ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

THE 7 (SEVEN) TOWER

M/S NSA BUILDERS AND DEVELOPERS

JUNE - 2026



THE 7 (SEVEN) TOWERS

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

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List of Abbreviation

APHA	American Public Health Association
ASTM	American Society For Testing Materials
BHU	Basic Health Unit
BOD	Biological Oxygen Demand
CAA	Civil Aviation Authority
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
Db	Decibel
E	East
EC	Electric Conductivity
EHS	Environmental Health And Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GDP	Gross Domestic Product
GPS	Global Positioning System
IEE	Initial Environmental Examination
KDA	Karachi Development Authority
KM	Kilometer
kW	Kilo Watt
LAA	Land Acquisition Act
MCHCs	Maternal and Child Health CentersMaternal And Child Health
MVA	Mega Volt Ampere
N	North
NGOs	Non-Governmental Organization
NOC	No Objection Certificate
NO_x	Nitrogen Oxides
PKR	Pakistani Rupee
PM	Particulate Matter
RHC	Rural Health Centre
SBCA	Sindh Building Control Authority
SDG	Sustainable Development Goals
SEPA	Sindh Environmental Protection Agency
SEQS	Sindh Environmental Quality Standards
SO2	Sulfur Dioxide
TB	Tuberculosis
TDS	Total Dissolve Solids
TSS	Total Suspended Solids
WHO	World Health Organization

EXECUTIVE SUMMARY

INTRODUCTION

The Environmental Impact Assessment (EIA) study for the proposed project of The 7 (Seven) Towers has been conducted by Indus Environmental Engineering Consultants at the request of project proponent i.e. M/s. NSA Builders and Developers. The EIA has been prepared in compliance with the requirements under Section 17 of Sindh Environmental Protection Act (SEPA) 2014 and SEPA Environmental Assessment (EIA/IEE) Regulations 2021, for Residential/commercial high-rise buildings / apartments from15 stories and above.

The Sindh Environmental Protection Act (SEPA) 2014 empowers the Sindh EPA as the principal authority for environmental management in Sindh. It has also established the requirement for environmental assessment of any project in place prior to commencement of work.

Project Owner has planned to conduct Environmental Impact Assessment (EIA) study for the proposed Project in order to mitigate and manage project's environmental impacts and to fulfil all the relevant legal obligations including environmental approval from Sindh EPA.

CATEGORIZATION OF THE PROJECT

The Proposed Project, "The 7 (Seven) Towers" falls in Schedule-III of SEPA EIA/IEE Regulation 2021 require an EIA at planning stage. The Project would be placed in Category I (Urban Development) - (2) Residential, Commercial High-rise buildings subject to compliance of building bylaws of relevant organizations more than 500,000 sq. feet. Accordingly, an EIA study has been conducted and the report will be submitted to Sindh EPA for review and approval.

OBJECTIVES OF ENVIRONMENTAL ASSESSMENT

The main purpose of this Environmental Impact Assessment study is to ensure that:

All major and minor positive or negative impacts on the environment (physical, biological, social and ecological environment) during the different stages of inception as well as construction and operation of proposed project are identified.

Appropriate and adequate mitigation measures are provided to minimize the adverse impacts, which are suggested and procedures for their implementation are provided.

Environmental Management Plan (EMP) for sustainable operation of the project forms an essential part of the EIA document.

SCOPE OF ASSESSMENT

The EIA study has taken into consideration, all the relevant national legislations and regulations, followed by site visits and details of construction and operation activities of proposed project. Environmental and socio-economic baseline has been taken from previous reports, books and other literature available specifically of the project area. The baseline has been further investigated and confirmed during site visits.

METHODOLOGY OF EIA

The EIA process requires identification and assessment of all potential significant environmental effects arising from the proposed project. The effects likely to occur due to Physical, Ecological, and Social aspects are identified during this EIA study. The critical aspects are highlighted for construction and post-construction (operation) phases of the project according to the nature of activities and their sequence and interconnectivity associated with the project.

The significant impacts arising during each phase of the project have been highlighted and appropriate mitigation measures have been suggested to minimize the impacts. For operation phase a perpetual Environmental Management Plan (EMP) has been proposed that will continue to adopt and implement measures for sustained environmental compliance in operations and maintenance of standards.

OVERVIEW OF PROJECT

The project site for proposed “The 7 (Seven) Towers” Project is located on Plot No. LA - 4/1, Rashid Minhas Road, Karachi. The Project is accessable from Main Superhighway, Rashid Minhas Road, and Sharah e Pakistan, and Liyari Expressway.

The proposed project “The 7 (Seven) Towers” is a residential development comprising seven residential towers constructed over a common podium structure. The shared structure includes Basement 1 (Parking) + Basement 2 (Parking) + Ground floor (Service Area and Recreation Area) + 1st to 5th Floor (Parking). Each residential tower extends from the 6th to the 19th Floors, consisting of residential apartments and recreational areas. The 20th Floor is designed as an interconnected recreational level linking all towers, while the 21st to the 35th Floors comprise residential apartments and recreational facilities. Through a proposed project, M/S N.S.A Builders and Developers aims to provide a perfect blend of luxurious and world-class lifestyle, modern design and peaceful living that is ideal for living in one of Karachi’s most desired neighbourhoods.

The proposed development is planned over a plot having a total area of 15670.00 Sq. Yds. (or 141030 Sq. Ft.). The proposed project net covered area after exemptions is 1146140.26 Sq Ft., comprises ofcomprising high-rise residential towers, supported with high-quality infrastructure, ample car parking and recreational facilities.

SCREENING OF IMPACTS

The assessment of impacts has primarily focused on the construction activities and later on the operations of the proposed project. The major areas covered in the impact analysis include wastewater, solid waste, resource consumption, occupational safety and socio-economic factors as well as traffic management.

The findings of impact study and visual inspections of existing environment of the project area in the present scenario indicates following main impacts along with simultaneous relevant and appropriate mitigation measures:

During construction of the proposed site waste may be generated due to the activities such as dust emissions, erosion of land, generation of construction waste, noise, and traffic problems. This may be avoided by proper management and planned construction work. Work may be avoided or keeping at minimum scale at night to avoid community disturbances with regards to noise and traffic congestion. In order to avoid damages, geo-technical study of sub-soil structure is conducted.

Excessive water consumption may result in water shortage and increased demand of water for construction as well as operation of the proposed project. This may be avoided by water management to prevent illogical water use. Storage tanks for water to be made leak proof.

Wastewater discharge to local nearby sewer without any treatment may increase the load of contaminant, which can be reduce to prescribed SEQS limits by use of septic tanks during construction and by wastewater treatment plant during the operational stage of the proposed project.

During construction, the project has minimal impact on traffic congestion. Critically loading and unloading will be conducted on site and avoid congestion on nearby roads. Traffic management plan will be developed and implemented.

The project project will have the provision of sustainable, environmental friendly technologies in the residential building.

ENVIRONMENTAL MANAGEMENT PLAN

Regardless of above impact assessment and mitigation measures, there is a need of Environmental Management Plan (EMP) to execute the mitigation measures by allocating roles and responsibilities and by monitoring its effectiveness. Therefore, an EMP has been created and compiled for the assistance of M/s. NSA Builders and Developers. Management shall supervise and monitor all the mitigation measures and their effectiveness. It explains and assigns the roles and responsibilities of work to relevant individuals from management and makes it easy to handle the issues with care. Several Procedures like waste management and emergency response plan are made part of this EMP. The main aspects covered in the EMP guidelines includes: 1) processes involved in EMP, 2) management approach, 3) organizational structure indicating roles and responsibilities and 4) implementation stages of EMP such as planning and design considerations, monitoring and mitigation plans during construction, and operation and needs of training.

Project Owner and their subsequent contractor(s) are required to follow the EMP. It is recommended that where necessary, M/s. NSA Builders and Developers shall amend this EMP as per gaps that arise.

CONCLUSION

The project proponent shall comply with the findings, conclusions and based on the approval of the environmental assessment of the study, the proposed mitigations as suggested in the form of Environmental Management Plan for ensuring sustainable development in the project area.

The study therefore recommends that the 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.

CHAPTER - 1: INTRODUCTION

1.1 Background

This Environmental Impact Assessment (EIA) report presents the assessment of environmental impacts that may arise due to the development of proposed "The 7 (Seven) Towers", residential project which will be developed by M/S NSA 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 Indus Environmental Engineering Consultants has been engaged by M/S NSA 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 building project named The 7 (Seven) Towers located at Plot No. LA-4/1, Block 21, F.B. Area, Scheme -16, Karachi.

1.2 Overview of Proponent

M/S NSA Builders Developers is the project proponent of the proposed project. The proponent aims to provide high-quality residential apartments to accommodate the growing urban population and housing demand in the city along with associated facilities including parking, utilities, fire safety systems and community amenities.

The project is owned by:

- Mr. Ashraf Ali Sayeed (Owner/Attorney)

The project owner(s) are responsible for the proposed project and its related activities, including construction, operations, and handling of all matters, including obtaining NOCs from all departments related to amenities and other legal requirements.

1.3 Overview of the Project

The proposed project will provide a perfect blend of luxurious and world-class lifestyle, modern design and peaceful living that is ideal for living in one of Karachi's most desired neighbourhoods.

The proposed development is planned over a plot having total area of ***15670.00 Sq. Yds. (or 141030 Sq. Ft.),*** comprises of high-rise to mid-rise residential towers, with high-quality infrastructure, ample car parking and recreational facilities for the project residents.

Table 1-1: Overview of Proposed Project

Project Name	The 7 (Seven) Towers

Category of Project	Residential Development
Proponent	M/s NSA Builders & Developers
Plot Area	15670 Sq. Yds. or 141030 Sq ft.
Gross Covered Area	2400407.01 Sq ft.
Net Area after Exemption	1146140.26 Sq ft.
Floors	Basement 2+Basement 1+Ground Floor + 35 Floors (Flats)
Roof Plan	Solar Panel, Portable OH Water Tanks, Battery Room
Total Flats	1,392 Flats
Total Parking	1414 Total Cars (16 % (153 Car Spots are reserved for motorcycles)
Height of the building	450 ft. Above Ground Level (AGL)



Figure 1-1: Conceptual Aerial View of Proposed Project

1.4 Objectives of Project

The project aims to achieve the following objectives;

- To provide an organized residential 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.

- Go beyond current concepts of building and construction in Pakistan in terms of lifestyle, comfort and pragmatism.
- Demonstrate environmental and social responsibility.
- Provide residential accommodation in a fast growing environment that has attracted commercial activities, with security as its major component.

1.5 Justification and Categorization of EIA Study

The Sindh Environmental Protection Act 2014 empowers the SEPA as the principal authority for environmental management in Sindh Province. It has also established the requirement of environmental assessment of any project in place prior to commencement of work.

Section 17 of "Sindh Environmental Protection Act 2014" and other regulatory document such as "Sindh Environmental Protection Agency (SEPA) Review of IEE/EIA Regulations 2021" requires that every new project in Sindh has to be preceded by an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) depending upon the size and severity of impacts anticipated on commissioning of the project.

SEPA Review of IEE and EIA Regulations 2021 categorizes projects in two separate schedules which require either an IEE (Schedule-II) or an EIA (Schedule-III) as follows:

Schedule II: A project falls in Schedule II if it is likely to have adverse environmental impacts, but of lesser degree or significance than those for category 'A' and all the mitigation measures to handle the impact is manageable. Such types of projects need IEE report including 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.

The Seven Towers Project falls in Schedule III requiring an EIA as the project is categorized as:

Category - I. Urban development and tourism; (2): Residential, Commercial High rise buildings subject to compliance of building by laws of relevant organizations more than 500,000 sq.feet.

The proposed **"7 (Seven) Towers"** project falls in Category I (2) of the Schedule III, as the total net covered area of building after exemption is **1146140.26 Sq. ft**.

Therefore, following EIA has been developed to evaluate the environmental impact of proposed project under guidelines of Sindh Environmental Protection Act (SEPA), 2014.

1.6 Scope of EIA Study

Scope of this EIA includes

- Meet the statutory requirements set forth by the Sindh Environmental Protection Act 2014.

- Establish a baseline of existing environmental and social status at the project site before project initiation by collecting secondary and primary data/information on the physical, biological and socio-economic environment of the project area.
- Help the project proponents to incorporate necessary measures for the legally compliant and socially acceptable environmental performance of their project.
- Identify significant environmental and social impacts (both positive and negative) during all stages of the project implementation and propose mitigation measures for negative impacts.

1.7 Methodology adopted for EIA

1.7.1 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.

1.7.2 Review of Legislation and Guidelines

National & Provincial legislation, 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.

1.7.3 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
- Topography
- Air Quality
- Noise Quality
- Soil
- Geology
- Fauna
- Hydrology
- Socioeconomic resources
- Surface Water and Groundwater Quality

1.7.4 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 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.

1.7.5 Impact Assessment & EMP

Environmental experts at IEEC 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.

1.7.6 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.

1.8 Structure of EIA report

This Environmental Impact Assessment (EIA) Report comprises ten chapters and a summary. The chapters are as follows:

Chapter 1: Introduction, gives an introduction of the Project, the Consultants' scope of services for EIA studies and the approach adopted by the Consultants for reaching compliance with guidelines.

Chapter 2: Legal and Regulatory Framework describes national laws applicable during the implementation of the Project. Federal and provincials' guidelines are required to be complied with during the preparation of the EIA report as well as followed during the implementation of the Project.

Chapter 3: Description of the Project, gives a rather detailed account of the Project, particularly emphasizing those project components which are of importance in relation to environmental and social aspects.

Chapter 4: Project Alternatives Considered: The chapter also deals with various alternatives considered for project location, layout in consideration of technical, economic and environmental aspects.

Chapter 5: Baseline Environmental Conditions. This chapter discusses various environmental and social entities i.e., Physical Environment, Climate, Ecological Resources, Socio-economic etc., before the project.

Chapter 6: Information Disclosure, Consultation, and Participation deals with the outcome of the consultation/scoping sessions carried out with the local communities, stakeholders such as Government departments, NGOs, knowledgeable people, public representatives, etc. It discusses the concerns of various tiers of the people and provides an outline of how these have been addressed within the framework of the project.

Chapter 7: Screening of Potential Impacts and Proposed Mitigation Measures provides an analysis of the environmental and social impacts of the project and discusses measures to mitigate adverse impacts and enhance the environment of the project-affected areas.

Chapter 8: Environmental Management and Monitoring Plan provides plans for the implementation of environmental management and monitoring. It proposes an organizational setup required for the implementation of mitigation actions and, in light of this, identifies strengthening needs in institutional arrangement presently existing within and allied departments.

Chapter 9: Estimated Environmental Cost, This chapter estimates an environmental cost, which comprises environmental mitigation costs during the construction and operation of the proposed project.

Chapter 10: Conclusions sums up the report and the conclusions resulting from the study as well as recommendations for making the project environmentally sustainable.

1.9 Details of Project Study Team

The following team of experts has been engaged in the proposed project to conduct/ update the EIA study.

Table 1-2: List of EIA Study Team Members

No.	Name	Expertise / Role
1.	Dr. Arshad Hussain Memom	Team Leader / Sr. Environment Specialist
2.	Vijay Kumar	Social Safeguard Specialist
3.	Engr. Suresh Kumar	Environment Specialist
4.	Ali Sarwar	GIS Specialist.
5.	Engr. Bahawal Khan	Environment Engineer
6.	Engr. Gul Muhammad	Environment Engineer
7.	Engr. Raiza Rafique	Environment Engineer
8.	Engr. Irtiqa Aurangzeb	Environment Engineer
9.	Khalil Mehran	Water Specialist,
10.	Mehtab Bhorani	Field Assistant
11.	Muskan Ali	Field Assistant
12.	Naqeeb Shah	Documentation

1.9.1 Contact Persons

In case of further details or clarifications regarding this EIA, don't hesitate to get in touch with the proponent's representative or the consultant at the addresses provided in **Table 1-3**.

Table 1-3: Contact Details of Project Proponent & Consultants

Project Proponent	Environment Consultant
M/S NSA Builders and Developers Site Office: Plot No. LA – 4/1, Rashid Minhas Road, Karachi	**M/S Indus Environmental Engineering Consultants.** Office No. 103, 1st Floor, Amber Estate, Block 7/8, Banglore Town, Main Shahrah-e-Faisal, Karachi Phone/Fax: +92 (021) 34387770; 0333-7045597

CHAPTER - 2: APPLICABLE REGULATIONS, GUIDELINES AND STANDARDS

2.1 General

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

2.2 Review of Applicable National Acts & Regulations

The applicable national Environmental and social legislation and regulations are briefly summarized in **Table 2-1:**

Table 2-1: Applicable National Acts & Regulation

Sr. No.	*Legislation*	*Summary*	*Relevance to the Project*
1.	National Environmental Policy, 2005	The **National Environmental Policy (2005)** provides a national framework to integrate environmental protection into development activities through pollution control, resource conservation and mandatory environmental assessment. It requires projects to manage air emissions, wastewater, solid waste, noise and energy use in accordance with NEQS and regulatory approvals.	The policy is applicable as it is an urban high-rise development that may cause construction dust, sewage generation, waste disposal and traffic impacts. Compliance will be ensured through EIA approval, proper waste and sewerage management, dust suppression and noise control measures during construction and operation.
2.	National Conservation Strategy 1992	The **National Conservation Strategy (1992)** is Pakistan's first comprehensive environmental planning document focusing on sustainable resource use, pollution reduction and improved urban environmental management. It emphasizes conservation of water, energy efficiency, waste minimization and environmentally responsible development practices.	The strategy is relevant as the urban construction may affect air quality, waste generation and resource consumption. The project will adopt measures such as controlled construction practices, efficient water and energy use, and proper waste management to align with the strategy's sustainability objectives.
3.	Pakistan Climate Change Act, 2017	The **Pakistan Climate Change Act, 2017** establishes the legal framework for climate change mitigation and adaptation, promoting reduction of greenhouse gas emissions,	The Act is relevant as the high-rise building must incorporate energy-efficient design, water conservation and heat-island reduction measures while managing emissions during

Sr. No.	*Legislation*	*Summary*	*Relevance to the Project*
		climate-resilient infrastructure and sustainable resource use. It requires development projects to consider climate risks, energy efficiency and environmental sustainability.	construction and operation to support climate-resilient urban development.
4.	Land Acquisition act 1892 and Land Acquisition (Sindh Amendment Act 2009)	The **Land Acquisition Act, 1894** (as amended by the **Sindh Amendment Act, 2009)** governs the procedure for acquisition of land for public and development purposes, ensuring compensation, transparency and protection of landowners' rights. It requires proper notification, valuation and payment before possession of land.	The law is relevant to confirm that the project land is legally owned or acquired and free from encroachment or disputes, ensuring that no involuntary displacement or unlawful occupation occurs prior to construction. The project land is owned by the proponent so no land acquisition is required. Land documents are attached in **Annexure – I.**
5.	Pakistan Penal Code, 1860 (PPC)	The **Pakistan Penal Code, 1860 (PPC)** contains legal provisions to prevent public nuisance, negligence and actions endangering public health and safety, including excessive noise, unsafe construction practices and obstruction of public ways.	The code is relevant as construction and operational activities must avoid hazards to nearby residents and road users by implementing safety measures, controlled working hours, traffic management and prevention of dust, noise and material spillage.
6.	National Disaster Management Act, 2010	The **National Disaster Management Act, 2010** establishes the framework for disaster risk reduction, preparedness and emergency response in Pakistan, requiring institutions and development projects to incorporate safety and risk-management measures against natural and man-made hazards	The Act is relevant as the high-rise building must include structural safety, fire protection, emergency evacuation planning and disaster management procedures to minimize risks to occupants and surrounding population.
7.	Building Code of Pakistan, 2007	The **Building Code of Pakistan, 2007** provides standards for safe design and construction of buildings, covering structural stability, fire safety, seismic resistance, ventilation and accessibility requirements.	The code is directly applicable as the high-rise structure must comply with approved structural design, earthquake-resistant construction, fire escape routes and safety systems to ensure protection of occupants and surrounding community.

