly rain occurs in the monsoon with July and August being the	The wind direction in the monsoon is mostly blowing from East.

[7] Waltham, T. (2009). *Foundations of engineering geology*. CRC Press.
[8] Hussain, V., Sheikh, S. A., Tabrez, A. R., & Anjum, S. (2004). Liquefaction effects of Bhuj earthquake on Thar, Indus delta region of Sindh, Pakistan. *Segmite International*, *1*(1), 39-42.
[9] Olson, S. M., & Stark, T. D. (2002). Liquefied strength ratio from liquefaction flow failure case histories. *Canadian Geotechnical Journal*, *39*(3), 629-647.
[10] Mahmud, S. A., & Sheikh, S. A. (2008). Earthquake Shocks and Liquefaction Threat to Dha and Clifton areas, Karachi Pakistan. A Case Study. In *Geotechnical Engineering for Disaster Mitigation and Rehabilitation* (pp. 398-405). Springer, Berlin, Heidelberg.
[11] https://en.climate-data.org/asia/pakistan/sindh/karachi-992367/

	and oscillates around 32°C.	wettest month.	
Post-Monsoon Summer (Mid-September to November)	The average temperature post monsoon drops and average min temperature may reach 12 °C in November.	The post-monsoon period remains mostly dry and rainfall in November is around 1.8 mm.	The wind speed in September is around 3.7 m/s and drops to 1.4 m/s in November.
Winter (December to mid-March)	The winter is mild with January being the coolest month where average minimum temperature falls to 6 °C.	Like the other seasons, except monsoon, there is little occasional rainfall. The rainfall in winter is less than 50 mm.	The wind speed in the winter season increases from 1.4 m/s in December to 2.6 m/s in March. The wind direction for most part winter season is blowing from NE and changes its course to blowing from West in early March

4.3.1 Temperature

The air temperature in Karachi Division and its coastal areas are generally moderate throughout the year due to presence of sea. Climate data generated by the meteorological station at Karachi Air Port represents climatic conditions for the region. The mean monthly maximum and minimum temperatures, recorded during 2001-2023 in Karachi to describe the weather conditions are shown in Table 4.2 and 4.3 respectively.

Table 4.2:Mean Monthly Maximum Temperature °C

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2001	27.2	29.6	33.1	34.6	35.1	34.9	32.2	32.3	33.1	36.0	33.5	30.4	32.7
2002	27.0	28.2	33.3	35.4	35.6	35.1	32.2	31.6	31.4	36.5	32.7	28.1	32.3
2003	27.6	28.5	32.4	36.6	35.7	34.9	34.1	32.6	32.5	37.0	32.2	28.3	32.7
2004	26.6	29.9	36.2	35.4	36.8	35.6	33.8	32.7	32.8	33.7	33.1	29.4	33.0
2005	24.9	26.3	31.5	35.3	35.4	36.0	33.2	32.2	34.2	35.2	33.1	28.4	32.1
2006	26.0	31.3	31.8	34.0	34.6	35.3	33.8	31.0	34.2	35.0	33.4	26.3	32.2
2007	26.9	29.4	31.4	37.7	36.0	36.4	N/A	N/A	N/A	N/A	N/A	N/A	33.0
2008	24.4	26.9	34.3	34.4	33.9	35.1	33.5	31.9	34.7	35.5	32.5	27.2	32.0
2009	26.2	29.8	33.0	36.0	36.8	35.7	34.5	33.0	32.8	35.9	33.0	28.6	32.9
2010	27.5	29.2	34	35.7	36.5	34.7	34.6	33.2	34.5	35.9	32.7	28	33.0
2011	26.9	28.5	33.2	35.8	35.3	35.3	34.2	32.8	32.9	N/A	N/A	N/A	N/A
2012	25.7	26.9	31.7	35.1	35.5	34.6	33.2	32.7	33.2	35.0	32.7	28.2	32.0
2013	26.7	28.0	33.3	34.0	35.1	36.5	33.8	32.1	33.0	35.7	32.3	28.3	32.4
2014	25.5	28.0	31.7	35.1	35.9	36.5	34.0	33.7	33.8	36.3	32.9	28.7	32.7
2015	26.3	28.9	31.5	35.9	36.0	37.7	34.1	32.3	34.6	35.8	33.0	28.6	32.9
2016	27.8	30.3	33.3	34.7	35.7	36.1	33.6	33.0	32.9	34.0	33.3	31.0	33.0
2017	25.4	30.2	32.8	35.5	36.2	36.3	33.1	33.8	33.4	36.6	32.3	28.2	32.8
2018	28.5	30.4	34.4	36.2	38.7	35.4	33.8	31.9	32.6	36.8	33.8	28.2	33.4
2019	26.3	26.8	31.3	35.4	36.0	37.2	34.7	32.5	35.7	35.8	31.5	27.1	32.5

Table 4.2:Mean Monthly Maximum Temperature °C													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2020	24.3	30.1	31.2	36.2	36.6	37.3	36.7	34.6	35.0	36.2	31.4	28.1	33.1
2021	26.6	31.3	34.6	37.3	37.5	36.1	34.5	32.6	36.3	34.8	34.0	27.6	33.6
2022	24.6	30.1	35.2	37.4	36.8	35.7	33.3	32.1	33.7	35.7	32.9	29.6	33.1
2023	25.6	30.9	33.3	34.5	35.5	35.9	35.0	31.4	34.4	35.1	33.0	29.4	32.8
Source: Pakistan Meteorological Department													

Table 4.3: Mean Monthly Minimum Temperature °C													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2001	11.5	14.9	19.6	23.8	28.1	29.0	27.1	26.5	25.9	24.4	18.6	15.8	22.1
2002	12.8	13.8	19.5	23.9	27.0	28.2	29.6	25.6	24.8	22.5	17.7	14.9	21.7
2003	12.7	16.9	19.8	24.2	26.5	28.2	23.6	27.0	25.3	20.9	15.2	12.0	21.0
2004	12.9	14.5	19.1	24.8	27.3	28.8	27.5	26.3	25.3	22.4	18.0	15.4	21.9
2005	12.3	11.3	20.3	23.0	26.4	28.3	27.2	26.6	26.6	22.9	18.9	13.0	21.4
2006	11.7	18.1	19.6	24.5	27.5	28.5	28.3	26.3	26.8	25.7	19.4	14.0	22.5
2007	13.0	17.3	19.7	24.7	27.6	28.6	N/A	N/A	N/A	N/A	N/A	N/A	21.8
2008	10.1	11.1	19.6	24.0	27.3	29.1	27.9	26.8	26.6	23.8	17.6	14.9	21.6
2009	14.7	16.5	20.8	23.8	27.6	28.7	28.1	27.5	26.5	22.6	17.0	13.9	22.3
2010	12.2	14.7	21.3	25.1	28	28.2	28.3	27.2	25.8	23.9	17.4	11.1	21.9
2011	11	14.5	19.7	23.1	27.1	28.8	27.8	28.6	26.5	N/A	N/A	N/A	N/A
2012	11.2	11.9	19.1	24.5	27.2	28.0	27.9	26.9	26.4	22.7	18.6	14.2	21.5
2013	11.6	15.1	19.2	24.2	27.1	29.3	28.0	26.6	25.5	25.4	18.1	13.0	21.9
2014	9.9	13.1	18.9	24.4	27.0	29.2	28.3	27.1	26.8	23.3	19.5	13.1	21.7
2015	12.6	16.4	19.2	25.7	27.7	29.8	28.4	26.9	26.3	24.9	18.6	12.6	22.4
2016	14.8	14.9	21.7	24.6	27.9	27.9	28.1	27.1	26.4	24.0	17.1	15.5	22.5
2017	12.5	18.2	20.3	24.4	27.8	29.2	27.7	27.0	26.2	23.5	16.8	13.0	22.2
2018	12.9	15.8	20.9	25.3	27.7	28.8	28.1	26.3	25.5	23.0	19.3	13.1	22.2
2019	13.3	15.3	19.0	24.0	26.6	28.9	28.1	26.8	27.2	24.0	19.4	13.7	22.2
2020	10.8	15.3	19.1	24.7	27.7	29.7	29.4	28.1	27.3	22.7	16.0	12.5	21.9
2021	9.2	15.0	21.6	25.1	28.9	29.6	28.5	27.4	28.0	23.1	17.6	13.9	22.3
2022	12.8	15.9	21.6	25.5	28.1	28.6	27.4	27.1	26.8	22.7	19.3	13.2	22.4
2023	10.6	15.4	20.9	24.3	27.5	29.3	28.9	27.0	27.1	25.7	20.0	14.8	22.6
Source: Pakistan Meteorological Department													

4.3.2 Precipitation

The main source of precipitation is rainfall which is received mostly in the months of July to September during SW Monsoon winds. It is very erratic as some years are very dry and there is no rain. The average rainfall is 217 mm and most of it is received in the month of July.

Occasional winter rains are also received in the months of December –February as result of NE winds which count 15-25% of total rainfall.

Table 4.4: Monthly Amount of Precipitation (mm) at Karachi Airport													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2001	0.0	0.0	0.0	0.0	0.0	10.6	73.6	16.2	N/A	0.0	0.0	0.0	33.46
2002	0.0	2.4	0.0	0.0	0.0	N/A	N/A	52.2	N/A	0.0	0.5	0.4	13.87
2003	6.4	21.8	0.0	0.0	0.0	16.3	270.4	9.8	N/A	0.0	0.2	0.0	54.15
2004	13.7	0.0	0.0	0.0	0.0	N/A	3.0	5.6	N/A	39.3	0.0	4.3	13.18

2005	6.6	12.8	N/A	0.0	0.0	N/A	N/A	0.3	54.9	0.0	0.0	17.1	18.34
2006	N/A	0.0	N/A	0.0	0.0	0.0	66.2	148.6	21.9	0.0	3.1	61.3	60.22
2007	0.0	13.2	33.4	0.0	0.0	110.2	N/A	N/A	N/A	N/A	N/A	N/A	52.26
2008	8.0	Trace	1.1	0.0	0.0	0.0	54.0	37.5	Trace	0.0	0.0	21.0	24.32
2009	3.0	Trace	0.0	Trac e	0.0	2.6	159.9	44.0	68.9	0.0	0.0	1.5	55.68
2012	0.2	0.0	0.0	0.0	0.0	Trace	Trace	8.1	121.0	0.0	0.0	22.8	152.1
2013	Trace	20.0	2.8	30.0	0.0	Trace	5.5	105.4	4.0	1.2	0.0	0.0	168.9
2014	Trace	0.0	12.4	0.0	1.3	Trace	1.1	9.9	1.4	0.0	4.6	0.0	30.7
2015	0.3	2.1	2.8	0.0	0.0	Trace	46.6	1.4	Trac e	0.0	0.0	0.0	53.2
2016	3.1	0.0	Trace	0.0	0.0	65.8	1.9	96.9	Trac e	0.0	0.0	0.0	167.7
2017	41.5	Trace	0.0	0.0	0.0	58.8	33.3	65.6	26.4	0.0	0.0	6.6	232.2
2018	Trace	Trace	0.0	0.0	0.0	Trace	Trace	0.8	Trac e	0.0	0.0	Trac e	0.8
2019	39.4	Trace	2.2	0.0	0.0	1.6	66.3	204	51.7	1.2	Trac e	Trac e	367.3
2020	Trace	2.6	0.5	0	0	Trace	101.2	366.8	Trac e	0	3.1	0	474.2
2021	0	0	0	0	0	Trace	45.4	Trace	88.3	17. 2	0.0	16.9	167.8
2022	28.5	0.4	0	0	0	21.6	348.3	127.9	43.4	0	2.6	0	572.7
2023	0.0	0.0	5.7	2.2	14.9	4.0	40.4	Trace	4.6	0.0	5.5	0.0	77.3
Source: Pakistan Meteorological Department													

The record for rainfall of PMD at Karachi Airport (2001-2023) suggests that July and August are the wettest months and that the maximum rainfall recorded in Karachi during 2001-2023 period was 270.4 mm during the month of July 2003, while the maximum annual rainfall was 372.9 mm during the year 2010, followed by 474.2 mm in 2020 and 572.7 mm in 2022.

The probability that precipitation will occur has been found to vary from different days of July and August at Karachi throughout the 1992-2012 period. Precipitation most likely occurs around August 4, in 35% of all days. Precipitation is least likely around April 27, occurring in 2% of all days.

Thunderstorms are the most severe type of precipitation observed during days was 38% precipitation. They are most likely around August 12, when it is observed during 12% of all days. Drizzle is the most severe precipitation observed during 34% of those days with precipitation. It is most likely around July 30, when it is observed during 14% of all days. Moderate rain is the most severe precipitation observed during 22% of those days with precipitation. It is most likely around July 28, when it is observed during 8% of all days. When precipitation does occur, it is most often in the form of thunderstorms (40% of days with precipitation have at worst thunderstorms) and cloud burst, drizzle (36%), moderate rain (19%), and light rain (5%).[12]

[12] *Average Weather for Karachi (https://weatherspark.com/averages/32864/Karachi-Sindh-Pakistan).*

Inundation due to Heavy Rainfall Events: Highest rainfall events have occurred in July 1994: 256.3mm, July 2003: 270.4mm and August 2006: 77mm in 3 hours. According to observations recorded for the year 2007, August 10 and 11 were witnesses to unusually high rainfall of 107 mm in 24 hours compared with the normal of about 60 mm for August. The wettest August ever experienced by the city was in 1979, when over 262mm of rainfall was recorded. The record for the maximum rainfall within 24 hours in the eighth month was 166mm of rain on August 7, 1979. The heavy rainfall was not unusual since it was caused by the general monsoon system that travels from across Rajasthan and lays over Sindh. The monsoon weather system did not move towards Baluchistan but the penetration of moist currents from Sindh brought scattered to heavy rain in southern Baluchistan, particularly along its coastal regions. Major inundation and land submergence was noticed in Karachi in July 2003 and August 2006. On both occasions, precipitation pattern and intensity were almost similar. The downpour on both occasions was a cloud burst. For estimating the impact of inundation on the six corridors, the maximum intensity of Rainfall of 18th August 2006 at 77mm in about 3 hours i.e., 25.7mm/hour will be considered critical and adopted for making estimates on land submergence.

4.3.3 Humidity

The relative humidity typically ranges from 25% (dry) to 70% (humid) over the course of a year, rarely dropping below 20% (very dry) and reaching as high as 90% (very humid).

Table 4.5: Mean Monthly Relative Humidity (Mean) at 1200 UTC (%)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2014	25.0	27.0	35.0	47.0	57.0	61.0	64.0	61.0	60.0	36.0	36.0	31.0	45.0
2015	38.0	41.0	37.0	45.0	60.0	56.0	69.0	67.0	56.0	47.0	28.0	31.0	47.9
2016	46.0	25.0	41.0	47.0	60.0	60.0	68.0	70.0	63.0	57.0	34.0	38.0	50.8
2017	38.0	25.0	36.0	44.0	59.0	62.0	70.0	67.0	63.0	44.0	29.0	20.0	46.4
2018	36.0	37.0	33.0	45.0	46.0	65.0	65.0	68.0	63.0	40.0	32.0	30.0	46.7
2019	40.4	33.9	36.6	48.0	55.6	58.8	64.8	72.6	67.6	41.1	34.6	29.7	48.6
2020	29.9	28.1	34.2	44.4	57.1	56.8	65.0	74.8	62.4	38.1	32.9	29.1	46.1
2021	31.3	34.1	41.2	43.3	54.3	60.3	67.5	64.5	63.0	46.5	27.6	38.7	47.7
2022	40.5	39.1	37.7	47.1	55.3	62.1	74.7	79.1	66.3	42.0	49.4	36.5	52.5
2023	25.5	42.2	39.3	46.7	57.7	62.4	67.8	71.0	59.5	54.9	32.5	28.7	49.0

Source: Pakistan Meteorological Department

4.3.4 Wind Speed & Direction

The wind direction and speed between the summer and winter monsoon seasons are rather unsettled and large variations are noted both with respect to speed and direction.

Table 4.6: Wind Speed (m/s) at 12:00UTS

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2001	2.6	3.4	4.3	5.6	7.5	8.1	6.8	7.3	5.5	3.7	2.0	2.4	4.9
2002	3.6	3.9	4.0	6.5	8.5	8.2	9.8	7.3	7.7	3.3	2.9	3.2	5.7
2003	4.0	5.0	5.4	5.2	7.7	8.8	6.7	7.1	6.0	3.2	3.1	3.0	5.4
2004	3.4	3.7	4.0	6.0	8.0	9.0	10.0	9.5	7.3	3.8	1.0	2.5	5.7
2005	3.6	4.2	4.8	5.1	7.1	7.5	9.0	6.9	6.4	3.9	2.0	1.5	5.2
2006	2.0	3.0	3.0	6.2	8.0	7.7	8.3	6.2	4.7	4.2	2.2	3.0	4.9
2007	2.0	3.7	4.0	4.0	6.0	6.3	N/A	N/A	N/A	N/A	N/A	N/A	4.3
2008	4.3	7.6	8.2	10.5	12.6	7.6	11.0	9.3	8.7	6.6	5.1	3.9	7.9

2009	7.0	7.2	7.9	9.3	9.8	9.7	9.5	9.3	9.1	6.1	5.0	3.9	7.8
2012	5.8	6.6	9.3	9.8	12.3	12.8	13.1	11.2	8.4	7.1	5.7	5.8	9.0
2013	5.2	6.9	9.0	10.3	11.5	10.8	12.0	11.2	10.3	7.7	5.1	4.5	8.7
2014	5.9	8.9	8.6	11.5	12.4	13.4	12.8	11.6	11.7	8.3	6.0	4.5	9.6
2015	6.9	10.3	10.1	11.5	12.8	12.3	13.7	12.3	10.5	8.7	5.6	5.8	10.0
2016	7.5	8.7	4.8	1.1	13.0	11.7	11.8	10.5	12.1	9.2	5.5	5.2	8.4
2017	7.0	8.0	10.8	12.1	12.8	11.5	12.1	10.3	8.7	8.5	5.4	7.4	6.9
2018	6.3	7.0	9.5	10.2	10.8	11.1	12.3	12.4	12.2	8.7	6.1	6.8	9.4
2019	6.7	8.9	10.2	11.7	12.1	11.7	13.7	9.1	8.5	8.0	6.9	7.4	9.6
2020	9.0	9.4	9.0	10.5	13.3	10.9	10.1	8.9	9.4	7.3	6.2	5.5	9.1
2021	6.1	7.6	9.7	8.5	11.7	12.7	12.6	11.1	8.8	8.1	6.7	6.6	9.2
2022	6.8	7.9	8.9	9.9	12.5	12.5	9.5	7.0	8.8	7.0	6.1	4.8	8.5
2023	7.0	7.7	9.2	10.1	11.7	11.5	11.3	12.3	9.1	7.9	6.9	6.6	9.3
Source: Pakistan Meteorological Department													

Table 4.7: Wind Direction at 12:00UTS

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2001	S54W	S43W	S42W	S45W	S46W	S45W	N52W	S59W	S44W	N56W	S45W	S06W
2002	S67W	S52W	S51W	S55W	S51W	S42W	S54W	S45W	S48W	S56W	N54W	S41W
2003	S60W	N50W	S45W	S48W	S45W	S68W	S60W	S47W	S43W	S54W	S50W	S27W
2004	N27E	S46W	S53W	S49W	S52W	S54W	S54W	S62W	S56W	S47W	S45W	N86E
2005	N63E	S51W	S50W	S52W	S63W	S48W	S54W	S49W	S87W	S54W	S52W	N23W
2006	S48W	S62W	S50W	S57W	S64W	S60W	S67W	S78W	S51W	S53W	S49W	N79E
2007	S30W	S62W	S47W	S55W	S58W	S47W	S41W	S55W	S60W	S48W	S48W	N45E
2008	N45E	S47W	S54W	S51W	S52W	S39W	S50W	S52W	S46W	S39W	S38W	N
2009	N45E	S45W	S41W	S58W	S46W	S46W	S56W	S49W	S56W	S42W	S39W	S45E
2012	S3E	N56E	S62W	S46W	S61W	S51W	S66W	S51W	S53W	S41W	S41W	N9W
2013	N39W	S54W	S56W	S54W	S61W	S40W	S53W	S52W	S55W	S47W	S17W	N50W
2014	S72E	S54W	S43W	S46W	S46W	S45W	S54W	S48W	S85W	S45W	S49W	S45E
2015	S72E	S54W	S43W	S48W	S50W	S40W	S54W	S55W	S50W	S41W	S	S58W
2016	S43W	S36W	S48W	S54W	S54W	S45W	S48W	S36W	S51W	S45W	S43W	S36W
2017	S83E	S56W	S51W	S45W	S45W	S44W	S66W	S57W	S48W	S51W	S59W	N45E
2018	S39W	S39W	S46W	S51W	S50W	S45W	S45W	S48W	S46W	S46W	S42W	S18W
2019	S24W	S65W	S45W	S44W	S42W	S37W	S48W	S46W	S53W	S35W	N59E	N55E
2020	N31E	S12W	S52W	S55W	S49W	S44W	S47W	S55W	S47W	S38W	S4E	N35E
2021	S21W	S38W	S44W	S42W	S52W	S53W	S55W	S48W	S40W	S41W	S22E	S40E
2022	N45E	S54W	S57W	S59W	S57W	S56W	S62W	S59W	S60W	S48W	S32W	S32W
2023	S22E	S45W	S40W	S58W	S65W	S38W	S56W	S74W	S57W	S53W	S40E	S84E
Source: Pakistan Meteorological Department												

4.3.5 Urban Heat Island (UHI) Effect

The term "heat island" describes built environment that are hotter than nearby natural areas. An urban heat island refers to a city or metropolitan area that is significantly warmer than its surrounding natural areas due to human activities. The temperature difference usually is larger at night than during the day and is most apparent when winds are weak. UHI is most noticeable during the summer and winter seasons. It is estimated that the annual mean air temperature of a city with 1 million or above inhabitants can be 1–3°C warmer than its surroundings. In the evening, the difference can be as high as 12°C. The heat island can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water quality.

The city of Karachi has been growing exponentially in terms of urbanization and population

growth. The city hosts more than 20 million population with a growth rate of 4.10[13]. Rapid urbanization and global warming have initiated UHI effect over the city. A strong incidence of UHI is generally associated with a severe heat wave hazard in terms of sensible temperature. UHI effect is the unique feature of the June 2015 heat wave in Karachi. It is expected that with growing global warming incidence and poor coping strategies, UHI would become a major health risk for the vulnerable segment of population in mega-cities around the globe such as Karachi.

Causes of Urban Heat Island Effect: The principal reason for the night time warming is the retention of short-wave solar radiation absorbed during the day time by the building material consisting of concrete and asphalt. These materials are commonly used in urban areas for pavement and roofs that have significantly different thermal and radiative properties compared to the surrounding rural areas. This causes a change in the energy balance of the metropolitan area, often leading to higher temperatures than surrounding rural areas. This energy is then slowly released during the night as a long wave radiation, making cooling a slow process. Because of this phenomenon, the minimum temperatures of Karachi remained extremely high during the heat-wave event.

There are several causes of an urban heat island effect in Karachi.

- Reduced and slow process of evapotranspiration due to shrinking green areas and spaces in the city. With a decreased amount of vegetation, the city loses the shade, cooling effect of trees and the removal of carbon dioxide.
- Geometric effects in terms of rising number of tall buildings are a significant contributing factor to urban heat island effect. Over the years, the number of tall buildings within the city has increased that provide multiple surfaces for the reflection and absorption of sunlight, and thus increasing the efficiency with which the city is heated. This is called the "urban canyon effect". Another effect of increased number of buildings is the blockage of wind, which also inhibits cooling by convection and pollution from dissipating.
- Waste heat from automobiles, air conditioning, industry, and other sources also contributes to the UHI. High levels of pollution in urban areas can also increase the UHI, as many forms of pollution change the radioactive properties of the atmosphere.

Aside from the effect on temperature, UHI can produce secondary effects on local meteorology, including the altering of local wind patterns and humidity, which have been discussed in the previous section. The UHI effect described above has been one of the major causes of unprecedented large number of heats related deaths in Karachi. Future climate scenarios suggest that the frequency of this kind of disasters may increase with the rise of temperature in future.

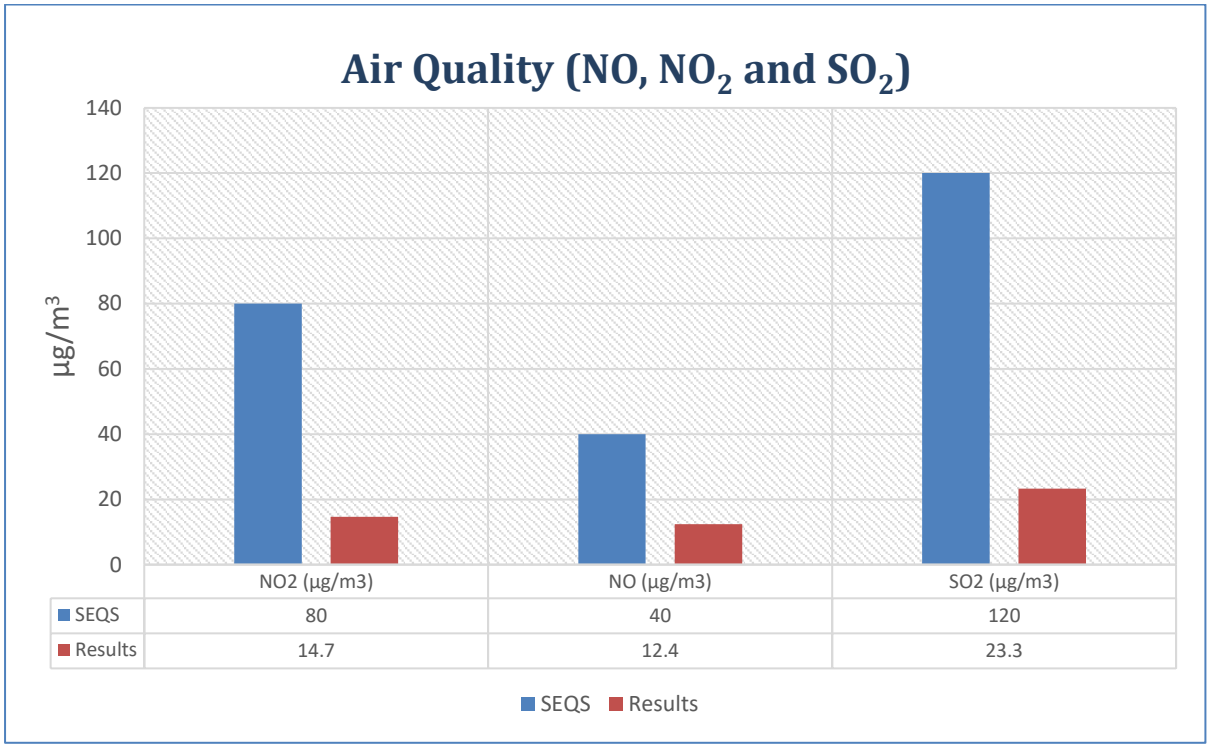
4.4 Ambient Air Quality & Noise

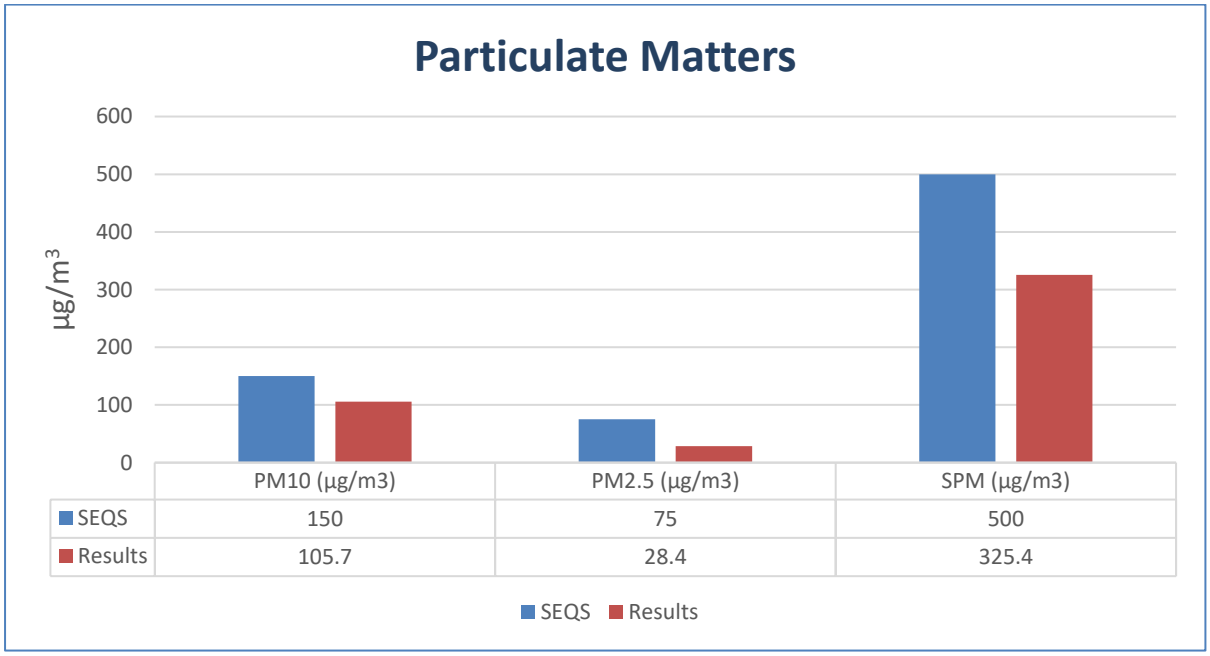
4.4.1 Ambient Air and Noise at Project Site

Ambient Air and Noise monitoring were conducted by SEPA certified lab at the proposed project

[13] Pakistan bureau of statistics

site. The location and results of Ambient Air quality and Noise monitoring are presented in table and graphs below. The results showed that ambient air quality and noise levels at the project site are well within the limits of SEQS. The detail lab report is attached in Annex-II.





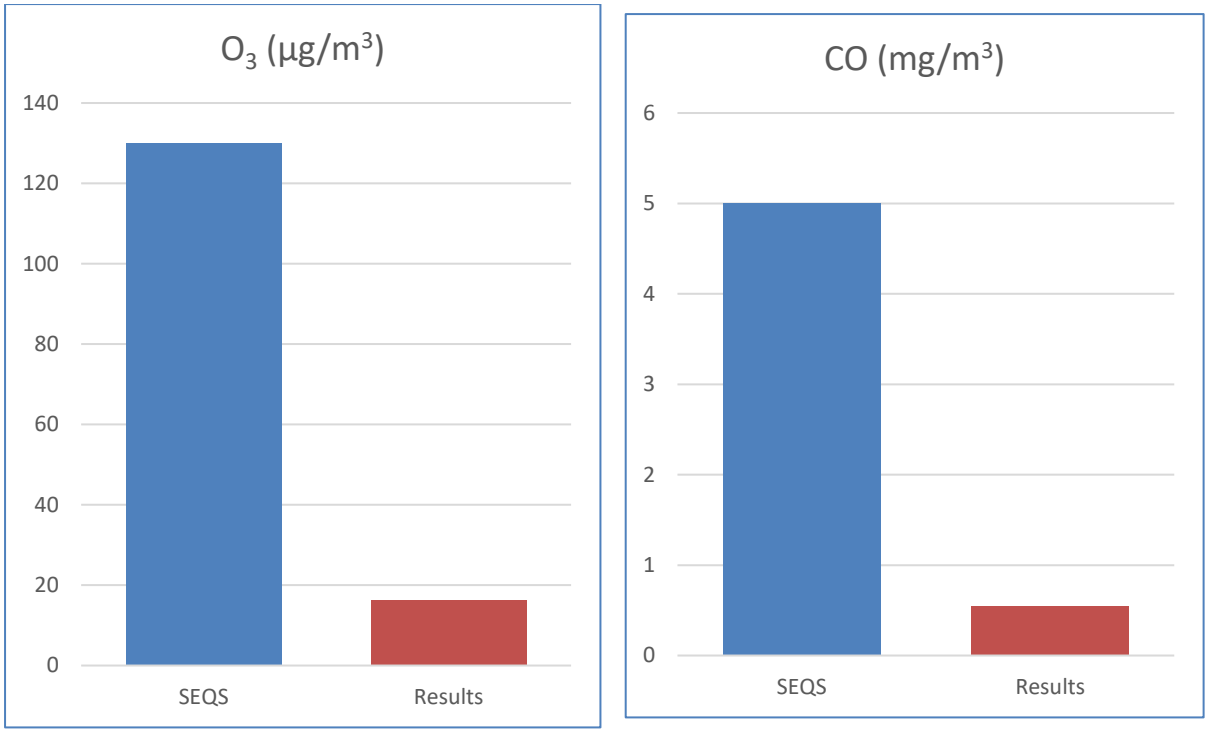
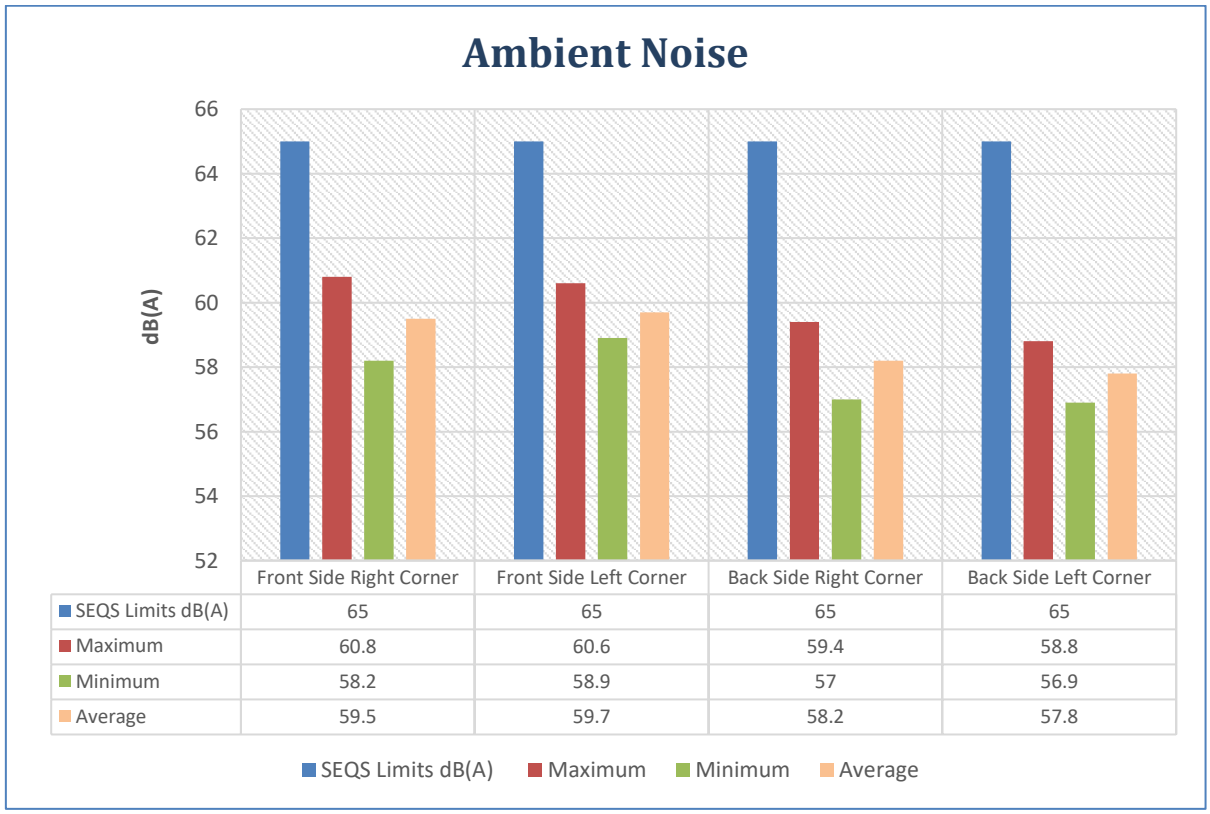


Figure 4.6: Ambient Air Quality at Project Site



	Front Side Right Corner	Front Side Left Corner	Back Side Right Corner	Back Side Left Corner
SEQS Limits dB(A)	65	65	65	65
Maximum	60.8	60.6	59.4	58.8
Minimum	58.2	58.9	57	56.9
Average	59.5	59.7	58.2	57.8

Figure 4.7: Noise Levels at Project Site

Ambient Air and Noise Monitoring at Project Site








4.5 Water Resources, Water Quality and Drainage

4.5.1 Surface Storm Water

Hydrogeologically, the city of Karachi lies in the Hub River Basin and the Malir River Basin. The Malir River Basin is drained by the Malir River and the Lyari River. The aquifer of Karachi is, therefore, mainly recharged by seepage from Hub River, Hub Dam as well as the Malir and the Lyari Rivers.

The Malir River system is the 2nd largest river system of the region after the Hub River with eight tributaries which contribute to the flow of the Malir River. The Malir River flows from the northeast to the center of the city and finally drains into the Arabian Sea. Small tributaries named Mol Nadi, Khadeji Nadi, Jarnado Nadi, Bazar Nadi, Konkar, Sukkun Nadi, and Thaddo Nadi join the Malir River at a distance of 48 kilometers north of Karachi. There are few small dams located in the northern and northwestern parts of the Malir River Basin including Konkar, Thaddo, Khar weir, Lath Dam, and many others which are used to store rainwater for irrigation purpose. The total area of the Malir Basin is 2,252 Km^2 out of which 930.5 Km^2 is located in the Karachi City[14].

4.5.2 Water Supply, Demand and Sewerage System

The Karachi City Water Supply System supplies approximately 650 MGD of water to Karachi citizens by means of bulk supply from the Indus River (Kinjhar Lake) and the Hub Dam and wells as shown in Figure 4.8. However, currently the water supply capacity is far below the water demand and NRW rate is up to 35%, which results in the shortage of water supply in many areas of the city. In response to this, the KIV project (described later) is being implemented to substantially increase the bulk supply from the Kinjhar[15].

[14] Zaidi, A., & Zafar, S. (2018, May). Karachi: An Expanding City with Rising Disasters. In *World Environmental and Water Resources Congress 2018: Watershed Management, Irrigation and Drainage, and Water Resources Planning and Management* (pp. 337-342). Reston, VA: American Society of Civil Engineers.
[15] https://openjicareport.jica.go.jp/pdf/12367207_01.pdf



Figure 4.8: Major Water Facilities in Karachi City[16]

Sewerage Facilities: Karachi city consists of three treatment districts, TP-1, TP-2 and TP-3. However, the amount of sewage treated at these treatment plants are only about 1/3 of the total planned amount of 472 MGD, which is the amount of sewage expected from the water supply. Currently, most of the sewage generated in Karachi is discharged into rivers and seas without any treatment. KWSB is working on the S III project (see below) to strengthen/construct new interceptors and sewage treatment plants. Under this project, the current situation of untreated effluent will be greatly improved by guiding water to sewage treatment plant through interceptors constructed on the right bank of the Lyari River and the left bank of the Malir River. Of the three sewage treatment plants, TP-1 and TP-2 use the trickling filter process, and TP-3 uses the stabilization pond process. The outline of the sewage treatment districts in Karachi city are shown in Figure 4.9. In addition to the sewage treatment plant, Karachi city owns 6 nos. of disposal stations, 32 sewage lift pumping stations, 5,670 km of sewer pipes, and 250,000 manholes as sewage transmission facilities. Since the amount of sewage actually flowing in is smaller than the amount of sewage expected from the treatment district of each sewage treatment plant, it is presumed that the sewer pipes are damaged or clogged[17].

[16] https://openjicareport.jica.go.jp/pdf/12367207_01.pdf
[17] https://openjicareport.jica.go.jp/pdf/12367207_01.pdf

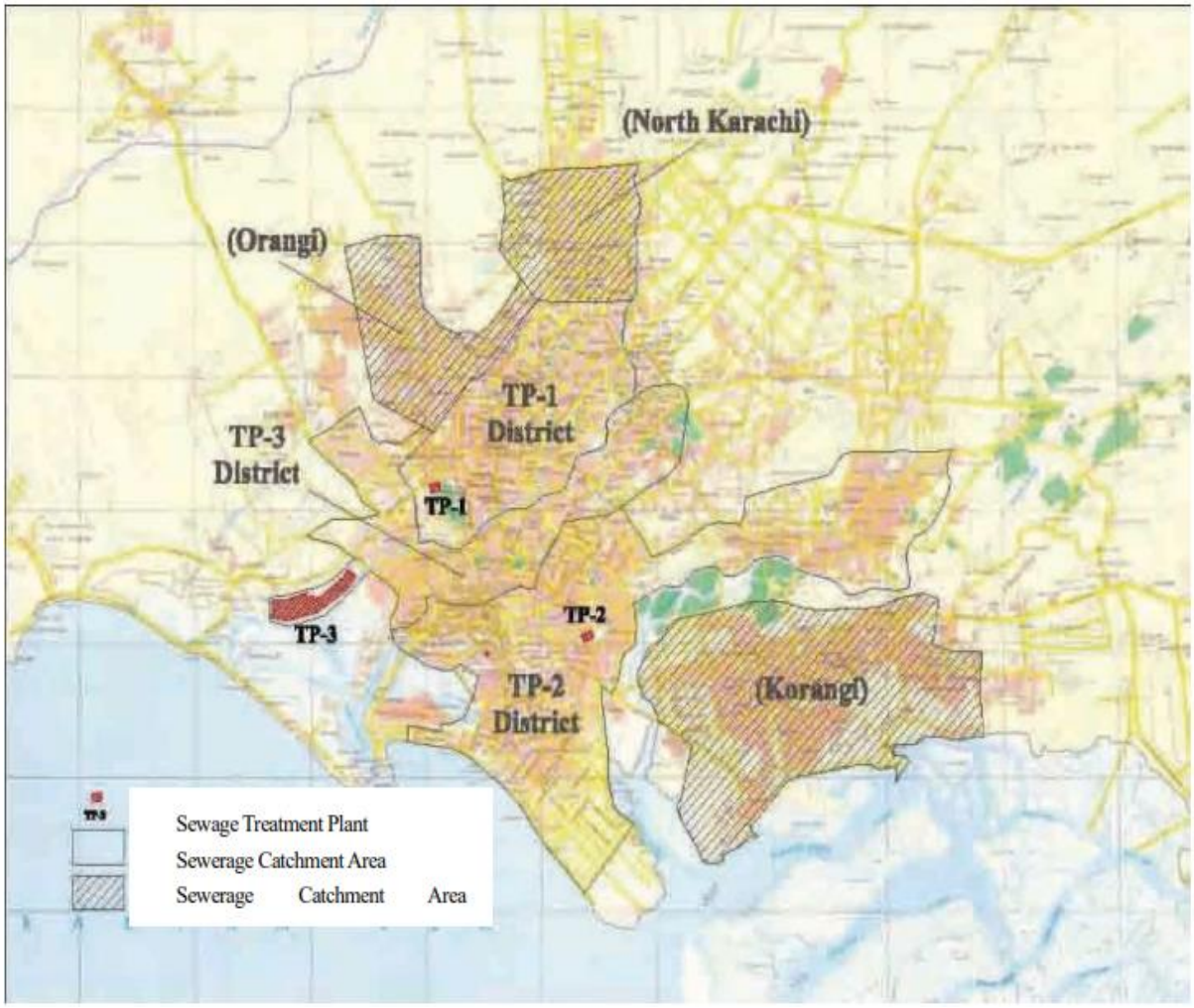


Figure 4.9 Karachi's Sewage Treatment Districts

4.5.3 Water Quality

Drinking water quality is one of the greatest factors affecting human health. However, drinking water quality in many countries, especially in developing countries is not desirable and poor drinking water quality has induced many waterborne diseases. The shortage of water in Karachi city due to rapid increase in population and industrial activities, has forced people to meet their water requirements from alternative supplies such as privately-owned ground water sources which extract, process and sell groundwater at a very high commercial cost[18]. However, the quality of groundwater is very poor in Karachi mainly due to the excessive pumping of groundwater by farmers, seepage of domestic wastewater in groundwater, huge amounts of chemical constituents in industrial wastewater and sea water encroachment, rendering it medically unfit for human consumption if consumed without prior treatment.

A study conducted by PCRWR in 2021 to assess of the water quality of cities of Pakistan revealed that Karachi, inhabits approximately 16.025 million (Population Census Report, 2017) people and houses about 60% of the industries of the country (UN Census, 2021). The water supply of Karachi is dependent on surface water and groundwater sources. Surface water sources include Haleji

[18] KWSB. (2010). Environmental Management Framework-Karachi Water Supply and Sewerage Improvement Project.

Lake, Keenjhar Lake and Hub Dam, while 44 groundwater source includes Dumlottee well-fields. Altogether, 28 fixed sources were monitored for drinking water quality. Out of these sources, 93% were found as unsafe for drinking (Table 28). The groundwater of the city belongs to mainly Sodium-Chloride (92%) and a minor involvement from Sodium-Bicarbonate (8%). This indicates the presense of seawater belonging to the Sodium-Chloride facies and permanent type water hardness. The situation of water quality in Karachi continues to worsen since 2002 (23%) and no remarkable improvement could be seen up to the recent study of 2020 (7%)[19].

These findings suggest that the water as received by the residents is not safe for drinking. Although water quality has not been tested yet, groundwater pollution by nitrates, pesticides, heavy metals and hydrocarbons discharged into the environment is not negligible. The salinity of groundwater in Southern Sindh, particularly in the coastal areas has increased since over pumping has induced seawater to flow in, causing what is known as seawater intrusion. The fact, also acknowledged by KW&SB that 150 mgd (681,900 m^3/day) of water supplied to the consumers is chlorinated and bypasses the KW&SB filter plants is an important indicator of the need of addressing this issue on a priority basis.

4.6 Biological Environment

4.6.1 The Ecology of Macroenvironment

The ecology of microenvironment and macroenvironment of the project area has completely changed as a result of continuous emergence of urban conglomerates. In terms of macroenvironment, the vegetation of Greater Karachi can be divided into three edaphic types[20]:

- The coastal vegetation consists of three main associations. In the protected creeks facing the mouth of the rivers in shallow water is found mangrove vegetation consisting of mainly *Avicennia alba*. In the muddy coastal swamps *Arthroenemum indicum* is the main species. On the coastal sand dunes the main species consist of *Suaeda monoica*, *Aerua pseudo-tomentosa*, *Calotropis procera* and *Tamarix troupii*.
- The vegetation of the calcarious rocks consists of mainly *Commiphora mukul, Grewia villosa, Grewia tena, Euphorbia caudicifolia* and *Acacia senegal.*
- In the valleys between the hills where alluvium has been deposited over the basic rock by various rivers, the vegetation consists of *Capparis decidua*, *Prosopis spicigera* and *Salvadora oleoides*.

Ecological risk of high order has been induced by land clearance and removal of natural vegetation from the plains during the urban sprawl to make room for industrialization and urbanization. This has degraded the physical environment as quantified in the above section & the biological environment in the sense that the entire macroenvironment has lost its biodiversity. During the survey, less number of flora species was recorded in the project area such as *Conocarpus*, *Acacia nilotica* (Sindhi Babur), *Capparis decidua* (Kirar), *Ficrus religiosa* (Pepul), *Azadirachta indica* (Neem), *Prosopis juliflora* (Devi) and *Saveda fruticosa* (Lani). Horticulturists and tree activists have

[19] https://pcrwr.gov.pk/wp-content/uploads/2021/10/Drinking-Water-Quality-in-Pakistan-2021.pdf
[20] Chaudhri, I. I. (1961). The vegetation of Karachi. *Vegetatio*, *10*(3-4), 229-246. https://link.springer.com/article/10.1007/BF00241786#Bib1

declared Conocarpus as harmful as the eucalyptus trees planted in the past. Eucalyptus was planted in huge numbers across the city only to be cut down for its negative impact on the environment. The same mistake was repeated with Conocarpus. In response to the growing concern against planting Conocarpus, district governments have put tremendous efforts in recent years towards plantation of neem trees and other native species in the city.

The impoverished as well as degraded environment resulting from non-availability of surface as well as groundwater and discharge of untreated wastewater into Lyari and Malir River has irreversibly reduced the biodiversity of the indigenous as well as introduced vegetation and hence it offers very little chance for the survival / growth of fauna in the macroenvironment of project area. There are even otherwise no habitats of large and small animals, birds or reptiles within the surveyed area.

4.7 Description of Socio-Economic Environment

The social baseline chapter provides a comprehensive review of the socio-economic conditions of the project area. This socio-economic profile is based on a literature review and several primary data gathering activities including site visits, review of secondary data, and consultations with primary and secondary stakeholders. This social baseline provides an overview of the socio-economic conditions of the people who reside and work in the project vicinity. It also includes an assessment of the public utilities and social services (education and health facilities) in the area concerning the proposed construction and operation of the SAAR Sky Icon.

The socio-economic baseline data in this chapter identifies the existing socio-economic trends in the area and the potential impacts of the project providing the basis for the development of a Social Management Plan. The social baseline is divided into macro and microenvironment of the project area. The macro-environment encompasses District South. The discussion on macro environment covers the administrative setup, demography, education and health profile of the area. The immediate neighborhood of the project area is considered to be the micro-environment of the project and covers land use, education, health and utilities profile of the area.

4.7.1 Macro Environment of the Project area

The description of baseline environment is presented below:

4.7.2 Administrative Context

The proposed project falls within the jurisdiction of sub-division Civil Line of District South. District South covers a total area of 85.0 sq. km while Civil Lines covers a total area of 18.6 sq. km, approximately one-fourth of the total district area. A total of 7 sub-divisions falls under District South Karachi which includes Aram Bagh sub-division, Civil Line sub-division, Clifton Cantonment sub-division, Garden sub-division, Karachi Cantonment sub-division, Lyari sub-division and Saddar.

The table below shows total population of sub-divisions of District South:

Table 4.8: South District and Sub Division Population (1998, 2017)					
Name	Area (km^2)	Density/Km^2 (2017)	Population Census (1998)	Population Census (2017)	%Change/year (1998-2017)
District South	**85.0**	**21,079**	**1,478,047**	**1,791,751**	**1.02**
Aram Bagh	3.90	32,916	131,880	128,374	0.14
Civil Line	18.6	12,059	142,721	224,057	2.40
Clifton Cantonment	43.4	7,049	182,489	305,938	2.75
Garden	3.68	99,273	325,716	365,323	0.60
Karachi Cantonment	12.2	38,834	378,917	471,830	1.16
Lyari	6.43	103,082	594,966	662,816	0.57
Saddar	3.99	9,114	42,187	36,366	0.78
Source: Pakistan Bureau of Statistics					

4.7.3 Land Use

Civil Lines was an upmarket neighborhood where much of Karachi's British officials and local elite resided during the colonial era. Numerous buildings of architectural significance are located in the locality, including civic administration buildings, churches, mansions, and social clubs. Civil Lines formed part of the "New Town" established during the colonial era, and developed shortly after the British gained control of Karachi from the Talpurs in 1839. It was built to the east of the densely-populated "Native Town" (made up of Mithadar and Jodia Bazaar), and was specifically designed to be spacious area, in contrast to the densely populated Native Town. It was primarily residential, and was where much of the British officials and local elite resided in Karachi during the colonial era. Now, it has become an area of public and private offices and main commercial buildings.

4.7.4 Demography

According to the 1998 census, the total population of District South was 1,478,047 which, increased to 1,791,751 in the 2017 census, showing an increase of 1.02% or an average annual growth rate of 0.05 % between the two censuses (nearly two decades). Similarly, the total population of Civil Lines Sub Division was 142,721 according to the 1998 census which, increased to 224,057 according to the 2017 census, showing an increase of 2.40% or an average annual growth rate of 0.13%. Several ethnic groups are residing in the area including, Urdu Speakers, Punjabis, Sindhis, Balochis, Bohras, Gilgitis, and Pashtons.

Table 4.9: District and Clifton Cantonment, Population according to the 1998 and 2017 Census		
1998 census population	**2017 census population**	**Change %**
District South		
1,478,047	1,791,751	21.2
CLIFTON CANTONMENT, KARACHI		
182,489	550,000	33.17
Source: Pakistan Bureau of Stats		

The following table provides a comparison of the population between 1998 and 2017 census.

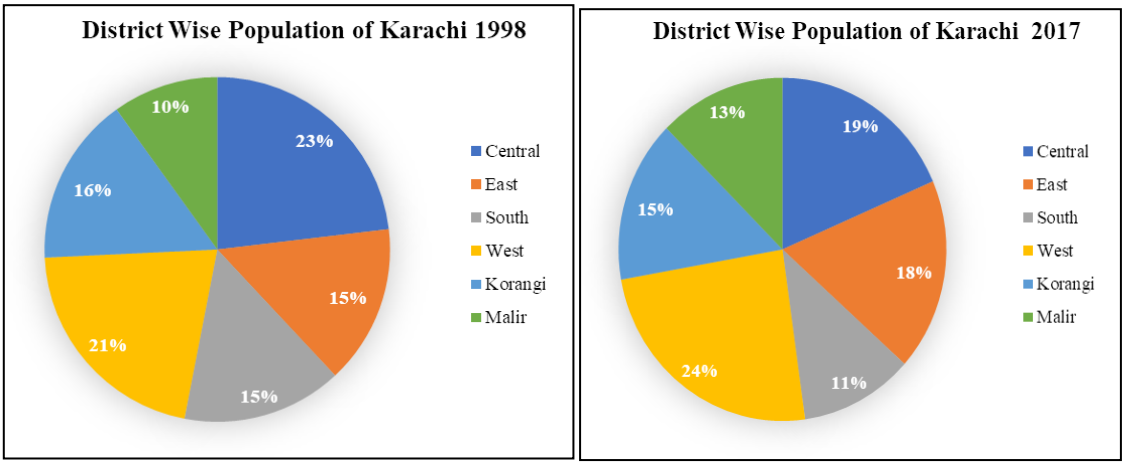


Figure 4.10: District-Wise Population according to the 1998 and 2017 Census

The pie-chart above illustrate the relative distribution of population in Karachi's districts based on the 1998 and 2017 census. Moreover, an additional modification to the District West population of Karachi 2017 has been made to account for the demographic changes that have come about due to splitting of District West, in 2020. Based on these new findings, one can observe that the relative population distribution of South has become now equal to the new established district of Keamari.

According to the 1998 census, District South comprised 15% of the entire city population. According to the latest census the population of District South comprises 11% of the city population making it the least populated district of Karachi. The population of District South is expected to increase in the coming years because there are many high-rise projects being planned in the area. Over time, many low-income settlements in the district that are now home to large pockets of residential and commercial establishments thriving with people from other parts of Sindh and the rest of Pakistan, that have made Karachi their second home and work for the upper income-classes living in Clifton and DHA and other posh areas of the District South.

4.7.5 Transportation

As the cities grow, the requirement of civic facilities also increases requiring continuous development, technological advancement and efficient management. Karachi city is among the fastest growing mega port cities with very high rate of urbanization where the need of transport

infrastructure and services is growing rapidly. It is also one of the oldest cities of the world due to which the old city areas do not have much provisions available to manage the rising traffic making it an even more challenging job for the authorities. Massive traffic jams on the roads have become a common feature of Karachi while the situation is getting worse day by day. It has turned into an alarming situation which if not handled on priority basis would soon turn in to a deadlock severely disrupting the economic activities in the city. The mushroom growth of vehicles is also a result of failure of the government in providing sufficient low-cost public transport facilities. Currently there are more than 4Mn registered vehicles on Karachi roads. The number of vehicles registered in Karachi has increased by 1.13Mn or 38% since 2013 with rickshaws rising sharply by 76% to 229,826, motorcycles by 50% to whopping 2.34Mn and private vehicles by 18% to 1.28Mn in 2016.

According to the Research Report of KCCI, August 2017, the ratio of the registered motorcycles is highest 57 % and private vehicles is 31 %, indicates that new public transport vehicles are not inducted to facilitate the citizens of the city and they have to resolve their transport problem themselves. Following graph shows the share of vehicles which have been registered in Karachi in 2017.

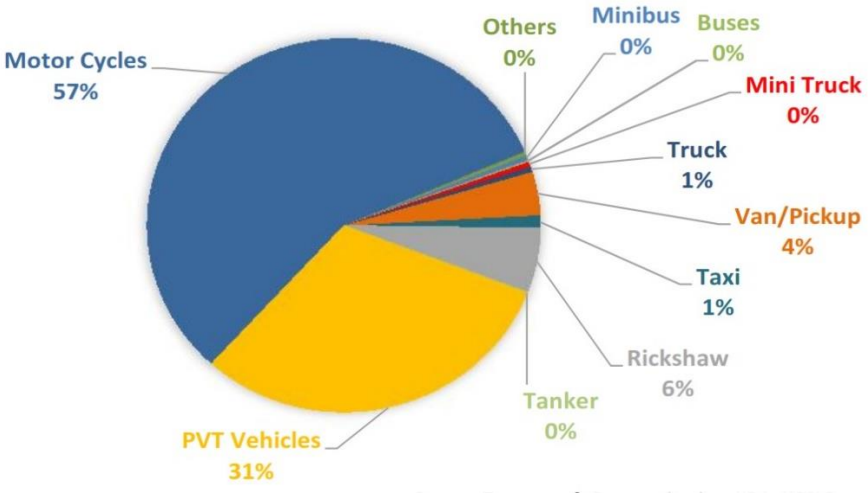


Figure 4.11: Registered Vehicles in Karachi by Vehicle-Type in 2017
Source: Transport & Communication, KDA; KCCI Research Report 2017

The impact of the transport crisis on people's lives is enormous. Travelling in environmentally degraded conditions for long-hours results in physical and mental health problems. This effects family and social life and limits people's choice of livelihoods (especially for women) since they wish to work in areas that they can easily access through the existing transport system. Increasingly, transport availability and quality are also determining where they would like to live. The district has an adequate communication network having metaled road. The increasing numbers of motorcycles, private vehicles put a lot of pressure on the roads of District South. The most important is Shahrah-e-Faisal Road that runs 18 kilometer and busiest of the city. Other roads like Club Road, MT Khan Road, Abdullah Haroon Road and Dr Ziauddin Road also have huge volumes of traffic in routine. Traffic pressure become sever in morning and evening timings owing to the public and private offices. Local Buses / Wagons running in the district provide the

cheapest mode of conveyance and their drivers take the advantage and make their efforts to put on maximum passengers into their vehicles. They often violate traffic rules and their rush driving results in serious road accidents.

4.7.6 Economy

Karachi South District is the economic backbone of the country. It has Head Offices of many Corporations, Companies and Banks. Governor House, Chief Minister House, Sindh Assembly, High Court, Embassies and Consulates of different countries and other government offices are also located there. There are so many shopping malls, shopping markets and shops in the district which contribute their part in making economic situation better and providing employment to a large section of the population not only to the district South but also to the people of other districts of Karachi.

4.7.7 Education Facilities

The educational infrastructure in Karachi South is well developed. The government is providing maximum possible educational facilities to provide a fair opportunity to the people of the district to enhance their human capital. There are several schools, colleges, and institutes in the district. Dubbed as the hub of education, District South is host to some of the city's highest public sector universities and higher educational institutions, such as the Jinnah Post Graduate Medical Centre, Preston Institute of Management Science and Technology, National Institute of Cardiovascular Diseases (NICVD), Institute of Chartered Accountants of Pakistan (ICAP) and Shaheed Zulfiqar Ali Bhutto University of Law.

Table 4.10: District-wise Number of Schools, Enrollment and Staff (2016-17)

District Name	No. of Schools				Enrollment			Teacher		
	Boys	Girls	Mixed	Total	Boys	Girls	Total	Male	Female	Total
Central Karachi	117	141	348	606	44,822	58,510	103,332	1,803	4,996	6,799
East Karachi	51	64	163	278	23,022	29,106	52,128	870	2,271	3,141
South Karachi	**70**	**87**	**173**	**330**	**26,122**	**35,824**	**61,946**	**1,079**	**2,496**	**3,575**
West Karachi	128	101	340	569	38,562	45,454	84,016	1,443	1,909	3,352
Malir Karachi	136	113	414	663	34,548	32,333	66,881	1,540	1,148	2,688
Korangi Karachi	97	94	220	411	35,192	46,918	82,110	1,025	3,082	4,107

Source: SEMIS Census 2016 - 2017

The number of schools, enrollment, and teachers shows here the active involvement of the residents of the District South in the education sector. The following table illustrates that according to School Education Statistics 2016-17, District South Karachi has a large number of schools with electricity, washrooms, drinking water, and boundary facilities. The data also shows that people of District South who are more educated and well aware of the importance of education are prepared to pay exorbitant school and college fees for the education of their children.

Table 4.11: District wise Basic and Advance Facilities in School									
District	**Schools**	**Electricity**	**Washroom**	**Drinking Water**	**Boundary Wall**	**Lab / Science Lab**	**Library**	**Play Ground**	**SMC**
Central Karachi	607	447	484	507	529	121	56	370	591
East Karachi	264	223	241	219	238	59	25	84	259
South Karachi	482	383	426	356	432	49	49	180	465
West Karachi	363	232	301	256	340	82	27	173	359
Korangi Karachi	550	397	431	391	509	46	37	288	533
Malir Karachi	591	240	398	302	479	56	21	106	573
Source: SEMIS Census 2016 – 2017									
Sindh Education Management Information System (SEMIS)									

4.7.8 Health Facilities

District South provides health facilities not only for its inhabitants but also for the resident of its adjoining districts. Adding to the significance of the district is the presence of three major hospitals – PNS SHIFA, National Medical Centre (NMC) and Dow Hospital. In addition to this, the number of dispensaries is also functioning at different places in the district under the supervision and administrative control of K.M.C / D.M.C South. Apart from the Government-run health institutions, dozens of private hospitals from the project. BHY Hospital, Kharadar General Hospital, Osmania General Hospital, Altamash General Hospital, Dr. Ruth K. M. Pfau, Civil Hospital Karachi are a few to be mentioned here along with many private clinics are also functioning in the district. The following table shows the number of health practitioners and paramedical personnel in Karachi.

Table 4.12: District wise Government Medical and Paramedical Personnel in Karachi 2017							
District	Doctors	Nurses	L.H. V	Dispensers / Dressers	X-Ray Technicians	Lab Technicians	O.T Technicians
Karachi Central	579	207	15	82	12	17	25
Karachi South	**324**	**115**	**4**	**51**	**14**	**23**	**33**
Karachi East	245	18	22	26	4	0	3
Karachi West	356	83	19	67	12	14	22
Karachi Malir	234	25	14	53	9	4	6
Karachi Korangi	252	90	38	-	-	-	-
Source: Directorate General of Health Services, Hyderabad.							

The public health facilities in Karachi are highly centralized in a few locations and cannot cater to a large part of the population. The above-mentioned public health facilities data is not uploaded,

in the government records, therefore subject to some shortcomings. The health care facilities of district South Karachi is better than other districts of Karachi division because there is the number of existing good government and private hospitals.

Table 4.13: District wise Government Health Facilities with Bed Capacity in Karachi 2017

District	Hospital		Hospital Beds		Dispensaries		R.H Centers		T.B. Centre		B.H. Units		M.C.H.C.	
	Teaching	Civil, Specialized & Taluka	Teaching	Civil, Specialized & Taluka	No.	Beds	No.	Beds	No.	Beds	No.	Beds	No.	Beds
Central	-	-	3150	-	5	-	-	-	8	-	2	-	3	6
South	**2**	**4**	**-**	**960**	**5**	**-**	**-**	**-**	**10**	**5**	**-**	**-**	**-**	**-**
East	-	-	361	-	5	-	-	-	5	97	4	-	4	-
West	1	1	-	248	14	15	4	20	8	-	7	14	5	6
Malir	-	1	-	48	7	-	2	8	4	-	14	22	6	-
Korangi	-	7	-	724	8	-	-	-	7	-	8	16	4	41

4.7.9 Micro Environment of Project Area

The proposed site is located in a well-developed area of Karachi, in CL.9, Civil Lines Quarters in its immediate neighborhood of Goethe Institute and CM House at its back, followed by Chapal Skymark, State Life Building 3, G&T Tower, Burhani Mahal, Hina Palace Apartment etc. It is located in the midst of several housing projects such as Civil Line Quarter Housing and City Railway Colony. The project is directly facing the 150ft wide Dr. Ziauddin Ahmed Road which connects the site to MT Khan Road, Club Road and Shahrah-e-Faisal.

4.7.10 Education Facilities

There are few governments and many private schools in the project area. The area residents have access to excellent educational facilities Montessori, primary, secondary level schools and, intermediate colleges. The educational institutes include Karachi High School Junior, Bay View High School, Govt. College of Commerce & Economics, Karachi Grammar School Middle Section, Habib Public High School and Trinity Methodist High School etc. Shaheed Zufiqar Ali Bhutto University of Law (SZABUL) is also located in the area which is internationally recognized Institution and called the first Law University of Pakistan. YMCA (Community-Focused Non-Profit Recreational Programs and Services) Polytechnic Institute is situated within the reach of 500 meters from the project.

4.7.11 Healthcare Facilities

There are private and some government healthcare facilities in the area. The health facilities in the vicinity of project which include Dow Hospital which is located at a distance of 600m from the project

site is the nearest medical facility that is used by the local residents, Burhani Hospital which is located at a distance of 1.75km, Bin Nasir Dawakhana which is located at a distance of 1.25 km. There is also Dow Family Medicine Clinic in Hijrat Colony which is 666 meters away from the Project Site. The residents of the area prefer to go to Jinnah Hospital (1.5 km) and NICVD hospital (1.3km). The most common diseases reported in the area include Fever, Typhoid and Blood Pressure.

4.7.12 Waste Management

Sindh Solid Waste Management Board (SSWMB) is responsible for the waste management in the nearby vicinity. The condition of solid waste in the project area is satisfactory. There is proper infrastructure for solid waste management, waste management of Civil Lines area falls under the jurisdiction of Karachi Cantonment. The developed projects and societies like Hoshang Pearl Tower, G&T Tower, Abeeda Towers and Royal Homes have their own private garbage collecting system. Government buildings such as Chief Minister's House, Chief Secretary's House and State Guest House are situated in the neighborhood that results in up to the standard.

4.7.13 Water Supply and Drainage

The water supply in the area falls under the jurisdiction of the Karachi Water and Sewerage Board (KWSB). There is no shortage of water supply in the area because of governmental buildings available in the area. Residents are satisfied with water condition and quality. It was also observed that the drainage system is satisfactory in the project area. The residents shared that they are safe during heavy rains, when the drain water overflows onto the streets of Karachi, no overflow of water in Civil Lines has been observed.

4.7.14 Electricity and Gas Supply

K-Electric supplies electricity for Civil Lines. Residents were mostly satisfied with the electricity supply in the area as load shedding is infrequent in the neighborhood but in summer season, there is interruption of supply which resumes its continuation within an hour. The area do not suffers from gas supply even in the winter season as it happens in other parts of the city.

4.7.15 Road Network and Traffic Conditions

Population is rising slowly but in the future traffic will increase with private vehicles on these roads if ratio of the residential development remains the same. The project site is enclosed by three major roads, Abdullah Haroon, Dr. Ziauddin and Club Road; therefore, movement of private vehicles are frequent on the nearby roads. These main roads also connects the project site with the main Shahrah-e-Faisal and MT Khan Road.

The traffic flow in the project area remains high due to the presence of commercial activities and lack of parking space. The traffic in the project area stays-up during school and office timings. Though Dr. Ziauddin Ahmed Road is also frequently used by VIP which makes traffic stagnate. As high-rise developments are increasing in the area which will put more traffic pressure on the already busy roads of the area.

4.7.16 Fire-fighting Facilities

The nearest fire station named Saddar Fire Station is located around 3.1 kilometer away from the project site. Other fire stations located near project site site are CBC Fire Station and Central Fires Station.

Chapter 5 Information Disclosure, Consultation & Participation

The participation of project stakeholders in project planning, design and implementation are now universally recognized as an integral part of environmental & social impact assessment. Local communities, their representatives, government departments, national and international NGOs and the civil society at large may all be able to contribute to and benefit from, the dialogue directed at identifying and resolving key project-related issues. Stakeholder consultation has become an important requirement of the EIA study after the enactment of the guidelines for public consultation under the Pakistan Environmental Protection Act (PEPA) 1997. After the 18th Amendment to the Constitution, the Government of Sindh passed the Sindh Environmental Protection Act 2014, which also stresses the importance of engaging with the concerned primary and secondary stakeholders during the EIA study.

While in the short-term, the impacts might be felt only in the microenvironment of the project, in the long-term, the impacts may also spread to other nearby neighborhoods and activities including traffic management, the swift passageway for fire tenders and ambulance and stress on existing utilities. Instead of these perceived impacts, meaningful engagement with the project stakeholders has been carried out to identify the potential positive and negative impacts, assess the magnitude of these impacts from a social perspective and prescribe solutions for the construction and operations phase of the proposed project.

5.1. Stakeholder Mapping

To better understand the different stakeholder groups for this project, a stakeholder mapping exercise has been carried out whereby the different stakeholder groups and their interests in the project are discussed in this section:

1. **Local People/Neighborhood:** Individuals or groups in the vicinity of the project site are informed regarding the project background and context. Due to their proximity to the project site, they are often the most vulnerable stakeholders and therefore, consultation with these stakeholders is carried out throughout the project life. The consultation exercise provides an opportunity to appraise the stakeholders regarding the consultation process, identify likely project impacts, and record concerns of local communities. Moreover, intensive stakeholder engagement during the planning stage of the project provides a basis for reducing the trust deficit and encourages confidence-building.
2. **Proponents:** The main aim of the project proponent is to accomplish the objectives of the project through cost-effective and sustainable project activities. To this end, the project proponent has to recognize that strong associations and responsive relations with stakeholders would go a long way to achieve the project objectives. Therefore, the proponent has to strive to engage stakeholders at all levels from the outset; inform them regarding project goals, design and alternatives. Moreover, they have to keep trying to create public understanding and acceptance of the proposal through a commitment to implement the promised objectives. They have to accomplish the project through general acceptance of the design and keep improving through the use of public inputs on alternatives and mitigation measures.
3. **Government Agencies:** The government agencies involved in the EIA process is mandated to have their policy and regulatory responsibilities addressed in impact analysis and mitigation consideration. For the competent authority, an effective public involvement

program will ensure a project proposal that effectively incorporates environmental and social concerns. During the EIA review, the most important concern for SEPA is a transparent public consultation process and a strong stakeholder engagement plan that can address the concerns and suggestions of all stakeholders.

4. **NGOs/Interest groups:** Comments from NGOs and specific interest groups often provide a useful policy perspective on the project's methodology and implementation mechanisms. For example, due to the vast exposure of certain NGOs and interests groups, alternative measures for reaching the project goals may be advised that is more environmentally friendly and socially acceptable.

5.2 Primary and Secondary Stakeholders

Primary stakeholders are those who have a direct interest in the project which includes residents, commercial entities and institutions falling in the immediate environs of the project area. Secondary stakeholders include the relevant government agencies and public interest groups which may indirectly influence or be influenced by the project. The concerns and input from both primary and secondary stakeholders are important to identify the issues arising from the construction and/or operation phase of the project and propose mitigation measures that minimize the negative project impacts and enhance the positive ones.

Within the vicinity of the proposed project, there are primary stakeholders which were identified before conducting survey in the field. The primary stakeholders are the residents of Brunton Rd, Mclver Rd, Railway Colony and Railway Officers Colony. The commercial interests in the immediate vicinity include Sumya Twin Tower, Sumya Sky Tower, Awais General Store, Bukhari General Store. The religious interests in this area are Hazrat Saeed Mehran Shah Bukhari Shrine and Jamia Masjid Bukhari. Governmental interests in this area are Chief Minister's House, CM's Secretary Building (Under Construction). The secondary stakeholders for this project include the utility companies that operate in the area including K-Electric, SSGC, as well as the regulatory authorities, mandated to ensure environmental protection in the city, which falls under the remit of SEPA and compliance with building and construction laws which is looked after by SBCA. The primary and secondary stakeholders for SAAR Sky Icon have been identified in the table below.

Table 5.2: Stakeholders for SAAR Sky Icon

Neighbourhood	*Residential Interests:* • Railway Colony • Railway Officers Colony *Commercial Interests:* • Chief Minister's House • Awais General Store • Bukhari General Store • Sumya Twin Towers • Sumya Sky Tower • SAAR Heights *Religious Interests*

	• Hazrat Saeed Mehran Shah Bukhari Shrine *Governmental Interests* • CM's House • CM's Secretary Building (Under Construction)

5.3 Consultation Approach & Methodology

5.3.1 Consultation with Primary Stakeholders

A Neighborhood Survey was conducted to identify the residential and commercial interests in the area that may face direct impacts from the proposed development. The survey was conducted in two stages. In the first stage, several site visits were carried out to identify all stakeholders that either reside or work in the project vicinity and conduct an initial identification of potential positive and negative impacts. Relevant public service institutions directly involved in service provision in the areas were also identified.

During the second stage, a social survey field team used a pre-designed semi-structured template to engage the area residents, commercial interests and public service institutions. Those stakeholders, who were not available at the first attempt, were re-visited on the same day or followed-up for their comments during the next few days. During each meeting, the project team introduced the project to the stakeholders, recorded their concerns, suggestions and provided contact details to enable stakeholders to share further comments over email or in writing. A 'Project Brief' providing the salient features of the project were also handed over to the available stakeholders as part of the information disclosure process.

Moreover, the team inquired about the current situation of the area such as the status of utilities, security and law and order situation in the project area from the residents near the project site. Several open-ended questions were also included in the questionnaire to ensure that the respondents could openly share their opinions and suggestions relevant to the study. The following table shows the stakeholders that were approached during the Neighborhood Survey.

Table 5.3: Consultation with Primary Stakeholders

S. No	Respondent Name	Stakeholder Location	Stakeholder Type	Date
01	Mr. Ali Dilber (Resident)	Railway Colony	Residential	01-04-2024
02	Mr. Awais (Owner)	Awais General Store	Commercial	01-04-2024
03	Mr. Abid Bukhari (Owner)	Bukhari General Store	Commercial	01-04-2024
04	Mr. Ibrahim Shah (Project Manager)	Sumya Twin Towers (Under Construction)	Commercial	01-04-2024
06	Mr. Hayat (Security Incharge)	Sumya Sky Tower (Under Construction)	Commercial	01-04-2024
07	Mr. Shehzad (Caretaker)	Mazar Hazrat Saeed Mehran	Religious Interest	01-04-2024

		Shah Bukhari Shrine		
08	Mr. Noorudin (Associate Architect)	CM's Secretary Building (Under Construction)	Governmental Interest	01-04-2024

5.4 Consultation Feedback

The comments, concerns and suggestions received from stakeholders during the neighborhood survey have been collated in this section. The comments solicited from stakeholders were helpful in the screening of the potential environmental & social aspects of the project.

5.4.1 Concerns & Suggestions: Neighborhood\ Survey

The social team from EMC carried out consultations in the project area during the 1st week of April. The following major issues and concerns were raised by the primary stakeholders:

- The Supervisor of SAAR Heights Mr. Salman Awan told the consultation team that there is no issue regarding the security in the area, police are patrolling the street 24/7. Police often do interrogations and ask for valid registration of construction workers with their CNICs.
- Mr. Noor Ud Din is an Associate Architect of the New CM Secretary Building (Under Construction) on the same Brunton road where the proposed project site is located. He suggested to take under consideration health and safety protocols during the construction.
- Hazrat Saeed Mehran Shah Bukhari Shrine is situated on Brunton Rd, Mr. Shahzed and Madam Bano are the caretakers of the shrine, their house is right besides the shrine, the consultation team met one of the members of the house and informed him regarding the project activities, the member of the house was satisfied with the project activities.
- There are two general stores located side by side Awais General Store and Bukhari General Store both general store owners were satisfied with the project activities and were expecting increase in sale due to the construction of a new building project.
- A resident of Railway Colony Mr. Ali Dilbar raised few concerns that high rise building will block light, air and intervene in the privacy of locals as well as the privacy of the CM's House.
- The Project Manager of Sumya Twin Towers Mr. Ibrahime Shah raised a concern that the proposed project will increase traffic flow on Burnton Rd which is right next to the Chief Minister's House. He further suggested to take care of sheet piling during the construction otherwise it can damage the foundations of other surrounded projects.
- The Security Incharge of Sumya Sky Tower told that 90% of the construction work is already completed, the building will be soon ready to accommodate offices because it is a commercial building.
- The residents of the neighborhood said that the majority of people living in the neighborhood are government employees. The maintenance of the local Mosque and the salary of Imam is also accommodated by Sindh Government.
- Consultation with other relevant departments were conducted, and their details are attached in Annex-IV.

Primary Stakeholders Consultation Pictures





Consultation with the Residents of Railway Colony





Consultation with the Owner, Awais General Store





Consultation with the Caretaker (Mutawali) of Shrine





Consultation with the Associate Architect of CM's Secretary Building, Sindh (Under Construction)





Consultation with Security Incharge of Sumya Sky Tower (Under Development)





Consultation with Project Manager, Sumya Twin Towers, (Under Construction)

Chapter 6 SCREENING OF POTENTIAL IMPACTS & PROPOSED MITIGATION MEASURES

This section presents the screening process that identifies the environmental aspects and makes assessment of impact of different activities on the physical, biological and social environment. The screening process has, through review of literature, primary as well as secondary baseline data, and expert judgment, made assessment of the potential impacts of said activities on the physical, biological, and socioeconomic environment of the Project. Mitigation measures have been proposed to reduce, minimize or compensate for the identified potential negative impacts and their adoption has been recommended. The report has taken cognizance of the deficiencies in infrastructure which has been overburdened as a result of increased demand of water supply, waste disposal and road congestion. The deficiencies having been created due to the non-sustainable development activities introduced in the megapolis for over two decades.

M/s SAAR Builders & Developers has planned to construct a ground plus 44 storeys tower in Karachi. The environmental aspects of the project as identified by situation analysis are related to the following:

- Physical environment,
- Biological environment, and
- Socio-economic environment.

Description of microenvironment and macroenvironment in the previous chapters have provided a classification of the micro-site based on assessment of impact using both primary and secondary data on climate, air quality & noise, hydrology, geology, geomorphology, soil characteristics and seismicity, ecology, built environment including road network and traffic movement, and the socioeconomic aspects pertinent to siting of the project and its adaptation in the emerging situation of intense construction activity in Karachi. Mitigation measures have been proposed wherever required.

Screening of potential environmental impacts on the physical environment is related to:

- Siting of the Project
- Topography, Geology and Seismicity of the microenvironment
- Vulnerability of soil to liquefaction
- Availability of utilities in the area
- Air, water and noise pollution and other forms of nuisance during construction at site, and in the microenvironment (neighborhood) and macroenvironment of site
- Burden on Infrastructure
- Capacity of adjoining roads, traffic movement, and congestion

The phases of project are:

- Siting
- Construction

- Operation

6.1 Impact Assessment Methodology

Potential environmental impacts of the proposed Project on different features of micro and macro-environment pertain to construction and operation of residential building project.

The screening process proceeds by identifying the potential environmental aspects of siting the project, identifying the potential environmental impacts at pre-construction, construction and operational stages of the project and identifying the residual impacts after adoption of mitigation measures that may be needed at the outset of activities. The impacts on environmental resources from the proposed project will be short-term and temporary in nature.

Environmental impact of a project is worked out using various factors, so that an environmental management plan can be evolved to take mitigation measures.

Impacts assessment strategy at different stages of the project is summarized as per Fig. 6.1 below:

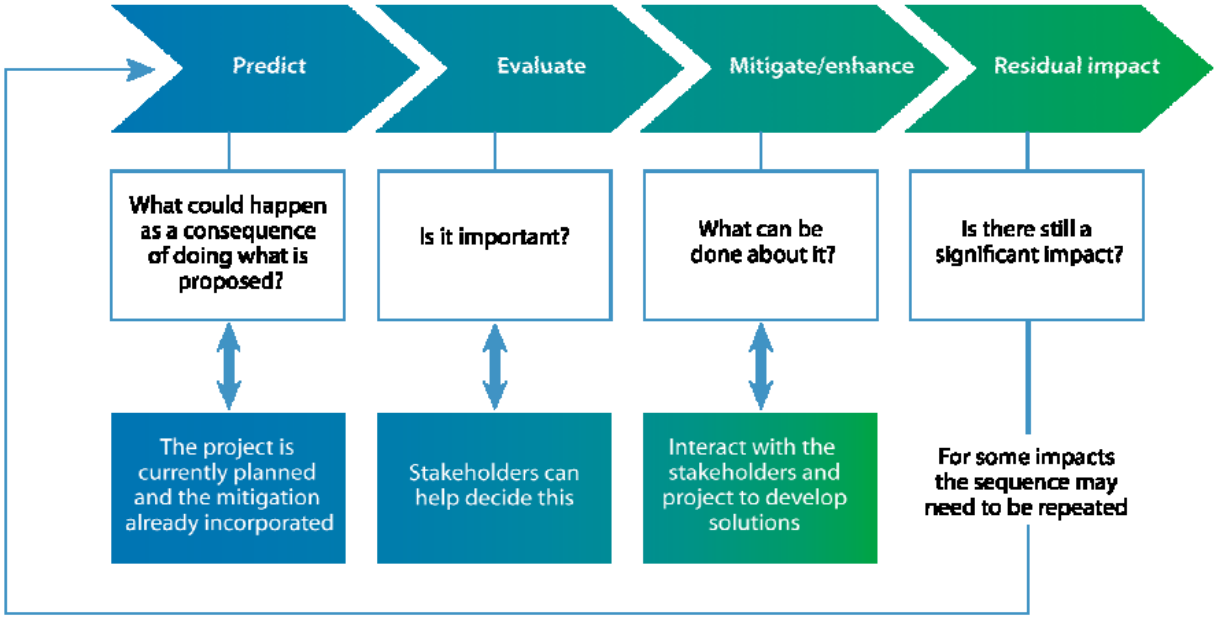


Figure 6.1: Impact Assessment Strategy

A systematic strategy was developed to provide an assessment of the likely impacts on the micro and macro-environment of the Project site. The strategy included:

6.2 Screening of Environmental Aspects related to Siting of Project

The **SAAR Sky Icon** Project will be sited at Plot No. 10/1, Sheet No. CL.9, Civil Lines Quarters, Karachi; the site falls in the appropriate category that permits the designated land-use by the relevant authority. The site is thus the only and hence the preferred alternative for siting the Project.