Sr. No.	*Legislation*	*Summary*	*Relevance to the Project*
8.	Guidelines for the preparation and review of environmental reports 1997	These guidelines outline the procedures and requirements for preparing and evaluating IEE/EIA reports in Pakistan, including impact identification, mitigation measures, alternatives analysis and Environmental Management Plans (EMP).	These guidelines are directly applicable as the project requires an EIA submission to SEPA, and the environmental study has been prepared following the prescribed format, impact assessment methodology and mitigation planning requirements.
9.	Guidelines for Environmental Assessment	The **Guidelines for Environmental Assessment** provide general procedures for conducting environmental screening, impact identification, mitigation planning and monitoring of development projects to ensure environmentally sound decision-making.	The guidelines are applicable as the high-rise development requires systematic assessment of construction and operational impacts such as dust, noise, wastewater and traffic, and preparation of mitigation and monitoring measures within the Environmental Management Plan (EMP).
10.	Green Building Code of Pakistan (2023)	The **Green Building Code of Pakistan (2023)** establishes national standards for environmentally sustainable buildings, promoting energy efficiency, water conservation, renewable energy use, indoor environmental quality and reduced construction waste. It applies mainly to multi-storey buildings and aims to lower emissions and resource consumption in the building sector.	The code is directly applicable to high-rise development; therefore the design must incorporate efficient HVAC and lighting, water-saving fixtures, waste reduction and sustainable materials to minimize environmental footprint and support climate-resilient urban construction.
11.	Guidelines for Public Consultation	These guidelines require stakeholder engagement during the EIA process, ensuring affected communities are informed, their concerns recorded and incorporated into project planning and mitigation measures.	The guidelines apply as nearby residents and businesses must be consulted regarding construction disturbance, traffic, noise and safety, and their feedback considered in the Environmental Management Plan and project implementation.
12.	**National Climate Change Policy, 2021**	The **National Climate Change Policy, 2021** provides Pakistan's framework for climate mitigation and adaptation, promoting low-carbon development, energy efficiency, urban resilience, water conservation and reduced greenhouse gas emissions	The policy is relevant as the high-rise building should incorporate energy-efficient systems, water saving measures, green design and heat-island reduction practices to support climate-resilient urban development.

Sr. No.	*Legislation*	*Summary*	*Relevance to the Project*
13.	**Civil Aviation Rules, 1994**	The Civil Aviation Rules, 1994 has mandated it for all builders and developers to obtain a No Objection Certificate (NOC) from the 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".	These rules are applicable to the proposed project as it includes high rise building, thus requires NOC forn CAA for height clearance. The NOC has been obtained and attached as **Annexure – V**.

2.3 Review of Applicable Provincial Acts & Regulations

The applicable national Environmental and Social legislations and regulations are briefly summarized in Table 2-2:

Table 2-2: Applicable Provincial Acts & Regulations

Sr. No.	Legislation	Summary	Relevance to the Project
1.	Sindh Environmental Protection Act, 2014	The **Sindh Environmental Protection Act, 2014 (SEPA Act)** provides the provincial legal framework for environmental protection in Sindh, making IEE/EIA approval mandatory, enforcing compliance with environmental quality standards, and imposing penalties for violations.	The Act is directly applicable as the project requires SEPA environmental approval and must comply with limits for air emissions, wastewater disposal, noise and waste management during construction and operation.
2.	Sindh EPA Review of IEE and EIA	The **Sindh EPA Review of IEE & EIA Regulations, 2021** define the provincial procedure for environmental assessment,	The regulations are directly applicable as the high-rise development requires EIA approval from SEPA,

Sr. No.	Legislation	Summary	Relevance to the Project
	regulations, 2021	including project screening (checklist, IEE or EIA), report submission, public consultation, review process and compliance monitoring before project approval.	adherence to prescribed study format, public consultation and implementation of mitigation and monitoring measures prior to construction and during operation.
3.	Sindh Environmental Quality Standards	The **Sindh Environmental Quality Standards (SEQS)** set permissible limits for air emissions, wastewater discharge, noise levels and industrial effluents to protect public health and the environment in Sindh Province.	The standards are applicable, as construction and operational activities must comply with limits on dust, generator emissions, sewage discharge, and noise through proper mitigation measures and monitoring during both the construction and operation phases.
4.	Sindh Prohibition of Employment of Children Act, 2017	The **Sindh Prohibition of Employment of Children Act, 2017** prohibits the employment of children in hazardous and non-hazardous occupations and regulates working conditions to protect minors' health, safety and welfare.	The law is applicable during construction and operation to ensure no child labor is engaged by contractors or subcontractors and that all workers meet legal age and labor safety requirements.
5.	Sindh Drinking Water Policy, 2017	The **Sindh Drinking Water Policy, 2017** aims to ensure safe, reliable and sustainable drinking water supply by protecting water sources, promoting water conservation and maintaining water quality standards.	The policy is relevant as the building must provide potable water meeting quality standards, prevent contamination of groundwater and adopt efficient water use and storage practices during construction and operation.
6.	Sindh Water Policy, 2023	The **Sindh Water Policy, 2023** provides a provincial framework for sustainable and integrated management of surface water, groundwater and wastewater to ensure equitable supply, conservation and protection of	The policy is relevant as the building must ensure efficient water use, proper sewerage disposal, prevention of groundwater contamination and adoption of water-saving fixtures and storage systems

Sr. No.	Legislation	Summary	Relevance to the Project
		water resources for present and future generations	during construction and operation.
7.	Sindh Sanitation Policy, 2017	**The Sindh Sanitation Policy, 2017** aims to ensure safe collection, treatment and disposal of wastewater and solid waste, improve public health and prevent environmental contamination in urban and rural areas.	The policy is relevant as the building must provide proper sewerage connection or treatment, hygienic waste handling and drainage management to avoid contamination, odours, and public health risks during construction and operation.
8.	Sindh Climate Change Policy 2022	The **Sindh Climate Change Policy, 2022** provides a provincial framework for climate change mitigation and adaptation, promoting climate-resilient infrastructure, reduced greenhouse gas emissions, water conservation and sustainable urban planning in line with national and international commitments.	The policy is relevant as the high-rise development must incorporate energy-efficient systems, heat-island reduction, water management and resilient building design to withstand urban flooding, heatwaves and other climate risks during construction and operation.
10.	Sindh Labor Policy, 2018	The **1st Sindh Labor Policy, 2018** provides a framework for protecting workers' rights, ensuring fair wages, safe working conditions, social security and occupational health and safety in workplaces across the province.	The policy is applicable during the construction and operation of the 7 (Seven) Towers project to ensure contractors provide PPE, safe working practices, legal employment terms and welfare facilities for workers at the project site.
11.	Sindh Hazardous Substances Rules, 2014	The **Sindh Hazardous Substances Rules, 2014** regulate the handling, storage, transport and disposal of hazardous chemicals to prevent risks to human health and the environment, requiring labeling, safety procedures and proper waste disposal.	The rules are applicable of The 7 (Seven) Towers project during construction and maintenance where fuels, paints, solvents and oils are used, ensuring safe storage, spill prevention and disposal through approved waste management practices.

Sr. No.	Legislation	Summary	Relevance to the Project
12.	Sindh Public Property Act, 2010	The **Sindh Public Property (Removal of Encroachment) Act, 2010** regulates protection of government land and removal of illegal occupation from public property such as roads, footpaths and open spaces.	The Act is relevant to ensure construction activities, material storage and access arrangements do not encroach on public roads or right-of-way and that the project remains within its legally approved plot boundaries.
13.	Building Code of Pakistan, 2021	The **Building Code of Pakistan, 2021** provides updated standards for planning, structural safety, seismic resistance, fire protection, ventilation and accessibility in building design and construction.	The code is directly applicable to The 7 (Seven) Towers project as the high-rise structure must comply with approved structural design, earthquake-resistant construction, fire safety systems and safe evacuation provisions to protect occupants and the surrounding community.
14.	Sindh Factories Act, 2021	Regulates working hours, health, safety, and welfare provisions for workers. Although primarily for industrial setups, its safety provisions are applicable to construction sites.	The Act is applicable during construction activities where labor and machinery are involved, requiring safe working practices, protective equipment, welfare facilities and accident prevention measures at the project site.
15.	Sindh Minimum Wages Act, 2015	The **Sindh Minimum Wages Act, 2015** requires employers to pay workers at least the government-notified minimum wage and ensures fair compensation and protection from exploitation.	The law applies to contractors and subcontractors during construction and operation to ensure all laborers are paid legal wages and employment conditions comply with provincial labor regulations.
16.	Sindh Terms of Employment (Standing	The **Sindh Terms of Employment (Standing Orders) Act, 2015** regulates employment conditions including appointment letters, working hours, leave,	The Act applies to contractors and site staff, requiring formal employment terms, defined duties and proper grievance handling for workers engaged

Sr. No.	Legislation	Summary	Relevance to the Project
	Orders) Act, 2015	termination procedures and worker rights to ensure fair and transparent employment practices.	during construction and operation.
17.	Sindh Workers Compensation Act, 2015	The Sindh Workers Compensation Act, 2015 provides financial compensation and medical benefits to workers for injuries, disability or death arising out of employment.	The Act applies during construction and operation to ensure laborers are covered for workplace injuries and contractors maintain insurance and safety compliance at the site.
18.	Sindh Prohibition of Employment of Children Act, 2017	The **Sindh Prohibition of Employment of Children Act, 2017** prohibits hiring children in any occupation and protects minors from hazardous work, ensuring their health, safety and education.	The law applies to all contractors and subcontractors to ensure no child labor is engaged at the construction site and all workers meet legal age requirements.
19.	Sindh Bonded Labor System (Abolition) Act, 2015	The **Sindh Bonded Labor System (Abolition) Act, 2015** abolishes bonded and forced labor practices and protects workers from debt-based or coercive employment conditions.	The Act is applicable to ensure all workers are employed voluntarily with fair contracts, no wage withholding or coercion, and compliance by all contractors and subcontractors at the construction site.
21.	Sindh Transparency and Right to Information Act, 2016	The **Sindh Transparency and Right to Information Act, 2016** grants the public the right to access information held by public bodies to ensure transparency and accountability in decisions affecting citizens.	The Act is relevant as environmental approvals, public consultation records and project information may be disclosed to stakeholders and authorities during the EIA and implementation stages.

CHAPTER - 3: DESCRIPTION OF THE PROJECT

3.1 General

This section provides a detailed account of the project and its salient features, such as location, components and various phases.

3.2 Project at a Glance

The proposed project "**The 7 (Seven) Towers**" is a residential development comprising seven residential towers constructed over a common podium structure. The shared structure includes Basement 1 (Parking) + Basement 2 (Parking) + Ground floor (Service Area and Recreation Area) + 1st to 5th Floor (Parking). Each residential tower extends from the 6th to the 19th Floors, consisting of residential apartments and recreational areas. The 20th Floor is designed as an interconnected recreational level linking all towers, while the 21st to the 35th Floors comprise residential apartments and recreational facilities. Through a proposed project, M/S N.S.A Builders and Developers aims to provide a perfect blend of luxurious and world-class lifestyle, modern design and peaceful living that is ideal for living in one of Karachi's most desired neighbourhoods.

The proposed development is planned over a plot having a total area of 15670.00 Sq. Yds. (or 141030 Sq. Ft.). The proposed project net covered area after exemptions is 1146140.26 Sq Ft., comprising high-rise residential towers, supported with high-quality infrastructure, ample car parking and recreational facilities. The schedule of area is provided in **Annexure – II**.

Table 3-1: Project at Glance

Criteria	Details
Project Name	The 7 (Seven) Towers
Category	Residential Project
Proponent	M/s NSA Builders & Developers
Plot Area	15670 Sq. Yds. or 141030 Sq ft.
Gross Covered Area	2400407.01 Sq ft.
Net Area after Exemption	1146140.26 Sq ft.
Floors	Basement 2+Basement 1+Ground Floor +35 Floors
Location	Plot No. LA - 4/1, Block 21, F.B. Area, Scheme - 16, Rahid Minhas Road & Shahrah-e-Pakistan, Karachi.
Basement 2 Plan (Parking + Services)	Visitor Parking +11 (Portable Water Tanks) + 7 (Non portable UG Water Tanks + 7 (Firefighting Water Tanks)

Criteria	Details
Basement 1 Plan (ARS + Parking + Services)	Air Raid Shelter, Parking + Circulation & Service Area
Ground Floor (Shops +Recreation Area+ Circulation & Service Area)	Ablution Area, Prayer Area, K-Electric Meter room, K-Electric Substation, CCTV Monitoring Room, Guard Room, Generator Room, Reception, Management Room, Pantry Garden Area, Flower Area, Waterfall, Community Hall, Bridal Room Shops, Emergency Clinic, Laundry, Ladies Parlor, Gents Hair Salon, Dairy Milk, Tandoor
1st to 5th Floor (Parking)	Parking + Circulation & Service Area
6th to 19th Floor & 21st to 35th Floor	Apartment + Circulation & Service Area
20th Floor (Recreation Area + Services)	Ladies Gym, Gents Gym, Child Day Care, Children Play Area, Club House, Indoor Gaming.etc
Roof Plan	Solar Panel, Portable OH Water Tanks, Battery Room
Total Flats	1,392 Flats
Total Parking	1414 Total Cars (16 % (153 Car Spots are reserved for motorcycles))
Height of the building	450 ft Above Ground Level (AGL)

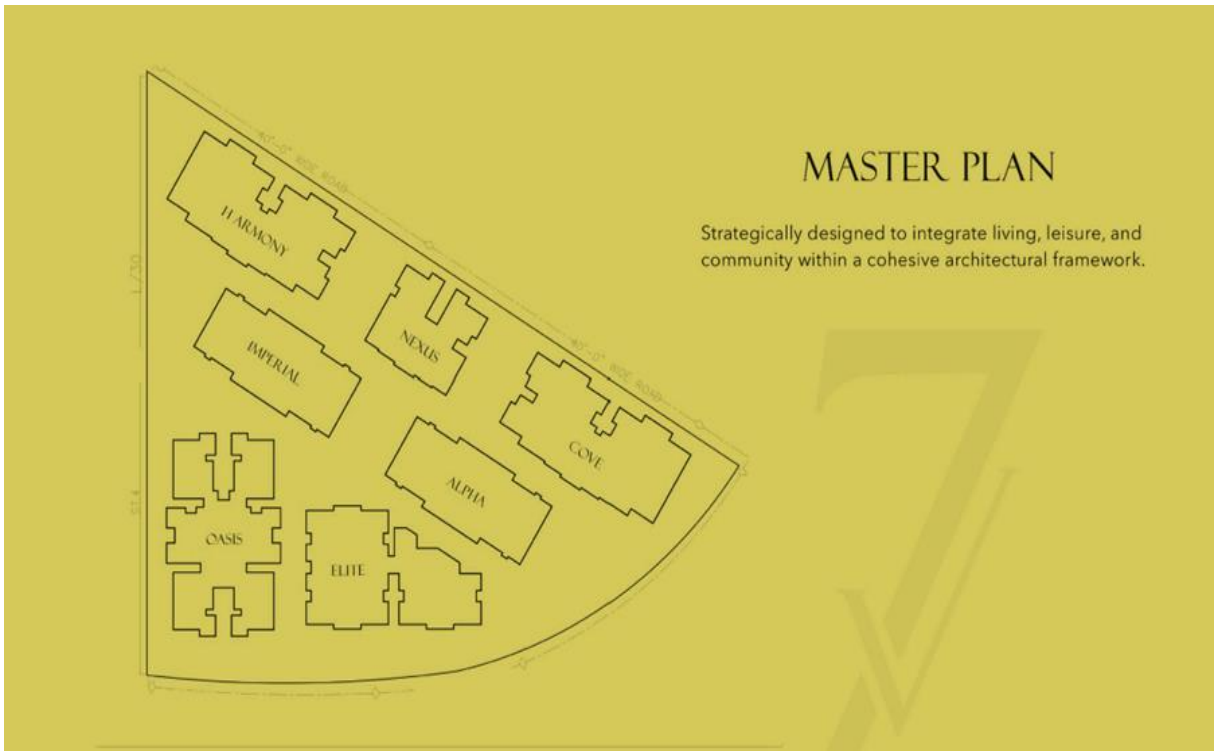


Figure 3-1: Conceptual Master Plan of the 7 (Seven) Towers

3.3 Project Location

The project site for proposed “The 7 (Seven) Towers” Project is located on Plot No. LA - 4/1, Rashid Minhas Road, Karachi. The project location map is provided in Figure 3-2. The particular site has many advantages e.g., its location within a developed housing estate area, availability of most of the utilities such as Electricity, Water, Natural Gas Supply, etc. The Project is accessable from Main Superhighway, Rashid Minhas Road, and Sharah e Pakistan, and Liyari Expressway.



Figure 3-2: Location Map of Proposed Project

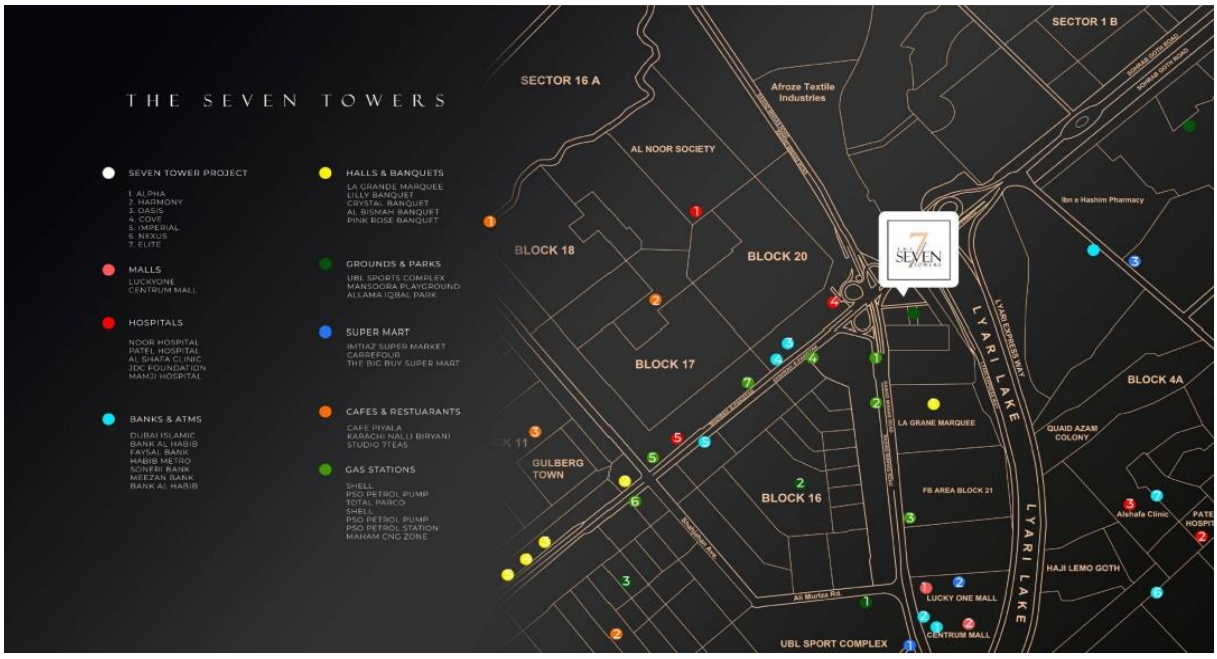


Figure 3-3: Key Landmarks Near the Surrounding the Proposed Project

3.4 Approvals Obtained

The proponent has obtained approvals from the relevant authorities for the execution of the proposed project, including:

Authority/Department	Approval/NOC

Sindh Building Control Authority (SCBA) Attached as (Annexure – III)	The Proponent has obtained approvals/NOCs from SCBA, including: • Approvals of Architectural Concept Plan • Construction Permit • NOC for Sale and Advertisement
Karachi Development Authority (KDA) Master Plan Department Attached as (**Annexure – IV**)	The proponent has also obtained NOC from MASTER PLAN DEPARTMENT & KDA for Land use change of an industrial plot into a commercial plot. However, this project will be used for residential purposes only.
Civil Aviation Authority (CAA) & PAF Attached as (**Annexure – V**)	The proponent has obtained height clearance NOC from Civil Aviation Authority (CAA)& PAF
Sui Southern Gas Company (SSGC)	NOC will be obtained from the relevant authorities by the Project Proponent, during the course of time as per policy of relevant department.
Karachi Water and Sewerage Board (KW&SB)	NOC will be obtained from the relevant authorities by the Project Proponent, during the course of time as per policy of the relevant department
K - Electric	NOC will be obtained from the relevant authorities by the Project Proponent, during the course of time as per policy of relevant department

3.5 Construction and Commissioning

The sequence of proposed activities from the pre-construction to operation stage is given below:

3.5.1 Pre-Construction/Design Phase

This is an essential phase that will provide the basis for the construction program, the methodology to be adopted and the technologies to be involved. The project site for the proposed unit will be assessed in terms of its geology and seismicity.

A details geo-technical investigation has been conducted, and the load-bearing capacity of the soil has been stabilised. The pre-construction activities will involve earthworks & excavation. In order to obtain geotechnical information for the design of the foundation, it was considered essential to carry out subsoil investigation at the project site.

3.5.2 Construction Phase

3.5.2.1 Site Preparation

Construction will start with pile driving and ground works, followed by concrete works for installations once the sub-base of the site has been prepared and foundations laid for the

process equipment and supporting infrastructure. Sealed site roads and paved areas will be constructed.

Topsoil will be removed and stored and not disposed of separately. Typical activities that will be conducted during civil construction are:

- Excavation for foundations
- Laying of foundations
- Masonry work
- Concrete work
- Asphalt work (pavement, roads etc.)
- Finishing (plastering, painting etc.)

Civil work comprises of construction of the Residential Towers, besides site levelling, drainage, sewerage and all other infrastructure within the site boundaries. The general specifications/details in respect of type of structures, grade of concrete, materials, etc. have been assumed to confirm the standard practice of civil works.

Site Status

At the commencement of this EIA study, the project site's office and marketing building had already been constructed. In addition, initial construction activities, including site clearance, excavation works, and piling operations, had commenced at the project site.

3.5.2.2 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:

- Levelling 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 water storage tank
- Provision of fence, access and emergency gates
- Construction of septic tanks
- Construction 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 centre

3.5.2.3 Foundations Works

Excavation for the foundations work will be made in accordance with the recommendations of the geotechnical investigation. Excavated material will be disposed of off-site via trucks and sent to approved sites. The excavated soil will be sent to road construction contractors for appropriate utilisation; otherwise, this may be reused if found suitable.

3.5.2.4 Building Shell and Core Construction

Construction of the exterior enclosure or “shell’’ of the building includes 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 tower cranes, compressors, personnel and material hoists, front-end loaders, concrete pumps, on-site bending jigs and a variety of hand-held tools, in addition to the delivery trucks bringing

construction materials to the site. At the same time, infrastructure connections are built. These include lines for water, sewer, stormwater, electricity & gas supplies.

3.5.2.5 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:

- Installation of elevators
- Internal and external pipe works
- Fire protection & Life safety systems
- Parking area Ventilation
- Electrical Distribution
- Emergency Lighting installations

3.5.2.6 Civil Works

Civil works involve excavation, piling, formwork, reinforcement, concreting, masonry, plastering, painting, tinsmith's, and also waterproofing work with gas-flame sticking, construction of walls, ceilings, flooring, lining and facing.

3.5.2.7 Construction Equipment & Machinery

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

3.5.2.8 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, aluminium, PVC pipes, concrete/cement pipes, electric cables, etc. will be used during the different 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 located in the Sindh Province.

3.5.2.9 Site Restoration

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

3.5.2.10 Subsoil Investigation

The program of investigation consisted of drilling 10 boreholes varying in depth from 20 to 40 feet. Following are the details of boreholes;

Table 3-2: Sub-Soil Investigation Boreholes Depths

Boring No.	Investigated Depth (Feet)
BH – 1	40
BH – 2	40

BH – 3	30
BH – 4	30
BH – 5	30
BH – 6	20
BH – 7	20
BH – 8	20
BH – 9	20
BH – 10	20

The deposition of the area mainly consists of 'medium dense to very dense, fine to coarse grained sand', 'dense to very dense, gravel', 'hard, sandy clay ', 'extremely weak to weak, sandstone', 'extremely weak to very weak, mudstone' and 'extremely weak to very weak, partially weathered, claystone'.

Groundwater table was not encountered in the boreholes drilled at the site during the time of this geotechnical investigation. The geotechnical investigation report is attached as **Annexure – VI**.

3.5.2.11 Construction Schedule

It is anticipated that construction of the project will be completed in about 03 years from the date of start of construction activities.

3.5.2.12 Waste Streams during the Construction Phase

The initial source of emissions to air during construction activities will be the exhaust gases from diesel engine generators. Other emission sources include construction machinery and vehicle exhaust emissions.

Fugitive dust emissions from construction activities and movement of vehicles will be the other main sources of air emissions. The sewage will be treated in a closed system and the sludge will be transported to the nearest municipal facility. The grey water will be sprinkled on unpaved sections within the construction corridor.

Recycling or reuse of waste material is the preferred option. However, where it is not possible, waste will be treated and appropriately disposed of as per proponent's policy and other contractual obligations.

3.5.3 Details of utilities and Other Facilities

3.5.3.1 Public Utility Infrastructure at Site

The concerned utility agencies are responsible for providing all basic services, i.e. electricity, gas, water and sewerage for the Project. Natural gas will be provided by Sui Southern Gas Company Ltd. (SSGCL) as described below, while electricity will be provided by K-Electric.

A. Water Supplies

Water requirement for construction activities will be fulfilled through bowsers.

The main water supply source to the project site is the Karachi Water & Sewerage Board. Water; for the project will be supplied by KW&SB through dedicated water pipelines. The project proponent has applied for NOC from KW&SB.

For the operation phase, breakdown of water requirements for Apartments, Amenities and Recreational Areas is as follows:

Apartments: The estimated water requirement for apartments is about 293,820 gallons per day. Water will be stored in Underground (U.G) tanks and Overhead (O.H) tanks.

Amenities: Water Requirement is estimated at 309,263 Gallons per day.

Recreational Areas: Daily Water Requirement is estimated at 274,050 Gallons per week.

Total water requirement in operation phase will be 583,313 gallons/day of say 0.58 MGD.

The detailed daily and weekly water requirement calculations for the entire project is attached **Annexure – VII.**

B. Natural Gas Requirement

Natural Gas is readily available throughout Pakistan and is the fuel of choice in terms of price and its environmentally friendly characteristics. Natural gas will be delivered to the towers through a low pressure dedicated pipeline to be provided by Sui Southern Gas Company. (SSGC). The project proponent has applied for the NOC from the SSGC for Natural Gas supply to the project.

C. Electricity Requirement

During the construction phase, the project's electricity requirements will be met through diesel-powered generators. During the operational phase, the estimated electricity requirement is approximately 5.08 MW (5,080 kW) under maximum demand conditions, while the total connected load is estimated at 8.31 MW (8,306 kW). The Electricity Load Estimation is provided in **Annexure – VIII**. The electricity demand will be met through the local power distribution network (K-Electric), with standby diesel generators provided for emergency backup. Additionally, the installation of a solar power system is planned to supplement the project's energy requirements and promote the use of renewable energy sources.

D. Other Utilities

Packaged A/C units and HVAC systems will be provided as required in the Amenities and recreation areas.

3.5.3.2 Wastewater and Storm Water System

Wastewater generated from the proposed project will be segregated into grey water and black water through an internal plumbing network.

Non-Potable water (grey water) generated from showers, service areas, laundry facilities, and other non-potable sources will be collected and conveyed to an on-site Sewage Treatment Plant (STP). The treated non-potable water will be reused for tree plantation, toilet flushing, cleaning of common areas, and other uses. A dedicated pipeline will be installed for the use of treated grey water.

Black water and other wastewater streams that are not intended for recycling will be conveyed through a dedicated sewerage network and discharged into the municipal sewerage system.

The stormwater drainage design is based on the existing topography of the site and surrounding area. Stormwater from rooftops, podium areas, and open spaces will be collected through a piping network and discharged to the municipal stormwater drainage primarily through gravity where feasible.

3.5.3.3 Solid Waste Management

The solid waste generated on site will be collected daily by a solid waste contractor who will dispose it in a responsible manner as per waste management plan. A number of trash bins will be located inside the building, and waste collection staff will be appointed for collection of solid waste. The solid waste disposal route has been defined and the solid waste contractor will collect the waste on daily basis.

3.5.3.4 Traffic Management

A comprehensive access point and traffic load management plan for the proposed project has been developed keeping in view the sensitivity of the project due to its location and traffic from adjoining areas. A comprehensive traffic impact study has been conducted by the project proponent and attached as **Annexure – IX**.

3.5.3.5 Firefighting System

The proposed project shall be equipped with a comprehensive firefighting system designed in accordance with the Building Code of Pakistan – Fire Safety Provisions (2016) and relevant international standards (NFPA guidelines).

A. Fire Detection and Protection Systems

Fire protection system shall comprise of building fire hydrants, fire hose reels, fire sprinklers, and portable fire extinguishers of various kind/types. The fire water shall be fed through a fire water storage tanks (details are attached as **Annexure – VII**). Fire hydrant system including fire hose connection point hoses and nozzles to provide a readily accessible water supply for fire department or occupants of the project area to combat fire instantly.

B. Fire Detection & Alarm System

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

C. Fire Protection Systems

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

D. Design Codes & Standards

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

- NFPA 10- Standard for Portable Fire Extinguishers
- 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
- BCP 2016- Building Code of Pakistan

3.5.3.6 Security System

A high degree of general safety and security system will be maintained in the project area. The entire project is enclosed with a secured boundary wall having CCTV-monitored entrance where Guard room placed.

CHAPTER - 4: ANALYSIS OF ALTERNATIVES

4.1 General

Consideration of project alternatives is an essential component of Environmental Impact Assessment as it allows evaluation of different options to achieve the intended objectives with minimum environmental and social impacts. The purpose of this analysis is to determine whether any alternative option would objectively be a better choice than the proposed The 7 (Seven) Towers development located at Plot LA-4, Shahrah-e-Pakistan, Federal B Area Block-21, Gulberg Town, Karachi.

The proposed project is a high-rise development comprising residential apartments, parking floors and associated utilities including a firefighting system, water storage, sewage disposal and solid waste management facilities.

The proponent is the lawful owner of the project land and the development is planned on privately owned property within an already urbanized zone. Therefore, site selection is primarily governed by land ownership, zoning compliance, and availability of municipal infrastructure.

The analysis compares environmental, social, economic and planning implications of the project against possible alternatives including abandonment, modification in scope and relocation.

4.2 Possible Alternatives

The following alternatives were examined:

- Abandonment of the project (No Project Option)
- Modification of project scale (downsizing or upsizing)
- Shifting the project to another location

4.2.1 Abandonment of the Project (No Project Alternative)

The “no project” option is the ubiquitous option that can be exercised for any and every project. Exercising this option means abandonment of the project altogether and continuing with the existing position i.e., status quo

The no-project alternative implies that the proposed project will not be constructed and the privately owned land will remain underutilized. Although this option would eliminate temporary impacts such as construction noise, dust emissions and traffic disturbance, it would not address the increasing demand for residential and commercial space in Karachi. The city is facing continuous population growth and a shortage of organized vertical housing facilities. Non-construction of the project would therefore widen the demand-supply gap in the housing and commercial sector.

The proposed development aims to utilize serviced urban land efficiently by providing structured apartments, organized parking, regulated sewerage disposal, firefighting systems and controlled waste management. If the project is abandoned, all positive impacts such as employment generation, investment activity and improved land utilization will be lost. Since the land belongs to the proponent and is designated for urban development, leaving it vacant

would neither provide environmental advantage nor planning benefit. Therefore, the no-project option is not considered a practical alternative.

4.2.2 Changing the Scope (Reducing/Downsizing or Enhancing/Upsizing) of the Project

Modification of project scope including reduction or increase in building scale was also considered. Downsizing the project would reduce resource consumption but would lead to inefficient use of privately owned serviced urban land and would reduce feasibility of providing essential building facilities such as elevators, firefighting infrastructure, standby power systems and parking areas. Reduced development intensity would not justify investment in modern infrastructure and would fail to meet urban housing demand.

Upsizing the project by increasing floors or occupancy would maximize land utilization but would impose excessive load on the surrounding road network and municipal services. This may increase traffic congestion and infrastructure stress.

The proposed project configuration has been designed according to zoning regulations, Building Code provisions and available infrastructure capacity, representing an optimized balance between environmental impact and economic viability. It includes 1392 residential units along with commercial facilities and several amenites. Therefore, modification of project scale is not considered suitable.

4.2.3 Shifting the Project to some other Location

The third alternative option could be relocating and shifting the project to another site. However, the objective rationale for this option was found lacking on two counts. Firstly, the proponent owns the current land and shifting the project would require acquisition of another plot of similar size, zoning compatibility and accessibility within Karachi, which is difficult and economically unjustified. Secondly, the selected site offers major advantages including location on Shahrah-e-Pakistan arterial road, availability of water supply, sewerage and electricity networks, access to public transport and presence within an already built-up urban environment. Development at this location does not involve displacement of population or conversion of agricultural land. Despite relocating the project, the pertinent environmental impacts on the air, water, soil, and socioeconomic environment would remain almost similar in nature as they would be at the present site.

Shifting the project would require new land acquisition, additional infrastructure development and increased commuting distances, resulting in greater environmental and economic cost. Therefore, relocation is neither environmentally preferable nor financially viable.

4.3 Summary & Conclusion

The analysis indicates that none of the alternative options provide advantages over the proposed project. The no-project option results in loss of socio-economic benefits and inefficient land utilization. Scope modification either reduces feasibility or increases infrastructure burden. Relocation is impractical due to land ownership constraints and environmental considerations. Therefore, the preferred option is to implement the project as proposed while mitigating environmental impacts through the Environmental Management Plan.

CHAPTER - 5: DESCRIPTION OF BASELINE ENVIRONMENTAL CONDITIONS

5.1 General

This section presents a detailed overview of the physical and socio-economic environment of the project area and the results of the primary investigations and the review of secondary information carried out under the proposed Project.

5.1.1 Purpose of the Baseline

During the process of conducting EIA studies for any project, documenting baseline conditions is considered a crucial priority. This step aims to establish a comprehensive database that enables the prediction and management of project impacts. Therefore, it encompasses all environmental parameters expected to be influenced by the project.

Documentation of environmental baseline conditions has two major objectives.

a) Provide the proponent of the project and stakeholders sufficient knowledge of the area about:
   - Physical and Biological environment
   - Sociological base
   - Understanding current problems and
   - Rationalization of decisions according to the ground realities.

b) To allow planners to evaluate the potential efficacy of actions to mitigate adverse impacts and enhance benefits.

This needs to provide a broad overview of regional resources, including those unlikely to be impacted by the project. Additionally, it entails offering a detailed qualitative description of resources that could potentially be affected by the project.

5.1.2 Approach and Methodology

The socio-environmental team adopted a two-pronged approach to gather baseline data to provide planners with a comprehensive understanding of the area. This approach enables planners to make informed and deliberate decisions. The two components of this approach are:

a. Collection of information through direct interventions

Primary data was collected directly from the project area through interventions such as site surveys and individual meetings. These interventions comprised:

- Visits to the project area.
- Transect walks at various project facilities.
- Conducting field surveys.
- Collection of data through multiple checklists.
- Scoping sessions.

b. Collection of information through indirect interventions

Secondary data regarding the project area was acquired through indirect interventions, which encompassed:

- Review of previous studies
- Various reports published by individual or national and international organizations
- Internet, Websites
- Study of available maps
- Review of information available with Govt. Departments and non govt. Organizations working in project area Districts.

5.2 Physical Environmental Conditions

The physical baseline for the proposed project describes micro environment and macro environment of the proposed project area. The proposed project “the 7(Seven) Tower” is located in Federal B Area, Scheme-16, District Central, Karachi. Its site coordinates are 24°56'37.92"N & 67°05'8.41"E, situated along the M-9 Motorway. (Refer to Project Location Map **Figure 3-2**). The proposed project “The 7 (Seven) Towers” is situated within a densely developed urban setting characterized by residential apartments, commercial plazas, educational institutions, and healthcare facilities. Major landmarks in proximity to the project include Lucky One Mall, Mamji Hospital, Noor Hospital, Imam Bargah, Edhi Center, and Ayesha Manzil. The project is situated within a fully urbanized, infrastructure-rich micro-environment characterized by intense commercial activity, high traffic volumes, established utilities, and comprehensive social amenities, making it strategically integrated into the central urban fabric of District Central Karachi.

5.2.1 Topography & Land Use

Karachi is one of the largest and the most rapidly growing megacities of Pakistan with a total population of over 18 million with the annual growth rate of 5% (Pakistan Economic Survey, 2013-14). Karachi can be broadly divided into two categories; the hilly areas in the north and west and an undulating plain and coastal area in the southeast. The hills in Karachi are the off-shoots of the Kirthar Range.

The highest elevation point of these hills in Karachi is about 528 m which lie in the extreme north. All these hills are devoid of vegetation and have wide intervening plains, dry river beds, and water channels. Karachi has a long coastline belt in the south. The famous sea beaches include Hawks Bay, Paradise Point, Sands Pit, and Clifton. Chenna Creek and Korangi Creek provide excellent calm water channels for rowing and other water activities. Away from the shoreline, there are small islands including Shamsh Pir, Baba Bhit, Bunker, Salehabad and Manora.

The project, “The 7 (Seven) Towers” is located in Gulberg, Central District of Karachi. The project area is entirely urbanized, in which most of the area’s infrastructure is commercial and residential. The neighboring land-use is a major fraction of commercial and residential within the surrounding. The project is at an elevation of 135 ft above mean sea level. The land elevation map of the project site is shown in Figure 5-1.

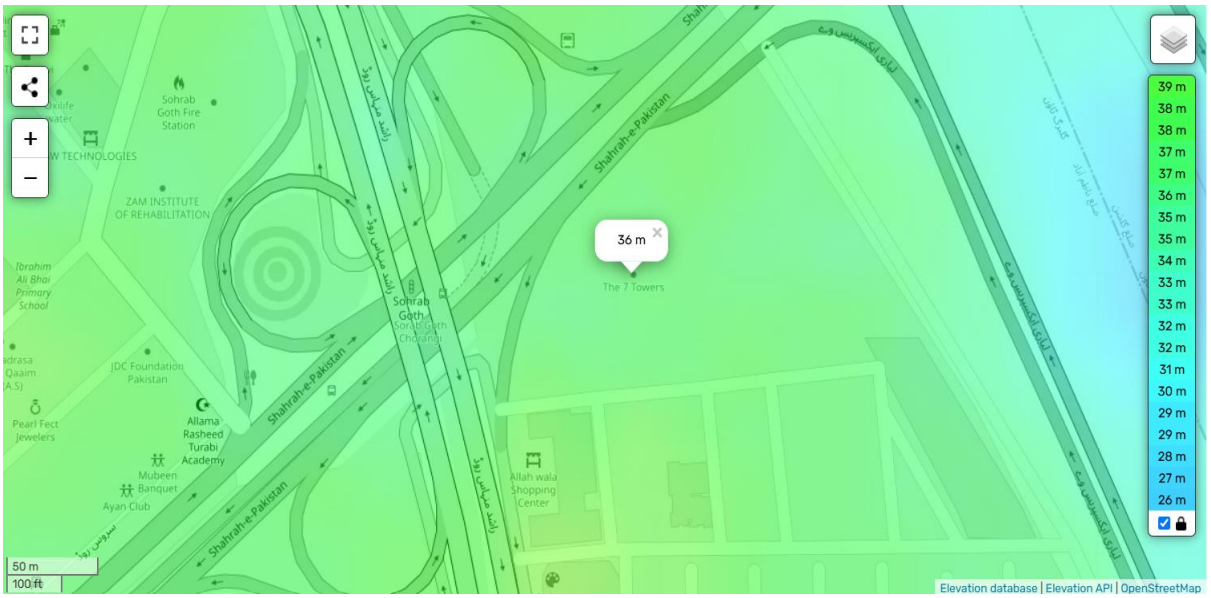


Figure 5-1: Land Elevation Map of Proposed Project Site

5.2.2 Geomorphology

Geomorphologically[1] the urban land of the Karachi region has been divided into seven zones based on the nature and origin of the surfaces . These zones are listed and illustrated in Figure 5-2 below:

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

In each of these zones, the dominant processes of denudation, the relief and the landform assemblages have been distinguished to assess 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

[1] *Hamid, G., Mallick, K. A., Bilal, M., Azma, I., & Zohra, S. Z. I. R. (2012). Geomorphology of Karachi with a brief note on its Vegetation. Int. J. Biol. Biotechnol, 9, 123-137.*

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.