The ownership of the plot lies with the **M/s SAAR Builders and Developers**. Since the

proponent is the rightful owner of the site/plot, there is no dispute with regard to siting of the project. To validate their claims on the site and on its being the only and hence the preferred alternative for establishment of the project, the proponent will take NOCs from utility agencies for the provision of electricity, gas, water and sewage arrangements.

The site is free from any encumbrances and therefore would least likely to cause displacement of population, loss of business and annoyance to the living environment, or disturb the peace and tranquility of its surroundings.

Within, the micro environment, there is a protected area of Chief Minister's House which is protected heritage site as per Sindh Cultural Heritage (Preservation) Act, 1994 under notification No. OSD/CHC/CLQ-01-/2017. The protected heritage site is located within 200 ft of proposed project.

The proposed project is a self-contained building having its own back-up power generation, water supply supplemented by hyper filtration system and sewage treatment, grey water recycling and disposal system in addition to provision of parking space. The relevant authorities have already received the due amount for provision of utility services and development of the area. They are expected to plan and implement augmentation of the facilities in advance; otherwise plan for densification would, instead of facilitating improvement in quality of life, be a burden on the environment.

The Project would thus achieve its objective of providing a secure and safe building at an attractive location with regards to upcoming development activities. This being a positive impact would be an indicator of achievement of the objectives of the Project.

6.3 Assessment of Impacts at the Construction stage of the Project

6.3.1 Demolition of Structure(s)

The site is an open land with no significant permanent structure at the site. No demolition will therefore be required.

6.3.2 Building Stability

The proposed building is an RCC framed structure. The different stages of construction including placement of foundation will have to be laid taking due consideration of the sub-soil structure, seismicity and liquefaction effects.

The sequence of construction should be as follows:

- Construction of earth retaining structure (secant pile wall, contiguous pile etc.)
- Drilling and installation of dewatering wells
- Excavation of plot up to groundwater level
- Dewatering
- Excavation up to Raft bottom level
- Construction of raft foundation followed by construction of substructure

The dewatering operations shall continue from start of excavation to completion of substructure. Tests on soil samples obtained from the borehole indicate 'moderate' sulphate and chloride exposure. Under these conditions Ordinary Portland Cement (OPC) is recommended to be used for all underground concrete works. As geotechnical investigation report, groundwater is available at a depth of 12-14 feet below.

6.3.3 Erosion of Soil

Generally, the exposed soil after excavation for foundations is vulnerable to erosions and runoffs by rains. Such a situation is of temporary nature and short duration. It lasts only during the landscaping and concreting phase of construction at the site. Standards operating procedures have to be adopted to minimize the impact.

Mitigation Measure

- Covering the open soil during the construction phase till such time that the foundation will adequately concreted.
- Intensification in fugitive dust emission caused by erosion of soil will be mitigated by appropriate measures to reduce the level of impact to minor significance.
- Control of air emission during construction will be ensured by adopting sound operating procedures such as:
    - Exposed surface will be regularly wetted to effectively keep airborne dust levels to minimum
    - Stockpiles of fine material will be wetted or covered with tarpaulin especially during windy weather conditions.
    - Site workers will be mandated to wear dust masks especially during dry & windy weather conditions.

6.3.4 Excavation

The provision of foundation will require excavation below ground level. Once removed, the void space is likely to impact the integrity of the soil in the surrounding. To maintain the stability of excavation and to protect foundations of adjacent structures, retention measures such as bracing or shoring can be used to retain the soil during the construction of basement. It is essential to keep the excavation dry and excavation should be performed during dry season. It is imperative that system should have adequate water proofing to make sure moisture doesn't ingress into the retention system and basement.

Mitigation Measure

- Engineering study of sub-soil structure and impact analysis of surrounding structures was carried out.
- Fencing and obscuring the construction site to reduce the perception impact was undertaken.
- During the construction of basement, it would be advisable to monitor the excavation cuts and if found necessary, shoring/bracing may be employed. It must be ensured that the excavation is done in dry season.

- The neighborhood will be notified with adequate signage at the very start of the project. Site will be appropriately covered all around to contain the fugitive dust emission within the microenvironment. The impact of the activity will be continuously monitored by IMC since it is apprehended that the residents in the immediate neighborhood are likely to be exposed to dust fall hazards.

6.3.5 Construction Waste

Typical solid waste generated during construction includes wasted concrete, steel and wooden scaffolding, cement bags, excavated soil, wood remains etc. It is envisaged that the quantum of earth fill material will be enormous since excavation will be deeper down. The waste generated has the potential to cause adverse impact on the surroundings if not properly managed and disposed to approved dumpsites by approved waste contractors. The excavated waste has the potential to block nearby drainage channels that could ultimately cause localized flooding, particularly during the monsoon season. Irregular storage of this waste may pose health hazards to the workers at site and more so to the school going children and residents in the neighborhood.

The following measures have been recommended for management of the excavation procedure and disposal of construction wastes:

Mitigation Measure

- Site will be properly cordoned off by placing curtains all around.
- Unusable wastes will be transported to approve dumpsites.
- Excavated soil will be disposed of through the regular channel of the approved disposal contractor.
- Proper solid waste containers of adequate capacity will be provided to cater to daily waste generation.

6.3.6 Topography and Geology

The Project is not likely to impose additional stress on topographical parameters and hence no significant impacts are envisaged. The siting of the project demands careful planning and evaluation of load bearing capacity of the soil to ensure the stability of the proposed structure. In view of the project stability requirements requirement, piling has been proposed. As such the stability of the project is ensured and is not likely to impose additional stress on the sub-soil structure and hence no significant impacts are envisaged.

6.3.7 Air Quality

The major source of air pollution during the construction phase will be dust emission due to earth works and gaseous emissions from construction equipment. Impacts from each source and proposed mitigation measures are likely to be as follows:

Dust Emission: Particulate matter emitted during construction activities results in deterioration of ambient air quality in the vicinity of the source and is usually a nuisance to the neighborhood and the communities in the neighborhood besides the construction workers.

Dust emission from construction site is a concern particularly if the site is near residential areas. The main health hazards emanate from particles smaller than 10 microns (PM_{10}) in particular $PM_{2.5}$ as they are respirable. These particles are sufficiently charged to assume the properties of aerosols which on reaching the receptors have heavy impact on the respiratory system and on the surface of furnishings of the living environment. The impact on the environment would be considered significant if there is an increase in suspended particulate matter within and beyond the boundaries of the project site due to activities at the site, or if the dust affects local property or results in complaints from the community.

- Potential sources of particulate matter emission during construction activities include earthworks (dirt or debris pushing and grading), exposed surfaces/storage piles, truck dumping, hauling, vehicle movement on unpaved roads, and concrete mixing and batching. The quantity of dust that is generated on a particular day depends on the magnitude and nature of activity and the atmospheric conditions prevailing on the day. Availability of Ready-mix on commercial scale has considerably reduced the level of emission of fugitive and construction sites are no longer required to have a batching plant.

Mitigation Measure

The following mitigation measures have been recommended:

- Water sprinkling and monitoring to ensure adequate suppression of dust will be a regular activity as long as the excavation activity lasts.
- Dust emission from soil piles and aggregate storage stockpiles will have to be reduced by appropriate measures like keeping the material moist by sprinkling of water at appropriate frequency and regularly monitored by IMC. Availability & use of ready-mix on commercial scale will considerably reduce the level of emission of fugitive at the project site.
- Construction materials that are fragile and vulnerable to raising visible dust will be transported only in securely covered trucks to prevent dust emission during transportation.
- The exposure of construction workers to dust needs to be minimized by provision of dust masks and mandating the workers to wear them.

Vehicle and Equipment Exhaust: Combustion exhaust from vehicles and construction equipment can affect the ambient air quality of the site surroundings. The impact would be potentially significant when the ambient air quality deteriorates due to emissions from construction equipment and machinery or the construction generators etc. beyond the guidelines especially at the environmental receptors in the neighborhood. The exhaust emissions will include particulate matter, hydrocarbons, oxides of nitrogen, sulphur, and carbon.

Mitigation Measure

- All vehicles, generators and other equipment's used during the construction will be properly tuned and maintained in good working condition in order to minimize emission of pollutants.

- The stack height of the generators during operation phase will be vented through vertical stacks to minimize exposure at ground level.
- The noise and air emission from the Project as a whole will be contained within its microenvironment by measures engrained in the design of the building. The mechanical area will be provided with noise abatement devices. Generators emissions will be controlled to acceptable levels by segregating their locations and timely maintenance.
- In order to compensate for the increase and footprint of carbon and water vapor it would be desirable for proponent of project to undertake plantation of large number of trees with dense canopy at the nearest public park/green belt in consultation with the Independent Monitoring Consultant (IMC).

6.3.8 Construction Noise

Depending on the construction equipment used and its distance from the receptors, the commuters and residents in the neighborhood may be exposed to intermittent and variable noise levels. During the day such noise results in general annoyance and can interfere with sleep during the night.

In general, human sound perception is such that a change in sound level of 3 dB is clearly noticeable, and a change of 10 dB is perceived as a doubling or halving of sound level. The noise in the project area will increase during construction and completion of the proposed project and may result in disturbance to the nearby receptors unless it is contained within the appropriately fenced and covered site of the Project.

Baseline noise measurements were obtained through continuous monitoring for a 24-hour period at the project site. It was found from the noise monitoring that the typical average noise level in the project area was >70 dB (A). The Sindh Environmental Quality Standards for noise require that the sound level in residential and commercial areas should not exceed 55 dB (A) and 65 dB (A) respectively during day time and 45 dB (A) and 55 dB (A) respectively during the night time.

Mitigation Measures

- Restraining the use of noisy equipment to suit to the conditions of the living environment namely 65 dB (A) during the day and 55 dB (A) during the night.
- Reducing equipment noise at source by proper design, regular maintenance & repair of construction machinery and equipment.
- Minimizing noise from vehicles and back-up power generators by use of proper silencers and mufflers.
- Use noise-abating devices wherever needed and practicable.

6.3.9 Water Sourcing

Water will be required during the construction activity for human consumption at the construction stage as well as for the construction activities including sprinkling of water for dust suppression.

Mitigation Measures

Adherence to the following measures will ensure efficient use of water during the subsequent stage of construction:

- A complete record of water consumption during the construction phase will be maintained.
- Water conservation practices will be adopted to prevent wastage of water.
- The water supply lines will be checked and repaired for leaks, if any, in order to reduce wastage of water.
- Use of water efficient sanitary fittings such as low flush toilets, water efficient shower heads, and aerators on faucets will be ensured throughout the Project cycle.

6.3.10 Soil Contamination

The contractor shall be mandated to follow the SOPs with regard to handling, storage, transfer, use and final disposal of contaminants, if any by the proponent. The following measures will be adopted during the construction stage to reduce the chances of soil contamination:

Mitigation Measure

- Fuel oils, lubricants, and chemicals will be stored in covered dyked areas, underlain with impervious lining. The construction site(s) will be provided with hard cover or tarpaulin lining to prevent contamination of soil.
- Washing and maintenance of vehicles and equipment will only be carried out at designated areas.
- Regular inspections will be carried out to detect leakages in construction vehicles and equipment.
- Appropriate implements such as shovels, plastic bags and absorbent materials will be made available near fuel and oil storage areas for removal of oil and contaminated soil.
- Contaminated soil will be removed and properly disposed after treatment such as by incineration by SEPA certified contractor.
- Hazardous Substances Rules 2014 will be adhered to for storage, transfer, subsequent handling and final disposal of any chemicals/substances during the construction stage.

6.3.11 Wastewater Generation & Disposal

Disposal of domestic effluent from the construction site has to be adequately managed so that the wastewater flows into the regular channel and does not contaminate the soil and groundwater of the site or its surrounding.

Mitigation Measures

The following mitigation measures will be adopted during stages of construction:

- Wastewater generated will be routed to the nearest drain / sewerage system.
- Sewage will not be mixed with any other waste.

6.3.12 Solid Waste Generation and Management

- The construction phase of the project is expected to generate wastes including; packing waste; scrap, excess construction materials and debris, domestic wastes from construction camp, empty containers and drums, used lubricating oils and chemicals etc.
- The impact of solid waste disposal would be significant if the waste management is not carried out appropriately. This may adversely affect the health of workers, cause soil pollution, and deteriorate the quality of surface water and groundwater. Also, if excessive wastes are generated, recyclable wastes are not recycled, wastes are scattered, handling of wastes will result in contamination, and wastes are improperly disposed of, the result would be serious degradation of the environment.
- Waste generated as a result of construction activity will be inherently less reactive and chemically inert under normal conditions however, its handling and storage may pose adverse impacts of minor nature which could be controlled by employing the recommended mitigation measures in the EMP.

Mitigation Measures

- A waste management plan will be developed for the construction stage of the project. The following will be the key elements of the waste management system:
    - Separate bins will be placed for different type of wastes - plastic, paper, metal, glass, wood, and cotton.
    - Recyclable material will be separated at source. The recyclable waste will be sold to EPA certified waste contractors for recycling.
    - Non-hazardous non-recyclable wastes such as kitchen wastes will be disposed of in landfill site managed by municipal administration or approved waste manager/contractor.
    - No wastes will be dumped at any location outside the site boundary.
    - All hazardous waste will be separated from other wastes. Hazardous wastes will be stored in designated areas with restricted access and proper marking. Hazardous wastes will be disposed of through SEPA approved waste contractor.
    - Surplus construction materials including partially filled chemical and paint containers will be returned to suppliers. Inert construction wastes will be disposed of onsite as fill material or sold as scrap to contractors.
    - Records of all waste generated during the construction period will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register.
    - Training will be provided to personnel for identification, segregation, and management of waste.

6.3.13 Materials Selection

General specification/details have been worked out in respect of type of structures, concrete, and all other materials required for the Construction of Building Project. The following measures will be adopted to ensure sustainable development of the Project:

Mitigation Measures

- The structures and materials will, in the construction stage, conform to recommended standards and follow standard practice of civil works.
- Materials including paving stones, crush, gravel and sand will be brought from commercial quarries located in Sindh province. Environmentally sound materials and goods will be selected, with priority being accorded to products meeting national and international standards.
- Traditionally well-tried materials and components will be selected and selection of construction materials would be based on sustainable source.
- The production, use and disposal of building materials during the construction stage of the project will utilize considerable amount of energy and resources; all attempts will be made towards efficient consumption and minimization of wastage of water, energy and materials
- Best practice of energy efficiency will be adopted in the building design. The Project building would be constructed with high level of thermal insulation
- The environmental impacts arising from selection of building materials and components would take account of the environmental issues during the materials selection process, and introduce Recycling strategies such as Reuse and Reduction of Wastewater.

6.3.14 Seismic Hazards

The area presents a moderate to high hazard potential for earthquake activity. The seismic zone map of Pakistan, developed after the October 2005 earthquake, divides the country into four seismic zones based on ground acceleration values, categorizing them as major, moderate, minor, and negligible zones. Under this zoning the project site lies in the moderate to high hazard zone with minor to moderate damaging impact.

The developed guidelines for earthquake design of buildings in Karachi have assigned an expected Peak Ground Acceleration'(PGA) value of 0.20g for larger buildings such as the project building. This would place the project site within Uniform Building Code (UBC) Zone 2B. The expected intensity according to the Modified Mercallis Scale (MM) would be VIII and higher.

Mitigation Measures: No specific mitigation measures other than construction of the building facility in accordance with the UBC Zone 2B are recommended.

6.3.15 Operation of Vehicular traffic

Vehicular traffic management will have to be undertaken seriously to restrain unnecessary traffic jams that may cause annoyance to the commuters travelling on the roads surrounding the project. This is relevant especially in the case due to the road condition and the

availability of a smaller road.

Mitigation Measures

- Heavy traffic during construction phase will come to the project site during late night hours.
- Project vehicles shall not be fitted with pressure horns
- During construction, regulate speed of vehicles
- Designated parking areas will be provided for different type of project vehicles within and around the project site.
- Manage vehicle movement to avoid traffic jam and long queues.
- Prepare, implement and monitor the traffic management plan.
- Vehicles to use designated parking areas during construction phase.
- Parking of vehicles alongside the road should be prohibited at all time.

6.3.16 Occupational & Community Health and Safety Impacts

The health, safety and welfare of personnel working on the Project and the general public, and the avoidance of damage to property, are important issues in themselves and for the project client. The construction of high-rise building poses significant risk for workers especially if they are not well-trained and are not equipped with appropriate personal Protective Equipment's (PPEs).

It is not unusual to observe that construction workers are left on their own to protect themselves from imminent hazards. Accidents usually occur at unprotected sites and are incident on unprotected workers. HSE considerations require that precautions must be taken against even the most insignificant impacts. The contractor is expected to give consideration to Occupational & Community Health and Safety (OCH&S) aspects of construction, so that operations are conducted in a manner that eliminates risk to persons and property. The Contractor is expected to treat safety as a high priority in his activities while executing the work. Contractors will not permit or cause unsafe conditions that pose a hazard during construction. Perceived risks will be addressed at the outset by way of adequate and concrete mitigation measures.

However, Major social concerns during the construction stage arise when: i) the stakeholders are not informed about the project or its schedule of operations; ii) the site is not appropriately cordoned off to restrain outsiders from entering the site; iii) construction crew invariably ignores or sidetracks the mandatory requirement of wearing PPEs; iv) construction crew is not pre-trained to be aware of the likely hazards during various stages of the project; v) even if they are trained on awareness and provided the PPEs the lukewarm attitude of the supervisors does not oversee the follow-up of HSE procedures/SOPs.

Mitigation Measures

The proponent will direct Contractor to prepare an Occupational & Community Health and Safety Plan (OCH&S) that conforms to requirements set out in the Sindh Occupational

Safety and Health Bill (2017), Sindh Occupational Health and Safety Rules (2019) and that aims to eliminate or minimize unwanted hazards and risks to personnel and the public during construction, and to achieve 'Best Practice' within the project context, establishing a work environment that conforms to provincial requirement with respect to health, safety and emergency response.

The proponent will make sure that OCH&S Plan will address the following key elements:

- The Contractor will provide as a minimum of safety training addressing 1) general safety awareness; 2) first aid procedures; 3) emergency procedures; and 4) use of personal protective equipment.
- The Contractor will conduct site safety inspections and make sure construction work in undertaken in safe and sound manner.
- The Contractor will provide a system for recording all accidents and dangerous occurrences, regardless of whether or not personnel injury occurs, including any incident involving a member of the public.
- The Contractor will investigate accidents in order to ascertain the facts with a view to prevent future and possibly more serious occurrences.
- The Contractor plan will include a Safety and Emergency Preparedness Plan to address foreseeable emergencies that may arise during the construction activity.
- The Contractor will propose safety signage for display around the sites in local language to address use of PPE, dangerous conditions, smoking prohibition, first aid station, and prohibited entry.
- The Contractor will provide means for maintaining healthy working conditions for workers related to the effects of noise, dust, use of chemicals, by removal of the cause and use of suitable Personal Protective Equipment (PPE), to be provided to workers. The Contractor will ensure that workers are properly trained in the use of PPE and that adequate supervision is provided to ensure its proper use.
- The Contractor will employ an Environmental, Health and Safety (EHS) expert on site.
- Provide alternative traffic arrangement/detours, if necessary, so that traffic can be distributed and move on different roads; and ensure that public/residents association is informed about such traffic diversions.
- Maintain transparency of the project, public information/caution boards must be provided at the work site – information shall inter-alia include project name, cost and schedule; executing agency and contractor details; nature and schedule of work; traffic diversion details, if any; entry restriction information; competent official's name and contact information for public complaints.
- Restraining access to the public from the site by enclosing/barricading the construction area; providing warning boards and sign boards and positioning security guards throughout the day and night, 24/07.

- Temporary inconveniences due to construction works will be minimized through planning and coordination with community members and organizations e.g. Traffic Management Authorities (if needed).
- Fulfillment of Occupational Safety Health Administration (OSHA) guideline for scaffoldings will be highly prioritized in order to make sure no accidents occur.
- Requirements of Scaffoldings should be considered; scaffolding should be able to bear its' own weight plus four times the maximum intended load.
- Scaffolds must be secured to a structure or building to prevent tipping.
- Scaffolding material should be properly inspected prior to its use.
- Base plates and mud sills must be used to provide stable footing for scaffold legs on a foundation.
- For scaffolding planks, solid sawn wood, fabricated planks, and fabricated platforms may be used as scaffold planks following the recommendations by the manufacturer or a lumber grading association or inspection agency.
- Fall protection, such as guardrails, must be provided on all open sides and ends of platforms more than 10 feet above the ground.
- All employees must be trained by a qualified person to recognize the hazards associated with the type of scaffold being used and how to control or minimize those hazards. The training must include fall hazards, falling object hazards, electrical hazards, proper use of the scaffold, and handling of materials.
- Platforms must be fully planked or decked, and they must extend over their end supports by at least 6 inches but not more than 12 inches.
- Maintain the service roads in good condition to allow smooth traffic movement; provide necessary personnel to guide and control the traffic.

6.4 Assessment of Impacts at the Operation stage of the Project

During operational phase of the project, various activities may have significant impact on some environmental parameters. Various environmental attributes are to be studied during this phase for their overall impact on the surrounding environment.

6.4.1 Solid Waste Generation and Disposal

There will be a considerably large quantity of solid waste generated from the residential units/apartments. The solid waste will mainly include food waste, paper, packaging material, plastic bottles and glass. If not properly managed and disposed of, these wastes can pose serious environmental hazard to the occupants and visitors of the proposed building project and also to the surrounding environment.

People will throw the waste until proper waste collection system is provided. It can pollute the marine waters and pose a threat to marine life and fishes.

The quantity of solid waste to be managed can be segregated at source into organic and recyclable components. Nearly half of the waste generated is expected to be of organic nature

i.e. biodegradable and the remaining mostly recyclable. Therefore, waste segregation can solve much of the solid waste management problem. The viable options after storing, collecting and transportation of segregated waste components for its ultimate safe disposal are composting and recycling, respectively which need to be carefully designed and managed appropriately.

Mitigation Measures

The following mitigation measures would be adopted to combat from the impacts imposed upon the project site and immediate environment due to the solid waste generation activities in the operational phase:

- All solid waste shall be segregated into organic and recyclable waste at source and then collected, stored, and transported for recycling/sold to vendors for ultimate safe disposal.
- Handling and disposal of such waste shall be managed by a dedicated waste management contractor.
- The solid waste management plan will be developed and facilities for collection, storage and transportation will be established and organized.
- Appropriate waste signage will be used to increase awareness among users.
- Covered waste bins (different colors) will be provided to every building that will be ultimately collected in a storage area. This storage area will be covered so that pollutants and smell from the waste would not affect the surrounding.
- Residential units of the project will be provided different colored bins for different categories of waste.
- Storage facility for collecting waste bins will be created and established by taking into account quantities of waste generation.
- Handling and disposal of such waste will be managed by a dedicated waste managing contractor.
- Waste managing contractor should have binding to dispose the waste to official dumpsites of Karachi.

6.4.2 Waste Water Generation and Disposal

The project on becoming functional will generate wastewater which will be mainly sewage. Small quantities of hazardous waste may be produced during the maintenance activities in the building (such as oily waste etc.). The cleaning waste generated by the use of surfactant and cleaning agents used during the operational phase. The wastewater generated can be a potential source of pollution to the surface and ground water resources of the area.

All type of wastewater generated (i.e. drainage of sewage, showers and kitchen effluent etc.) will be directed to the wastewater treatment consisting of Septic Tank prior to disposal into an allocated out fall sewer. This will ensure the specifications stipulated in SEQS will comply.

Following additional mitigation measures will be adopted for effective management of wastewater during the operational phase of the project:

- Grease interceptor and/ or oil skimmer to be installed on kitchen effluent to maintain oil levels within SEQS limits.
- Waste segregation measures would be employed to minimize entry of solid waste into the wastewater stream.
- Water conservation strategies will be employed to avoid wastage of water.
- Periodic preventive maintenance of pumps, diffusers and other ancillary equipment's.
- Monitoring of wastewater to ensure compliance with SEQS.
- Provision of holding tank, so that the effluent is settled and then disposed of to the main sewer line.
- The cleaning agents used will be non-hazardous.
- If groundwater is used and desalinated water is required, RO reject water will be disposed in environmentally friendly manner.

6.4.3 Water Consumption and Quality Assurance

The water requirement for the project will mainly be catered through city water supply and through water tankers and/or borehole when required. Potable water may directly be supplied to apartments in bottles or after filtration. Water conversation measures will be applied in order to reduce the amount of wastewater generation in this phase. Additionally, relevant quality standards will be maintained to ensure that the water is fit for drinking purpose using guidelines of established SEQS water metrics.

Adherence to the following mitigation measures will ensure efficient use of water during the subsequent stage of operation:

- A complete record of water consumption during the operation phase will be maintained.
- The water supply lines will be checked and repaired for leaks, if any, in order to reduce wastage of water.
- Water filtration systems will be installed to keep water purity levels within acceptable SEQS parameters, especially coliform levels which indicate presence of harmful pathogens.
- All the main water inlets will be provided with water flow meters to record consumption of water.
- Drinking water and service water sources should be clearly labeled.
- Water conservation practices will be adopted to prevent wastage of water.
- Reuse and recycle water as much as possible for example by using grey water for flushing toilet. Grey water is the term used for the used water that goes down our sinks and shower drains. Black water is another term for the water 'and stuff' that goes down from our toilets. The grey water from bathrooms sink can be reused to flush the toilets.
- Use of water efficient sanitary fittings such as low flush toilets will be ensured throughout the Project cycle.
- It will ensure that all activities executed must comply with all the environmental regulations as well as cooperation will be bridged with concerned regulatory authorities.

6.4.4 Energy Consumption

During operation phase, for electricity supply, the primary sources will be Karachi Electric (KE) and solar panels mounted on the building. Additionally, generators are available to ensure uninterrupted power in case of outages. Energy saving techniques such as Energy efficient mechanical systems and Passive ventilation/cooling by provision of natural lighting and ventilation will be employed to conserve energy.

Mitigation Measures

Following energy conservation measures are being adopted.

- The energy-efficient lighting system installed for the project will contribute immensely to energy saving during the operational phase of the project.
- Natural lighting and ventilation shall be preferred in the buildings.
- The energy-efficient lighting system installed for the project will contribute immensely to energy saving during the operational phase of the project.
- The energy usage during the operational phase will be monitored and targets would be set for efficient use of energy.

6.4.5 Air Emissions

During the operational phase, air emissions may come from backup generators. If vented at lower heights, the exhaust gases are likely to disperse locally and cause localized pollution to the working staff. Other emissions coming from this project will be from the exhausts of additional traffic movement related to proposed project activity.

Mitigation Measures

Impacts of Emissions may be reduced to prescribed level by attempting the following mitigation measures:

- Monitor all exhausts at regular frequency to meet SEQS exhaust emissions.
- Stack height of generators will be increased to ensure better dispersion and distance covered by the pollutants in air before reaching the ground.
- Carry out regular maintenance of generators.
- An awareness program will be organized for generator operators to regularly tune-up engines and ensure proper maintenance.

6.4.6 Fire Hazards and Life Safety

Fire is one of the major safety hazards. Fires can cause loss of life and property. However, at the same time fires have the potential to severely harm the people in the vicinity and affect the environment.

Mitigation Measures

Risks involved with fire hazard can be reduced by adopting following measures:

- For all engineering designs, IBC (International Building Control), EN 54 & NFPA codes will be followed.
- Standard fire and smoke detection and protection devices such as alarms, fire hoses and hydrants to be provided in all areas of the project.
- The facility will possess a detailed emergency and evacuation plan that will be regularly drilled to make sure that the responsible staff remains trained at all times.
- Firefighting equipment such as fire extinguishers and hydrant systems will be maintained at strategic locations within the proposed building.
- Regular inspection and servicing of the extinguishers will be undertaken by a reputable service provider and record of such inspections should be maintained.
- Fire safety signs will be prominently displayed within the floors.

6.4.7 Positive Socioeconomic Impacts

Employment Opportunities

Job opportunities will be developed for both construction and operation phase of project. During construction phase, 200 workers will be required during peak construction period for skilled, semi-skilled and unskilled jobs. Further, during operation phase, jobs opportunities will also be developed for project as management agents, caretakers, cleaners, security personnel and technicians.

Provision of Market for the Supply of Building Materials

The project will require the supply of large quantities of building materials which will be sourced locally. This provides ready market for building material suppliers such as quarrying companies, hardware shops and individuals with such materials.

Increased Business Opportunities

The large number of project staff required will provide ready market for various goods and services, leading to several business opportunities for small scale traders such as food vendors around the construction site.

Revenue to National and Provincial Government

Through payment of relevant taxes, rates and fees of the government and the local authorities, the proposed project will contribute towards the national and local revenue earning.

6.4.8 Cultural Resources

Near the project site is the Chief Minister House, a significant antiquity. It's crucial to protect this landmark while construction and operation work on the project. Therefore, strict measures will be enforced to minimize any potential damage. Specifically, the appointed contractor will implement the following measures:

- The project's design will be mindful of the Chief Minister House's architectural significance, aiming to harmonize with its surroundings.
- Landscaping efforts will be undertaken to enhance the area's aesthetics while preserving sightlines to the Chief Minister House.
- Protective fencing will be erected to maintain a safe distance between construction activities and the Chief Minister House.
- All construction traffic will be carefully managed to avoid routes that pass near CM house.
- Where feasible, alternative routes will be designated to divert construction traffic away.
- The handling and management of construction materials will be conducted with utmost care and attention to prevent disturbance to the antiquity.
- Storage areas for construction materials will be located away from CM House to minimize the risk of accidental damage.
- Protocols will be established for the safe transportation and delivery of materials, with a focus on avoiding routes that pass near sensitive areas.
- The appointed contractor and construction personnel will receive training and information regarding the significance of nearby cultural resource.

6.4.9 Land-use and Aesthetics

The Project falls in the category that permits the designated land-use; the Project will add the skillfully and sustainably designed mixed-use housing scheme as a landmark to the skyline of Karachi and produce positive impact on the aesthetics of the urban environment. The Project is designed as a self-contained building; with 24-hour security system all over the building the designers have ensured that the concerns on invasion of privacy are alleviated and eased. The Project would thus achieve its objective of providing a secure and safe building at an attractive location. This being a positive impact would be an indicator of achievement of the objectives of the Project.

- No mitigation measures will be required.

Chapter 7 Environmental Management Plan

7.1 Introduction

7.1.1 General

The EIA for the proposed development activities of Projecthas identified potential impacts that are likely to arise during the construction and operation phases. The EIA has examined in detail both negative and positive impacts of each stage of theoperation. Where adverse impacts have been identified, the EIA has recommended mitigation measures; include management and monitoring practices, physical controls, or compensation in monetary terms. The mitigation measures proposed are based on a good understanding of the sensitivity and behavior of environmental receptors, past experience, case studies, legislativecontrols, guidelines, & expert advice. For the effective implementation and management of the mitigation measures and monitoring requirements an Environmental Managements Plan (EMP)has been prepared and presented in this section. For any residual impacts (impacts remaining after applying the recommended mitigation measures) or for impacts in which there has been alevel of uncertainly in prediction, monitoring measures have been recommended. Advice on monitoring measures required was sought from experts involved in the EIA and case studies ofsimilar development activates at international level.

7.1.2 Objectives

The EMP provides a delivery mechanism to address adverse impacts, to enhance project benefits and to introduce standards of good practice to be adopted for all project works.

The primary objectives of the EMP are to:

- Outline mitigation measures recommended in the EIA and define the responsibility and timing for the implementation of these measures;
- Develop monitoring mechanism & identify parameters that can confirm the implementation of the mitigation of these measures;
- Define roles and responsibilities of the project proponent for the implementation of EMP and identify areas where these roles & responsibilities can be shared with other stakeholders and
- Define the requirements necessary for documenting compliance with the EMP and communicating it to all concerned regulatory agencies.

For each impact, or activity, which could give rise to an impact, the following information is presented:

- Mitigation measure that will be implemented;
- The person(s) responsible for ensuring full implementation of the mitigation measure;
- The parameters that will be monitored to ensure effective implementation of the mitigation measure;
- The timing for the implementation of the action, to ensure that the objectives of the

mitigation are fully met.

7.2 Structure of the EMP

The EMP consists of the following section.

- Legislation and guidelines.
- Organizational structure and roles and responsibilities;
- Mitigation management's matrix
- Environmental monitoring program
- Change management plan
- Training Program

7.3 Legislation and Guidelines

The EIA has discussed in detail all the legislation and guidelines (chapter 2) which has relevance to the project. The proponent shall ensure that the construction and operation of project is conducted in conformance to relevant legislations and guidelines and guidance is sought as and when required. The proponent shall also ensure that the key project management staff is awareof these legislations and guidelines. SEQS for municipal and industrial effluents, selected gaseous pollutants from industrial sources and motor vehicle exhaust and noise have been provided in Chapter 2.

7.4 Organizational Structure and Roles and Responsibilities

7.4.1 Organizational Structure

The proposed project includes the following main organization:

- The project proponent and owners of the EMP.
- The construction contractor as well as contractor required during the operational phase (e.g. waste contractor) as the executors of the EMP.

These organizations will have the following roles and responsibilities during the project activities.

7.4.2 Roles and Responsibilities

(i) ***General***

Project Proponent: Project proponent will be responsible for ensuring the implementation of the EMP. A person holding a senior position will be responsible for the overall environmental performances during the proposed project. The person will be responsible for ensuring the implementation of the EMP by the proponent and all project contractors. The proponent's Site Representative (SR) will be responsible of implementation of the EMP and liaison with project contractor and stakeholders at site regarding environmental issues during the construction phase. Further the person holding a senior position in the proponent team will also be responsible for monitoring EMP's compliance and provided technical support in environmental issues.

Project Contractors: For the proposed project, the proponent will appoint construction contractor for different field operations. Various contractor will also be hired during the operation phase of the facilities in town (e.g. waste contractors). The contractors will be responsible for implementation of, or adherence to, all provisions of the EIA and the EMP and with any environmental and other codes of conduct required by the proponent. Overall responsibility of the contractor's environmental performances will rest with the person holding the highest management position within the contractor's organization reporting to their management. The contractor's site managers will be responsible for the effective implementation of the EIA and the EMP. The contractor's HSE officers will have functional responsibilities to ensure implementation of or adherence to the EMP.

(ii) ***Planning and Design of the Operations***

Details of project Activities: Details of the project activities are provided in section 2 of the EIA report. Following approval of the EIA, any changes to the proposed activities will be handled through the change Management Plan provided in this EMP.

Approvals: No-objection Certificate (NOC)/Approval from SEPA will not relieve the proponent of other legal obligation and hence the proponent and project contractors will obtain all other relevant clearance and necessary approvals required by the Government of Sindh and Relevant departments prior to commencing the respective operations.

Contractual Provision: Adherence to the requirements of the EIA and EMP in terms of environmental mitigation will be required from all project contractors and thus EMP will form partof their contractor with the proponent.

(iii) ***Implementation of the Operation***

Co-ordination with Stakeholders: The proponent will ensure that co-ordination with the regulators and other stakeholders on environmental & social matters is maintained throughout construction & operation phase of the project.

Monitoring: The proponent and the contractors will ensure that monitoring of the project activities is carried out throughout the project. The site representative will monitor all project activities duringthe construction and operation phase. He will keep a record of all non-conformances observedand report these along with actions to the proponent management in Karachi for further action.The site representative will also report any impacts anticipated along with his recommendation forfurther action.

Emergency Procedures: The proponent and the contractors will prepare contingency plans to deal with any emergency situation that may arise during the construction and operation e.g. majoroil spills, medical evacuation & communicate these to the regulatory agencies if required by these agencies.

Approvals: The project contractor will be responsible for obtaining all relevant approvals such as approvals for waste contractors, water source & others as specified in Mitigation Management Matrix.

Trainings: The project contractors will be responsible for the selection and training of their staff capable of completing the project activities properly and efficiently. The contractors will be responsible for providing training to their staff members according to the training programme.

(iv) *Communication and Documentation*

The proponent and the contractor will ensure that the communication and documentation requirements specified in the EMP are fulfilled during the construction and operation phase.

Change Management: The EIA for the proposed project recognizes that changes in the operationor the EMP may be required during the project activities and therefore provides a Change Management Plan to manage such changes. Overall responsibility for the preparation of change management statements will be with Proponent's site representative.

Restoration: The proponent along with the construction contractor will be responsible for the final restoration of work areas.

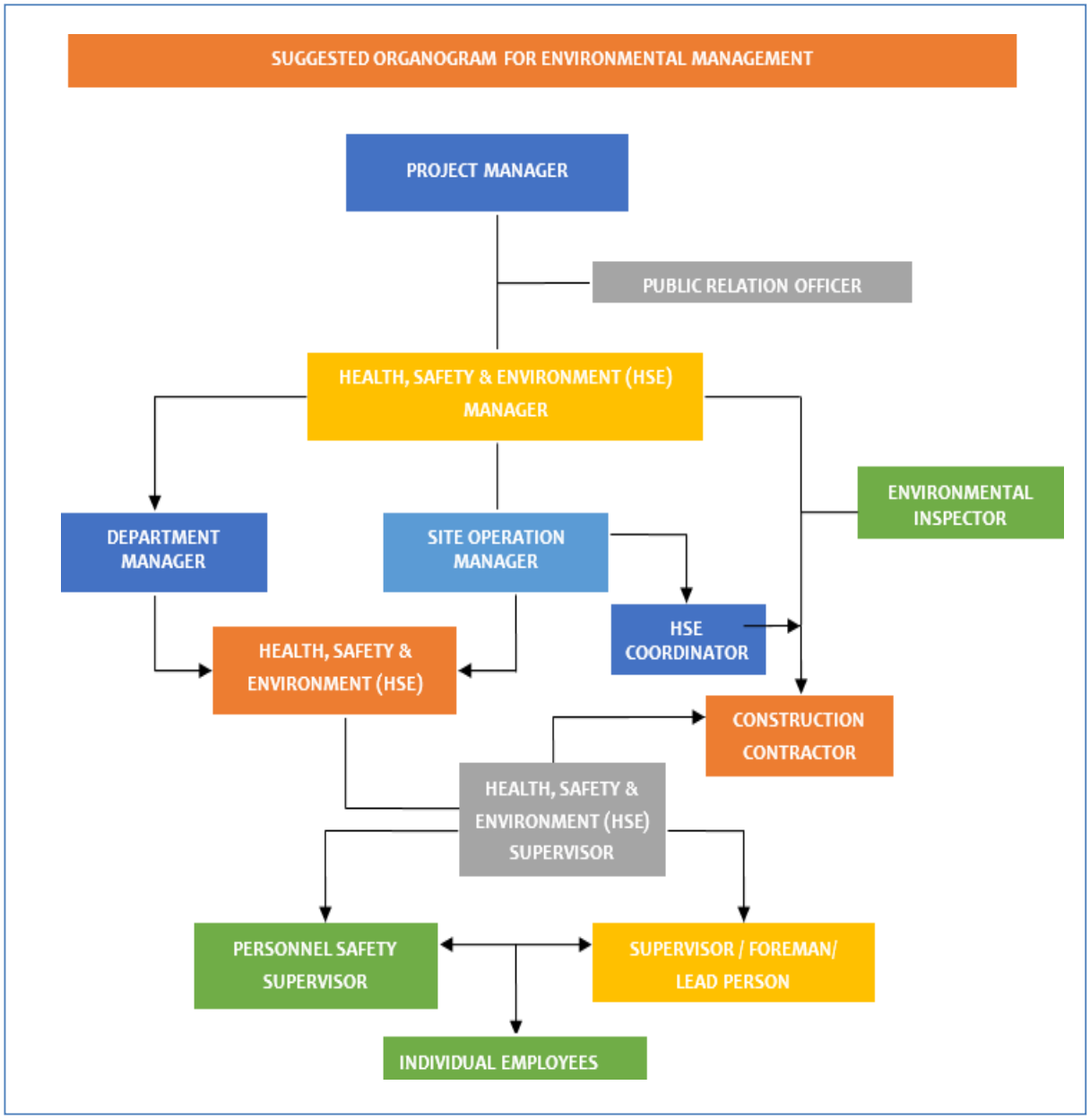


Figure: 7.1: Suggested organogram for Environmental Management

7.5 Maintenance of the EMP

EMP needs to be revised on timely basis to keep up-to-date as per the requirements comes up regularly. Therefore, outlining the responsibilities and activities associated with the maintenance of the EMP is essential. The responsibilities of the Construction Contractor should be detailed and procedures for requesting EMP revisions should also be outlined. EMP revision procedures must include requirements for notification of the appropriate government and municipal agencies so that their role is also played in the overall management process.

7.6 Environmental Health and Safety Management System

Environmental, Health and Safety Management System is essential for the care of EHS issues which should outline mitigation measures and best management practices. This management system recommends carrying out a complete assessment, evaluating, monitoring, identifying and control all potential hazards and risks arise during the construction and operation phases of the proposed project. It needs to ensure that the Health and Safety Plan (HSP) along with the Health and Safety Rules is established and enforced. The Plan should outline roles, responsibilities and expected outcomes with respect to the environmental health and safety management of the construction & operation phase of the Project. These measures should be implemented to ensure that no significant adverse environmental, health and safety impacts are created by activities associated with the construction of the project.

Protection of the public and workforce health and safety during both construction and operationsis the prime responsibility of proponent. Utilizing expert personnel and the Environment, Healthand Safety Management System (EHSMS), the potential health and safety hazards and risks willbe identified and assessed, then the subject of substantial planning, organization, procedures for various facility are developed.

7.6.1 Health and Safety during Construction Phase

Worker Health & Safety Management Plan will also be outlined to implement mitigation measures and best management practices. The plan should be implemented to ensure that no significant adverse worker's health and safety issues arise from activities associated with the construction of the project.

Potential hazards for workers in construction include:

- Falls (from heights);
- Trench collapse;
- Scaffold collapse;
- Electric shock and arc flash/arc blast;
- Failure to use proper personal protective equipment; and
- Repetitive motion injuries.

7.6.2 Health and Safety during Operation Phase

Since the project is high-rise development, occupational health & safety issues need to be addressed and managed effectively to ensure safety of its occupants in particular and the neighborhood in general.

7.7 Emergency Response Plan

Emergency may be defined as a sudden event causing or has the potential to cause serious human injury and/or environmental degradation of large magnitude. The best “cure’’ for an emergency is, of course, “prevention”. The probable emergency situation can be:

- Serious fire or explosion
- Major gas leakage.
- Major Spillage
- Natural calamity such as heavy rain, flooding, dust storm or earthquake, cyclone, etc.
- Bomb threat or any sabotage/terrorist activity
- Any other incident involving all or large part of the premises and its workers.

Emergency Response Management is provided by a small team of senior managers (the “Control Committee”) who in turn will direct all response activities through the Emergency Response Unit.

7.7.1 Objectives

The main objective of this plan is to establish the general guidelines for the actions to be taken in the event of fires, explosion, emergencies, accidents, disasters and sabotage, aimed at minimizingtheir effects and consequences, in order to protect:

- The lives of own or third-party personnel present in the project facilities.
- The lives of the occupants of the Project
- The lives of the nearby residents & communities coming into the direct influence of theproject area.
- The lives of the ecological systems located in the surroundings of the Project.

7.7.2 Emergency Response Manuals

Based on the Risk Assessment the proponent should prepare written emergency preparedness and response plans/procedures for the project facilities to cover emergency situations that could occur. It may be required that Emergency Response Manuals will be developed for various situations arising.

7.8 Environmental Compliance Reporting, Documentation and Trainings

The management will be responsible for the regular audit and review of the environmental management and monitoring plan. This will include both on-site auditing and review of performance reports. Additional onsite inspections and investigations will be undertaken in theevent of significant environmental incidents. These will be undertaken in conjunction with the

IMC.The management will participate in the audits and inspections and investigations. The management will also be responsible for regular review of the environmental performance of thesite and site personnel, and for the reporting on the implementation of commitments made in theEMP.

In particular, there will be:

- Periodic audit reports.
- A review and improvement of the EMP.

Management recognizes that periodic external compliance audits and inspections will be made through a third-party consultant (IMC) to monitor, assess and validate the level of performance and compliance pursuant to the commitments made in the accepted Environmental Management Plan. The monitoring reports shall also be submitted to SEPA on regular intervals.

Training: It an important step for the implementation of the EMP. All the employees will require to be trained to work appropriately on EMP. EHS Manager will organize trainings in consultationwith HSE Officer. It will make sure that employees understand the Environment, Health and Safetyissues. Trainings should be arranged on regular basis with notification that it should be attendedall respective employees.

HSE Officer will determine the training requirements during both phases. Induction will be thebasis of all training courses for contractor & subcontractor during construction phase.

Trainings identified in EMP are given below:

- Site induction course
- Training for emergency response and preparedness
- Training for familiarization with site environmental controls

7.9 Mitigation Management Matrix

The Mitigation Management Matrix will be used as a management & monitoring tool for implementation of the mitigation measures required by the EIA. Mitigation management matrix forconstruction and operation is provided in the table 6.1. The matrix lists down the following:

- The mitigation measure recommended in the EIA.
- The person/organization directly responsible for adhering to or executing the requiredmitigation measures.
- The parameters which will be monitored to ensure compliance with the mitigationmeasures;
- The timing at which the mitigation or monitoring has to be carried out.

It is highlighted that although responsibilities for executing and monitoring mitigation measures have been delegated to different persons, the proponent will hold the primary and overall responsibility for ensuring full implementation of the EMP.

7.10 Environmental Monitoring Programme

The objective of the environmental monitoring during the construction & operation phase will beas follows:

- To check compliance of the contractors with the EMP by monitoring activities of the projecton a daily basis. This will be called compliance monitoring.
- To monitor impacts of the operation in which there has been a level of uncertainty in prediction such as impacts of noise, water abstraction etc. and to recommend mitigationmeasures if the impacts are assessed to be in excess of or different from those assessedin the EIA. The aim will be attained through effects monitoring.
- To achieve these objectives, the following monitoring programme will be implemented.

7.10.1 Compliance Monitoring

Compliance monitoring will be carried out to ensure compliance with the requirements of the EIA and to document and report all non-compliances. The mitigation management matrix provided inthe EMP will be used as a management and monitoring tool. The contractor's HSE Officer will beresponsible for monitoring the compliance of their organization with the relevant EMP requirements. Proponent's site representative will monitor the contractor's compliance and willalso ensure that during construction each activity system and plan is in place for effective compliance monitoring.

The site representative will make regular checks on the contractor's works; keep records of allnon-compliances observed during the execution of the project activities; & the details of all remedial actions taken to mitigate the project impacts.

7.10.2 Effects Monitoring

An independent monitoring consultant (IMC) will be responsible to carry out the required effects monitoring during the construction and operation phase.

7.10.3 Environmental compliance Reporting and Documentation

The management will be responsible for the regular audit and review of the environmental management and monitoring plan. This will include both on-site auditing and review of performance reports. Additional onsite inspections and investigations will be undertaken in the event of significant environmental incidents. These will be undertaken in conjunction with the IMC. The management will participate in the audits and inspections and investigations. The management will also be responsible for regular review of the environmental performance of the site and site personnel, and for the reporting on the implementation of commitments made in the EMP.

In particular, there will be:

- Periodic audit reports.
- A review and improvement of the EMP.

Management recognizes that periodic external compliance audits and inspections will be made through a third-party consultant (IMC) to monitor, assess and validate the level of

performance and compliance pursuant to the commitments made in the accepted Environmental Management Plan. The monitoring reports shall also be submitted to Sindh Environmental Protection Agency (SEPA) on regular intervals.

7.11 Change Management Plan

The EIA for the proposed project recognizes that changes in the operation or the EMP may be required during the construction and operation and therefore provides a Change ManagementPlan to manage such changes. The management of changes is discussed under two separateheadings, Additions to the EMP and Changes to the Operation and the EMP.

7.11.1 Changes to the EMP

The EIA and the EMP have been developed based on the best possible information available atthe time of the EIA study. However, it is possible that during the conduct of the proposed operationadditional mitigation measures based on the findings of environmental monitoring during the operation may have to be included in the EMP. In such cases following actions will be taken:

- A meeting will be held between the proponent and the concerned project contractors. During the meeting, the proposed addition to the EMP will be discussed and agreed uponby all parties.
- Based on the discussion during the meeting, a change report will be produced collectively, which will include the additional EMP clause and the reasons for the addition.
- The report will be signed by all parties and will be filled at the site office: A copy of the report will be sent to the proponent and contractor head offices.
- All relevant project personnel will be informed of the addition.

7.11.2 Changes to the Operation

The change management system recognizes three orders of changes:

A. First Order

A first order change is one that leads to a significant departure from the project described or the impacts assessed in the EIA and consequently require a reassessment of the environmental impacts associated with the change. Example of first order change includes change in location ofproposed project. Action required in this case will be that the environmental impacts of the proposed change will be reassessed by the proponent and sent to the SEPA for approval.

B. Second Order

A second order change is one that does not result in the change in project description or impacts that are significantly different from those detailed in the EIA. Example of second order changes includes extension in the site area. Action required for such changes will be that the proponent will reassess the impact of the activity on the environment & specify additional mitigation measures ifrequired and report the changes to SEPA.

C. Third Order

A third order change is one that does not result in impacts above those already assessed in theEIA, rather these may be made site to minimize the impact of an activity such as:

- Increase in project workforce;
- Change in layout plan.

The only action required for such changes will be to record the change in the Change Record Register.

7.12 Training Programme

Environmental training will form part of the environmental management system. The training willbe directed towards all personnel for general environmental awareness.

7.12.1 Objectives

The key objective of training program is to ensure that the requirements of the EMP are clearly understood and followed throughout the project. The trainings to the staff will help in communicating environmental related restrictions specified in the EIA and EMP.

7.12.2 Roles and Responsibilities

The contractors will be primarily responsible for providing environmental training to all project personnel on potential environmental issues of the project. The contractors will be responsible toarrange trainings and ensure the presence of targeted staff.

7.12.3 Training Programme

The environmental awareness, EIA and EMP training will be carried out during the project activities.

A. Training log

A training log will be maintained by tine contractors. The training log will include:

- Topic
- Date, time and location
- Trainer
- Participants

B. Training Needs Assessment

In addition to the training specified in the training log special/additional trainings will be provided during the project activity. The criteria to assess the need of training will be based on the following:

- When a specified percentage of staff is newly inducted in the project
- When any non-compliance is repeatedly reported refresher training will be providedregarding that issue.
- When any incident/accident of minor or major nature occurs. Arrival of new contractor/sub-contractor.

- ✧ Start of any new process/activity.

C. Training Material

The contractors will develop & prepare training material regarding environmental awareness, sensitivity of the area, EIA, EMP and restrictions to be followed during the project. Separate training material will be prepared for each targeted staff.

Table 7.1: Environmental Management Plan (EMP)				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
1.	**Erosion of soil**			
1.1	Covering the open soil during the construction phase till such time that the foundation will adequately concreted.	CC	Monitoring compliance	During construction phase
1.2	Exposed surface will be regularly wetted to effectively keep airborne dust levels to minimum.	CC	Monitoring compliance	During construction phase
1.3	Stockpiles of fine material will be wetted or covered with tarpaulin especially during windy weather conditions.	CC	Monitoring compliance	During construction phase
1.4	Site workers will be mandated to wear dust masks especially during dry & windy weather conditions.	CC	Monitoring compliance	During construction phase
2.	**Construction of waste**			
2.1	Unusable wastes will be transported to approve dumpsites.	CC	Monitoring compliance	During construction phase
2.2	Excavated soil will be disposed of through the regular channel of the approved disposal contractor.	CC	Monitoring compliance	During construction phase
2.3	Proper solid waste containers of adequate capacity will be provided to cater to daily waste generation	CC	Monitoring compliance	During construction phase
3.	**Air Quality**			
3.1	**Dust Emissions**			
3.1.1	Water will be sprinkled daily or when there is an obvious dust problem on all exposed surfaces to suppress emission of dust. Frequency of Sprinklings will be kept such that the dust remains under control, particularly when wind is blowing towards the receptors	CC	Monitoring compliance	During construction phase
3.1.2	Dust emissions from soil piles and aggregate storage stockpiles will be reduced by appropriate measures. These may include:	CC	Monitoring compliance	During construction phase

Table 7.1: Environmental Management Plan (EMP)				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
	→ Keeping the material moist by sprinkling of water at appropriate frequency → Erecting windshield walls on three sides of the piles such that the wall project 0.5m above the pile, or → Covering the pile, for example with tarpaulin or thick plastic sheets, to prevent emissions. → Locating stock piles out of the wind direction			
3.1.3	All roads within the proposed Project will be paved as early as possible after the commencement of construction work. Until the roads are paved, they will be sprinkled regularly to prevent dust emission. Other temporary tracks within the site boundary will be compacted and sprinkled with water during the construction works.	SAAR Builders & Developers, CC	Monitoring compliance	During construction phase
3.1.4	Project traffic will maintain a maximum speed limit of 20km/hr on all unpaved roads within the proposed site area.	SAAR Builders & Developers, CC	Check speed of vehicles	During construction phase
3.1.5	Construction materials that are susceptible to dust formation will be transported only in securely covered trucks to prevent dust emission during transportation.	CC	Monitoring compliance	During construction phase
3.1.6	The exposure of construction workers to dust will be minimized by provision of dust masks.	CC	Check for dust masks	During construction phase
3.2	**Vehicle Equipment and Exhaust.**			
3.2.1	All vehicles, generators and other equipment used during the construction will be properly tuned and maintained in good working condition in order to minimize emission of pollutants.	SAAR Builders & Developers, CC	Maintenance records of vehicles and equipment	During construction phase
3.2.2	The stack height of the generators during operation phase will be	CC	Monitor	During

Table 7.1: Environmental Management Plan (EMP)				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
	vented through vertical stacks to minimize exposure at ground level		compliance	construction phase
3.3	**Generator Emissions**			
3.3.1	The option of using natural gas as fuel in the back-up generators should be explored.	CC , SAAR Builders & Developers, Generator Vendor	Monitor compliance	During design phase
3.3.2	The generator will be properly tuned and maintained in good working condition in order to minimize exhaust emissions	CC , SAAR Builders & Developers	Check maintenance records	During construction phase
3.3.3	The diesel generator should be used for a very short duration with the power switched back to the main power supply as quickly as possible.	CC , SAAR Builders & Developers	Monitoring compliance	During construction phase
3.3.4	NOx emission reduction techniques should be employed on a regular basis	CC , SAAR Builders & Developers	Monitor NOx emissions	During construction phase
4.	**Construction Noise**			
4.1	Reduce equipment noise at source by proper design, maintenance and repair of construction machinery and equipment	SAAR Builders & Developers, CC	Check maintenance records	During construction phase
4.2	Minimize noise from vehicles and power generators by use of proper silencers and mufflers.	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
4.3	Use noise-abating devices wherever needed and practicable.	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
5.	**Water Sourcing**			
5.1	A complete record of water consumption during construction and	SAAR Builders &	Check water	During

Table 7.1: Environmental Management Plan (EMP)

S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
	operation phase will be maintained	Developers, CC	consumption records	construction phase
5.2	If a new water well is to be installed, it will be designed to abstract water preferably from deep aquifer not being used by local communities	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
5.3	Water conservation program will be initiated to prevent wastage of water.	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
5.4	The water supply lines will be checked and repaired for leaks in order to reduce wastage of water.	SAAR Builders & Developers, Maintenance Contractor	Check maintenance records	During construction phase
5.5	Recycle grey water for use for toilet flushing	SAAR Builders & Developers	Monitor compliance	During construction phase
5.6	Ensure that water efficient sanitary fittings are used throughout the development e.g. low flush toilets, water efficient shower heads, and aerators on faucets	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
6.	**Soil Contamination**			
6.1	Fuels, lubricants, and chemical will be stored in covered bounded areas, underlain with impervious lining	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
6.2	Maintenance of vehicles and equipment will only be carried out designated areas. The area will be provided with hard surface or tarpaulin will be spread on the ground to prevent contamination of soil	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
6.3	Vehicles will only be washed at designated areas.	CC	Vehicle Inspection record	During construction phase

Table 7.1: Environmental Management Plan (EMP)				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
6.4	Regular inspections will be carried out to detect leakage in construction vehicles and equipment	SAAR Builders & Developers, CC	Check inspection / maintenance records	During construction phase
6.5	Appropriate arrangements, including shovels, plastic bags and absorbent materials, will be available near fuel and oil storage areas	CC	Monitor compliance	During construction phase
6.6	Contaminated soil will be removed and properly disposed after treatment such as incineration etc.	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
7.	**Wastewater Generation**			
7.1	Wastewater generated at the campsites will be stored temporarily in septic systems comprising of septic tanks from where it will be routed to a nearest drain/sewerage system.	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
7.2	At the time of restoration, septic tanks will be dismantled in place and backfilled with at least 1m of soil cover above the surrounding natural surface level	CC	Monitor compliance	After the completion of construction phase
8.	**Occupational and Community Health & safety Impact**			
8.1	The Contractor will provide as a minimum of safety training to its workers addressing 1) general safety awareness; 2) first aid procedures; 3) emergency procedures; and 4) use of personal protective equipment.	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
8.2	The Contractor will conduct site safety inspections and make sure construction work in undertaken in safe and sound manner.	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
8.3	The Contractor will provide a system for recording all accidents and dangerous occurrences, regardless of whether or not personnel injury occurs, including any incident involving a	SAAR Builders & Developers, CC	Monitor compliance	During construction phase

Table 7.1: Environmental Management Plan (EMP)

S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
	member of the public			
8.4	The Contractor plan will include a Safety and Emergency Preparedness Plan to address foreseeable emergencies that may arise during the construction activity.	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
8.5	The Contractor will provide means for maintaining healthy working conditions for workers related to the effects of noise, dust, use of chemicals, by removal of the cause and use of suitable Personal Protective Equipment (PPE), to be provided to workers. The Contractor will ensure that workers are properly trained in the use of PPE and that adequate supervision is provided to ensure its proper use.	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
8.6	Temporary inconveniences due to construction works will be minimized through planning and coordination with community members and organizations e.g. Traffic Management Authorities (if needed	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
8.7	Fulfillment of Occupational Safety Health Administration (OSHA) guideline for scaffoldings will be highly prioritized in order to make sure no accidents occur.	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
9.	**Solid waste generation**			
9.1	Separate bins will be placed for different type of wastes - plastic, paper, metal, glass, wood, and cotton.	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
9.2	Non-hazardous non-recyclable wastes such as kitchen wastes will be disposed of in landfill site managed by municipal administration or approved waste manager/contractor	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
9.3	All hazardous waste will be separated from other wastes. Hazardous wastes will be stored in designated areas with	SAAR Builders & Developers, CC	Monitor compliance	During construction phase

Table 7.1: Environmental Management Plan (EMP)

S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
	restricted access and proper marking. Hazardous wastes will be disposed of through SEPA approved waste contractor			
9.4	Records of all waste generated during the construction period will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
9.5	Training will be provided to personnel for identification, segregation, and management of waste	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
10. Material Selection				
10.1	The structures and materials will, in the construction stage, conform to recommended standards and follow standard practice of civil works.	CC, SAAR Builders & Developers	Monitor compliance	During construction phase
10.2	Materials including paving stones, crush, gravel and sand will be brought from commercial quarries located in Sindh province. Environmentally sound materials and goods will be selected, with priority being accorded to products meeting national and international standards.	CC, SAAR Builders & Developers	Monitor compliance	During construction phase
11. Solid waste generation				
11.1	Waste generation will be minimized by adopting waste management strategy of reduce, reuse and recycle	SAAR Builders & Developers	Monitor compliance	During operation phase
11.2	A waste management plan will be prepared, implemented and monitored for the safe collection, storage and treatment/disposal of the building waste	SAAR Builders & Developers	Monitor compliance	During operation phase
11.3	Records of all waste generated will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register	SAAR Builders & Developers	Check waste tracking register	During operation phase
11.4	Training will be provided to personnel for identification,	SAAR Builders &	Check	During operation

Table 7.1: Environmental Management Plan (EMP)

S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
	segregation, and management of waste	Developers	training records	phase
11.5	All inert and non-hazardous construction wastes will be disposed to the existing tipping sites within or outside of the city limits.	SAAR Builders & Developers, Waste Contractor	Monitor compliance	During operation phase
11.6	Hazardous wastes will be disposed of through waste management contractors who will identify suitable disposal options for these wastes such as recycling, metal recovery, incineration or bioremediation etc.	SAAR Builders & Developers, Waste Contractor	Monitor compliance	During operation phase
11.7	Various waste containers for waste collection should be placed at appropriate locations in the building	SAAR Builders & Developers	Monitor compliance	During operation phase
12. Wastewater generation				
12.1	Grease interceptor and/ or oil skimmer to be installed on kitchen effluent to maintain oil levels within SEQS limits.	SAAR Builders & Developers	Monitor compliance	During operation phase
12.2	Waste segregation measures would be employed to minimize entry of solid waste into the wastewater stream	SAAR Builders & Developers	Monitor compliance	During operation phase
12.3	Monitoring of wastewater to ensure compliance with SEQS.	SAAR Builders & Developers	Monitor compliance	During operation phase
12.4	If groundwater is used and desalinated water is required, RO reject water will be disposed in environmentally friendly manner	SAAR Builders & Developers	Monitor compliance	During operation phase
13. Water consumption				
13.1	A complete record of water consumption during the operation phase will be maintained.	SAAR Builders & Developers	Monitor compliance	During operation phase
13.2	Water conservation practices will be adopted to prevent wastage of water.	SAAR Builders & Developers	Monitor compliance	During operation phase

Table 7.1: Environmental Management Plan (EMP)				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
13.3	Drinking water and service water sources should be clearly labeled.	SAAR Builders & Developers	Monitor compliance	During operation phase
14. Energy Consumption				
14.1	The energy-efficient lighting system installed for the project will contribute immensely to energy saving during the operational phase of the project.	SAAR Builders & Developers	Monitor compliance	During operation phase
14.2	Natural lighting and ventilation shall be preferred in the buildings.	SAAR Builders & Developers	Monitor compliance	During operation phase
14.3	The energy-efficient lighting system installed for the project will contribute immensely to energy saving during the operational phase of the project.	SAAR Builders & Developers	Monitor compliance	During operation phase
14.4	The energy usage during the operational phase will be monitored and targets would be set for efficient use of energy.	SAAR Builders & Developers	Monitor compliance	During operation phase
15. Air emissions				
15.1	Monitor all exhausts at regular frequency to meet SEQS exhaust emissions.	SAAR Builders & Developers	Monitor compliance	During operation phase
15.2	Stack height of generators will be increased to ensure better dispersion and distance covered by the pollutants in air before reaching the ground.	SAAR Builders & Developers	Monitor compliance	During operation phase
15.3	An awareness program will be organized for generator operators to regularly tune-up engines and ensure proper maintenance	SAAR Builders & Developers	Monitor compliance	During operation phase
15.4	Carry out regular maintenance of generators	SAAR Builders & Developers	Monitor compliance	During operation phase
16. Traffic				

Table 7.1: Environmental Management Plan (EMP)				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
16.1	Heavy traffic during construction phase will come to the project site during late night hours.	SAAR Builders & Developers, CC	Traffic record	During construction phase
16.2	Project vehicles shall not be fitted with pressure horns	CC	Monitor compliance	During construction phase
16.3	During construction, regulate speed of vehicles	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
16.4	Designated parking areas will be provided for different type of project vehicles within and around the project site	SAAR Builders & Developers, CC	Monitor compliance	During construction phase
16.5	Manage vehicle movement to avoid traffic jam and long queues	SAAR Builders & Developers, CC	Monitor compliance	During construction and operation phase
16.6	Prepare, implement and monitor the traffic management plan	SAAR Builders & Developers	Monitor compliance	During construction and operation phase
16.7	Vehicles to use designated parking areas during operational phase.	SAAR Builders & Developers	Monitor compliance	During operation phase
16.8	Parking of vehicles alongside the road should be prohibited at all time.	SAAR Builders & Developers	Monitor compliance	During construction and operation phase
17. Cultural resources				
17.1	The project's design will be mindful of the Chief Minister House's architectural significance, aiming to harmonize with its surroundings.	SAAR Builders & Developers	Monitor compliance	During Design Stage
17.2	Landscaping efforts will be undertaken to enhance the area's aesthetics while preserving sightlines to the Chief Minister House.	SAAR Builders & Developers	Monitor compliance	During Design Stage

Table 7.1: Environmental Management Plan (EMP)				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
17.3	Protective fencing will be erected to maintain a safe distance between construction activities and the Chief Minister House.	SAAR Builders & Developers, CC	Monitor compliance	During construction stage
17.4	All construction traffic will be carefully managed to avoid routes that pass near CM house.	SAAR Builders & Developers, CC	Monitor compliance	During construction stage
17.5	Where feasible, alternative routes will be designated to divert construction traffic away.	SAAR Builders & Developers, CC	Monitor compliance	During construction stage
17.6	Protocols will be established for the safe transportation and delivery of materials, with a focus on avoiding routes that pass near sensitive areas.	SAAR Builders & Developers, CC	Monitor compliance	During construction stage
17.7	The appointed contractor and construction personnel will receive training and information regarding the significance of nearby cultural resource.	SAAR Builders & Developers, CC	Monitor compliance	During construction stage

Table 7.1: Environmental Monitoring Plan

Ambient Air Quality Sampling Plan					
Phase	**Parameters**	**Locations**	**Frequency**	**Duration**	**Standards**
Construction	SOx, NOx, CO, O3, PM2.5, PM10 Lead, SPM	At the interface of project site and residential community	Monthly	Continuous for 8 hours* in a full working day	SEQS
Drinking Water Quality Sampling Plan					
Stages	**Parameters**	**Locations**	**Frequency**	**Duration**	**Standards**
Construction	Heavy metals, TDS, TSS, pH, Total Coliform, Faecal Coliform	Ground water source and other sources	Monthly	Grab sampling	SEQS for drinking water
Wastewater Quality Sampling Plan					
Stages	**Parameters**	**Locations**	**Frequency**	**Duration**	**Standards**
Construction	BOD, COD, DO, TSS, TDS, pH, NO_3, SO_4, Oil & Grease)	Camp site discharge points into drains	Monthly	Grab sampling	SEQS
Operation	BOD, COD, DO, TSS, TDS, pH, NO_3, SO_4, Oil & Grease)	Effluent from compact type treatment plant	Quarterly	Composite sampling / Grab sampling	SEQS
Noise Level Sampling Plan					
Stages	**Parameters**	**Locations**	**Frequency**	**Duration**	**Standards**
Construction	Decibels [dB(A)Scale]	At the interface of project site & residential community	Monthly	Continuous for 8 hours in a full working day	SEQS
		7 m from the equipment at construction site			

Solid Waste					
Stages	**Parameters**	**Locations**	**Frequency**	**Duration**	**Standards**
Construction	Waste generation rate, waste composition; recyclables and non-recyclables, hazardous waste	At main solid waste collection point from where the waste is transported from site	Monthly	24-hour sample collected during week days	Best Practices
Operation	Segregated bins to be provided to store different types of waste provided	At main solid waste collection point from where the waste is transported from site	Daily	---	Best Practices
Occupational Health and Safety					
Construction	Assessment of scaffolding, its proper installation as per OSHA standards Provision of fall protection system Regular inspection and maintenance of electrical system Provision of PPEs	Scaffolding, construction site and equipment yard	Daily	During working hours	Best Practices
Fire Safety					
Operation	Regular testing and maintenance of fire alarm, fire extinguishers, smoke detectors and fire hydrant system Regularly inspection of exit stairwells for obstructions, proper signage, and functionality of emergency exist	In areas where fire safety equipment's are installed and areas for emergency exist	Monthly	As per requirement	Best Practices

Table 7.3: EMP Implementation Cost		
Activity	**Cost (Rupees PKR)**	**Remarks**
Training Program	500, 000	**Refer section 7.12**
Environmental Monitoring		
Ambient Air (Construction)	(40,000 * 12) = 480,000	**Cost for 1-year monitoring at 01 location @Rs.40,000/per location.**
Drinking Water Quality (Construction)	(20,000 * 12) = 240,000	**Cost for 1-year monitoring at 1 sample @Rs.20,000 for all primary parameters**
Wastewater (Construction)	(50,000 * 12) = 600,000	**Cost for 1-year monitoring at 1 sample**
Wastewater (Operation)	(50,000 * 4) = 200,000	**Cost for 1-year monitoring at 1 sample**
Noise Levels (Construction)	(1,000 * 4 * 12) = 48,000	**Cost for 1-year monitoring at 04 locations @Rs.1,000/location**
Solid Waste (Construction/Operation)	10,000	**Estimated cost for 1 year**
Mitigation Measures (Construction)	500,000	**Initial estimates**
Mitigation Measures (Operation)	500,000	**Initial estimates**
Reporting	1,000,000	**Initial estimates**
Total	4,078,000	**-**
Contingencies (5% of EMP cost)	203900	
Grand Total	4,281,900	
Grand Total (in words)	**Four Million Two Hundred Eighty-one Thousand**	**-**

Chapter 8 Conclusion

Realizing that the city has overgrown its sustainability limits, it is imperative that the Builders and Developers take cognizance of the cumulative effect of the current pace of rapid development. Consequently, each project is required to keep the sustainability principles in view and go an extra mile beyond the present approach which is confined to bare survival.

Based on the findings of the environmental impact assessment it is concluded that the environmental impacts of the construction and operation of project are manageable and can be mitigated by implementing the Environmental Management and Monitoring Plan which forms an integral part of EIA document. The screening process has through review of literature, primary as well as secondary baseline data, and expert judgment, made assessment of the potential impacts of said activities on the physical, biological, and socioeconomic environment of the Project. Mitigation measures have been proposed to reduce, minimize or compensate for the identified potential negative impacts and their adoption has been recommended. The proposed project is a self-contained building having its own back-up power generation, and sewage treatment, recycling and disposal system in addition to commitment for the provision of required parking space. This being a positive impact would be an indicator of achievement of the objectives of the Project.

Construction and operation of project is not expected to have unacceptable/significant impact on the aesthetics of the microenvironment and macro environment. Nevertheless, the impact will be mitigated through careful planning, suitable landscaping, waste management, traffic management and adopting appropriate mitigation measures.

Mitigation measures will be assured by a program of environmental monitoring conducted to ensure that all measures are provided as intended, and to determine whether the environment is protected as envisaged.

The recommendations that need to be followed to ensure that the environmental impacts of the project are successfully mitigated. The proponent shall ensure that:

- All mitigation, compensation and enhancement measures proposed in this EIA report are implemented in full, as described in the document;
- The Environmental Management and Monitoring Plan are implemented in letter and spirit.

Screening of potential impact suggests that the Construction & operation of project will, on adoption of the suggested mitigation measures, be an environmentally acceptable proposition.

Annexures

Annex I: Soil Investigation Report

SOIL TESTING SERVICES

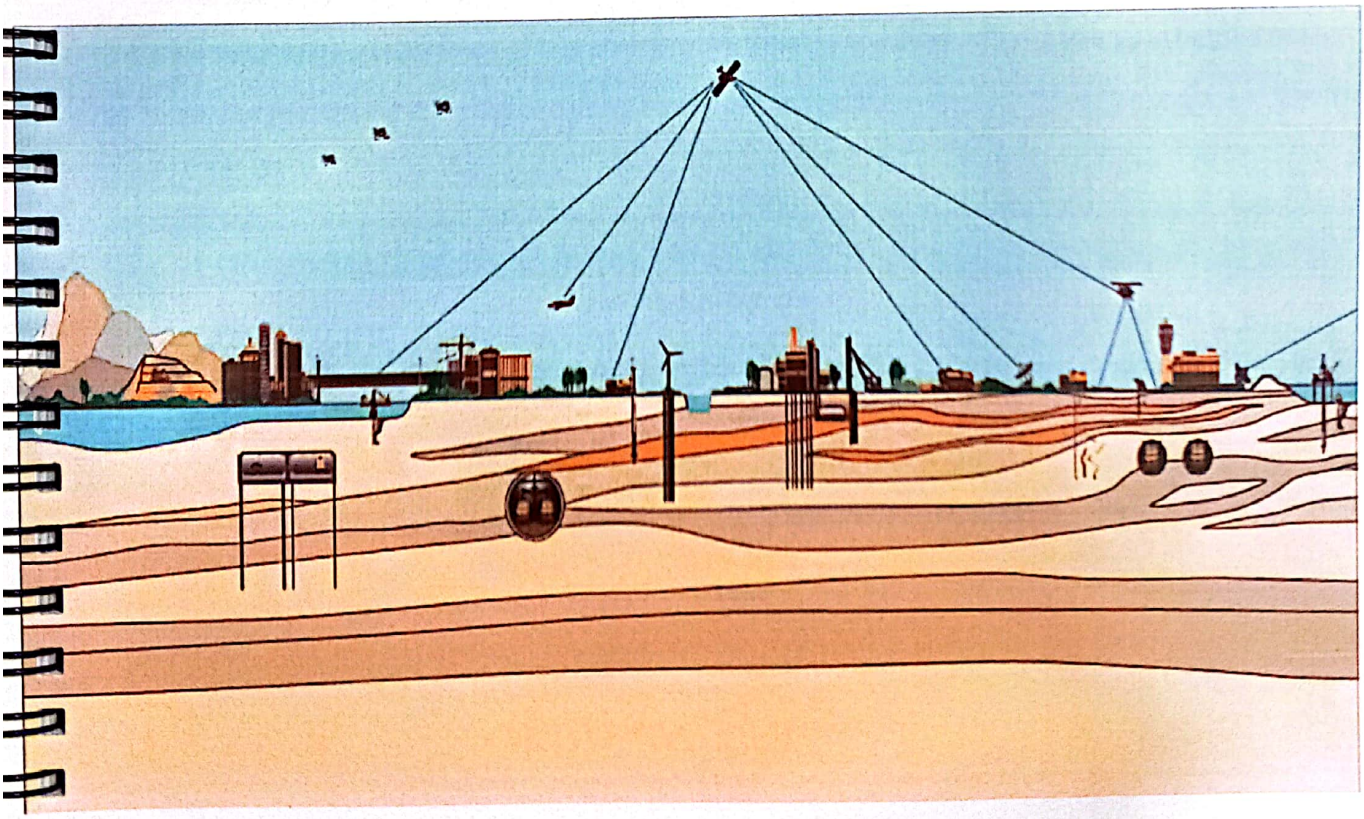
Geotechnical Engineers and Testing Laboratory

Report No. S-24-1046

GEOTECHNICAL INVESTIGATION REPORT FOR CONSTRUCTION OF B+G+44 STOREY BUILDING PLOT NO. 10/1, CL-09, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

(REV. 0.0, DATED: MARCH 19, 2024)

CLIENT: MR. SALMAN YOUSUF



SOIL TESTING SERVICES

GEOTECHNICAL ENGINEERS

&

MATERIAL TESTING LABORATORY

C-101/A KDA Scheme 1, Karachi

Pakistan. 75350

Tel: +92-21-34381117-8

Fax: +92-21-34525206

House # 852, Main Service Road

Sector I-10/4 Islamabad. Pakistan

Tel: +92-51-4436379

Fax: +92-51-4431801

Email: **info@sts.com.pk**

www.sts.com.pk

SOIL TESTING SERVICES	Geotechnical Investigation Report	Revision	
		#	Date
	Report No.: Vol I	00	19/03/2024

PROJECT: Geotechnical Investigation Report for Construction of B+G+44 Storey Building at Plot No. 10/1, CL-09, Civil Line Quarters, District South, Karachi

	NAME	SIGNATURE	DATE
PREPARED BY: (Project Engineer)	Safi ul Hasan		19/03/24
REVIEWED BY: (Project Manager)	Zainab Abbasi		19/03/24
APPROVED BY: (General Manager)	Naveed Anwer		19-03-24

ISSUE/REVISION INDEX

Issue Code	Revision					Revision Details
	No.	By	Rev'd.	App.	Date	
RD	00	SUH	ZA	NA	19/03/2024	

Issue Codes: RC = Released for Construction, RD = Released for Design, RF = Released for Fabrication, RI = Released for Information, RP = Released for Purchase, RPA = Released for Permit Application, RQ = Released for Quotation, RR = Released for Review and Comments.

SOIL TESTING SERVICES

EXECUTIVE SUMMARY

Geotechnical Investigation for construction of B+G+44 Storey Building at Plot No. 10/1, CL-09, Civil Line Quarters, District South, Karachi was carried out in order to determine geotechnical parameters of subsurface deposits. Scope of work included drilling of five (05) boreholes; two (02) up to the depth of 40.0 meters and three (03) up to the depth of 30.0 meters below existing ground level. Soil, rock and ground water samples were collected during field investigation. Laboratory testing of these samples has been carried out in the Soil Testing Services laboratory, Karachi.

The deposition of the area mainly consists of *'fill material', 'loose to very dense*, clayey and silty sand', *'hard*, silty clay', *'very weak to weak,* distinctly weathered, sandstone', *'very weak,* distinctly weathered, mudstone', *'very weak to weak,* distinctly weathered, siltstone' and 'distinctly weathered, claystone'. Groundwater table was encountered in the depth range of 2.4 – 2.8 meters below the existing ground level in the boreholes drilled at site, at the time of this investigation.

Keeping these conditions under consideration:

- Piled-raft foundation is recommended as the main foundation system for the project site.
- Allowable bearing pressures have been given for raft foundations at a depth of 3.0 – 4.0 meter below the existing ground level.
- Allowable pile capacities have been provided for various diameters and depths.
- Liquefaction analysis is carried out for the project site and results are discussed in the report.
- Earth pressure parameters have been provided for earth retaining structures.
- Seismic soil profile has been taken as 'S_C' for the foundations in accordance with PBC-21.

The exposure of underground concrete to aggressive chemicals is found to be *'moderate'* for sulphates and chlorides which have influenced the selection of cement for underground concreting and it is recommended to use *Ordinary Portland Cement (OPC) with slag.*

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1. INTRODUCTION

Planning for construction of B+G+44 Storey Building at Plot No. 10/1, CL-09, Civil Line Quarters, District South, Karachi is underway. In order to determine the geotechnical parameters of the subsurface deposits, *M/s. Soil Testing Services (STS)* were entrusted by *Mr. Salman Yousuf* to perform the geotechnical investigation at the project site.

Scope of field work included drilling of five (05) boreholes; two (02) up to the depth of 40.0 meters and three (03) up to the depth of 30.0 meters below the existing site grade. Elevation of the drilling platform at each borehole point was noted with respect to the adjacent road level and is mentioned in borehole logs attached in Appendix B. Standard penetration tests were carried out at regular intervals in the boreholes along with the collection of soil samples via split spoon sampler. Boreholes in rock were advanced through continuous coring. Rock core samples were extracted with the help of double tube core barrels. Groundwater samples were also collected from the boreholes drilled at the site. The samples retrieved from the field work were tested in the laboratory and this report is prepared from the information obtained from the field and laboratory tests.

The report consists of five chapters with *Chapter 2* describing the site's existing condition, *Chapter 3* discusses the subsurface deposits in detail, *Chapter 4* includes the recommendations for foundation design, and *Chapter 5* contains a summary of conclusions regarding the ground conditions, with respect to geotechnical engineering for this project.

2. THE SITE

The project site is located in 2 Brunton Rd, Civil Lines Karachi, Saddar Karachi, Sindh in the neighbourhood of Chief Minister's House. Nearby landmarks include Dr. Ziauddin Ahmed Road, Movenpick and Kabab Ji Labenese.

The topography of the plot is almost plain with no major changes in elevation observed across the site. Figure 2.1 shows the google image of the site.

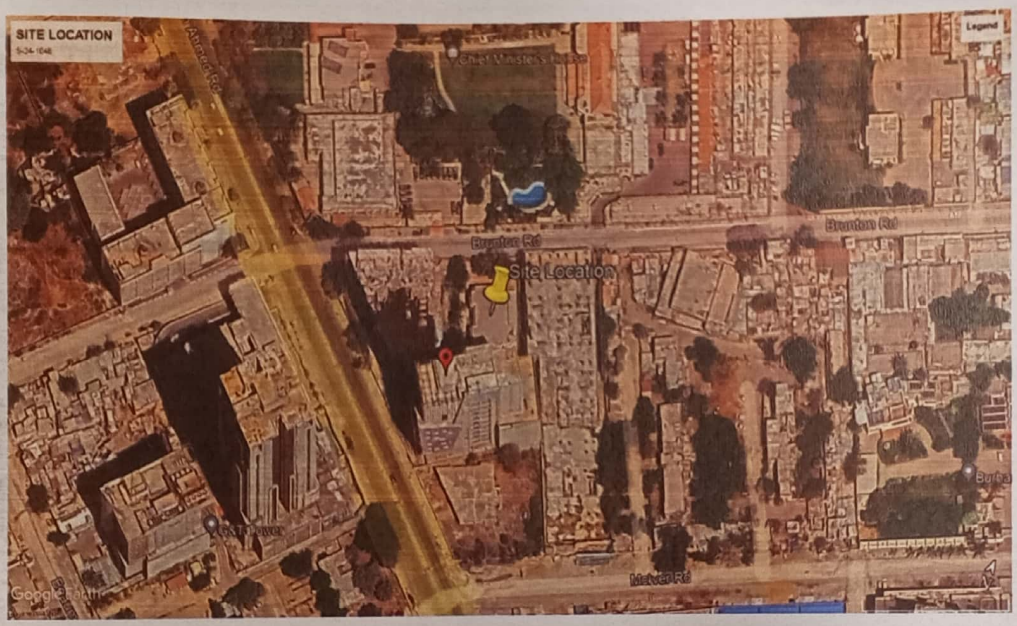


Fig 2.1: Google image of the the Neighbourhood area (Courtesy: Google Earth)

3. GROUND CONDITIONS

The subsurface deposits up to the explored depth consist of the following unit:

- Sand
- Clay
- Sandstone
- Mudstone
- Siltstone
- Claystone

Following sub-sections describe the strength characteristics of the geological unit and the groundwater conditions. A layer of filling material consisting of *concrete, gravel, coarse sand etc.* was encountered up to the maximum depth of 1.5 meters below existing ground level in the boreholes drilled at site at the time of this investigation. Rocks are classified as per BS-5930 and soils are classified as per USCS classification system.

3.1 SAND

Deposits of clayey and silty sand were encountered in all of the boreholes drilled at site. State of compactness according to SPT 'N' counts has been determined to be '*loose to very dense*'. The grain size analysis has been carried out of samples collected from these deposits. Unified Classification System (UCS) classifies these deposits as '*SC*', '*SC-SM*' and '*SM*'. Table 3.1 summarizes the details of these deposits.