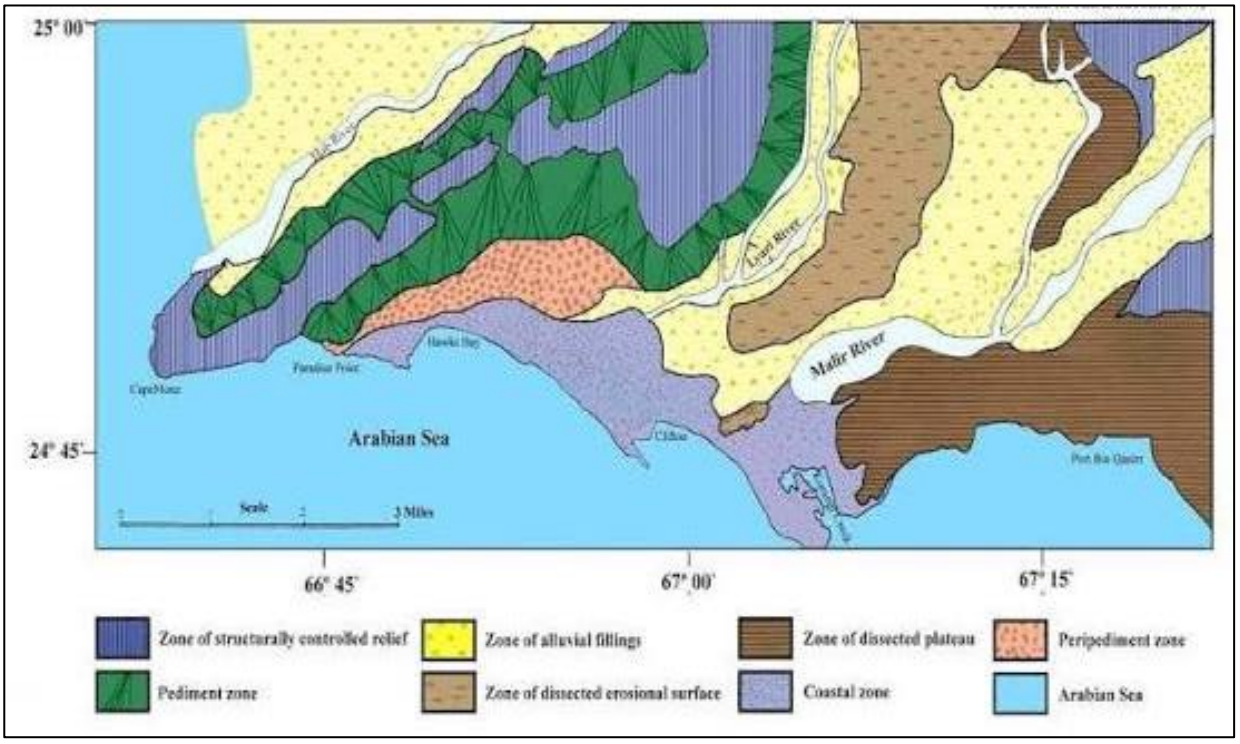


Figure 5-2: Geomorphological Zones of Karachi

5.2.3 Geology and Soil

The geology of Karachi, represents the variable sedimentary rocks of the late Tertiary period unconformably overlain by fluviatile and aeolian sediments of Quaternary times. Structurally, the Karachi region forms part of the Kirthar fold belt of lower Indus basin and presents a series of plunging folds trending northeast-southwest. A cross section from the west to east transects four major anticline structures with three intervening synclines. The synclinal troughs are alluvial-filled basins, which form a drainage network of three ephemeral stream systems. The plunging tips of the anticlines form well-developed headlands and spurs of enechelon nature. The landscape features show a marked structural and lithological control. However much of land surface is irregularly blanketed by aeolian sandy/silty cover and at places gravely mounds of variable dimensions are exposed as remnants of former fluvial terraces. In general, the maturity is exhibited in the relief condition of the area.

The Central District of Karachi is situated within a structurally complex area of the Karachi

Embayment, characterized by Tertiary sedimentary rocks (Oligocene-Miocene) and Quaternary alluvial deposits. It is part of a folded belt (Karachi Arc) characterized by anticlines and synclines, specifically featuring the Nari Formation (sandstone/shale) and Gaj Formation (limestone/shale), often covered by recent alluvial gravels and aeolian deposits. The geological map of Karachi is shown in Figure 5-3.

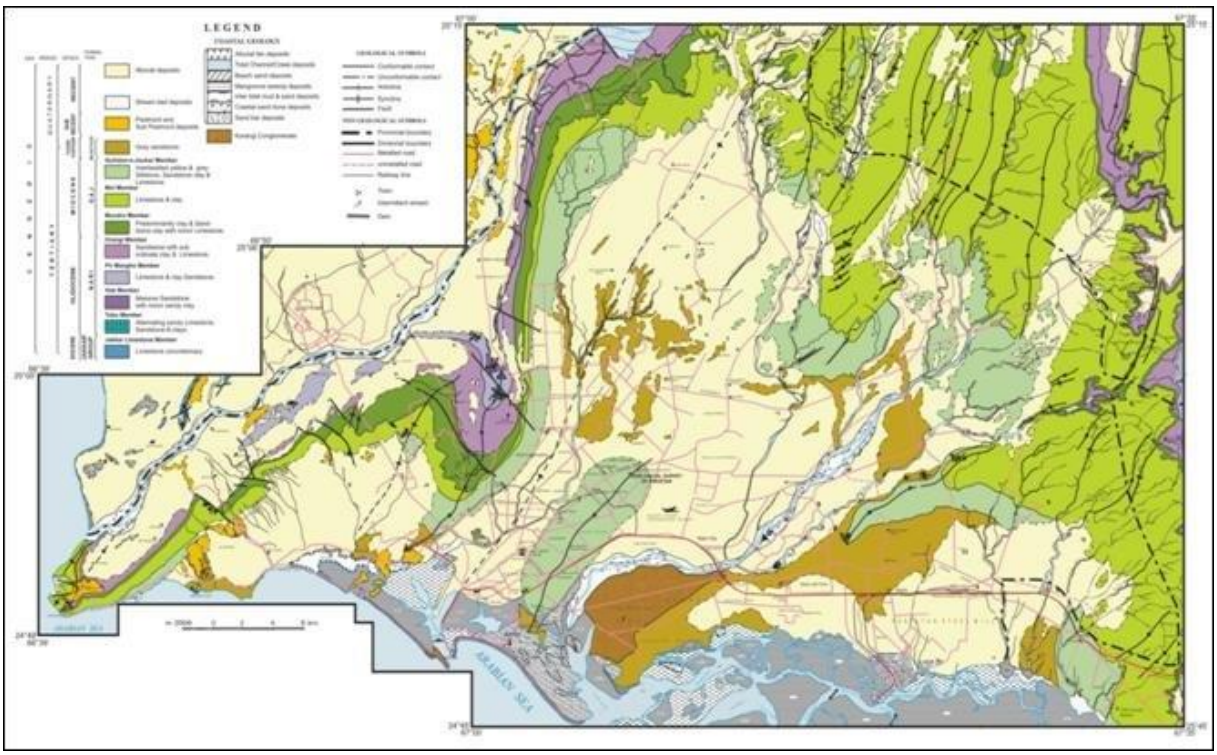


Figure 5-3: Geological Map of Karachi[2]

The geology of Karachi is underlain a Lower Indus Basin described as Indus River Alluvial Zone of early Eoicene Age. Early deposition of sediments includes silt, sandstone, conglomerate and limestone with low compact and cementing materials. Surface feature is described as syncline delta and valley region and anticline ridges exposed.

The soil study of the project site was carried out by “Soil Testing Services”, an Testing Laboratory engaged by a project propoenent to identify the soil structure, texture and to evaluate the foundation design parameters. Borehole depth was selected at 20-40 ft and soil samples were collected at different depth to analyze the soil quality. The area mainly consists of ‘medium dense to very dense, fine to coarse grained sand’, ‘dense to very dense, gravel’, ‘hard, sandy clay, ‘extremely weak to weak, sandstone’, ‘extremely weak to very weak, mudstone’ and ‘extremely weak to very weak, partially weathered, claystone’.

5.2.4 Climate & Rain Fall

Karachi has an arid climate dominated by long summer season but moderated by marine influence from the Arabian Sea[3]. 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

[2] *Geological map of Karachi area, Sindh, Geological Survey of Pakistan (Qureshi et al., 2001)*
[3] https://en.climate-data.org/asia/pakistan/sindh/karachi-992367/

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 5-1.**

Table 5-1: 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 raising up to 40°C in June.	There are less frequent rain showers with no more than 1 or 2 rainy days in summer. Average total amount of rain in summer is 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 and oscillates around 32°C.	Almost 80 % of the yearly rain occurs in the monsoon with July and August being the wettest month.	The wind direction in the monsoon is mostly blowing from East.
Post-Monsoon Summer (Mid-September to November)	The average temperature post monsoon drops and average minimum temperature may reach 12°C in November.	The post monsoon period remains mostly dry and rainfall in November in November is round 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 the monsoon, there is little occasional rainfall. The rainfall in winter is less than 50mm.	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.

Temperature

The air temperature in Karachi Division and its coastal areas are generally moderate throughout the year due to presence of sea. The mean monthly maximum and minimum temperatures, are shown in **Table 5-2** and **Table 5-3** respectively.

Table 5-2: 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
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 5-3: 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

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
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	223
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	224
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													

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. Monthly amount of precipitation is shown in Table 5-4.

Table 5-4: 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	Trace	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	Trace	0.0	0.0	0.0	53.2
2016	3.1	0.0	Trace	0.0	0.0	65.8	1.9	96.9	Trace	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	Trace	0.0	0.0	Trace	0.8
2019	39.4	Trace	2.2	0.0	0.0	1.6	66.3	204	51.7	1.2	Trace	Trace	367.3
2020	Trace	2.6	0.5	0	0	Trace	101.2	366.8	Trace	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	Trace	348.3	127.9	43.4	0	2.6	0.0	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%)4

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.

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 5-5: 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

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

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
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	49.9	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													

Wind Speed and 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 5-6: Wind Speed (m/s) at 12:00 UTS

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.	8.5
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 5-7: 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	N43E
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	S41W	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

5.2.5 Seismicity

Karachi falls under Seismic Zone 2B of Pakistan's Seismic Zoning Map, indicating a minor moderate damage seismic zone.

The sub-project area lies within Zone 2A, with Peak Ground Acceleration (PGA) values ranging from 0.08 to 0.16, as per the Pakistan Building Code of 2007. Although the risk of earthquakes is relatively low, adherence to standard construction practices in compliance with the building code is essential to ensure structural safety. Seismic map of project location is shown in Figure 5-4.

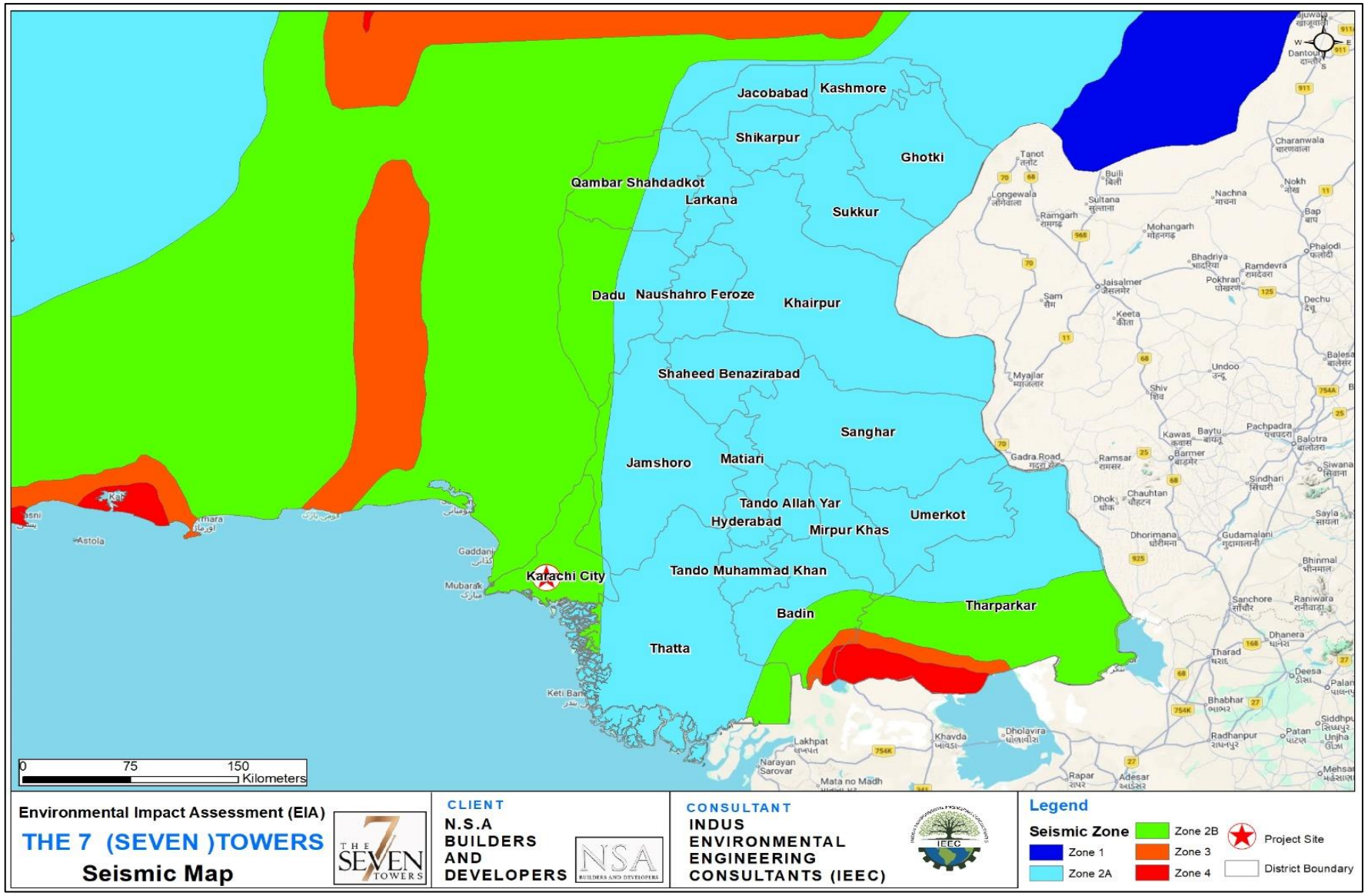


Figure 5-4: Seismic Map of the Project Area

5.2.6 Hydrology and Water Resource Management

Hydrogeologically[5], the city of Karachi lies in the Hub River Basin and the Malir River Basin. The Malir River and the Lyari River drain the Malir River Basin. The aquifer of Karachi is, therefore, mainly recharged by seepage from the Hub River and Hub Dam, as well as the Malir and the Lyari Rivers. The Hub River lies on the western frontier of Sindh and, for some distance, the boundary between Sindh and the Baluchistan provinces. It is located about 30 km to the west of Karachi, along the Karachi- Lasbela boundary. It falls into the Arabian Sea near Cape Monze, with a total drainage course length of 336 km. During the past several years, several pumping wells have been installed to meet requirements for the irrigation-water supply (to raise vegetables, fruits, dairy and poultry) and drinking-water supply for Karachi. Excessive pumping of groundwater and continuous lowering of water-table is likely to result in intrusion of seawater into the Malir Basin under natural seepage conditions and under artificially induced conditions of recharge of saline seawater in the coastal aquifer(s) of Karachi.

Recharge Sources: Five possible water sources contribute to groundwater recharge in Karachi. The first potential source is rainfall. As Karachi suffers from a deficit of precipitation (only rainfall), the contribution to shallow groundwater storage from rain is very small. However, rainfall in the hinterlands and other areas surrounding Karachi may significantly contribute to the groundwater flow system. The two freshwater sources are the Hub Lake/Hub Dam and the Indus River. Water from Hub Dam and the Indus River is piped to various residential zones in Karachi for drinking and irrigation purposes. The spring water discharges into Malir River and Lyari River, and the municipal/industrial waste effluents added to these rivers contribute to groundwater storage as a fourth recharge source. Seawater intrusion along the Karachi coast is the fifth possible source.

Water Supply and Sewerage System: The Karachi Water Supply & Sewerage Board (KW&SB) manages the water supply and sewerage system. The present water supply system of Karachi City has a supply capacity of about 650 MGD. As of 2019, Karachi receives about 580 MGD, well below the demand of over 1,100 MGD.

S.No.	Description of Water Supply System	Rated Supply (MGD)	Actual Supply (MGD)
1.	Haleji Scheme	30	-
2.	Greater Karachi (GK) Bulk Water Supply Scheme Stages I to IV	280	280
3.	K-II Scheme	100	100
4.	Additional Water Supply from GK BWS System	40	40
5.	(To) Port Qasim Authority	26	26
6.	(To) Pakistan Steel	7.5	7.5
7.	K-III Scheme	100	100
8.	Hub Dam	10013	7014
Source: EA/KW&SB, Express Tribune, WAPDA			

[5] *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.*

5.2.7 Impact of Climate Change – Karachi

Due to climate change, there could be an exceptional change in the temperatures in Pakistan as a whole in the coming years. Karachi may, however, face the threat of rising sea levels by the year 2100, at about 8 feet below sea level. Climate change could influence monsoon dynamics and cause summer precipitation levels to drop, as well as delays in the start of the monsoon season. The impact of climate change in Karachi will deepen by 2030. Due to global warming, the coastline of Karachi is likely to be flooded due to rising sea levels. Many seminars and public gatherings are held in the city to make the government and public fully aware of global warming; speakers at the seminar have urged the government to prepare long and short-term plans to reduce the impact of global warming on natural resources. Karachi also faces the threat of super cyclones, which are said to increase their intensity and momentum in the years to come.

List of cyclones that affected Karachi and the Sindh coast: Cyclones that form in the Arabian Sea do not usually hit Karachi or the Sindh coast. However, during 1902, 1907, 1944, 1964, 1985, 1999, 2007, and 2010, cyclones made landfall in the Sindh coast, including Karachi. Other cyclones listed below caused rain as remnants.

- In May 1985, a cyclonic storm made landfall in the eastern direction of Karachi. The storm, which was moving towards Karachi, actually weakened over the sea while still a few hundred Kilometers south of Karachi.
- In November 1993, a category 1 cyclone approached the Sindh-Gujarat border but dissipated due to high vertical shear over open waters.
- In June 1998, remnants of the category 3 Gujarati cyclonee (the 5th most robust cyclone of the Arabian Sea) killed 12 people near and in the city.
- In May 1999, another category 3 major cyclone (the fourth strongest cyclone in the Arabian Sea) hit near the city. This Cyclone killed 700 people in Sindh, including Karachi. It is the strongest cyclone recorded in Pakistan.
- In May 2001, the powerful category three cyclonee (the 3rd most robust cyclone of the Arabian Sea) hit the Indian border of Gujarat. It caused rain along the Sindh coast, but no damage was reported.
- In October 2004, a severe cyclonic storm, Cyclone Onil, approached the Sindh coast but later recurved back to the sea. It caused heavy rain that killed nine people in Karachi.
- In early June 2007, supercyclonic storm Gonu (the strongest cyclone in the Arabian Sea) caused strong gusty winds in the metropolis and light rainfall as it moved towards Oman.
- In June 2007, a cyclonic storm, Cyclone Yemyin, passed near the city and killed 200 people before moving towards Balochistan, where it killed 380 people.
- In November 2009, remnants of Cyclone Phyan caused gusty winds along the Sindh coast, including Karachi. However, six Pakistani fishermen were trapped in the storm and later rescued by the Indian Navy.
- In June 2010, Cyclone Phet (the second strongest cyclone in the Arabian Sea), once a powerful category 4 cyclone, made landfall near the city as a weak tropical depression, with 14 casualties in and near the city.
- In November 2010, remnants of Cyclone Jal caused drizzle with dusty winds in Karachi while it caused light to moderate rainfall in southeastern Sindh. • In November 2011,

the outer bands of cyclone Keila brought drizzle to the city while moderate showers to the Makran coast.

List of Notable floods in Karachi: Most of the flooding in Karachi occurs due to the monsoon season. However, due to the enhancement of the city's infrastructure, flooding has been controlled. However, excessive and irregular rains can still lead to significant flooding in the metropolis. Following are some of the major floods in the city;

- On 7 August 1953, the city received its record-breaking 24-hour rainfall, which caused widespread flooding. About 278.1 millimetres (10.95 in) of rain were recorded.
- On 1 July 1977, Karachi received its third-highest rainfall of 207 millimetres (8.1 in) in 24 hours; it caused massive flooding in the city and killed 248 people in the city.
- In 2003, massive flooding during the monsoon season devastated Sindh. Two days of rainfall of 284.5 millimeters (11.20 in) created havoc in the city.
- In 2006, after two years of drought period heavy rainfall lashed the city during the monsoon season, but the city came to a standstill on 17 August when widespread rainfall of 77 millimetres (3.0 in) created a flood-like situation in the city, killing 13 people and submerging roads, low-lying areas and underpasses with rainwater.
- In 2007, almost all the rains that occurred in this monsoon season brought flooding with it. During the month of June, Cyclone Yemyin created havoc in the city from 21 June to 26 June 2007 110.2 millimetres (4.34 in) of heavy downpours were recorded which killed 228 Karachiites on 23 June, then from 9 August to 11 August a robust tropical depression brought massive flooding in the city with 191 millimetres (7.5 in) of rain killing 21 people and submerging low-lying areas and underpasses. On 22 August, a monsoon depression once again flooded the city with 80 millimetres (3.1 in) of rainfall, killing 10 people.
- On 18 July 2009, severe flooding occurred due to a tropical depression. The city's second-highest rainfall, 245 mm (9.6 in), occurred in just four hours, killing 20 and injuring 150 people. Another flooding event occurred on August 31, 2009, when a well-marked low pressure was present over Sindh. The rainfall was recorded to be around 147 mm (5.7 in).
- On September 13, 2011, life was crippled in the city due to heavy rainfall that caused urban flooding in the town. The rainfall was recorded to be around 145 mm (5.7 in).
- In Aug & Sep 2019, life in the city was crippled due to multiple spells of heavy rain that caused urban flooding and loss of life and property.
- 6 – 9 Jul 2020, spells of heavy rain caused urban flooding in several areas of the city, causing loss of life and property, mainly due to electrocution.
- The hours-long spell, which began before sunrise and continued till night, broke previous records of rainfall recorded in the city during August 2020. The Met Department said that Karachi had received 345mm of rainfall in August, breaking the previous record of 298mm reported in August 1984.
- Rains in September 2021 and July & August 2022 caused substantial urban flooding in Karachi.

List of droughts in Karachi: Drought-like conditions in the city are not common, but if the Monsoon season fails to deliver rains, then drought emerges. The following are some of the worst droughts in Karachi city.

- The major drought in Karachi as well as for the whole of Pakistan was from 1996 to 2002, peaking from 1998 till 2001. While in 2002 drought conditions started to dissipate. The drought of 1998-2001 was considered the worst in 50 years.
- In 2004, no rain occurred in the city as well as in Sindh province, but during the month of October, heavy downpours lashed different parts of Sindh due to Cyclone Onil.
- In 2005, the drought conditions continued, but a post-monsoon low pressure dumped heavy rains on 12 and 13 September.
- In 2009, drought conditions emerged during the summer season in suburban areas of Karachi due to the El Nino phenomenon, which caused drought during the winter season, but the monsoon rains of 2009 were above normal.

5.3 Baseline Environmental Monitoring

The primary objective of baseline environmental monitoring is to evaluate and manage environmental changes over time comprehensively. Initially, it aims to establish a thorough understanding of current environmental conditions, focusing on factors such as ambient air quality, noise levels, and water quality. A baseline assessment of environmental quality was conducted to establish baseline conditions for groundwater, surface water, ambient air, and noise levels at the project site and its immediate surroundings. This study provides a critical reference point against which any future changes or impacts from project activities can be measured and mitigated. The environmental quality assessment findings are presented in sections below, and the location map is provided in Figure 5-5. Environmental Monitoring was conducted by a SEPA-certified third-party Environmental Monitoring Laboratory (IERL).

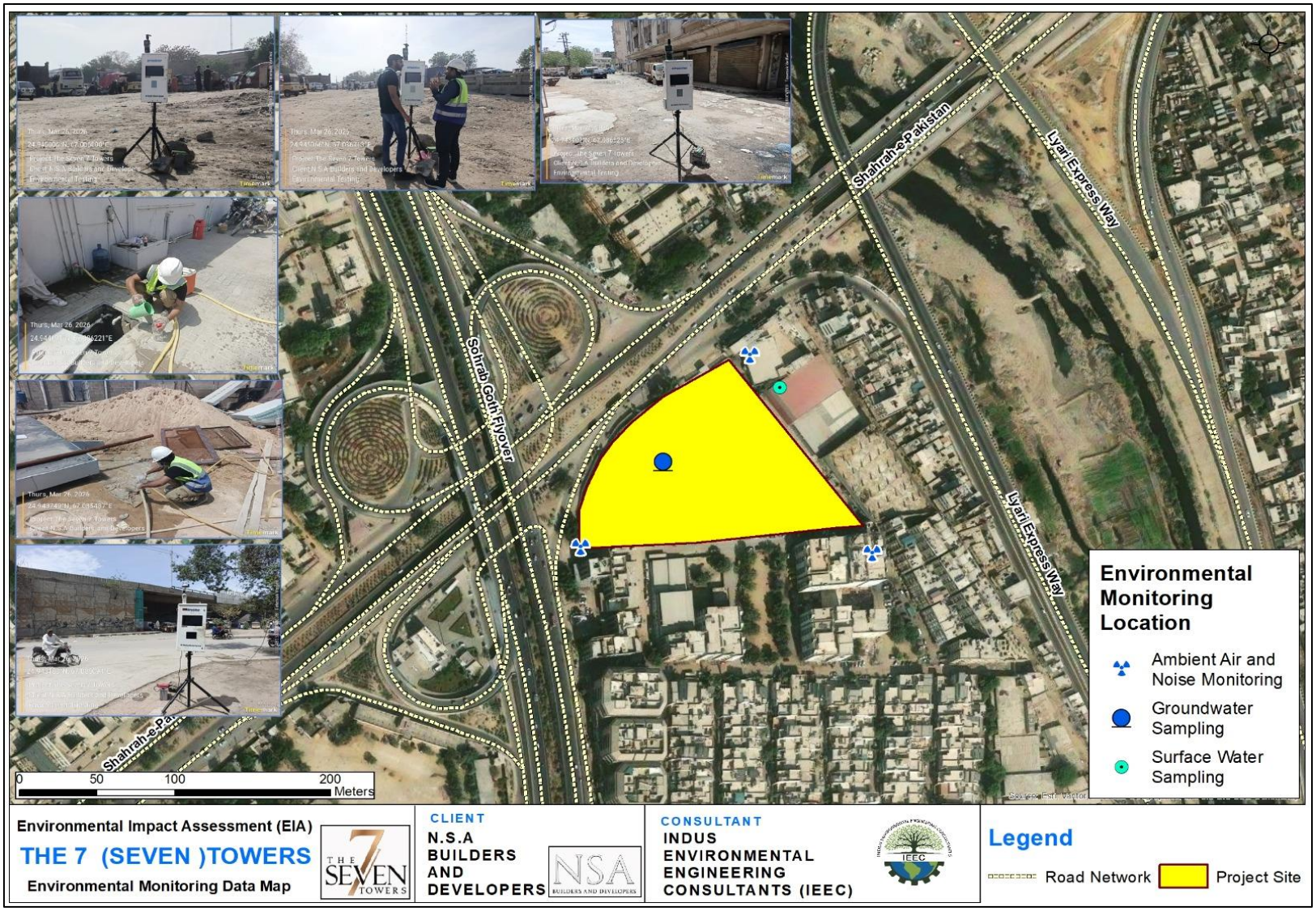


Figure 5-5: Environmental Monitoring Locations

5.3.1 Groundwater Analysis

Table 5-8 summarizes ground water quality parameters surrounding the proposed project. The groundwater sample was collected from a groundwater source at the project site. The depth of the groundwater is about 100 Ft. The water quality parameters are compared against Sindh Environmental Quality Standards (SEQS) to assess the safety and suitability of the water for consumption and use. Below is an explanation of the key parameters:

pH: The pH levels range from 6.7, indicating that the water is slightly neutral to slightly acidic. The value is within the acceptable SEQS range of 6.5 to 8.5, which is safe for drinking and general use.

Odor: The odor of the water is objectionable/unacceptable, not meeting the SEQS standard, which requires that water have no objectionable odors.

Color (TCU): The color value is 11 TCU is well within the SEQS limit of 15 TCU.

Taste: The Taste of the water is objectionable/unacceptable, not meeting the SEQS standard, which requires that water have no objectionable Taste.

Total Hardness (mg/l): Total hardness value is 1810 mg/l significantly exceeds the SEQS limit of 500 mg/l. High hardness is often caused by calcium and magnesium, which may affect water's taste and scaling properties.

Total Dissolved Solids (TDS) (mg/l): TDS levels, which indicate the concentration of dissolved substances, is 7550 mg/l. Exceed the SEQS limit of 1000 mg/l. Elevated TDS can affect taste and may indicate possible contamination.

Turbidity (NTU): Turbidity, which measures water clarity, exceeds the SEQS limit of 5 NTU in sample (8.97 NTU), suggesting particulate contamination. Other locations are within safe limits.

Chloride (mg/l): Chloride value is 1075 mg/l, exceed the SEQS limit of 250 mg/l in sample, potentially giving the water a salty taste and making it unsuitable for large-amount consumption.

Chlorine, Residual (mg/l): No residual chlorine was detected in sample as the sample is collected from groundwater source. Chlorine is typically added to disinfect water, so the absence of residual chlorine.

Heavy Metals (Aluminum, Antimony, Barium, Boron, etc.): Heavy metals are below detection limit in sample.

Fluoride (mg/l): Fluoride value is 1.31 mg/l. Fall within the SEQS limit of 1.5 mg/l.

Nitrate and Nitrite (mg/l): Nitrate level is 0.3 mg/l, while nitrite level is even lower. These values are well within the SEQS limits.

Microbial Contamination (Total Coliform, E-Coli, and Fecal Coliform): Microbial contamination is absent in water sample.

Table 5-8: Groundwater Sample Analysis

S.No.	Parameter	Method	Unit	SEQS Limits	Result
1.	Temperature	APHA 2550	°C	NGVS	25.5

S.No.	Parameter	Method	Unit	SEQS Limits	Result
2.	pH @ 25°C	APHA 4500 H+B	-	6.5-8.5	6.7
3.	Odour	APHA 2150 B	-	Acceptable	Unacceptable
4.	Color	APHA 2120 B	TCU	15	11
5.	Taste	APHA 2150 B	-	Acceptable	Unacceptable
6.	Total Hardness	APHA 2340 C	mg/l	500	1810
7.	Total Dissolved Solids	APHA 2540 C	mg/l	1000	7550
8.	Turbidity	APHA 2130 B	NTU	<5	8.97
9.	Chloride	APHA 4500-Cl B	mg/l	<250	1075
10.	Chlorine, Residual	APHA 4500-Cl G	mg/l	0.2 - 0.5	0
11.	Aluminum	APHA 3111 B	mg/l	0.2	BDL
12.	Antimony	APHA 3111 B	mg/l	0.005	BDL
13.	Barium (Ba)	APHA 3111 B	mg/l	0.7	BDL
14.	Boron	APHA 3111 B	mg/l	0.3	BDL
15.	Fluoride	APHA 4500-F C	mg/l	1.5	1.31
16.	Nitrate	APHA 4500-NO3- F	mg/l	0.5	0.3
17.	Nitrite	APHA 4500-NO2- E	mg/l	3	0.008
18.	Arsenic	APHA 3111 B	mg/l	<0.05	BDL
19.	Cadmium	APHA 3111 B	mg/l	0.01	BDL
20.	Chromium	APHA 3111 B	mg/l	<0.05	BDL
21.	Copper	APHA 3111 B	mg/l	2	BDL
22.	Cyanide	APHA 4500-CN- G	mg/l	0.05	BDL
23.	Lead	APHA 3111 B	mg/l	<0.05	BDL
24.	Manganese	APHA 3111 B	mg/l	0.5	BDL
25.	Mercury	APHA 3111 B	mg/l	0.001	BDL
26.	Nickel	APHA 3111 B	mg/l	<0.02	BDL
27.	Phenols	APHA 4500-P	mg/l	NoGL	BDL
28.	Selenium	APHA 3111 B	mg/l	0.01	BDL
29.	Zinc	APHA 3111 B	mg/l	5	BDL
30.	Total Coliform	APHA 9222 B	cfu	0/100ml	0
31.	E-Coli	APHA 9222 D	cfu	0/100ml	0

5.3.2 Surface Water Analysis

Table 5-9 summarizes surface water quality parameters surrouding the proposed project. These parameters are compared against Sindh Environmental Quality Standards (SEQS) to assess the safety and suitability of the water for consumption and use. The surface water same was collected from storage tank at project site. Below is an explanation of the key parameters:

pH: The pH levels range from 7.5, indicating that the water is neutral to alkaline. The value is within the acceptable SEQS range of 6.5 to 8.5, which is safe for drinking and general use.

Odor: The odor of the water is acceptable, meeting the SEQS standard, which requires that water have no objectionable odors.

Color (TCU): The color value is 4 TCU is well within the SEQS limit of 15 TCU.

Taste: The Taste of the water is acceptable, not meeting the SEQS standard, which requires that water have no objectionable Taste.

Total Hardness (mg/l): Total hardness value is 190 mg/l well within the SEQS limit of 500 mg/l.

Total Dissolved Solids (TDS) (mg/l): TDS levels, which indicate the concentration of dissolved substances, is 400 mg/l is within the SEQS limit of 1000 mg/l. Making the water fil for human consumption.

Turbidity (NTU): Turbidity, which measures water clarity, within the SEQS limit of 5 NTU in sample (2.61 NTU), suggesting particulate contamination. Other locations are within safe limits.

Chloride (mg/l): Chloride value is 75 mg/l, within the SEQS limit of 250 mg/l in sample, potentially giving the water a sweet taste and making it suitable for large-amount consumption.

Chlorine, Residual (mg/l): No residual chlorine was detected in sample. Chlorine is typically added to disinfect water, so the absence of residual chlorine.

Heavy Metals (Aluminum, Antimony, Barium, Boron, etc.): Heavy metals are below detection limit in sample.

Fluoride (mg/l): Fluoride value is 0.67 mg/l. Fall within the SEQS limit of 1.5 mg/l.

Nitrate and Nitrite (mg/l): Nitrate level is 0.4 mg/l, while nitrite level is even lower. These values are well within the SEQS limits.

Microbial Contamination (Total Coliform, E-Coli, and Fecal Coliform): Microbial contamination is present in water sample. Total coliforms are too numerous to count, with the presence of E. coli (24 cfu/100 ml), indicating possible mocrobial contamination, which can pose serious health risks if untreated.

Table 5-9: Surface Water Quality Analysis

S.No.	Parameter	Method	Unit	SEQS Limits	Result
1.	Temperature	APHA 2550	°C	NGVS	25.6
2.	pH @ 25°C	APHA 4500 H+B	-	6.5-8.5	7.5
3.	Odour	APHA 2150 B	-	Acceptable	Acceptable
4.	Color	APHA 2120 B	TCU	15	4
5.	Taste	APHA 2150 B	-	Acceptable	Acceptable
6.	Total Hardness	APHA 2340 C	mg/l	500	190
7.	Total Dissolved Solids	APHA 2540 C	mg/l	1000	400
8.	Turbidity	APHA 2130 B	NTU	<5	2.61
9.	Chloride	APHA 4500-Cl B	mg/l	<250	75
10.	Chlorine, Residual	APHA 4500-Cl G	mg/l	0.2 - 0.5	0
11.	Aluminum	APHA 3111 B	mg/l	0.2	BDL
12.	Antimony	APHA 3111 B	mg/l	0.005	BDL
13.	Barium (Ba)	APHA 3111 B	mg/l	0.7	BDL

S.No.	Parameter	Method	Unit	SEQS Limits	Result
14.	Boron	APHA 3111 B	mg/l	0.3	BDL
15.	Fluoride	APHA 4500-F C	mg/l	1.5	0.67
16.	Nitrate	APHA 4500-NO3- F	mg/l	0.5	0.4
17.	Nitrite	APHA 4500-NO2- E	mg/l	3	0.006
18.	Arsenic	APHA 3111 B	mg/l	<0.05	BDL
19.	Cadmium	APHA 3111 B	mg/l	0.01	BDL
20.	Chromium	APHA 3111 B	mg/l	<0.05	BDL
21.	Copper	APHA 3111 B	mg/l	2	BDL
22.	Cyanide	APHA 4500-CN- G	mg/l	0.05	BDL
23.	Lead	APHA 3111 B	mg/l	<0.05	BDL
24.	Manganese	APHA 3111 B	mg/l	0.5	BDL
25.	Mercury	APHA 3111 B	mg/l	0.001	BDL
26.	Nickel	APHA 3111 B	mg/l	<0.02	BDL
27.	Phenols	APHA 4500-P	mg/l	NoGL	BDL
28.	Selenium	APHA 3111 B	mg/l	0.01	BDL
29.	Zinc	APHA 3111 B	mg/l	5	BDL
30.	Total Coliform	APHA 9222 B	cfu	0/100ml	TNTC
31.	E-Coli	APHA 9222 D	cfu	0/100ml	24

5.3.3 Ambient Air Quality Monitoring

To assess the status of environmental conditions, mainly ambient air quality, criteria pollutants (NO, SO_2, CO, O_3, SPM, PM_{10}, $PM_{2.5}$ were monitored for 8 hours at the designated location nearby the project site.

Imperial Environmental Research Laboratory (IERL) collected the ambient air data using its USEPA-recommended monitoring equipment at three (03) sites.

5.3.4 Noise Monitoring Method and Quality Standards Noise Monitoring

Noise is regarded as a significant environmental stressor pollutant and is monitored as an essential matrix, particularly during baseline environmental studies. In the absence of any reliable and established Noise data, noise monitoring was conducted at the exact location where ambient air quality measurements were carriedout for 8 hours.

Noise measurement was carried out using the ASTM method (American Society for Testing Materials Method), which integrates a sound level meter fitted with A and C filter networks in accordance with IEC PUB 651 TYPE2 for compliance with virtually all noise measurement regulations., the monitoring values of Noise was compared with standards set by SEQS.

5.3.5 GPS Coordinates of Monitoring Sites

Site names with their GPS coordinates are given below in **Table 5-10**.

Table 5-10: GPS Coordinates of Monitoring Sites

Sr.No	Names	Latitude	Longitude
1	Southwest Corner of Project Site	24.943223°N	67.084967°E
2	Southeast Corner of Project Site	24.943213°N	67.086824°E
3	Northeast Corner of Project Site	24.945058°N	67.086682°E

5.3.6 Interpretation and Compliance of Monitoring Results

5.3.7 Ambient Air Monitoring

- **Monitoring Results of NO**

Values of NO & NO_2 are expressed in µg/Nm³ and are found to be within the SEQs limits at all locations.

- **Monitoring Results of SO_2:**

Sulfur Dioxide (SO_2) is a significant air pollutant that has various environmental and health impacts.

The results of SO_2 are also expressed in µg/Nm³ and are found to be within the SEQS limit at all locations.

- **Monitoring Results of CO**

The values of CO are expressed in mg/Nm³ and found to be within the SEQs limit at all three (03) locations. The Values of CO were found to be within the SEQs at all locations.