Table 3.1 Deposits of Sand

Borehole No.	Depth (meters)
BH-01	1.5 – 3.6
	5.3 – 6.7
BH-02	0.9 – 7.6
BH-03	1.5 – 6.8
BH-04	0.5 – 6.7
BH-05	0.5 – 6.5

3.2 CLAY

Deposits of silty clay were encountered in one of the boreholes drilled at site. State of compactness according to SPT 'N' counts has been determined to be *'hard'*. The grain size analysis has been carried out of samples collected from these deposits. Unified Soil Classification System (USCS) classifies these deposits as *'CL'*. Table 3.2 summarizes the details of these deposits.

Table 3.2 Deposits of Clay

Borehole No.	Depth (meters)
BH-01	3.6 – 5.3

3.3 SANDSTONE

Deposits of distinctly weathered sandstone were encountered in all of the boreholes drilled at the site. Disturbed and undisturbed rock core samples were collected from these deposits which were tested for moisture content, density, and unconfined compressive strength. According to BS 5930, these deposits are classified as *'very weak to weak'* rock. Table 3.3 summarizes the details of these deposits.

Table 3.3 Deposits of Sandstone

Borehole No.	Depth (meters)
BH-01	6.7 – 12.6
	20.0 – 32.0
	36.5 – 40.0
BH-02	7.6 – 12.0
	22.5 – 26.7
BH-03	7.5 – 12.3
	31.0 – 40.0
BH-04	6.7 – 20.0
	23.0 – 28.5

Borehole No.	Depth (meters)
BH-05	6.5 – 16.0
	22.5 – 27.0

3.4 MUDSTONE

Deposits of distinctly weathered mudstone were encountered in four of the boreholes drilled at the site. Disturbed and undisturbed rock core samples were collected from these deposits which were tested for moisture content, density, and unconfined compressive strength. According to BS 5930, these deposits are classified as *'very weak'* rock. Table 3.4 summarizes the details of these deposits.

Table 3.4 Deposits of Mudstone

Borehole No.	Depth (meters)
BH-01	12.6 – 17.0
BH-02	12.0 – 20.0
BH-03	12.2 – 15.3
BH-05	16.0 – 20.0

3.5 SILTSTONE

Deposits of distinctly weathered siltstone were encountered in all of the boreholes drilled at the site. Disturbed and undisturbed rock core samples were collected from these deposits which were tested for moisture content, density, and unconfined compressive strength. According to BS 5930, these deposits are classified as *'very weak to weak'* rock. Table 3.5 summarizes the details of these deposits.

Table 3.5 Deposits of Siltstone

Borehole No.	Depth (meters)
BH-01	17.0 – 20.0
	32.0 – 36.5

Borehole No.	Depth (meters)
BH-02	20.0 – 22.5
	26.7 – 30.0
BH-03	15.3 – 31.0
BH-04	20.0 – 23.0
	28.5 – 30.0
BH-05	27.0 – 30.0

3.6 CLAYSTONE

Deposits of distinctly weathered claystone were encountered in one of the boreholes drilled at the site. Disturbed and undisturbed rock core samples were collected from these deposits which were tested for moisture content, density, and unconfined compressive strength. Table 3.6 summarizes the details of these deposits.

Table 3.6 Deposits of Claystone

Borehole No.	Depth (meters)
BH-03	6.8 – 7.5

3.7 GROUNDWATER CONDITIONS

Groundwater was encountered at the depth of 2.4 – 2.8 meters below existing ground level in the boreholes drilled at the site at the time of this geotechnical investigation. However, this may fluctuate due to seasonal and other environmental variations.

4. ENGINEERING DESIGN CONSIDERATIONS

Foundation type for a structure depends on the expected loads taken by the foundation and the type of soil underlying it. The characteristics of subsurface soil deposits have been discussed in the previous section. Keeping in view the subsoil conditions prevailing at the site and the loads expected to be transferred to the foundations, Piled-raft foundations are recommended as the main foundation system. Pile-raft foundation system shall economize the design and it is recommended to analyse the pile-raft behaviour by finite element modelling. The following section gives the allowable bearing pressures for raft footings and allowable pile capacities for the project.

4.1 DESIGN PARAMETERS

The design soil parameters are based on grain size, material type, SPT N-values, field and laboratory testing data and water table conditions. Our recommended design soil parameters used in our analysis are presented below.

Table 4.1: Engineering Design Parameters

Layer Depth From EGL (Existing Ground Level) (m)		Layer Thickness (m)	Design SPT-N	Material Type	Cohesion, C, (KPa)	Angle of Internal friction (Φ), (degree)	Unit Weight co-related with SPT N (kN/m³)	Modulus of Elasticity, E (kN/m²)
Top	Bottom							
3.0	3.5	0.5	11	Clayey Sand	-	24	17.0	8,320
3.5	5.5	2.0	32	Clay	180	-	17.0	10,000
5.5	6.0	0.5	36	Sand	-	34	18.5	25,500
6.0	7.5	1.5	29	Clayey Sand	-	27	17.5	14,080
7.5	40.0	32.5	>50	Rock	120	40	21.5	200,000

4.2 ALLOWABLE BEARING PRESSURES

The allowable bearing pressure has been calculated following shear strength determination through in-situ field tests and settlement analysis. Table 4.2 gives the gross allowable bearing pressures for shallow foundations at various depths from the existing ground level.

Table 4.2: Gross Allowable Bearing Pressures

Minimum Embedment Below EGL (meter)	Raft Foundation (kPa / tsf)
3.0	250.0 / 2.50
3.5	260.0 / 2.60
4.0	270.0 / 2.70

Proper drainage shall be provided to avoid infiltration of water into the foundation soil. It should be ensured that the foundation is not placed on the fill material. The settlement of raft foundation due to allowable pressure has been estimated to be within the allowable limit of 50 mm (2-inches).

4.3 MODULUS OF SUBGRADE REACTION

Designing of floor slab system requires the modulus of subgrade reaction at the depth at which it is to be placed. Table 4.3 shows the values of modulus of subgrade reaction for given pressure.

Table 4.3: Modulus of subgrade reaction based on allowable bearing pressure

Minimum Embedment below EGL (meter)	k_s for Shallow Foundation (MN/m^3 / tcf)
3.0	15.0 / 45.0
3.5	15.6 / 46.8
4.0	16.2 / 48.6

4.4 DEWATERING

Groundwater level lies at a depth of 2.4 – 2.8 meters below the existing ground level. However, this may fluctuate due to seasonal and environmental variations. In case the groundwater is encountered at the level of foundations, some positive measures of effectively controlling groundwater level should be provided to enable the construction to be completed in the dry. For the construction of foundation below ground water table,

proper dewatering system may be required. However, the design of dewatering system is not in the scope of this report.

4.5 EARTH RETAINING STRUCTURE

All measures shall be taken to provide safety to adjacent structures. Properly designed earth retaining structure must be constructed prior to deep excavation.

Earth pressure parameters required for the design of structure to retain the excavation are given in *Table 4.4.*

Table 4.4: Earth pressure parameters

Strata	Φ' (Undisturbed)	k_a (Coefficient of active earth pressure)	k_p (Coefficient of passive earth pressure)
Clay	0°	1.000	1.000
Fill	15°	0.589	1.699
Clayey Sand	24°	0.422	2.371
Sand	32°	0.307	3.255
Rock	40°	0.217	4.600

4.6 DEEP FOUNDATIONS – ALLOWABLE PILE CAPACITIES

The ultimate compressive capacity, Q, for a given bored concrete pile penetration is taken as the sum of the skin friction on the pile wall, Qs, and the end bearing on the pile tip, Qp, so that:

$$Q = Q_s + Q_p = \Sigma f A_s + q A_p$$

Where A_s and A_p represent, respectively, the embedded surface and pile end area; f and q represent, respectively, the unit skin friction and unit end bearing. When computing ultimate tensile capacity, the end bearing term in the above equation is neglected. Therefore, the value of the ultimate tensile capacity is the same value as the ultimate compression capacity due to skin friction Qs.

The design parameters for calculating pile capacities have been derived from shear strength determination, through in-situ field tests and laboratory tests of collected soil samples. The results of analysis for 1.00, 1.20 and 1.50 meter diameter drilled concrete piles are presented below in *Table 4.5*.

Table 4.5: Allowable Pile Capacities

Diameter (mm)	Length of Pile below Cut-Off Level* (m)	Tension (kN)	Compression (kN)
1000	22.0	8956	10527
	27.0	11509	13080
	32.0	14063	15634
	37.0	16617	18188
1200	22.0	10747	13009
	27.0	13811	16073
	32.0	16876	19138
	37.0	19940	22202
1500	22.0	13434	16968
	27.0	17264	20799
	32.0	21094	24629
	37.0	24925	28460

**Cut off level was assumed as 3.0 meters below existing site grade.*

The design approach followed is based on FOS and as per this design approach, the settlement criteria of "Net settlement not to exceed 1% of the pile diameter at working load and Total penetration of the base not to exceed 10% of the pile diameter at test load" shall be fulfilled.

4.7 RECOMMENDED DRILLING METHOD AND CONFIRMATORY TESTING

The recommended drilling method for the construction of bored cast in-situ piles is straight rotary. Tentative pile capacity values given in table 4.5 have been computed by

static formulae which suffer from limitations. As such capacity values shall be verified by full scale load tests under the guidance of geotechnical engineer. Pile capacity shall be suitably adjusted if warranted by results of load tests. This report will be valid only if requirement of pile load tests is fulfilled.

The test pile should be loaded to 2.0 to 2.5 times the Specified Working Load (SWL) and the working pile should be loaded to 1.5 times the Specified Working Load (SWL). The calculations for allowable pile capacities for 1000, 1200 and 1500mm diameter bored cast in-situ piles are presented in appendix E of this report.

4.8 PILE CONSTRUCTION

Allowable pile capacities have been derived from combination of end bearing and skin friction components. It is, therefore, essential to adopt the following construction methodology to satisfy following requirements:

1. Excessive disturbance to sub-surface along shaft and pile tip shall be avoided during the course of drilling.
2. The bottom of pile shall be cleaned of all loose materials which may accumulate during the course of drilling.

Pile concreting shall be undertaken only when above conditions are fulfilled. It is understood that subsurface materials will be carefully examined during pilling and it shall be ensured that all piles are placed in proper stratum. This exercise will serve as safeguard against variations in quality and level of occurrence of dense stratum.

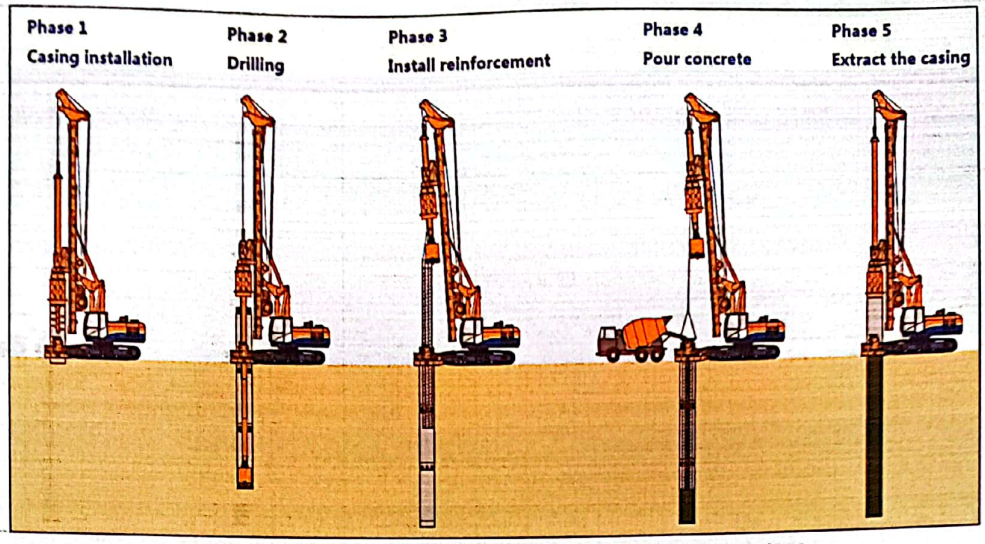


Fig 4.1: Construction of cast in situ piles by straight rotary

4.9 LIQUEFACTION POTENTIAL OF SOIL

The potential for liquefaction at this project site was evaluated using Peysanj software. This program is based on the most recent publications of the NCEER Workshop (1996) and Ambraseys (1988). The method evaluates liquefaction potential based on soil type and density, groundwater conditions, peak surface acceleration (2475 Years - 2% PE in 50 Yrs = 0.3723g), and magnitude of the design earthquake.

The method is used to compare the cyclic shear stresses indicated during the design earthquake, with those that would be required to cause liquefaction to determine whether any zone exists within the soil where liquefaction may be expected.

A peak ground acceleration of 0.3723g was evaluated based on BCP Seismic provision 2021 for design, and has been adopted for the current study. We based our liquefaction analyses for an earthquake magnitude of M = 6.6.

Using the design parameters and procedures discussed above, the factors of safety against liquefaction is calculated. The factor of safety against liquefaction is observed as greater than 1.0 for earthquakes of magnitude 6.6. Hence, the subsurface deposits at project site are not susceptible to liquefaction.

4.10 SEISMIC GROUND MOTION PARAMETERS (BCP – 2021)

4.10.1 SITE CLASS

Chapter 16 of BCP – 2021 defines the site class definition in accordance with Chapter 20 ASCE-7 to be used for determining site coefficients. Based on the field data obtained from sub-soil exploration, the soil class will be taken as "**Sc**".

4.10.2 SHORT PERIOD SPECTRAL RESPONSE ACCELERATION (S_s)

Chapter 16 of BCP – 2021, Section 1613.2.1 deals with the mapped values for 0.2-seconds spectral acceleration corresponding to Maximum Considered Earthquake (MCE) defined as the ground motion level with 2% probability of exceedance in 50 years (2745 years return period). The S_s for project site will be taken as 0.8118.

4.10.3 LONG PERIOD SPECTRAL RESPONSE ACCELERATION (S_1)

Chapter 16 of BCP – 202, Section 1613.2.1 deals with the mapped values for 1-second spectral acceleration corresponding to Maximum Considered Earthquake (MCE) defined as the ground motion level with 2% probability of exceedance in 50 years (2745 years return period). The S_1 for project site will be taken as 0.2307.

4.11 TYPE OF CEMENT

Tests on water samples obtained from the boreholes indicate '*moderate*' exposure to sulphate and chloride. Under these conditions it is recommended to use *Ordinary Portland Cement (OPC) with slag* for all underground concrete works.

5. CONCLUSIONS

Geotechnical Investigation for construction of B+G+44 Storey Building at Plot No. 10/1, CL-09, Civil Line Quarters, District South, Karachi was carried out in order to determine geotechnical parameters of subsurface deposits. Scope of work included five (05) boreholes; two (02) up to the depth of 40.0 meters and three (03) up to the depth of 30.0 meters below the existing site grade. Soil, rock and groundwater water samples were collected during the field investigation. Laboratory testing on these samples has been carried out in the lab and includes determination of index properties through grain-size analysis, natural moisture content & density, unconfined compressive strength etc. Chemical characteristics of soil and water samples have also been assessed through determination of total dissolved solids, sulphate content, chloride content and pH.

Keeping in view, the results from field and laboratory tests and the expected loads being transferred to the founding stratum, pile-raft foundations have been recommended as the foundation system. Exposure to chloride and sulphate salts is '*moderate*' for water samples; therefore, *Ordinary Portland Cement (OPC) with slag* may be used for all underground concreting works.

Appendix A

Location Plan

Borehole Location Plan



Client:	Borehole Location Plan	
M/s. Impact Engineering	S-24-1046 Confirmatory Geotechnical Investigation for Rehabiliattion of Road from 60th Mile to Connect 3 Chak via 68 Mile and Chaudhry Nazeer Road	Soil Testing Services

Borehole Logs

Mud Rotary Log BH-01

Project Info.
Project : Geotechnical Investigation Works
Client : Impact Engineering
Location : Saddar, Karachi
Job No. : S-24-1046

Borehole Info.
Depth: 40 (m)
GWL: 2.8 (m)
Drill Date: 02.03.2024
Logged By: ARH
Elevation: 0.60m above to R/L
Easting:
Northing:
Method: Mud Rotary

Company Info
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	FI (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
0	K	U	**FILL MATERIAL** *Filled with concrete, gravel, coarse sand etc*	50		0																						1	SPT - 1
2		U	**Clayey SAND** *Yellowish brown, dense, fine to medium grained, some clay, little to some silt & gravel*	43		2	SC A-4(0)	13.3	48.7	11.9	26.1	21.4	13.6	7.8	11	1.69	1.9											2	SPT - 2
3		U		41		3	SC A-2-4(0)	22.3	55.6	22.1		23.4	14.4	9	14	1.67	1.9											3	SPT - 3
4		U	**CLAY** *Yellowish brown, hard, silty, some sand, traces of gravel*	36		4	CL A-6(7)	3.3	28.6	30.1	37.9	33.8	21	12.8	16.8	1.64	1.9											4	SPT - 4
5		U		50		5																					5	SPT - 5
6		U	**SAND** *Brownish grey, very dense, silty, cemented, fine grained, (fiable sandstone(*	50		6																					6	SPT - 6
7		U	**SANDSTONE** *Brownish grey, very weak, distinctly weathered, loosely cemented, very poor quality of rock*	50		7																					7	SPT - 7 Run - 1
8		+ ■				8									7.2	2.02	2.2				25.65							8	CR - 70% / RQD - 36% UDC - 1 (8.20 - 8.32m)
9		■				9																						9	Run - 2 CR - 30% / RQD - Nil
10						10																						10	

Sample Types
● Disturbed
+ Undisturbed
□ Shelby / U4
■ Core Cutter
U SPT Sample
Water Sample
Groundwater Level

Abreviations
LL : Liquid Limit
PL : Plastic Limit
PI : Plastic Index
NPI : None PI
C : Cohesion
Phi : Friction Angle
C' : Cohesion (CU)
Phi' : Friction Angle (CU)
Cc : Cc
Cs : Cs
Pc : Pre-Consolidation Pressure
K : Permeability Coeff.
w : Moisture Content
qu : Unconfined Comp. Qu
F : Fast
S : Slow
CD : Consolidated, Drained
UU : Unconsolidated, Undrained
CU : Consolidated, Undrained

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Mud Rotary Log BH-01

Project Info.
Project : Geotechnical Investigation Works
Client : Impact Engineering
Location : Saddar, Karachi
Job No. : S-24-1046

Borehole Info.
Depth: 40 (m)
GWL: 2.8 (m)
Drill Date: 02.03.2024
Logged By: ARH
Elevation: 0.60m above to R/L
Easting:
Northing:
Method: Mud Rotary

Company Info.
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT 10 20 30 40 50)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	Fi (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
10		■	**SANDSTONE** *Brownish grey, very weak, distinctly weathered, loosely cemented, very poor quality of rock*			10																						10	Run - 3 CR - 36% / RQD - 10% UDC - 2 (11.00 - 11.15m)
11		+				11																						11	
12		■				12																						12	Run - 4 CR - 59% / RQD - 29% UDC - 3 (13.07 - 13.25m)
13		+	**MUDSTONE** *Yellowish brown, very weak, distinclty weathered, very poor to poor quality of rock, interbedded with claystone*			13									8.5	1.97	2.1				17.81							13	
14		■				14																						14	Run - 5 CR - 76% / RQD - 33% UDC - 4 (13.76 - 13.94m)
15		+				15																						15	Run - 6 CR - 79% / RQD - 42% UDC - 5 (15.60 - 15.86m)
16		■				16									8.3	2.07	2.2				37.85							16	
17		+	**SILTSTONE** *Grey, distinclty weathered, very weak, poor quality of rock, interbedded with mudstone & thin layer of sandstone at places*			17																						17	Run - 7 CR - 80% / RQD - 44% UDC - 6 (17.06 - 17.24m)
18		■				18																						18	Run - 8 CR - 71% / RQD - 38% UDC - 7 (18.39 - 18.62m)
19		+				19									7.5	2.1	2.3				42.51							19	
20		■				20																						20	Run - 9 CR - 75% / RQD - 35%

Sample Types: ● Disturbed, + Undisturbed, □ Shelby / U4, ■ Core Cutter, U SPT Sample, Water Sample, Groundwater Level

Abbreviations: LL : Liquid Limit; PL : Plastic Limit; PI : Plastic Index; NPI : None PI; C : Cohesion; Phi : Friction Angle; C' : Cohesion (CU); Phi' : Friction Angle (CU); Cc : Cc; Cs : Cs; Pc : Pre-Consolidation Pressure; K : Permeability Coeff.; w : Moisture Content; qu : Unconfined Comp. Qu; F : Fast; S : Slow; CD : Consolidated, Drained; UU : Unconsolidated, Undrained; CU : Consolidated, Undrained

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Mud Rotary Log BH-01

Project Info.
Project : Geotechnical Investigation Works
Client : Impact Engineering
Location : Saddar, Karachi
Job No. : S-24-1046

Borehole Info.
Depth: 40 (m)
GWL: 2.8 (m)
Drill Date: 02.03.2024
Logged By: ARH
Elevation: 0.60m above to R/L
Easting:
Northing:
Method: Mud Rotary

Company Info.
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3) Bulk	Direct Shear Test: Test Type	C (kg/cm2)	FI (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
20		+	**SANDSTONE** *Grey, very weak to weak, disntictly weathered, poor quality of rock, interbedded with siltstone at places*	10 20 30 40 50		20																						20	UDC - 8 (20.06 - 20.25m)
21		■				21																						21	Run - 10 CR - 74% / RQD - 38% UDC - 9 (21.57 - 21.70m)
22		+				22																						22	Run - 11 CR - 77% / RQD - 40%
23		■				23									10.3	2.08	2.3			18.91								23	UDC - 10 (23.16 - 23.29m)
24		+				24																						24	Run - 12 CR - 74% / RQD - 44% UDC - 11 (24.55 - 24.67m)
25		■				25																						25	Run - 13 CR - 78% / RQD - 43%
26		+				26									11.5	1.95	2.2			12.93								26	UDC - 12 (26.12 - 12.28m)
27		■				27																						27	Run - 14 CR - 70% / RQD - 31% UDC - 13 (27.43 - 27.54m)
28		+				28																						28	Run - 15 CR - 72% / RQD - 29%
29		■				29									6.3	2.23	2.4			66.21								29	UDC - 14 (29.11 - 29.11m)
30						30																						30	Run - 16

Sample Types: ● Disturbed; + Undisturbed; □ Shelby / U4; ■ Core Cutter; ∪ SPT Sample; Water Sample; Groundwater Level

Abbreviations: LL : Liquid Limit; PL : Plastic Limit; PI : Plastic Index; NP : Non Pl

C : Cohesion; Phi : Friction Angle; C' : Cohesion (CU); Phi' : Friction Angle (CU)

Cc : Cc; Cs : Cs; Pc : Pre-Consolidation Pressure; K : Permeability Coeff.

w : Moisture Content; qu : Unconfined Comp. Qu; F : Fast; S : Slow

CD : Consolidated, Drained; UU : Unconsolidated, Undrained; CU : Consolidated, Undrained

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Mud Rotary Log BH-01

Project Info.
Project : Geotechnical Investigation Works
Client : Impact Engineering
Location : Saddar, Karachi
Job No.: S-24-1046

Borehole Info.
Depth: 40 (m)
GWL: 2.8 (m)
Drill Date: 02.03.2024
Logged By: ARH
Elevation: 0.60m above to R/L
Easting:
Northing:
Method: Mud Rotary

Company Info.
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	Fi (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
30		+	**SANDSTONE** *Grey, very weak to weak, disntictly weathered, poor quality of rock, interbedded with siltstone at places*			30																						30	Run - 16 CR - 74% / RQD - 29% UDC - 15 (30.49 - 30.73m)
31		■				31																						31	Run - 17 CR - 73% / RQD - 34% UDC - 16 (32.16 - 32.30m)
32		+	**SILTSTONE** *Grey, distinctly weathered, very weak to weak, poor quality of rock, interbedded with sandstone at places*			32																						32	
33		■				33									8.4	2.2	2.4				51.19							33	Run - 18 CR - 75% / RQD - 39% UDC - 17 (33.55 - 33.72m)
34		+				34									8.7	2.18	2.4				48.93							34	Run - 19 CR - 69% / RQD - 41% UDC - 17 (34.80 - 34.93m)
35		■				35																						35	
36		+	**SANDSTONE** *Grey, weak, disntictly weathered, poor quality of rock, interbedded with siltstone at places*			36																						36	Run - 20 CR - 68% / RQD - 32% UDC - 18 (36.63 - 36.76m)
37		■				37																						37	Run - 21 CR - 71% / RQD - 39% UDC - 19 (38.12 - 38.24m)
38		+				38									8.4	2.28	2.5				89.27							38	
39		■				39																						39	Run - 22 CR - 58% / RQD - 20% UDC - 20 (39.40 - 39.52m)
40		+				40																						40	

End of Log @ 40 (m)

Sample Types
● Disturbed
+ Undisturbed
□ Shelby / U4
■ Core Cutter
SPT Sample
Water Sample
Groundwater Level

Abbreviations
LL : Liquid Limit
PL : Plastic Limit
PI : Plastic Index
NPI : None PI
C : Cohesion
Phi : Friction Angle
C' : Cohesion (CU)
Phi' : Friction Angle (CU)
Cc : Cc
Cs : Cs
Pc : Pre-Consolidation Pressure
K : Permeability Coeff.
w : Moisture Content
qu : Unconfined Comp. Qu
F : Fast
S : Slow
CD : Consolidated, Drained
UU : Unconsolidated, Undrained
CU : Consolidated, Undrained

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Mud Rotary Log BH-02

Project Info
Project : Geotechnical Investigation Works
Client : Impact Engineering
Location : Saddar, Karachi
Job No. : S-24-1046

Borehole Info
Depth: 30 (m)
GWL: 2.7 (m)
Drill Date: 06.03.2024
Logged By: ARH
Elevation: 0.60m above to R/L
Easting:
Northing:
Method: Mud Rotary

Company Info
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	FI (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
0			**FILL MATERIAL** *Filled with concrete, gravel, coarse sand etc*			0																						0	
1		U	**clayey SAND** *Yellowish brown, loose to very dense, fine to coarse grained, some clay & silt, traces of gravel*	8		1	SC-SM A-4(0)	3.2	51.5	21.5	23.8	22	15.3	6.7	11	1.63	1.8								7.4	0.012	0.26	1	SPT - 1
2		U		45		2																						2	SPT - 2
3	K	U	**Clayey SAND** *Yellowish brown, dense to very dense, clayey, little silt*	50		3																						3	SPT - 3
4		U		32		4	SC A-4(2)		50.8	19.1	30.1	23.7	14.1	9.6	12.4	1.68	1.9											4	SPT - 4
5		U	**SAND** *Brownish grey, dense, silty, fine grained*	36		5	SM A-4(0)		54.9	45.1		NLL	-	NPI	13.6	1.71	1.9											5	SPT - 5
6		U	**Clayey SAND** *Yellowish brown, very stiff to hard, clayey, little silt*	29		6	SC A-4(2)		51.2	18.6	30.2	28	18.3	9.7	16.1	1.66	1.9											6	SPT - 6
7		U		50		7																						7	SPT - 7
8		■	**SANDSTONE** *Brownish grey, very weak, distinctly weathered, loosely cemented, very poor to poor quality of rock*			8																						8	Run - 1 CR - 30% / RQD - Nil
9		+				9									6.9	2.09	2.2				23.02							9	Run - 2 CR - 32% / RQD - 8% UDC - 1 (9.20 - 9.32m)
10						10																						10	

Sample Types
● Disturbed
+ Undisturbed
□ Shelby / U4
■ Core Cutter
U SPT Sample
Water Sample
Groundwater Level

Abbreviations
LL : Liquid Limit
PL : Plastic Limit
PI : Plastic Index
NPI : None PI
C : Cohesion
Phi : Friction Angle
C' : Cohesion (CU)
Phi' : Friction Angle (CU)
Cc : Cc
Cs : Cs
Pc : Pre-Consolidation Pressure
K : Permeability Coeff.
w : Moisture Content
qu : Unconfined Comp. Qu
F : Fast
S : Slow
CD : Consolidated, Drained
UU : Unconsolidated, Undrained
CU : Consolidated, Undrained

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Mud Rotary Log BH-02

Project Info
Project : Geotechnical Investigation Works
Client : Impact Engineering
Location : Saddar, Karachi
Job No. : S-24-1046

Borehole Info
Depth: 30 (m)
GWL: 2.7 (m)
Drill Date: 06.03.2024
Logged By: ARH
Elevation: 0.60m above to R/L
Easting:
Northing:
Method: Mud Rotary

Company Info
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	Fi (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
10		■ +	**SANDSTONE** *Brownish grey, very weak, distinctly weathered, loosely cemented, very poor to poor quality of rock*			10																						10	Run - 3 CR - 69% / RQD - 29% UDC - 2 (10.79 - 10.93m)
11						11																						11	
12		■	**MUDSTONE** *Yellowish brown, very weak, distinclty weathered, very poor to poor quality of rock, interbedded with claystone*			12									9.1	2	2.2				15.74								12	Run - 4 CR - 72% / RQD - 31% UDC - 3 (12.81 - 13.12m)
13		+				13																						13	
14		■				14																						14	Run - 5 CR - 74% / RQD - 34% UDC - 4 (14.06 - 14.34m)
15		+				15																						15	
16		■				16																						16	Run - 6 CR - 79% / RQD - 32% UDC - 5 (15.73 - 15.94m)
17		+				17																						17	
18		■				18																						18	Run - 7 CR - 76% / RQD - 36% UDC - 6 (16.88 - 17.09m)
19		+				19																						19	
20		■				20																						20	Run - 8 CR - 77% / RQD - 38% UDC - 7 (18.44 - 18.59m)
		+																											Run - 9 CR - 83% / RQD - 41%

Sample Types: ● Disturbed	⟨⟩ SPT Sample	Abbreviations: LL : Liquid Limit	C : Cohesion	Cc : Cc	w : Moisture Content	CD : Consolidated, Drained
+ Undisturbed	▽ Water Sample	PL : Plastic Limit	Phi : Friction Angle	Cs : Cs	qu : Unconfined Comp. Qu	UU : Unconsolidated, Undrained
□ Shelby / U4	⊻ Groundwater Level	PI : Plastic Index	C' : Cohesion (CU)	Pc : Pre-Consolidation Pressure	F : Fast	CU : Consolidated, Undrained
■ Core Cutter		NPI : None PI	Phi' : Friction Angle (CU)	K : Permeability Coeff.	S : Slow	

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Mud Rotary Log BH-02

Project Info.
Project : Geotechnical Investigation Works
Client : Impact Engineering
Location : Saddar, Karachi
Job No.: S-24-1046

Borehole Info.
Depth: 30 (m)
GWL: 2.7 (m)
Drill Date: 06.03.2024
Logged By: ARH
Elevation: 0.60m above to R/L
Easting:
Northing:
Method: Mud Rotary

Company Info.
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	FI (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
20			**SILTSTONE** *Grey, distinctly weathered, very weak, poor quality of rock, interbedded with mudstone & thin layer of sandstone at places*	10 20 30 40 50		20																						20	UDC - 8 (19.83 - 19.99m)
21						21									7.6	2.07	2.2				27.19							21	Run - 10 CR - 74% / RQD - 34% UDC - 9 (21.61 - 21.75m)
22						22																						22	
23			**SANDSTONE** *Grey, very weak, distinctly weathered, poor quality of rock, interbedded with siltstone at places*			23																						23	Run - 11 CR - 79% / RQD - 39% UDC - 10 (23.34 - 23.54m)
24						24									7.5	2	2.2				19.8							24	Run - 12 CR - 89% / RQD - 37% UDC - 11 (24.49 - 24.63m)
25						25																						25	
26						26																						26	Run - 13 CR - 74% / RQD - 34% UDC - 12 (26.36 - 26.61m)
27			**SILTSTONE** *Grey, distinctly weathered, very weak, poor quality of rock, interbedded with mudstone & thin layer of sandstone at places*			27																						27	Run - 14 CR - 76% / RQD - 38% UDC - 13 (27.55 - 27.68m)
28						28									7.9	2.06	2.2				33.25							28	
29						29																						29	Run - 15 CR - 71% / RQD - 35% UDC - 14 (29.06 - 29.27m)
30			End of Log @ 30 (m)			30																						30	

Sample Types
- ● Disturbed
- + Undisturbed
- □ Shelby / U4
- ■ Core Cutter
- { } SPT Sample
- ▽ Water Sample
- ▽ Groundwater Level

Abbreviations
- LL : Liquid Limit
- PL : Plastic Limit
- PI : Plastic Index
- NPI : None PI
- C : Cohesion
- Phi : Friction Angle
- C' : Cohesion (CU)
- Phi' : Friction Angle (CU)
- Cc : Cc
- Cs : Cs
- Pc : Pre-Consolidation Pressure
- K : Permeability Coeff.
- w : Moisture Content
- qu : Unconfined Comp. Qu
- F : Fast
- S : Slow
- CD : Consolidated, Drained
- UU : Unconsolidated, Undrained
- CU : Consolidated, Undrained

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Mud Rotary Log BH-03

Project Info.
Project :Geotechnical Investigation Works
Client :Impact Engineering
Location :Saddar, Karachi
Job No.:S-24-1046

Borehole Info.
Depth:40 (m)
GWL:2.6 (m)
Drill Date:10.03.2024
Logged By:ARH
Elevation:0.60m above to R/L
Easting:
Northing:
Method:Mud Rotary

Company Info.
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	Fi (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
0			**FILL MATERIAL** *Filled with concrete, gravel, coarse sand etc*			0																						0	
1		U		50		1																						1	SPT - 1
2		U	**Clayey SAND** *Yellowish brown, dense to very dense, fine to coarse grained, some clay, little silt, traces of gravel*	39		2	SC A-4(1)	6.8	45.2	19.6	28.4	24.1	16.7	7.4	11.1	1.64	1.8											2	SPT - 2
3	K	U		11		3																						3	SPT - 3
4		U	**SAND** *Greyish brown, medium dense to dense, silty*	33		4	SM A-4(0)		52.6	47.4		NLL	-	NPI	14.6	1.68	1.9												4	SPT - 4
5		U		48		5																						5	SPT - 5
6		U	**Clayey SAND** *Yellowish brown, very dense, clayey, little silt*	50		6	SC A-4(2)		50.6	19.4	30	29.6	20.5	9.1	16.4	1.68	2											6	SPT - 6
7		U	**CLAYSTONE** *Yellowish brown, distinclty weathered, very poor qulity of rock*	50		7																						7	SPT - 7
8		■	**SANDSTONE** *Brownish grey, very weak, distinctly weathered, loosely cemented, very poor quality of rock*			8									8.3	2	2.2				18.52							8	Run - 1 CR - 46% / RQD - 20% UDC - 1 (7.80 - 8.04m)
9		■				9																						9	Run - 2 CR - 59% / RQD - 23% UDC - 2 (9.52 - 9.69m)
10		+				10																						10	

Sample Types
- Disturbed
- Undisturbed
- Shelby / U4
- Core Cutter
- SPT Sample
- Water Sample
- Groundwater Level

Abbreviations
- LL : Liquid Limit
- PL : Plastic Limit
- PI : Plastic Index
- NPI : None PI
- C : Cohesion
- Phi : Friction Angle
- C' : Cohesion (CU)
- Phi' : Friction Angle (CU)
- Cc : Cc
- Cs : Cs
- Pc : Pre-Consolidation Pressure
- K : Permeability Coeff.
- w : Moisture Content
- qu : Unconfined Comp. Qu
- F : Fast
- S : Slow
- CD : Consolidated, Drained
- UU : Unconsolidated, Undrained
- CU : Consolidated, Undrained

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Mud Rotary Log BH-03

Project Info.
Project : Geotechnical Investigation Works
Client : Impact Engineering
Location : Saddar, Karachi
Job No. : S-24-1046

Borehole Info.
Depth: 40 (m)
GWL: 2.6 (m)
Drill Date: 10.03.2024
Logged By: ARH
Elevation: 0.60m above to R/L
Easting:
Northing:
Method: Mud Rotary

Company Info.
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sieve Analysis Test: Sand (%)	Sieve Analysis Test: Silt (%)	Sieve Analysis Test: Clay (%)	Atterberg Limits: LL (%)	Atterberg Limits: PL (%)	Atterberg Limits: PI (%)	w (%)	Dry Unit Weight (gr/cm3): Bulk	Direct Shear Test: Test Type	Direct Shear Test: C (kg/cm2)	Direct Shear Test: FI (o)	qu (kg/cm2)	Consolidation: Cc	Consolidation: Cs	Consolidation: Pc (kg/cm2)	Chemical Tests: PH	Chemical Tests: SO3	Chemical Tests: CL	Depth (m)	Remarks & Comments
10–20		■ + ■ + ■ + ■ + ■	**SANDSTONE** *Brownish grey, very weak, distinctly weathered, loosely cemented, very poor quality of rock*	10 20 30 40 50		10–20																						10–20	Run - 3 CR - 56% / RQD - 20% UDC - 3 (11.03 - 11.17m) Run - 4 CR - 60% / RQD - 23% UDC - 4 (13.14 - 23.29m) Run - 5 CR - 64% / RQD - 25% Run - 6 CR - 75% / RQD - 29% UDC - 4 (15.62 - 15.82m) Run - 7 CR - 69% / RQD - 24% UDC - 5 (16.82 - 16.97m) Run - 8 CR - 73% / RQD - 33% UDC - 6 (18.23 - 18.36m) Run - 9 CR - 74% / RQD - 30%
			MUDSTONE *Yellowish brown, very weak, distinclty weathered, very poor to poor quality of rock, interbedded with claystone*												10.1	2.05	2.3			20.54								
			SILTSTONE *Grey, distinctly weathered, very weak, poor quality of rock, interbedded with sandstone & mudstone at places*												7.9	2.12	2.3			38.04								

Sample Types: ● Disturbed; + Undisturbed; □ Shelby / U4; ■ Core Cutter; SPT Sample; Water Sample; Groundwater Level

Abbreviations: LL : Liquid Limit; PL : Plastic Limit; PI : Plastic Index; NPI : None PI; C : Cohesion; Phi : Friction Angle; C' : Cohesion (CU); Phi' : Friction Angle (CU); Cc : Cc; Cs : Cs; Pc : Pre-Consolidation Pressure; K : Permeability Coeff.; w : Moisture Content; qu : Unconfined Comp. Qu; F : Fast; S : Slow; CD : Consolidated, Drained; UU : Unconsolidated, Undrained; CU : Consolidated, Undrained

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Mud Rotary Log BH-03

Project Info
Project : Geotechnical Investigation Works
Client : Impact Engineering
Location : Saddar, Karachi
Job No.: S-24-1046

Borehole Info
Depth: 40 (m)
GWL: 2.6 (m)
Drill Date: 10.03.2024
Logged By: ARH
Elevation: 0.60m above to R/L
Easting:
Northing:
Method: Mud Rotary

Company Info
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	Fl (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
20		+	**SILTSTONE** *Grey, distinctly weathered, very weak, poor quality of rock, interbedded with sandstone & mudstone at places*	10 20 30 40 50		20																						20	UDC - 7 (20.06 - 20.21m)
21		+				21																						21	Run - 10 CR - 79% / RQD - 36% UDC - 8 (21.64 - 21.62m)
22		+				22																						22	
23		+				23									9.2	2.09	2.3				33.4							23	Run - 11 CR - 77% / RQD - 41% UDC - 9 (22.87 - 23.09m)
24		+				24																						24	Run - 12 CR - 75% / RQD - 29% UDC - 10 (24.39 - 24.49m)
25		+				25																						25	
26		+				26																						26	Run - 13 CR - 69% / RQD - 34% UDC - 11 (26.03 - 26.17m)
27		+				27									7.6	2.13	2.3				43.37							27	Run - 14 CR - 63% / RQD - 36% UDC - 12 (27.53 - 27.65m)
28		+				28																						28	
29		+				29																						29	Run - 15 CR - 68% / RQD - 35% UDC - 13 (29.14 - 29.32m)
30						30																							Run - 16

Sample Types
● Disturbed
+ Undisturbed
□ Shelby / U4
■ Core Cutter
SPT Sample
Water Sample
Groundwater Level

Abbreviations
LL : Liquid Limit
PL : Plastic Limit
PI : Plastic Index
NPI : None PI
C : Cohesion
Phi : Friction Angle
C' : Cohesion (CU)
Phi' : Friction Angle (CU)
Cc : Cc
Cs : Cs
Pc : Pre-Consolidation Pressure
K : Permeability Coeff.
w : Moisture Content
qu : Unconfined Comp. Qu
F : Fast
S : Slow
CD : Consolidated, Drained
UU : Unconsolidated, Undrained
CU : Consolidated, Undrained

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Mud Rotary Log BH-03

Project Info
Project : Geotechnical Investigation Works
Client : Impact Engineering
Location : Saddar, Karachi
Job No.: S-24-1046

Borehole Info.
Depth: 40 (m)
GWL: 2.6 (m)
Drill Date: 10.03.2024
Logged By: ARH
Elevation: 0.60m above to R/L
Easting:
Northing:
Method: Mud Rotary

Company Info.
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT 10 20 30 40 50)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	FI (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
30		■	**SILTSTONE** *Grey, distinctly weathered, very weak, poor quality of rock, interbedded with sandstone & mudstone at places*			30																						30	Run - 16 CR - 67% / RQD - 26% UDC - 14 (30.46 - 30.59m)
31		+				31																						31	
32		■	**SANDSTONE** *Grey, weak, disntictly weathered, very poor to poor quality of rock, interbedded with siltstone at places*			32									8.2	2.15	2.3				68.51							32	Run - 17 CR - 71% / RQD - 31% UDC - 15 (31.88 - 32.07m)
33		+				33																						33	Run - 18 CR - 72% / RQD - 33% UDC - 16 (33.59 - 33.72m)
34		■				34																						34	Run - 19 CR - 76% / RQD - 20% UDC - 17 (35.10 - 35.21m)
35		+				35																						35	
36		■				36																						36	Run - 20 CR - 75% / RQD - 34% UDC - 18 (36.71 - 36.83m)
37		+				37									7.8	2.27	2.4				85.09							37	
38		■				38																						38	Run - 21 CR - 79% / RQD - 37% UDC - 19 (38.11 - 38.24m)
39		+				39																						39	
40		■				40																						40	Run - 22 CR - 74% / RQD - 22% UDC - 20 (39.24 - 39.36m)

End of Log @ 40 (m)

Sample Types: ● Disturbed; + Undisturbed; □ Shelby / U4; ■ Core Cutter; SPT Sample; Water Sample; Groundwater Level

Abbreviations: LL : Liquid Limit; PL : Plastic Limit; PI : Plastic Index; NPI : None PI; C : Cohesion; Phi : Friction Angle; C' : Cohesion (CU); Phi' : Friction Angle (CU); Cc : Cc; Cs : Cs; Pc : Pre-Consolidation Pressure; K : Permeability Coeff.; w : Moisture Content; qu : Unconfined Comp. Qu; F : Fast; S : Slow; CD : Consolidated, Drained; UU : Unconsolidated, Undrained; CU : Consolidated, Undrained

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Mud Rotary Log BH-04

Project Info.
Project : Geotechnical Investigation Works
Client : Impact Engineering
Location : Saddar, Karachi
Job No. : S-24-1046

Borehole Info.
Depth: 30 (m)
GWL: 2.4 (m)
Drill Date: 17.03.2024
Logged By: ARH
Elevation: 0.60m above to R/L
Easting:
Northing:
Method: Mud Rotary

Company Info.
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	Fi (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
0			**FILL MATERIAL** *Filled with concrete, gravel, coarse sand etc*			0																						0	
1		U	**SAND** *Yellowish brown, dense, fine to coarse grained*	37		1																						1	SPT - 1
2	▽	U	**Clayey SAND** *Yellowish brown, medium dense to dense, some clay & silt, traces of gravel*	20		2	SC-SM A-4(0)	4.2	50.4	20.8	24.6	23.8	18	5.8	10.4	1.67	1.8											2	SPT - 2
3		U		50		3																						3	SPT - 3
4		U	**SAND** *Yellowish brown, dense to very dense, fine grained little clay*	40		4	SM A-4(0)		55.6	44.4		NLL	-	NPI	13.7	1.7	1.9											4	SPT - 4
5		U		40		5																						5	SPT - 5
6		U		50		6																						6	SPT - 6
7		+ ■	**SANDSTONE** *Grey, weak, disntictly weathered, very poor to poor quality of rock, interbedded with siltstone at places*			7									7.7	2.08	2.2				22.58							7	SPT - 7 Run - 1 CR - 57% / RQD - 20% UDC - 1 (7.89 - 8.01m)
8		+				8																						8	
9		■				9																						9	Run - 2 CR - 62% / RQD - Nil
10						10																						10	

Sample Types
- ● Disturbed
- + Undisturbed
- □ Shelby / U4
- ■ Core Cutter
- U SPT Sample
- ▨ Water Sample
- ▽ Groundwater Level

Abrevations
- LL : Liquid Limit
- PL : Plastic Limit
- PI : Plastic Index
- NPI : None PI
- C : Cohesion
- Phi : Friction Angle
- C' : Cohesion (CU)
- Phi' : Friction Angle (CU)
- Cc : Cc
- Cs : Cs
- Pc : Pre-Consolidation Pressure
- K : Permeability Coeff.
- w : Moisture Content
- qu : Unconfined Comp. Qu
- F : Fast
- S : Slow
- CD : Consolidated, Drained
- UU : Unconsolidated, Undrained
- CU : Consolidated, Undrained

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Mud Rotary Log BH-04

Project Info.
Project : Geotechnical Investigation Works
Client : Impact Engineering
Location : Saddar, Karachi
Job No.: S-24-1046

Borehole Info.
Depth: 30 (m)
GWL: 2.4 (m)
Drill Date: 17.03.2024
Logged By: ARH
Elevation: 0.60m above to R/L
Easting:
Northing:
Method: Mud Rotary

Company Info.
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
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Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	Fi (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
10		■	**SANDSTONE** *Grey, weak, disntictly weathered, very poor to poor quality of rock, interbedded with siltstone at places*			10																						10	Run - 3 CR - 59% / RQD - 21% UDC - 2 (11.06 - 11.26m)
11		+				11																						11	
12		■				12									8	2.13	2.3				31.53							12	Run - 4 CR - 56% / RQD - 20% UDC - 3 (12.46 - 12.60m)
13		+				13																						13	Run - 5 CR - 60% / RQD - 19% UDC - 4 (13.83 - 13.99m)
14		+				14																						14	
15		■				15																						15	Run - 6 CR - 63% / RQD - 22% UDC - 5 (16.06 - 16.24m)
16		+				16																						16	
17		+ ■				17																						17	Run - 7 CR - 61% / RQD - 22% UDC - 6 (16.76 - 16.96m)
18		■				18									6.7	2.21	2.4				37.69							18	Run - 8 CR - 71% / RQD - 24% UDC - 7 (18.61 - 18.77m)
19		+				19																						19	
20		■				20																						20	Run - 9 CR - 59% / RQD - 19%

Sample Types: ● Disturbed; + Undisturbed; ☐ Shelby / U4; ■ Core Cutter; SPT Sample; Water Sample; Groundwater Level

Abbreviations: LL : Liquid Limit; PL : Plastic Limit; PI : Plastic Index; NPI : None PI; C : Cohesion; Phi : Friction Angle; C' : Cohesion (CU); Phi' : Friction Angle (CU); Cc : Cc; Cs : Cs; Pc : Pre-Consolidation Pressure; K : Permeability Coeff.; w : Moisture Content; qu : Unconfined Comp. Qu; F : Fast; S : Slow; CD : Consolidated, Drained; UU : Unconsolidated, Undrained; CU : Consolidated, Undrained

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Mud Rotary Log BH-04

Project Info.
Project : Geotechnical Investigation Works
Client : Impact Engineering
Location : Saddar, Karachi
Job No.: S-24-1046

Borehole Info.
Depth: 30 (m)
GWL: 2.4 (m)
Drill Date: 17.03.2024
Logged By: ARH
Elevation: 0.60m above to R/L
Easting:
Northing:
Method: Mud Rotary

Company Info
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	FI (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
20		+	**SILTSTONE** *Grey, distinctly weathered, very weak, poor quality of rock, interbedded with sandstone & mudstone at places*			20																						20	UDC - 8 (20.55 - 20.71m)
21		■				21																						21	Run - 10 CR - 63% / RQD - 29% UDC - 9 (21.84 - 21.99m)
22		+				22									8.4	2.03	2.2				26.71							22	
23		■	**SANDSTONE** *Grey, weak, disntictly weathered, very poor to poor quality of rock, interbedded with siltstone at places*			23																						23	Run - 11 CR - 64% / RQD - 28% UDC - 10 (23.11 - 23.26m)
24		+				24																						24	Run - 12 CR - 69% / RQD - 36% UDC - 11 (24.37 - 24.55m)
25		■				25																						25	Run - 13 CR - 73% / RQD - 31% UDC - 12 (25.66 - 25.85m)
26		+				26																						26	
27		■				27																						27	Run - 14 CR - 76% / RQD - 29% UDC - 13 (28.03 - 28.16m)
28		+				28									7.7	2.05	2.2				37.44							28	
29		■	**SILTSTONE** *Grey, distinctly weathered, very weak, poor quality of rock, interbedded with sandstone & mudstone at places*			29																						29	Run - 15 CR - 80% / RQD - 31% UDC - 14 (28.89 - 29.11m)
30		+	End of Log @ 30 (m)			30																						30	

Sample Types: Disturbed; Undisturbed; Shelby / U4; Core Cutter; SPT Sample; Water Sample; Groundwater Level

Abbreviations:
LL : Liquid Limit; PL : Plastic Limit; PI : Plastic Index; NPI : None PI
C : Cohesion; Phi : Friction Angle; C' ; Cohesion (CU); Phi' . Friction Angle (CU)
Cc : Cc; Cs : Cs; Pc : Pre-Consolidation Pressure; K : Permeability Coeff.
w : Moisture Content; qu : Unconfined Comp. Qu; F : Fast; S : Slow
CD : Consolidated, Drained; UU : Unconsolidated, Undrained; CU : Consolidated, Undrained

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Mud Rotary Log BH-05

Project Info.
Project :Geotechnical Investigation Works
Client :Impact Engineering
Location :Saddar, Karachi
Job No.:S-24-1046

Borehole Info.
Depth:30 (m) Elevation:0.70m above to R/L
GWL:2.8 (m) Easting:
Drill Date:17.03.2024 Northing:
Logged By:ARH Method:Mud Rotary

Company Info.
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	FI (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
0			**FILL MATERIAL** *Filled with concrete, gravel, coarse sand etc*			0																						0	
1		U	**Clayey SAND** *Yellowish brown, dense to very dense, fine to coarse grained, clayey, traces of fine grained sand*	34		1																						1	SPT - 1
2		U		50		2	SC A-4(1)	2.2	48.2	18.8	30.8	23.8	15.8	8	11.4	1.72	1.9											2	SPT - 2
3		U	**SAND** *Grey, dense to very dense, silty, fine grained, little clay clay*	50		3																						3	SPT - 3
4		U		34		4	SM A-4(0)		61.8	38.2		NLL	-	NPI	15.7	1.67	1.9											4	SPT - 4
5		U		50		5																						5	SPT - 5
6		U		50		6																						6	SPT - 6
7		■ +	**SANDSTONE** *Brownish grey, very weak, distinctly weathered, very poor to poor quality of rock*			7									9.4	2.05	2.2				17.99							7	Run - 1 CR - 37% / RQD - Nil
8		■ +				8																						8	BB - 41% / RQD - 12% UDC - 1 (8.10 - 3.28m)
9		■ +				9																						9	Run - 2 CR - 33% / RQD - 19% UDC - 2 (9.40 - 9.55m)
10						10																						10	

Sample Types: ● Disturbed; + Undisturbed; □ Shelby / U4; ■ Core Cutter; U SPT Sample; Water Sample; Groundwater Level

Abbreviations:
LL : Liquid Limit; PL : Plastic Limit; PI : Plastic Index; NPI : None PI
C : Cohesion; Phi : Friction Angle; C' : Cohesion (CU); Phi' : Friction Angle (CU)
Cc : Cc; Cs : Cs; Pc : Pre-Consolidation Pressure; K : Permeability Coeff.
w : Moisture Content; qu : Unconfined Comp. Qu; F : Fast; S : Slow
CD : Consolidated, Drained; UU : Unconsolidated, Undrained; CU : Consolidated, Undrained

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Mud Rotary Log BH-05

Project Info
Project : Geotechnical Investigation Works
Client : Impact Engineering
Location : Saddar, Karachi
Job No. : S-24-1046

Borehole Info
Depth: 30 (m)
GWL: 2.8 (m)
Drill Date: 17.03.2024
Logged By: ARH
Elevation: 0.70m above to R/L
Easting:
Northing:
Method: Mud Rotary

Company Info.
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	Fi (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
10		+	**SANDSTONE** *Brownish grey, very weak, distinctly weathered, very poor to poor quality of rock*			10																						10	Run - 3 CR - 79% / RQD - 31% UDC - 3 (10.20 - 10.34m)
11		■				11																						11	
12		+				12									7.2	2.11	2.3				28.91							12	Run - 4 CR - 68% / RQD - 26% UDC - 4 (12.40 - 12.54m)
13		■				13																						13	Run - 5 CR - 74% / RQD - 34% UDC - 5 (14.10 - 14.30m)
14		+				14																						14	
15		■				15																						15	Run - 6 CR - 79% / RQD - 38% UDC - 6 (15.80 - 16.00m)
16		+	**MUDSTONE** *Yellowish brown, very weak, distinclty weathered, very poor to poor quality of rock, interbedded with claystone*			16																						16	
17		■				17									11	2.08	2.3				19.9							17	Run - 7 CR - 80% / RQD - 32% UDC - 7 (17.10 - 17.25m)
18		+				18																						18	Run - 8 CR - 77% / RQD - 36% UDC - 8 (18.00 - 18.25m)
19		■				19																						19	Run - 9 CR - 65% / RQD - 35%
20						20																							

Sample Types
- ● Disturbed
- + Undisturbed
- □ Shelby / U4
- ■ Core Cutter
- SPT Sample
- Water Sample
- Groundwater Level

Abbreviations
- LL : Liquid Limit
- PL : Plastic Limit
- PI : Plastic Index
- NPI : None PI
- C : Cohesion
- Phi : Friction Angle
- C' : Cohesion (CU)
- Phi' : Friction Angle (CU)
- Cc : Cc
- Cs : Cs
- Pc : Pre-Consolidation Pressure
- K : Permeability Coeff.
- w : Moisture Content
- qu : Unconfined Comp. Qu
- F : Fast
- S : Slow
- CD : Consolidated, Drained
- UU : Unconsolidated, Undrained
- CU : Consolidated, Undrained

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Mud Rotary Log BH-05

Project Info.
Project : Geotechnical Investigation Works
Client : Impact Engineering
Location : Saddar, Karachi
Job No.: S-24-1046

Borehole Info.
Depth: 30 (m)
GWL: 2.8 (m)
Drill Date: 17.03.2024
Logged By: ARH
Elevation: 0.70m above to R/L
Easting:
Northing:
Method: Mud Rotary

Company Info
Soil Testing Services
Geotechnical Engineers & Material Testing Laboratory
www.sts.com.pk

Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	FI (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
20		+	**SILTSTONE** *Grey, distinctly weathered, very weak, poor quality of rock, interbedded with sandstone & mudstone at places*			20																						20	UDC - 9 (20.10 - 20.35m)
21		■				21									8.4	2.06	2.2				31.26							21	Run - 10 CR - 78% / RQD - 44% UDC - 10 (21.00 - 21.30m)
22		■				22																						22	Run - 11 CR - 82% / RQD - 52% UDC - 11 (23.60 - 23.98m)
23			**SANDSTONE** *Grey, weak, disntictly weathered, very poor to poor quality of rock, interbedded with siltstone at places*			23																						23	
24		+				24																						24	Run - 12 CR - 68% / RQD - 39% UDC - 12 (25.10 - 25.34m)
25		■				25									6.9	2.22	2.4				59.84							25	
26		+				26																						26	Run - 13 CR - 79% / RQD - 48% UDC - 13 (26.20 - 26.35m)
27		■	**SILTSTONE** *Grey, distinctly weathered, very weak, poor quality of rock, interbedded with sandstone & mudstone at places*			27																						27	Run - 14 CR - 70% / RQD - 40% UDC - 14 (28.25 - 28.39m)
28		+				28									7.1	2.1	2.2				41.62							28	
29		■				29																						29	Run - 15 CR - 79% / RQD - 36% UDC - 15 (29.40 - 26.58m)
30		+				30																						30	

End of Log @ 30 (m)

Sample Types
● Disturbed
+ Undisturbed
□ Shelby / U4
■ Core Cutter
SPT Sample
Water Sample
Groundwater Level

Abbreviations
LL : Liquid Limit
PL : Plastic Limit
PI : Plastic Index
NPI : None PI
C : Cohesion
Phi : Friction Angle
C' : Cohesion (CU)
Phi' : Friction Angle (CU)
Cc : Cc
Cs : Cs
Pc : Pre-Consolidation Pressure
K : Permeability Coeff.
w : Moisture Content
qu : Unconfined Comp. Qu
F : Fast
S : Slow
CD : Consolidated, Drained
UU : Unconsolidated, Undrained
CU : Consolidated, Undrained

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Laboratory Test Results

Summary of Lab. Tests

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Soil Testing Services

STS

Sieve Analysis Test

Borehole	Sample Depth (m)	Soil Class	D10 mm	D30 mm	D60 mm	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Cobble (%)	LL	PL
BH-01	2	SC A-4(0)	-1	-1	1.775	26.1	11.9	48.7	13.3		21.4	13.6
BH-01	3	SC A-2-4(0)	-1	0.265	2.448		22.1	55.6	22.3		23.4	14.4
BH-01	4	CL A-6(7)	-1	-1	-1	37.9	30.1	28.6	3.3		33.8	21
BH-02	1	SC-SM A-4(0)	-1	-1	0.185	23.8	21.5	51.5	3.2		22	15.3
BH-02	4	SC A-4(2)	-1	-1	0.102	30.1	19.1	50.8			23.7	14.1
BH-02	5	SM A-4(0)	-1	-1	0.102		45.1	54.9			-	-
BH-02	6	SC A-4(2)	-1	-1	0.109	30.2	18.6	51.2			28	18.3
BH-03	2	SC A-4(1)	-1	-1	0.148	28.4	19.6	45.2	6.8		24.1	16.7
BH-03	4	SM A-4(0)	-1	-1	0.097		47.4	52.6			-	-
BH-03	6	SC A-4(2)	-1	-1	0.11	30	19.4	50.6			29.6	20.5
BH-04	2	SC-SM A-4(0)	-1	-1	0.118	24.6	20.8	50.4	4.2		23.8	18
BH-04	4	SM A-4(0)	-1	-1	0.119		44.4	55.6			-	-
BH-05	2	SC A-4(1)	-1	-1	0.111	30.8	18.8	48.2	2.2		23.8	15.8
BH-05	4	SM A-4(0)	-1	-1	0.118		38.2	61.8			-	-

ATTERBERG LIMITS TEST

Borehole	Sample Depth (m)	Soil Class	Liquid Limit (LL)	Plastic Limit (PL)
BH-01	2	SC A-4(0)	21.4	13.6
BH-01	3	SC A-2-4(0)	23.4	14.4
BH-01	4	CL A-6(7)	33.8	21
BH-02	1	SC-SM A-4(0)	22	15.3
BH-02	4	SC A-4(2)	23.7	14.1
BH-02	6	SC A-4(2)	28	18.3
BH-03	2	SC A-4(1)	24.1	16.7
BH-03	6	SC A-4(2)	29.6	20.5
BH-04	2	SC-SM A-4(0)	23.8	18
BH-05	2	SC A-4(1)	23.8	15.8

Summary of Lab. Tests

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Soil Testing Services

Density & Moisture Test

Borehole	Sample Depth (m)	Soil Class	Moisture Content (%)	Dry Density (gr/cm3)
BH-01	2	SC A-4(0)	11.03	1.69
BH-01	3	SC A-2-4(0)	13.98	1.67
BH-01	4	CL A-6(7)	16.76	1.64
BH-01	8.2		7.2	2.02
BH-01	13.07		8.5	1.97
BH-01	15.6		8.3	2.07
BH-01	18.39		7.5	2.1
BH-01	23.16		10.3	2.08
BH-01	26.12		11.5	1.95
BH-01	29.11		6.3	2.23
BH-01	33.55		8.4	2.2
BH-01	34.8		8.7	2.18
BH-01	38.12		8.4	2.28
BH-02	1	SC-SM A-4(0)	10.98	1.63
BH-02	4	SC A-4(2)	12.36	1.68
BH-02	5	SM A-4(0)	13.59	1.71
BH-02	6	SC A-4(2)	16.08	1.66
BH-02	9.2		6.9	2.09
BH-02	12.81		9.1	2
BH-02	18.44		8.1	2.1
BH-02	21.61		7.6	2.07
BH-02	24.49		7.5	2
BH-02	27.55		7.9	2.06
BH-03	2	SC A-4(1)	11.13	1.64
BH-03	4	SM A-4(0)	14.64	1.68
BH-03	6	SC A-4(2)	16.37	1.68
BH-03	7.8		8.3	2
BH-03	13.14		10.1	2.05
BH-03	18.23		7.9	2.12
BH-03	22.87		9.2	2.09
BH-03	27.53		7.6	2.13
BH-03	31.88		8.2	2.15
BH-03	36.71		7.8	2.27
BH-04	2	SC-SM A-4(0)	10.39	1.67
BH-04	4	SM A-4(0)	13.69	1.7
BH-04	7.21		7.7	2.08
BH-04	12.64		8	2.13

Summary of Lab. Tests

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Soil Testing Services

Borehole	Sample Depth (m)	Soil Class	Moisture Content (%)	Dry Density (gr/cm3)
BH-04	18.61		6.7	2.21
BH-04	21.84		8.4	2.03
BH-04	28.03		7.7	2.05
BH-05	2	SC A-4(1)	11.43	1.72
BH-05	4	SM A-4(0)	15.71	1.67
BH-05	6.85		9.4	2.05
BH-05	12.4		7.2	2.11
BH-05	17.1		11	2.08
BH-05	21		8.4	2.06
BH-05	25.1		6.9	2.22
BH-05	28		7.1	2.1

Unconfined Compression Test

Borehole	Sample Depth (m)	Soil Class	Diameter (cm)	Height (cm)	qu (kg/cm2)
BH-01	8.2		5.79	7.52	25.65
BH-01	13.07		5.69	11.12	17.81
BH-01	15.6		5.52	10.93	37.85
BH-01	18.39		5.7	10.31	42.51
BH-01	23.16		5.52	9.28	18.91
BH-01	26.12		5.82	8.71	12.93
BH-01	29.11		5.78	11.42	86.21
BH-01	33.55		5.81	11.53	51.19
BH-01	34.5		5.72	11.29	48.93
BH-01	38.12		5.68	11.24	89.27
BH-02	9.2		5.792	8.694	23.02
BH-02	12.81		5.66	10.243	15.74
BH-02	18.44		5.438	9.982	28.87
BH-02	21.61		5.646	10.452	27.19
BH-02	24.49		5.49	10.06	19.8
BH-02	27.55		5.712	11.04	33.25
BH-03	7.8		5.73	10.12	18.52
BH-03	13.14		5.68	10.42	20.54
BH-03	18.23		5.734	10.42	38.04
BH-03	22.87		5.746	11.12	33.4
BH-03	27.53		5.72	9.98	43.37
BH-03	31.88		5.682	11.02	68.51
BH-03	36.71		5.705	11.06	85.09
BH-04	7.21		5.792	10.054	22.58
BH-04	12.64		5.74	9.86	31.53
BH-04	18.61		5.74	10.21	37.69
BH-04	21.84		5.68	10.58	26.71
BH-04	28.03		5.76	11.12	37.44
BH-05	6.85		5.64	9.056	17.99
BH-05	12.4		5.79	9.923	28.91
BH-05	17.1		5.58	10.83	19.9

Summary of Lab. Tests

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Soil Testing Services

Borehole	Sample Depth (m)	Soil Class	Diameter (cm)	Height (cm)	qu (kg/cm2)
BH-05	21		5.52	9.78	31.26
BH-05	25.1		5.68	10.02	59.84
BH-05	28		5.76	9.74	41.62

Chemical Test Results

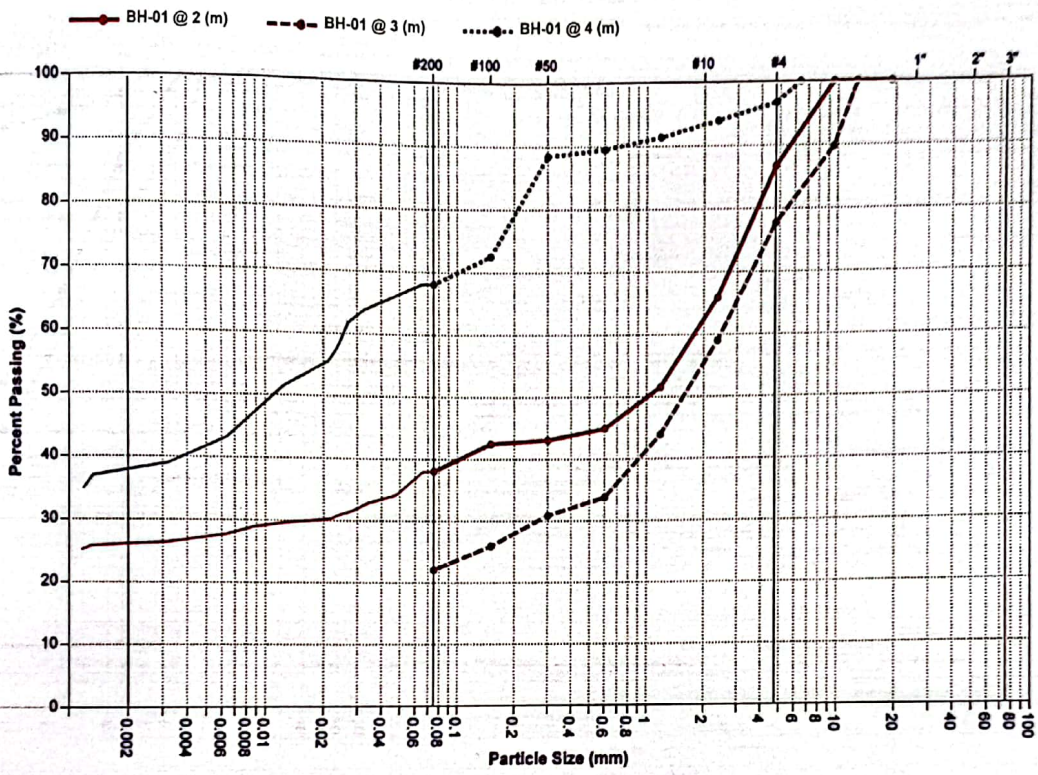
Borehole	Sample Depth (m)	Soil Class	#	Value
BH-02	1	SC-SM A-4(0)	9	0.26
BH-02	1	SC-SM A-4(0)	6	0.012
BH-02	1	SC-SM A-4(0)	2	7.42

Sieve Analysis Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Soil Testing Services

ASTM C136



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobble
26.1	11.9	48.7	13.3	-
-	22.1	55.6	22.3	-
37.9	30.1	28.6	3.3	-

Classification

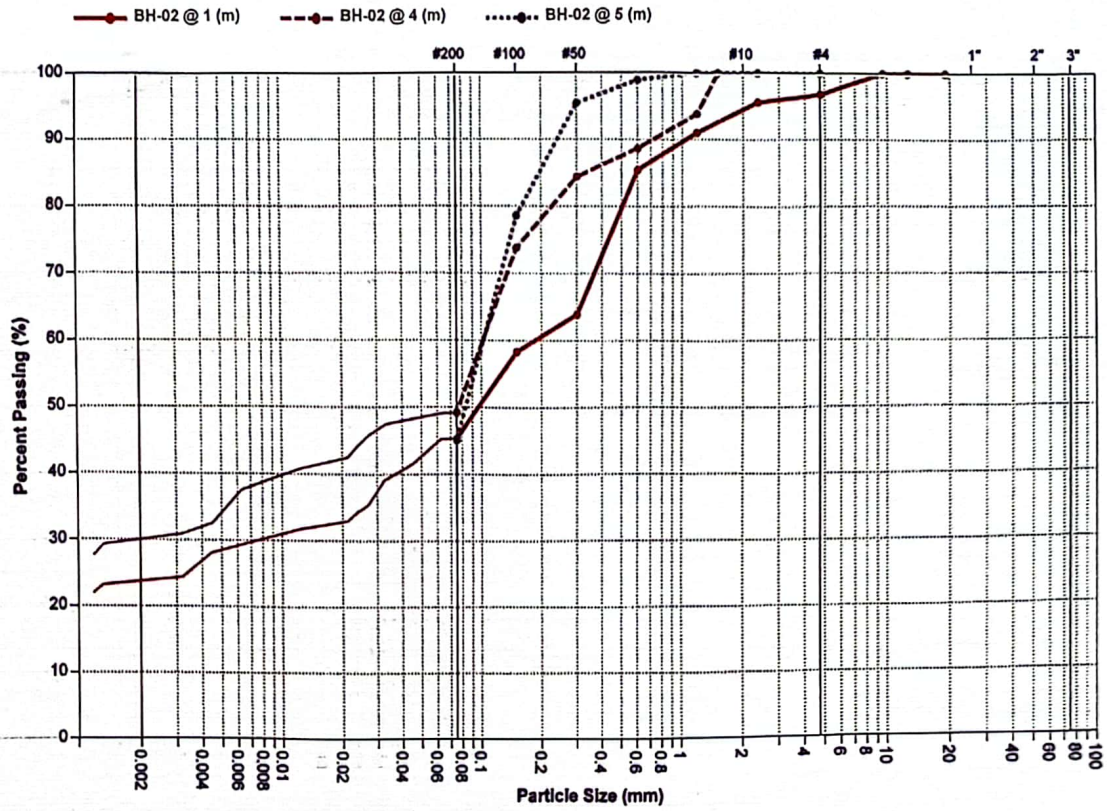
Borehole	Sample Depth (m)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
BH-01	2	0.001	0.017	1.008	1.775	0.163	1775	21.4	7.8	N/A	SC	A-4(0)
BH-01	3	-	0.265	1.561	2.448	0.382	-	23.4	9	N/A	SC	A-2-4(0)
BH-01	4	0.001	0.001	0.011	0.025	0.04	25	33.8	12.8	N/A	CL	A-6(7)

Sieve Analysis Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Soil Testing Services

ASTM C136



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobble
23.8	21.5	51.5	3.2	-
30.1	19.1	50.8	-	-
-	45.1	54.9	-	-

Classification

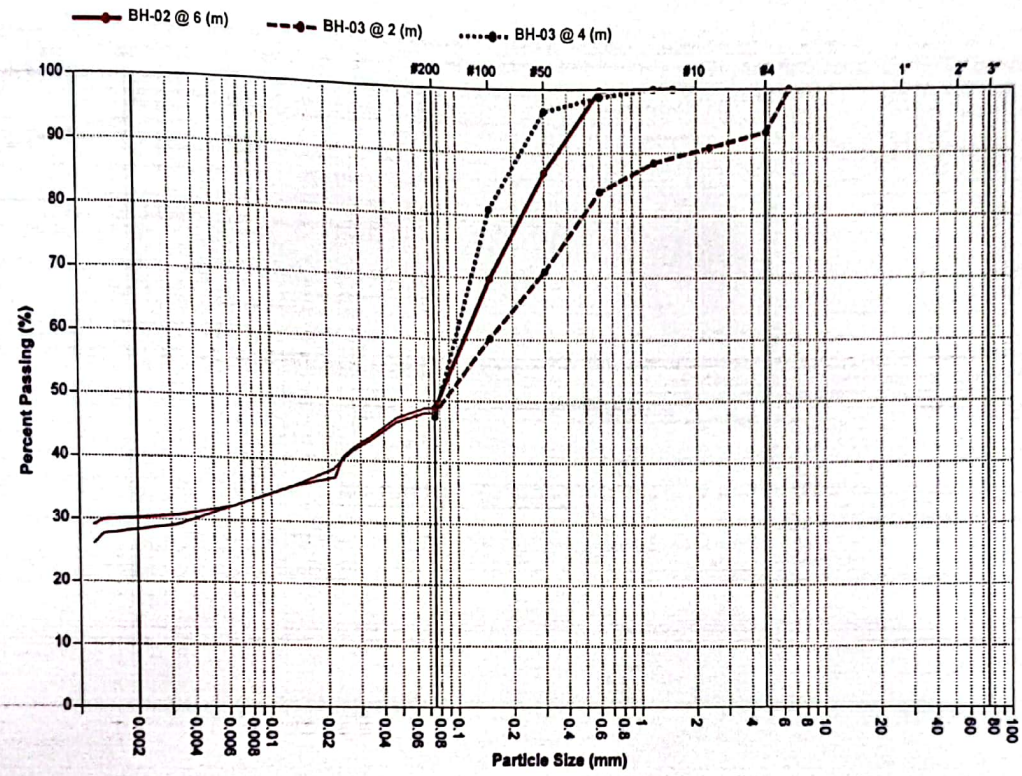
Borehole	Sample Depth (m)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
BH-02	1	0.001	0.008	0.096	0.185	0.346	185	22	6.7	N/A	SC-SM	A-4(0)
BH-02	4	0.001	0.002	0.077	0.102	0.039	102	23.7	9.6	N/A	SC	A-4(2)
BH-02	5	-	-	0.083	0.102	-	-	-	-	N/A	SM	A-4(0)

Sieve Analysis Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Soil Testing Services

ASTM C136



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobble
30.2	18.6	51.2	-	-
28.4	19.6	45.2	6.8	-
-	47.4	52.6	-	-

Classification

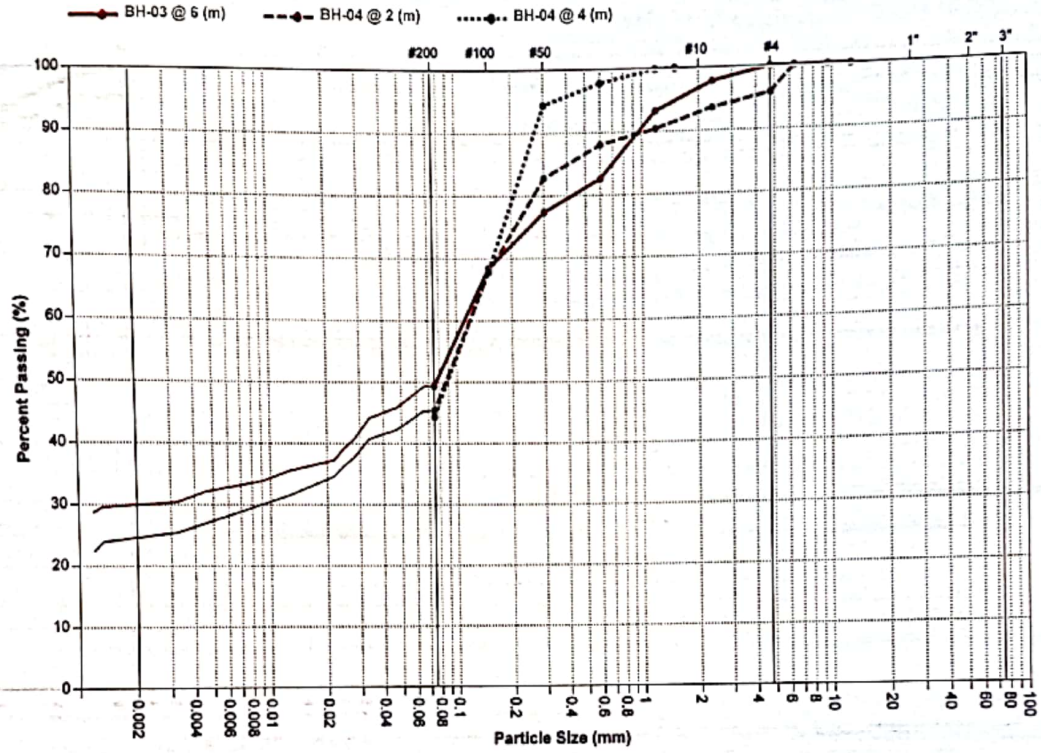
Borehole	Sample Depth (m)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
BH-02	6	0.001	0.002	0.078	0.109	0.037	109	28	9.7	N/A	SC	A-4(2)
BH-03	2	0.001	0.004	0.084	0.148	0.108	148	24.1	7.4	N/A	SC	A-4(1)
BH-03	4	-	-	0.079	0.097	-	-	-	-	N/A	SM	A-4(0)

Sieve Analysis Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Soil Testing Services

ASTM C136



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobble
30	19.4	50.6	-	-
24.6	20.8	50.4	4.2	-
-	44.4	55.6	-	-

Classification

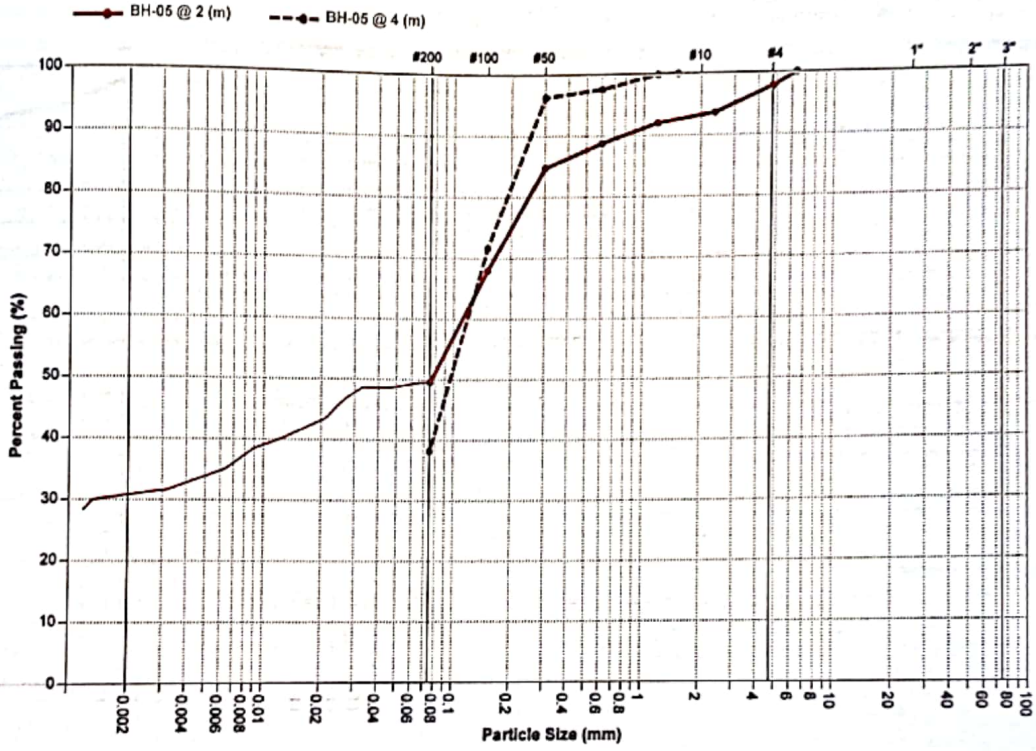
Borehole	Sample Depth (m)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
BH-03	6	0.001	0.002	0.077	0.11	0.036	110	29.6	9.1	N/A	SC	A-4(2)
BH-04	2	0.001	0.009	0.086	0.118	0.686	118	23.8	5.8	N/A	SC-SM	A-4(0)
BH-04	4	-	-	0.088	0.119	-	-	-	-	N/A	SM	A-4(0)

Sieve Analysis Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Soil Testing Services

ASTM C136



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobble
30.8	18.8	48.2	2.2	-
-	38.2	61.8	-	-

Classification

Borehole	Sample Depth (m)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
BH-05	2	0.001	0.001	0.076	0.111	0.009	111	23.8	8	N/A	SC	A-4(1)
BH-05	4	-	-	0.096	0.118	-	-	-	-	N/A	SM	A-4(0)

ATTERBERG LIMITS TEST

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Borehole : BH-01
Sample Depth : 2 (m)
Classification : SC | A-4(0)
Sample Type : SPT Split Spoon

Soil Testing Services

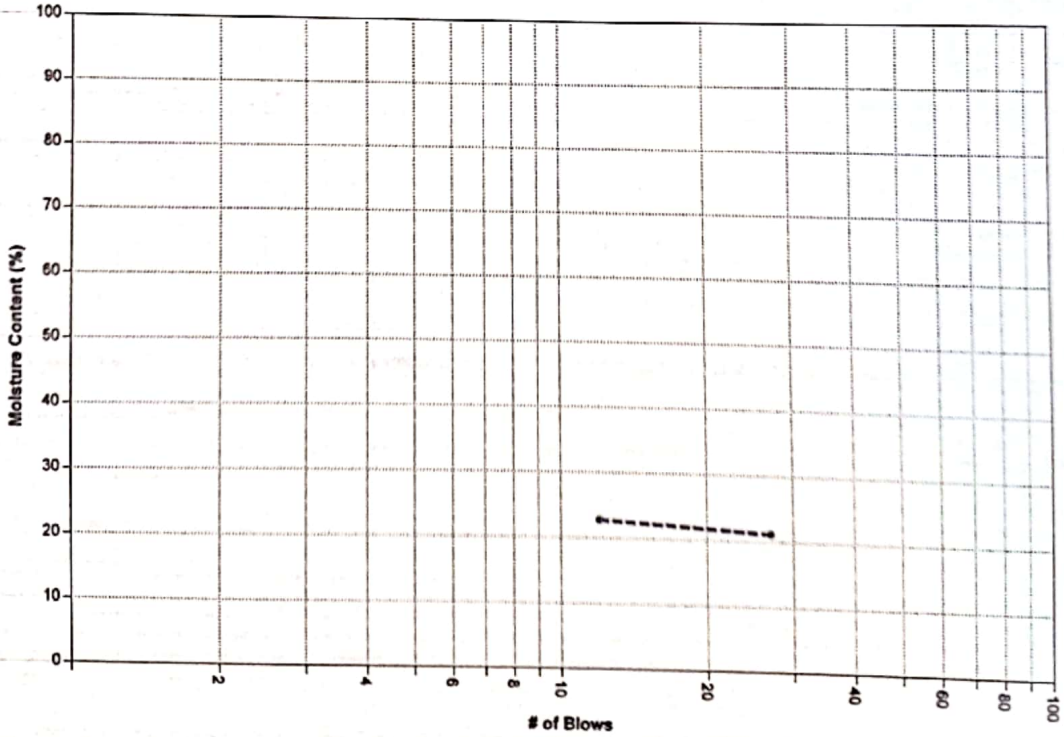
Liquid Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	# of Blows	Moisture Content (%)
11.17	42.95	37.04	12	22.8
19.76	55.05	48.88	27	21.2