- **Monitoring Results of O_3:**

The results of O_3 are also expressed in µg/Nm³ and are found to be within the SEQS limit at all locations.

- **Monitoring Results of $PM_{2.5}$ and PM_{10}:**

Particulate matters ($PM_{2.5}$ and PM_{10}) are significant air pollutants have various environmental and health impacts.

The results of $PM_{2.5}$ and PM_{10} are also expressed in µg/Nm³ and are found to be within the SEQS limit at all locations.

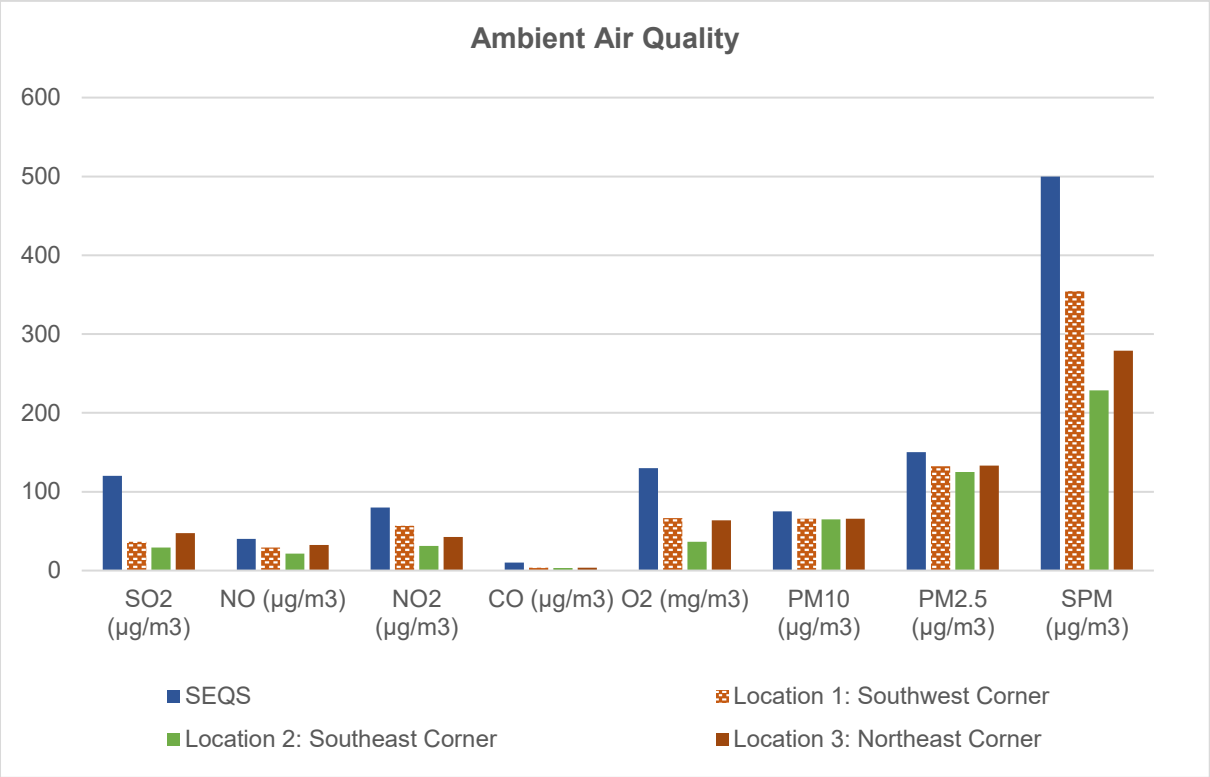


Figure 5-6: Average Ambient Air Monitorng Results

5.3.8 Ambient Noise Monitoring

The noise levels were monitoried for 8 hours and found within the SEQS limitsfor residential and commercial in day time. Figure 5-7, presents ambient noise monitorin results.

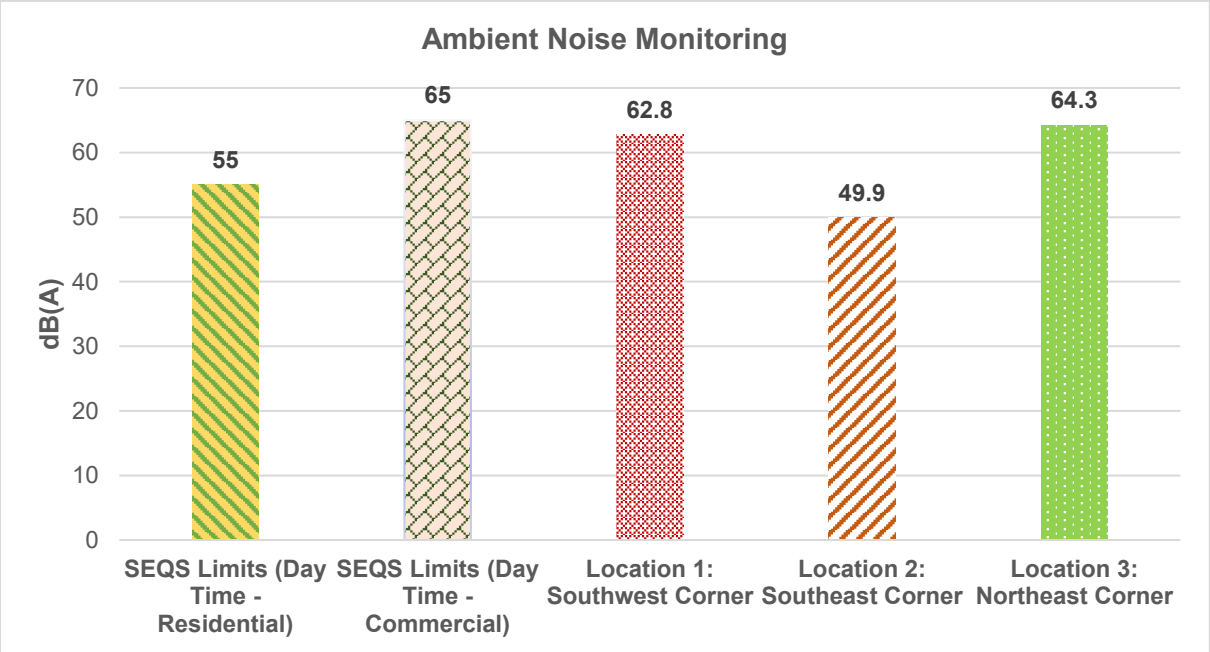


Figure 5-7: Average Ambient Noise Monitorng Results

This environmental monitoring study indicates that the average levels of all Ambient Air

Pollutants & Surface Water Quality except Microbiological were found to be within the SEQS limits, while Groundwater quality does not comply with the prescribes limits of SEQS. Detailed reports in the form of scanned copies are attached as **Annexure - X**.

Pictures of Environemntal Monitoirng Activity

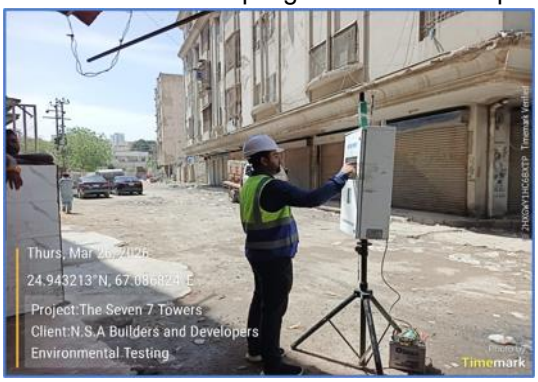


Surface water Sampling from Storage Tank



Groundwater Sampling from Motor Pump





Ambient Air & Noise Quality Monitoring





Ambient Air & Noise Quality Monitoring

5.4 Ecological Baseline

The ecology of the 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.

- The coastal vegetation consists of three main associations. In the protected creeks facing the mouth of the rivers, in shallow water, mangrove vegetation consisting mainly of Avicennia alba. In the muddy coastal swamps, Arthrocnemum 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 calcareous 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.

5.4.1 Flora

Vegetation in the project area is limited to roadside plantation and ornamental species planted along medians and within private plots. Common species observed in the district include:

	
Neem (Azadirachta indica)	*Conocarpus (Conocarpus erectus)*
	
Banyan (Ficus benghalensis)	*Peepal (Ficus religiosa)*



Date Palm (Phoenix dactylifera)

No protected plant species or natural vegetation communities are reported within the immediate project footprint.

5.4.2 Fauna

Wildlife is limited to common urban-adapted species. Frequently observed birds include:



House Crow (Corvus splendens)



Common Myna (Acridotheres tristis)



Rock Pigeon (Columba livia)



House Sparrow (Passer domesticus)



Funambulus pennanti

Small mammals such as rodents and stray cats/dogs are also present, typical of urban Karachi. No endangered or protected terrestrial fauna species are known to inhabit the project site.

5.4.3 Sensitive Habitats and species hotpots

The biological environment of the area is typical of dense metropolitan settings and does not contain natural habitats, forests, wetlands, or ecologically sensitive ecosystems.

5.5 Socio-Economic Baseline

The socio-economic baseline section outlines the current socio-economic conditions in the proposed project vicinity. This section is based on literature reviews, site visits, surveys, and stakeholder consultations.

It assesses the broader (District Centeral Karachi) and immediate (project vicinity) environments, focusing on demographics, land use, education, health, and public utilities. This baseline will inform the development of a Social Management Plan to address potential social impacts and ensure alignment with SDG Goal 3: promoting health and well-being for all.

The macro-environment refers to the broader context of District Centeral Karachi in Sindh province. This section examines the district's administrative structure, demographic trends, and the status of key public services such as education and healthcare. According to the Pakistan Bureau of Statistics (2023 Census), Center Karachi has a population of approximately 2,971,382, with a literacy rate of around 30%, significantly below the national average. Healthcare facilities are limited, with a few government hospitals and basic health units serving a widely dispersed population.

In contrast, the micro-environment focuses on the immediate surroundings of the proposed project site. This includes detailed analysis of local land use patterns, access to utilities such as water, electricity, and sanitation, and the availability of nearby education and health services. The micro-level assessment helps identify specific community needs and potential areas of social impact, forming a critical input into the project's Social Management Plan.

Macro-environment: Central Karachi District

5.5.1 Administrative Context

District Central Karachi is located in the central part of Karachi, making it one of the most accessible and densely populated districts of the metropolitan city. It shares borders with District West to the west, District East to the east, District South to the south, and District Korangi and Malir toward the southeast and northeast respectively. Covering an area of approximately 69 square kilometers, District Central consists predominantly of urban terrain and includes several major residential and commercial localities such as North Nazimabad, Liaquatabad, Gulberg, and New Karachi, which contribute significantly to Karachi’s economic and social activity.

Administratively, District Central Karachi is divided into several subdivisions and union committees, including North Nazimabad, Liaquatabad, Gulberg, New Karachi, and North Karachi. The district serves as a major residential and commercial hub within Karachi, with well-developed road networks and connectivity through major arteries such as Shahrah-e-

Pakistan and the Lyari Expressway. Its central location and access to key transportation routes enhance the district's importance for urban development, commercial activity, and public services.

5.5.2 Demography

According to the 2023 national census, District Central, Karachi, has a population of approximately 3,822,325, making it one of the most densely populated districts in the city. The district reflects steady urban population growth, driven by residential expansion and migration within Karachi. The population distribution is relatively balanced, with males slightly outnumbering females, consistent with broader metropolitan trends. The district is known for its diverse communities, established housing sectors, and access to essential services, contributing to its significance in the city's demographic and economic landscape. Table 5-11, presents detailed demographic data from the 2023 census.

Table 5-11: Demographic Profile

District	Area (km^2)	Population 2023	Population 2017	2017-2023 Average Annual Growth Rate			
Karachi Central	69	3,822,325	2,971,382	4.30			
Population Census 2023							
Total	Male	Female	Transgender	Sex Ratio	Population Density Per km^2	Urban Proportion	Average Household Size
3,822,325	2,019,115	1,802,647	563	112.01	55,396	100.00	5.80
Source: PBS-2023 Census							

5.5.3 Ethnicity and Culture

District Central Karachi has a total population of approximately 3.82 million people, reflecting significant linguistic diversity while remaining predominantly Urdu-speaking. Urdu is the most widely spoken language, accounting for about 80.2% of the population (over 3.06 million people), highlighting the district's strong Muhajir demographic presence.

Among regional languages, Pushto speakers constitute around 4.7% of the population, followed closely by Punjabi speakers at 4.0% and Saraiki speakers at 3.9%. Sindhi-speaking residents represent approximately 2.2% of the district's population, while Balochi speakers account for nearly 0.9%. Smaller linguistic communities include Hindko, Kashmiri, Brahvi, Shina, Balti, Mewati, and Kohistani speakers, each contributing less than 1% individually. The data demonstrates that District Central Karachi is a highly multicultural urban district where Urdu serves as the dominant language and primary medium of communication, while a variety of regional languages reflect the district's diverse migrant and ethnic communities. Table 5-12, shows the population by mother tongue.

Table 5-12: Population by Mother Tongue

District	Total	Languages														
		Urdu	Punjabi	Sindhi	Pushto	Balochi	Kashmiri	Saraiki	Hindko	Brahvi	Shina	Balti	Mewati	Kalasha	Kohiostani	Others
Central	3,820,388	3,063,793	154,238	84,881	177,748	33,638	6,493	148,299	31,693	6,111	2,205	2,438	4,134	109	3,767	100,841
%	**100**	**80.2**	**4.0**	**2.2**	**4.7**	**0.9**	**0.2**	**3.9**	**0.8**	**0.2**	**0.1**	**0.1**	**0.1**	**0.0**	**0.1**	**2.6**
Source: PBS-2023 Census																

District Central Karachi has an overwhelmingly Muslim population, with Muslims comprising approximately 98.3% of the district's total population (around 3.76 million people). This indicates that Islam is the dominant religion and forms the primary cultural and social foundation of the district.

Religious minorities make up a comparatively small proportion of the population. Christians represent the largest minority community, accounting for about 1.3% of residents (approximately 48,464 people). Hindu Jati communities constitute around 0.3% of the population, while smaller groups include Qadiani/Ahmadi, Sikh, Parsi, Scheduled Caste, and other religious communities, each representing less than 0.1% individually. The district wise population by religions is provide in the below Table **5-13**.

Table 5-13: Population by Religion

District	Muslim	Christian	Hindu Jati	Qadiani/ Ahmedi	Scheduled Caste	Sikh	Parsi	Other
Karachi Central	3,756,578	48,464	12,084	1,556	100	159	53	1,394
%	98.3	1.3	0.3	0.0	0.0	0.0	0.0	0.0
Source: PBS-2023 Census								

5.5.4 Education Facilities

There are many schools, colleges and technical training centers in Karachi Central. The noteworthy higher education institutions of the district are Jinnah University for women, Iqra University North Karachi and Karachi Medical and Dental College. The following statistics shows that District Central has a high number of schools and enrollment. In fact, the number of female teachers is almost five times higher than the number of male teachers in schools of District Central, which shows a significantly higher number of women work in the education sector, compared to women from other districts of Karachi.

According to education data from 2016-2017 Table 5-14. District Central has total of 337 schools with 88,375 enrollment of students and 5012 teachers for educating them. Apart from

the government run institutions, numerous private schools are also functioning in the district, but accurate data on the number of schools and student volume is not available. Table below shows that school facilities in the schools of District Central.

Table 5-14: Educational Statistics of District Central

DISTRICT NAME	NUMBER OF SCHOOLS				ENROLLMENT			TEACHERS			Total Rooms	BUILDING	
	Boys	Girls	Co-Edu	Total	Boys	Girls	Total	Male	Female	Total		Yes	No
Karachi Central	153	81	103	337	39,984	48,391	88,375	1,559	3,453	5,012	3,654	322	15

The 7 (Seven) Towers project, located along Shahrah-e-Pakistan in Federal B Area within Karachi Central District, is situated in a well-developed urban setting with extensive access to educational facilities. The educational institutes in the surrounding area include Institute of Business Administration Karachi, Health and Welfare Center, Institute of Business Administration, Karachi, Karachi university Campuses located 10-15 km away, Beaconhouse School, Happy Palace Grammar School, Pingu's English School, F.B area, Metropolitan School Gulberg Campus, and New Vision School.

5.5.5 Health Facilities

The healthcare infrastructure of Karachi Central reflects a primary and preventive healthcare-oriented system with limited availability of large-scale hospital facilities within the district. In 2020, Karachi Central had no teaching hospitals, civil hospitals, Rural Health Centers (RHCs), or major inpatient bed capacity, but it maintained 3 dispensaries, 13 TB clinics, 2 Basic Health Units (BHUs), and 2 Maternal and Child Health Centers (MCHCs) with a small number of beds. Compared with other districts of Karachi Division, Karachi Central's healthcare network appears more dependent on outpatient and community-based healthcare services rather than tertiary medical institutions. At the city level, Karachi Division showed gradual improvements in healthcare infrastructure between 2020 and 2023, including increases in hospital bed capacity, TB clinics, BHUs, and RHC facilities. However, the absence of updated district-wise statistics after 2020 limits a more detailed assessment of recent healthcare infrastructure development in Karachi Central.

District	Teaching Hospitals		Civil, Specialized and Taluka and DHQ		Dispensaries		R .H.C.		TB Clinics		Basic Health Units		MCHC	
	Nos.	Beds	Nos.	Beds	No.	Beds	No.	Beds	No.	Beds	No.	Beds	No.	Beds
Karachi Centarl (2020)	-	-	-	-	3	-	-	-	13	-	2	-	2	5
Karachi East (2020)	-	-	-	-	3	-	-	-	10	108	4	-	2	-
Karachi South (2020)	2	3,564	4	1,100	5	-	-	-	15	6	-	-	-	-
Karachi West (2020)	1	380	1	250	16	-	4	20	13	-	7	15	4	5
Karachi Korangi (2020)	-	-	8	810	8	-	-	-	12	-	8	17	3	27

Karachi Malir (2020)	-	-	1	50	19	-	2	8	9	-	14	24	5	-
Total Karachi 2020	3	3944	14	2210	54	0	6	28	72	114	35	56	16	37
*Total Karachi 2022	3	4200	11	1757	32	0	5	12	33	350	33	66	21	23
*Total Karachi 2023	3	4200	13	1931	31	0	5	36	42	350	33	76	21	23
Source: Sindh Development Statistics, Government of Sindh														
Note: * After 2020, District wise data not Published in Development Statistics of Sindh by Sindh Bureau of Statistics, hence overall Karachi Division data given in the table.														

5.5.6 Housing

Housing characteristics including household size, ownership status, roofing, walls and assets provide a holistic description of the overall well-being of the household. Description of household characteristics provide a snapshot for the government to improve target housing conditions as per district/division-wise deprivations.

Housing facilities	Sindh	Karachi
Home Owners	77.7%	68.1%
Average number of persons per room	4.1	3
Mean household size	6.5	5.5
Pacca Roofing	70.7%	98.2%
Pacca Walls	70.7%	99.1%
Source: MICS 2018-19		

The housing environment surrounding The 7 (Seven) Towers project in Federal B Area, within the Central District of Karachi, is characterized by high-density urban residential development. The neighborhood predominantly comprises multi-storey apartment blocks, townhouses, and closely spaced single- dwellings. Recent trends show the redevelopment and vertical expansion to accommodate population growth and rising demand for housing near the proposed project area.

5.5.7 Livelihood

The livelihood pattern of the Central District is diversified, urban-based, and economically integrated into Karachi's metropolitan economy, with low vulnerability to land-use changes associated with the proposed development.

The majority of the working population is engaged in private sector employment, small and medium enterprises (SMEs), retail trade, transportation services, education, healthcare, banking, and public administration. A significant proportion of residents operate small businesses, including grocery shops, workshops, tailoring units, pharmacies, and food outlets. The proximity to major commercial hubs and industrial areas of Karachi enhances employment opportunities for residents. Women in the area are increasingly engaged in education, healthcare, home-based enterprises, and private employment, contributing to household income. There is no dependence on agriculture, fishing, or natural resource-based livelihoods within the immediate project vicinity due to its fully urbanized setting.