Plastic Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	Moisture Content (%)
25.75	35.19	34.06	13.6

LL = 21.4 % PL = 13.6 % PI=7.8



USCS Soil Description : Clayey Sand With Gravel
AASHTO Soil Description : A-4, Silty soils (0)

Tested By :

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ATTERBERG LIMITS TEST

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Borehole : BH-01
Sample Depth : 3 (m)
Classification : SC | A-2-4(0)
Sample Type : SPT Split Spoon

Soil Testing Services

ASTM D2216-90, D854

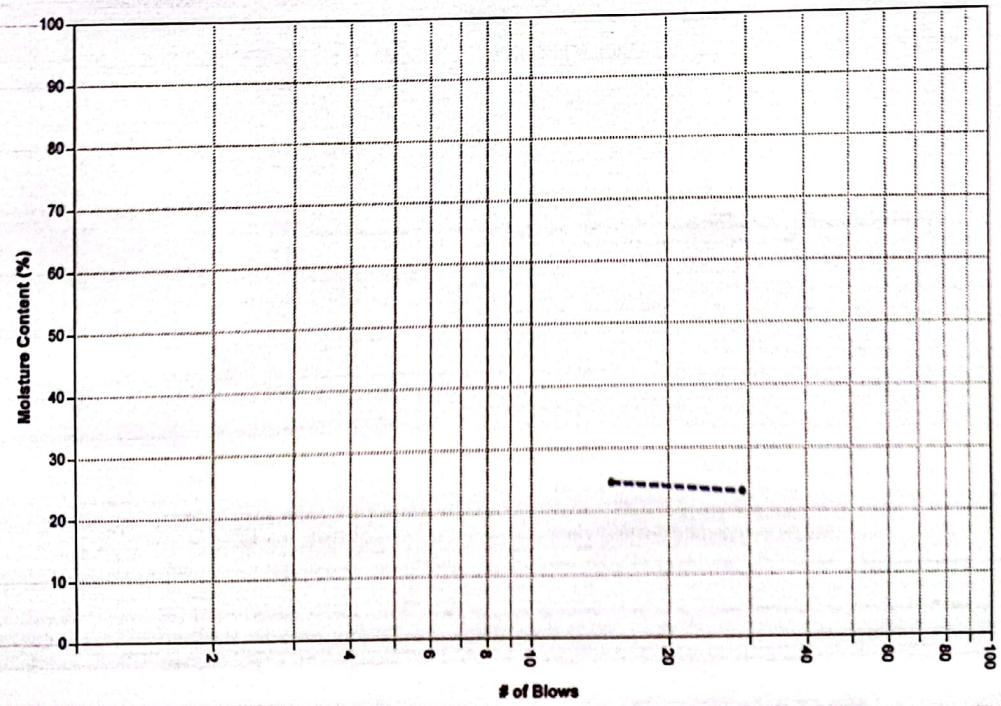
Liquid Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	# of Blows	Moisture Content (%)
10.35	42.72	36.32	15	24.6
13.2	53.26	45.73	29	23.1
				-

Plastic Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	Moisture Content (%)
25.55	36.01	34.69	14.4

LL = 23.4 % **PL = 14.4 %** **PI=9**



USCS Soil Description : Clayey Sand With Gravel
AASHTO Soil Description : Silty or clayey gravel and sand (0)

Tested By :

ATTERBERG LIMITS TEST

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Borehole : BH-01
Sample Depth : 4 (m)
Classification : CL | A-6(7)
Sample Type : SPT Split Spoon

Soil Testing Services

ASTM D2216-90, D854

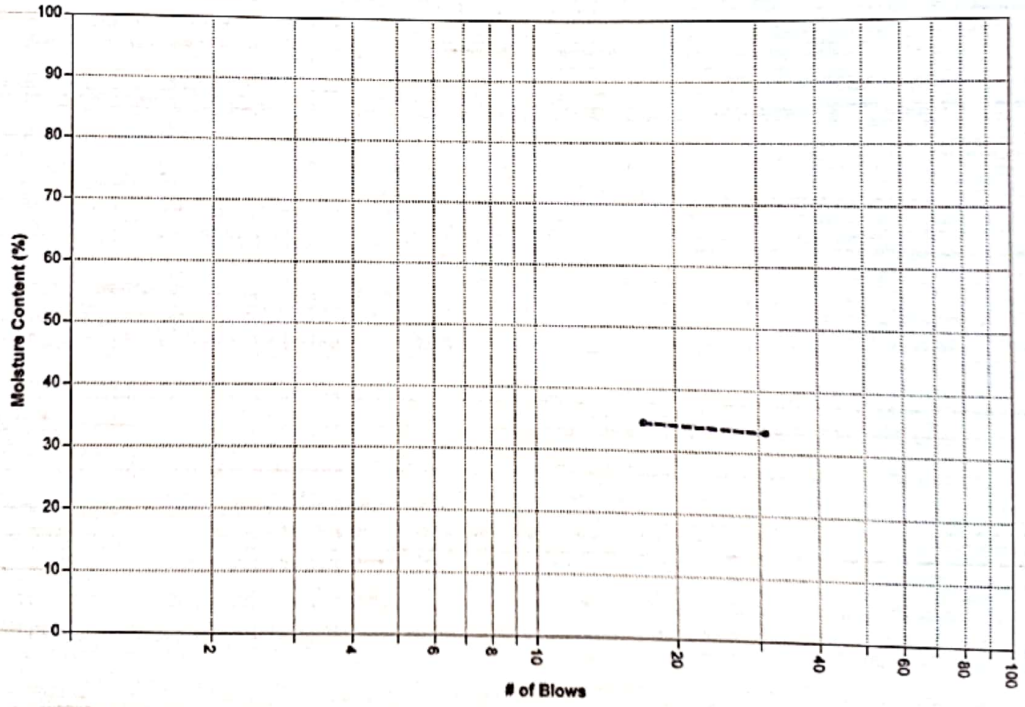
Liquid Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	# of Blows	Moisture Content (%)
16.72	50.38	41.73	17	34.6
20.69	55.68	46.93	31	33.3
				-

Plastic Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	Moisture Content (%)
30.74	41.05	39.26	21

LL = 33.8 % PL = 21 % PI=12.8



USCS Soil Description : Low Plasticity Clay With Sand
AASHTO Soil Description : Clayey soils (7)

Tested By :

ATTERBERG LIMITS TEST

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Borehole : BH-02
Sample Depth : 1 (m)
Classification : SC-SM | A-4(0)
Sample Type : SPT Split Spoon

Soil Testing Services

ASTM D2216-90, D854

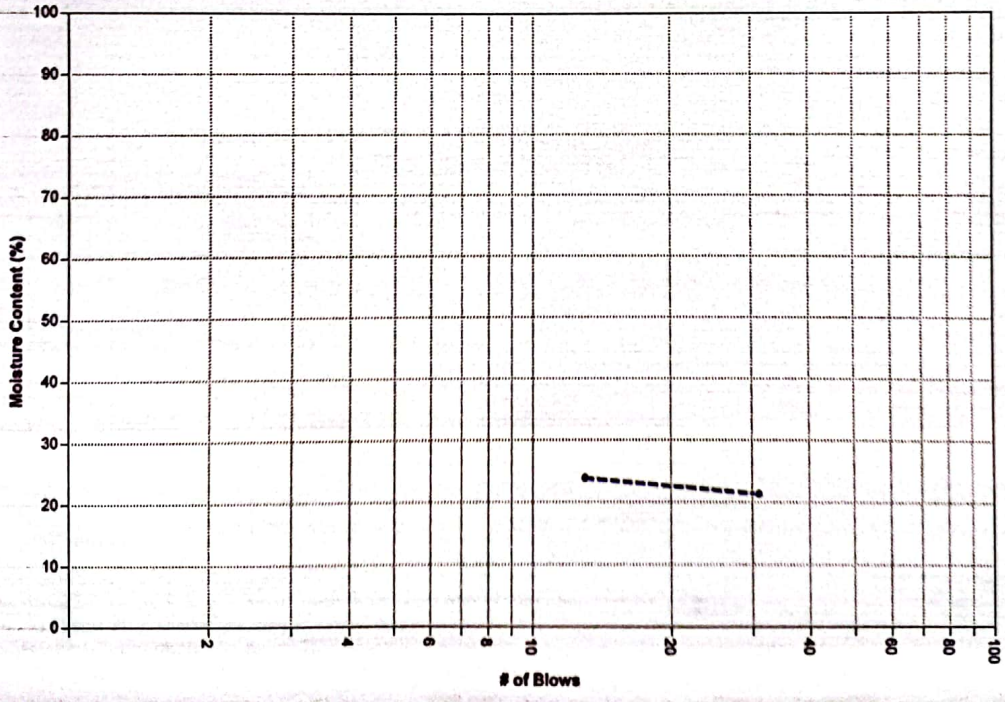
Liquid Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	# of Blows	Moisture Content (%)
12.36	29.56	26.24	13	23.9
10.28	32.16	28.31	31	21.4

Plastic Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	Moisture Content (%)
28.56	41.02	39.37	15.3

LL = 22 % **PL = 15.3 %** **PI=6.7**



USCS Soil Description : Clayey - Silty Sand With Gravel
AASHTO Soil Description : A-4, Silty soils (0)

Tested By :

ATTERBERG LIMITS TEST

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Borehole : BH-02
Sample Depth : 4 (m)
Classification : SC | A-4(2)
Sample Type : SPT Split Spoon

Soil Testing Services

ASTM D2216-90, D854

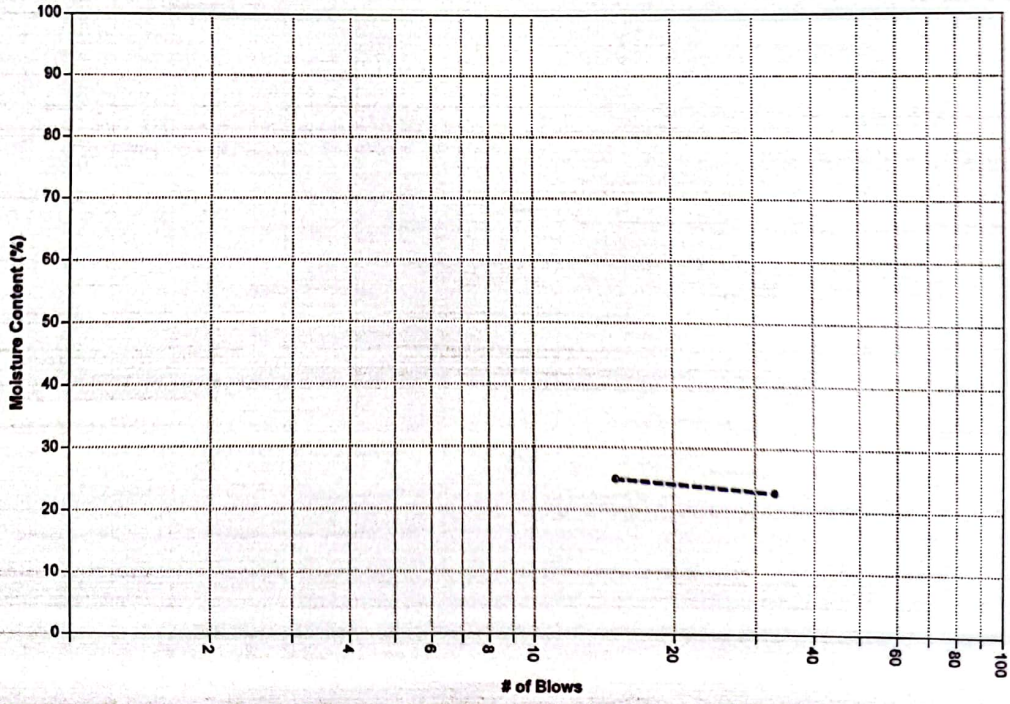
Liquid Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	# of Blows	Moisture Content (%)
13.48	33.26	29.31	15	25
10.95	30.16	26.57	33	23
				-

Plastic Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	Moisture Content (%)
35.48	46.71	45.32	14.1

LL = 23.7 % **PL = 14.1 %** **PI=9.6**



USCS Soil Description : Clayey Sand With Gravel
AASHTO Soil Description : A-4, Silty soils (2)

Tested By :

ATTERBERG LIMITS TEST

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Borehole : BH-02
Sample Depth : 6 (m)
Classification : SC | A-4(2)
Sample Type : SPT Split Spoon

Soil Testing Services

ASTM D2216-90, D854

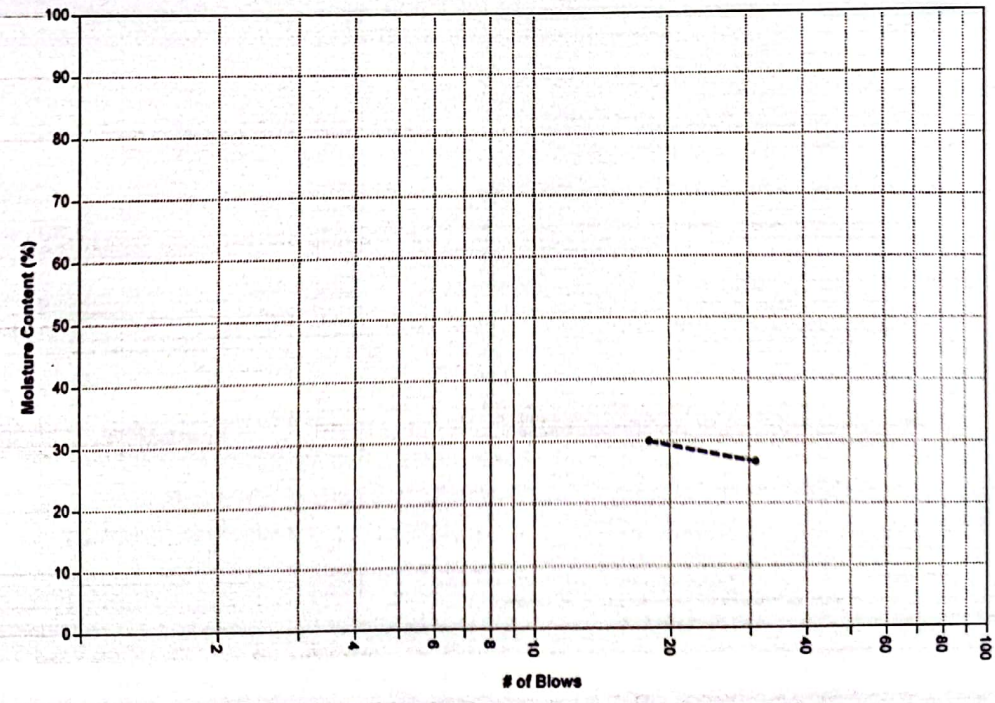
Liquid Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	# of Blows	Moisture Content (%)
14.39	36.51	31.41	18	30
10.46	30.12	25.98	31	26.7

Plastic Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	Moisture Content (%)
28.46	40.05	38.26	18.3

LL = 28 % **PL = 18.3 %** **PI=9.7**



USCS Soil Description : Clayey Sand With Gravel
AASHTO Soil Description : A-4, Silty soils (2)

Tested By :

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ATTERBERG LIMITS TEST

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Borehole : BH-03
Sample Depth : 2 (m)
Classification : SC | A-4(1)
Sample Type : SPT Split Spoon

Soil Testing Services

ASTM D2216-90, D854

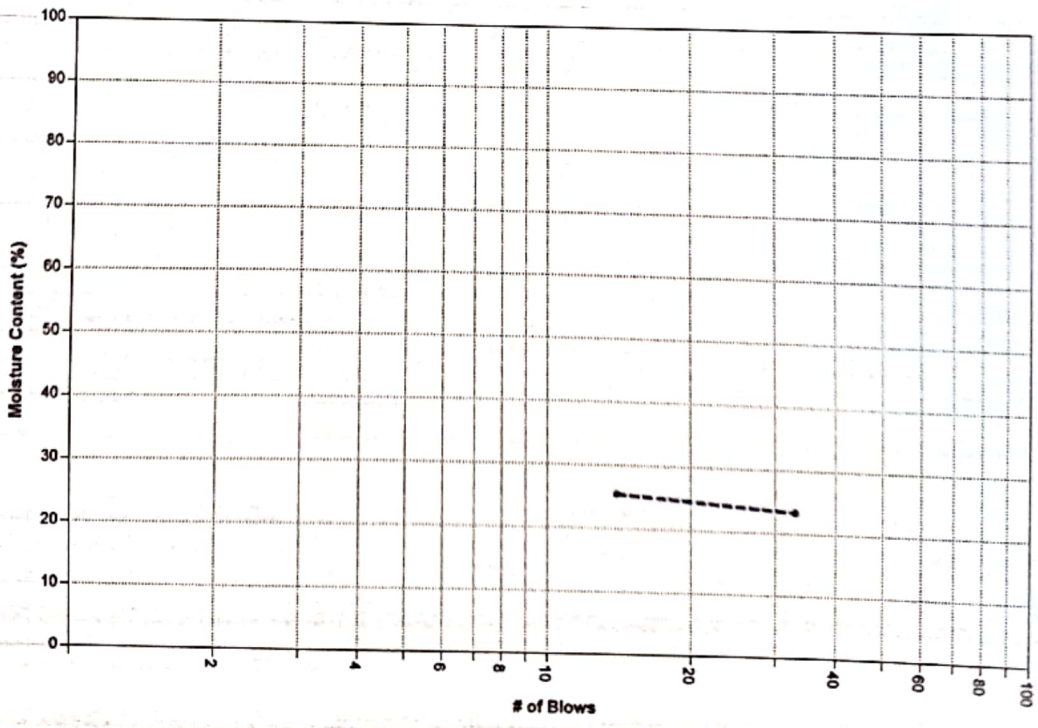
Liquid Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	# of Blows	Moisture Content (%)
10.39	30.12	26.11	14	25.5
13.92	33.46	29.75	33	23.4

Plastic Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	Moisture Content (%)
28.97	39.46	37.96	16.7

LL = 24.1 % **PL = 16.7 %** **PI=7.4**



USCS Soil Description : Clayey Sand With Gravel
AASHTO Soil Description : A-4, Silty soils (1)

Tested By :

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ATTERBERG LIMITS TEST

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Borehole : BH-03
Sample Depth : 6 (m)
Classification : SC | A-4(2)
Sample Type : SPT Split Spoon

Soil Testing Services

ASTM D2216-90, D854

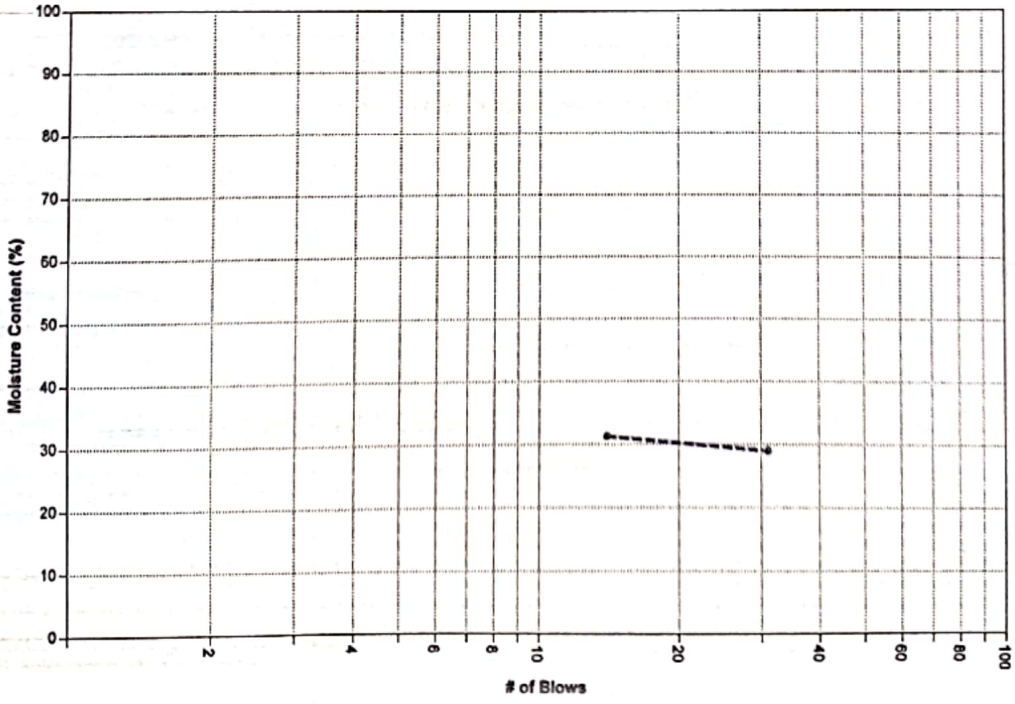
Liquid Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	# of Blows	Moisture Content (%)
11.47	28.43	24.39	14	31.3
13.25	33.26	28.76	31	29
				-

Plastic Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	Moisture Content (%)
30.16	42.05	40.03	20.5

LL = 29.6 % **PL = 20.5 %** **PI=9.1**



USCS Soil Description : Clayey Sand With Gravel
AASHTO Soil Description : A-4, Silty soils (2)

Tested By :

ATTERBERG LIMITS TEST

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Borehole : BH-04
Sample Depth : 2 (m)
Classification : SC-SM | A-4(0)
Sample Type : SPT Split Spoon

Soil Testing Services

ASTM D2216-90, D854

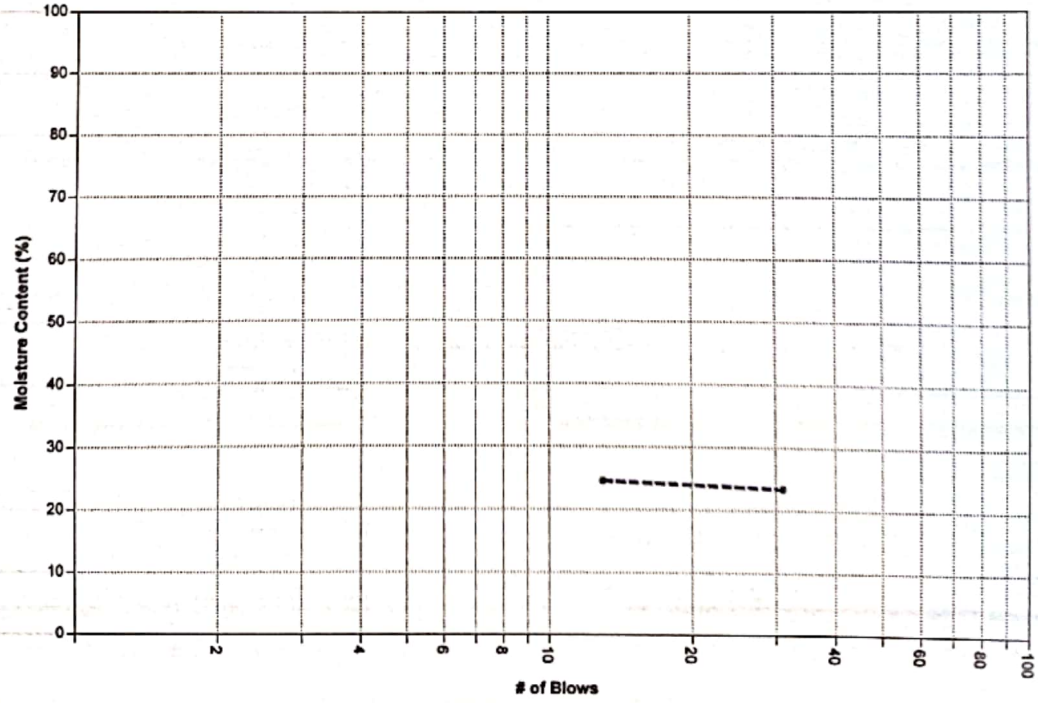
Liquid Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	# of Blows	Moisture Content (%)
12.26	31.02	27.32	13	24.6
10.74	30.14	26.45	31	23.5

Plastic Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	Moisture Content (%)
30.14	41.56	39.82	18

LL = 23.8 % PL = 18 % PI=5.8



USCS Soil Description : Clayey - Silty Sand With Gravel
AASHTO Soil Description : A-4, Silty soils (0)

Tested By :

ATTERBERG LIMITS TEST

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Borehole : BH-05
Sample Depth : 2 (m)
Classification : SC | A-4(1)
Sample Type : SPT Split Spoon

Soil Testing Services

ASTM D2216-90, D854

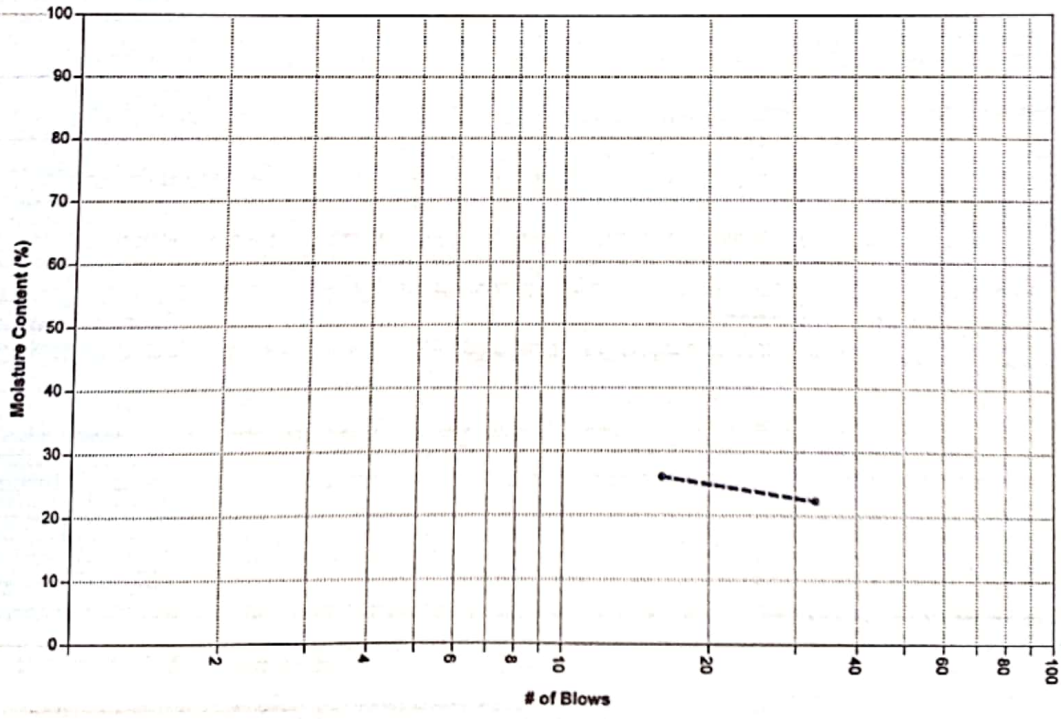
Liquid Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	# of Blows	Moisture Content (%)
13.52	33.26	29.18	16	26.1
11.78	30.05	26.71	33	22.4
				-

Plastic Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	Moisture Content (%)
34.56	46.28	44.68	15.8

LL = 23.8 % PL = 15.8 % PI=8



USCS Soil Description : Clayey Sand With Gravel
AASHTO Soil Description : A-4, Silty soils (1)

Tested By :

Density & Moisture Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Soil Testing Services

ASTM D4643, D2216

Borehole	Sample Depth (m)	Moisture Content (%)	Dry Density (gr/cm3)	Wet Density (gr/cm3)
BH-01	2	11.03	1.69	1.88
BH-01	3	13.98	1.67	1.9
BH-01	4	16.76	1.64	1.91
BH-01	8.2	7.2	2.02	2.17
BH-01	13.07	8.5	1.97	2.14
BH-01	15.6	8.3	2.07	2.24
BH-01	18.39	7.5	2.1	2.26
BH-01	23.16	10.3	2.08	2.29
BH-01	26.12	11.5	1.95	2.17
BH-01	29.11	6.3	2.23	2.37
BH-01	33.55	8.4	2.2	2.38
BH-01	34.8	8.7	2.18	2.37
BH-01	38.12	8.4	2.28	2.47
BH-02	1	10.98	1.63	1.81
BH-02	4	12.36	1.68	1.89
BH-02	5	13.59	1.71	1.94
BH-02	6	16.08	1.66	1.93
BH-02	9.2	6.9	2.09	2.23
BH-02	12.81	9.1	2	2.18
BH-02	18.44	8.1	2.1	2.27
BH-02	21.61	7.6	2.07	2.23
BH-02	24.49	7.5	2	2.15
BH-02	27.55	7.9	2.06	2.22
BH-03	2	11.13	1.64	1.82
BH-03	4	14.64	1.68	1.93
BH-03	6	16.37	1.68	1.96
BH-03	7.8	8.3	2	2.17
BH-03	13.14	10.1	2.05	2.26
BH-03	18.23	7.9	2.12	2.29
BH-03	22.87	9.2	2.09	2.28
BH-03	27.53	7.6	2.13	2.29
BH-03	31.88	8.2	2.15	2.33
BH-03	36.71	7.8	2.27	2.45
BH-04	2	10.39	1.67	1.84
BH-04	4	13.69	1.7	1.93
BH-04	7.21	7.7	2.08	2.24
BH-04	12.64	8	2.13	2.3
BH-04	18.61	6.7	2.21	2.36
BH-04	21.84	8.4	2.03	2.2
BH-04	28.03	7.7	2.05	2.21
BH-05	2	11.43	1.72	1.92
BH-05	4	15.71	1.67	1.93
BH-05	6.85	9.4	2.05	2.24
BH-05	12.4	7.2	2.11	2.26
BH-05	17.1	11	2.08	2.31

Density & Moisture Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Soil Testing Services

ASTM D4643, D2216

Borehole	Sample Depth (m)	Moisture Content (%)	Dry Density (gr/cm3)	Wet Density (gr/cm3)
BH-05	21	8.4	2.06	2.23
BH-05	25.1	6.9	2.22	2.37
BH-05	28	7.1	2.1	2.25

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

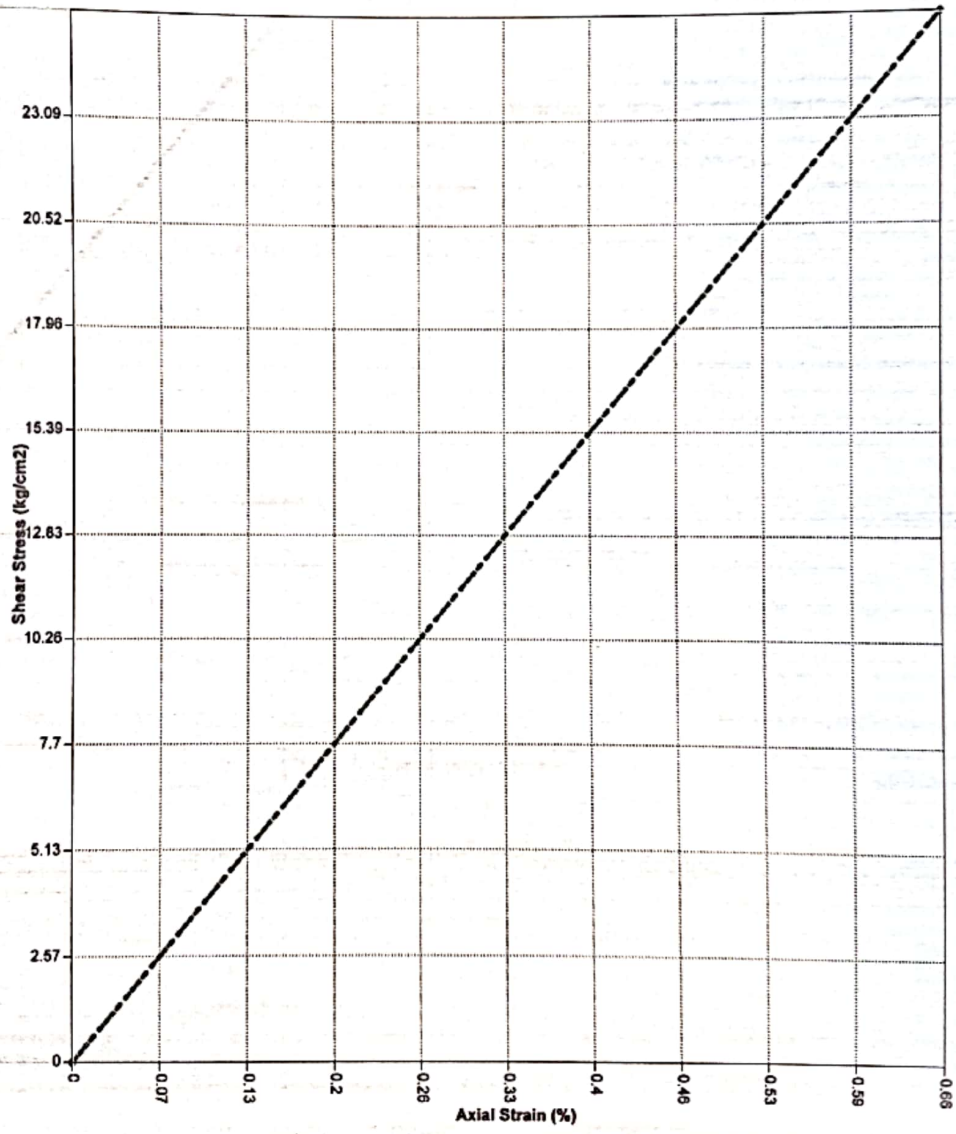
Borehole : BH-01
Sample Depth : 8.2 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.79	7.52	1	Moist	7.2	2.02	25.65	12.82



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

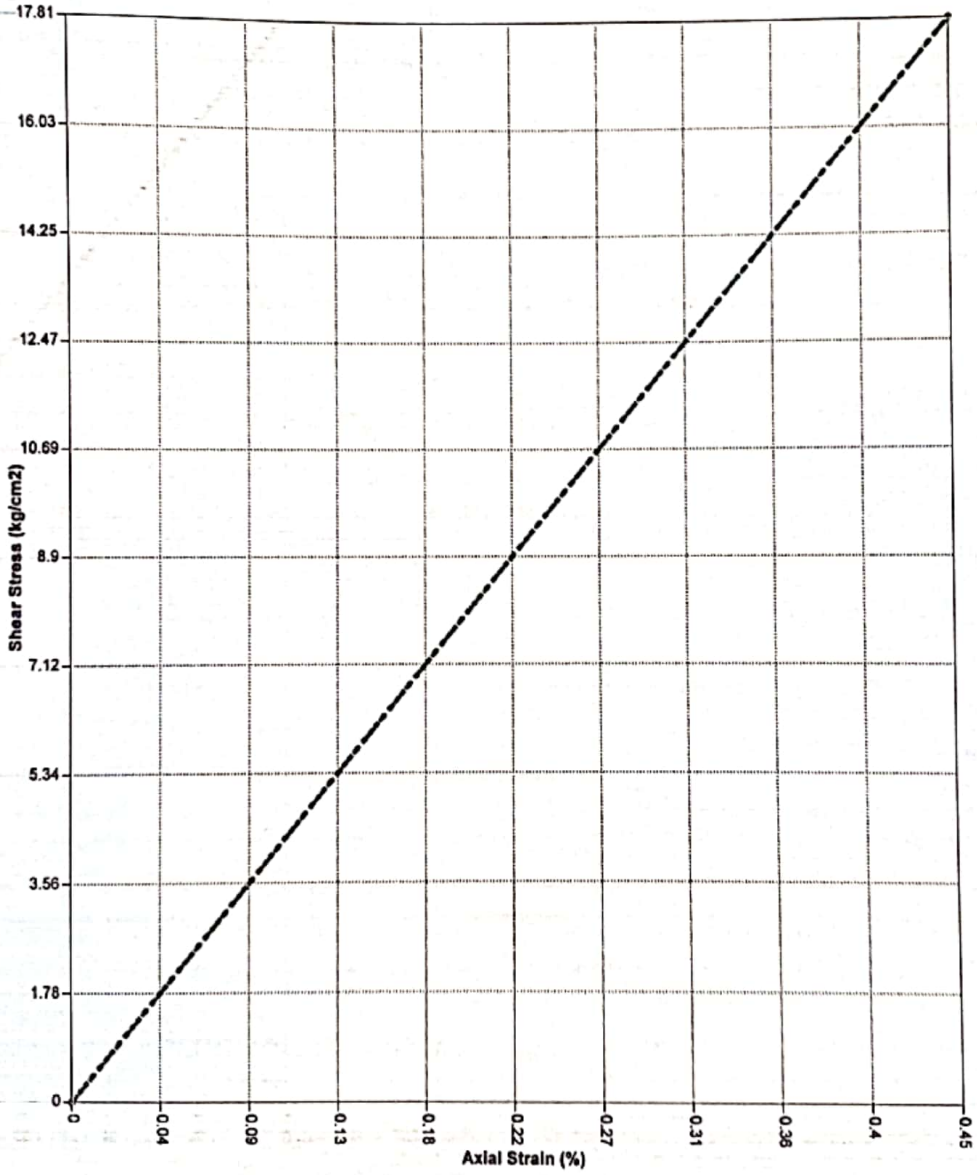
Borehole : BH-01
Sample Depth : 13.07 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.69	11.12	1	Moist	8.5	1.97	17.81	8.9



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

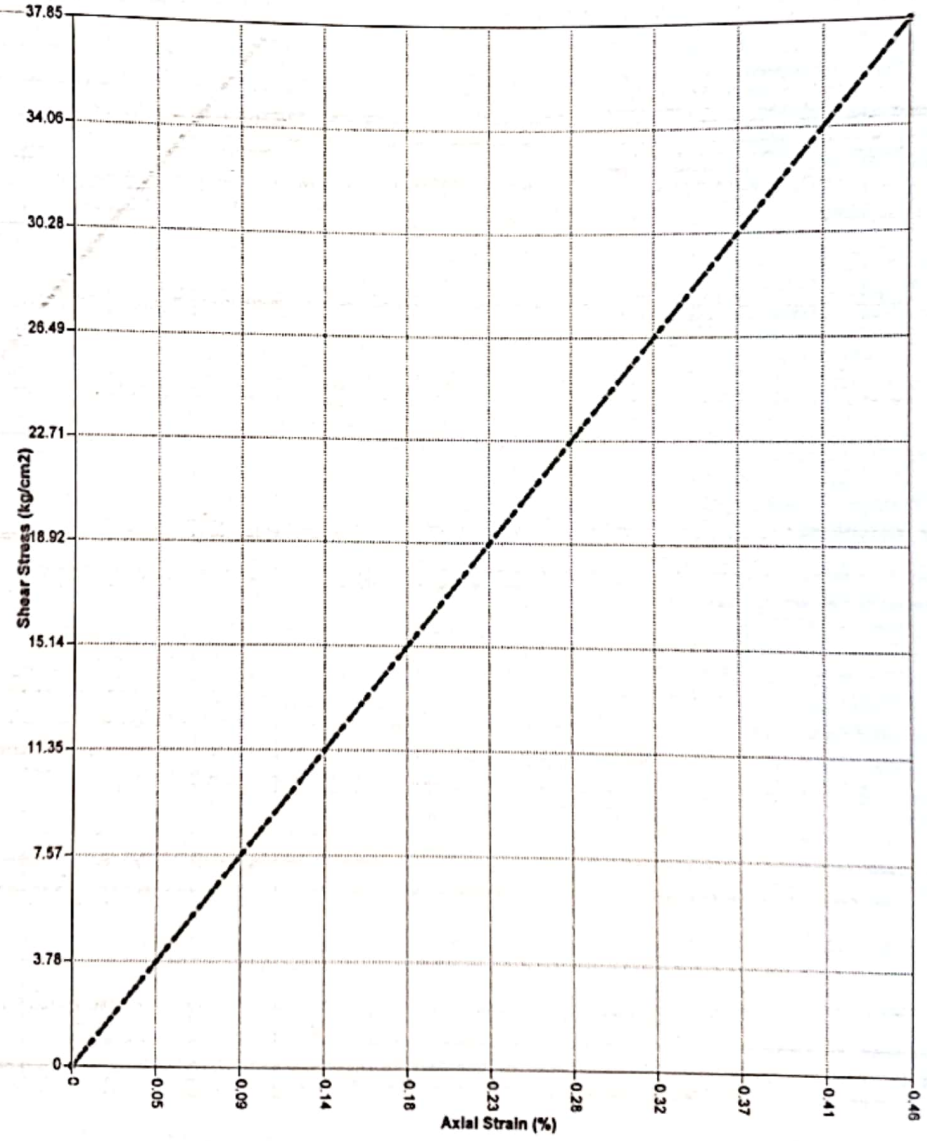
Borehole : BH-01
Sample Depth : 15.6 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.52	10.93	1	Moist	8.3	2.07	37.85	18.92



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

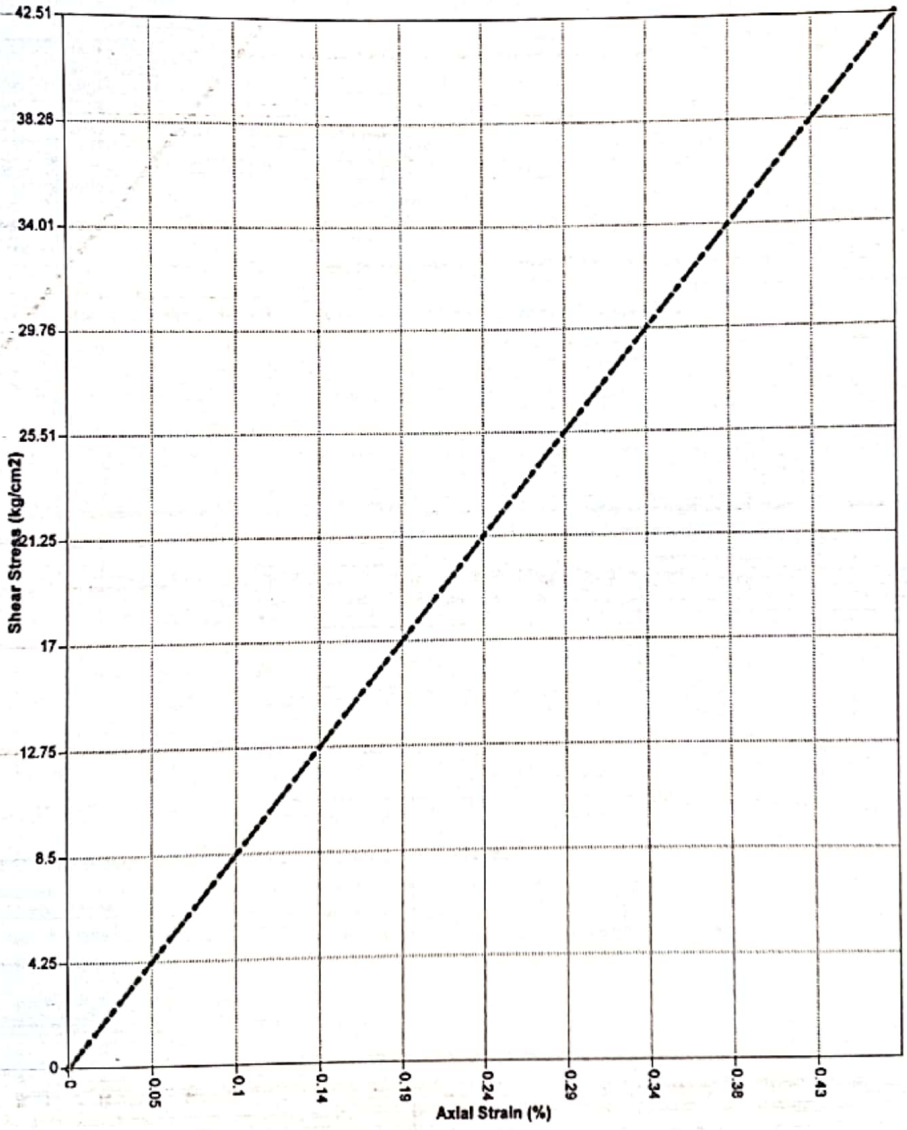
Borehole : BH-01
Sample Depth : 18.39 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.7	10.31	1	Moist	7.5	2.1	42.51	21.25



USCS Soil Description :
AASHTO Soil Description :

Tested By :

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Unconfined Compression Test

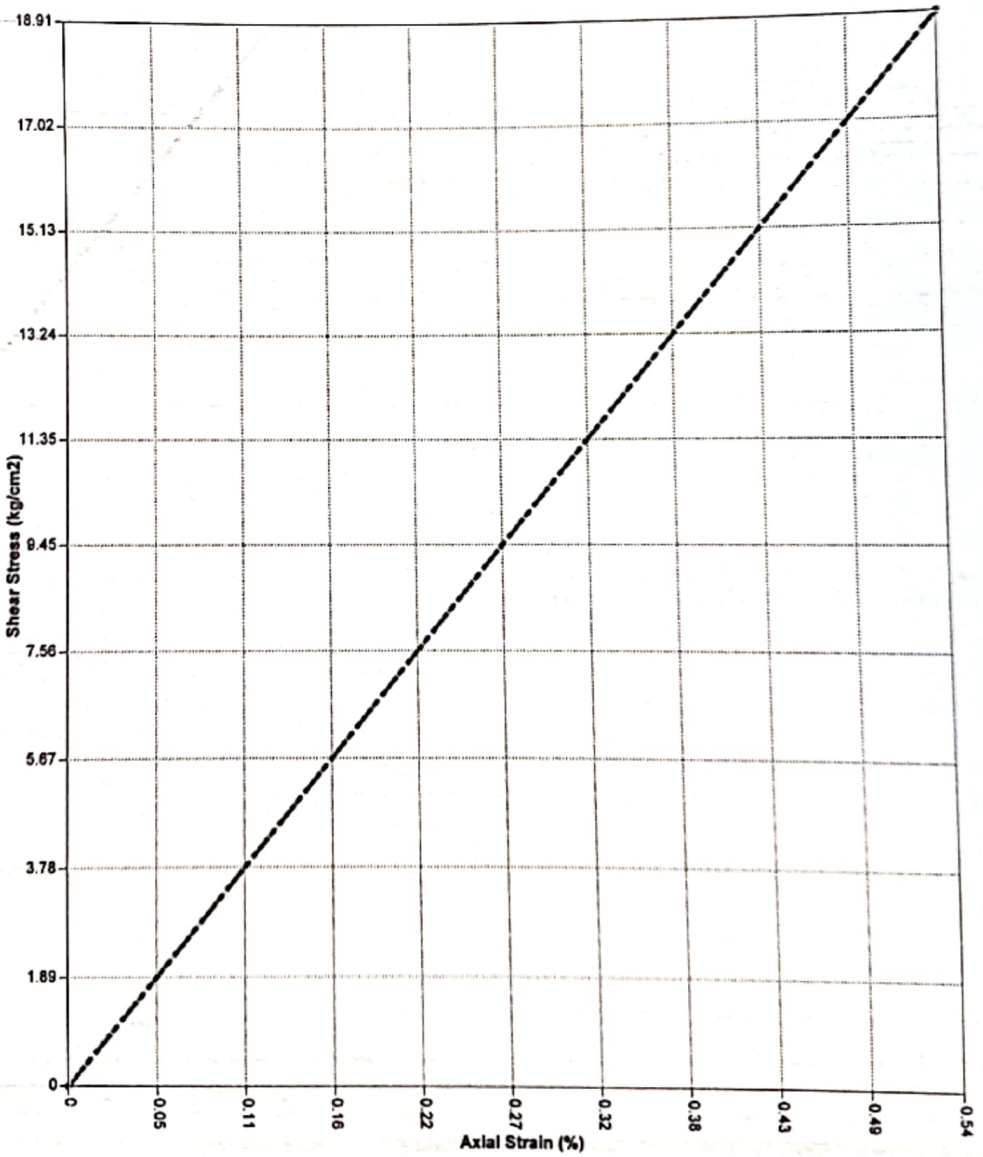
Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Borehole : BH-01
Sample Depth : 23.16 (m)
Sample Type : Undisturbed

Soil Testing Services

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.52	9.28	1	Moist	10.3	2.08	18.91	9.45



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

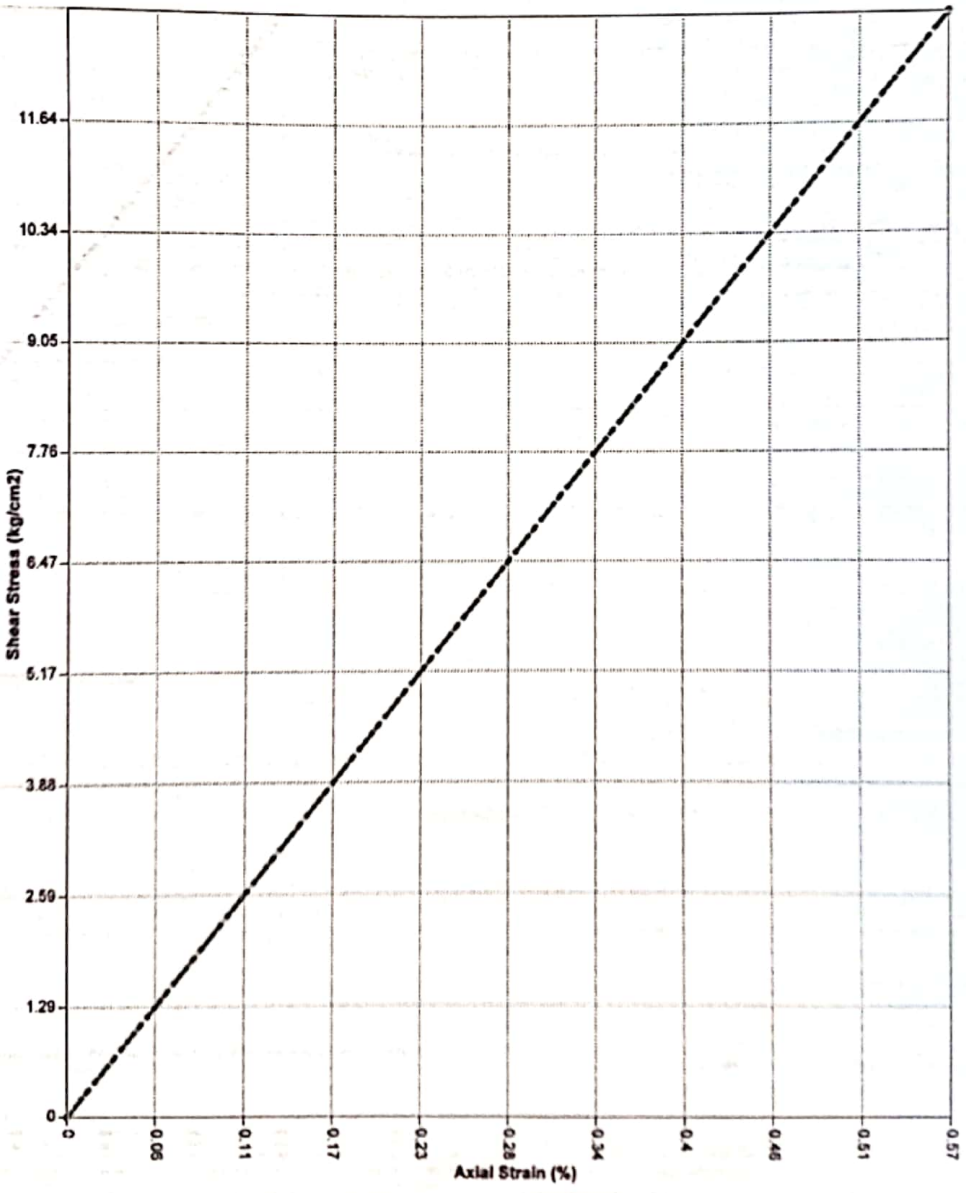
Borehole : BH-01
Sample Depth : 26.12 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.82	8.71	1	Moist	11.5	1.95	12.93	6.47



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

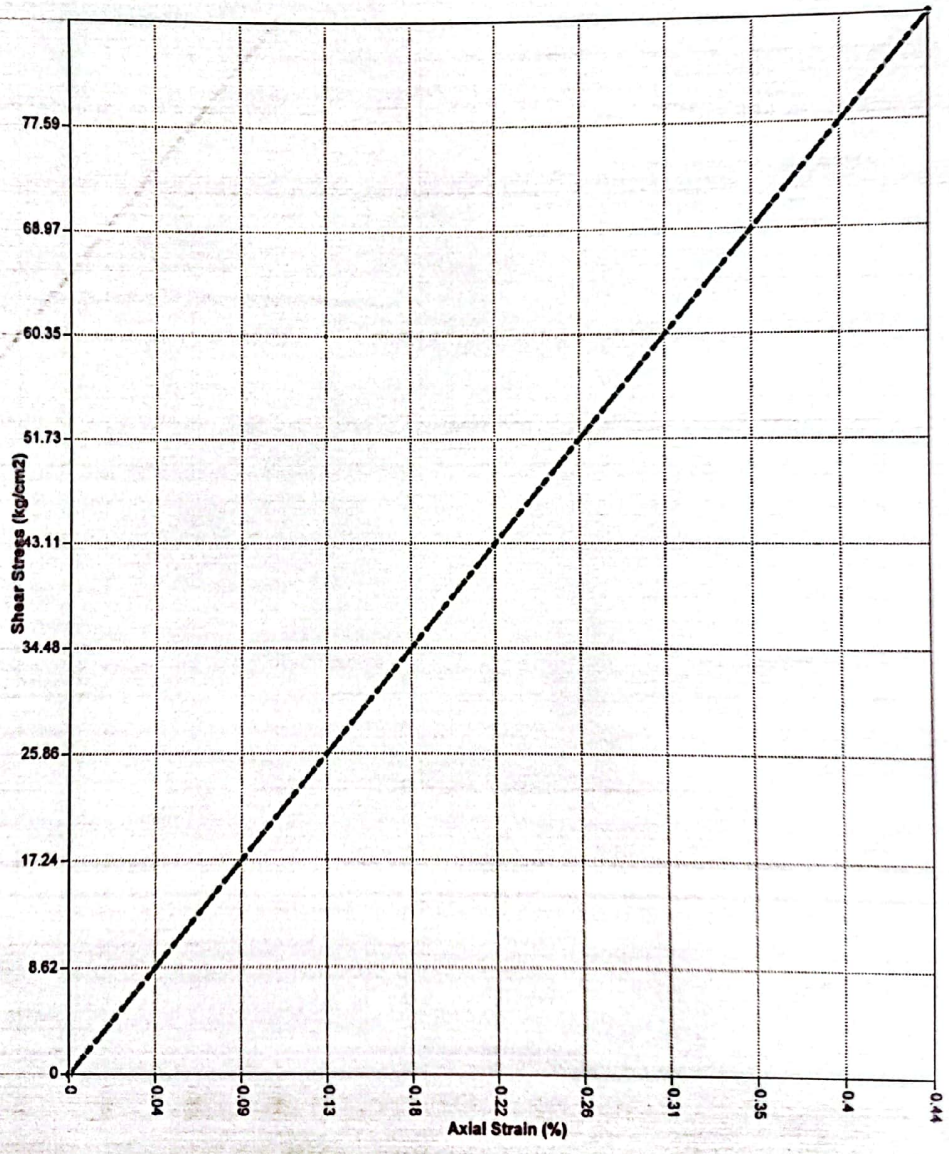
Borehole : BH-01
Sample Depth : 29.11 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.78	11.42	1	Moist	6.3	2.23	86.21	43.1



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No. : S-24-1046
Location : Saddar, Karachi

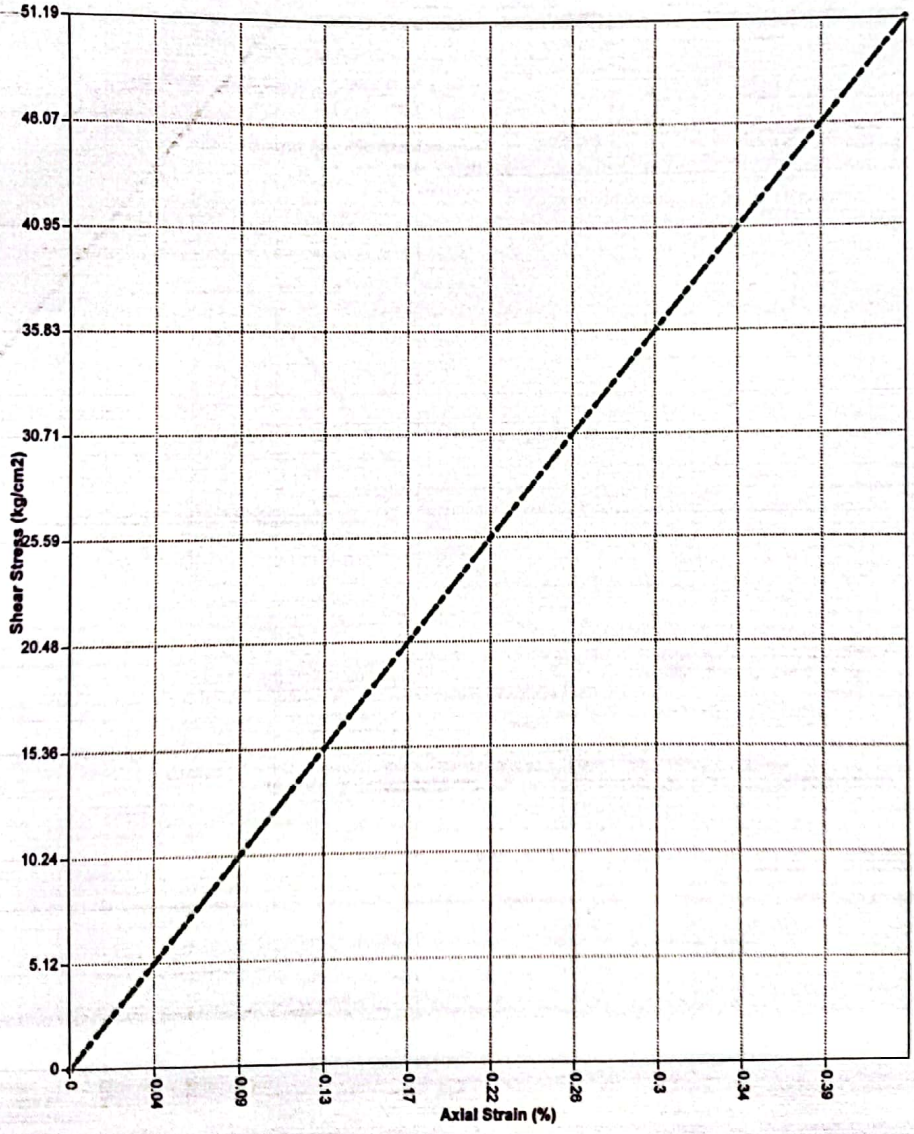
Borehole : BH-01
Sample Depth : 33.55 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.81	11.53	1	Moist	8.4	2.2	51.19	25.59



USCS Soil Description :
AASHTO Soil Description :

Tested By :

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Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

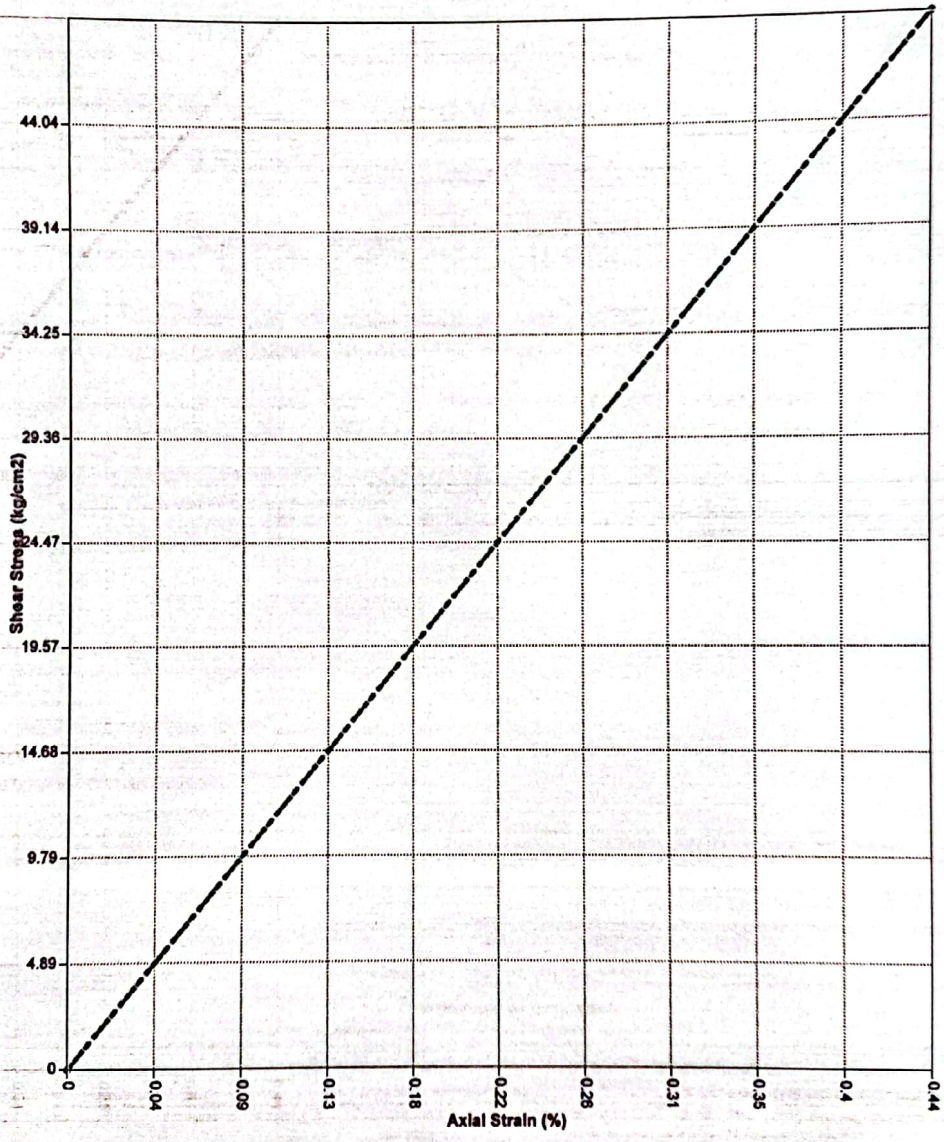
Borehole : BH-01
Sample Depth : 34.5 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.72	11.29	1	Moist	8.7	2.18	48.93	24.47



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

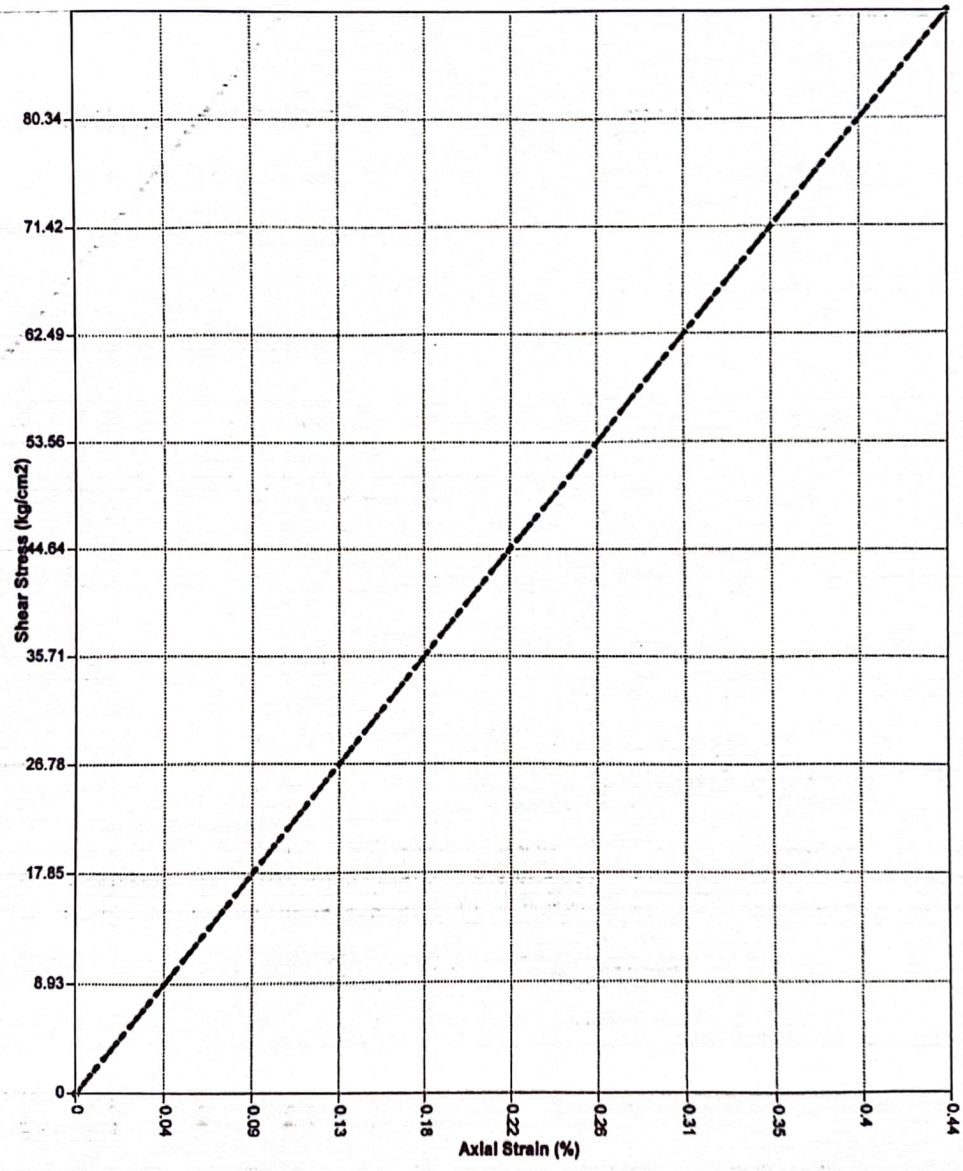
Borehole : BH-01
Sample Depth : 38.12 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.68	11.24	1	Moist	8.4	2.28	89.27	44.63



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

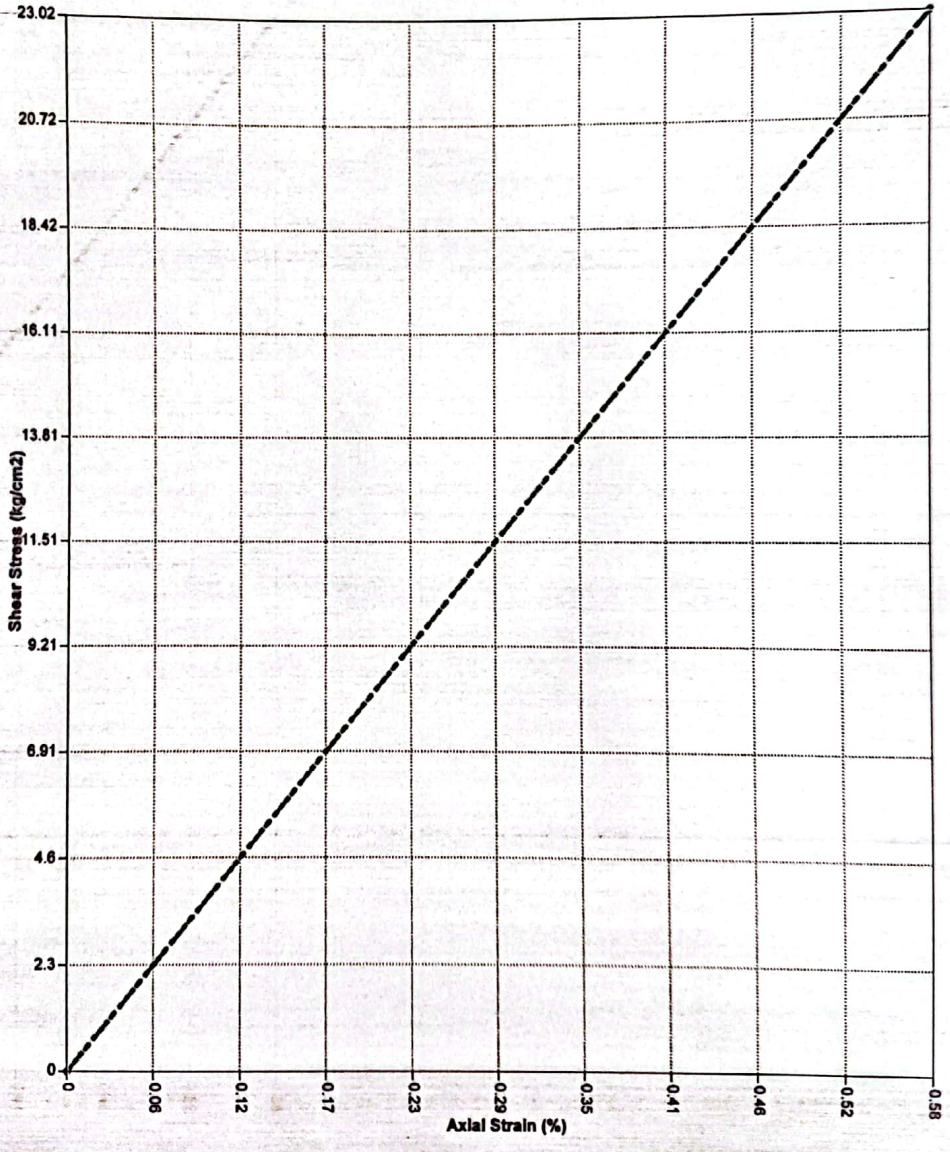
Borehole : BH-02
Sample Depth : 9.2 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.792	8.694	1	Moist	6.9	2.09	23.02	11.51



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

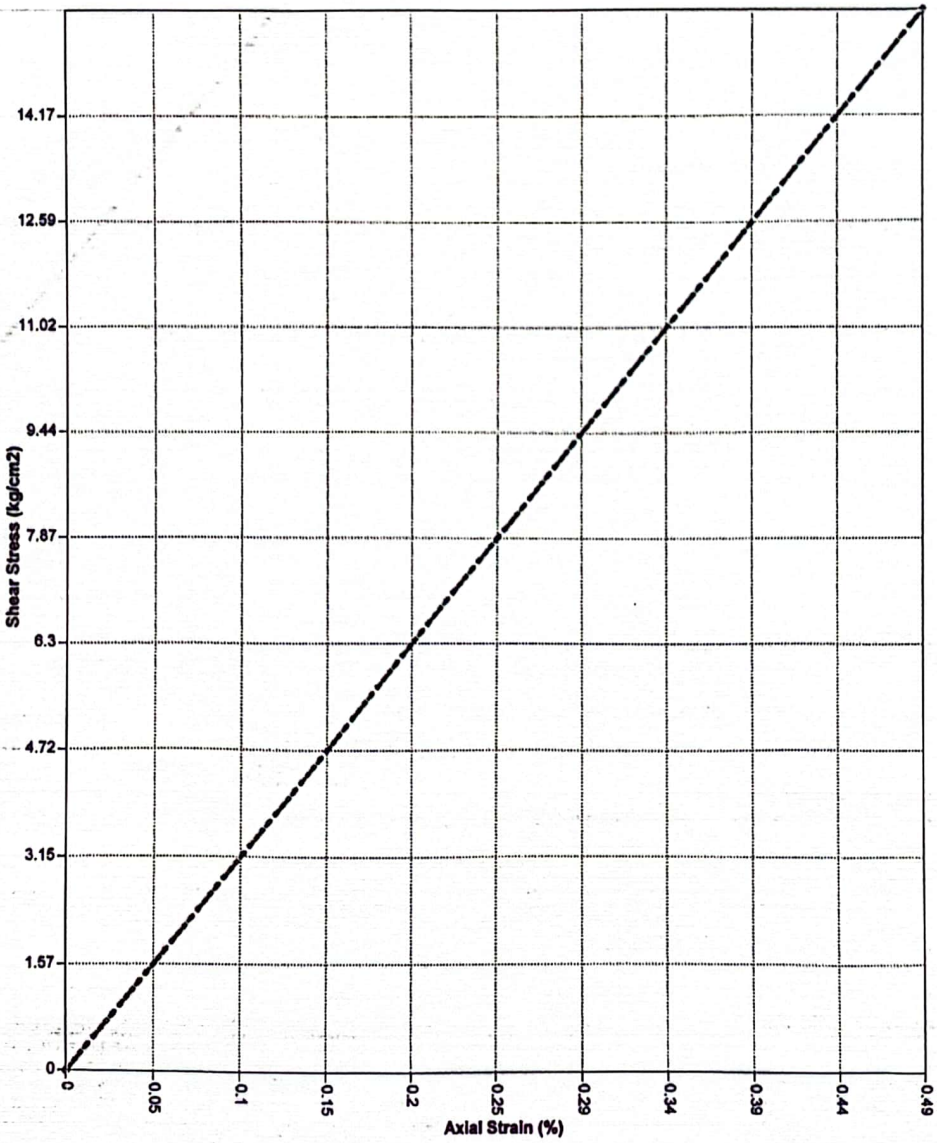
Borehole : BH-02
Sample Depth : 12.81 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.66	10.243	1	Moist	9.1	2	15.74	7.87



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

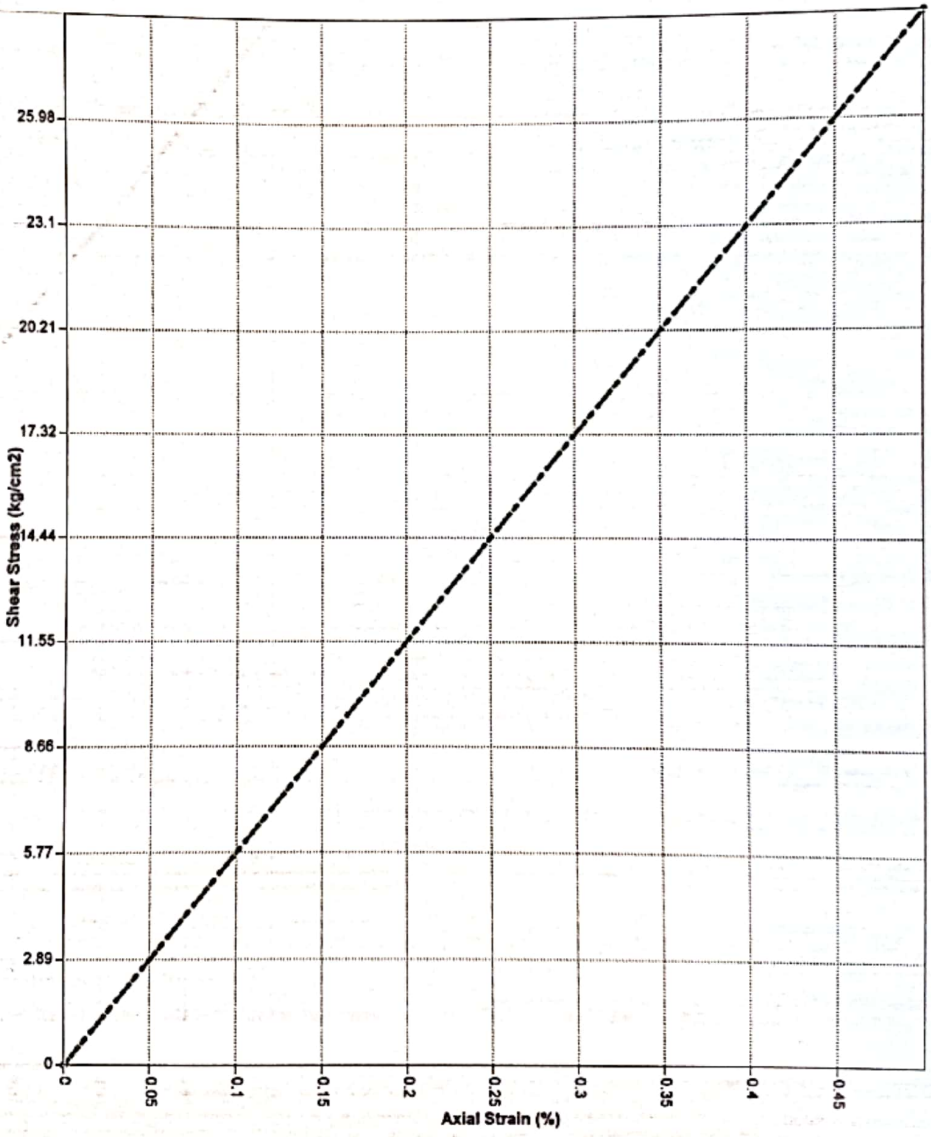
Borehole : BH-02
Sample Depth : 18.44 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.438	9.982	1	Moist	8.1	2.1	28.87	14.44



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

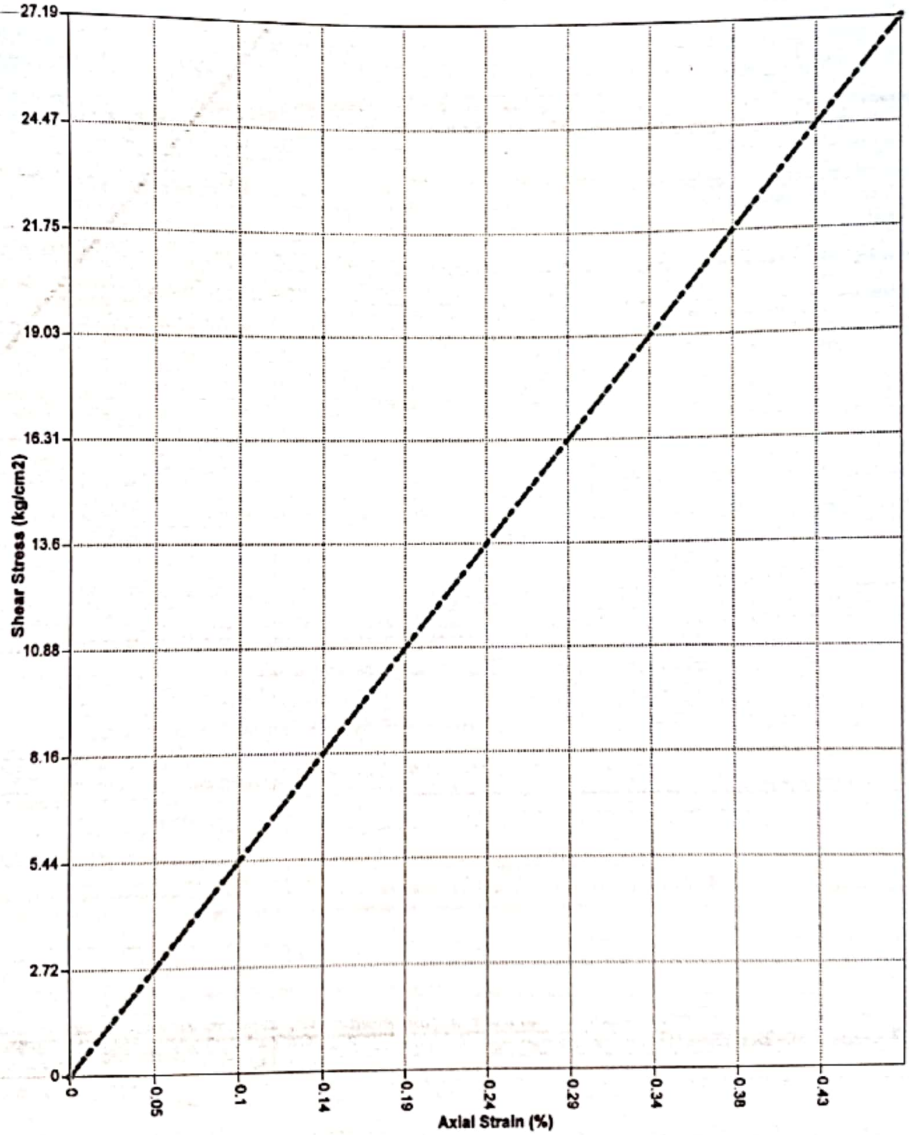
Borehole : BH-02
Sample Depth : 21.61 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.646	10.452	1	Moist	7.6	2.07	27.19	13.6



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Location : Saddar, Karachi

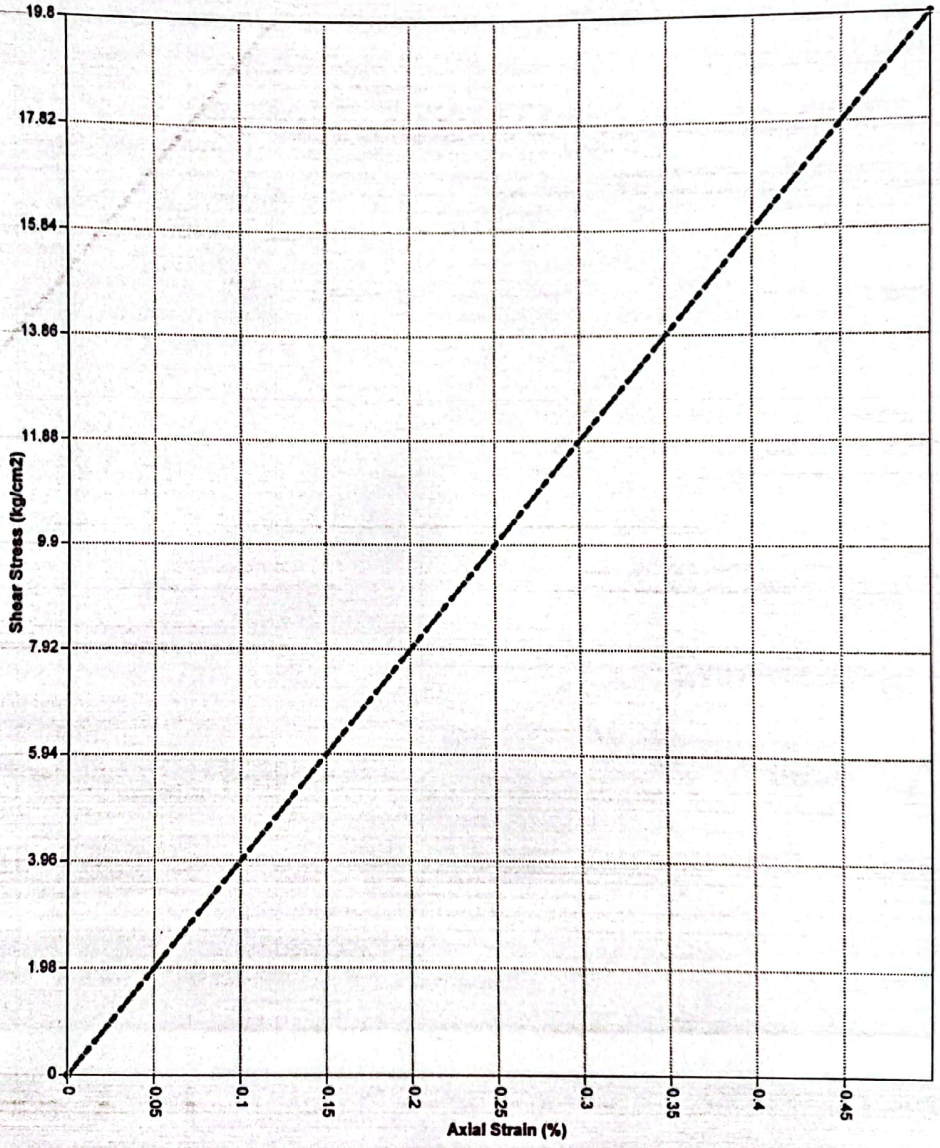
Borehole : BH-02
Sample Depth : 24.49 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.49	10.06	1	Moist	7.5	2	19.8	9.9



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

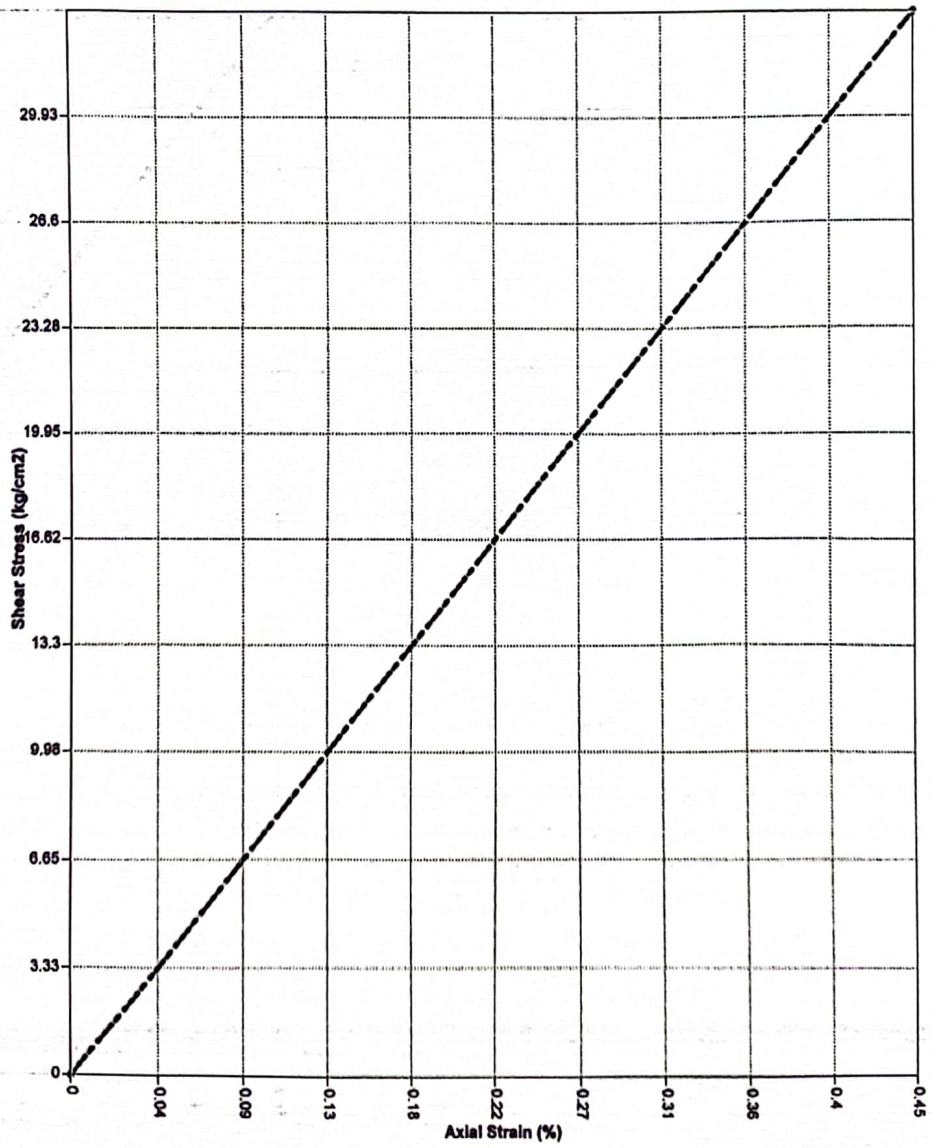
Borehole : BH-02
Sample Depth : 27.55 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.712	11.04	1	Moist	7.9	2.06	33.25	16.62



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No. : S-24-1046
Location : Saddar, Karachi

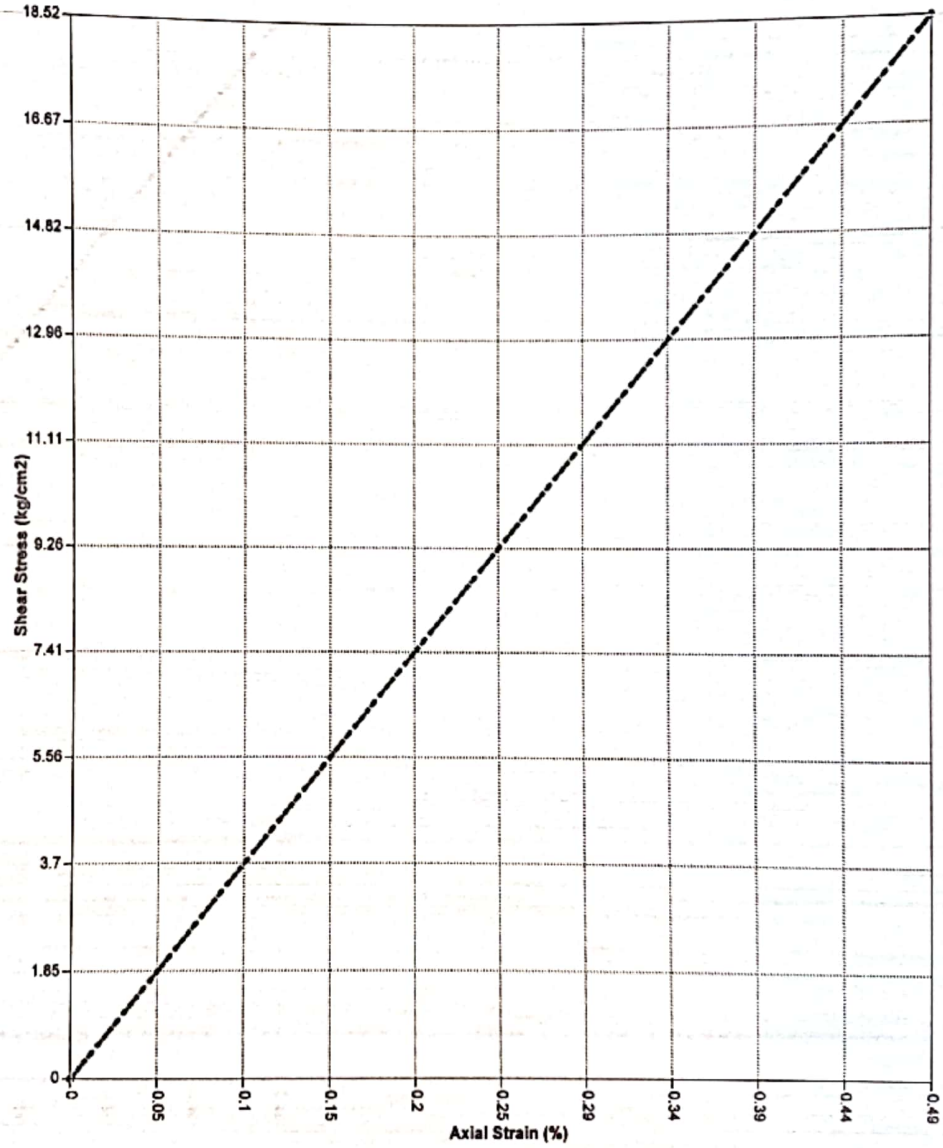
Borehole : BH-03
Sample Depth : 7.8 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.73	10.12	1	Moist	8.3	2	18.52	9.26



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

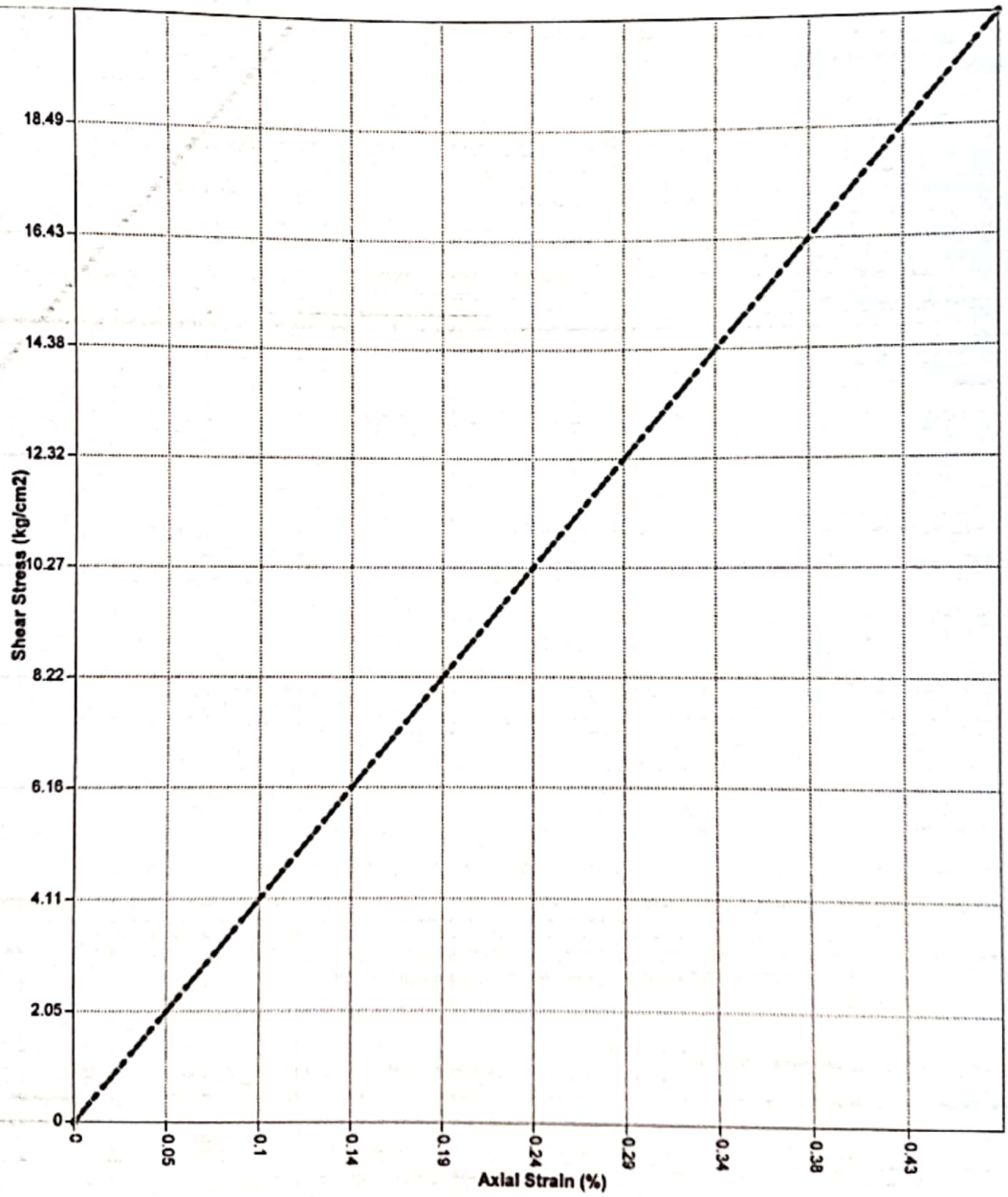
Borehole : BH-03
Sample Depth : 13.14 (m)
Sample Type : Undisturbed

Soil Testing Services

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Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.68	10.42	1	Moist	10.1	2.05	20.54	10.27



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

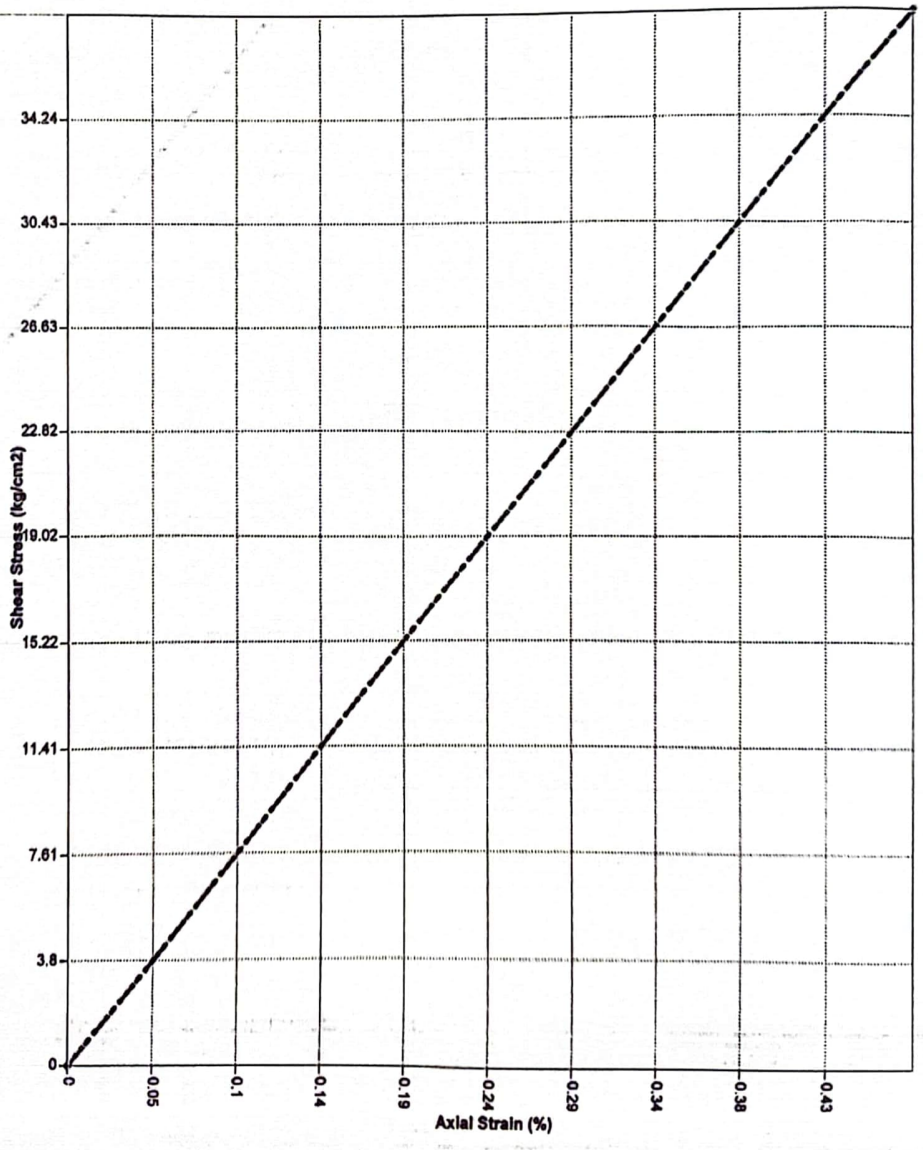
Borehole : BH-03
Sample Depth : 18.23 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.734	10.42	1	Moist	7.9	2.12	38.04	19.02



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

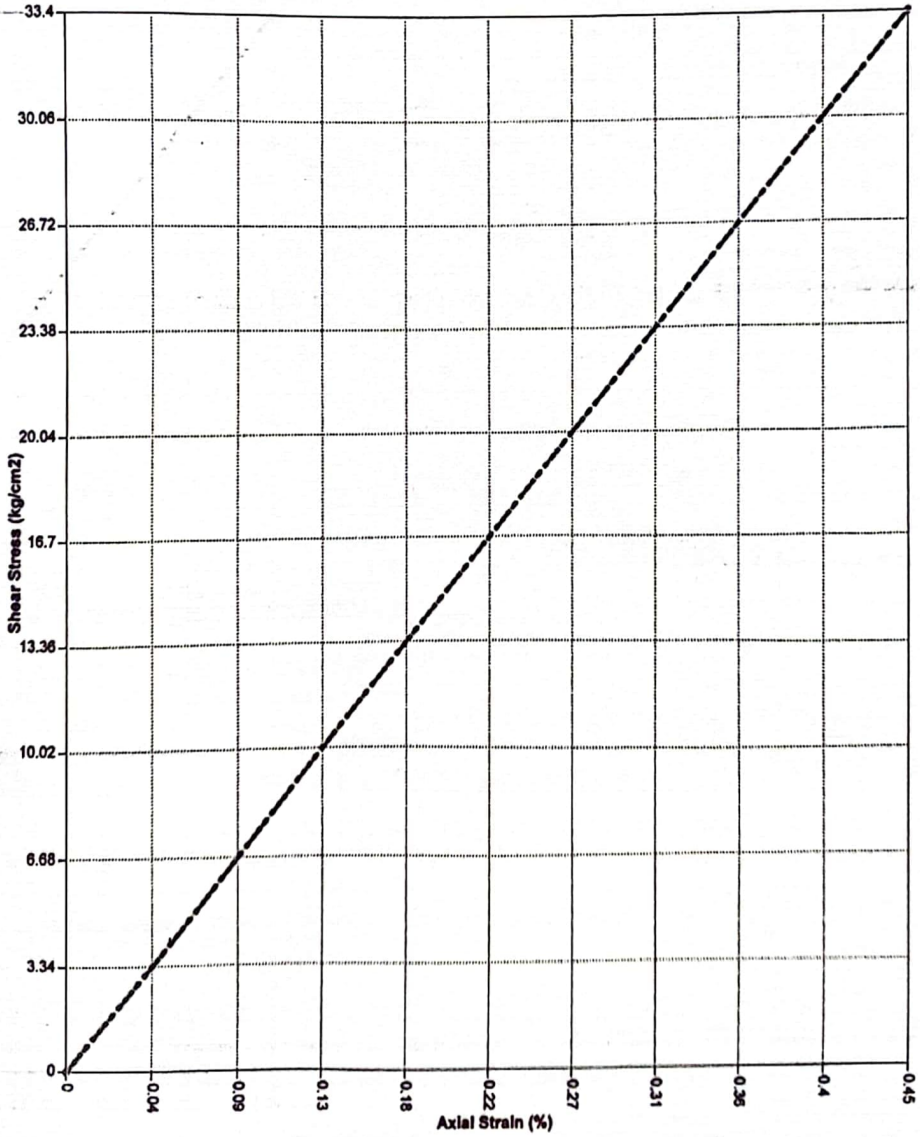
Borehole : BH-03
Sample Depth : 22.87 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.746	11.12	1	Moist	9.2	2.09	33.4	16.7



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

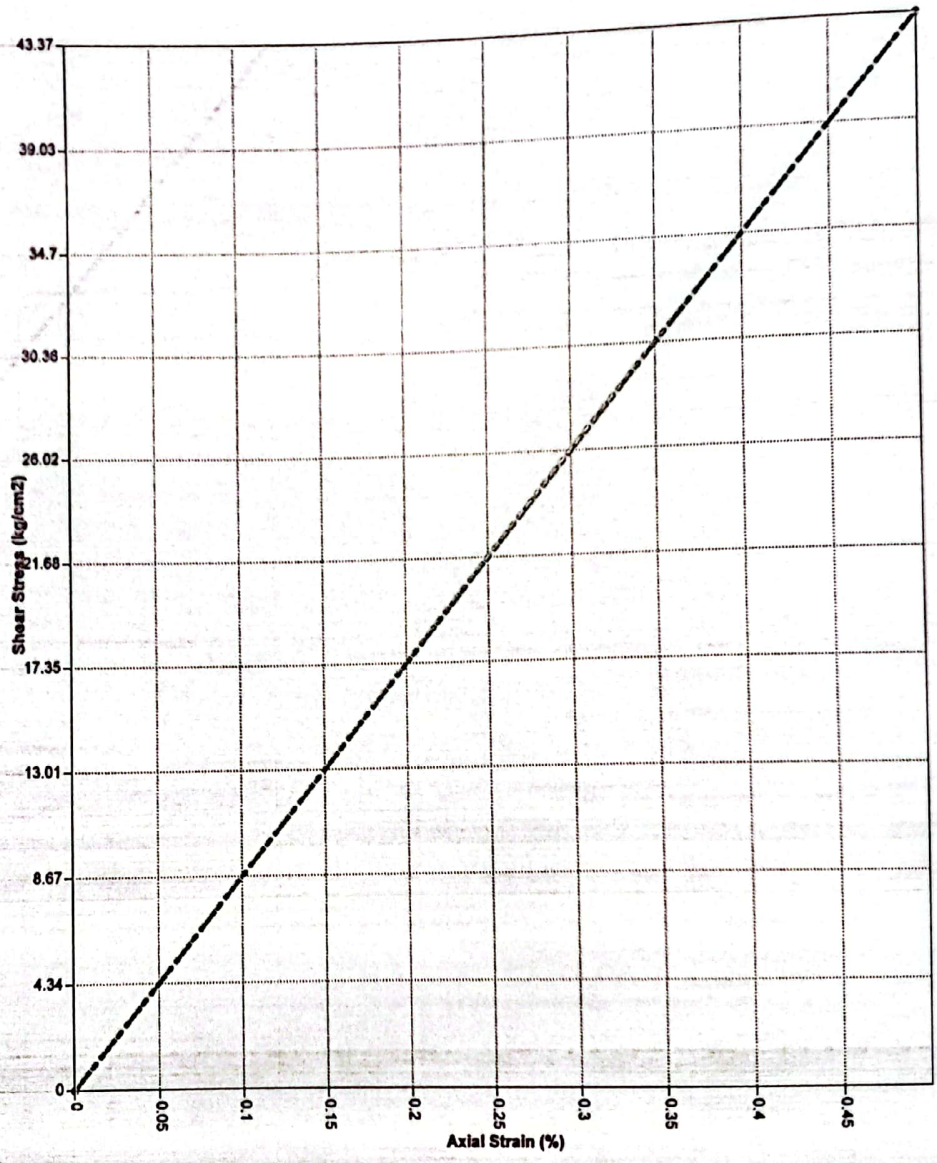
Borehole : BH-03
Sample Depth : 27.53 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.72	9.98	1	Moist	7.6	2.13	43.37	21.68



USCS Soil Description :
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Unconfined Compression Test

Project : Geotechnical Investigation Works
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Job No.: S-24-1046
Location : Saddar, Karachi

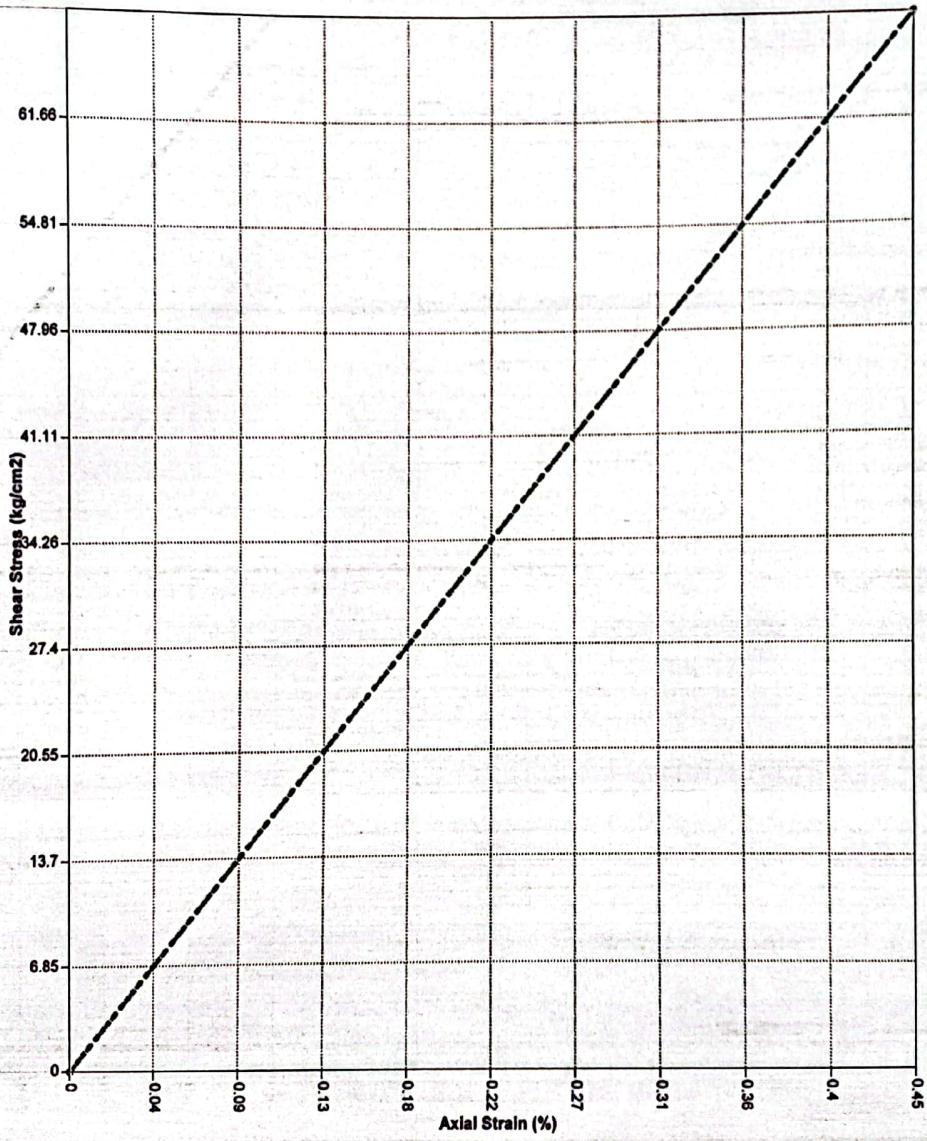
Borehole : BH-03
Sample Depth : 31.88 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.682	11.02	1	Moist	8.2	2.15	68.51	34.26



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No. : S-24-1046
Location : Saddar, Karachi

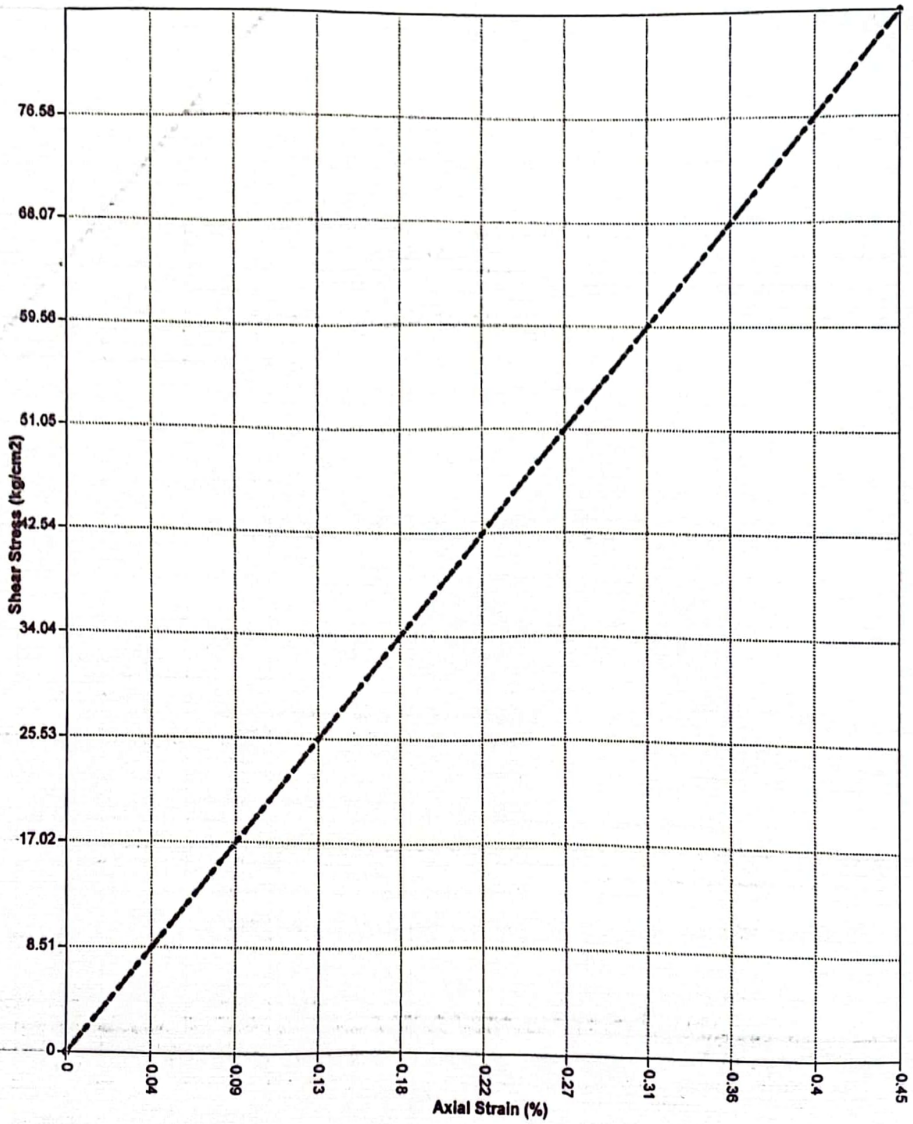
Borehole : BH-03
Sample Depth : 36.71 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.705	11.06	1	Moist	7.8	2.27	85.09	42.54



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

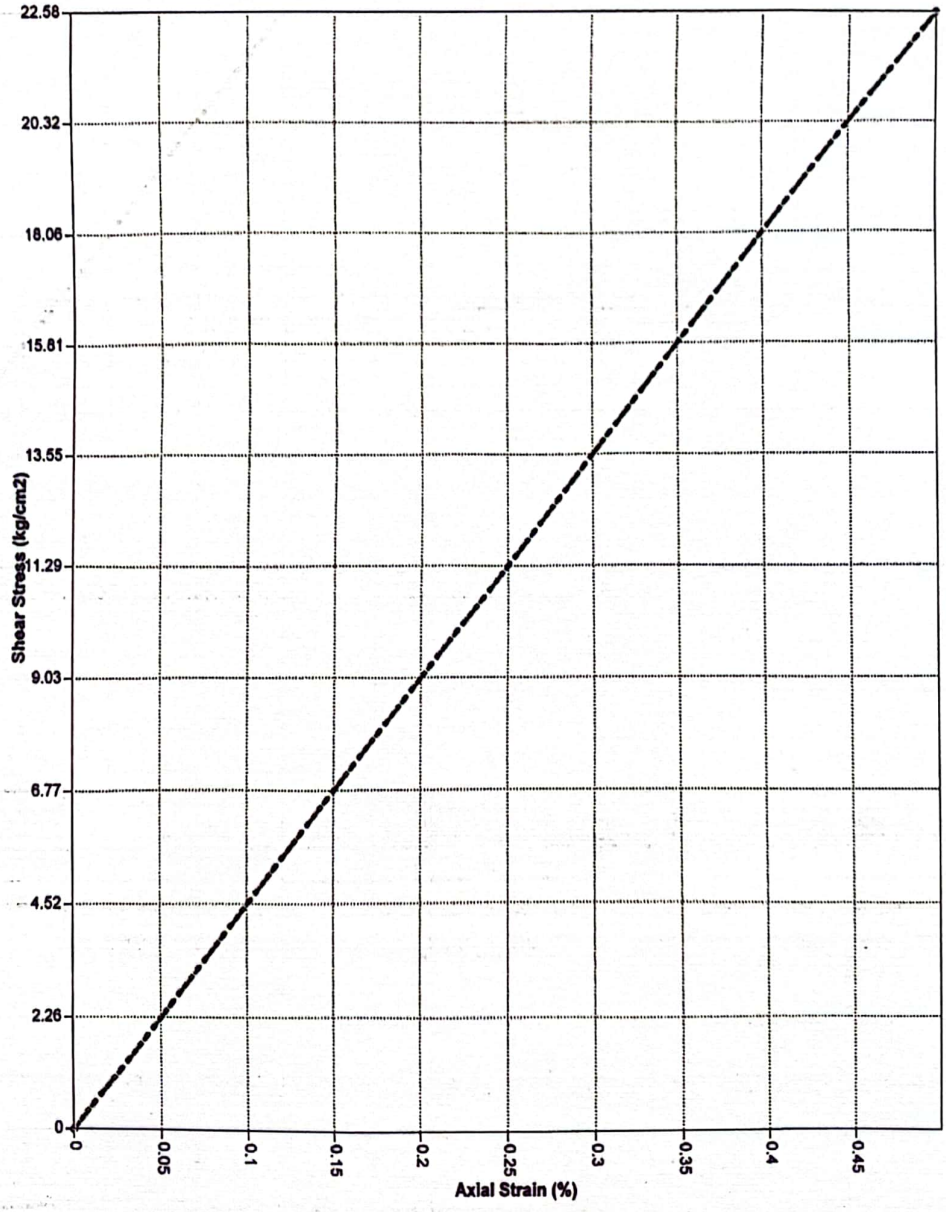
Borehole : BH-04
Sample Depth : 7.21 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.792	10.054	1	Moist	7.7	2.08	22.58	11.29



USCS Soil Description :
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Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

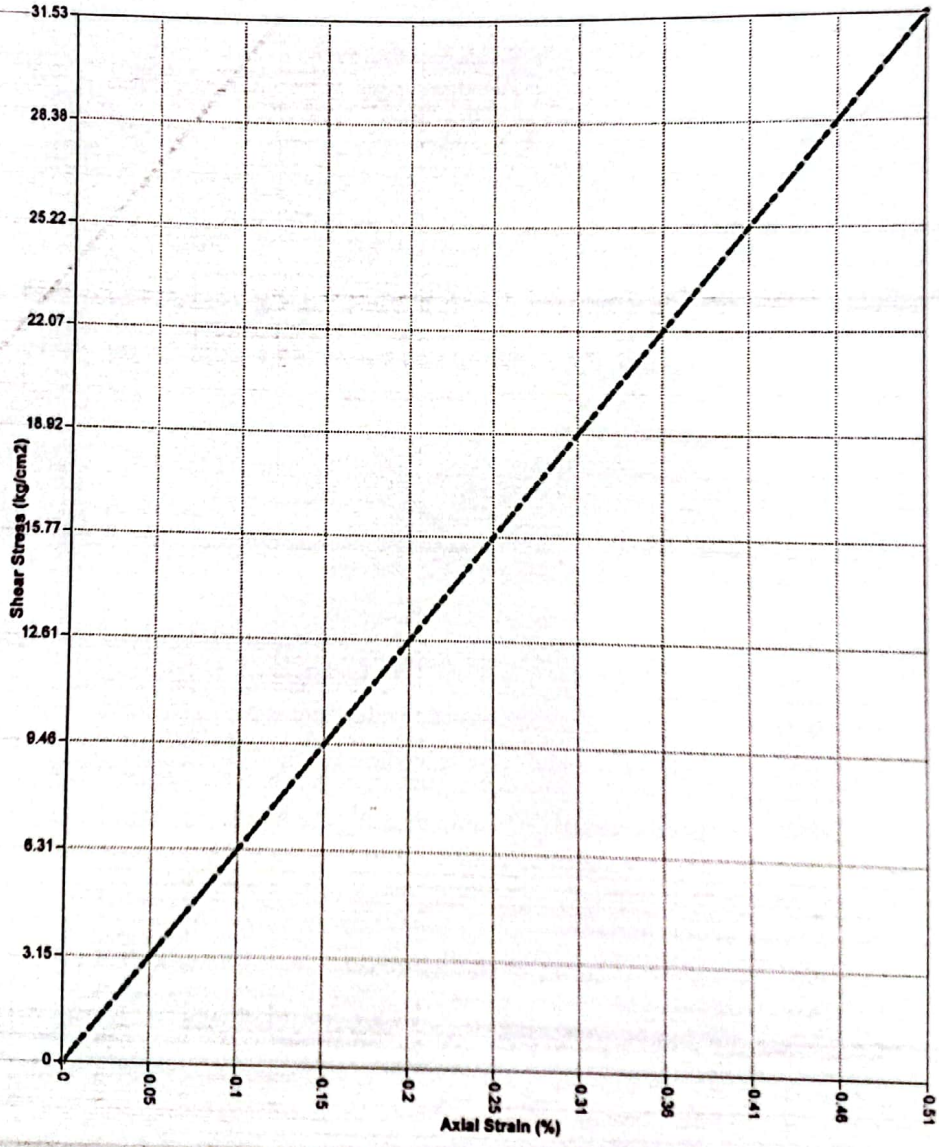
Borehole : BH-04
Sample Depth : 12.64 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.74	9.86	1	Moist	8	2.13	31.53	15.77



USCS Soil Description :
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Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

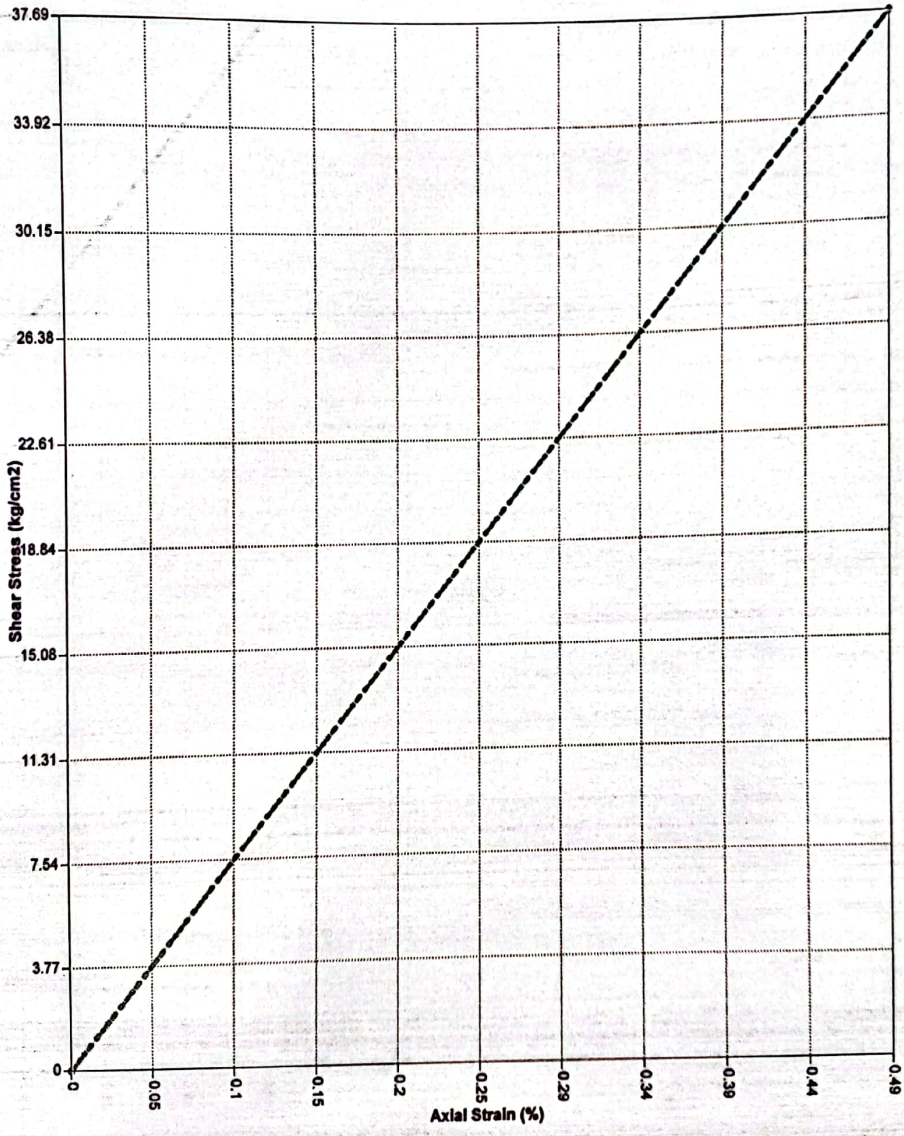
Borehole : BH-04
Sample Depth : 18.61 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.74	10.21	1	Moist	6.7	2.21	37.69	18.84



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Location : Saddar, Karachi

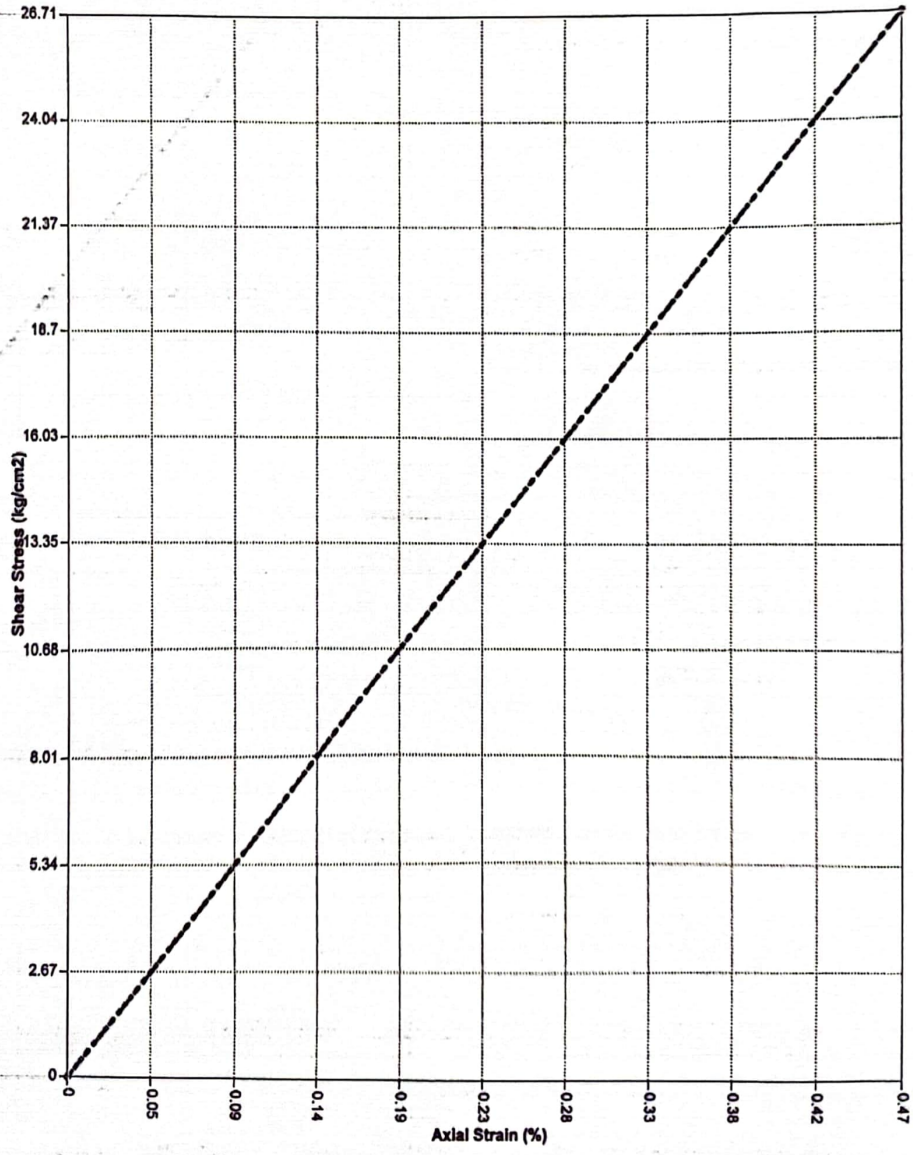
Borehole : BH-04
Sample Depth : 21.84 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.68	10.58	1	Moist	8.4	2.03	26.71	13.35



USCS Soil Description :
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Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

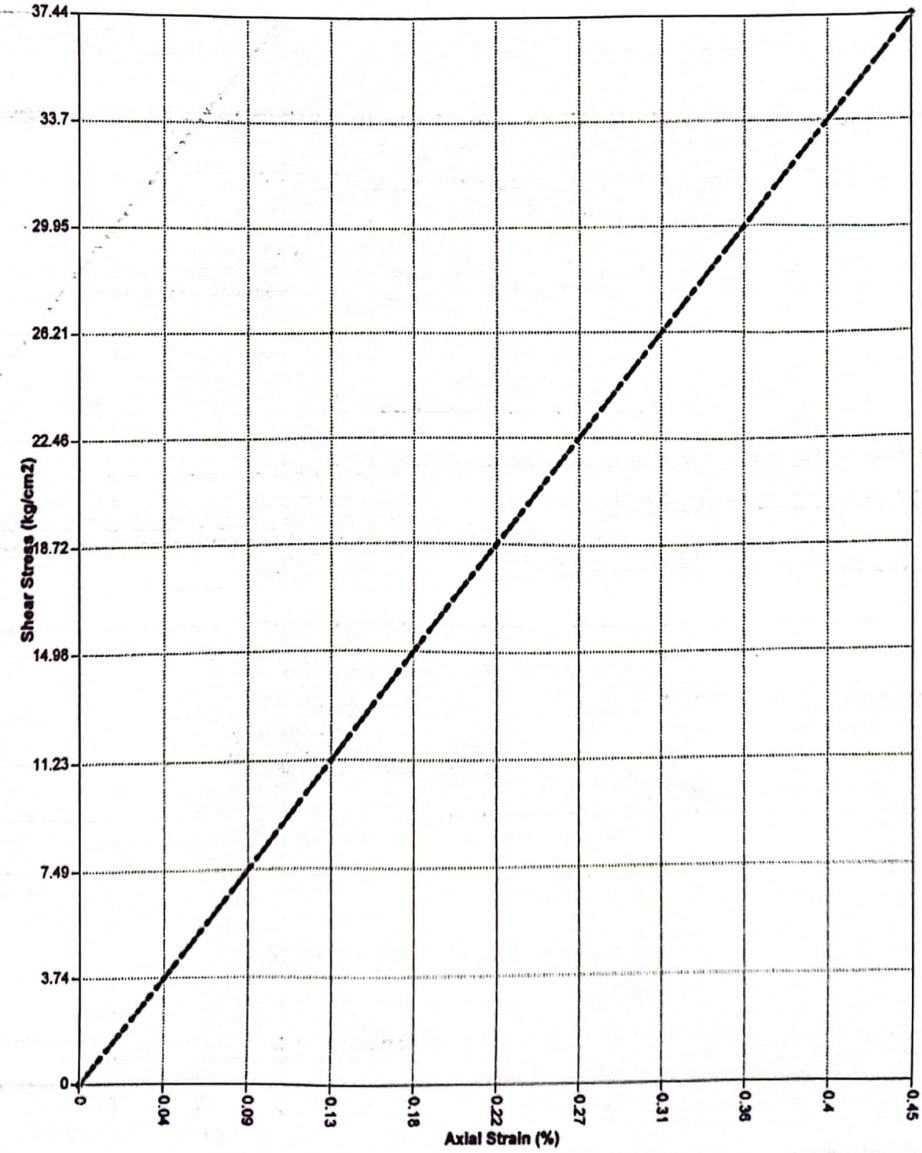
Borehole : BH-04
Sample Depth : 28.03 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.76	11.12	1	Moist	7.7	2.05	37.44	18.72



USCS Soil Description :
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Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

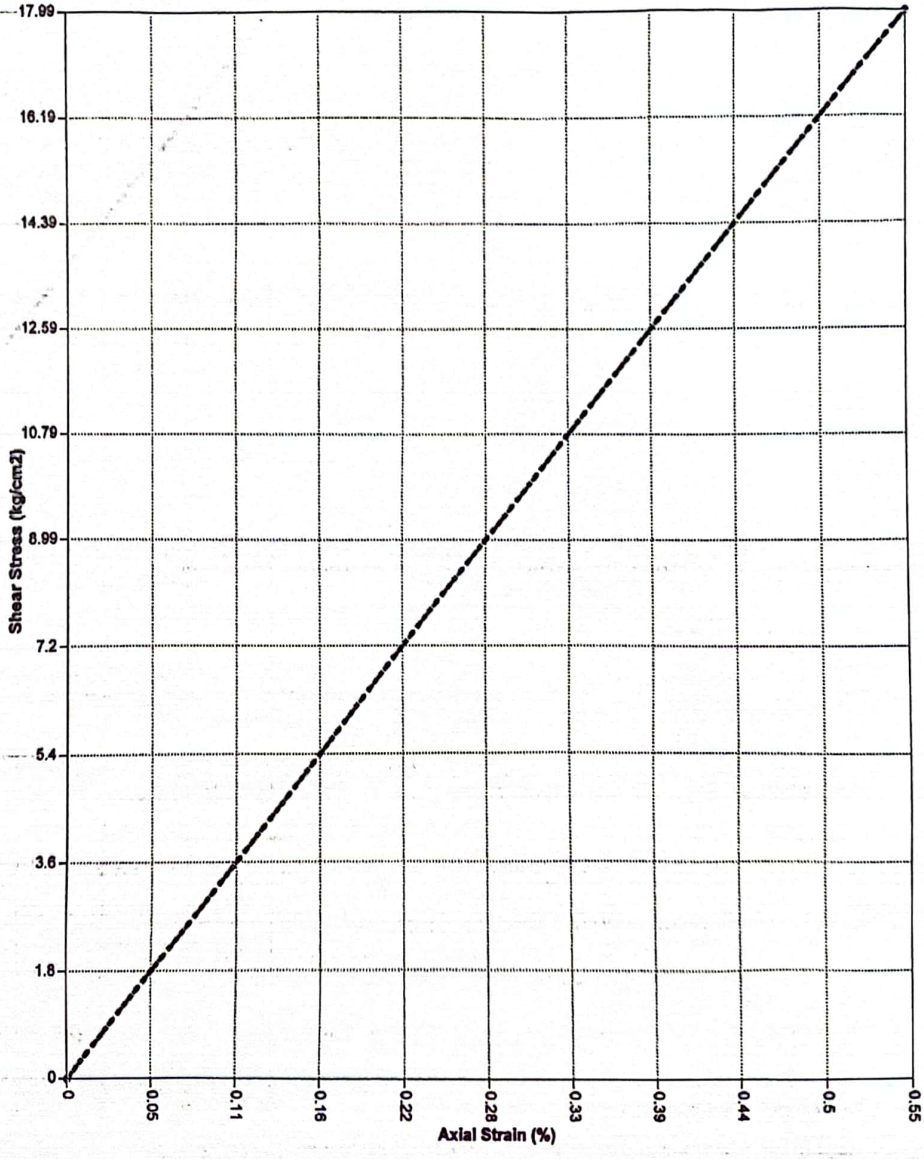
Borehole : BH-05
Sample Depth : 6.85 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.64	9.056	1	Moist	9.4	2.05	17.99	8.99



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Location : Saddar, Karachi

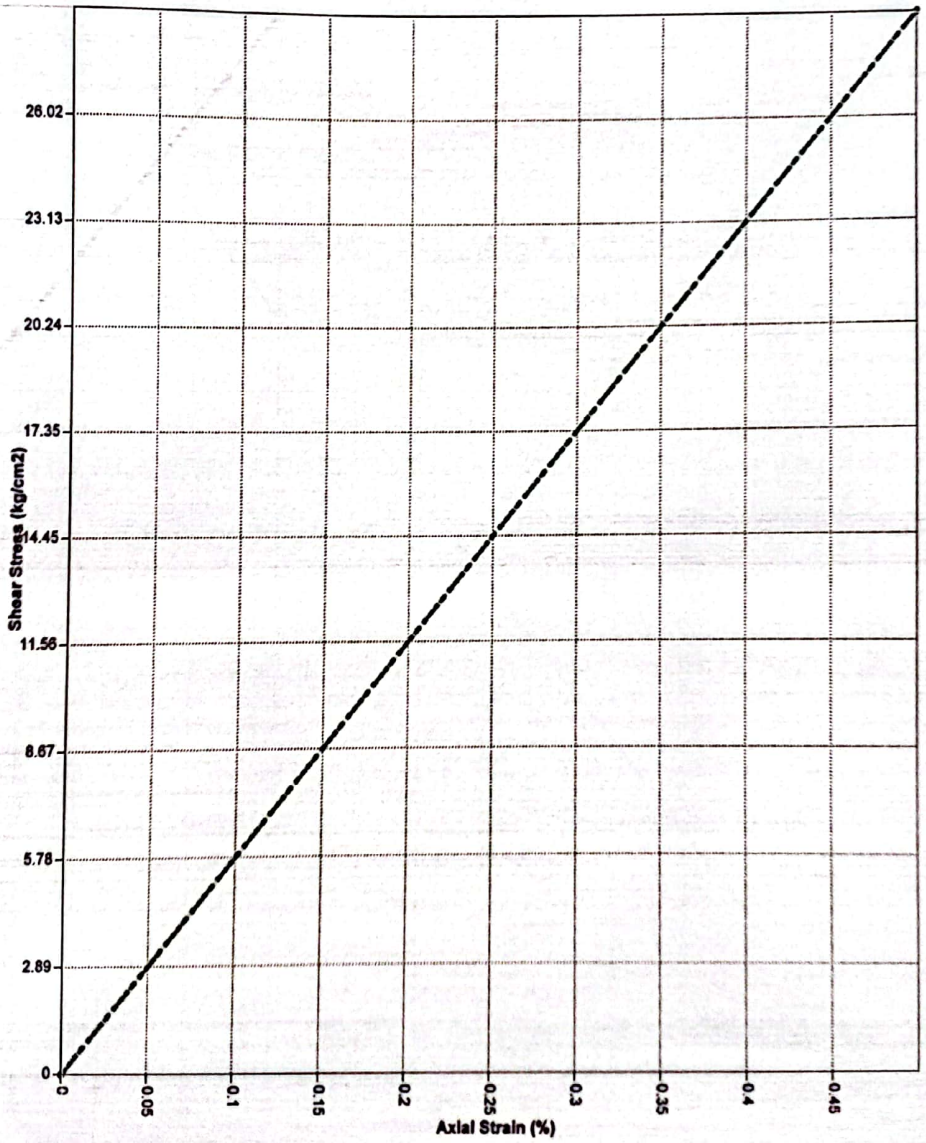
Borehole : BH-05
Sample Depth : 12.4 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.79	9.923	1	Moist	7.2	2.11	28.91	14.45



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Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

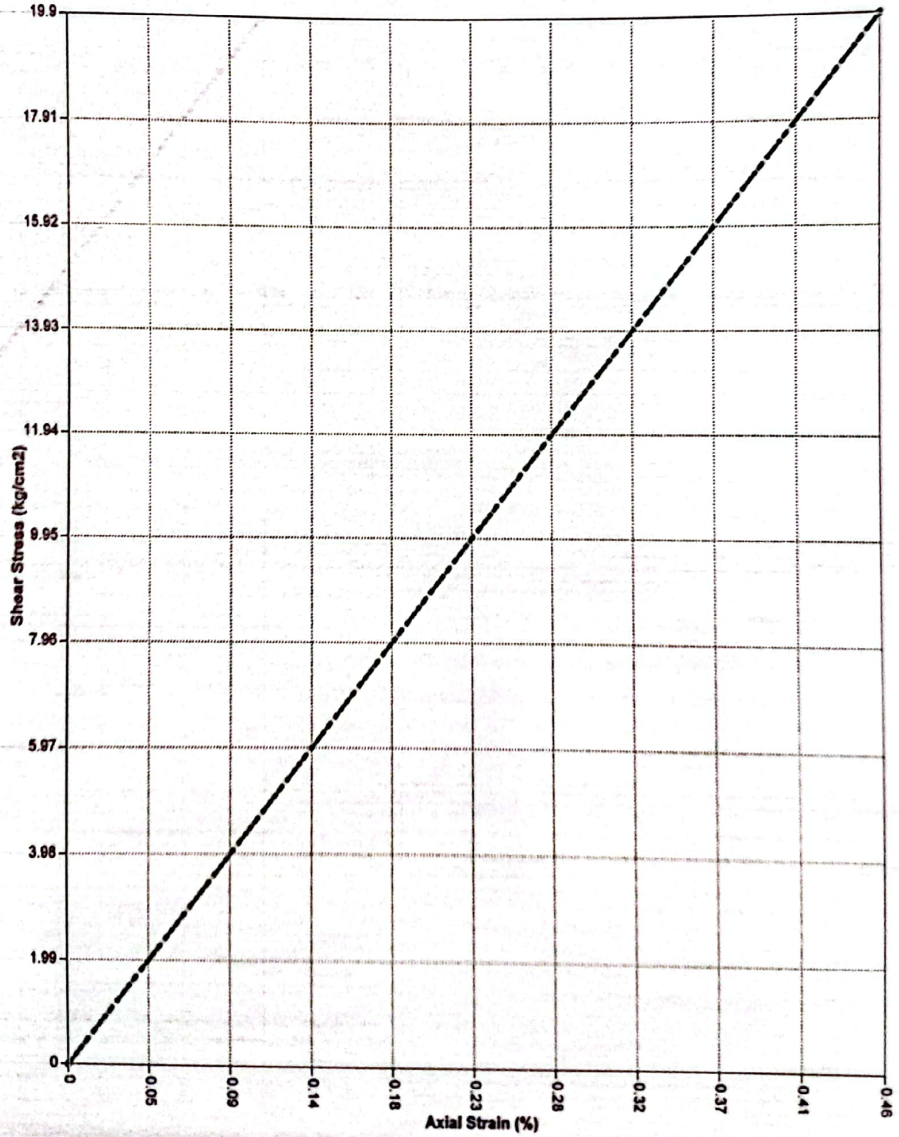
Borehole : BH-05
Sample Depth : 17.1 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.58	10.83	1	Moist	11	2.08	19.9	9.95



USCS Soil Description :
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Unconfined Compression Test

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Job No. : S-24-1046
Location : Saddar, Karachi

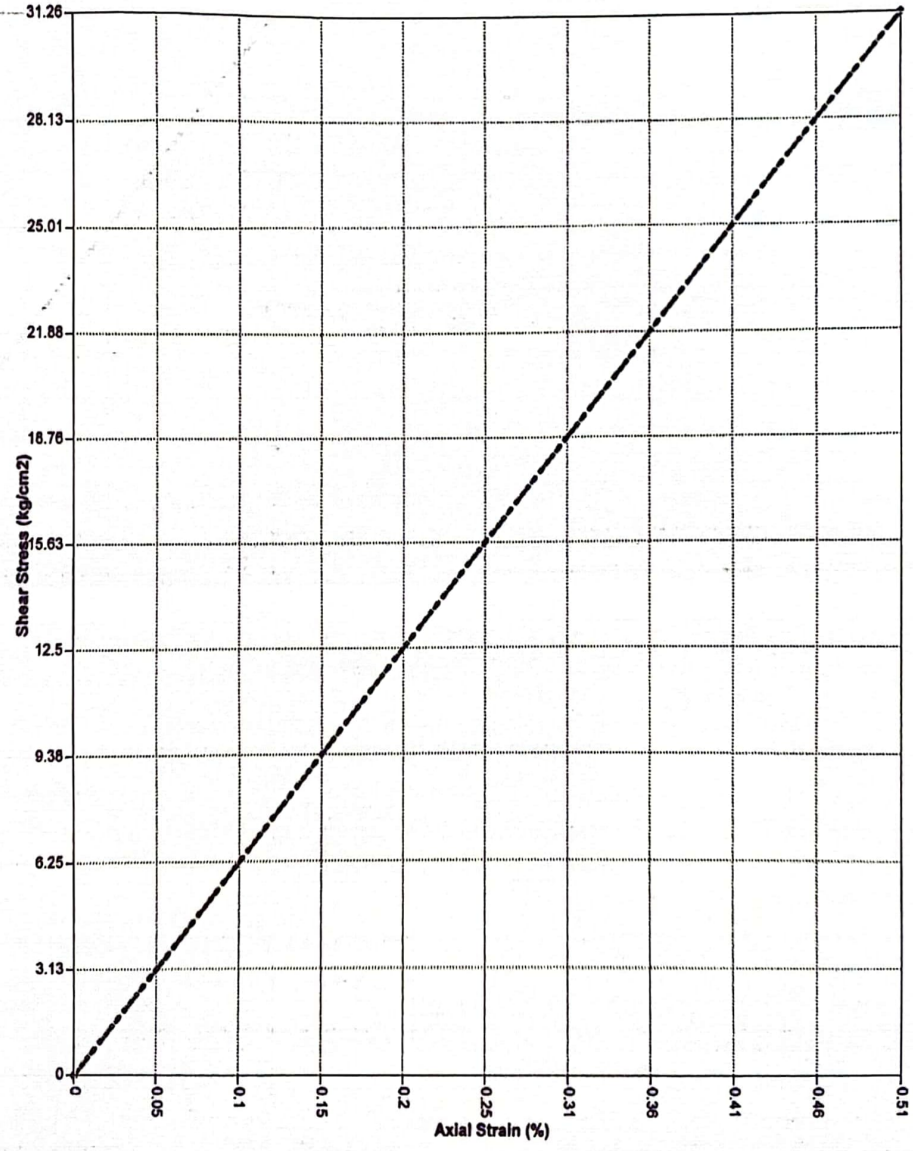
Borehole : BH-05
Sample Depth : 21 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.52	9.78	1	Moist	8.4	2.06	31.26	15.63



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

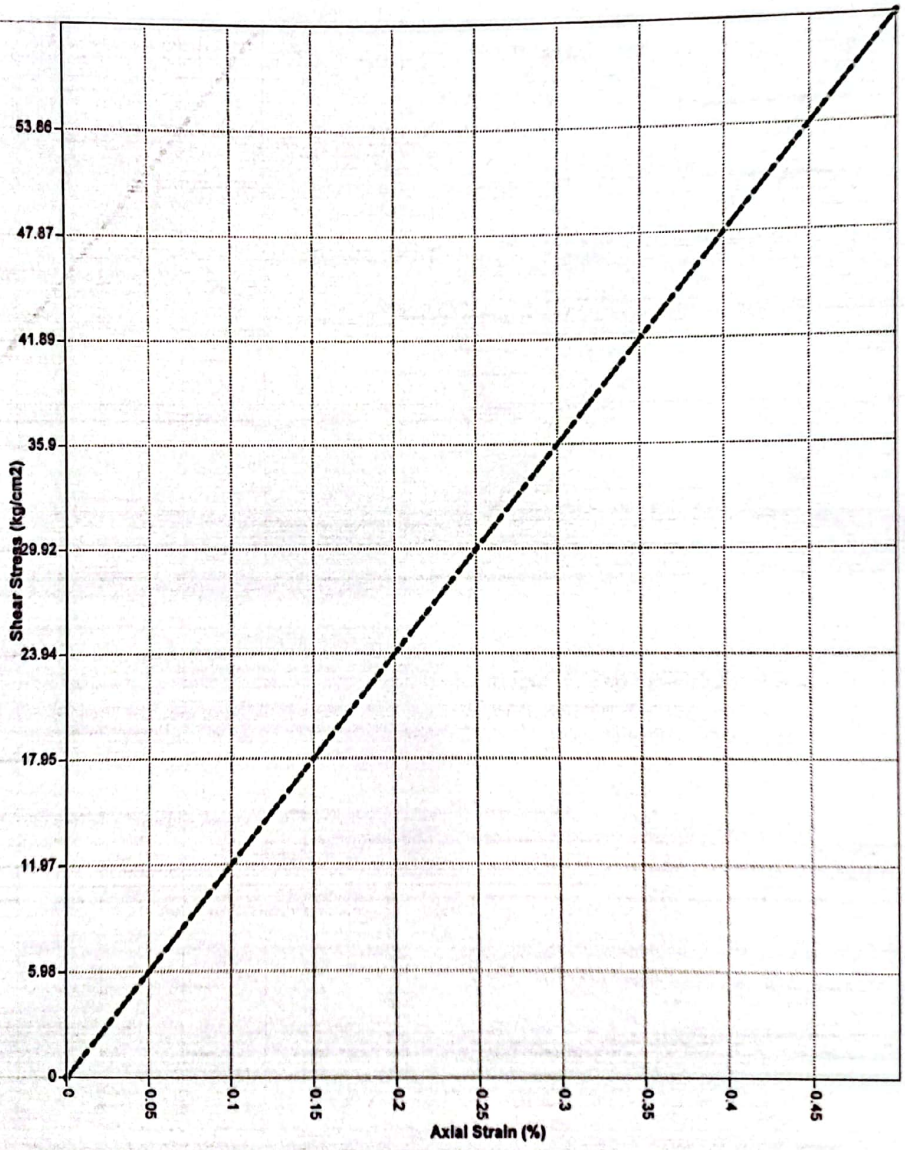
Borehole : BH-05
Sample Depth : 25.1 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.68	10.02	1	Moist	6.9	2.22	59.84	29.92



USCS Soil Description :
AASHTO Soil Description :

Tested By :

Unconfined Compression Test

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

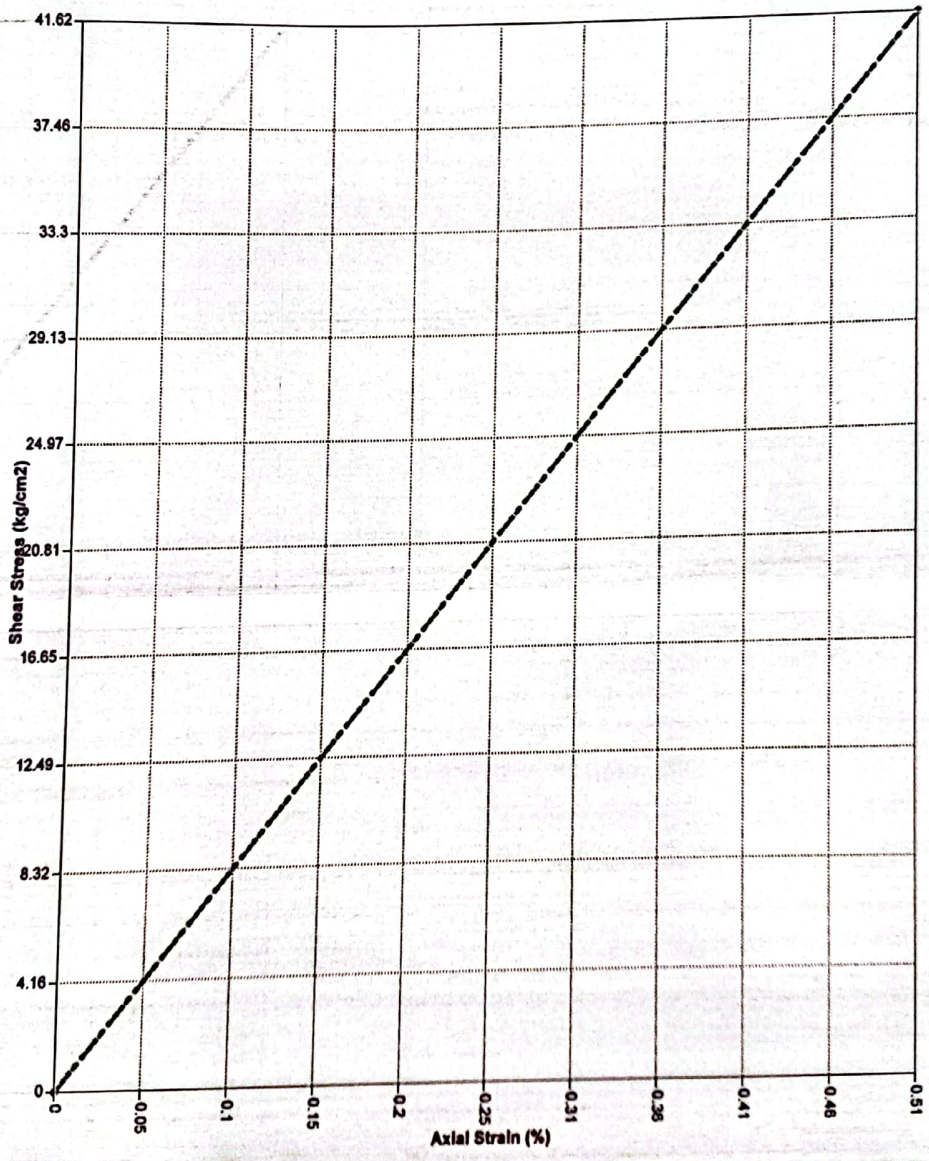
Borehole : BH-05
Sample Depth : 28 (m)
Sample Type : Undisturbed

Soil Testing Services

ASTM D2166

Test Results

Diameter (cm)	Height (cm)	Loading rate (mm/min)	Moisture Status	Moisture Content (%)	Dry Density (gr/cm3)	Unconfined Comp. Qu (kg/cm2)	Su (kg/cm2)
5.76	9.74	1	Moist	7.1	2.1	41.62	20.81



USCS Soil Description :
AASHTO Soil Description :

Tested By :

NovoLAB 4.0.2019.1206 Licensed to: Soil Testing Services (info@sts.com.pk)
Printed On 3/19/2024 By UMAIR-PC\aftab

Chemical Test Results

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

ASTM D516, D512, D1293

Borehole	Sample Depth (m)	Description	Value
BH-02	1	pH value	7.42
BH-02	1	Sulphate Content (%)	0.012
BH-02	1	Chloride Content (%)	0.26

Water Chemical Test Results

Project : Geotechnical Investigation Works
Client : Impact Engineering
Job No.: S-24-1046
Location : Saddar, Karachi

Soil Testing Services

Borehole	Sample	SampleDepth (m)	Total Salt Content (ppm)	Chloride Content (ppm)	Sulphate (ppm)	pH Values
BH-01	WS-1	2.80	4380	2650	320	7.52

General Information on Testing Procedures

A. DRILLING, FIELD TESTING & SAMPLING

The field testing program consisted of drilling works, and in-situ testing including Standard Penetration Test (SPT), collection of soil samples using soil sampler and water samples. The following sections describe these activities in further detail.

A.1. DRILLING METHOD

Borehole was drilled by using rotary/wash boring method; in this method soil or rock is cut by the constant rotation of various types of bits. Drilling fluid, which is either water or bentonite slurry, is circulated through drilling rods. The returning fluid lifts loosened material.

The drilling in rock was carried out by double tube core barrels in conjunction with carbide or diamond bit. In a double tube core barrel the outer barrel is rotated by the drill rods, while, the inner barrel, which is mounted on a swivel, does not rotate during the drilling process. The core cut by the coring bit passes into the inner barrel. Core was prevented from dropping out by a steel core catcher. It was then extruded and wrapped with waxed bandage tape, to preserve the natural moisture of the recovered core.

Details of the boreholes are given in Table A.1.

Table A.1 Detail of Boreholes

Borehole No.	Borehole Depth (meters)	Water table Depth (meters)
BH-01	40.0	2.8
BH-02	30.0	2.7
BH-03	40.0	2.6
BH-04	30.0	2.4
BH-05	30.0	2.8

- The numbers of blows are recorded during each of the last two increments.
- The test was deemed finished when total number of blows equal to 50 was reached.

The standard penetration test was carried out in accordance with the procedure given in BS 1377-9:1990.

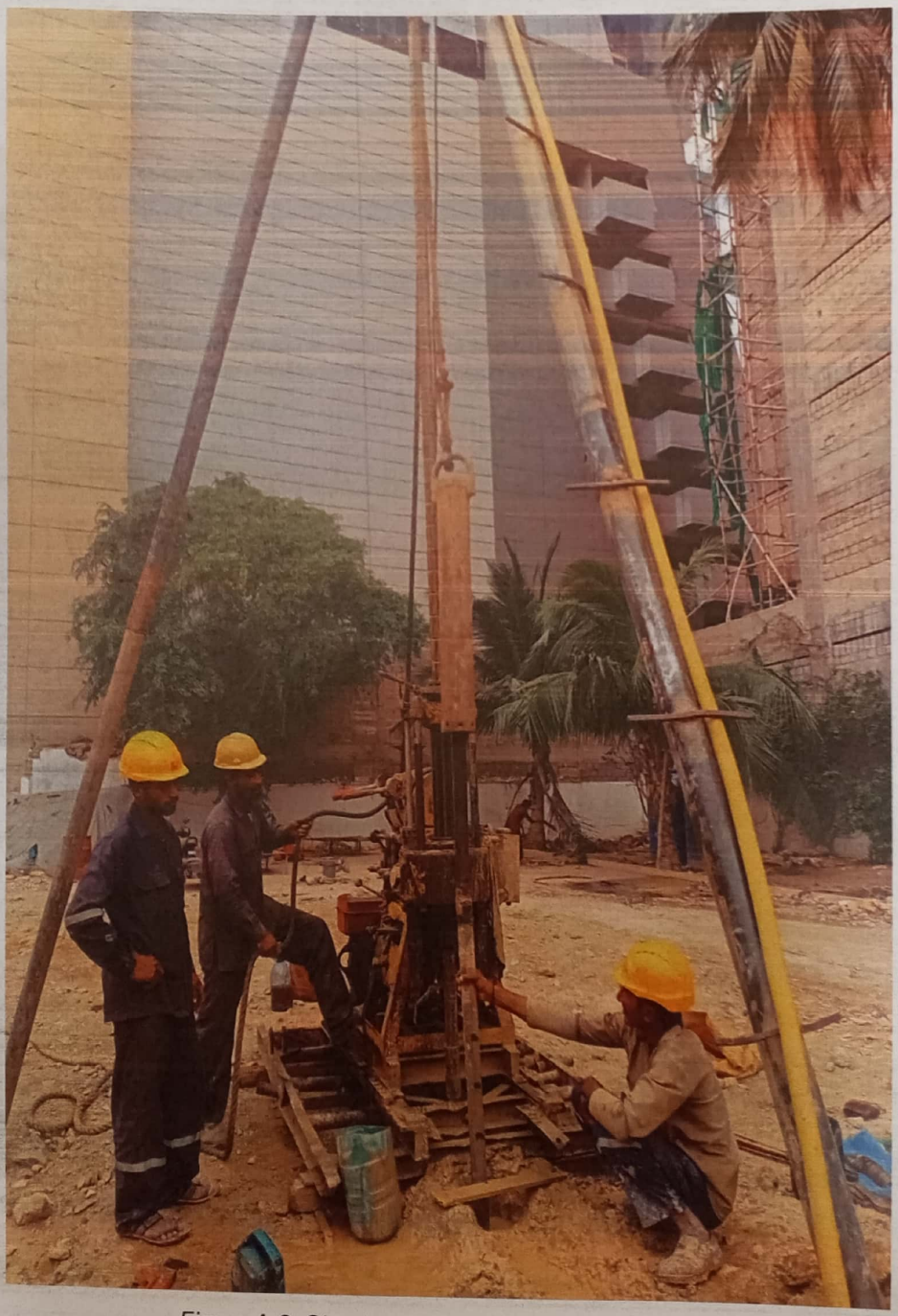


Figure A-2: Standard Penetration Test in Progress

A.3. SAMPLING

Sampling forms an essential part of the geotechnical investigation process and good sampling is essential for proper laboratory testing of samples for determining strength and compressibility characteristics of soil.

A.3.1. SPT SAMPLES

Samples were recovered from standard penetration testing. The samples were recovered in split-spoon sampler and then stored in plastic bags. The storage of split-spoon samples in bags ensured retention of natural moisture of the samples which were later tested for gradation, consistency and chemical characteristics.



Figure A-3: Sample collection via split spoon sampler

A.3.2. ROCK CORE SAMPLES

Rock core samples were collected from the deposits through coring. Double tube core barrel (HQ size) was used to collect these samples. The samples were recovered in core barrel, packed in aluminium foil, and then stored in rock core boxes. The storage of rock core samples in aluminium foil ensured retention of natural moisture. Unconfined compressive strength, natural moisture content, density, etc. of these samples was determined in the laboratory.

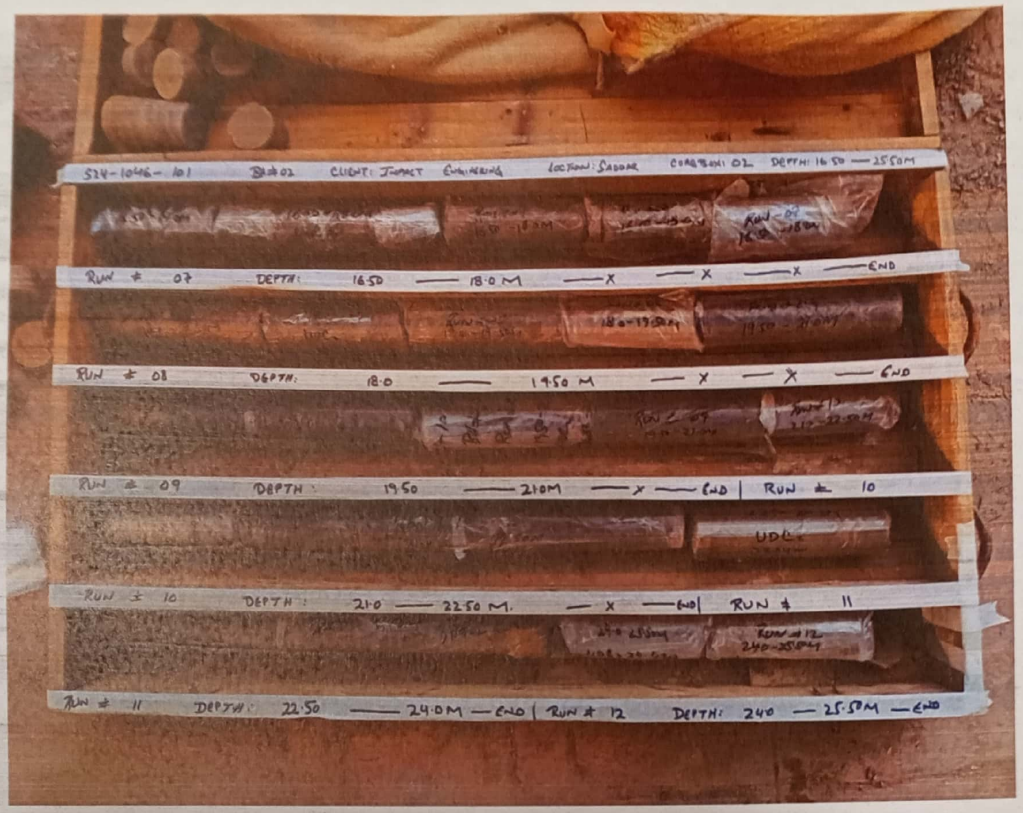


Figure A-4: Sample preservation in rock core boxes

A.3.3. WATER SAMPLES

In order to determine the chemical characteristic of groundwater, water samples were collected from the boreholes. The samples were preserved in airtight bottle & later transported to the testing laboratory. Chemical characteristics of water samples have also been assessed through determination of sulphate content, chloride content, TDS and pH.

B. LABORATORY TESTING

Laboratory testing was carried out on retrieved samples. The following section enlists and gives details of relevant tests carried out on selected samples as required for determining the subsurface conditions and correlating with the information obtained from field testing and sampling.

B.1. GRAIN SIZE ANALYSIS

The purpose of grain size analysis is to determine the sizes of the assemblage of particles that make up the soil. The grain size analysis is conducted in two parts: for particles above the "# 200 US sieve", sieve analysis is carried out by passing the selected soil sample from various sieves. For particles finer than the "# 200 US sieve", hydrometer analysis is carried out. The combined process of determination of the size of particles is termed as the grain size analysis.

The results are appended with the report in Appendix C. Grain size analysis of soil samples was carried out as per *ASTM D 422*.

B.2. NATURAL MOISTURE CONTENT

Natural moisture content is the quantity of water contained in a soil or rock sample. It is the ratio of the weight of water to the weight of solids in a given volume of soil or rock sample. Natural moisture content of samples was determined in accordance with *ASTM 2216-05*.

B.3. DENSITY

The weight per unit volume of the solid portion of soil is called particle (dry) density. Whereas, the oven dry weight of a unit volume of soil inclusive of pore spaces is called bulk (wet) density. The bulk density of a soil is always smaller than its particle density. Density of samples was determined in accordance with the procedure described in ASTM D 7263-09.

B.4. UNCONFINED COMPRESSION TEST

Unconfined compressive strength test involves axially loading a cylindrical rock core or undisturbed clay sample to failure. The term unconfined is used because the lateral force

on the sample is zero. The unconfined compressive strength test was carried out in accordance with *ASTM D 7012*. The strength of the retrieved samples tested came out to be ranging from 12.93 Kg/cm^2 to 89.27 Kg/cm^2. The results of the unconfined compression test are summarized in *Appendices*.

B.5. CHEMICAL TESTS

Sulphate in groundwater or soil can attack concrete placed in the ground or on surface. A reaction takes place between the sulphate and the aluminate compounds present in the cement, causing crystallisation of complex compounds. The expansion, which accompanies crystallisation, induces stresses in the concrete, which results in mechanical disintegration. In moist conditions, such as exposure to seawater, the presence of chloride ion, Cl^-, presents a serious possibility of the corrosion of the reinforcement. The presence of $Ca(OH)_2$ provides a strong alkaline environment in which a thin film of iron oxide is formed on the metal surface which protects it against corrosion. However, if the concrete is permeable to the extent that the soluble chlorides can reach up to the reinforcing steel, then in the presence of water and oxygen, the corrosion of the reinforcement will take place. Rust occupies more volume than the original steel, and hence the ensuing expansion of concrete, results in cracking and spalling.

Due to adverse effect of sulphates and chlorides on the quality of concrete it is essential to conduct chemical tests on soil and groundwater. This helps in quantifying the expected exposure of concrete to these chemicals and in devising precautionary measures to ensure integrity of concrete. The following chemical tests were carried out on groundwater samples:

- Total dissolved solids
- Chloride content
- Sulphate content
- pH

Chemical tests were carried out in accordance with *ASTM C 1580-09, and D 4972-01*. The selection of cement for underground concreting and is discussed in *Chapter 4*.