Micro-environment: Centre Karachi District

5.5.8 Waste Management

Sindh Solid Waste Management Board (SSWMB) is responsible for the waste management in the nearby vicinities. The condition of solid waste in the project area is somewhat satisfactory. The infrastructure for solid waste management in gated societies and apartment buildings is managed by hired sweepers, while in slum areas people usually dump their waste directly in empty plots in the surroundings by themselves.

5.5.9 Water Supply and Drainage

The water supply in the area falls under the jurisdiction of the Karachi Water and Sewerage Board (KWSB). There is a shortage of water supply in the area, especially during the summer season. The residents use bore water to meet household demands due to a shortage of water. The drainage system is somewhat satisfactory in the project area. The residents shared that they face obstacles during heavy rains when the drain water overflows onto the streets.

5.5.10 Electricity & Gas Supply

K-Electric supplies electricity to the area, and the residents are quite satisfied with the electricity, except a few power outages that happen throughout the city to meet the demands. Gas supply is available in the area, and the residents are satisfied with the gas supply in the area.

5.5.11 Cultural Heritage Sites

No cultural heritage sites or archaeological sites were found within the Socioeconomic Study Area during the field surveys. Furthermore, according to the Antiquities & Archaeology Department, no archaeology site is present within the Socioeconomic Study Area.

CHAPTER - 6: STAKEHOLDER CONSULTATION AND INFORMATION DISCLOSURE

6.1 General

Stakeholder participation is now a key component of environmental and social impact assessments. Engaging local communities, government bodies, NGOs, and civil society helps identify and address project-related concerns. This approach became a legal requirement under the Pakistan Environmental Protection Act (PEPA) 1997 and was reinforced by the Sindh Environmental Protection Act 2014 following the 18th Constitutional Amendment. Both laws emphasize the importance of consulting primary and secondary stakeholders throughout the EIA process.

The key objectives of stakeholder engagement for this Consultation chapter are:

- Obtain local knowledge about the micro environment that may be useful for the decisions regarding project design and identification of potential impacts.
- Promote better understanding of the proposed operation through explaining its objectives and potential positive and negative impacts;
- Identify and address the concerns of all interested and affected stakeholders;
- Facilitate consideration of alternatives, mitigation and compensatory measures
- Ensure that important impacts are not overlooked and benefits are maximized.

The proposed “The 7 (Seven) Towers” aims to develop a Residential-cum-commercial project located along the Plot No. LA-4/1, Block 21, F.B. Area, Scheme -16, Karachi.. The project primarily involves the construction and development of residential apartments in the designated area.

6.2 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:

6.2.1 Local People/Neighborhood

Individuals and groups residing near the project site are kept well-informed about the project’s background and objectives. Due to their close proximity, these local stakeholders are often the most directly affected and vulnerable, making continuous consultation with them essential throughout the project’s duration. This ongoing engagement allows stakeholders to stay informed about the consultation process, helps identify potential project impacts, and provides a platform to voice community concerns and suggestions.

Furthermore, active and transparent stakeholder involvement during the planning phase fosters trust, reduces misunderstandings, and strengthens community confidence in the project. It also enables project planners to incorporate local knowledge and address social, environmental, and economic issues early on, thereby enhancing the project’s sustainability and social acceptance. Regular dialogue with nearby communities is crucial for building long-term partnerships and ensuring that development benefits are shared equitably.

6.2.2 Proponents

The primary objective of the project proponent, M/S NSA Builder & Developers, is to successfully deliver the residential development by implementing cost-effective and sustainable practices. The project aims to create a well-planned residential community that addresses the growing demand for affordable residential buildings while ensuring environmental stewardship and social inclusivity. Through the integration of modern infrastructure, efficient resource management, and community-oriented amenities, the scheme seeks to improve the quality of life for future residents.

6.2.3 Government Agencies

The government agencies involved in the EIA process is mandated to have their policy and regulatory responsibilities addressed in the impact analysis and mitigation considerations. 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.

6.2.4 Primary and Secondary Stakeholders

Primary stakeholders are individuals and groups with a direct interest in the project, including local residents, businesses, and institutions located within the immediate vicinity of the project area. These stakeholders are directly affected by the project's construction and operation activities. Secondary stakeholders encompass government agencies, regulatory bodies, and public interest organizations that may have an indirect influence on, or be impacted by, the project's outcomes.

Engaging both primary and secondary stakeholders is crucial for identifying potential issues throughout the project lifecycle. Their concerns and feedback help to uncover social, environmental, and economic impacts arising during construction and operational phases. This collaborative approach enables the development of effective mitigation strategies to minimize negative effects while maximizing benefits. Moreover, continuous stakeholder involvement fosters transparency, enhances project acceptance, and supports the sustainable success of the residential development.

Primary stakeholders within the project vicinity include a range of prominent residential developments, community facilities, and commercial establishments are situated nearby. These include Sannaullah Apartment, Omema Pride, Urban Crystal Phase-II, and Pak People Colony, alongside key institutions such as Jama Masjid Madaras Quba and the JDC Warehouse. The area also hosts various business and service outlets, including Leopard Courier Service, Danish Cooperation Factory (Gatta Factory), Hassan Pakwan Center, Hasnain Hair Saloon, Zubair Gas Shop, Allah Wala Hotel, and Lucky Allied Autos, all located in close proximity to the project site. Secondary stakeholders consist of institutes and welfare services operating in the area, as well as regulatory bodies responsible for environmental oversight, notably the Sindh Environmental Protection Agency (SEPA).

6.3 Consultation Approach & Methodology

6.3.1 Consultation with Primary Stakeholders

A 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.

In the second phase, the social survey team utilized a pre-designed semi-structured questionnaire to engage with residents, commercial entities, and public service institutions. Stakeholders who were unavailable during the initial visit were either revisited the same day or followed up with over the following days to gather their input. During each interaction, the project team presented an overview of the project, documented stakeholders' concerns and suggestions, and provided contact information to facilitate ongoing communication via email or written feedback. Additionally, a 'Project Brief' outlining the key aspects of the project was distributed to those present as part of the information disclosure process.

Moreover, the team gathered information from nearby residents regarding the current conditions in the area, including the status of utilities, security, and law and order. To encourage open and detailed responses, the questionnaire included several open-ended questions, allowing participants to freely express their opinions and suggestions related to the study. Table 6-1, summarizes the stakeholders who were engaged during the survey.

Table 6-1: Details of Consultations with Primary and Secondary Stakeholders

Sn.No	Stakeholders	Stakeholder Type	Date
1	Sannaullah Apartment	Residential	02-04-2026 16-04-2026
2	Omema Pride		
3	Urban Crystal Phase-II		
4	Pak People Colony		
5	Lucky Allied Autos	Commercial	02-04-2026 16-04-2026
6	Allah Wala Hotel		
7	Zubair Gas shop		
8	Hasnain Hari Saloon		
9	Hassan Pakwan Center		
10	Danish Cooperation Factory (Gatta Factory), Industry		
11	Leopard Couriers Service		
12	JDC Wareshouse	Institutions	16-04-2026
13	Jama Masjid madarab Quba		
14	Sindh Environment Protection Agency (SEPA)	Government Department	07-05-2026

6.4 Consultation Feedback

The social team from Indus Environment Engineering Consultant (IEEC) carried out consultations in the project area during the April- 2026. Consultations were conducted with the residential and commercial stakeholders in the vicinity of project site. The following major issues and concerns were raised by the primary stakeholders.

6.4.1 Concern & Suggestions

Residential perspective, community members expressed concerns regarding increased traffic congestion, construction-related noise, dust emissions, and pressure on existing utilities such as water supply, drainage, and electricity.

Residents also emphasized the importance of maintaining safety standards and minimizing disruption during the construction phase.

They acknowledged that the project could significantly enhance the area's urban profile, improve infrastructure, and increase surrounding property values.

From the commercial perspective, local businesses identified short-term challenges such as restricted access during construction, reduced customer flow, and logistical difficulties for deliveries. Despite these concerns, business stakeholders largely recognized the project's long-term economic advantages. The development is expected to attract a larger residential population, generate increased commercial activity, create employment opportunities, and stimulate demand for retail, hospitality, and service sectors in the surrounding area.

Residents of Sannaullah, Omema, and Urban Cryrstal apartments welcomed the new development, noting that such projects are likely to increase the value of their land.

Residents emphasized that their privacy must be respected and protected throughout the development of the towers.

Table 6-2: Stakeholder Consultation Pictures

	
Consultation with Zubair Gas Shop	




Consultation with Hasnain Hair Saloon




Consultation with Residency of Urban Crystal Phase-II





Consultation with Supervisor of Leopard Couriers Service




Consultation with Residency of Sannaullah Apartment	Consultation with Residency of Omema Pride





Consultation with Manager of Danish Cooperation Factory (Gatta Factory), Industry





Consultation with Owner of Allah Wala Hotel



Consultation of Residencey of Pak People Colony



Consultation of Residencey of Jama Masjid madarab Quba





Hassan Pakwan Center





Consultation with Owner of Lucky Allied Autos



Consultation with SEPA, Karachi



Consultation with Lucky Allied Autos

CHAPTER - 7: SCREENING OF POTENTIAL IMPACT AND MITIGATION MEASURES

7.1 General

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 project located at Plot No. LA-4/1, Block 21, F.B. Area, Scheme -16, Karachi, is duly authorized. 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.

7.2 Screening of Potential Impacts

All the potentially significant environmental impacts from the project are grouped in three types and phase; Table 7-1 shows the overview of potential impacts in all three phases.

- Design
- Construction
- Operation/Usage

Table 7-1: Screening of Potential Impacts

S. No	Impacts	Negative Impact		Positive Impact		No Impact
		Short Term	Long Term	Short Term	Long Term	
A	**Design Phase Impacts**					
	Dislocation of people					√
	Change of land use					√
	Loss of trees/vegetation					√
	Relocation of existing utilities					√

S. No	Impacts	Negative Impact		Positive Impact		No Impact
		Short Term	Long Term	Short Term	Long Term	
	Impact on archaeological property					√
B	**Construction Phase**					
	Soil Erosion/Dust	√				
	Wastewater Discharges	√				
	Release of Air Emission	√				
	Noise	√				
	Disposal of Construction Debris	√				
	Disturbance to Traffic flow	√				
	Water consumption & Demand	√				
	Fuel Storage	√				
	Soil Contamination	√				
	Safety of Workers & Public	√				
	Employment & Business Opportunities			√		
C	**Operation Phase**					
	Wastewater Discharges		√			
	Solid Waste Disposal		√			
	Utility services & Consumption of Resources		√			
	Fire Hazards		√			
	In-adequate Parking Floors Exhaust ventilation		√			
	Sustainable Plantation				√	
	Parking Facility				√	
	Employment Generation				√	

7.3 Construction Phase Impacts

7.3.1 Dislocation of people

Since the project and its associated activities are limited within premises of plot boundary of proponent and is free from encroachment, and the proposed site is the property of project proponent, hence no displacement of any person is anticipated.

Mitigation Measures:

Not required.

7.3.2 Change of Land use

Proposed site is located within the residential and commercial area and development is in designated area which is property of the proponent and is in accordance to the Approved Plan of proposed project , “The 7 (Seven) Tower”.

Mitigation Measures:

Not required.

7.3.3 Loss of Trees / Vegetation

The proposed site is located in urban zone and has existing residential and commercial area where no trees and other flora found.

Mitigation Measures:

Not required.

7.3.4 Relocation of existing Utilities

The proposed location is uniform surface plot, where there are no public utilities that need to be relocating.

Mitigation Measures:

Not required.

7.3.5 Impact on Archaeological Sites

The proposed project location is located within the residential and commercial area where no archeological properties exits, therefore, impact may not be envisaged, anyhow activities related to project during construction stage shall be confined to the designated site, and the nature and magnitude of the activities is too small, hence no impact on any of the archeological properties are anticipated.

Mitigation Measures:

Not required.

7.4 Construction Phase Impacts

7.4.1 Soil Erosion/Dust

Deep excavations carried out during foundation work of the civil structures and utility laying work would generate heaps of soil which may result in soil erosion causing air pollution.

Deep excavated trenches may pose falling threat to workers and machinery.

Mitigation Measures:

- Excavated soil will be re-used as back filling material in civil work, leveling of uneven areas, and filling of depressions.
- Left over surplus soil would be disposed of through waste management contractor as early as possible and unnecessary accumulation and stockpiling at the site would be avoided to reduce the risk of movement of soil with surface runoff during rain and erosion with the wind.

- Excavated trenches and ditches would be barricaded with caution tape and necessary safety signs would be posted at prominent locations. Night illumination and warning lights would also be posted.
- Soil stockpiles would be regularly wetted to keep airborne dust levels to minimum.
- Necessary measures and planning would be done to keep the excavation work to minimum possible duration.
- Site workers will be mandated to wear dust masks especially during dry & windy weather conditions.
- The proponent will be responsible for taking necessary mitigation measures for reduction of air pollution from dust emissions and safety measure during construction work.

7.4.2 Wastewater Discharges

Construction activity generates two types of effluents: sewage waste from temporary toilet facilities for site workers, and flushed water/ground water generated from deep excavation for the foundation, piling and flushing activities. Improper disposal of sewage water can cause sewers to choke. The water generated from foundation/piling works and flushing of lines can cause localized flooding in the area. This may not only cause inconvenience to the nearby passing public, but also provide breeding place for mosquitoes and other insects, which is dangerous for the environment.

Mitigation Measures:

- Ground Water from the foundation excavation hole will be disposed through third party contractor water Bowser
- Sewage water will be drained through temporary piping into the main sewer drain near the construction site.
- Any domestic wastewater/sewage if released into the natural drainage system would be processed through a temporary sedimentation pit and no direct discharge be carried out.

7.4.3 Release of Air Emissions

Exhaust emissions from the operation of construction machinery and transportation vehicles may cause air pollution. Movement of heavy machinery and construction material transportation vehicles would create dust emissions in the area. Generators used for power generation may cause pollution in ambient air and have adverse impacts on the workers, operators and nearby area.

Mitigation Measures:

- The impact from above mentioned activities will be mitigated by selection of good quality equipment, machinery and vehicles. Smoke releasing machinery and vehicles would not be allowed to be operated on the project by proponent and contractor.
- High exhaust pipes would be used in generators and other fixed equipment for better dispersion of air emissions and to prevent high concentrations of pollutants in the immediate vicinity. However, operators and workers working in proximity of heavy machinery, equipment and generators would be required to wear masks.

- Emission levels of the generators and other fixed equipment would be monitored regularly and maintenance would be done as per the recommendation of the manufacturer/supplier.
- Duration of the work having potential of dust emissions would be minimized by proper project management.
- Movement of the vehicle would be planned and allowed on designated routes only. Water sprinkling would be done on vehicles, routes/tracks to control dust emissions from vehicular movement within the project site.
- Specific timings would be allocated during normal daytime working hours for movement of heavy construction machinery. Night time movement would be avoided to the possible limits.

7.4.4 Noise

The operation of generators and movement of heavy machinery may create high noise levels in the project area. However, this would be a localize issue and noise levels will attenuate with distance from the work site. Movement of heavy vehicles for delivery of construction material may also induce high noise levels for short periods. High noise levels may affect the workers engaged in the construction activities besides causing disturbance in the neighborhood.

Mitigation Measures:

- The impact from above mentioned activities will be mitigated by selection of good quality of generators and heavy machinery. Noise-producing machinery and vehicles would not be allowed to be operated on the project site by the proponent and contractor.
- While fixing generators at the work site all possible noise reducing measures would be adopted, including usage of canopy over the generator and noise-dampener pads over the foundation platform.
- Noise levels of the generators and other fixed equipment would be monitored regularly and necessary maintenance would be done to control the noise levels.
- Operators and workers working in proximity of heavy machinery, equipment and generators would be required to use ear plugs.
- Duration of the work having potential of high noise generation would be minimized by proper project management.
- Movement of the vehicle would be planned and allowed on designated routes only. Specific timings would be allocated during normal daytime working hours for movement of heavy construction machinery. Night time movement would be avoided to the possible limits.

7.4.5 Disposal of Demolition / Construction Debris

Typical solid wastes generated during construction may include waste concrete, steel scrap, wooden scaffolding, empty cement bags, excavated soil, wood remains etc. Rock cutting material will be in the form of bore-wash generated due to pilling or boring activity. This waste has the potential to cause adverse impact on the surroundings if not appropriately managed and disposed of. Improper storage of waste may pose hazards to the workers at the site as well. Wind-blown debris cause nuisance to the neighborhood. Poor waste management

practices result in short term and long term adverse impacts on the aesthetics of the surrounding.

Mitigation Measures:

- Effective and instant removal will be ensured for unusable construction material such as broken bricks, damaged pipes, left over steel bars, steel cuttings, and pieces of wood, glass and plastics from the site for recycling.
- Waste including concrete debris, stones, excavated rocks, soil, etc. will not be allowed to accumulate on site and shall be removed intermittently either for use as filling material at other sites or disposal at a landfill site.
- Possibility of reuse of the waste concrete material and construction waste from demolition works as filling material in paving large concrete floors would be on explored.

7.4.6 Disturbance to the Traffic Flow

The movement of the heavy construction machinery and construction material transportation vehicles may disturb the other traffic using the proposed project commercial lane.

Mitigation Measures:

- The proposed Project site is located along Shahrah-e-Pakistan, Karachi. The site is directly accessible through the existing road network, which comprises wide carriageways with adequate traffic-handling capacity. The surrounding road infrastructure is capable of accommodating the additional traffic generated during the construction phase of the proposed Project without causing significant congestion or disruption to existing traffic flow.
- The movement of the heavy machinery to and from the project site will be planned in the off-peak hours.
- Traffic rules and directions issues by the Government for movement of trucks and construction material vehicles would be complied with.
- Movements of the vehicles approaching or leaving the project site would be regulated by dedicated staff to avoid any congestion or disturbance to the normal tariff flow on the main road and other approach roads.

7.4.7 Water Consumption and Demand

Water required for numerous construction activities will be fulfilled from tanker water and groundwater. Improper storage of water at site may not only cause loss of valuable resource but also disturb the project site by creation of water pools and muddy swamps leading to breeding of mosquitoes and insects. Usage of bad quality of water may lead to poor construction.

Mitigation Measures

- A complete record of water consumption during the construction and operation phase will be maintained.
- Water conservation practices will be adopted to prevent wastage of water.
- Water consumption will be monitored regularly.
- Water quality will be regularly monitored to ensure good quality concreting.

- Water conservation practices will be adopted during the entire course of construction to keep the water demand as low as possible.
- 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.

7.4.8 Fuel Storage

Storage of fuel for generators and other construction related machinery may be a potential source of risk at the project site. Any leakage or spill would cause contamination of soil. Unsafe storage and usage may be a risk to fire and explosion. Fumes may be harmful to worker.

Mitigation Measures:

- Fuel storage area will be developed in an isolated and safe area.
- Storage area would be properly bounded and lines with concrete floor or any impervious sheet to prevent soil contamination.
- Adequate numbers, of Fire extinguishers will be kept at appropriate location.
- Storage of fuel at site would be kept to minimum quantities. Excess storage would be discouraged. Storage preferably be in close mouth steel drums of 200 liter capacity.
- Operators would be required to use safety mask while delivering or decanting the fuel.

7.4.9 Soil Contamination

The proponent 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 a 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.

7.4.10 Safety of Workers and Public during Construction

Operation of heavy machinery, movement of vehicles, excavated trenched, working at height; fire and handling of materials, including cement, paints, solvents, etc., are some potential sources having safety concerns for the workers. The possibilities of accidents also cannot be ruled out during the construction phase.

Since the project is located within the residential and commercial area; but it project site will be confined and No unauthorized person will be allowed.

Mitigation Measures:

- Necessary awareness will be imparted to workers related to health and safety during construction phase.
- Safety signs will be placed at prominent locations at relevant sites.
- First aid facilities will be made available for the workers at site.
- Necessary Personnel Protective Equipment (PPE) will be provided to the workers engaged in work having potential risk to health and safety.
- The proponent would be required to have safety personnel to ensure safe working practices during construction.

7.4.11 Employment and Business Opportunity

The Project would provide direct employment opportunities for a period of 3 years. Approximately 80-90 workers would be engaged in the construction work depending on the stage of the construction. It would include skilled and semi-skilled workers.