Table B.1 ACI standards for concrete for sulphate exposure

Sulphate Exposure	Water Soluble Sulphates in Soil (%)	Sulphate in Water (mg/L)	Cement Type
Negligible	0.00-0.10	0- 150	OPC
Moderate	0.10-0.20	150- 1500	Type II
Severe	0.20-2.00	1500-10000	Type V
Very Severe	Over 2.00	Over 10000	Type V plus pozzolan

Pile Capacity Calculations

(A) - CALCULATION OF ALLOWABLE SKIN FRICTION :

Depth of pile (m)	Soil Encountered	Diameter of Pile (m)	Length of Layer (m)	Effective σ for this layer	Effective overburden (kN/m^2)	phi	c (kN/m^2)	q_{uc} (kN/m^2)	α adhesion	α reduction-rock	β correction	δ	tan δ	k_s	FOS	Q_{skin} (kN)	$Q_{skin\ cum}$ (kN)
0-1	Basement	1.00	1	0.0	0.0	-	0.00	-	0.45	-	-	-	-	-	2.0	0	0
1-2	Basement	1.00	1	0.0	0.0	-	0.00	-	0.45	-	-	-	-	-	2.0	0	0
2-3	Basement	1.00	1	0.0	0.0	-	0.00	-	0.45	-	-	-	-	-	2.0	0	0
3-4	Cohesionless	1.00	1	7.0	3.5	24	-	-	-	-	-	18	0.32	0.593	2.0	1	1
4-5	Cohesive	1.00	1	7.0	10.5	-	180.00	-	0.45	-	-	-	-	-	2.0	127	128
5-6	Cohesive	1.00	1	7.0	17.5	-	180.00	-	0.45	-	-	-	-	-	2.0	127	256
6-7	Cohesionless	1.00	1	7.5	24.8	27	-	-	-	-	-	20.25	0.37	0.546	2.0	8	263
7-8	Cohesionless	1.00	1	7.5	32.3	27	-	-	-	-	-	20.25	0.37	0.546	2.0	10	274
8-9	Rock	1.00	1	11.5	41.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	784
9-10	Rock	1.00	1	11.5	53.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	1295
10-11	Rock	1.00	1	11.5	64.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	1806
11-12	Rock	1.00	1	11.5	76.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	2317
12-13	Rock	1.00	1	11.5	87.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	2827
13-14	Rock	1.00	1	11.5	99.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	3338
14-15	Rock	1.00	1	11.5	110.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	3849
15-16	Rock	1.00	1	11.5	122.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	4359
16-17	Rock	1.00	1	11.5	133.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	4870
17-18	Rock	1.00	1	11.5	145.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	5381
18-19	Rock	1.00	1	11.5	156.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	5892
19-20	Rock	1.00	1	11.5	168.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	6402

Depth of pile (m)	Soil Encountered	Diameter of Pile (m)	Length of Layer (m)	Effective σ for this layer	Effective overburden (kN/m^2)	phi	c (kN/m^2)	q_{uc} (kN/m^2)	α adhesion	α reduction-rock	β correction	δ	tan δ	k_s	FOS	Q_{skin} (kN)	$Q_{end\ bearing}$ (kN)
20-21	Rock	1.00	1	11.5	179.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	6913
21-22	Rock	1.00	1	11.5	191.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	7424
22-23	Rock	1.00	1	11.5	202.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	7934
23-24	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	8445
24-25	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	8956
25-26	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	9467
26-27	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	9977
27-28	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	10488
28-29	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	10999
29-30	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	11509
30-31	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	12020
31-32	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	12531
32-33	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	13042
33-34	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	13552
34-35	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	14063
35-36	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	14574
36-37	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	15084
37-38	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	15595
38-39	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	16106
39-40	Rock	1.00	1	0.0	208.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	511	16617

(A) - CALCULATION OF ALLOWABLE SKIN FRICTION :

Depth of pile (m)	Soil Encountered	Diameter of Pile (m)	Length of Layer (m)	Effective σ for this layer	Effective overburden (kN/m^2)	phi	c (kN/m^2)	q_{uc} (kN/m^2)	α adhesion	α reduction-rock	β correction	δ	tan δ	k_s	FOS	Q_{skin} (kN)	$Q_{skin(Corr)}$ (kN)
0-1	Basement	1.20	1	0.0	0.0	-	0.00	-	0.45	-	-	-	-	-	2.0	0	0
1-2	Basement	1.20	1	0.0	0.0	-	0.00	-	0.45	-	-	-	-	-	2.0	0	0
2-3	Basement	1.20	1	0.0	0.0	-	0.00	-	0.45	-	-	-	-	-	2.0	0	0
3-4	Cohesionless	1.20	1	7.0	3.5	24	-	-	-	-	-	18	0.32	0.593	2.0	1	1
4-5	Cohesive	1.20	1	7.0	10.5	-	180.00	-	0.45	-	-	-	-	-	2.0	153	154
5-6	Cohesive	1.20	1	7.0	17.5	-	180.00	-	0.45	-	-	-	-	-	2.0	153	307
6-7	Cohesionless	1.20	1	7.5	24.8	27	-	-	-	-	-	20.25	0.37	0.546	2.0	9	316
7-8	Cohesionless	1.20	1	7.5	32.3	27	-	-	-	-	-	20.25	0.37	0.546	2.0	12	328
8-9	Rock	1.20	1	11.5	41.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	941
9-10	Rock	1.20	1	11.5	53.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	1554
10-11	Rock	1.20	1	11.5	64.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	2167
11-12	Rock	1.20	1	11.5	76.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	2780
12-13	Rock	1.20	1	11.5	87.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	3393
13-14	Rock	1.20	1	11.5	99.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	4006
14-15	Rock	1.20	1	11.5	110.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	4618
15-16	Rock	1.20	1	11.5	122.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	5231
16-17	Rock	1.20	1	11.5	133.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	5844
17-18	Rock	1.20	1	11.5	145.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	6457
18-19	Rock	1.20	1	11.5	156.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	7070
19-20	Rock	1.20	1	11.5	168.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	7683

Depth of pile (m)	Soil Encountered	Diameter of Pile (m)	Length of Layer (m)	Effective σ for this layer	Effective overburden (kN/m^2)	phi '	c (kN/m^2)	q_{uc} (kN/m^2)	α adhesion	α reduction-rock	β correction	δ	tan δ	k_s	FOS	Q_{skin} (kN)	$Q_{skin\ (Cum.)}$ (kN)
20-21	Rock	1.20	1	11.5	179.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	8296
21-22	Rock	1.20	1	11.5	191.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	8908
22-23	Rock	1.20	1	11.5	202.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	9521
23-24	Rock	1.20	1	11.5	214.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	10134
24-25	Rock	1.20	1	11.5	225.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	10747
25-26	Rock	1.20	1	11.5	237.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	11360
26-27	Rock	1.20	1	11.5	248.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	11973
27-28	Rock	1.20	1	0.0	254.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	12586
28-29	Rock	1.20	1	0.0	254.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	13198
29-30	Rock	1.20	1	0.0	254.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	13811
30-31	Rock	1.20	1	0.0	254.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	14424
31-32	Rock	1.20	1	0.0	254.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	15037
32-33	Rock	1.20	1	0.0	254.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	15650
33-34	Rock	1.20	1	0.0	254.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	16263
34-35	Rock	1.20	1	0.0	254.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	16876
35-36	Rock	1.20	1	0.0	254.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	17488
36-37	Rock	1.20	1	0.0	254.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	18101
37-38	Rock	1.20	1	0.0	254.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	18714
38-39	Rock	1.20	1	0.0	254.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	19327
39-40	Rock	1.20	1	0.0	254.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	613	19940

(A) - CALCULATION OF ALLOWABLE SKIN FRICTION :

Depth of pile (m)	Soil Encountered	Diameter of Pile (m)	Length of Layer (m)	Effective σ for this layer	Effective overburden (kN/m^2)	phi	c (kN/m^2)	q_{uc} (kN/m^2)	α adhesion	α reduction-rock	β correction	δ	tan δ	k_s	FOS	Q_{skin} (kN)	$Q_{skin\,(Cum)}$ (kN)
0-1	Basement	1.50	1	0.0	0.0	-	0.00	-	0.45	-	-	-	-	-	2.0	0	0
1-2	Basement	1.50	1	0.0	0.0	-	0.00	-	0.45	-	-	-	-	-	2.0	0	0
2-3	Basement	1.50	1	0.0	0.0	-	0.00	-	0.45	-	-	-	-	-	2.0	0	0
3-4	Cohesionless	1.50	1	7.0	3.5	24	-	-	-	-	-	18	0.32	0.593	2.0	2	2
4-5	Cohesive	1.50	1	7.0	10.5	-	180.00	-	0.45	-	-	-	-	-	2.0	191	193
5-6	Cohesive	1.50	1	7.0	17.5	-	180.00	-	0.45	-	-	-	-	-	2.0	191	383
6-7	Cohesionless	1.50	1	7.5	24.8	27	-	-	-	-	-	20.25	0.37	0.546	2.0	12	395
7-8	Cohesionless	1.50	1	7.5	32.3	27	-	-	-	-	-	20.25	0.37	0.546	2.0	15	410
8-9	Rock	1.50	1	11.5	41.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	1177
9-10	Rock	1.50	1	11.5	53.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	1943
10-11	Rock	1.50	1	11.5	64.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	2709
11-12	Rock	1.50	1	11.5	76.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	3475
12-13	Rock	1.50	1	11.5	87.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	4241
13-14	Rock	1.50	1	11.5	99.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	5007
14-15	Rock	1.50	1	11.5	110.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	5773
15-16	Rock	1.50	1	11.5	122.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	6539
16-17	Rock	1.50	1	11.5	133.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	7305
17-18	Rock	1.50	1	11.5	145.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	8071
18-19	Rock	1.50	1	11.5	156.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	8837
19-20	Rock	1.50	1	11.5	168.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	9603

Depth of pile (m)	Soil Encountered	Diameter of Pile (m)	Length of Layer (m)	Effective σ for this layer	Effective overburden (kN/m^2)	phi	c (kN/m^2)	q_{uc} (kN/m^2)	α adhesion	α reduction-rock	β correction	δ	tan δ	k_s	FOS	Q_{skin} (kN)	$Q_{skin\ (cum)}$ (kN)
20-21	Rock	1.50	1	11.5	179.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	10369
21-22	Rock	1.50	1	11.5	191.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	11135
22-23	Rock	1.50	1	11.5	202.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	11902
23-24	Rock	1.50	1	11.5	214.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	12668
24-25	Rock	1.50	1	11.5	225.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	13434
25-26	Rock	1.50	1	11.5	237.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	14200
26-27	Rock	1.50	1	11.5	248.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	14966
27-28	Rock	1.50	1	11.5	260.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	15732
28-29	Rock	1.50	1	11.5	271.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	16498
29-30	Rock	1.50	1	11.5	283.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	17264
30-31	Rock	1.50	1	11.5	294.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	18030
31-32	Rock	1.50	1	11.5	306.3	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	18796
32-33	Rock	1.50	1	11.5	317.8	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	19562
33-34	Rock	1.50	1	0.0	323.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	20328
34-35	Rock	1.50	1	0.0	323.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	21094
35-36	Rock	1.50	1	0.0	323.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	21860
36-37	Rock	1.50	1	0.0	323.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	22627
37-38	Rock	1.50	1	0.0	323.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	23393
38-39	Rock	1.50	1	0.0	323.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	24159
39-40	Rock	1.50	1	0.0	323.5	30	-	1000	-	0.50	0.65	22.5	0.41	0.432	2.0	766	24925

ALLOWABLE END BEARING RESISTANCE :

Socket Strata	Diameter of Pile (mm)	Length of Pile (m) Below Basement Level	Nϕ	q_{uc} (kN/m^2)	FOS	Q_{END} (kN)
Rock	1000.0	22.0	3.0	1000.0	3.0	1571
Rock	1000.0	27.0	3.0	1000.0	3.0	1571
Rock	1000.0	32.0	3.0	1000.0	3.0	1571
Rock	1000.0	37.0	3.0	1000.0	3.0	1571
Rock	1200.0	22.0	3.0	1000.0	3.0	2262
Rock	1200.0	27.0	3.0	1000.0	3.0	2262
Rock	1200.0	32.0	3.0	1000.0	3.0	2262
Rock	1200.0	37.0	3.0	1000.0	3.0	2262

Rock	1500.0	22.0	3.0	1000.0	3.0	3535
Rock	1500.0	27.0	3.0	1000.0	3.0	3535
Rock	1500.0	32.0	3.0	1000.0	3.0	3535
Rock	1500.0	37.0	3.0	1000.0	3.0	3535



SOIL TESTING SERVICES

C-101/A KDA Scheme 1, Karachi

Pakistan. 75350

Tel: +92-21-34381117-8

Fax: +92-21-34525206

House # 852, Main Service Road

Sector I-10/4 Islamabad. Pakistan

Tel: +92-51-4436379

Fax: +92-51-4431801

Email: info@sts.com.pk

www.sts.com.pk

Annex –II: Environmental Monitoring Report

Ambient Air Quality Test Report

Project Name:	**EIA- SAAR SKY ICON**	**Test Report No:**	**QTS/EMC/SSI/24/9175**
		Sample Duration:	**24hr's**
Sample Description:	**Ambient Air Quality Test**	**Location:**	**24°50'42.76"N 67° 01'39.92"E**

Date	Time	NO (µg/m³)	NO_2 (µg/m³)	SO_2 (µg/m³)	PM 10 (µg/m³)	PM 2.5 (µg/m³)	SPM (µg/m³)	Lead (µg/m3)
01.04.2024	10:00	08.6	14.5	24.4	124	29	342	
	11:00	12.4	13.8	25.2	132	34	348	
	12:00	15.3	15.6	29.4	129	38	345	
	13:00	12.4	15.8	31.0	123	42	340	
	14:00	08.0	16.6	30.0	120	39	344	
	15:00	09.5	15.2	26.3	122	38	346	
	16:00	10.4	11.2	22.4	120	35	342	
	17:00	08.0	14.9	21.2	119	37	342	
	18:00	10.2	12.3	20.4	120	41	344	
	19:00	14.5	16.0	18.0	123	39	345	
	20:00	13.8	12.9	16.4	120	32	346	
	21:00	10.4	14.3	18.5	116	30	339	
	22:00	18.1	20.8	16.3	112	26	311	
	23:00	20.5	21.6	19.4	106	22	298	ND
01.04.2024	00:00	16.3	16.3	21.2	102	24	296	
	01:00	12.7	14.6	20.0	91	18	295	
	02:00	10.2	15.4	19.5	83	20	298	
	02:00	11.4	12.2	22.4	75	20	301	
	04:00	12.0	18.5	25.0	74	18	304	
	05:00	15.2	13.2	23.6	65	17	308	
	06:00	11.4	10.5	26.4	74	16	314	
	07:00	09.3	10.9	28.3	86	21	318	
	08:00	10.5	11.6	27.2	104	22	322	
	09:00	12.8	13.4	28.4	112	24	330	
MIN		8	10.5	16.3	65	16	295	
MAX		20.5	21.6	31	132	42	348	
AVG		12.4	14.7	23.3	105.7	28.4	325.4	
SEQS		**40**	**80**	**120**	**150**	**75**	**500**	**1.5**
LDL-Limits		**0ppm**	**0ppm**	**0ppm**	**10µg/m³**	**2.5µg/m³**	**1 µg/m³**	**-**

Ambient Air Quality Test Report

Project Name:	**EIA- SAAR SKY ICON**	**Test Report No:**	**QTS/EMC/SSI/24/9175**
		Sample Duration:	**24hr's**
Sample Description:	**Ambient Air Quality Test**	**Location:**	**24°50'42.76"N 67° 01'39.92"E**

Parameter	Unit	Monitoring Duration	Average Obtained Concentration	SEQS	LDL-Limits	Methodology
Carbon Monoxide (CO)	mg/m3	08 Hours	0.55	5.0	0.01	Non Dispersive Intra Red (NDIR)
Nitrogen oxide (NO)	µg/m3	24 Hours	12.4	40.0	1.00	Chemiluminescence
Nitrogen Dioxide (NO2)	µg/m3	24 Hours	14.7	80.0	1.00	
Sulphur Dioxide (SO2)	µg/m3	24 Hours	23.3	120.0	1.00	Ultraviolet Fluorescence Method
Ozone (O3)	µg/m3	01 Hour	16.2	130.0	0 ppm	Non Dispersive UV Absorption Method
Particulate Matter (PM10)	µg/m3	24 Hours	105.7	150.0	1.00	β Ray Absorption Method
Particular Matter (PM2.5)	µg/m3	24 Hours	28.4	75.0	1.0	
Total Suspended Particles (TSP)	µg/m3	24 Hours	325.4	500.0	1.0	
Lead	µg/m3	24 Hours	ND	1.5	-	ASS Method

*SEQS= Sindh Environmental Quality Standards.
*IFC= International Finance Corporation
(24 Hours Standard for all the parameters Except O3 and CO),
µg/m3= Micrograms per Cubic Meter
mg/m3= Milligrams per Cubic Meter
ppm = Parts per million
ND= Not Detected

Remarks:
The average concentration is well within guideline values set by SEQS.

Sample Analyzed By: Sajid Ali	**Signature of Laboratory Incharge:** **Name : Haseeb Arshad**

Office No.505, Anum Estate Building, Opposite Duty Free Shop, Main Shahrah-e-Faisal, Karachi.
Tel. No. 92-21-34311466, 92-21-34382860, 92-21-34321532, Fax. No. 92-21-34311467
Email: info@qts.com.pk

Test Report No: QTS/EMC/SSI/24/9176
Project Name: EIA. SAAR SKY ICON

SAMPLE DESCRIPTION

Sample ID: Noise Level Test
Sample Description: Ambient Noise
No. of samples: 04
Sample Collected/Submitted by: QTS representative
Sampling Date: 01/04/2024

NOISE LEVEL TEST REPORT

S.NO.	LOCATION/SOURCE	Noise Level Readings			
		Minimum	Maximum	Average	Limits
1	Front Side Right Corner	58.2	60.8	59.5	**SEQS Limits: *65dB(A)**
2	Front Side Left Corner	58.9	60.6	59.7	
3	Back Side Right Corner	57.0	59.4	58.2	
4	Back Side Left Corner	56.9	58.8	57.8	

SEQS *= Sindh Environmental Quality Standards (Outside Noise Level)*
dB (A) Leq=Time weighted average of the level of sound in decibel on scale which is relatable to human hearing.

Term & Condition:

- This report is not valid for any negotiations
- Report is valid for current batch(sample)
- This report is intended only for your guidance & not for legal purpose or for advertisement.

Comments:
All The Tested Noise are within SEQS Limits

Sample Analyzed by: Sajid Ali	**Signature of Laboratory In charge:** **Name : Haseeb Arshad**

Annex –III: Status of land, NOC & Drawings

SINDH BUILDING CONTROL AUTHORITY
DSITRICT SOUTH, KARACHI

No. SBCA/DD (District South /2024./102 Dated./5 -03-2024.

(ARCHITECTURAL CONCEPT PLAN)

Mr. Muhammad Asim & 04 others (Owner)
Plot No. 10/1, CL-09, Civil Line Quarters,
Karachi.

Area of plot: 4540.00 Sq. yds.
Category: Commercial

SUBJECT: REVISED ARCHITECTURAL CONCEPT PLAN IN RESPECT OF PLOT NO. 10/1, CL-09, CIVIL LINE QUARTERS, DISTRCT SOUTH, KARACHI.

This Revised Architectural Concept Plan has been examined and scrutinized in the light of Karachi Building & Town Planning Regulations,2002 (amended up to date) and the Competent Authority has been pleased to accept the Revised Architectural Concept Plan for proposed building comprising of Basement (ARS + Showrooms) + Ground floor (Showrooms + Services) + 1st floor (Parking) + 2nd to 6th floors (Parking) + 7th floor (Parking + Services) + 8th floor (Flats + Recreation) + 9th to 10 the floor (Flats + Recreation) + 11th to 21st floors (Flats) + 22nd floor (Flats + Roof of 21st floor) + 23rd floor (Flats + roof of 22nd floor) + 24th to 44th floors (Flats) + Roof Plan (Solar Panel + Services), in respect of the subject plot, subject to the fulfillment of following terms & conditions within 15 days' time:

1. Subject to receipt of verification of ownership/title documents and status of land use from the lessor.
3. Parking on 1st Floor, 2nd Floor, 3rd Floor, 4th Floor, 5th Floor, 6th Floor, 7th Floor, and Recreation Area at 8th, 9th & 10th Floors shall not be misused under any circumstances.
4. This approval is granted with the condition that Air Raid Shelter provided as per provision of KB&TPR-2002 is for the use of allottees of Flats/Showrooms in emergency conditions only and shall not be offered for sale by the owner/builder under any circumstance.
5. This approval is granted with the condition that owner/builder shall design / ensure the provision of Broadband wiring which is MANDATORY as per Clause 25-1.9.3 of KB&TPR-2002.
6. This approval is granted with the condition that owner/Builder shall mandatory design/provide the provision for utilization of at-least 5% for Solar Energy.
7. In case of any complaint / dispute or any court matter the SBCA shall not be the party and shall not be the responsible.
8. Land escaping shall be provided as per KB&TPR-2002 (amended up to date).as shown in the proposed building plans.
9. Subject to condition that all constructional activities, supervision etc. shall jointly be the responsibility of professionals and owner / builder.
10. In order to achieve better quality concrete of required strength for Safe, Sound and Stable Structure, Builder shall use Ready Mix Concrete from the batching plant as defined in these regulations.
11. Revised NOC for Sale /Advertisement shall be obtained from Design Section, SBCA as per Notification No. SBCA/PS-CE/2020/06, Dated: 23-07-2020 after issuance of construction permit.
12. NOC from Structural Point of view for proposed new construction shall be obtained from Structure Section, SBCA and Stability Certificate from "Category-A" proof Engineer to be provided in respect of additional 18th to 22nd floor proposed already approved and under construction, block.

Continued on Page/2

13. In case of any complaint / evidence regarding Sale / Booking of units without Revised Sale NOC, this Architectural Concept Plan will be withdrawn and Builder License shall be cancelled by the Authority.
14. No construction shall be allowed in cut-line/affected portion marked as with red on the plan.
15. The owner is required to produce NOC for Height Clearance, Valid Builder's License, NTN Certificate, Agreements with Architect, Structure Engr., SITE Engineer Registered in PEC & Site Report / Clearance from Concerned Town.
16. The owner/builder shall conduct Environmental Impact Assessment (EIA) Study through consultants and accordingly report shall be submitted to SBCA well before the commencement of construction.
17. The owner/builder shall conduct Traffic Impact Study through consultants and accordingly report shall be submitted.
18. Separate drawing showing Fire detector/sprinkler system, detail of Plumbing, Sanitary, and Electrical details as per KB&TPR-2002 and amended up to date to be submitted.
19. The submitted drawings are Architectural Concept Plan, once it has been approved owner/builder shall be directed to submit Firefighting drawings for record purpose before final approval shall be granted owner/builder as per Clause No.9-8.7.
20. In case of any misrepresentation / concealment of facts or construction started without getting construction permit under Section 6 (1) of SBCA 1979, this approval will be withdrawn / cancelled without any notice.
21. Owner/builder/Lic. Professionals will produce all required NOCs and documents or within 15 days from issuance of this Revised Architect Concept Plan, otherwise said plan will be cancelled / withdrawal automatically without any Notice.
22. SBCA reserve the right to obtain all fees / charges / taxes / dues remaining to owner / builder subsequently. (if applicable).

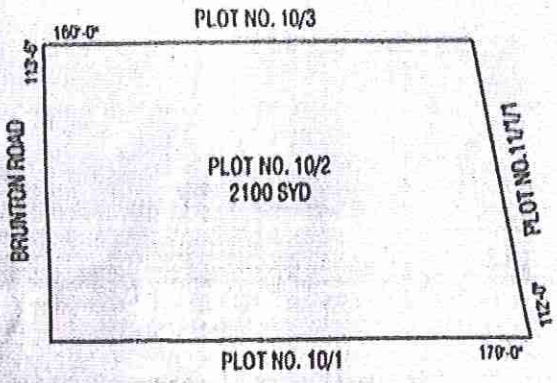
You are therefore, advised to comply above and submit the Structure requirements for further process in accordance with these rule regulations.

15/03/24

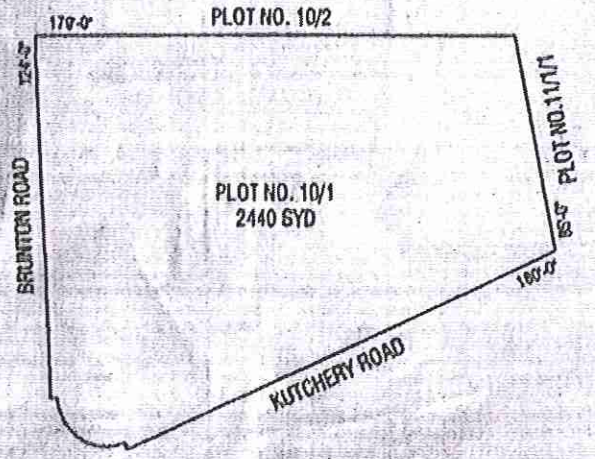
Deputy Director
District South SBCA

Copy for information to:

1. Director, (District South), SBCA.
2. Director, Structure Section, SBCA.
3. Director, IT, SBCA.
4. Chairman, ABAD.
5. Secretary to DG, SBCA.

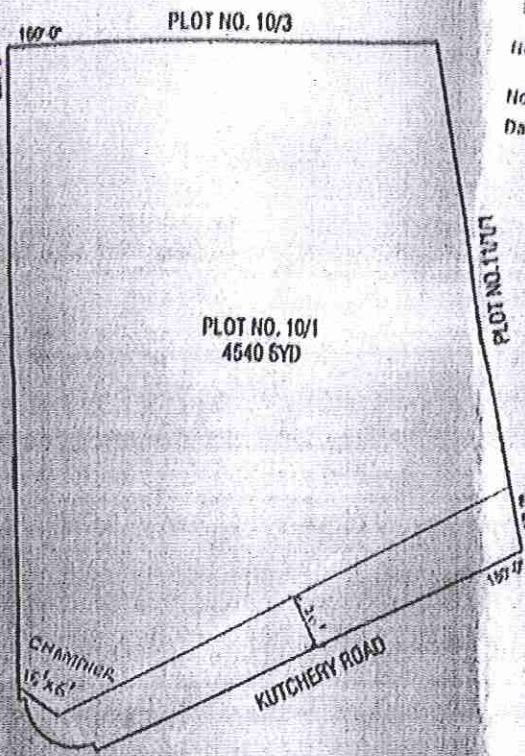


SITE PLAN



SITE PLAN

Assistant Director
Sindh Master Plan Authority



PARTIAL WITHDRAWAL OF SUB-DIVISION

Sindh Master Plan Authority
Master Plan Department Ka
No Objection Certificate from Plannin
of view with the condition vide letter
No: SMPA/PC-11/Amd-15/2023
Dated: 28-12-2023

Diary & Dispatch Section
S.M.P.A. (HO)
Outward No 4198/L
Dated 28-12-23



AREA STATMENT

PLOT NO. 10/1	=	2440 SYD
PLOT NO. 10/2	=	2100 SYD
FINAL PLOT NO. 10/1	=	4540 SYD

SCALE = 1" = 50'-0"

TITLE

PARTIAL WITHDRAWAL OF SUB-DIVISION OF PLOT NO. 10/1 & 10/2, FINAL PLOT NO. 10/1, SHEET CL-9, CIVIL LINES QUARTERS, KARACHI.

OWNER/AUTHORIZED

TOWN PLANNER

SHAMSHER A. SOOMRO
B.C.C.A. Town Planner
Lic No. TP-07-20
Sindh Building Control Authority

Scanned with CamScanner

SINDH MASTER PLAN AUTHORITY

9TH FLOOR, CIVIC CENTER, UNIVERSITY ROAD, GULSHAN-E- IQBAL, KARACHI-75300, PAKISTAN

No. SMPA/PC-II/Amal-15/2023/

Dated: 28-12-2023

Diary & Dispatch Section
S.M.P.A. (HO)
Outward No. 4148/L
Date 28 DEC 2023

NOT VALID FOR CONSTRUCTION

The Additional Deputy Commissioner-I,
Karachi South,
Office of the Deputy Commissioner Karachi East.
Karachi.

SUBJECT: NOC FOR PARTIAL WITHDRAWAL OF SUB-DIVISION OF PLOT NOS. 10/1 & 10/2, SHEET NO. CL-09, MEASURING 2440.00 SQ.YARDS & 2100.00 SQ.YARDS, SITUATED AT CIVIL LINE QUARTER, KARACH.

Reference: (1) Letter No. South/ADC-I/RB/9851/2023, dated: 23-11-2023

With reference to your letter referred above, I am directed to convey that the Competent Authority viz the Senior Director, SMPA has approved the case for issuance of NOC for Partial withdrawal of sub-division in respect of Plot Nos. 10/1 & 10/2, Sheet No. CL-09, measuring 2010.00 sq.yards & 2142.00 sq.yards, situated at Civil Line Quarter, Karachi into one as final plot No. 10/1, total measuring 4540.00 sq.yards from the Town Planning Point of View with the following terms and conditions:

1. Subject to clear title of land.
2. Subject to approval of the Competent Authority / lessor i.e. Board of Revenue / Deputy Commissioner, South Karachi.
3. Subject to physical verification of area measurement by Lessor.
4. The original Lease conditions should not be altered.
5. This approval is based on forwarding letter from the Additional Deputy Commissioner-II, South Karachi vide his Letter No. Letter No. South/ADC-I/RB/9851/2023, dated: 23-11-2023.
6. This NOC has been accorded on the basis of forwarding letter from the office of the Additional Deputy Commissioner-I, Karachi south being a lessor, who would be responsible for all consequences.
7. Building plan shall be got approved from SBCA and Zoning Regulation as per KB & TP Regulation 2002 amended up to date shall be applicable.
8. Only one connection for water supply, sewerage and drainage services will be provided to the plot from its nearest main at the owner's cost. Any internal extension of the services shall be the responsibility of the owner of the plot and will be carried out and maintained at the cost of owner or successor of the title.
9. The SMPA will not be responsible with regard to any discrepancies and / or any dispute whatsoever in respect of the above said plot.
10. This NOC is not valid for construction.
11. It may be ensured that no land of any other part is affected by this land / plot.
12. In case of any misrepresentation of the facts this NOC will be withdrawn / cancelled without any intimation.
13. The owner is bound to pay the Govt. dues / charges, if any, to the concerned authority as and when demanded.
14. In case of any dispute in future, Sindh Master Plan Authority, shall not be responsible.
15. This approval subject to the conditions agreed by the Owner / applicant as per Undertaking dated: 21-09-2023 submitted by the Owner / applicant on Stamp Paper stating that after Withdrawal of Sub-division, the above mentioned plot will be utilized as per its original allotment conditions / lease conditions and it shall be constructed in accordance with KB & TPR-2002 amended up to date prevailing / policy.
16. In case of finding any violation of the above (Item No. 16) Withdrawal of Sub-division permission shall be cancelled / withdrawn without intimation.
17. Road width Road Dr. Ziauddin Ahmed Road Street (Kutchery Road), it should be maintained at site accordingly.
18. In case of arising any dispute regarding the ownership / title of land in question / dispute of office of the Deputy Commissioner, South Karachi, the approval of Withdrawal of Sub-division will be withdrawn, and fee paid shall not be refunded. The SMPA shall carry no responsibility.

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19. **No construction shall be allowed within reservation of roads / Right of way.**
20. **Overhead / underground services, if passing through the land, shall be take care of by the owner / attorney to the such satisfaction of the concerned agency.**
21. **The office of the Additional Deputy Commissioner (South) / owner will be bound to comply with rules / regulation / by laws and assessment as and when come into force.**
22. **Area of the plot shall not be violated under any circumstances.**
23. **All other planning and scrutiny aspects should be checked by the concerned Department / Authority before taking any action.**

ASSISTANT DIRECTOR
MASTER PLAN DEPARTMENT
SINDH MASTER PLAN AUTHORITY

Copy to:

1. The Director General, Sindh Buildings Control Authority.
2. The Director (T.P), Sindh Buildings Control Authority.

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MASTER PLAN DEPARTMENT
SINDH BULDING CONTROL AUTHORITY

No: 8387

Challan for Account # 0010011062510279

The Manager
ABL
Civic center

PROVISIONAL

Issue Date: 28-12-2023
Valid Upto: 15days

Please receive the amount from Mr/Ms/M/S ① M/S Nabid Sohail Ahmed ② M/S Sadia Sohail ③ Mr Rashid Mehmood ④ Mr Salman Yousuf ⑤ Mr Muhammad Asim

S/o, D/o, W/o, Mr. _____ through Pay Order

No. 18663802 Dt. 26-12-2023

Drawn on UBL Bank Branch Civic center Karachi

~~Against Plot~~/Survey~~AC~~ # 10/1 10/2 Sheet No ~~Block/Sector~~# CL-9

Scheme# Civil Lines Quarters Burton Road Karachi

Nature of Plot _____ Measuring 4540 sq.yds. on account of the following:

Particulars	Amount	Particulars	Amount
LoP Approval/TP Scrutiny fee@		Level Height fee@	ALLIED BANK LIMITED
Restoration of LoP fee@		CTC Charges@	REF#F
Sub-Division fee@		ODC@	
~~Part~~ Amalgamation fee@ ~~Part withdrawl~~	4540,000/-	DB Consulting fee@	
Consolidation fee@		Sale of Map/Documents@	
Conversion of Land Use Charges@		Copy of LoP Charges@	
Commercialization Charges@		Revalidation fee@	
Petrol Pump Scrutiny fee@		KW&SB Share	
CNG Scrutiny fee@		Others	
		Total Rs.	4540,000/-

(Rupees ~~forty~~ five lac & forty Thousand only.)

Prepard by :	Issuing Authority:	Receiving Officer/Stamp:
Sign:	Sign:	Sign:
Name:	Name: ACCOUNTS OFFICER	Name:
Desig:	~~Sindh Master Plan~~ S.M.P.A	

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FACE SHEET
Automation of Stamps & Registration
Board of Revenue, Sindh.

SR Office: Saddar-I **Deed Type:** Conveyance Deed **Doc ID:** 1006243
Property Type: Commercial & Residential **Area:** 2100 SQR YD

Property Details

District: Karachi South **Taluka/Town:** Saddar-I **Deh/Area:** Civil Lines Quarters

Complete Address: PLOT NO CL-9-10-2 SHEET NO CL-9 BURNTON ROAD, CIVIL LINES QUARTERS, KARACHI **Computer Number:** BOR - 2023 - 21 - 2449

1st Party Detail:

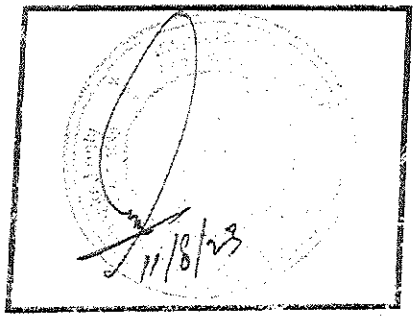
WAZEER AHMED KHAN 42401-0144865-5 03158749509

No More Members

2nd Party Detail:

MRS. NAHID SOHAIL ADMANI 42301-2435032-2 NULL

4 More Members



For Office Use Only:

RD No#: 2316 **RD Date:** 08-Aug-2023 **Indexing Date:** 10-Aug-2023

☐	Registration Fee:	☐	Advance Tax: 6900000
☐	CVT:	☐	Municipal Tax: 3236625
☐	Cess Tax: 6900000		
☐	Stamp Duty: 3236625		

Signature (Sub Registration)

Audit Observation (if any):

The Registration Fees Realized were Checked and Found Correct
Asst. Azhar Shah
Senior Inspector Team
I.R.C. Karachi

Signature (Audit Officer)

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E-STAMP





CONVEYANCE DEED OF IMMOVABLE PROPERTY
VALUED AT RS: 230,000,000/- (RUPEES TWO HUNDRED THIRTY MILLION ONLY)

THIS CONVEYANCE DEED is made here at Karachi on this [illegible] day of July, 2023

Page 1 of 8

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GoS-KHI-382162379-A2E8D6

E-STAMP

BETWEEN

Mr. **NAZEER AHMED KHAN** s/o Mumtaz Khan Muslim, adult, holder of CNIC No.42401-0194886-5 and r/o House No A-205, Block F North Nazimabad Karachi hereinafter referred to as "**the VENDOR**" (which expression wherever the context so admits and permits shall mean and include his heirs, assigns, legal representatives, attorneys, executors, administrators and or any other person authorized in this respect) of the **ONE PART.**

AND

(1) **Mrs. NAHID SOHAIL ADMANI** w/o Sohail Admani, Muslim, adult, holder of CNIC No.42301-2438032-2 and resident of Flat No.1801 & 1801 The Residence Blocks-8, Clifton, Karachi (25% share).

(2) **Mrs. SADIA SOHAIL ADMANI** w/o Sohail Admani Muslim, adult, holder of CNIC No.42301-0034606-6 and resident of Flat No.1801 & 1801 "The Residence" Blocks-8, Clifton, Karachi (25% share).

(3) **Mr. RASHID MEHMOOD** son of Mirdad Khan, Muslim, adult, holder of CNIC No.42501-1609426-1 and resident of 527, Defence Officers Housing Society Phase I, Malir Cantt. (39.73% share).

(4) **Mr. SALMAN YOUSUF** son of Muhammad Yousuf, Muslim, adult, holder of CNIC No.42201-9576932-9 and resident of House No.81-91, Street No.6 A Askari IV Gulistan-e-Jauhar, Karachi (5.27% share).

(5) **Mr. MUHAMMAD ASIM** son of Shaukat Ismail, Muslim, adult, holder of CNIC No.42201-4875528-3 and resident of House No.81-91, Askari IV Gulistan-e-Jauhar Karachi (5% share).

hereinafter referred to as the "**VENDEES**" (which expression wherever appearing in these presents shall mean and include their heirs, assigns, legal representatives, attorneys, executors, administrators and or any other person authorized in this respect) PARTY OF THE OTHER PART.

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[illegible]

UNDERLEASE

[illegible] THREE RESIDENTIAL-CUM-COMMERCIAL PLOT OF LAND BEARING NO.CL-9, SHEET NO.CL-9, MEASURING 2100 SQUARE YARDS, SITUATED IN CIVIL LINES QUARTERS, BURNESS ROAD, KARACHI WITH DOUBLE STORIED BUILDING CONSTRUCTED THEREON, HAVING COVERED AREA 4500 SQUARE FEET OF EACH GROUND AND FIRST FLOOR, [illegible]

SAID PROPERTY [illegible] SALE DEED

[illegible] 2668 [illegible]

[illegible]

WITNESSETH AS UNDER

AND WHEREAS [illegible] Civil Lines Quarters, Karachi measuring 6437 Square Yards was allotted vide Honorable High Court Order dated 06-03-1971 in Suit No.193/1971, which was sanctioned vide D.C. Letter No.DMC/N.O./340/72 dated 26-04-1972 and portion of above Plot measuring 2100 Square Yard, bearing Survey No.16/2, Sheet No.CL-9, Civil Lines, Karachi with double storied Bungalow constructed thereon was allotted in the name of Mr. Saifuddin Lotia in the record of Assistant Commissioner, South Karachi C.D.C. Karachi.

AND WHEREAS thereafter Mr. Saifuddin Lotia vide Declaration of Oral Gift Deed dated 01-02-1990 bearing Registration No.495 of Book No.I, Addl. dated 01-02-1990, M.F. Roll No.1207 dated 15-02-1990, gifted the "Said Property" in favor of his wife and two daughters namely, (1) Mrs. Marum Bai w/o Saifuddin G. Lotia (2) Mrs. Sher Bano Ibrhaim w/o Saleh Ibrahim and (3) Mrs. Rashida Anwar w/o Anwar Shaikh Mohammad Ally respectively.

AND WHEREAS vide Declaration confirming Oral Gift dated 12-07-1995 bearing Registration No.1889 dated 27-09-1995, M. F. Roll No.2101 dated 12-10-1995 Mrs. Marum Bai w/o Saifuddin G. Lotia and (2) Mrs. Rashida Anwar w/o Anwar Shaikh Mohammad Ally gifted their 66.66% undivided share in the aforesaid Property in favor of Mr. Saifuddin G. Lotia.

Nahid

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AND WHEREAS subsequently by Declaration Confirming Oral Gift Deed Registration No.1824 dated 04.12.2015 M. F. Roll No.21[illegible] Photo Registrar, Mr. Saifuddin G. Lotia gifted his 11/66th out of his share 66/66 in favour of Mrs. Sher Bano Ibrahim w/o Saleh Ibrahim (the Purchaser herein) being 1/6th un-divided share in the Said Property.

AND WHEREAS Permission for Commercial Use of the "Said Property" has already been granted by the City Deputy Collector vide its Letter No.CTS/CS-1486 dated 31-12-1979 and on 06-07-1999 the Lease was renewed for further period of 99 years with effect from 1958 by Assistant Commissioner South Karachi vide their Letter No.CTS/CS-1/2231/99 dated 06-07-1999.

AND WHEREAS subsequently vide **DEED OF SALE** bearing Registration No.1680 at pages 52 to 61 in Volume No.91, Sub-Registrar I, Division II(B), Karachi, (1) Mrs. Sher Bano Ibrahim w/o Saleh Ibrahim co-owner to the extent of 44% un-divided share of the "Said Property" and (2) Mr. Saifuddin G. Lotia s/o Ghulam Hussain Lotia co-owner to the extent of 56% un-divided share of the "Said Property", sold, transferred, granted, conveyed and assigned their respective their ownership share, rights, title and interest in "Said Property" to (1) Mrs. Fatima Anwar Rammal w/o Anwar Hussain Ali Rammal (2) Mr. Karim S/o Anwar Hassan Ali Ramal & (3) Mr. Amin A. Rammal S/o Anwar Hassan Ali Rammal.

AND WHEREAS subsequently vide **Declaration Confirming Oral Gift**, bearing Registration No.**175** of Book No.I, dated 15.01.2004, Sub-Registrar I, Division II(B), Karachi, M. F. Roll No.U-9029/1674 dated 21.02.2004, Photo Registrar, Karachi, the above named (1) Mr. Karim S/o Anwar Hassan Ali Ramal co-owner to the extent of 1/3rd undivided share of the "Said Property" & (2) Mr. Amin A. Rammal S/o Anwar Hassan Ali Rammal co-owner to the extent of 1/3rd undivided of the "Said Property" gifted their respective share i.e. jointly 2/3 undivided share of the "Said Property" to **Mr. Anwar Hassan Ali Rammal** s/o Hassan Ali Rammal.

AND WHEREAS subsequently vide **SALE DEED** bearing Registration No.**2668** of Book No.I, dated 24.08.2022, Sub-Registrar-I, Saddar Town, Karachi and marked with Digital Scanning No.RD:2668/SRO:2/DocType:35 dated 30-Nov-2022 by DSU KHI BoR Sindh, the above named (1) **Mr. Anwar Hassan Ali Rammal** s/o Hassan Ali

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Rammal co-owner to the extent of 2.5% undivided share of the "Said Property" and (2) Mrs. Fatima Anwar Rammal w/o Anwar Hassan Ali Rammal co-owner to the extent of 1.5% undivided share of the "Said Property", sold, transferred, granted, conveyed and assigned entire their respective share in the "Said Property" to the Vendor above named.

AND WHEREAS the Vendor had agreed to sell and the Vendees had agreed to purchase **"SAID PROPERTY"** for a total sale consideration of **Rs.230,000,000/-(Rupees Two Hundred Thirty Million Only)**, with peaceful vacant possession and free from all charges, claims, encumbrances, mortgages, burdens, litigations, liens, rights, obligations, disputes, demands, liabilities, dues and objections of any nature whatsoever and together with valid, marketable and transferable leasehold rights, free from any restrictions or objection from any department, authority or person whatsoever on the terms and conditions set-forth in this Conveyance Deed.

NOW THEREFORE, THIS CONVEYANCE DEED WITNESSETH AS UNDER:

1. That in pursuance of an Agreement duly signed between the parties, the amount of sale consideration of **Rs.230,000,000/-(Rupees Two Hundred Thirty Million Only)** is payable by the Vendees to the Vendor as per schedule and mode of payment as decided between the parties; the Vendor being the exclusive, legal and beneficial owner of the "Said Property" hereby sell, transfer, assign and convey absolutely unto the Vendees the **"SAID PROPERTY" TOGETHER WITH** marketable and transferable title hereto and the existing privileges, rights, title, leasehold interest, easements, passages and all advantages whatsoever belonging hereto or in any way appertaining therewith or any part thereof now or at any time hereto before usually held, occupied or enjoyed by the Vendor **TO HAVE AND TO HOLD THE SAME** unto and to the use and benefit of the Vendees as absolute joint owners thereof, free from all lets, hindrances, claims, demands, suits, disputes, denials, interruptions, litigations, previous commitments, sureties, mortgages, charges and/or ejection whatsoever AND together with the absolute right to further sell, transfer, convey mortgage, gift and assign the **"SAID PROPERTY"** with the benefit contained in Sanad Form H-3/1.

2. THAT the Vendor further doth hereby covenants with the Vendees and represents that the Vendees shall be absolutely entitled to peacefully and quietly own, possess, occupy and enjoy the **"SAID PROPERTY"** free from all claims,

Wahid Sadia Sohail

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demands, charges lets, hindrances, interruptions and disputes, litigations and eviction whatsoever from any persons, claiming through under or in trust from the Vendor.

3. THAT the Vendor doth hereby covenants with the Vendees and represents that the Vendor has not done, made, commitment, permitted or caused, suffered to be done or neglected from doing anything whereby the Vendor's right to grant, sell, assign, convey or transfer any of estate, rights, titles and interest in respect of the **"SAID PROPERTY"** and or right of possession and enjoyment have been or may be impaired.

4. THAT the Vendor further doth hereby covenants with the Vendees that the Vendor has valid marketable leasehold title to the **"SAID PROPERTY"** and the **"SAID PROPERTY"** is free from all claims, disputes, mortgages, charges, liens, demands and encumbrances whatsoever and that the Vendor shall keep and hold the Vendees secured, harmless and indemnified against any losses, damages or costs suffered or incurred by the Vendees on account of any defect in the title of the Vendor to the **"SAID PROPERTY"** or on account of any lawful claims, liens, mortgages, charges, evictions, lets, hindrances and encumbrances in respect of the **"SAID PROPERTY"** created prior to the date hereof.

5. THAT the Vendor doth hereby declares that the vacant and Physical possession of the **"SAID PROPERTY"** has been handed over to the Vendees and the Vendor has also delivered to the Vendee all the available original deeds and documents of title pertaining to the **"SAID PROPERTY"** in the possession of the Vendor and relating to the **"SAID PROPERTY"** and that henceforth the Vendor has ceased to have any rights, title, interest or claim in the **"SAID PROPERTY"** or any part thereof and the Vendees shall be the exclusive, absolute, rightful co-owners of the **"SAID PROPERTY"** and the Vendees acknowledge receipt of vacant and Physical possession of the **"SAID PROPERTY"** and of the available original deeds and documents.

6. THAT the Vendor further covenants with the Vendees and represents that all dues, outgoings, taxes, levies, charges in respect of the **"SAID PROPERTY"** upto the date of presentment for registration of this Conveyance Deed, have been paid and cleared by the Vendor, however, if any claims and/or bills in respect of

Wahid

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the same are received by the Vendees pertaining to the period upto the date of presentation for registration of this Conveyance Deed, the same will be borne by the Vendor and the amount thereof immediately paid to the Vendees on demand.

7. THAT the Vendor undertakes to execute or sign such other documents, applications, declaration and provide all necessary co-operation as may be necessary or required for more fully perfecting the Conveyance and transfer of the **"SAID PROPERTY"** to the Vendees and to procure the **"SAID PROPERTY"** to be transferred/mutated in the records of rights maintained by the Mukhtiarkar Civil Lines, District South, Karachi and other departments, at the entire cost and expenses of the Vendees.

8. That the Vendees hereby assure and undertake to Stamp Duty, Advance Tax u/s 236k, Registration Fee and the Vendor hereby agrees to pay Town Tax and withholding Tax u/s 236c.

SCHEDULE OF THE PROPERTY

ALL THAT RESIDENTIAL-CUM-COMMERCIAL PLOT OF LAND BEARING NO.CL-9/10/2, SHEET NO.CL-9, MEASURING 2100 SQUARE YARDS, SITUATED IN CIVIL LINES QUARTERS, BURNTON ROAD, KARACHI WITH DOUBLE STORIED BUILDING CONSTRUCTED THEREON, HAVING COVERED AREA 4500 SQUARE FEET OF EACH GROUND AND FIRST FLOOR, within the territorial limits of P.S. Civil Lines Quarters, Karachi and bounded and butted as under: -

ON THE NORTH BY	:	ROAD.
ON THE SOUTH BY	:	PLOT NO.CL-9, 11/1.
ON THE EAST BY	:	PLOT NO.CL-9, 10/1.
ON THE WEST BY	:	PLOT NO.CL-9, 10/3.

Together with all easements rights, titles, interests and amenities alongwith absolute ownership rights of the SAID PROPERTY.

Wahid

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IN WITNESSES WHEREOF the parties hereto have set and subscribed their respective hands on these presents on the day, month and the year first above mentioned.

Vendor:

Mr. NAZEER AHMED KHAN
s/o Mumtaz Khan
CNIC No.42401-0114865-5
0321-2081293

Vendees:

1. _____
Mrs. NAHID SOHAIL ADMANI
wife of Sohail Admani
CNIC No.42301-2435432-2
(25% share)

2. _____
Mrs. SADIA SOHAIL ADMANI
wife of Sohail Admani
CNIC No.42301-6034665-6
(25% share)

2316

3. _____ 0300-9242764
Mr. RASHID MEHMOOD
Son of Mirdad Khan
CNIC No.42501-1605426-1
(39.73% share)

4. _____ 0321-82.22.84
Mr. SALMAN YOUSUF
son of Muhammad Yousuf
CNIC No.42201-9576932-9
(5.27% share)

5. _____ 0321-9270970
Mr. MUHAMMAD ASIM
son of Shaukat Ismail
CNIC No.42201-4375528-3
(5% share)

WITNESSES:

1. Salman Ilyas
CNIC NO. 41304-0897017-5

2. _____
JAMIL AKBER
42301-6044891-9

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(No)

S. No. _____

Presented in the office of
Sub Registrar (West)
Saddar on 08 AUG 2023

Between Mr. _____ to _____

Sub-Registrar I
Saddar Town, Karachi

Serial No. 1016
Receipt Registration No. 1016
Book No. 1
Date 08-08-2023
Amount Rs. 1,000/-
Name of Party Mr. Abdul Wahab
Description of Property Flat
Consideration Rs. 1,000/-
Stamp Duty Rs. 1,000/-
Registration Fee Rs. 1,000/-
Total Rs. 3,000/-

Sub-Registrar II
Saddar Town, Karachi

Mr. Miss/Mrs. Abdul Wahab
S/o D/o W/o Late Abdul Ghaffar
Executing Party Business/Service _____
Muslim Adult Age _____
R/o Karachi _____ Karachi

Admits execution of this deed.
NIC No. 42101-1011747-5

Mr. Miss/Mrs. Mahid Sohail Mohsin
S/o D/o W/o Sohail Mohsin
Executing Party Business/Service _____
Muslim Adult Age _____
R/o Karachi _____ Karachi

Admits execution of this deed.
NIC No. 42301-0463165-9

Mr. Miss/Mrs. Sadia Sohail Mohsin
S/o D/o W/o Sohail Mohsin
Executing Party Business/Service _____
Muslim Adult Age _____
R/o Karachi _____ Karachi

Admits execution of this deed.
NIC No. 42301-0063765-7

Mr. Miss/Mrs. Rashid Mehmood
S/o D/o W/o Khurshid Khan
Executing Party Business/Service _____
Muslim Adult Age _____
R/o Karachi _____ Karachi

Admits execution of this deed.
NIC No. 42301-1163076-1

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Yasmeen Yousuf

S/o D/o W/o Muhammad Yousuf

Executing Party Business/Service -

Muslim Adult Age -

R/o Karachi Karachi

Admits execution of this deed.

NIC No. 42201-7157467328-9

Muhammad Ahsan

S/o D/o W/o Shaukat Ismail

Executing Party Business/Service -

Muslim Adult Age -

R/o Karachi Karachi

Admits execution of this deed.

NIC No. 42201-7132520-13

Wahid

States that he personally knows the above executants and identities

Date: 07 AUG 2023

Sub-Registrar
Saddar Town, Karachi

Adjoining Owner
Adjoining Owner

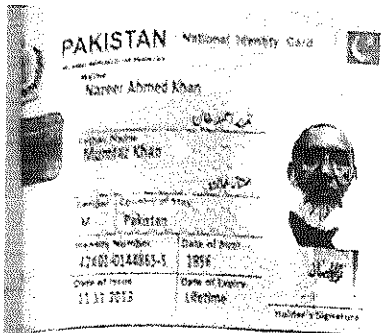
Registered No. 2316
Book No. I
Date 08-08-23

Sub-Registrar
Saddar Town, Karachi

SADDAR TOWN
KARACHI

Receiving Owner
Adjoining Owner
Land is ordinary
Gaurdy
for Ryoshalini

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PAKISTAN National Identity Card

Name: Nasrullah Ahmed Khan

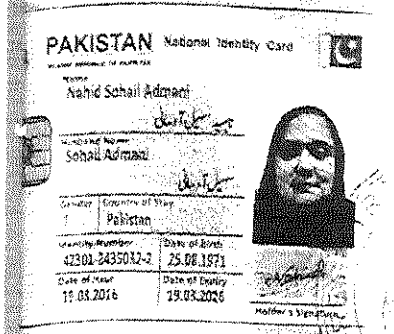
Father Name: Mumtaz Khan

Gender: M | Country of Stay: Pakistan

Identity Number: 42401-0144865-5 | Date of Birth: 1956

Date of Issue: 11.11.2013 | Date of Expiry: Lifetime

Holder's Signature


PAKISTAN National Identity Card

Name: Nahid Sohail Admani

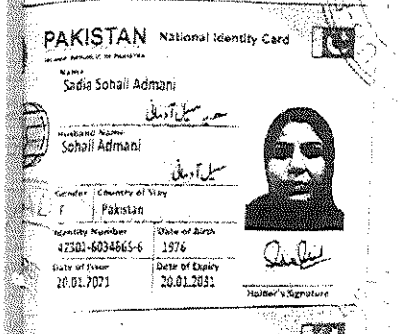
Husband Name: Sohail Admani

Gender: F | Country of Stay: Pakistan

Identity Number: 42301-2435032-2 | Date of Birth: 25.08.1971

Date of Issue: 19.03.2016 | Date of Expiry: 19.03.2026

Holder's Signature


PAKISTAN National Identity Card

Name: Sadia Sohail Admani

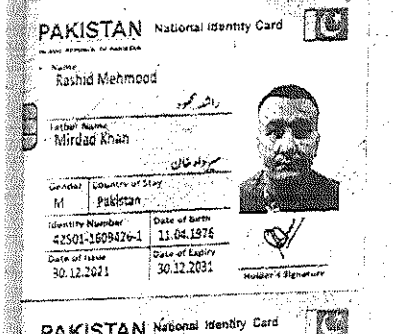
Husband Name: Sohail Admani

Gender: F | Country of Stay: Pakistan

Identity Number: 42301-6034665-6 | Date of Birth: 1976

Date of Issue: 20.01.2021 | Date of Expiry: 20.01.2031

Holder's Signature


PAKISTAN National Identity Card

Name: Rashid Mehmood

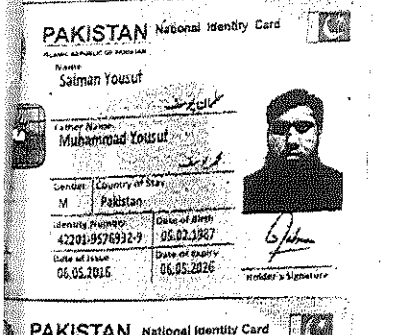
Father Name: Mirdad Khan

Gender: M | Country of Stay: Pakistan

Identity Number: 42501-1609426-1 | Date of Birth: 11.04.1976

Date of Issue: 30.12.2021 | Date of Expiry: 30.12.2031

Holder's Signature


PAKISTAN National Identity Card

Name: Salman Yousuf

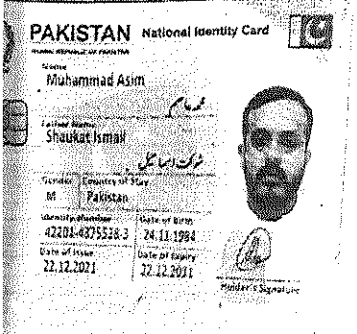
Father Name: Muhammad Yousuf

Gender: M | Country of Stay: Pakistan

Identity Number: 42201-9576932-9 | Date of Birth: 06.02.1987

Date of Issue: 06.05.2016 | Date of Expiry: 06.05.2026

Holder's Signature


PAKISTAN National Identity Card

Name: Muhammad Asim

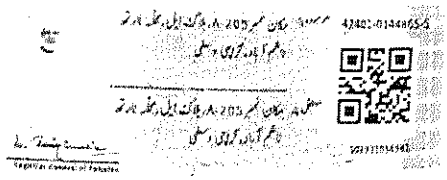
Father Name: Shaukat Ismail

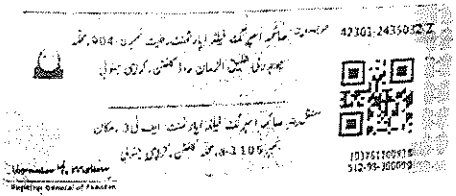
Gender: M | Country of Stay: Pakistan

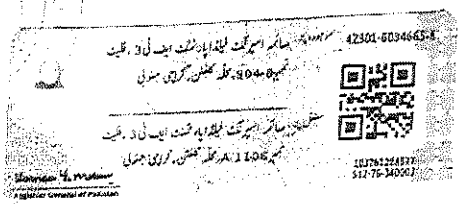
Identity Number: 42201-4375538-3 | Date of Birth: 24.11.1984

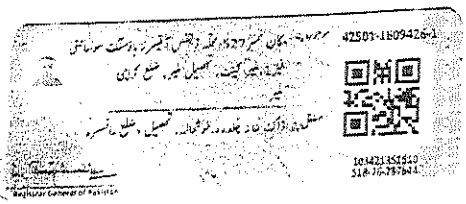
Date of Issue: 22.12.2021 | Date of Expiry: 22.12.2031

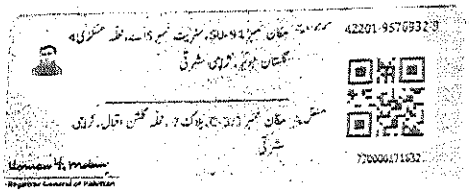
Holder's Signature

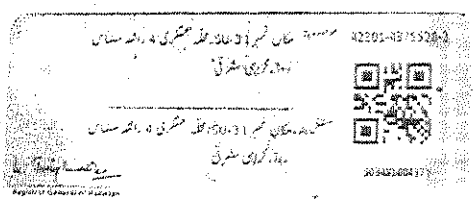

گمشدہ کارڈ ملنے پر قریبی لیٹر بکس میں ڈال دیں


گمشدہ کارڈ ملنے پر قریبی لیٹر بکس میں ڈال دیں

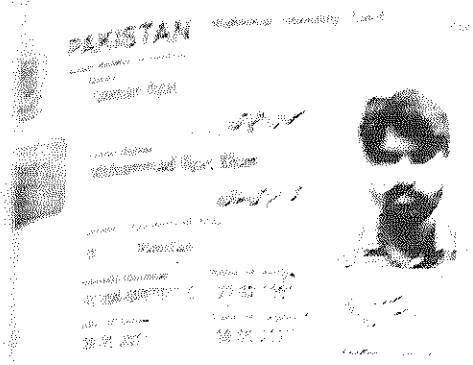

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گمشدہ کارڈ ملنے پر قریبی لیٹر بکس میں ڈال دیں

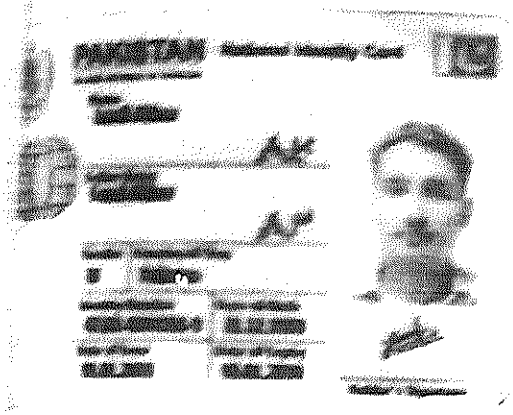

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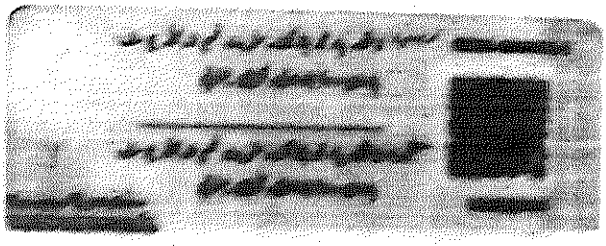

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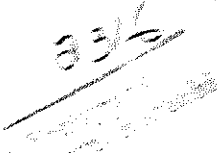
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Board of ...evenue, Sindh
Face Sheet

Office: Saddar-I

Deed Type: Conveyance Deed

Doc ID: 553046

Property Type: Built Up Commercial Property

Area: 2440 SQR YD

Property Details

District: Karachi South

Taluka/Town: Saddar I

Deh/Area: Civil Lines Saddar-I

Complete Address: SURVEY NO.10-1, SHEET NO CL-9, CIVIL LINES QUARTERS, KARACHI.

Computer Number: BOR - 2020 - 21 - 325

1st Party Detail:

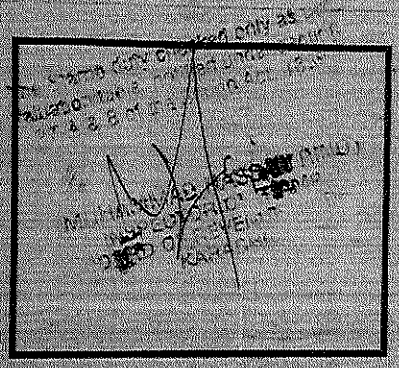
Full Name	CNIC	Mobile No
MR. MOHAMMAD AKHTAR BAWANY	42000-0389543-7	03005005777

No More Members

2nd Party Detail:

Full Name	CNIC	Mobile No
MRS. NAHID SOHAIL ADMANI	42301-2435032-2	NULL

4 More Members



For Office Use Only:

RD No#: 304 RD Date: 03-Feb-2020

☐ Registration Fee:	975000	☐ Advance Tax:	5600000
☐ CVT:	2925000	☐ Municipal Tax:	5600000
☐ Gain Tax:	5600000		
☐ Stamp Duty:	1950000		

Signature (Sub Registration)

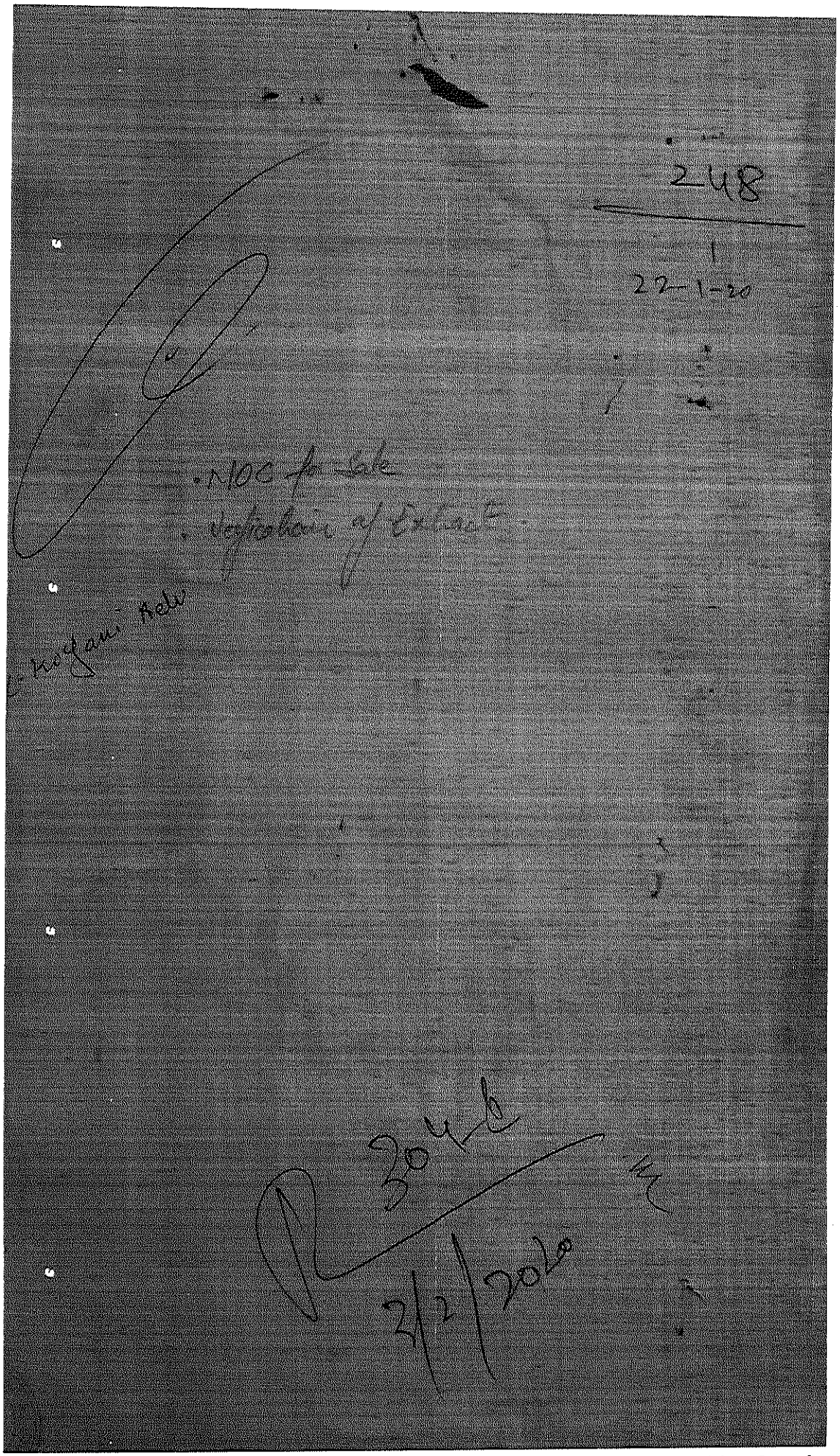
Audit Observation (if any):

The Registration Fees checked and found correct as per Rules

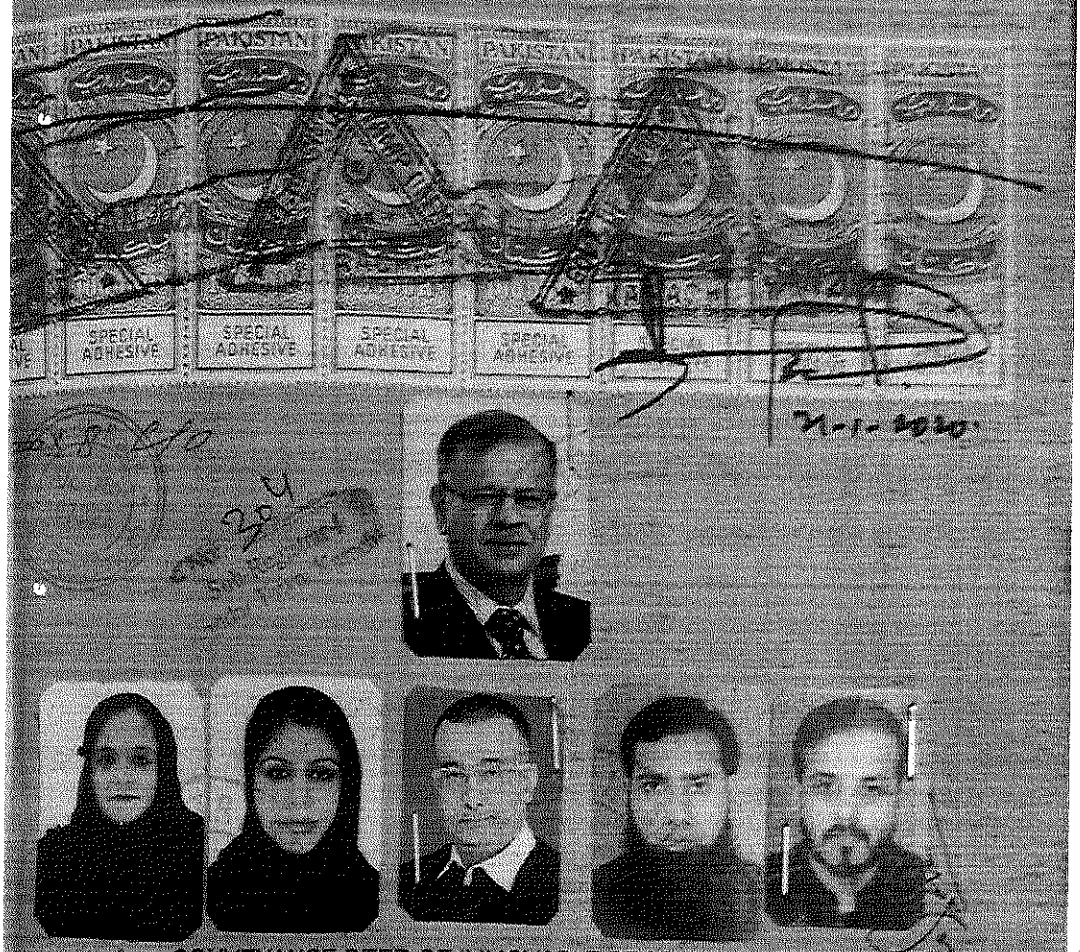
Senior Inspector Saddar Karachi

Signature (Audit Officer)

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CONVEYANCE DEED OF IMMOVABLE PROPERTY

VALUED AT RS.560,000,000/-(RUPEES FIVE HUNDRED SIXTY MILLION)

Floating rate as defined in Notification dated 10th July, 2019 applied for Stamp Duty, CVT, Registration Fee

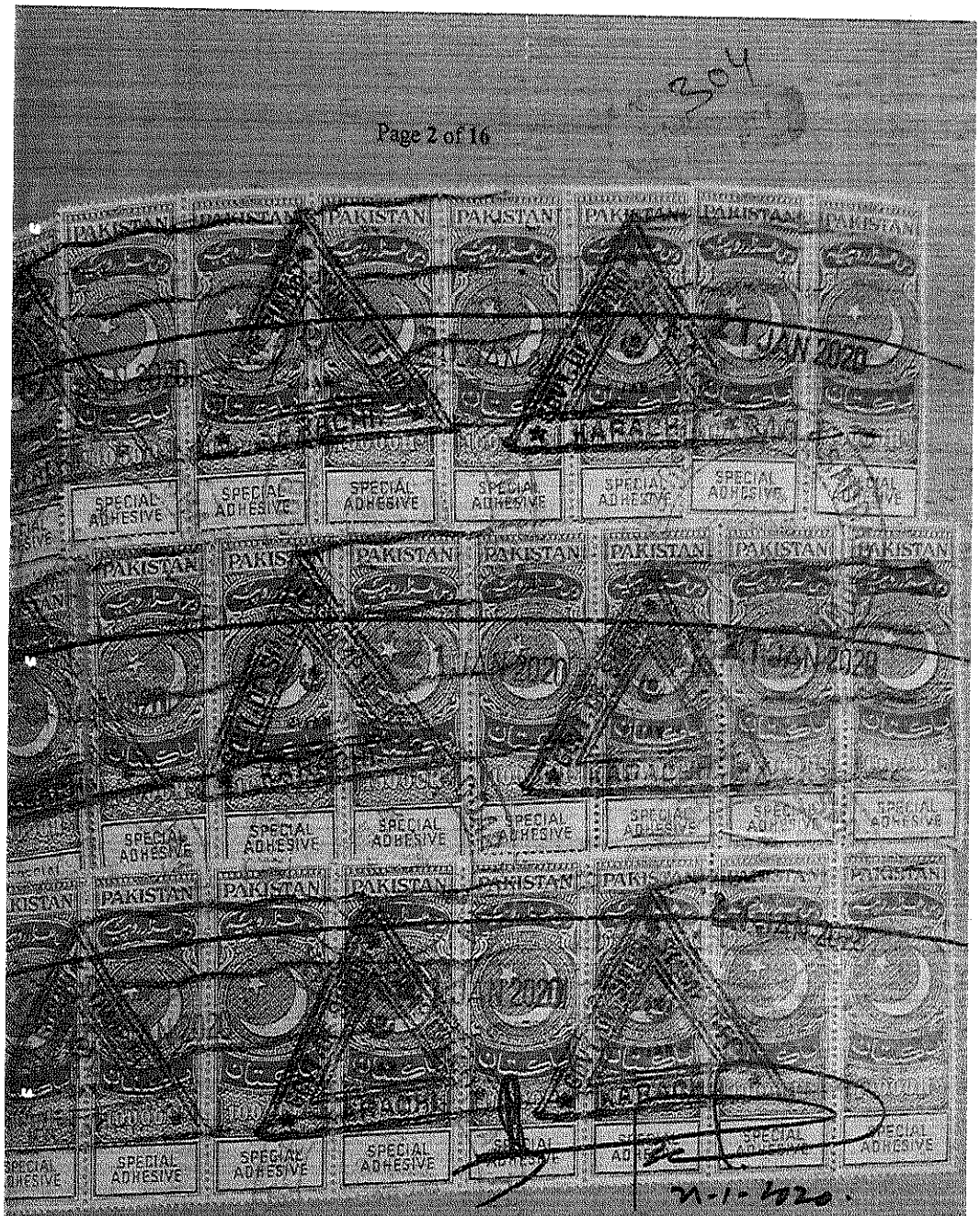
Floating Rate=Value in the Valuation Table/Actual Value* Stamp Duty Rate

THIS CONVEYANCE DEED is made here at Karachi on this 22nd day of January, 2020.

BETWEEN

M/S CITY PROPERTIES (PVT.) LIMITED, a company, limited by shares, incorporated under the Corporate Laws of Pakistan, having its Registered Office at 1st Floor, NESPAK House G-6/2, Islamabad, through its authorized Chief Executive Officer Mr. Mohammad Akhtar Bawany s/o Haji Latif Bawany, holding CNIC No.42000-0389543-7, duly authorized under Board of Directors' Resolution dated 20th January, 2020 hereinafter referred to as "**the VENDOR**" (which expression wherever the context so admits and permits shall mean and include its successors, executors, administrators assigns-in-interest) of the **ONE PART**;

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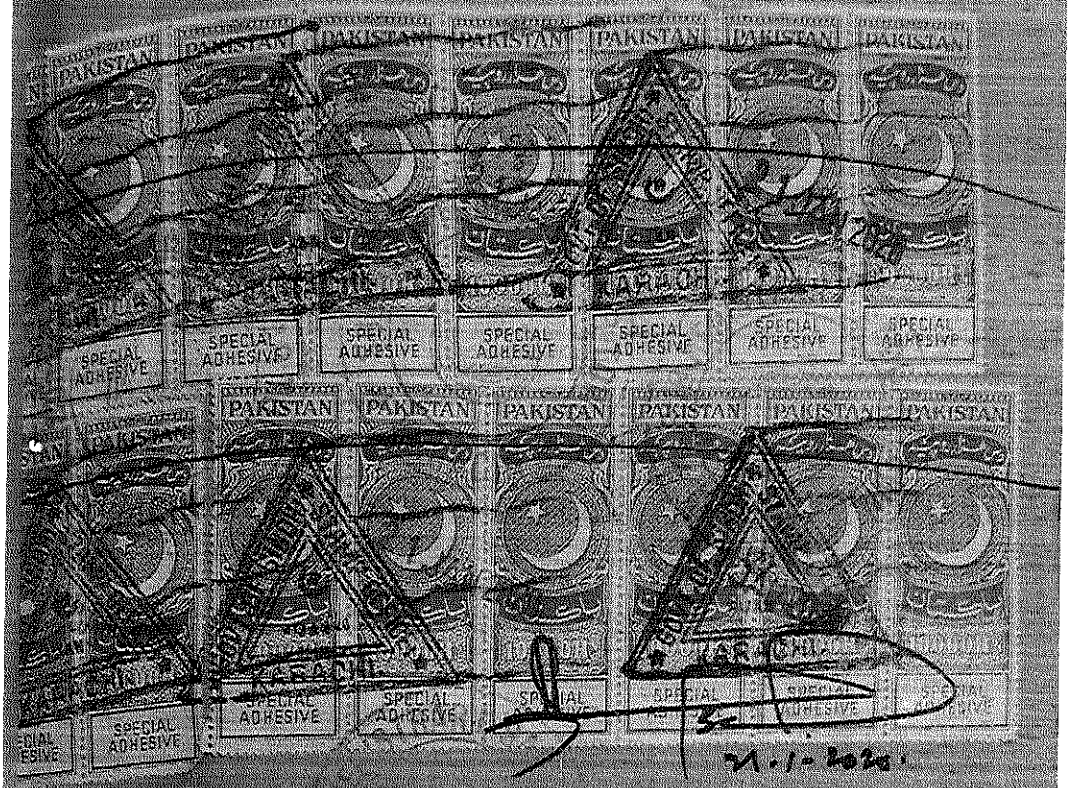


AND

(1) **MRS. NAHID SOHAIL ADMANI** w/o Sohail Admani, Muslim, adult, holder of CNIC No.42301-2435032-2 and resident of Flat No.1802 & 1804 "The Residence" Block-8, Clifton, Karachi **(25% share).**

(2) **MRS. SADIA SOHAIL ADMANI** w/o Sohail Admani, Muslim, adult, holder of CNIC No.42301-6034665-6 and resident of Flat No.1802 & 1804 "The Residence" Block-8, Clifton, Karachi **(25% share).**

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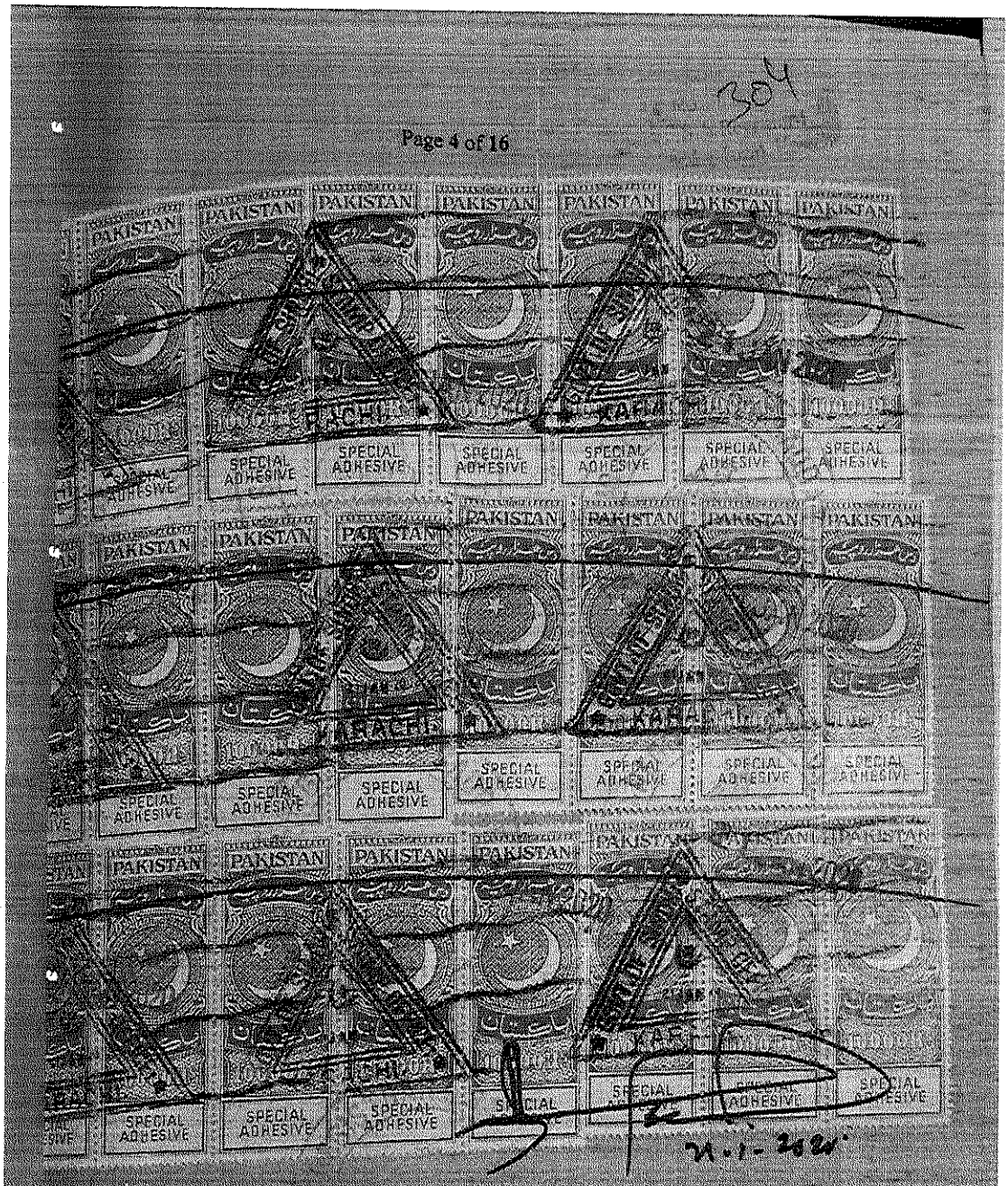
(3) **MR. RASHID MEHMOOD** son of Mirdad Khan, Muslim, adult, holder of CNIC No.42501-1609428-1 and resident of 527, Defence Officers Housing Society, Phase-I, Malir Cantt. **(39.73% share).**

(4) **MR. SALMAN YOUSUF** son of Muhammad Yousuf, Muslim, adult, holder of CNIC No.42201-9576932-9 and resident of House No.SU-91, Street No.5-A, Askari-IV, Gulistan-e-Jauhar, Karachi **(5.27% share).**

(5) **MR. MUHAMMAD ASIM** son of Shaukat Ismail, Muslim, adult, holder of CNIC No.42201-4375528-3 and resident of House No.SU-31, Askari-IV, Gulistan-e-Jauhar, Karachi **(5% share).**

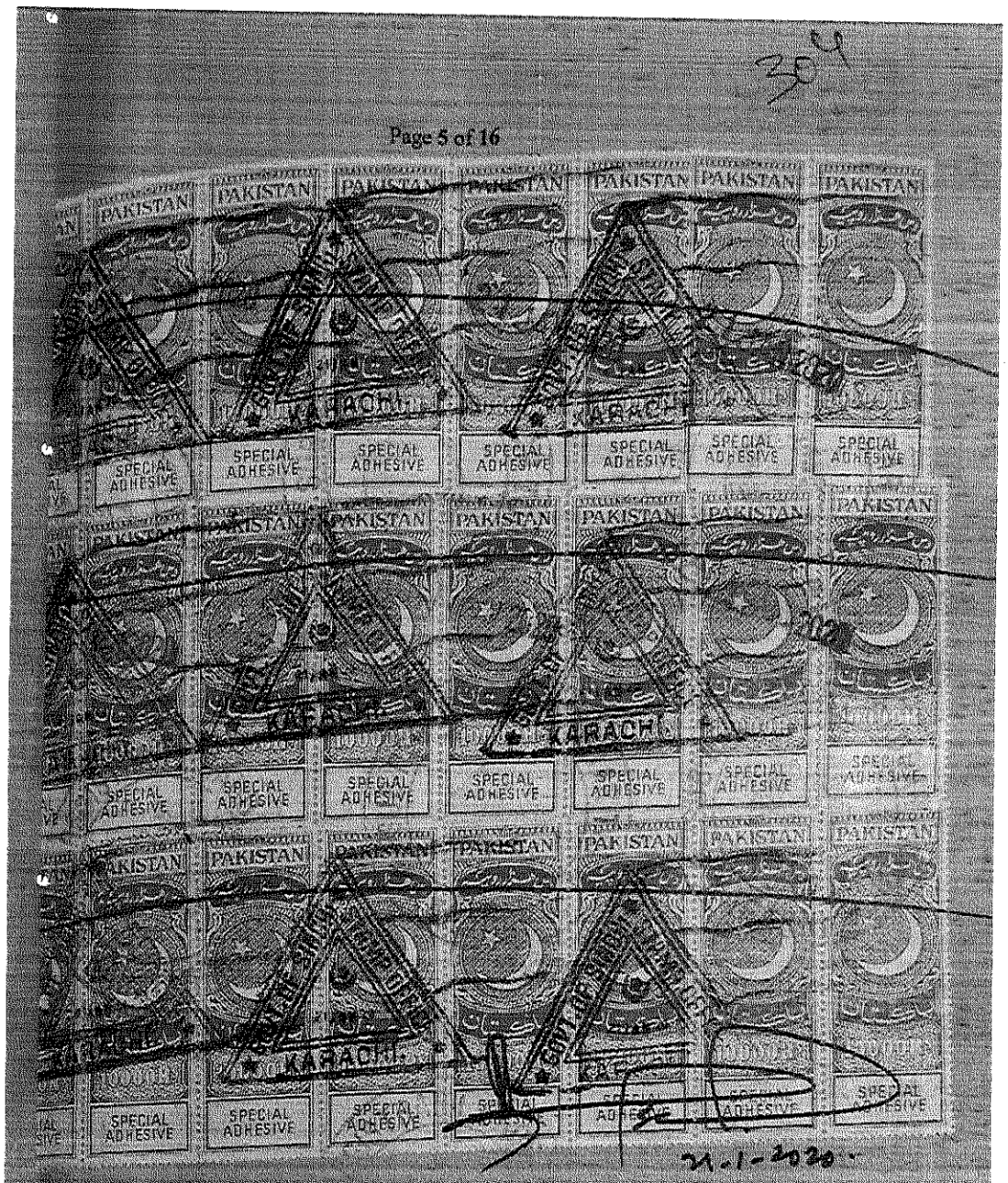
(hereinafter referred to as the "**VENDEES**" (which expression wherever appearing in these presents shall mean and include their heirs, assigns, legal representatives, attorneys, executors, administrators and/or any other person authorized in this respect) PARTY OF THE OTHER PART.

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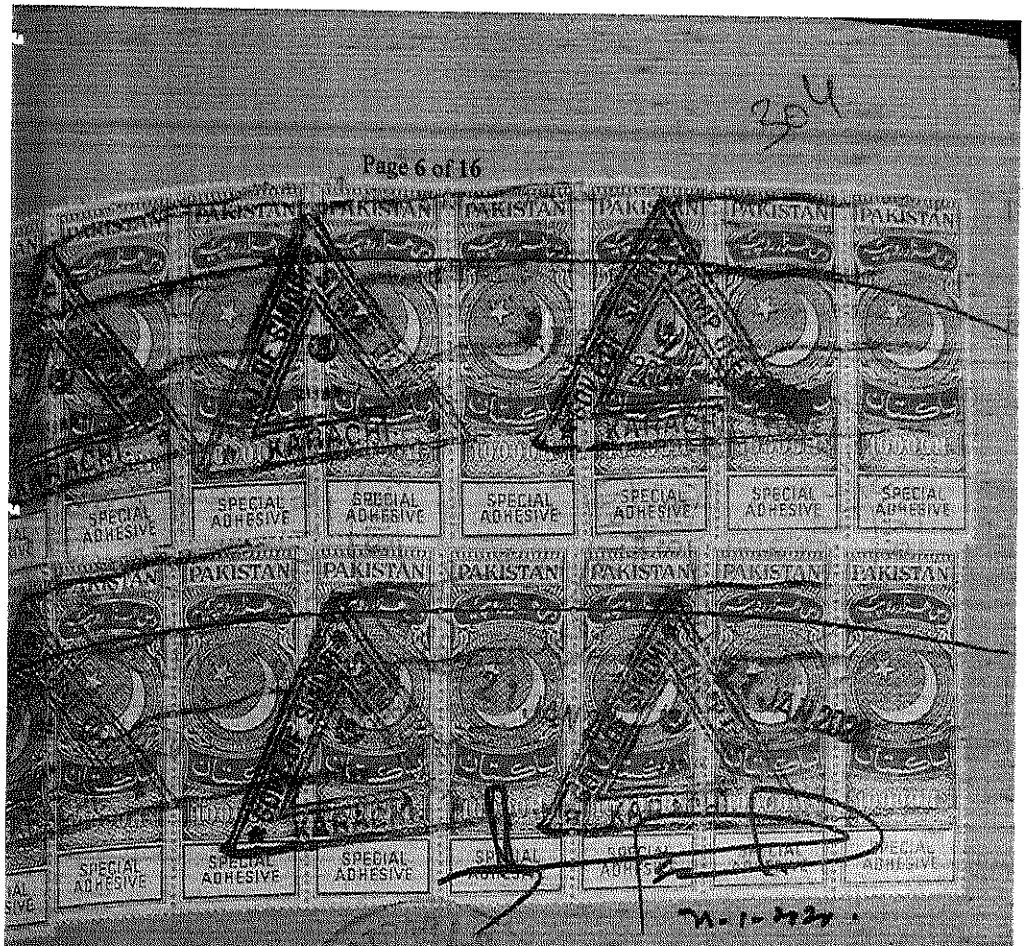
WHEREAS by virtue of and under the Consent Decree dated 19.10.1971 passed by Honourable High Court of Sindh and Baluchistan in Suit No.183 of 1971 (1) Mr. Saifuddin son of Ghulam Hussain Lotia and (2) Mr. Ghulam Abbas son of Adamali Lotia acquired **ALL THAT** piece and parcel of plot of land bearing **SURVEY NO.10/1, SHEET NO.CL-9,** admeasuring 2440 square yards or thereabout, with Ground plus One Storied Building thereon, situated at Civil Lines Quarters, Karachi, hereinafter referred to as the **"SAID PROPERTY"** for an unexpired term of 99 years commencing from 25.04.1958 with the benefits of covenants contained in Sanad Form H-3/1.

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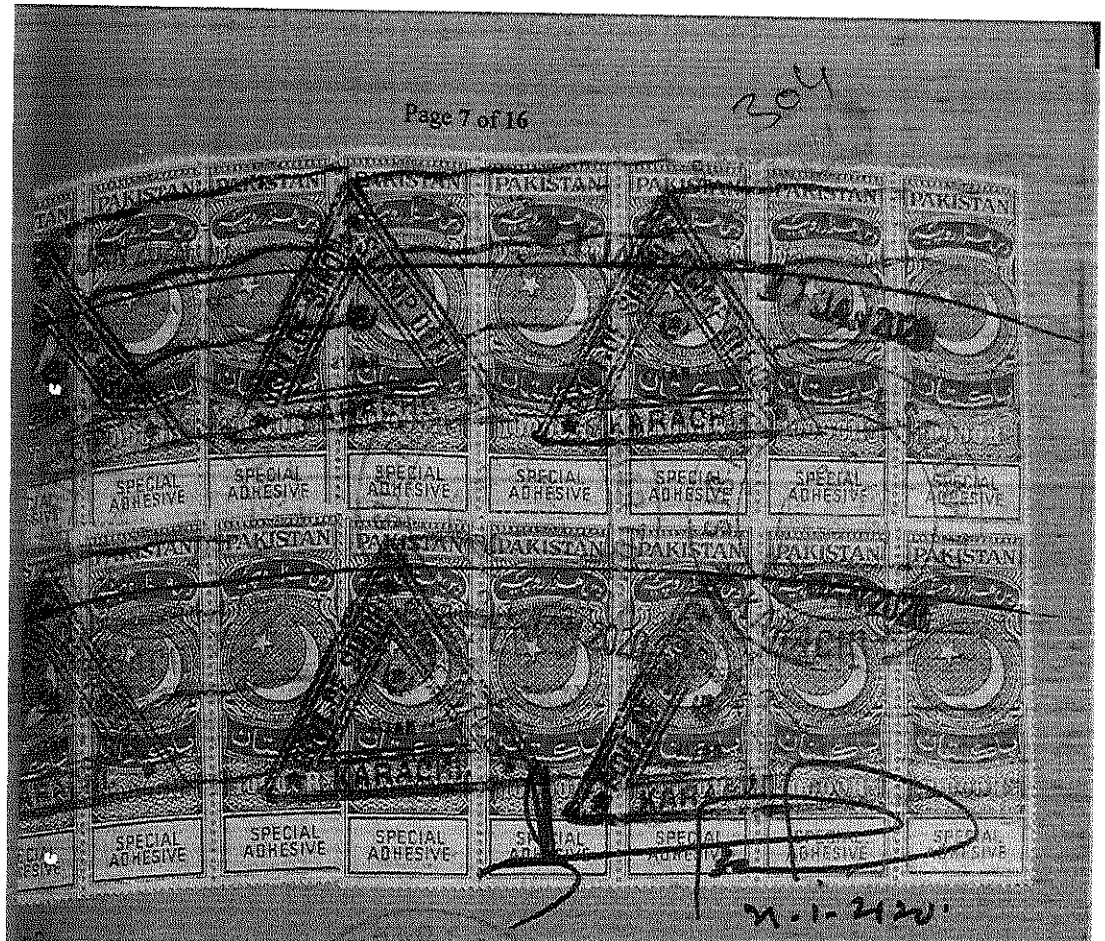
AND WHEREAS (1) Mr. Saifuddin son of Ghulam Hussain Lotia and (2) Mr. Ghulam Abbas son of Adamali Lotia, sold, conveyed and otherwise transferred the Plot of land bearing Survey No.10/1, Sheet No.CL-9, admeasuring 2440 square yards or thereabout with Ground Plus One Storied Building thereon, situated at Civil Lines Quarters, Karachi to M/s Rashid (Private) Limited, by means of Sale Deed duly registered under Registered No.4776 at pages 13 to 19 of Volume 956 of Book No.I, Addl. dated 16.04.1975 with the Sub-Registrar I, Division-II, Karachi.

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AND WHEREAS the above named M/s. Rashid (Private) Limited, a private company registered under the Companies Ordinance 1984, having its registered office at CL-9/10/1, Dr. Ziauddin Ahmed Road, Civil Lines, Karachi through its duly authorized Director Mr. Afzal Rashid son of Sher Ali Rashid, Muslim, adult, holding CNIC No.42000-0514190-9, sold, conveyed and otherwise transferred the Plot of land bearing Survey No.10/1, Sheet CL-9, admeasuring 2440 square yards or thereabout with Ground Plus One Storied building thereon, situated at Civil Lines Quarters, Karachi to **MR. HANIF ABDANI** son of Abdul Aziz Abdani by means of **DEED OF CONVEYANCE** duly Registered as Registered No.579 of Book No.1, dated 19.02.2007 (M. F. Roll No.U-1858/4127 dated 10.03.2007) with the Sub-Registrar-I, Saddar Town, Karachi and the ownership thereof was accordingly recorded in his name in the records of rights maintained by the Mukhtiarkar Saddar Town, Karachi vide Extract dated 18.06.2007.

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AND WHEREAS the above named **MR. HANIF ABDANI** son of Abdul Aziz Abdani, sold, conveyed and otherwise transferred the Plot of land bearing Survey No.10/1, Sheet CL-9, admeasuring 2440 square yards or thereabout with Ground Plus One Storied building thereon, situated at Civil Lines Quarters, Karachi to the VENDOR above named by means of **CONVEYANCE DEED** bearing Registration No.3064 of Book No.I dated 22.12.2015, Sub-Registrar-I, Saddar Town, Karachi and marked with Digital Scanning No.**RD:3064/SRO:2/DocType:14** by Digital Scanning Unit, BOR Sindh, Karachi, and the ownership thereof was accordingly recorded in his name in the records of rights maintained by the Mukhtiarkar Saddar Town, Karachi vide Extract dated 13.01.2020.

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304



21-1-2020

AND WHEREAS at the date of these presents, the VENDOR is seized, possessed of and otherwise well and sufficiently entitled to **ALL THAT** piece and parcel of **Commercial** plot of land bearing **SURVEY NO.10/1, SHEET NO.CL-9,** admeasuring 2440 square yards or thereabout, with Ground plus One Storied Building thereon, situated at Civil Lines Quarters, Karachi (more fully shown and described in the Schedule hereto and hereinafter referred to as the **"SAID PROPERTY"**).

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AND WHEREAS by means of Agreement to Sell dated 19th February 2019 and its Addendum, the Vendor had agreed to sell and the Vendees had agreed to purchase **"SAID PROPERTY"** for a total sale consideration of Rs.560,000,000/- (Rupees Five Hundred Sixty Million Only), with peaceful vacant possession and free from all charges, claims, encumbrances, mortgages, burdens, litigations, liens, rights, obligations, disputes, demands, liabilities, dues and objections of any nature whatsoever and together with valid, marketable and transferable leasehold rights, free from any restrictions or objection from any department, authority or person whatsoever on the terms and conditions set-forth in this Conveyance Deed.

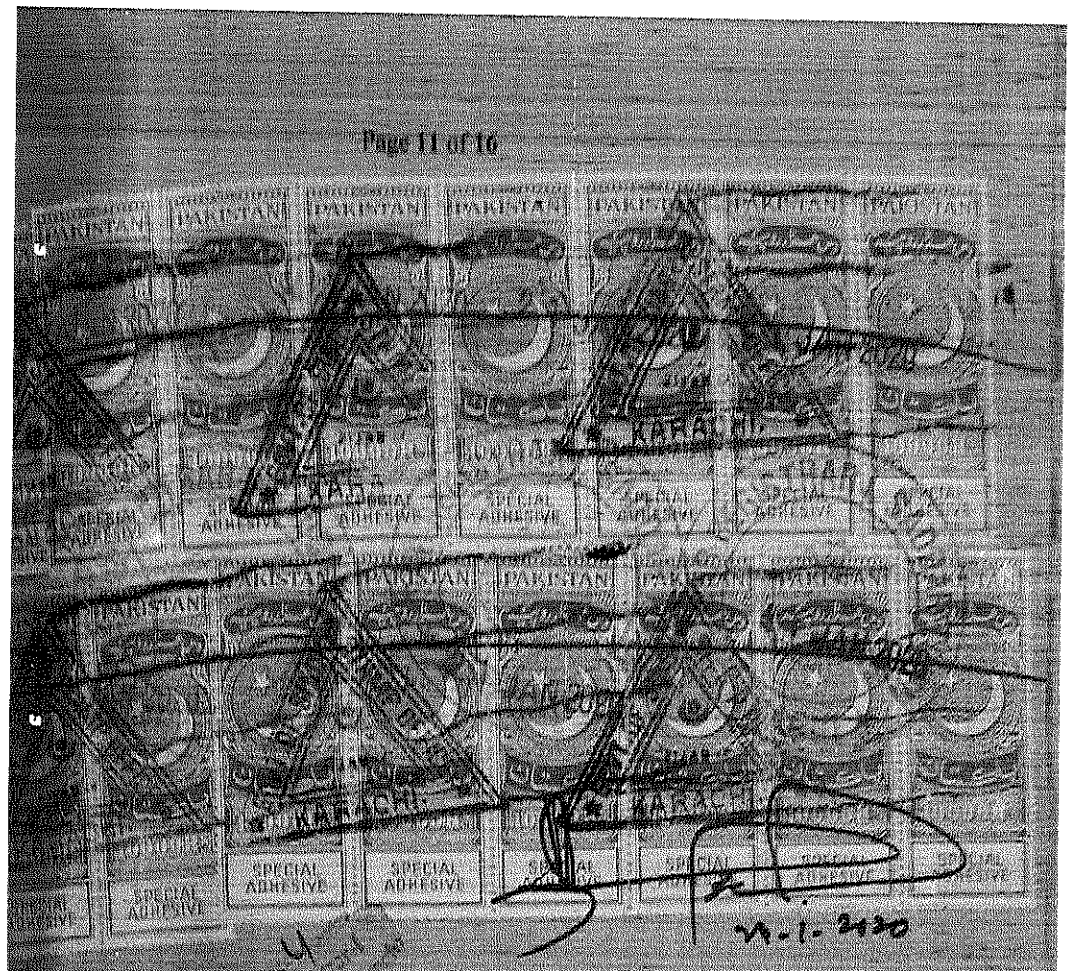
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NOW THEREFORE, THIS CONVEYANCE DEED WITNESSETH AS UNDER:

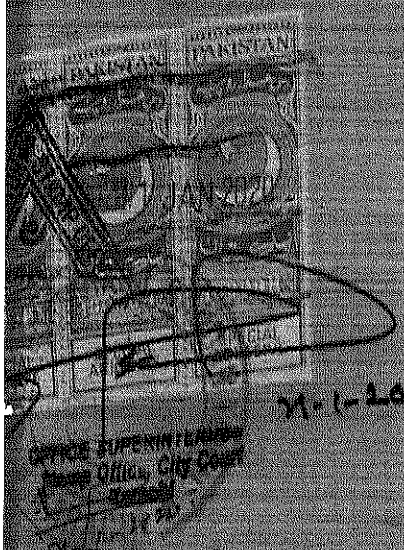
That in pursuance of Sale Agreement dated 19th February 2019 and its Addendum the total sale consideration of the sum of Rs.560,000,000/- (Rupees Five Hundred Sixty Million Only) for the sale of SAID PROPERTY well and truly paid by the Vendees to the Vendor prior to execution of Conveyance Deed through various Pay Orders/Cheques as full and final payment towards SAID PROPERTY, the receipt whereof the Vendor doth hereby fully admit and acknowledge for the same and every

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part thereof, the Vendor hereby acquits, discharges and exonerates the Vendees in this behalf and the Vendor being the exclusive, legal and beneficial owner of the "Said Property" hereby sell, transfer, assign and convey absolutely unto the Vendees the **"SAID PROPERTY" TOGETHER WITH** marketable and transferable title hereto and the existing privileges, rights, title, leasehold interest, easements, passages and all advantages whatsoever belonging hereto or in any way appertaining therewith or any part thereof now or at any time hereto before usually held, occupied or enjoyed by the Vendor **TO HAVE AND TO HOLD THE SAME** unto and to the use and benefit of the Vendees as absolute joint owners thereof, free from all lets, hindrances, claims, demands, suits, disputes, denials, interruptions, litigations, previous commitments, sureties, mortgages, charges and/or ejection whatsoever AND together with the absolute right to further sell, transfer, convey mortgage, gift and assign the **"SAID PROPERTY"** with the benefit contained in Sanad Form H-3/1.

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21 JAN 2020

8. THAT the Vendor further doth hereby covenants with the Vendees and represents that the Vendees shall be absolutely entitled to peacefully and quietly own, possess, occupy and enjoy the "SAID PROPERTY" free from all claims, demands, charges lets, hindrances, interruptions and disputes, litigations and eviction whatsoever from any persons, claiming through under or in trust from the Vendor.

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3.6 THAT the Vendor doth hereby covenants with the Vendees and represents that the Vendor has not done, made, commitment, permitted or caused, suffered to be done or neglected from doing anything whereby the Vendor's right to grant, sell, assign, convey or transfer any of estate, rights, titles and interest in respect of the **"SAID PROPERTY"** and/or right of possession and enjoyment have been or may be impaired.

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4. THAT the Vendor further doth hereby covenants with the Vendees that the Vendor has valid marketable leasehold title to the **"SAID PROPERTY"** and the **"SAID PROPERTY"** is free from all claims, disputes, mortgages, charges, liens, demands and encumbrances whatsoever and that the Vendor shall keep and hold the Vendees secured, harmless and indemnified against any losses, damages or costs suffered or incurred by the Vendees on account of any defect in the title of the Vendor to the **"SAID PROPERTY"** or on account of any lawful claims, liens, mortgages, charges, evictions, lets, hindrances and encumbrances in respect of the **"SAID PROPERTY"** created prior to the date hereof.

5. THAT the Vendor doth hereby declares that the vacant and Physical possession of the **"SAID PROPERTY"** has been handed over to the Vendees and the Vendor has also delivered to the Vendee all the available original deeds and documents of title pertaining to the **"SAID PROPERTY"** in the possession of the Vendor and relating to the **"SAID PROPERTY"** and that henceforth the Vendor has ceased to have any rights, title, interest or claim in the **"SAID PROPERTY"** or any part thereof and the Vendees shall be the exclusive, absolute, rightful co-owners of the **"SAID PROPERTY"** and the Vendees acknowledge receipt of vacant and Physical possession of the **"SAID PROPERTY"** and of the available original deeds and documents.

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THAT the Vendor further covenants with the Vendees and represents that all dues, outgoings, taxes, levies, charges in respect of the **"SAID PROPERTY"** upto the date of presentment for registration of this Conveyance Deed, have been paid and cleared by the Vendor, however, if any claims and/or bills in respect of the same are received by the Vendees pertaining to the period upto the date of presentation for registration of this Conveyance Deed, the same will be borne by the Vendor and the amount thereof immediately paid to the Vendees on demand.

THAT the Vendor undertakes to execute or sign such other documents, applications, declaration and provide all necessary co-operation as may be necessary or required for more fully perfecting the Conveyance and transfer of the **"SAID PROPERTY"** to the Vendees and to procure the **"SAID PROPERTY"** to be transferred/mutated in the records of rights maintained by the Mukhtiarkar Civil Lines, District South, Karachi and other departments, at the entire cost and expenses of the Vendees.

Stamp Duty, CVT, Registration Fee is being paid and deposited in accordance with Floating Rate as fully defined in Notification dated 10th July, 2019 passed by Provincial Assembly of Sindh, Karachi.

SCHEDULE OF THE PROPERTY

ALL THAT piece and parcel of **Commercial** Plot of land bearing **SURVEY NO.1(M), SHEET NO.CL-9, MEASURING 2440 SQ. YDS., OR THEREABOUT,** with Ground plus one storied building thereon (4500 Sq. Ft. covered area each on the ground and the first floor and 1440 sq. yds. open area on the ground floor), situated at **CIVIL LINES QUARTERS, KARACHI** bounded and butted as under:-

ON THE NORTH BY	:	**BRUNTON ROAD.**
ON THE SOUTH BY	:	**PLOT NO.11/1/1.**
ON THE EAST BY	:	**PLOT NO.10/2.**
ON THE WEST BY	:	**KUTCHERI ROAD.**
		(Dr. Ziauddin Ahmed Road)

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IN WITNESS WHEREOF the parties hereto have set and subscribed their respective hands to these presents on the day, month and the year first above mentioned.

For and on behalf of
City Properties (Pvt.) Limited

Mr. Mohammad Akhtar Bawany
Chief Executive
Vendor
0300 5005777

Vendees:

1. _____
MRS. NAHID SOHAIL ADMANI
wife of Sohail Admani
CNIC No.42301-2435032-2
0321-2277486 (25% share)

2. _____
MRS. SADIA SOHAIL ADMANI
wife of Sohail Admani
CNIC No.42301-6034665-6
0301-3333867 (25% share)

3. _____
MR. RASHID MEHMOOD
Son of Mirdad Khan
CNIC No.42501-1609426-1
(39.73% share)
0300-9242764

4. _____
MR. SALMAN YOUSUF
son of Muhammad Yousuf
CNIC No 42201-9576932-9
0321-8212984 (5.27% share)

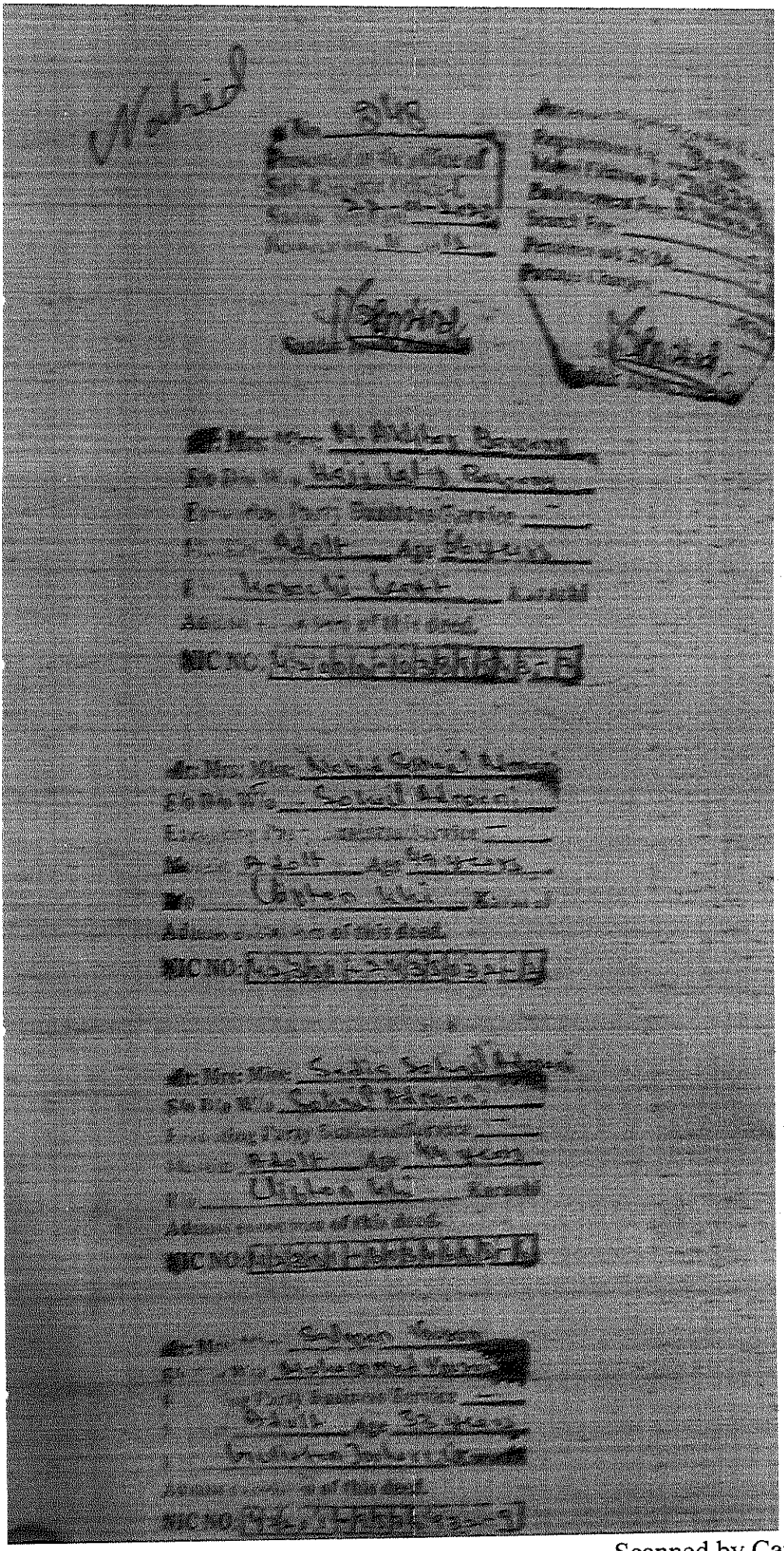
5. _____
MR. MUHAMMAD ASIM
son of Shaukat Ismail
CNIC No.42201-4375628-3
(5% share)
0321-9220470

WITNESSES:

1. _____
Name: Mr. Mudassar Zaki
CNIC No.42201-8160821-7

2. _____
Name: Mr. Muhammad Imran
CNIC No.42201-5072151-5

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Mr/Mrs/Miss: Rashid Mehmood

S/o/D/o/W/o: Mirabad Lehri

Executor/Party Business/Profession: —

Muslim: Adult Age: 44 years

R/o: Malir Cantt Karachi

Admits execution of this deed.

NIC NO: 42901-1604543-1

Mr/Mrs/Miss: Muhammad Asim

S/o/D/o/W/o: Shaukat Ismail

Executor/Party Business/Profession: —

Muslim: Adult Age: 36 years

R/o: Askari IV Gulistan Johar Karachi

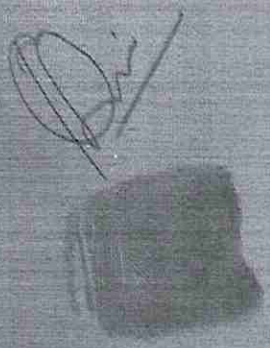
Admits execution of this deed.

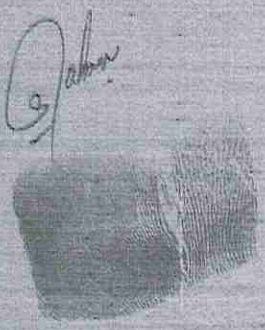
NIC NO: 42301-4375523-3

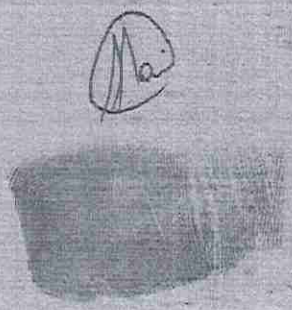












Kashif Ahmed Khojani
Advocate

15026/HC

States that he personally knows the above executant and identifies

Date: 22-01-2020

Saddar Town, Karachi

Scanned by CamScanner

Note: Adjourn for want of clearance Pay Order and
2nd party Thumb Mark.

SUB-REGISTRAR
SADDAR TOWN
KARACHI

Note: Required Requirement is Fulfilled Today Hence
Seed Order for Registration Dated 03-02-2020.

SUB-REGISTRAR
SADDAR TOWN
KARACHI

304
03-02-2020



Scanned by CamScanner

SINDH BUILDING CONTROL AUTHORITY
(AUTHORITY UNDER SINDH BUILDING CONTROL ORDINANCE 1979)

APPLICATION FOR SUBMISSION OF PROPOSED/REVISED/ADDITION/ALTERATION BUILDING PLAN DOCUMENTS

In pursuance of the provision of the Sindh Building Control Ordinance 1979 as amended up-to-date. Permission maybe granted to erect/mark additions and or alterations in building on the proposal as-below:

Date : 2024-01-31

File No	REV-20240116-14	File Status	Initial
City	Karachi	District	South
Scheme	N/A	Category	Category-IV.
Plot No.	10/01	Lessor	Deputy Commissioner South
Societies / Areas	Deputy Commisioner South	Area of Plot in Sq. Yd.	4540.00
Covered Area in Sq. Ft.	762496.97	Status of Plot.	VACANT
Property Address	PLOT NO. 10/1, CL-09, CIVIL LINE QUARTERS. DISTRICT SOUTH, KARACHI.	Amalgamated / Sub-Divided	Yes

Description of Plans

Type of Plan	REV		
Court case/ Litigation		Previous approval (if any)	REV/ PROP/ 24/ 2022/ 26
Court's Name		Court Case No.	

Description of the Proposed Construction

Type of Building	Commercial		
No. of Floors	B+G+44+ROOF		
Car Parking Space (Sft/Sq.m)	N/A	No. of Units	N/A
		Area of Amenity (Sft/Sq.m)	N/A

License Professional Information

Name	Syed Junaid Iqbal		
CNIC No.	N/A	License No.	AL-01-791
		Phone Number	03002263164

For Public Sale

Yes

Owner Details

Name of Owner/Attorney	Nahid Sohail Admani		
CNIC No.	42301-2435032-2	S/o W/o D/o	Sohail Admani
Email	ABDULRAZZAKADMANI@GMAIL.COM	Mobile No.	03458254386
Permanent Address	Apartment No, 904/b Saima Sprin Field Apartment Clifton Karachi...	Mailing Address	Apartment No, 904/b Saima Sprin Field Apartment Clifton Karachi...
Name of Owner/Attorney	Sadia Sohail Admani	CNIC No.	42301-6034665-6
Name of Owner/Attorney	Salman Yousuf	CNIC No.	42201-9576932-9
Name of Owner/Attorney	Muhammad Asim	CNIC No.	42201-4375528-3
Name of Owner/Attorney	Rashid Mehmood	CNIC No.	42501-1609426-1

Verification Details

Forwarding Number : N/A

Layout Verification Number : N/A

The Following Documents have been submitted by the licensed Architect and have been kept on record:

1. CNIC Copy Owner Attorney
2. Two Passport Size Pictures Owner Attorney Partners
3. Current Picture of Site
4. Site Plan
5. Sub Division Amalgamation if applicable
6. Mutation Transfer Order Extract Form II
7. Eight Sets of Drawing
8. Previous Approved Building Plan
9. ZP2
10. ZP3 Undertaking from professional
11. additional_document
12. additional_document
13. additional_document
14. additional_document
15. additional_document

By Submitting this Application, You agree:

1. The information and documents provided here is complete and accurate. Providing false and/or incorrect information could result in the rejection of application
2. Building Plans are accepted with the condition that approval will be granted/accorded as per existing rules and regulations of SBCA-2002, SBCA reserved the right to reject or accept the building plan
3. The accepting of the building plan does not grant its approval if it shall falls beyond the conquerable limits.
4. The acceptance of the building plan does not necessary imply that the same shall be approved.
5. Additional information may be required in order to process your application
6. If / Where applicable Architecture & Planning Section / Town will be at liberty to obtain balance scrutiny fee prior to grant / accordance of approved building plan.

Acknowledgement

We are pleased to acknowledge your payment of Rs. 14308044.00 via Challan Number 176238
Dated: 2024-01-30

Your Tracking ID is: REV-20240116-14.

Smart Info: Smart Info2

SAAR
Iconic Living

Ref: _____ Date: _____

To,

The Director Southern Circle

Survey of Pakistan Karachi

Subject: **REQUEST FOR ISSUE OF SITE CO-ORDINATES END MEAN SEA LEVEL HEIGHT**

Dear Sir,

I am requesting you to make survey at my plot for the Co-ordinates location is **"Plot Nos 10/1, Sheet NO: CL-09, Situated at Civil Lines Quarters, Karachi"**. Kindly issue the Site Co-Ordinates and mean Sea Level Height required for Civil Aviation Authority Karachi.

I have attached all document as per your requirement. I will be grateful if you issue us the Co-Operates. At your earliest.

Your Truly,

(Salman Yousuf)

Plot No: 672, 2nd Floor Central Commercial Area P.E.C.H.S Tadiq Road Karachi

Contact No: 0323-2525545 / 0345-3601383

Date: 28-Feb-24

Civil Lines Quarter Plot No. 10/1. Sheet C. L. 9
Scale 80' = 1"

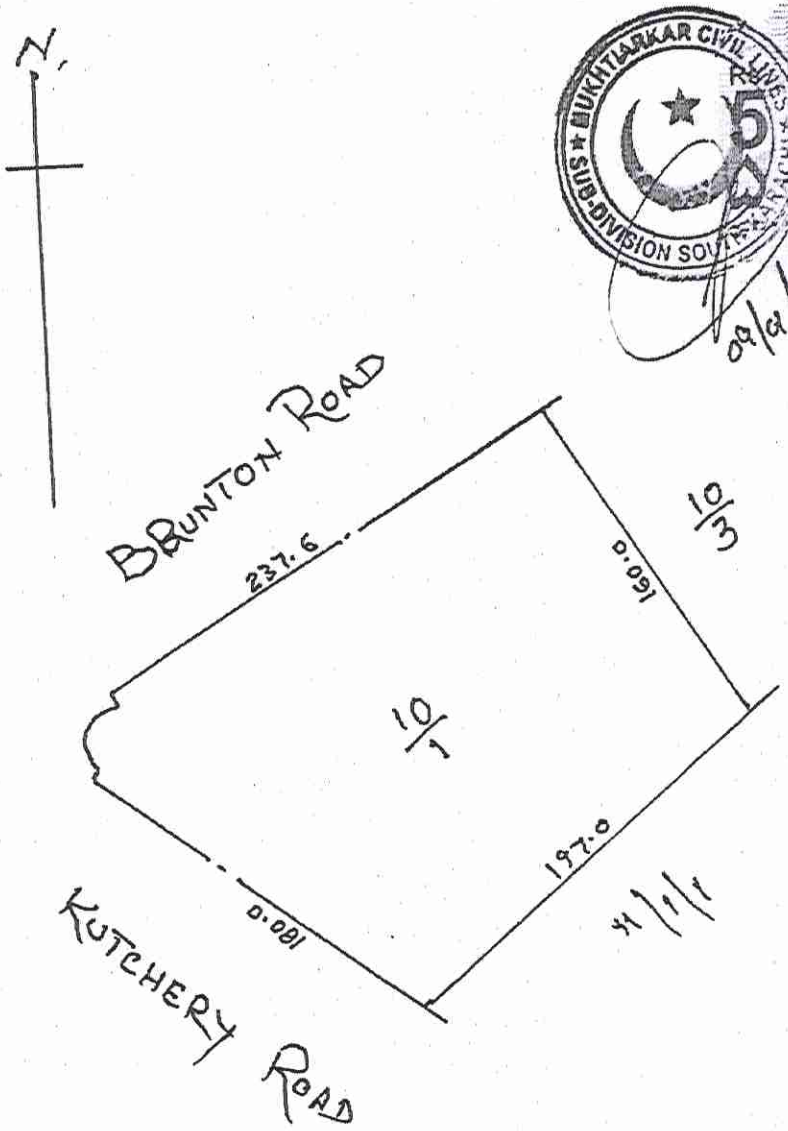
FIVE RUPEES

BUKHTIARKAR CIVIL LINES SUB-DIVISION SOUTH KARACHI

09 JAN 2024

PAKISTAN COURT FEE

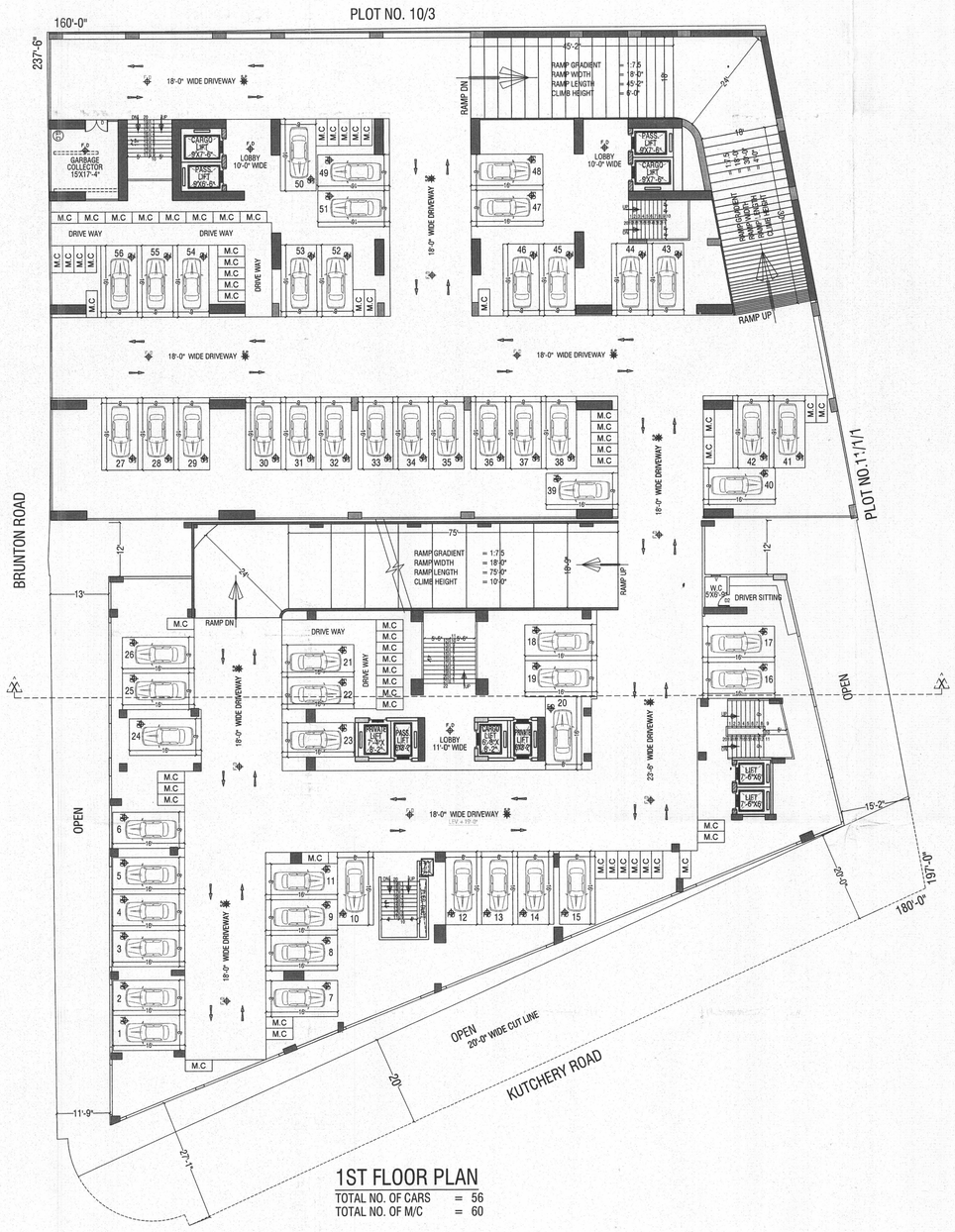
09/01



TRUE COPY NO. 02/2024
NAME OF APPLICANT Mrs: Nahid Sohail Admani
DATE OF APPLICATION 12-8-2023 and (04) Others
TREASURY CHALLAN NO. 01/2024 Dt. 02-01-2024
PAID AMOUNT / COPY FEE 500/=
DEPOSITED IN BANK / BRANCH NBP
DDC House Br ON 03-01-2024
COPY PREPARED BY
COPY CHECKED BY 09/01/2024
COPY DELIVERED ON 09-01-2024

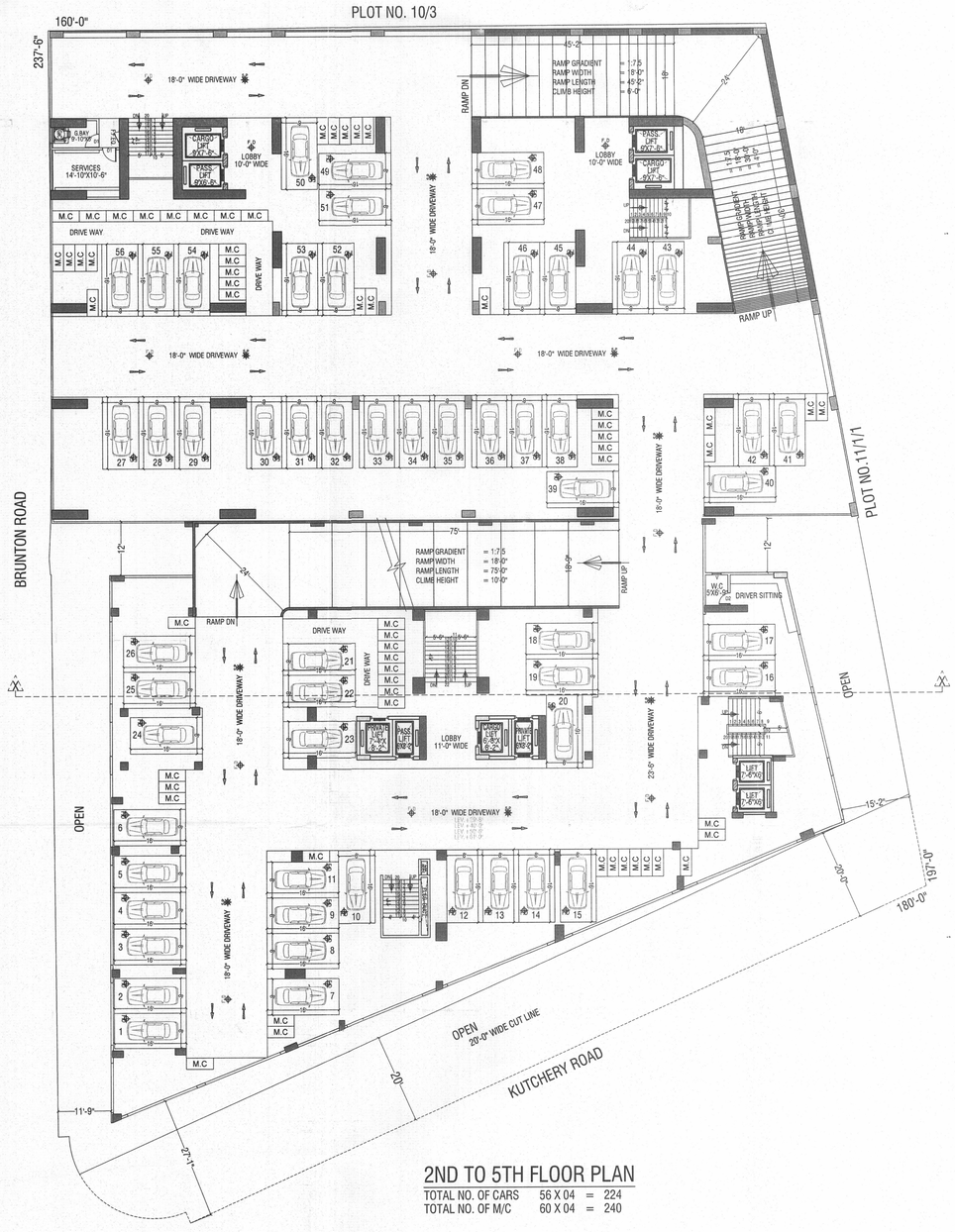
09/01/2024

BUKHTIARKAR CIVIL LINES
SUB-DIVISION SOUTH KARACHI



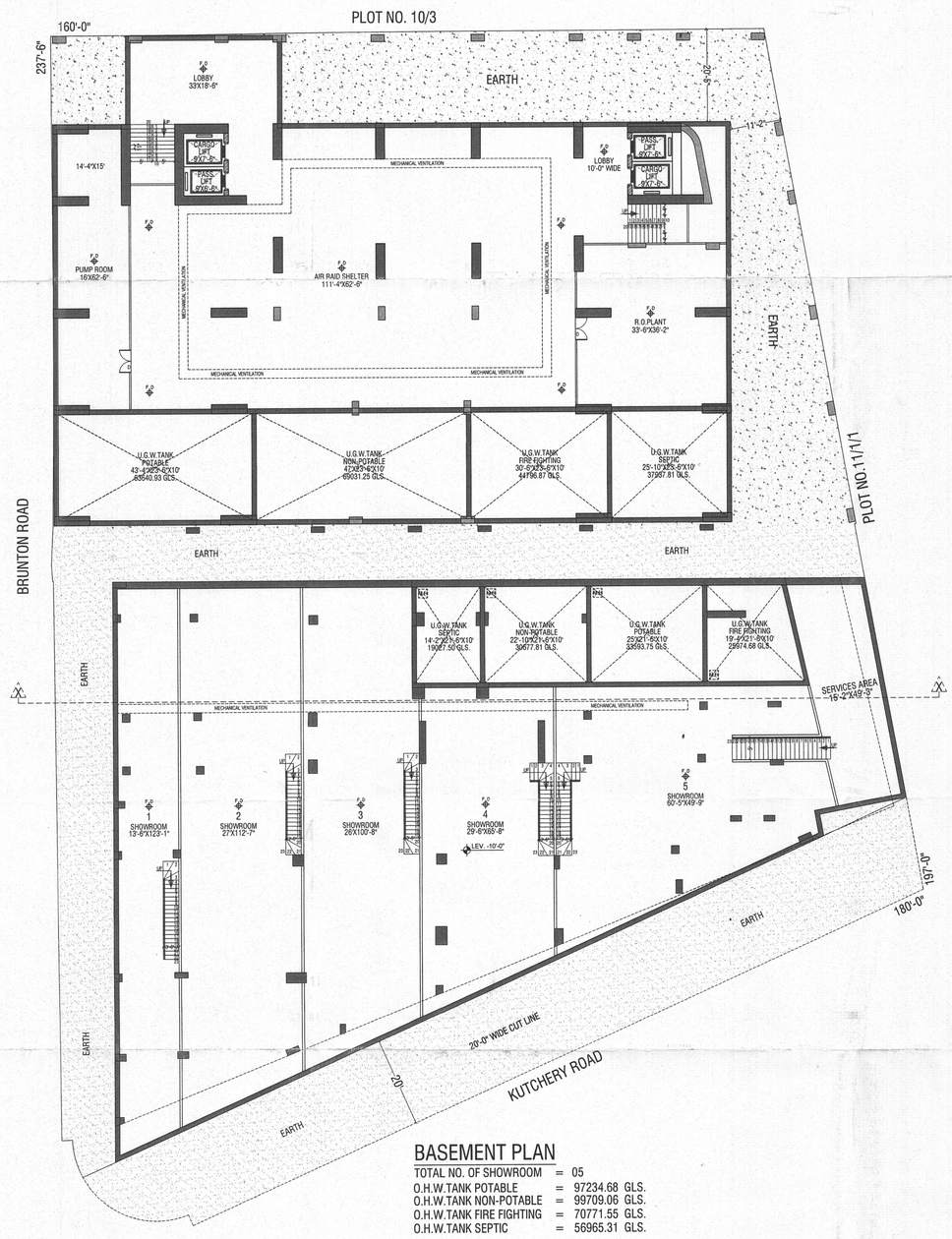
1ST FLOOR PLAN

TOTAL NO. OF CARS = 56
TOTAL NO. OF M/C = 60



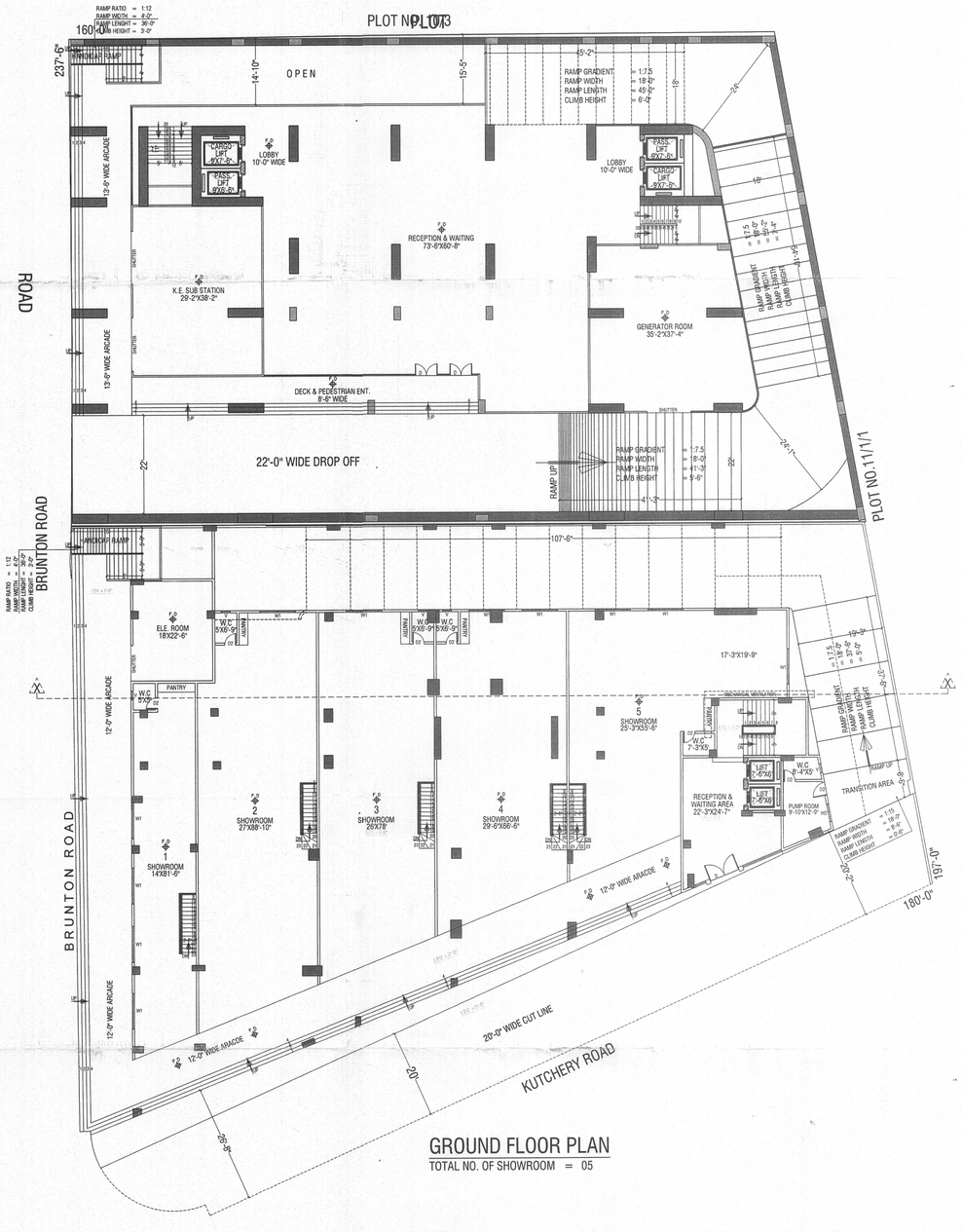
2ND TO 5TH FLOOR PLAN

TOTAL NO. OF CARS 56 X 04 = 224
TOTAL NO. OF M/C 60 X 04 = 240



BASEMENT PLAN

TOTAL NO. OF SHOWROOM = 05
O.H.W.TANK POTABLE = 97234.68 GLS.
O.H.W.TANK NON-POTABLE = 99709.06 GLS.
O.H.W.TANK FIRE FIGHTING = 70771.55 GLS.
O.H.W.TANK SEPTIC = 56965.31 GLS.



GROUND FLOOR PLAN

TOTAL NO. OF SHOWROOM = 05

ADDRESS:

REVISED BUILDING PLAN ON OF PLOT NO. 10/1,
SHEET CL-9, CIVIL LINES QUARTERS,
KARACHI.

OWNER/ATTORNEY :

LIC. ENGINEER

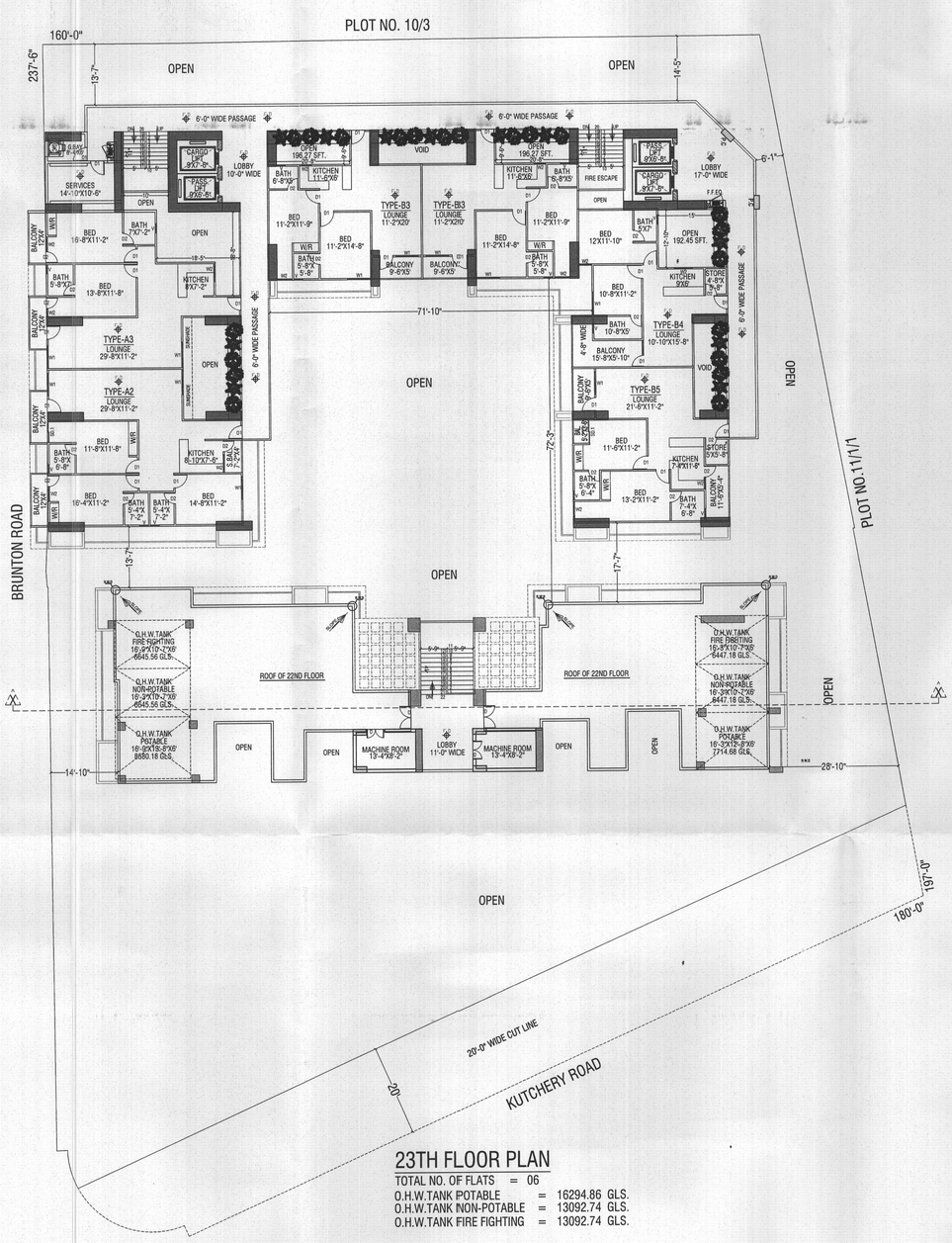
LIC.ARCHITECT

NORTH:

SCALE: 1/16"=1'-0"

DRAWN BY: W.K. / S.H. / M.R

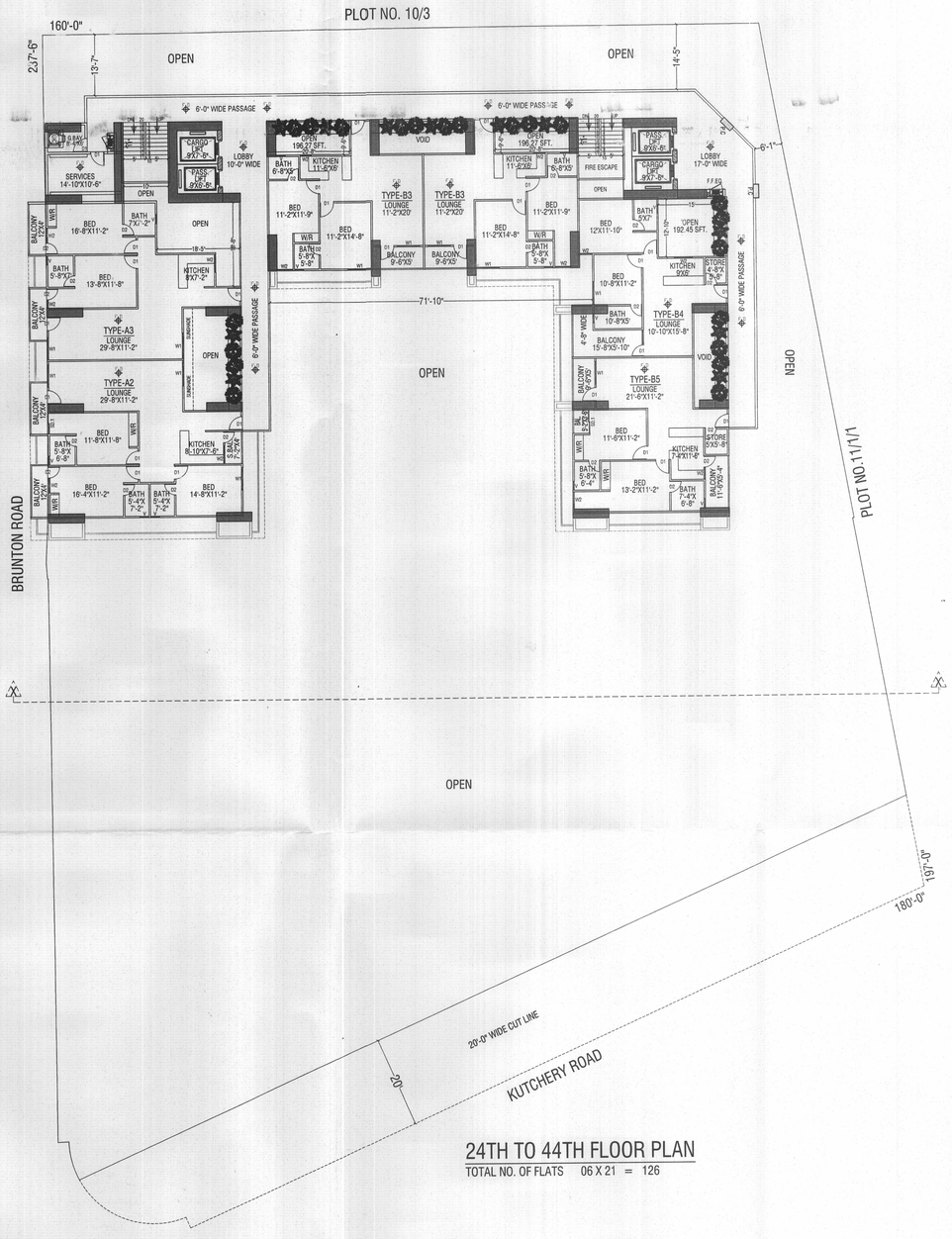
DRG NO # 01 / 05



23TH FLOOR PLAN

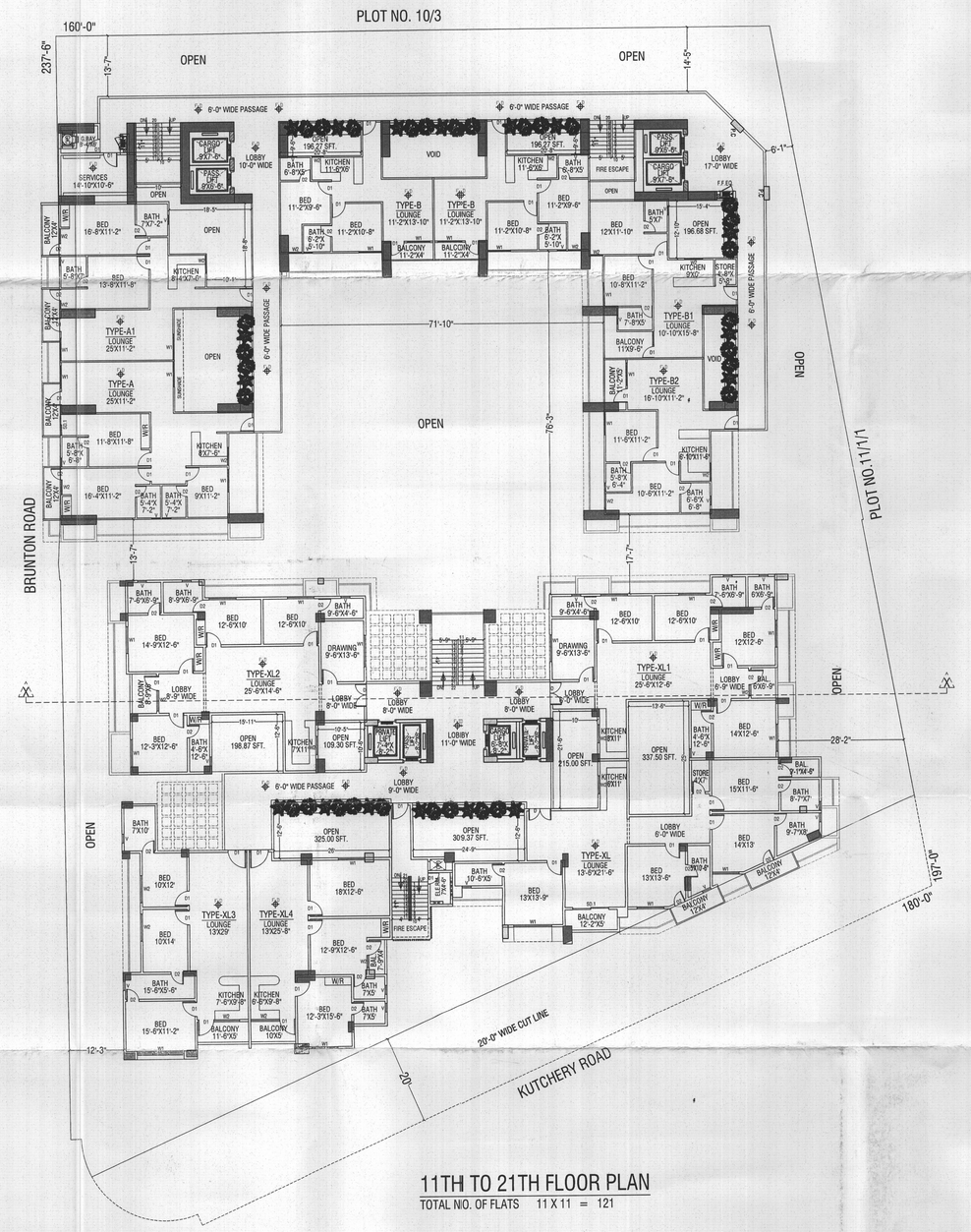
TOTAL NO. OF FLATS = 06

O.H.W.TANK POTABLE = 16294.86 GLS.
O.H.W.TANK NON-POTABLE = 13092.74 GLS.
O.H.W.TANK FIRE FIGHTING = 13092.74 GLS.



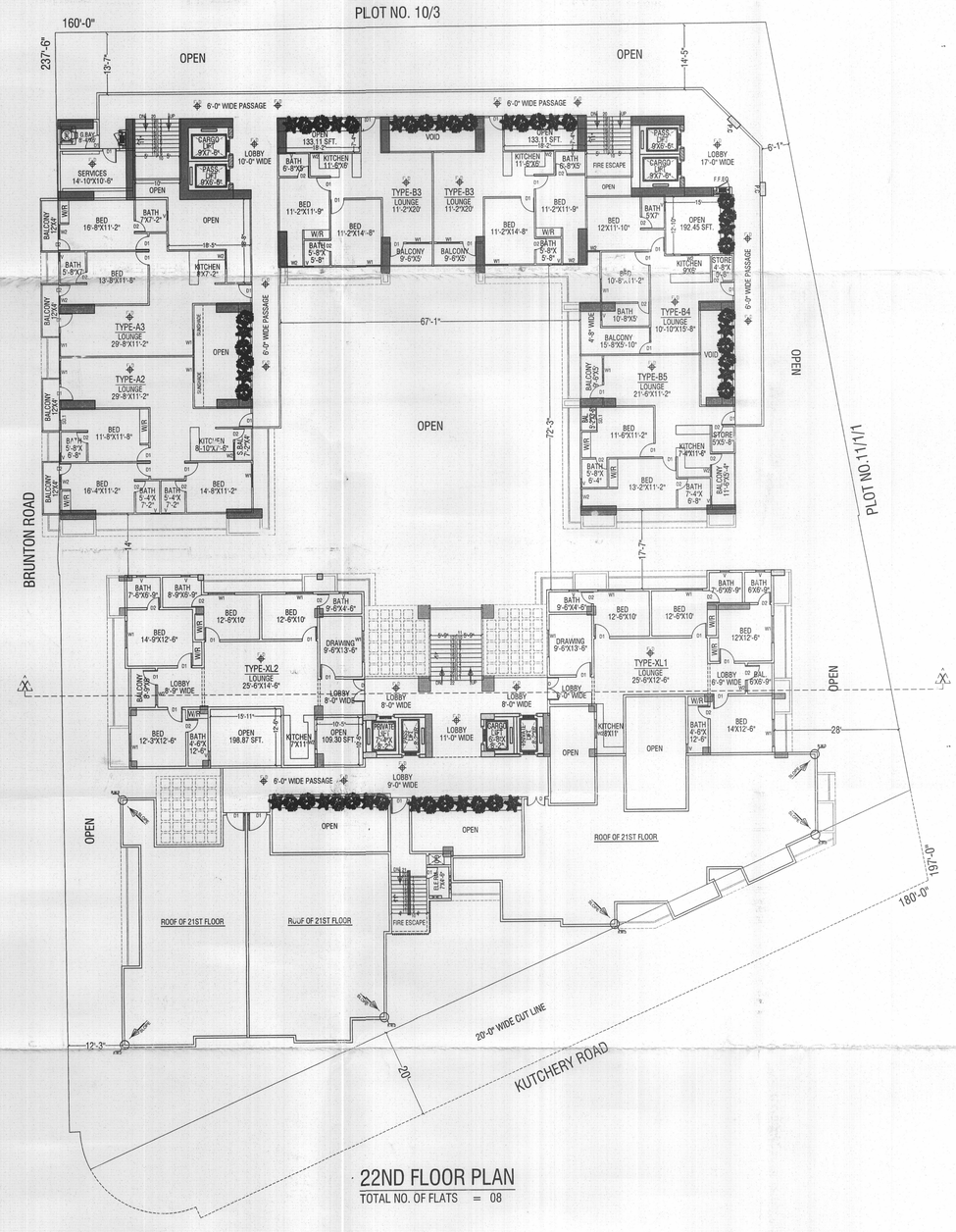
24TH TO 44TH FLOOR PLAN

TOTAL NO. OF FLATS 06 X 21 = 126



11TH TO 21TH FLOOR PLAN

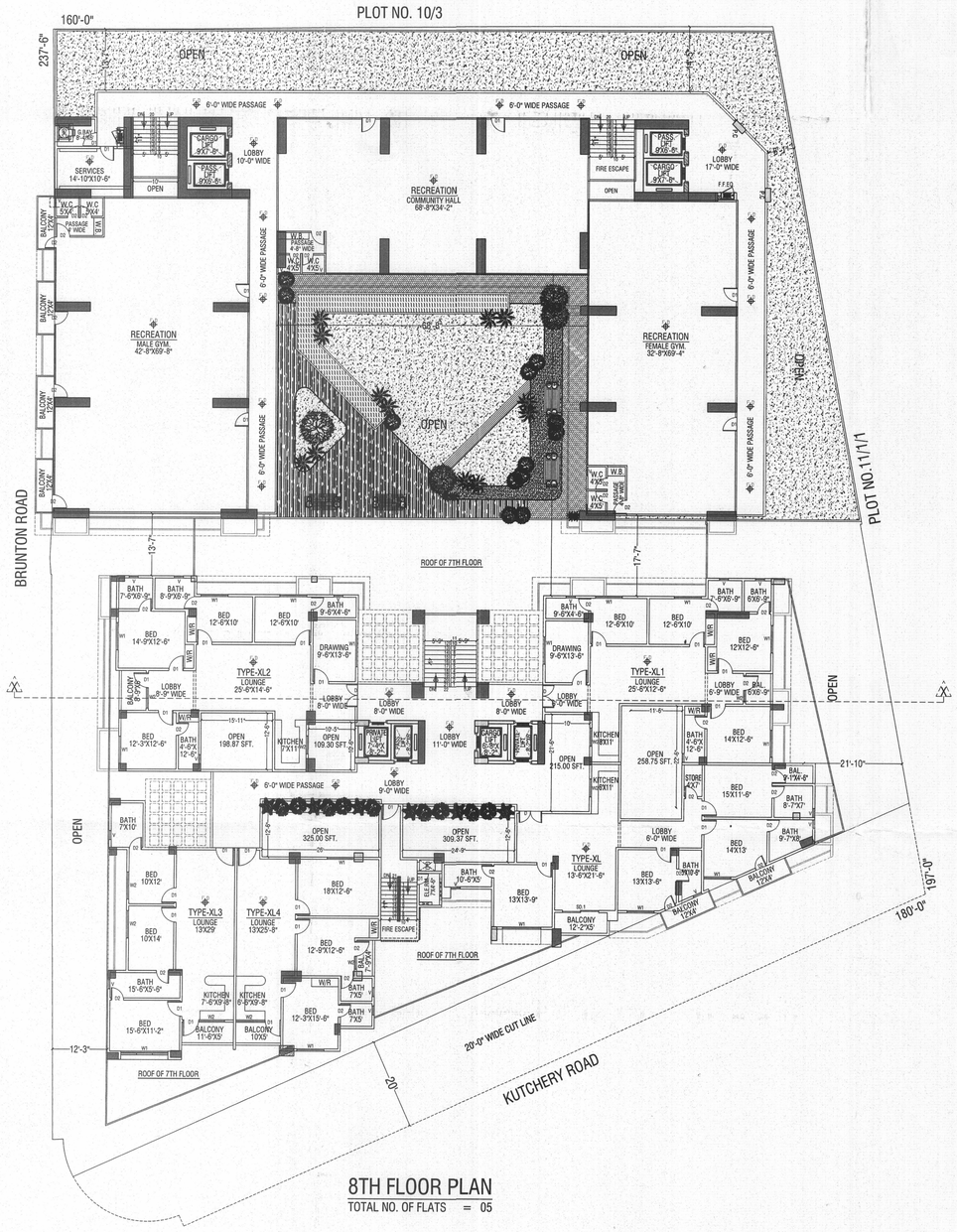
TOTAL NO. OF FLATS 11 X 11 = 121



22ND FLOOR PLAN

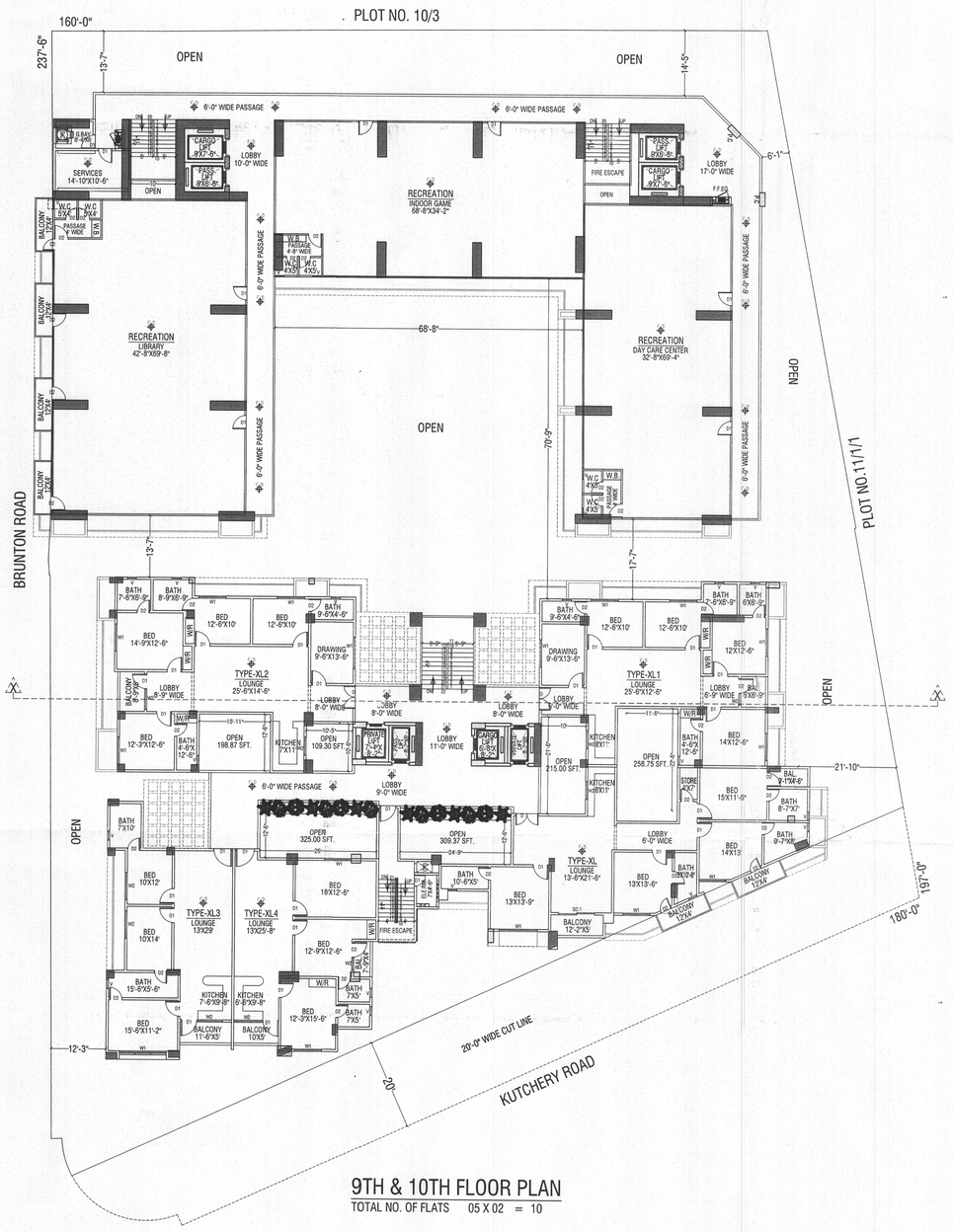
TOTAL NO. OF FLATS = 08

ADDRESS: REVISED BUILDING PLAN ON OF PLOT NO. 10/1, SHEET CL-9, CIVIL LINES QUARTERS, KARACHI.	OWNER/ATTORNEY :	LIC. ENGINEER	LIC.ARCHITECT	NORTH:	SCALE: 1/16"=1'-0" DRAWN BY: W.K. / S.H. / M.R DRG NO # 03 / 05



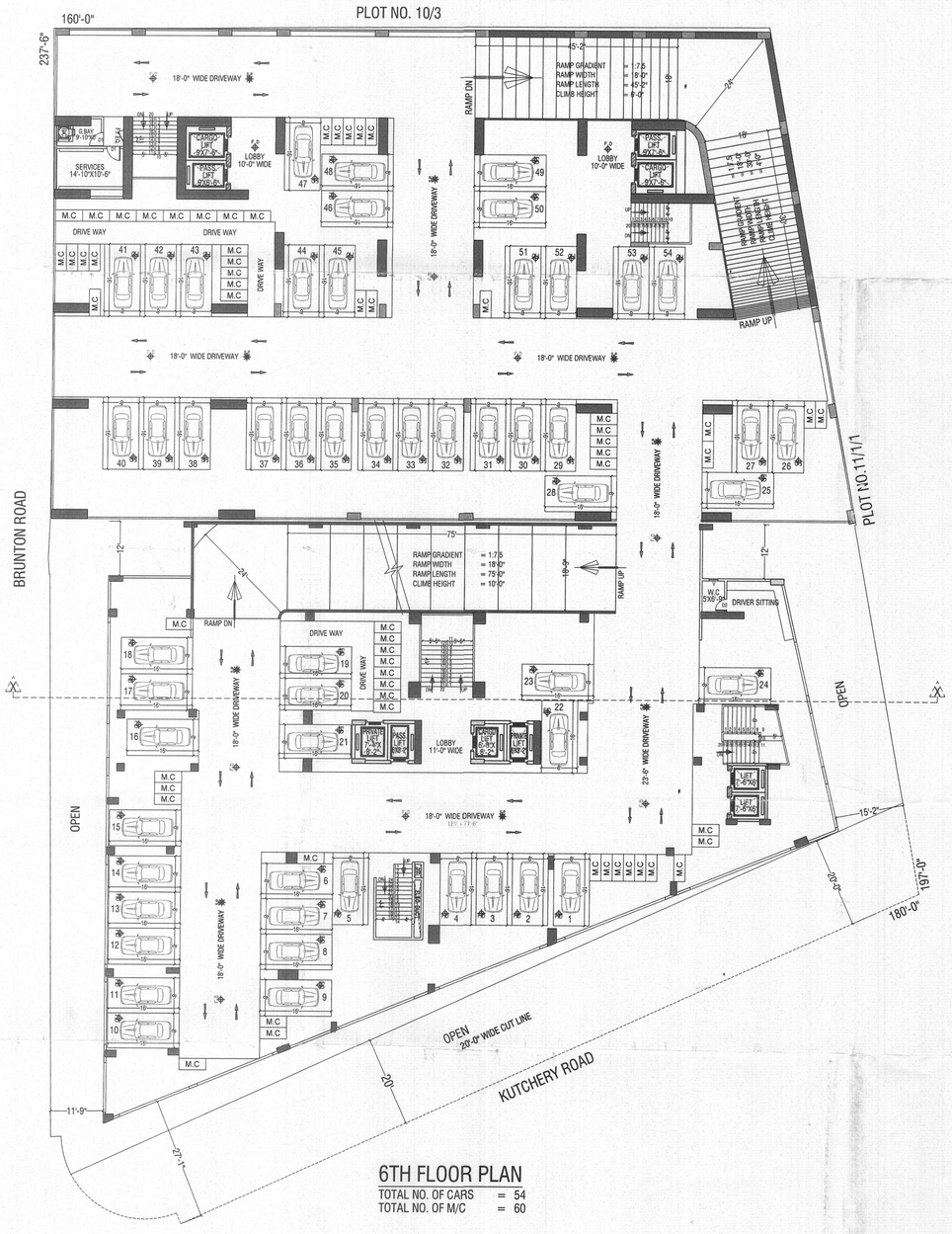
8TH FLOOR PLAN

TOTAL NO. OF FLATS = 05



9TH & 10TH FLOOR PLAN

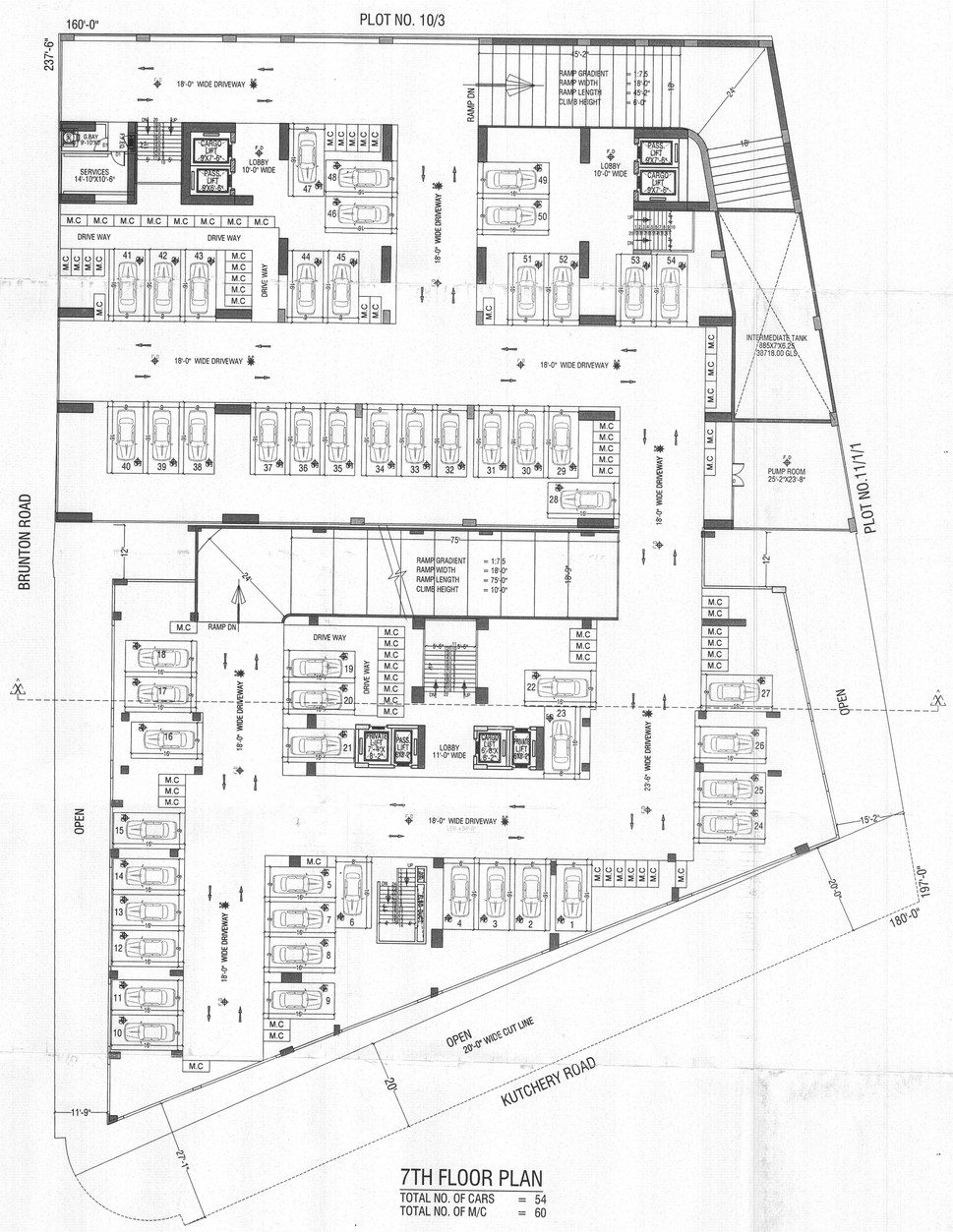
TOTAL NO. OF FLATS 05 X 02 = 10



6TH FLOOR PLAN

TOTAL NO. OF CARS = 54

TOTAL NO. OF M/C = 60

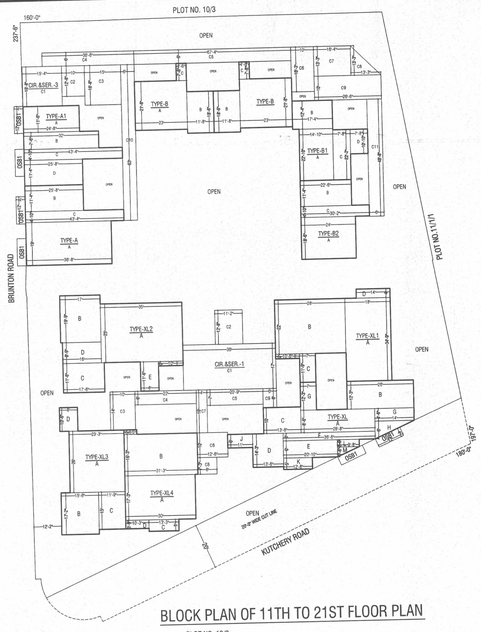


7TH FLOOR PLAN

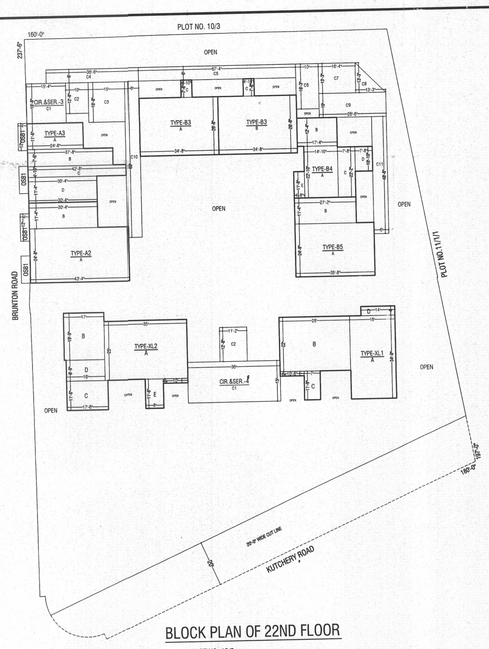
TOTAL NO. OF CARS = 54

TOTAL NO. OF M/C = 60

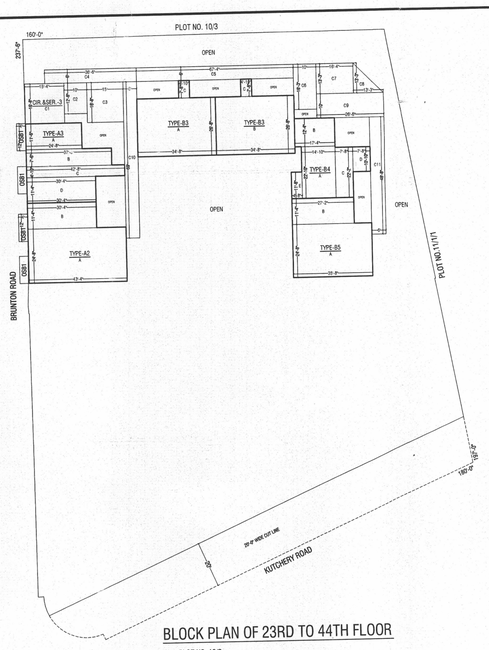
ADDRESS: REVISED BUILDING PLAN ON OF PLOT NO. 10/1, SHEET CL-9, CIVIL LINES QUARTERS, KARACHI.	OWNER/ATTORNEY :	LIC. ENGINEER	LIC.ARCHITECT	NORTH:	SCALE: 1/16"=1'-0" DRAWN BY: W.K. / S.H. / M.R DRG NO # 02 / 05



BLOCK PLAN OF 11TH TO 21ST FLOOR PLAN



BLOCK PLAN OF 22ND FLOOR

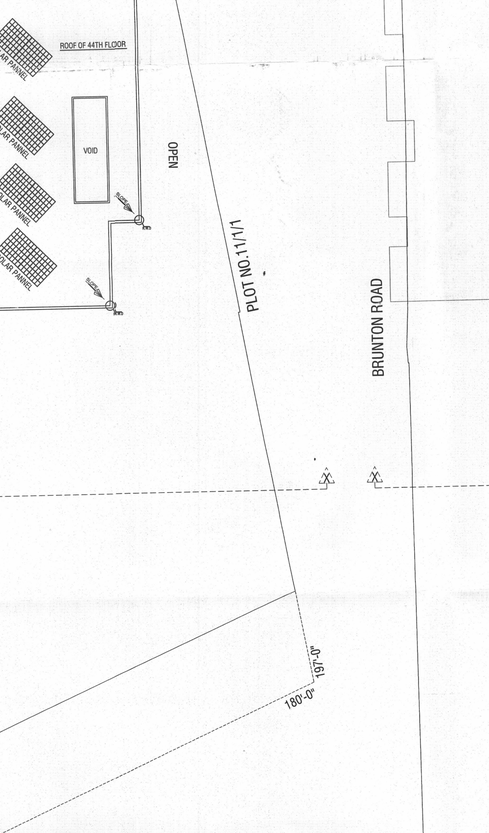


BLOCK PLAN OF 23RD TO 44TH FLOOR



BLOCK PLAN OF ROOF (SERVICES)

BLOCK PLAN OF BASEMENT

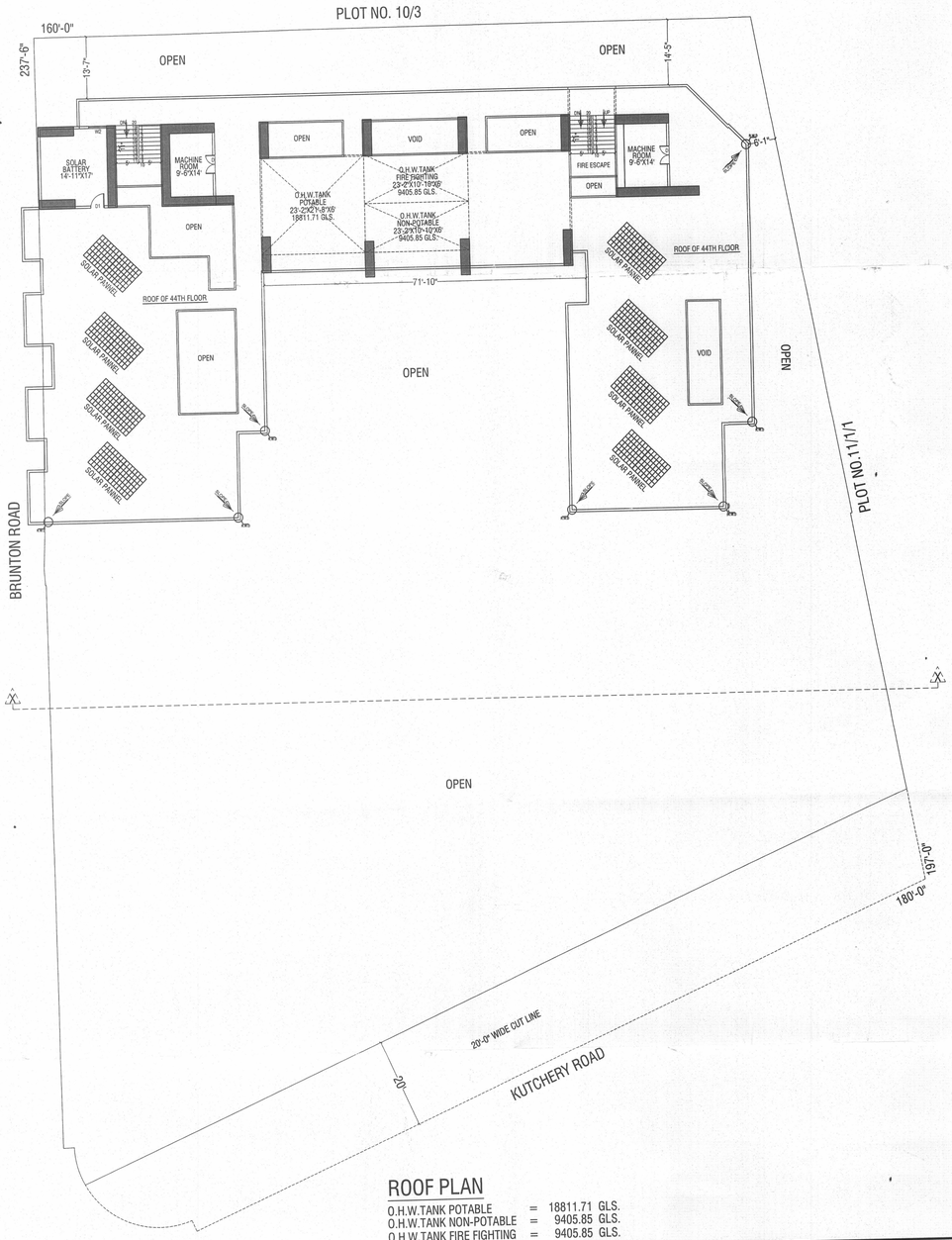


BLOCK PLAN OF GROUND FLOOR

BLOCK PLAN OF 1ST TO 7TH FLOOR (PARKING)

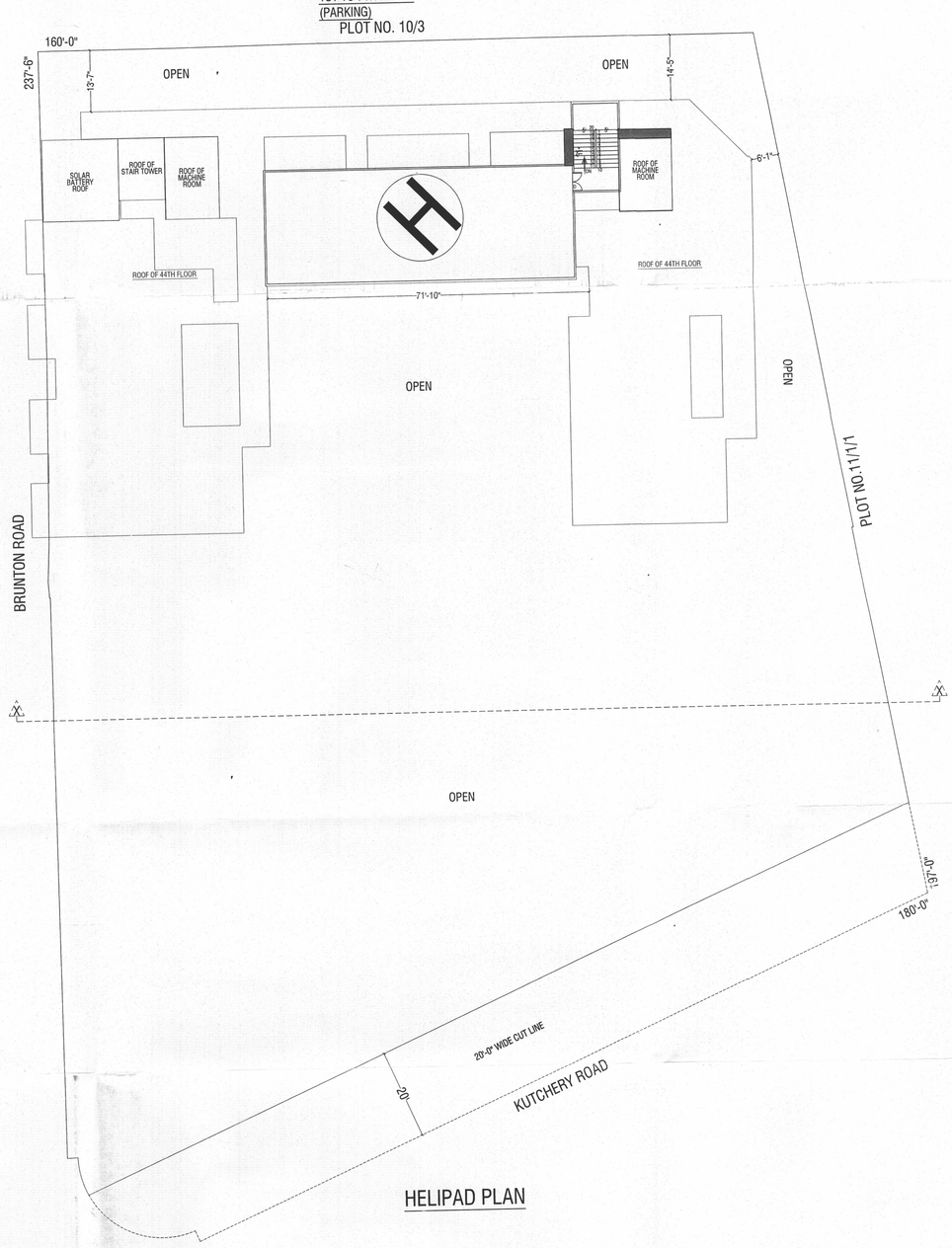


BLOCK PLAN OF 8TH TO 10TH FLOOR PLAN



ROOF PLAN

O.H.W.TANK POTABLE = 18811.71 GLS.
O.H.W.TANK NON-POTABLE = 9405.85 GLS.
O.H.W.TANK FIRE FIGHTING = 9405.85 GLS.



HELIPAD PLAN

ADDRESS:

REVISED BUILDING PLAN ON OF PLOT NO. 10/1,
SHEET CL-9, CIVIL LINES QUARTERS,
KARACHI.

OWNER/ATTORNEY :

LIC. ENGINEER

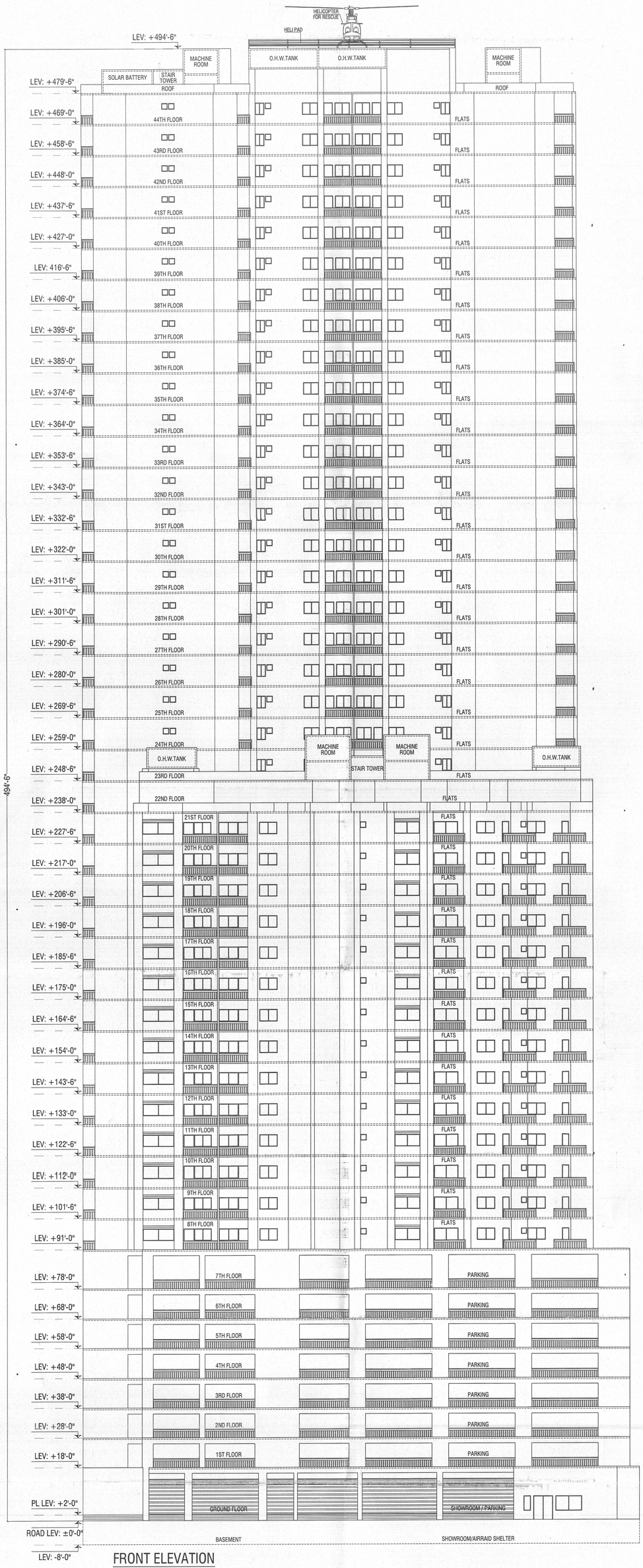
LIC.ARCHITECT

NORTH: N E S W

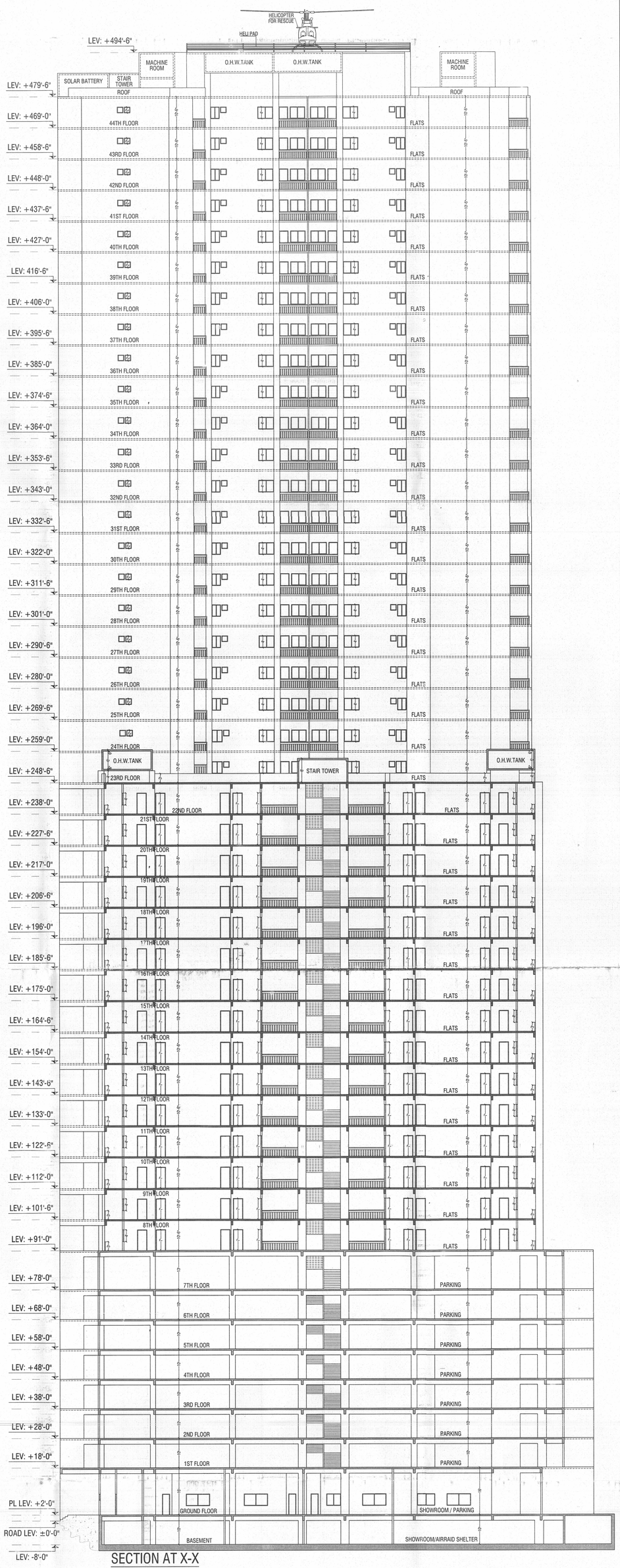
SCALE: 1/16"=1'-0"

DRAWN BY: W.K. / S.H. / M.R

DRG NO # 04 / 05



FRONT ELEVATION



SECTION AT X-X

CIR.&SER-2

C1	=	22'-0"	X	22'-8"	=	498.52 SQ.FT.
C2	=	15'-4"	X	16'-8"	=	255.39 SQ.FT.
C3	=	10'-0"	X	12'-8"	=	126.60 SQ.FT.
C4	=	17'-0"	X	6'-0"	=	102.00 SQ.FT.
C5	=	16'-4"	X	23'-3"	=	379.67 SQ.FT.
C6	=	10'-0"	X	16'-3"	=	162.50 SQ.FT.
C7	=	13'-3"	X	10'-0"	=	132.50 SQ.FT.
C8	=	13'-3"	X	13'-3" /2	=	87.78 SQ.FT.
TOTAL					=	1744.96 SQ.FT.

CIR.&SER-3

C1	=	15'-4"	X	16'-8"	=	255.39 SQ.FT.
C2	=	10'-0"	X	12'-8"	=	126.60 SQ.FT.
C3	=	15'-0"	X	16'-8"	=	249.90 SQ.FT.
C4	=	36'-6"	X	6'-0"	=	219.00 SQ.FT.
C5	=	67'-4"	X	6'-0"	=	403.98 SQ.FT.
C6	=	10'-0"	X	16'-3"	=	162.50 SQ.FT.
C7	=	16'-4"	X	13'-3"	=	216.37 SQ.FT.
C8	=	13'-3"	X	13'-3" /2	=	87.78 SQ.FT.
C9	=	26'-6"	X	10'-0"	=	265.00 SQ.FT.
C10	=	6'-0"	X	63'-0"	=	378.00 SQ.FT.
C11	=	6'-0"	X	48'-8"	=	291.96 SQ.FT.
TOTAL					=	2656.48 SQ.FT.

CIR.&SER-4

C1	=	36'-0"	X	15'-0"	=	540.00 SQ.FT.
C2	=	11'-2"	X	12'-8"	=	141.28 SQ.FT.
TOTAL					=	681.28 SQ.FT.

OVER STREAT BAL. (8TH TO 21ST FLOOR)

C1	=	12'-0"	X	4'-0"	X6 =	288.00 SQ.FT.
TOTAL					=	288.00 SQ.FT.

OVER STREAT BAL. (22ND TO 44TH FLOOR)

C1	=	12'-0"	X	4'-0"	X4 =	192.00 SQ.FT.
TOTAL					=	192.00 SQ.FT.

SUMMARY OF 8TH TO 10TH FLOOR (FLAT & RECREATION) (EACH FLOOR)

TYPE	NET AREA	NOS	TOTAL AREA
TYPE-XL	1542.61 SQ.FT.	01	1542.61 SQ.FT.
TYPE-XL1	1402.75 SQ.FT.	01	1402.75 SQ.FT.
TYPE-XL2	1664.00 SQ.FT.	01	1664.00 SQ.FT.
TYPE-XL3	1130.73 SQ.FT.	01	1130.73 SQ.FT.
TYPE-XL4	1139.99 SQ.FT.	01	1139.99 SQ.FT.
RECREATION	8722.08 SQ.FT.	--	8722.08 SQ.FT.
CIRCULATION-01	1432.53 SQ.FT.	--	1432.53 SQ.FT.
CIRCULATION-02	1744.96 SQ.FT.	--	1744.96 SQ.FT.
TOTAL		05	18779.65 SQ.FT.

SUMMARY OF 11TH TO 21ST FLOOR (EACH FLOOR)

TYPE	NET AREA	NOS	TOTAL AREA
TYPE-A	1196.54 SQ.FT.	01	1196.54 SQ.FT.
TYPE-A1	1023.59 SQ.FT.	01	1023.59 SQ.FT.
TYPE-B	748.36 SQ.FT.	02	1496.72 SQ.FT.
TYPE-B1	804.92 SQ.FT.	01	804.92 SQ.FT.
TYPE-B2	844.59 SQ.FT.	01	844.59 SQ.FT.
TYPE-XL	1542.61 SQ.FT.	01	1542.61 SQ.FT.
TYPE-XL1	1402.75 SQ.FT.	01	1402.75 SQ.FT.
TYPE-XL2	1664.00 SQ.FT.	01	1664.00 SQ.FT.
TYPE-XL3	1130.73 SQ.FT.	01	1130.73 SQ.FT.
TYPE-XL4	1139.99 SQ.FT.	01	1139.99 SQ.FT.
CIRCULATION-01	1432.53 SQ.FT.	--	1432.53 SQ.FT.
CIRCULATION-03	2656.48 SQ.FT.	--	2656.48 SQ.FT.
TOTAL		11	16335.45 SQ.FT.

SUMMARY OF 22ND FLOOR

TYPE	NET AREA	NOS	TOTAL AREA
TYPE-A2	1412.14 SQ.FT.	01	1412.14 SQ.FT.
TYPE-A3	1112.04 SQ.FT.	01	1112.04 SQ.FT.
TYPE-B3	961.02 SQ.FT.	02	1922.04 SQ.FT.
TYPE-B4	859.25 SQ.FT.	01	859.25 SQ.FT.
TYPE-B5	1187.09 SQ.FT.	01	1187.09 SQ.FT.
TYPE-XL1	1426.25 SQ.FT.	01	1426.25 SQ.FT.
TYPE-XL2	1704.25 SQ.FT.	01	1704.25 SQ.FT.
CIRCULATION-03	2656.48 SQ.FT.	--	2656.48 SQ.FT.
CIRCULATION-04	681.28 SQ.FT.	--	681.28 SQ.FT.
TOTAL		11	12960.82 SQ.FT.

SUMMARY OF 23RD TO 44TH FLOOR (EACH FLOOR)

TYPE	NET AREA	NOS	TOTAL AREA
TYPE-A2	1412.14 SQ.FT.	01	1412.14 SQ.FT.
TYPE-A3	1112.04 SQ.FT.	01	1112.04 SQ.FT.
TYPE-B3	961.02 SQ.FT.	02	1922.04 SQ.FT.
TYPE-B4	859.25 SQ.FT.	01	859.25 SQ.FT.
TYPE-B5	1187.09 SQ.FT.	01	1187.09 SQ.FT.
CIRCULATION-03	2656.48 SQ.FT.	--	2656.48 SQ.FT.
TOTAL		05	9149.04 SQ.FT.

DETAIL OF ROOF

ROOF SERVICES

S1	=	17'-1"	X	18'-0"	=	307.44 SQ.FT.
S2	=	12'-0"	X	18'-0"	=	216.00 SQ.FT.
S3	=	10'-4"	X	13'-7"	=	140.28 SQ.FT.
S4	=	12'-0"	X	18'-0"	=	216.00 SQ.FT.
S5	=	10'-4"	X	13'-7"	=	140.28 SQ.FT.
TOTAL					=	1020.00 SQ.FT.

SUMMARY OF CIRCULATION & SERVICES

FLOOR	TOTAL AREA
GROUND FLOOR	10712.79 SQ.FT.
8TH. TO 10TH. FLOOR (3177.49 X 03)	9532.47 SQ.FT.
11TH. TO 21ST FLOOR (4089.01 X 12)	49068.12 SQ.FT.
22ND FLOOR	3337.76 SQ.FT.
23RD. TO 44TH FLOOR (2656.48 X 22)	58442.56 SQ.FT.
TOTAL	131093.70 SQ.FT.

SUMMARY OF RECREATION

FLOOR	TOTAL AREA
8TH TO 10TH FLOOR (8722.08 X 03)	26166.21 SQ.FT.
TOTAL	26166.21 SQ.FT.

SUMMARY

BASEMENT AREA	(SHOWROOM + A.R.S + TANK)	=	29756.36 SQ.FT.
GROUND FLOOR AREA	(SHOP's +MEZZ.+CIRCULATION + LOBBIES+SWP)	=	35833.91 SQ.FT.
1ST FLOOR AREA	(PARKING)	=	33890.84 SQ.FT.
2ND FLOOR AREA	(PARKING)	=	33890.84 SQ.FT.
3RD FLOOR AREA	(PARKING)	=	33890.84 SQ.FT.
4TH FLOOR AREA	(PARKING)	=	33890.84 SQ.FT.
5TH FLOOR AREA	(PARKING)	=	33890.84 SQ.FT.
6TH FLOOR AREA	(PARKING)	=	33890.84 SQ.FT.
7TH FLOOR AREA	(PARKING)	=	33890.84 SQ.FT.
8TH FLOOR AREA	(FLATS + REC.+CIR.& SER.)	=	18779.65 SQ.FT.
9TH FLOOR AREA	(FLATS + REC.+CIR.& SER.)	=	18779.65 SQ.FT.
10TH FLOOR AREA	(FLATS + REC.+CIR.& SER.)	=	18779.65 SQ.FT.
11TH FLOOR AREA	(FLATS +CIR.& SER.)	=	16329.47 SQ.FT.
12TH FLOOR AREA	(FLATS +CIR.& SER.)	=	16329.47 SQ.FT.
13TH FLOOR AREA	(FLATS +CIR.& SER.)	=	16329.47 SQ.FT.
14TH FLOOR AREA	(FLATS +CIR.& SER.)	=	16329.47 SQ.FT.
15TH FLOOR AREA	(FLATS +CIR.& SER.)	=	16329.47 SQ.FT.
16TH FLOOR AREA	(FLATS +CIR.& SER.)	=	16329.47 SQ.FT.
17TH FLOOR AREA	(FLATS +CIR.& SER.)	=	16329.47 SQ.FT.
18TH FLOOR AREA	(FLATS +CIR.& SER.)	=	16329.47 SQ.FT.
19TH FLOOR AREA	(FLATS +CIR.& SER.)	=	16329.47 SQ.FT.
20TH FLOOR AREA	(FLATS +CIR.& SER.)	=	16329.47 SQ.FT.
21ST FLOOR AREA	(FLATS +CIR.& SER.)	=	16329.47 SQ.FT.
22ND FLOOR AREA	(FLATS +CIR.& SER.)	=	12960.82 SQ.FT.
23RD FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
24TH FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
25TH FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
26TH FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
27TH FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
28TH FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
29TH FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
30TH FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
31ST FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
32ND FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
33RD FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
34TH FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
35TH FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
36TH FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
37TH FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
38TH FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
39TH FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
40TH FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
41ST FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
42ND FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
43RD FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
44TH FLOOR AREA	(FLATS +CIR.& SER.)	=	9149.04 SQ.FT.
OVER STREAT BAL.	(8TH TO 21ST FLOOR) (288.00 X 14)	=	4032.00 SQ.FT.
OVER STREAT BAL.	(22ND TO 44TH FLOOR) (192.00 X 23)	=	4416.00 SQ.FT.
ROOF AREA	(ROOF SERVICES)	=	1020.00 SQ.FT.
TOTAL		=	762496.97 SQ.FT.
DEDUCTION AREA			
LESS A.R.S.+TANK	(ON BASEMENT)	=	17119.90 SQ.FT.
LESS ARCADE	(ON GROUND FLOOR)	=	4108.38 SQ.FT.
LESS RAMP	(ON GROUND FLOOR)	=	10830.20 SQ.FT.
LESS PARKING	(1ST TO 7TH) (33890.84 X 7)	=	237235.88 SQ.FT.
LESS RECREATION	(ALLOWABLE 8 %)	=	26150.40 SQ.FT.
LESS CIRCULATION	(40% ALLOWABLE)	=	130752.00 SQ.FT.
OVER STREAT BAL.	(8TH TO 21ST FLOOR) (288.00 X 14)	=	4032.00 SQ.FT.
OVER STREAT BAL.	(22ND TO 44TH FLOOR) (192.00 X 23)	=	4416.00 SQ.FT.
LESS ROOF SERVICES	(ON ROOF)	=	1020.00 SQ.FT.
TOTAL		=	435664.76 SQ.FT.
DEDUCTION AREA			
762496.97 - 435664.76			
GRAND TOTAL		=	326832.21 SQ.FT.

PARKING SCHEDULE

COV. AREA OF SHOWROOM	=	22819.00 SQ.FT
22819.00 / 800	=	28.52 CARS
COV. AREA OF FLATS	=	313155.44 SQ.FT
313155.44 / 1000	=	313.15 CARS
28.52 + 313.15 = 341.67	=	342 CARS
DUE TO HIGH DENSITY BYELAWS 25 % EXTRA PARKING AS PER BYELAWS REQUIREMENT		
342 X 1.25 / 100 = 86	=	86 CARS
343 + 86	=	429 CARS
DISABLE PARKING 429 / 50 = 8.58 (INCLUDED IN 429 CARS)	=	09 CARS
REQUIRED MOTOR CYCLE PARKING		
429 / 100 X 16 = 68.64	=	69 CARS
429 - 69	=	360 CARS
REQ. CARS	=	360 CARS
REQ. MOTOR CYCLES (69X 6)	=	414 M.C.S
PROVIDED CARS		
1ST FLOOR	=	56 CARS
2ND FLOOR	=	56 CARS
3RD FLOOR	=	56 CARS
4TH FLOOR	=	56 CARS
5TH FLOOR	=	56 CARS
6TH FLOOR	=	54 CARS
7TH FLOOR	=	54 CARS
TOTAL	=	388 CARS
PROVIDED MOTOR CYCLE		
1ST FLOOR	=	60 M.C
2ND FLOOR	=	60 M.C
3RD FLOOR	=	60 M.C
4TH FLOOR	=	60 M.C
5TH FLOOR	=	60 M.C
6TH FLOOR	=	60 M.C
7TH FLOOR	=	60 M.C
TOTAL	=	420 M.C

AREA SCHEDULE

PLOT AREA OR		= 4540.00 SQ.YD = 40860.00 SQ.FT
ITEM	ALLOWABLE	PROPOSED
RATIO = 1:8	326880.00 SQ.FT	326832.21 SQ.FT
FOOT PRINT GROUND 40%	16344.00 SQ.FT	14090.92 SQ.FT (SHOWROOM + ARCADE)
FOOT PRINT TYP. 40%	16344.00 SQ.FT	16335.45 SQ.FT (FLATS + CIRCULATION)
RECREATION 8%	26150.40 SQ.FT	27195.33 SQ.FT (209.73 SFT. IN F.A.R)
CIRCULATION 40%	130752.00 SQ.FT	131093.70 SQ.FT (341.70 SFT. IN F.A.R)

DETAIL OF BASEMENT

SHOWROOM AREA

SH1	=158'-11'	X	71'-7"	/2	=	5687.38 SQ.FT.
SH2	= 67'-0"	X	52'-0"		=	3484.00 SQ.FT.
SH3	= 89'-0"	X	28'-0"		=	2492.00 SQ.FT.
SH4	= 6'-6"	X	28'-0"	/2	=	91.00 SQ.FT.
SH5	= 158'-1"	X	5'-7"		=	882.08 SQ.FT.
TOTAL					=	12636.46 SQ.FT.

AIR RAID SHELTER & TANK

ARS1	= 151'-8"	X	25'-6"		=	3867.33 SQ.FT.
ARS2	= 151'-8"	X	63'-6"		=	9630.41 SQ.FT.
ARS3	= 35'-0"	X	19'-6"		=	682.50 SQ.FT.
ARS4	= 83'-5"	X	24'-0"		=	2001.84 SQ.FT.
ARS5	= 16'-11"	X	51'-6"		=	870.86 SQ.FT.
ARS6	= 5'-7"	X	24'-0"	/2	=	66.96 SQ.FT.
TOTAL					=	17119.90 SQ.FT.

SHOWROOM AREA	= 12636.46 SQ.FT.
AIR RAID SHELTER & TANK	= 17119.90 SQ.FT.
TOTAL	= 29756.36 SQ.FT.

DETAIL OF GROUND FLOOR

ARCADE AREA

AR1	= 129'-1"	X	12'-0"		=	1548.96 SQ.FT.
AR2	= 12'-0"	X	15'-11" /2	X2	=	190.92 SQ.FT.
AR3	= 4'-10"	X	12'-11" /2		=	31.17 SQ.FT.
AR4	= 12'-0"	X	100'-8"		=	1207.92 SQ.FT.
AR5	= 13'-6"	X	83'-8"		=	1129.41 SQ.FT.
TOTAL					=	4108.38 SQ.FT.

SHOWROOM AREA

SH1	= 124'-3"	X	49'-10"	/2	=	3095.68 SQ.FT.
SH2	= 18'-6"	X	35'-4"		=	653.60 SQ.FT.
SH3	= 105'-9"	X	23'-4"		=	2467.14 SQ.FT.
SH4	= 113'-6"	X	32'-0"		=	3632.00 SQ.FT.
SH5	= 16'-6"	X	20'-3"		=	334.12 SQ.FT.
TOTAL					=	10182.54 SQ.FT.

CIR.&SER.AREA

C1	= 80'-2"	X	69'-0"		=	5531.04 SQ.FT.
C2	= 16'-5"	X	64'-2"		=	1052.86 SQ.FT.
C3	= 34'-8"	X	64'-8"		=	2241.11 SQ.FT.
C4	= 11'-1"	X	61'-11" /2		=	342.98 SQ.FT.
C5	= 18'-6"	X	23'-0"		=	425.50 SQ.FT.
C6	= 23'-9"	X	16'-11"		=	401.61 SQ.FT.
C7	= 34'-8"	X	13'-11" /2		=	241.06 SQ.FT.
C8	= 7'-9"	X	22'-5"		=	173.67 SQ.FT.
C9	= 21'-3"	X	13'-0"		=	276.25 SQ.FT.
C10	= 3'-2"	X	16'-11" /2		=	26.71 SQ.FT.
TOTAL					=	10712.79 SQ.FT.

RAMP AREA

RM1	=114'-0"	X	15'-0"		=	1710.00 SQ.FT.
RM2	= 14'-9"	X	19'-3"		=	283.93 SQ.FT.
RM3	= 2'-5"	X	19'-3"	/2	=	23.19 SQ.FT.
RM4	=19'-10"	X	68'-0"		=	1348.44 SQ.FT.
RM5	= 18'-6"	X	12'-0"		=	222.00 SQ.FT.
RM6	= 13'-1"	X	19'-6"		=	255.06 SQ.FT.
RM7	=64'-10"	X	24'-11"		=	1614.91 SQ.FT.
RM8	= 4'-7"	X	24'-11"	/2	=	57.04 SQ.FT.
RM9	=110'-1"	X	25'-5"		=	2797.13 SQ.FT.
RM10	= 47'-1"	X	19'-6"		=	918.06 SQ.FT.
RM11	= 3'-6"	X	19'-6"	/2	=	34.12 SQ.FT.
RM12	= 18'-5"	X	85'-1"		=	1566.32 SQ.FT.
TOTAL					=	10830.20 SQ.FT.

ARCADE AREA	= 4108.38 SQ.FT.
SHOWROOM AREA	= 10182.54 SQ.FT.
CIR.& AREA	= 10712.79 SQ.FT.
RAMP AREA	= 10830.20 SQ.FT.
TOTAL	= 35833.91 SQ.FT.

DETAIL OF 1ST TO 7TH. FLOOR (EACH FLOOR)

PARKING:

P1	= 150'-6"	X	55'-7"		=	8364.79 SQ.FT.
P2	= 163'-5"	X	65'-6"	/2	=	5351.67 SQ.FT.
P3	= 114'-0"	X	12'-7"		=	1434.12 SQ.FT.
P4	= 159'-5"	X	108'-6"		=	17295.98 SQ.FT.
P5	= 20'-0"	X	108'-6"	/2	=	1085.00 SQ.FT.
P6	= 12'-11"	X	55'-8"	/2	=	359.28 SQ.FT.
TOTAL					=	33890.84 SQ.FT.

DETAIL OF INDIVIDUAL & CIRCULATION

RECREATION

R1	= 49'-0"	X	68'-0"		=	3332.00 SQ.FT.
R2	= 39'-8"	X	68'-0"		=	2696.88 SQ.FT.
R3	= 67'-4"	X	40'-0"		=	2693.20 SQ.FT.
TOTAL					=	8722.08 SQ.FT.

TYPE-A

A	= 36'-8"	X	19'-0"		=	696.54 SQ.FT.
B	= 25'-8"	X	11'-4"		=	290.72 SQ.FT.
C	= 43'-4"	X	4'-10"		=	209.28 SQ.FT.
TOTAL					=	1196.54 SQ.FT.

TYPE-A1

A	= 24'-8"	X	11'-6"		=	283.59 SQ.FT.
B	= 32'-0"	X	7'-6"		=	240.00 SQ.FT.
C	= 43'-4"	X	4'-10"		=	209.28 SQ.FT.
D	= 25'-8"	X	11'-4"		=	290.72 SQ.FT.
TOTAL					=	1023.59 SQ.FT.

TYPE-A2

A	= 43'-4"	X	24'-8"		=	1068.51 SQ.FT.
B	= 30'-4"	X	11'-4"		=	343.63 SQ.FT.
TOTAL					=	1412.14 SQ.FT.

TYPE-A3

A	= 24'-8"	X	11'-6"		=	279.79 SQ.FT.
B	= 37'-8"	X	7'-6"		=	282.45 SQ.FT.
C	= 42'-8"	X	4'-10"		=	206.17 SQ.FT.
D	= 30'-4"	X	11'-4"		=	343.63 SQ.FT.
E	= 2'-0"	X	7'-0"		=	14.00 SQ.FT.
TOTAL					=	1112.04 SQ.FT.

TYPE-B

A	= 23'-0"	X	21'-8"		=	498.18 SQ.FT.
B	= 11'-8"	X	18'-6"		=	215.71 SQ.FT.
C	= 4'-6"	X	7'-8"		=	34.47 SQ.FT.
TOTAL					=	748.36 SQ.FT.

TYPE-B1

A	= 14'-10"	X	22'-10"		=	338.56 SQ.FT.
B	= 17'-4"	X	12'-4"		=	213.67 SQ.FT.
C	= 7'-8"	X	22'-2"		=	169.74 SQ.FT.
D	= 7'-8"	X	10'-10"		=	82.95 SQ.FT.
TOTAL					=	804.92 SQ.FT.

TYPE-B2

A	= 24'-0"	X	18'-6"		=	444.00 SQ.FT.
B	= 22'-6"	X	11'-4"		=	254.92 SQ.FT.
C	= 30'-2"	X	4'-10"		=	145.67 SQ.FT.
TOTAL					=	844.59 SQ.FT.

TYPE-B3

A	= 34'-8"	X	26'-8"		=	924.03 SQ.FT.
B	= 4'-10"	X	7'-8"		=	36.99 SQ.FT.
TOTAL					=	961.02 SQ.FT.

TYPE-B4

A	= 14'-10"	X	22'-10"		=	338.56 SQ.FT.
B	= 17'-4"	X	12'-4"		=	213.67 SQ.FT.
C	= 7'-8"	X	22'-2"		=	169.74 SQ.FT.
D	= 7'-8"	X	10'-10"		=	82.95 SQ.FT.
E	= 4'-8"	X	11'-8"		=	54.33 SQ.FT.
TOTAL					=	859.25 SQ.FT.

TYPE-B5

A	= 35'-8"	X	24'-8"		=	879.37 SQ.FT.
B	= 27'-2"	X	11'-4"		=	307.72 SQ.FT.
TOTAL					=	1187.09 SQ.FT.

TYPE-XL

A	= 28'-8"	X	13'-6"		=	386.91 SQ.FT.
B	= 26'-0"	X	12'-3"		=	318.50 SQ.FT.
C	= 13'-6"	X	10'-0"		=	135.00 SQ.FT.
D	= 13'-6"	X	14'-3"		=	192.37 SQ.FT.
E	= 20'-10"	X	6'-0"		=	124.98 SQ.FT.
F	= 36'-6"	X	3'-0"		=	109.50 SQ.FT.
G	= 14'-0"	X	4'-6"		=	63.00 SQ.FT.
H	= 14'-0"	X	6'-0"	/2	=	42.00 SQ.FT.
J	= 11'-0"	X	6'-0"		=	66.00 SQ.FT.
K	= 12'-8"	X	5'-0"		=	63.30 SQ.FT.
L	= 9'-8"	X	2'-6"		=	24.15 SQ.FT.
M	= 9'-8"	X	3'-6"	/2	=	16.90 SQ.FT.
TOTAL					=	1542.61 SQ.FT.

TYPE-XL1

A	= 18'-0"	X	34'-9"		=	627.50 SQ.FT.
B	= 28'-0"	X	22'-0"		=	616.00 SQ.FT.
C	= 7'-0"	X	11'-9"		=	82.25 SQ.FT.
D	= 14'-0"	X	4'-0"		=	56.00 SQ.FT.
E	= 10'-6"	X	2'-0"		=	21.00 SQ.FT.
TOTAL					=	1402.75 SQ.FT.

TYPE-XL2

A	= 35'-0"	X	25'-0"		=	875.00 SQ.FT.
B	= 17'-0"	X	19'-9"		=	335.75 SQ.FT.
C	= 17'-6"	X	11'-6"		=	201.25 SQ.FT.
D

Annex –IV: Other Department Consultations

SAAR
BUILDERS &
DEVELOPERS

Date: 15 May 2024

Attn:
The Secretary,
Chief Minister House
Government of Sindh

Reference: Environmental Impact Assessment for the Construction of SAAR Sky Icon (A Residential Cum Commercial Building Project)

Subject: Stakeholder Consultation for Proposed Project

Dear Concern,

M/S SAAR Builders & Developers has proposed a project named **"SAAR Sky Icon"** that will be a modern residential cum commercial building (B+G+44 Floors) with all the standard facilities. The project site is approved by the Sindh Building Control Authority (SBCA) and will be constructed on Plot No. 10/1, Sheet No: CL.9, Civil Lines Quarters, Karachi measuring 4540.00 SQ YDS.

As part of this Environmental & Social Assessment, stakeholder consultation is a vital and mandatory requirement to ensure the involvement of all potential stakeholders, to ensure the incorporation of their concerns and perspectives into the design and implementation of the project.

As such, your organization has been identified as a vital stakeholder for the project, where we would request to meet a relevant person/ official in your department/ organization to further discuss the project, its impacts, and mitigation measures necessary in your opinion. In this regard, please let us know of a time and place where such a meeting may be possible. A brief description of the project along is also attached to this letter for your review.

If by any chance, time may not allow for such a meeting, we would request that your feedback on the project be conveyed to us over a call or through an email at the below given details:

Received R&I Section
Chief Minister Secretariat Sindh

Phone – 0332-5256444
Email – saarbuildersndeveloper@gmail.com

Thanking you for your help in making this project more sustainable.

Yours faithfully,

SAAR BUILDERS & DEVELOPERS

Mr. Yogesh Kumar
Supervisor

Encl: • SBCA Architectural Approval
• Sindh Master Plan Authority Approval
• Verification Letter from Deputy Commissinor (South)
• Executive Summary of Project from EIA Report
• Notification Copy of Antiquities Dpt. GOS

SAAR
BUILDERS &
DEVELOPERS

Date: 15 May 2024

The Director General,
Archaeology Department
Government of Sindh

Reference: Environmental Impact Assessment for the Construction of "SAAR Sky Icon" (A Residential Cum Commercial Building Project)

Subject: Stakeholder Consultation for Proposed Project

Dear Concern,

M/S SAAR Builders & Developers has proposed a project named **"SAAR Sky Icon"** that will be a modern residential cum commercial building (B+G+44 Floors) with all the standard facilities. The project site is approved by the Sindh Building Control Authority (SBCA) and will be constructed on Plot No. 10/1, Sheet No: CL.9, Civil Lines Quarters, Karachi measuring 4540.00 SQ YDS.

As part of this Environmental & Social Assessment, stakeholder consultation is a vital and mandatory requirement to ensure the involvement of all potential stakeholders, to ensure the incorporation of their concerns and perspectives into the design and implementation of the project.

As such, your organization has been identified as a vital stakeholder for the project, where we would request to meet a relevant person/ official in your department/ organization to further discuss the project, its impacts, and mitigation measures necessary in your opinion. In this regard, please let us know of a time and place where such a meeting may be possible. A brief description of the project along is also attached to this letter for your review.

If by any chance, time may not allow for such a meeting, we would request that your feedback on the project be conveyed to us over a call or through an email at the below given details:

Phone – 0332-5256444
Email – saarbuildersndeveloper@gmail.com

Thanking you for your help in making this project more sustainable.

Yours faithfully,

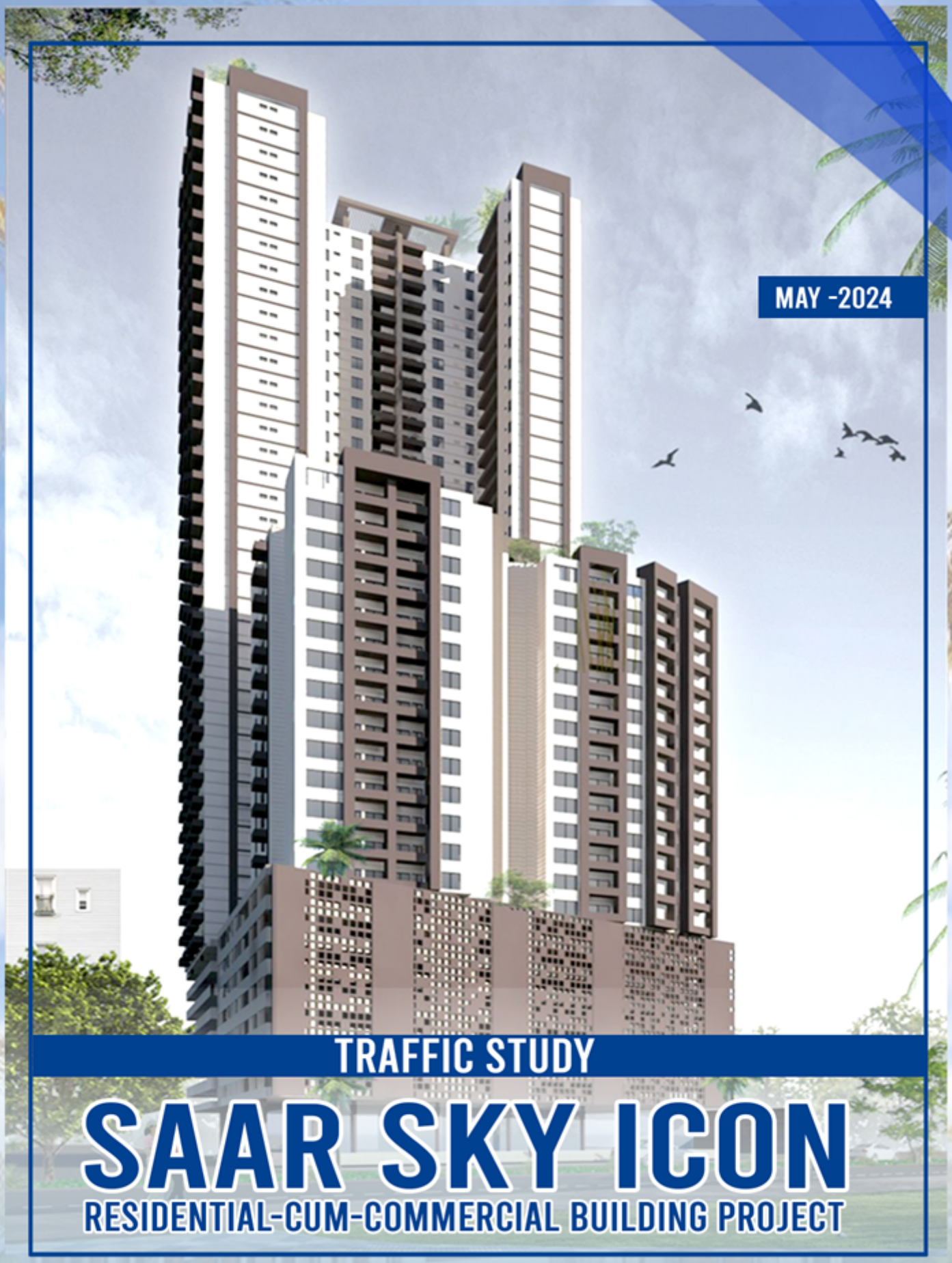
Received 17/05/24

DISPATCHER
Director General Antiquities
Culture, Tourism & Antiquities Dept.
Government of Sindh

Mr. Yogesh Kumar
Supervisor

Encl: • SBCA Architectural Approval • Executive Summary of Project from EIA Report
• Sindh Master Plan Authority Approval • Notification Copy of Antiquities Dpt, GOS
• Verification Letter from Deputy Commissinor (South)

Annex V: Traffic Study Report



MAY -2024

TRAFFIC STUDY

SAAR SKY ICON

RESIDENTIAL-CUM-COMMERCIAL BUILDING PROJECT

SAAR BUILDERS &
DEVELOPERS

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Annex – 1: Parking Floors

Annex – 2: layout of proposed underpass on M.T Khan Road

CHAPTER 1 INTRODUCTION

1.1 Project Overview

This report presents the findings of a comprehensive traffic impact evaluation & assessment study conducted for proposed Residential-cum Commercial Building Project on Plot # 10/1, Sheet CL-9, Civil Lines Quarters, Karachi.

Studied the on-site traffic situation and parking plan and has proposed the traffic management system. In this context, the engineers have studied the site and its surroundings in detail in the context of the traffic engineering. The traffic engineering team conducted a visual reconnaissance survey of the site along with a comprehensive photography.

Megacities all over the world are experiencing rapid growth of motorized transportation. Karachi is one of the megacities that face severe transportation problems. The situation is deteriorating day-by-day due to a lack of appropriate transport policies and decision making. The lack of a properly regulated and monitored public transport system results in a gap which is filled by the non-professional private sector. The informal private sector works on the principle of profit maximization, which results in a poor level of service for commuters. In this situation, commuters experience problems in comfort, availability, accessibility, and safety which trigger commuters to switch to either private vehicles or paratransit/e-hiring services. The lack of a proper public transport system resulted in increased dependency on motorbikes and cars which contributes to more traffic congestion. The number of motorbikes registered in Karachi has increased by 50% during a period of four years from 2013 to 2017, whereas the number of cars has increased by 38% during the same period. Public transit routes are decreasing continuously, which dropped to 90 routes in 2017 in comparison with 149 routes in 2012.

The informal public transport system in Karachi comprises of various modes, which includes minibus, bus, and chingchi as shown in **Fig. 1.** The routes for buses and minibuses are approved by the Regional Transport Authority (RTA).



Figure 1 Public Transport Modes in Karachi: Bus (left top), Minibus (right top), Chingchi Bike (left bottom) and Chingchi Rickshaw (right bottom)

1.2 Salient Features of the project

The proposed project: ***SAAR Sky Icon*** is planned to be infrastructure development on Plot # 10/1, Sheet CL-9, Civil Lines Quarters, Karachi, having total area of **4540.00 SQ YDS.** and it will serve as Residential-cum Commercial Building Project. The project comprises the following components:

Table 3.1: Salient Features of the Project	
Project Name	SAAR Sky Icon
Category	Residential-cum-Commercial
Proponent	M/s SAAR Builders & Developers
Plot Area	4540.00 SQ YDS (0.9380 acres)
Gross covered area	762,496.97 SQ FT
Storeys	B+G+44
Location	Plot # 10/1, Sheet CL-9, Civil Lines Quarters, Karachi.
Basement Plan (ARS + Project Parking + Services)	Showrooms (5), Air Raid Shelter, Underground Water Tank for Potable, Non-Potable, Fire Fighting and Septic, Pump Room and RO plant.
Ground Floor Plan (Shops + Services)	Showrooms (5), KE substation, Electric room, Generator room, and Reception.
1st Floor Plan (Project Parking + Services)	Parking (56 cars and 60 motorcycles), and others services
2nd to 5th Floor Plan (Project Parking + Services)	Parking (224 cars and 240 motorcycles), and others services
6th Floor Plan (Project Parking + Services)	Parking (56 cars and 60 motorcycles), and others services
7th Floor Plan (Project Parking + Services)	Parking (56 cars and 60 motorcycles), and others services
8th Floor Plan (Flats)	Flats (5), Male and Female Gym, Community Hall and other services
9th to 10th Floor Plan (Flats)	Flats (5x2=10), Library, Daycare center, Indoor games and other services.
11th to 21st Floor Plan (Flats)	Flats (11x11=121) and other services.
22nd Floor Plan (Flats)	Flats (8) and other services.
23rd Floor Plan (Flats)	Flats (6) OHWT for Potable, Non-Potable, Fire Fighting and other services.
24th to 44th Floor Plan (Flats)	Flats (6x21=126) and other services.
Roof Plan (Solar Panels + Battery Room + Services)	Solar Panels, Machine room, Overhead Water Tank for Potable, Non-Potable and Fire Fighting, Battery and Machine Room, and otherservices
Total Parking	Total Project Parking: 388 cars and 420 motorcycles
Totals Flats	Total 276 Flats

Total Showrooms	10 showrooms
Height of the Building	494'-6'' Above Ground Level (AGL)

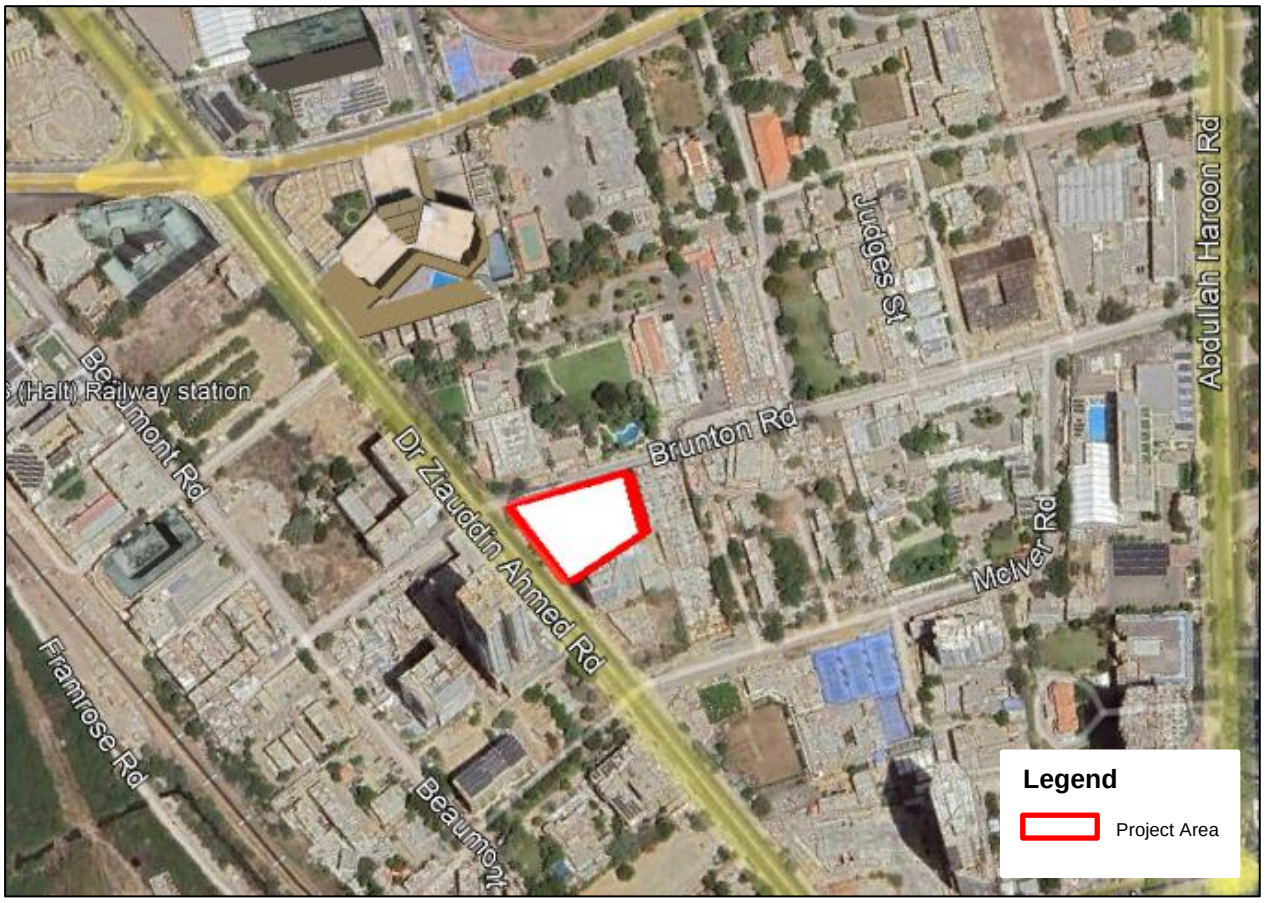
1.3 Objective of Traffic Study

The following are the objectives of the traffic impact evaluation & assessment conducted for the Residential-cum-Commercial development on "Plot # 10/1, Sheet CL-9, Civil Lines Quarters, Karachi:

- Develop a proper and an integrated long range traffic flow system for the project.
- Equitably satisfy the mobility, accessibility and circulation needs of the site in-conformity with the surrounding area.
- The project conforms to the existing and future traffic growth of the area.

1.4 Project Location

The project site is located at Plot # 10/1, Sheet CL-9, Civil Lines Quarters, Karachi. The project falls in the High-density "Railway/KPT Marshalling Yard" zone.



The project site is located between McIver Road is at south and Brunton Road is in its north. The Dr. Ziauddin Ahmed Road towards is at west of the project site. Abdullah Haroon Road (formerly known as Victoria Road) is at east of the project site.

The nearby landmarks include CM House, PIDC Karachi, Movenpick Hotel and Karachi Gymkhana etc.









Figure 2 Pictorial Views of Project site and surroundings

1.5 Structure of Traffic Assessment Report

The report has been presented in the following sections:

Section 1 - Introduction to Project
Section 2 – Methodology of Traffic Study
Section 3 – Existing Traffic and Finding
Section 4 - Conclusion and Recommendations

CHAPTER 2 METHODOLOGY ADOPTED FOR TIS

This traffic impact assessment was conducted in the following manner:

2.1 Review of Legislation and Guidelines

National & Provincial legislations, guidelines, and best traffic management practices were reviewed to set standards that the project will be required to follow during different stages of the project.

2.2 Review of Published literature

All available published and unpublished information pertaining to the micro and macro environment of the study area was obtained and reviewed. It included the earlier studies conducted in the study area, and traffic impact assessment studies conducted by different consultants in past. Secondary data was very helpful in understanding the issues that were identified by other consultants.

2.3 Initial site visit

An initial site visit was conducted to get an overview of site conditions and the surrounding areas.

2.4 Traffic Management Plan

Traffic management plan will be introduced to manage smooth flow of vehicular traffic and to avoid traffic jam and long queues. Traffic management plan will be implemented and monitored.



Figure 3 Conceptual Framework

CHAPTER 3 EXISTING TRAFFIC AND FINDING

This part of the report discusses existing traffic conditions within the study area.

3.1 Junction 1 (Hotel Moven Pick Junction)

This junction is a four-legged junction at Hotel Moven Pick. At this junction, turning movement counts would help to determine the traffic volume coming from Dr. Ziauddin Ahmed Road, from PC Hotel and from Moulvi Tamizuddin Khan Road. This junction will serve the traffic exiting from proposed development and move towards the north direction.

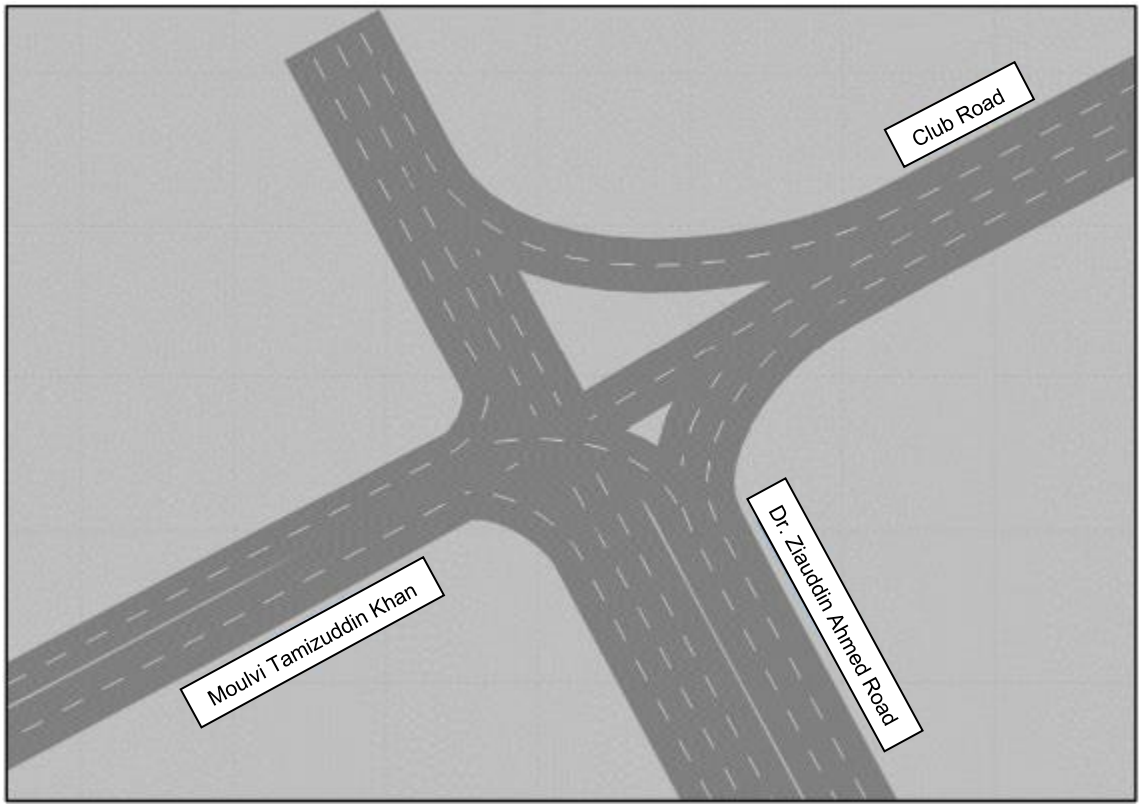


Figure 4 Junction 1 (Hotel Moven Pick Junction)

3.2 Junction 2 (Dr. Ziauddin Ahmed Road Junction)

This junction is a three-legged signalized junction located between Brunton Road and Dr. Ziauddin Ahmed Road. At this junction, turning movement counts would help to determine the traffic volume on Brunton road, moving in north, south and east directions. It will also serve the traffic exiting from proposed development.

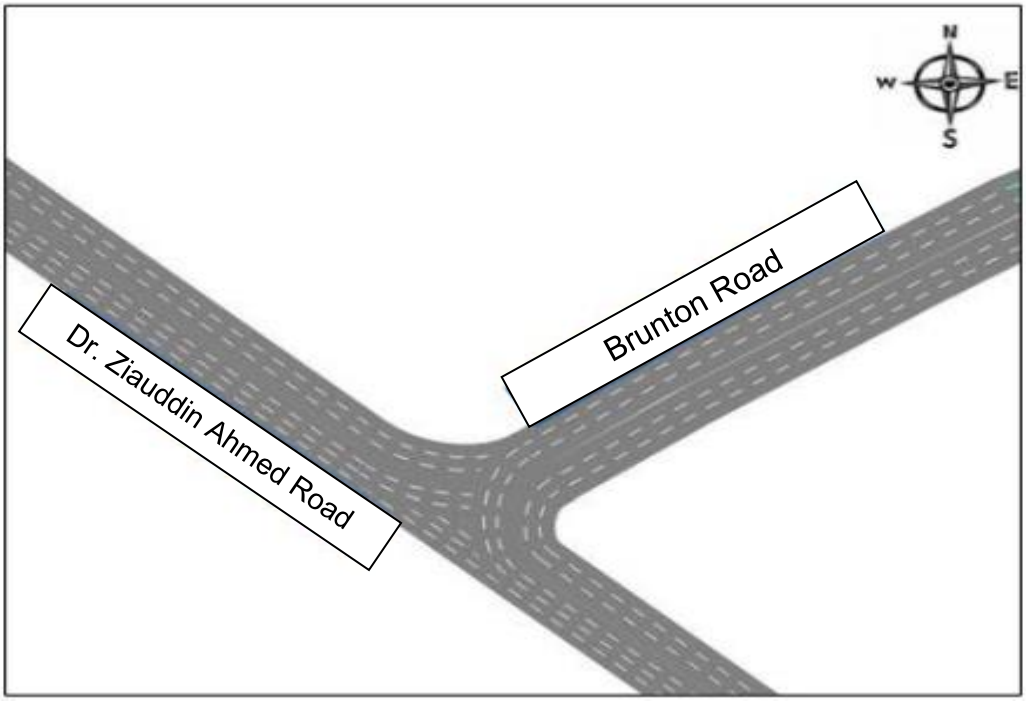


Figure 5 Junction 1 (Dr. Ziauddin Ahmed Road Junction)

3.3 Junction 3 (Abdullah Haroon Road Junction)

This junction is also a three-legged signalized junction located between Brunton Road and Abdullah Haroon Road. At this junction, turning movement counts would help to determine the traffic volume on Brunton road, moving in north, south and west directions. It will also serve the traffic exiting from proposed development.

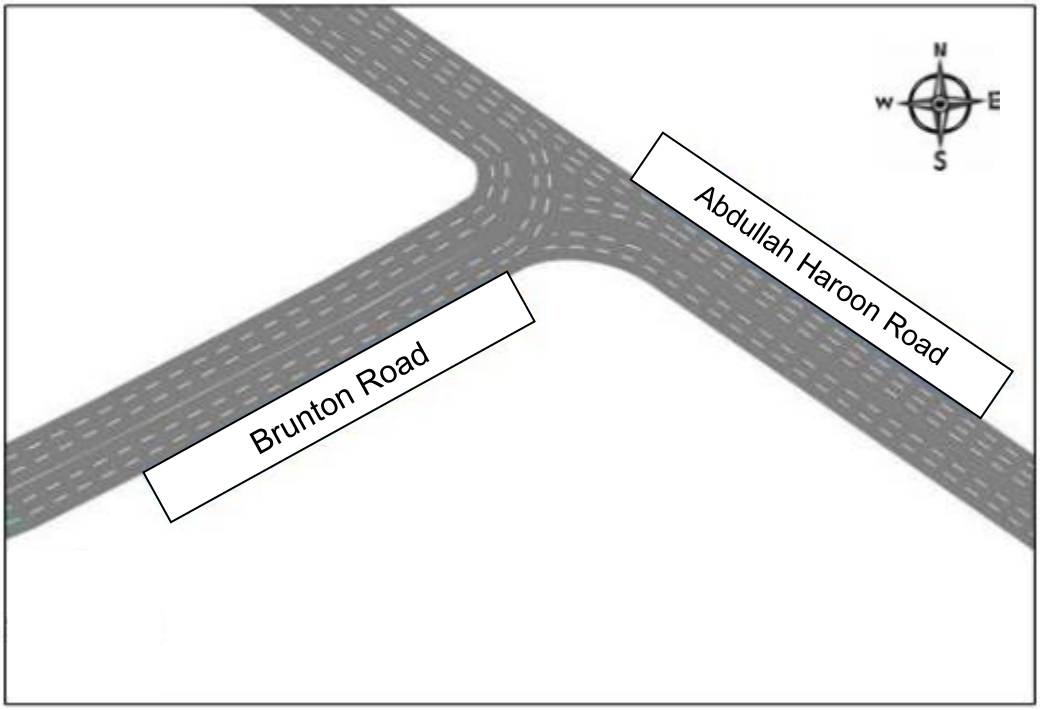


Figure 6 Junction 3 (Abdullah Haroon Road Junction)

The summary of parking within the proposed development are described in the table below:

Table 3.1: Summary of Parking	
Required Parking	
Car Parking	429 Cars
Motorcycle Parking	420 Motorcycle
Disable Car Parking	05 Cars
Provided Parking	
Project Car Parking	
1st Floor -7th Floor	342
Total Floors Car Parking	**342 Cars**
Due to High Density Byelaws	**86 Cars**
Total Project Car Parking	**429 Cars**
Project Motorcycle Parking	
1st Floor	60
2nd Floor	60
3rd Floor	60
4th Floor	60
5th Floor	60
6th Floor	60
7th Floor	60
Total Project Motorcycle Parking	**420 Motorcycle**

CHAPTER 4 CONCLUSION AND RECOMMENDATIONS

Following are the summarizing points of the study:

- The proposed project is Ground + 44 floors Building included one basement with a total land area 4540.00 Sq.Yd.
- The land use of the building consists of apartments, offices and shops.
- The total car parking stalls available for the development are 429.
- The total car parking stalls required for the development are 429 including 05 disable cars parking as per SBCA.
- The total MC parking stalls available for the development are 420.
- The total MC parking stalls required for the development are 414 as per SBCA

Vehicular traffic management will have to be undertaken seriously to restrain unnecessary traffic jams that may cause annoyance to the commuters travelling on the roads surrounding the project.

The following mitigation measures and recommendations will be adopted to remove the constraints to smooth flow of traffic:

- Heavy traffic during construction; phase will come to the project site during late night hours. Project vehicles shall not be fitted with pressure horns.
- Speed of vehicles will be regulated during construction phase.
- Designated parking areas will be provided for different type of project vehicles within and around the project site.
- Traffic management plan will be introduced to manage smooth flow of vehicular traffic and to avoid traffic jam and long queues.
- Traffic management plan will be implemented and monitored.
- Vehicles will be parked at designated parking areas during operational phase.
- Parking of vehicles alongside the road would be prohibited at all time
- An alternate route is proposed for the traffic which is coming from Sh. Faisal and wants to go towards 2-talwar. It can take a left turn to Fatima Jinnah Road to join the Khayaban e Iqbal again on 3-talwar by passing from Cantt. Station and Lily Bridge. The diagrammatic representation of the route is attached as **Annexure II**. This can serve as an alternate route which will not only not only improve the Abdullah Haroon Road Junction but also improve the Hotel Moven Pick Junction as the traffic moves forward towards Club Road. It's only about giving a little awareness regarding the alternate route to the drivers going to 2-Talwar from Shahrah e Faisal.

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ANNEXURES

ANNEXURES-I
Parking Floors


PLOT NO. 10/3
BRUNTON ROAD
PLOT NO. 11/1/1
OPEN
KUTCHERY ROAD
1ST FLOOR PLAN
TOTAL NO. OF CARS = 55
TOTAL NO. OF M/C = 60

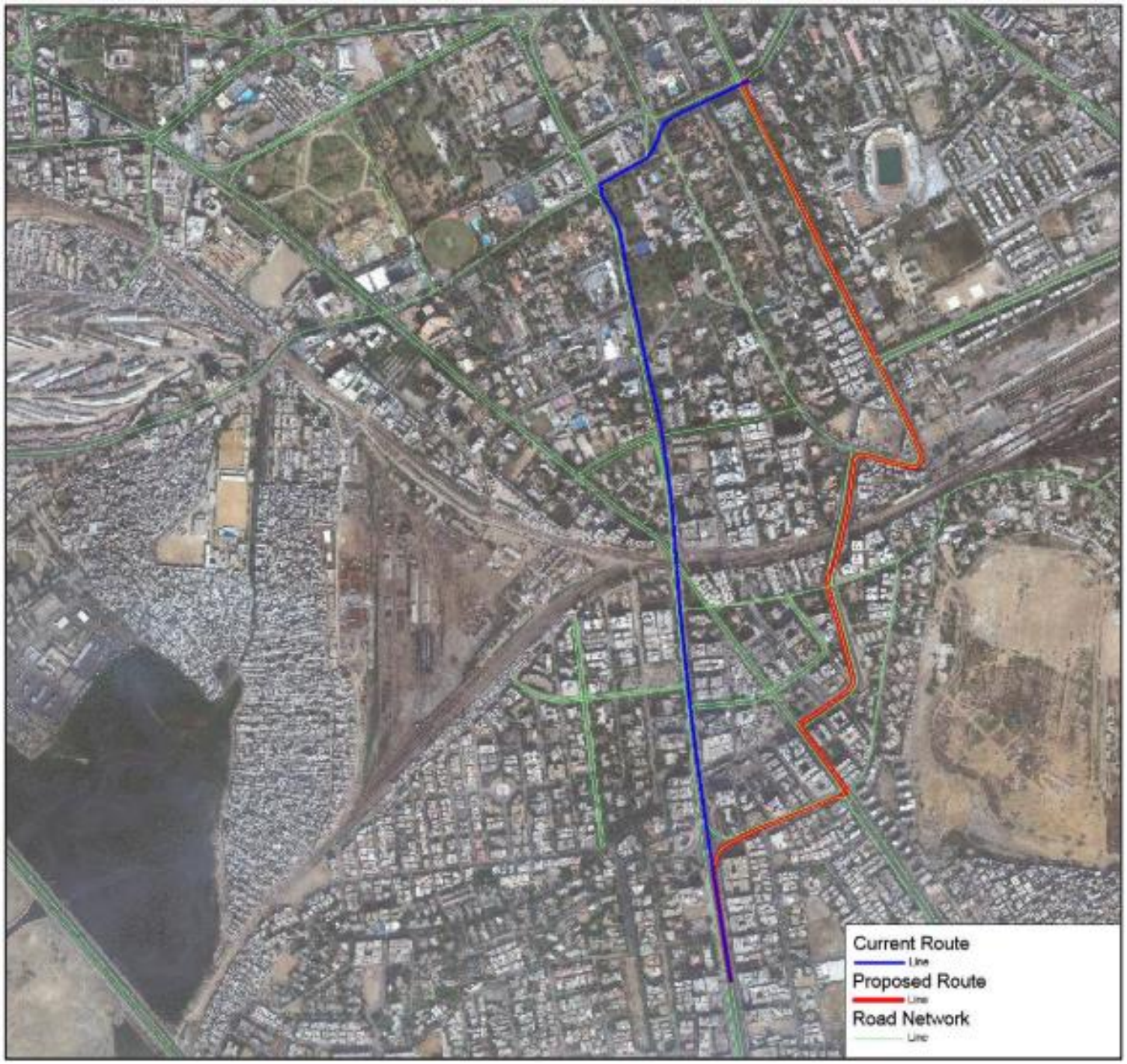

PLOT NO. 10/3
BRUNTON ROAD
PLOT NO. 11/1/1
OPEN
KUTCHERY ROAD
2ND TO 5TH FLOOR PLAN
TOTAL NO. OF CARS 55 X 04 = 224
TOTAL NO. OF M/C 60 X 04 = 240


PLOT NO. 10/3
BRUNTON ROAD
PLOT NO.11/1/1
OPEN
KUTCHERY ROAD
6TH FLOOR PLAN
TOTAL NO. OF CARS = 54
TOTAL NO. OF M/C = 60


PLOT NO. 10/3
BRUNTON ROAD
PLOT NO.11/1/1
OPEN
KUTCHERY ROAD
7TH FLOOR PLAN
TOTAL NO. OF CARS = 54
TOTAL NO. OF M/C = 60

ANNEXURES-II

Diagrammatic Representation of the Alternate Route


Current Route
Line
Proposed Route
Line
Road Network
Line