Besides direct employment in the construction work, the project would provide several indirect opportunities of business and trade. These would include but not limited to supply of construction material, water, equipment, machinery, fuel. The procurement of material such as bricks/blocks, wood, glass, plumbing fixtures, sewerage pipes, electrical wires/cables, electrical fittings, stone, marble, tiles, sanitary fittings, etc. would promote business in the local markets and indirect opportunities of employment.

Mitigation Measures:

- This has positive impacts on the area and requires no mitigation.
- Preference would be given to hire services of trained and awarded labor for skilled and semi-skilled work.
- Preference would be given to local market for purchase of material.

Preference would be given to local suppliers for procurement of construction material and machinery.

7.5 Operation Phase Impacts

7.5.1 Wastewater Discharge

Wastewater discharged from the building would be only sewage from domestic, contain bacteria, pathogens and other organisms and may create adverse impacts if not managed appropriately. Impounding would result in swamps, leading to breeding of mosquitoes and insects. Overall impact would be nuisance in the area; pollution of the soil; adverse impact on human health; devaluing of the property; damage to other infrastructure of the area; and adverse impacts on social life and recreation activities. Unsafe disposal of the wastewater may also contaminate the water supply system leading to serious adverse impacts on the occupants and public.

Mitigation Measures:

- Since the proposed project will be utilized for the residential purpose, therefore, only domestic wastewater will be generated.
- Non-potable water sgould be treated through sewerage treatment plant and reused for other purposes.
- Proper sewerage system has been designed with adequate slopes and sewer sizes for collection and transportation of wastewater from the proposed building project to the main drain collection line sewerage system.
- The sewerage network will comprise uPVC/HDPE pipes, buried underground. No open channel or drain would be designed in the project area for collection of wastewater to avoid chocking of sewage flow due to deposition of debris and solid waste.
- All manholes would have covers to prevent entry of solid waste or debris that might cause chocking and disruption of sewage flow.
- Exhaust vent will be provided for escape of gases from the sewerage lines as a safety measure to avoid any mishap or incident.
- Water conservation strategies will be employed to avoid wastage of water.

7.5.2 Solid Waste Disposal

The operation stage will generate only domestic waste from the kitchen; domestic waste will mainly comprise food waste, packaging material, paper, plastic, and glass will be generated in considerable quantities regularly. If this waste is not properly managed and disposed of may pose a serious environmental hazard not only to the occupants but also to the public in the vicinity of the project.

Improper handling and storage of solid waste may also provide favorable ground for the breeding of vectors and rodents, a source of foul smell.

Mitigation Measures:

- Separate waste bin for plastic, glass, paper, food waste will be placed, so that on site segregation took place.
- The solid waste shall be collected through garbage chute at dedicated site.
- Handling & disposal of solid waste shall be managed by a dedicated waste management contractor.
- The solid waste management plan developed will be implemented and facilities for collection, storage and transportation will be established and organized.Awareness signs will be places to educate occupants managing their solid waste properly.

7.5.3 Utility Services and Consumption of Resource

Water, electricity and gas will be the prime utilities in the project having large networks for transmission and distribution. During normal usage of utilities in due course of time there is likelihood of leakages form the network resulting in loss of resources as well as pollution in the Project area. Excessive and uncontrolled usage of these resources at will contradict with the principles of sustainable usage of natural resources.

Mitigation Measures:

- Best quality of electrical cables and gadgets, water supply pipes and control valves will be used in the project which would require less maintenance and prevent leakages of resources.

7.5.4 Fire Hazards

Fire is one of the major hazards in residential and commercial buildings. Fire can cause loss of life and property. However, at the same time fire have the potential to severely harm the people in the vicinity and affect the living environment..

Mitigation Measures:

- A dedicated fire tender shall be available at the Project Site.
- For all engineering designs, NFPA (National Fire Protection Association) codes need to be followed.
- Standard fire and smoke detection and protection devices such as alarms, fire hoses and hydrants to be provided in all critical areas.
- A detailed emergency and evacuation plan shall be prepared 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 e.g., floors, amenities, services areas, parking floors etc.
- Regular inspection and servicing of the extinguishers will be undertaken by a reputable service provider and record of such inspections should be maintained.
- Signs such as “NO SMOKING” will be prominently displayed within the premises, especially in parts where fuel storage is involved.
- Fuel will be properly stored in in an isolated and safe area.
- Storage area will be accessible only for dedicated guard and building union and secondary containment shall be provided.
- Oil absorbent shall be placed at the storage area to avoid and control spillage hazard.
- Adequate numbers of fire extinguishers shall be kept in generator, meter station room as well as at security office.

7.5.5 In-adequate Parking Floor Exhaust Ventilation

During the operation phase, inadequate local exhaust ventilation may be a potential risk of exhaust gaseous emissions build up in the parking floors, mainly CO. This will be a potential hazard of nausea.

Mitigation Measures:

- Proper local exhaust ventilation will be provided in parking floors.
- Adequate exhaust ventilation fans will be installed on the parking floors.

7.5.6 Sustainable Plantation

Plantation at the project as well at road side areas is very important for a number of reasons. The first and foremost reason is as a mitigation measure to protect the degrading environment and cooling effects. The proposed project management shall plant 50 most suitable trees within the project area and the roadside of the project area.

Mitigation Measures:

- No mitigation measure is required.

7.5.7 Parking Facility

The project has dedicated floors for the occupants parking. This facility would ease up parking issues in the area of the project.

Mitigation Measures:

- No mitigation measure is required.

7.5.8 Employment Generation

This project is expected to generate 20-25 direct employment opportunities and 30-35 indirect employment opportunities. Direct employment would include staff for security and housekeeping and indirect would include shop supervisors, helpers etc. Besides lots of suppliers and distributors for residential towers.

Mitigation Measures:

- No mitigation measure is required.

CHAPTER - 8: ENVIRONMENTAL MANAGEMENT PLAN

8.1 General

This section of the EIA report describes the Environmental Management Plan (EMP) to assist the proponent, i.e. M/S NSA Builders and Developers, to ensure sound environmental and health safety management during various planned phases of the project such as development/designing, construction and operation. The EMP is developed in recognition of the fact that it is seldom possible to eliminate the adverse environmental impacts altogether, but it is often feasible to reduce its intensity by adopting and regularly practicing mitigation measures as framed in the Environmental Management Plan.

8.2 Purpose and Objectives of EMP

This EMP provides the delivery mechanism to address the adverse environmental and health safety impacts of the proposed project during its execution, to enhance project benefits, and to introduce standards of good practice to be adopted for all project phases.

The EMP will:

- Define the responsibilities of the project proponent, contractors, and environmental monitors (Independent Monitoring Consultants), and provide a means of effectively communicating environmental and social issues among them,
- Define the implementation mechanism for the mitigation measures identified during the present study.
- Identify environmental as well as social (if applicable) training requirements at various levels
- Provide the mechanism for taking timely action in the face of unanticipated environmental situations,
- Define the monitoring mechanism and identify monitoring parameters in order to:
    - Ensure the complete implementation of all mitigation measures, and
    - Ensure the effectiveness of the mitigation measures.
    - Identify environmental as well as social training requirements at various levels.

8.3 Organization of the EMP

EMP provides the procedures; organisation and instruction to ensure Project personnel understand and implement environmental protection procedures for routine activities associated with the construction and operation of the Project and its anticipated facilities. The organisation, style and format of the EMP is intended to enhance its use by Project personnel in the field and to provide an important support document between overall environmental management of the Project and various permits and authorisations issued for specific construction and operation related Project components and activities.

8.4 Maintenance of the EMP

EMP needs to be revised on a timely basis to keep up-to-date as requirements comes up regularly. Therefore, outlining the responsibilities and activities associated with the maintenance of the EMP is essential. The responsibilities of the Environmental Monitor are mentioned, and procedures for requesting EMP revisions are outlined. EMP revision procedures include requirements for notification of the appropriate government, public and municipal and other relevant agencies so that their role is also included in the overall management process.

8.5 Management Approach

The project proponent, along with the project manager and its EHS officer, will undertake overall responsibility for implementation and supervision for compliance with the EMP. It will ensure that all activities it executes with the construction team comply with positive environmental sensitivities, and it will cooperate with the concerned regulatory agencies such as the SEPA.

On the other hand, the construction team will carry out field activities as part of the proposed project that includes relevant and subsidiary construction work. The proponent will be subjected to certain liabilities under the environmental laws of the Province which will be mentioned in the implementation of project manager and supervision of EHS officer of the proponent.

Some of the approaches to be followed during the environmental management practices are given below:

- Complying with the relevant legislation and regulations.
- Regularly reviewing of the impacts on the environment.
- Developing appropriate indicators in order to monitor core impacts.
- Communicating openly with internal and external stakeholder on environmental issues.

8.6 Roles and Responsibilities

Environmental management will be an integral part of the policy of M/S NSA Builders and Developers. Therefore, committing to reduce the environmental impacts will reflect the management approach and believe that good performance in this area is synonymous with running a well-managed efficient proposed project operations. During the construction phase, main responsibility of environmental performance will reside with the construction manager, who in turn will be assisted in daily activity monitoring by the site EHS officer.

In the normal operational phase, the main responsibility for environmental performance will be supervised by the Site Manager of the proposed project, while the daily management will be performed under the Site Supervisor. Under their surveillance, environmental management during operations will be performed as per the mitigation and monitoring plans outlined in this EIA. A brief structure of roles and responsibilities is given below:

8.6.1 Top Management of Project

Environmental management plan (EMP) will be regulated by the Project top management; therefore will play an important role. Some of the key role & responsibilities are given below.

- To cooperate and consult with relevant environmental agencies in order to perform in a better way.

- To evaluate the progress of development and implementation of this management plan.
- To approve any change in decision making with the consultation of respective managers, if appropriate.

8.6.2 Construction Manager

The role of Construction Manager is very important. The success of an EMP will mainly depend upon effective management of the EMP by this person. Following are some of the roles and responsibilities given to the Construction Manager.

- To ensure that the points of views of staff, contractors and EHS officers are considered and placed in the EMP accordingly.
- To identify issues and where possible propose solutions for inclusion in the management plan review process.
- To improve coordination and exchange of information between top management, employees, contractors, etc.
- To contribute towards the actions to deliver the management plan and ensure its continued development.
- To monitor the progress of development and implementation of this management plan.

8.6.3 EHS Officer

The role of EHS officer will be vital during the construction phase. He will be the key advisor on environmental issues to the construction manager of proposed project.

- To integrate, as far as possible, the aims and objectives of different users within an agreed plan.
- To maintain a balanced, holistic approach to the solution of concerned issues in accordance with the compliance to the legislative requirements.
- To provide professional guidance on questions relating to the environmental management and issues raised by contractors/relevant personals.
- To progress the EMP process through development towards implementation.

8.6.4 Contractor

On behalf of contractor, the main responsibilities for all matters pertaining to environment will be that of the chief executive officer of the assigned contractor. The role and responsibilities of the contractor will consist of the following basic points:

- To carry out construction activities in environmentally sound manner.
- To coordinate with the EHS officer to resolve issues arise during construction phase.
- To manage and implement environmental management practices as per the impact assessment report as well as EHS polices belong to both contractor and the project proponent.
- To manage the construction crew and reduce the environmental impacts.
- To appoint a dedicated environment officer who will understand and tackle environmental issues more easily.

8.6.5 Security/Administration/ Fire Safety Managers

The role of these managers will be crucial during the operation phase as all of the key environmental aspects listed fall into their respective domains. Following are some of the common roles and responsibilities given to these positions.

- To ensure that the points of views of staff, are considered and placed in the EMP accordingly.
- To regularly meet and resolve the upcoming and on-going environmental issues.
- To identify issues and where possible propose solutions for inclusion in the management plan review process.
- To make sure that relevant staff is adequately trained to carry out their respective duties in order to improve environmental performance of the proposed Project.
- To contribute towards the actions to deliver the management plan and ensure its continued development.

8.7 Review of Existing Condition

The current situation of the project has been given in the EIA report. The project proponent is the responsible authority for reviewing the EIA, implementing the project and managing all environmental risks arising out of it.

8.8 Legislation and Guidelines

The EIA has discussed in detail all the legislation and guidelines in Section-2 which are relevant to the project. M/S NSA Builder and Developers herein referred as proponent, will ensure that the construction and operation of the project is conducted in conformance to relevant legislations and guidelines, guidance is sought as and when required.

8.9 Health, Safety & Environmental Management System

Health, Safety and Environment Management System is an essential and integral component of the environmental management system for the safe and secure working environment, assuring sustained development, dependent on health-associated performance of human resources. HSE issues and aspects are outlined in EMP with mitigation measures based on principles of best management practices. HSE management system undertakes carrying out a complete assessment, evaluating, monitoring, identifying and control measures (mitigation) of all potential hazards and risks arising during the construction, operation and decommissioning phases of the proposed project. It needs to ensure that the Health Safety and Environemnt (HSE) Plan along with the Health and Safety Rules is established, documented and enforced. The plan also outlines roles, responsibilities and expected outcomes of proper implementation with respect to the environment, health and safety management of various phases of the project. These measures should be implemented to ensure that no significant adverse, health and safety impacts occur due to proposed activities associated with the project.

Protection of the public in general and workforce health and safety in particular during both construction and operations is of paramount importance to the project. Utilizing expert personnel and adopting tailor made Environment, Health and Safety Management System (EHSMS) that is specifically designed for the project, the potential health and safety hazards and risks associated with the project as identified and assessed, would then be mitigated by adopting standard procedures for various operations at facilities in the project.

8.10 Regulatory Requirements

8.10.1 Approvals, Authorizations and Permits

The list of potential approvals, authorizations and permits required for the Project from various agencies, including federal, provincial, and municipal are given below:

- Sindh Environmental Protection Agency (SEPA)
- Sindh Building Control Authority
- Karachi Water & Sewerage Board
- Civil Aviation Authority

8.10.2 Environmental Quality Objectives

This section outlines the criteria for management's quality objectives and generation of solid waste and wastewater quality, air and noise quality. The management of M/S. NSA Builder & Developers Limited will review Environmental Objectives once a year and try to complete them in the stipulated time frame. This will also include any applicable treatment criteria meeting the Sindh Environmental Quality Standards (SEQS) as per Sindh Environment Protection Act 2014.

8.10.3 Compliance Monitoring

It would be required by the management of proponent to comply with the Environmental Monitoring Plan laid in the subsequent section. The compliance shall also require periodic reporting of the monitoring results in form of report submitted to the Sindh Environmental Protection Agency. As the project is at smaller scale so it is proposed, during the construction, it will be on bi-annually basis.

8.11 Implementation Stages of the EMP

The success of the management plan will lie with its implementation. An EMP requires to be executed in three stages. Those are, planning & design stage, construction stage and operation stage.

8.11.1 Planning and Design of Proposed Project

There are two main components to consider in an EMP prior the construction phase. Implementation of EMP at this stage may tackle the environmental issues before they arise. Those components are given below:

A. Construction of Building

It describes the location of the proposed building, its adjoining conditions in the area, facilities to be installed in particular building. If any design parameter changes at time of approval, management will assess the environmental impacts that may arise from such changes. If the impacts are found to be different and in excess of those mentioned in the report, Proponent will develop further mitigation measures with respect to the changes to minimize these impacts and seek approval for the required change from SEPA as well as other regulatory authorities, if comes under.

B. Approvals

Obtaining NOC from SEPA does not relieve the Proponent of other obligations and hence the Proponent will obtain all relevant clearances and necessary approvals required by the government prior to commencing the proposed project In addition, the issuance of NOC will abide-by proponent Management to carry-on continuous monitoring.

8.11.2 Construction and Operation Phase

In order to implement EMP successfully during construction, it is required to follow mitigation measures and monitoring plan strictly. Awareness will be required at each step and phase, also if necessary to change management processes, will be documented and available to the employees.

A. Mitigation Plan

It defines all the impacts and their remedial with highlighting the responsible personals to work on those mitigations. An Environmental Management Plan(EMP); Environmental Mitigation Plan is basically an environmental mitigation matrix which is given as Table 8-1. All these impacts and mitigations have already been given in previous section of this report. Proponent will be required to adhere to these mitigation measures throughout the project.

B. Monitoring and Review

Environmental Management Plan; Environmental Monitoring Plan of all the activities will be required to analyse the impacts of construction and operation on the environment as mentioned in Table 8-2. EHS Officer will coordinate with the project manager and site representative to monitor environmental parameters during the construction phase. During operation, the proponents will aware proposed building union the follow the waste management.

The proponent will conduct the Environmental Monitoring (Air, Noise (ambient noise and equipment noise) as per frequencies and parameters mentioned in Table 8-3.

C. Training

This is another major step for the implementation of EMP. All the employees will be required to be trained appropriately to work on EMP effectively. Employee training can help workers to minimize waste generation and conserve resources such as water and natural gas etc. The HSE Officer will determine the training requirements in consultation with contractor among the staff of both construction contractor and developer's staff with the advice of Site Manager.

8.12 Change Management

The present EIA has been carried out on the basis of the project information available at this stage. This is, however possible that the changes are made in some components of the project, during the design and construction phases. In order to address the environmental and social implications of these changes, a simple framework has been devised, which is described below:

No modification will be made to the Project without authorization from proponent's top management or. Any modification will be carried out in accordance with the procedures approved by the project proponent.

Proposed modifications must be evaluated for safety, health and environmental impact and a signed document should be available before the change can be implemented. The document should be signed for a second time before the change is made.

8.13 Constructor's Environmental and Social Management Plan

The project proponent will be responsible for preparing Site-Specific Management Plans. These plans will be integrated into the contract documents and utilized as a supervisory tool to ensure compliance. Failure to comply with the requirements will result in corrective actions or penalties imposed on the Contractor. The will include the following plans:

(i) Traffic Management Plan

(ii) Sustainable Water Supply Management and Monitoring Plan (SWSMMP)

(iii) Occupational Health and Safety Management Plan (OHSMP)

(iv) Emergency Response Plans

(v) Waste management plan

Table 8-1: Environmental Management Plan (EMP)

Sr. No.	Anticipated Impacts	Mitigation Measures	Time Frame	Responsibility	
				Implementation	Supervision
Construction Phase					
1.	**Soil Erosion/Dust**	• Excavated soil will be re-used as back filling material in civil work, leveling of uneven areas, and filling of depressions. • Left over surplus soil would be disposed of through waste management contractor as early as possible and unnecessary accumulation and stockpiling at the site would be avoided to reduce the risk of movement of soil with surface runoff during rain and erosion with the wind. • Excavated trenches and ditches would be barricaded with caution tape and necessary safety signs would be posted at prominent locations. Night illumination and warning lights would also be posted. • Soil stockpiles would be regularly wetted to keep airborne dust levels to minimum. • Necessary measures and planning would be done to keep the excavation work to minimum possible duration. • Site workers will be mandated to wear dust masks especially during dry & windy weather conditions. • The proponent will be responsible for taking necessary mitigation measures for reduction of air pollution from dust emissions and safety measure during construction work.	Construction Phase	Project Manager	EHS Officer
2.	**Wastewater Discharges**	• Ground Water from foundation excavation hole would be disposed through third party contractor water Bowser • Sewage water will be drained through temporary piping into the main sewer drain near the construction site. • Any domestic wastewater/sewage if released into the natural drainage system would be processed through a temporary-sedimentation pit and no direct discharge be carried out.	Construction Phase	Project Manager	EHS Officer
3.	**Release of Air Emissions**	• The impact from above mentioned activities will be mitigated by selection of good quality equipment, machinery and vehicles. Smoke releasing machinery and vehicles would not be allowed to be operated on the project by proponent and contractor. • High exhaust pipes would be used in generators and other fixed equipment for better dispersion of air emissions and to prevent high concentrations of pollutants in the immediate vicinity. However, operators and workers working in proximity of heavy machinery, equipment and generators would be required to wear masks. • Emission levels of the generators and other fixed equipment would be monitored regularly and maintenance would be done as per the recommendation of the manufacturer/supplier. • Duration of the work having potential of dust emissions would be minimized by proper project management. • Movement of the vehicle would be planned and allowed on designated routes only. Water sprinkling would be done on vehicles, routes/tracks to control dust emissions from vehicular movement within the project site. • Specific timings would be allocated during normal daytime working hours for movement of heavy construction machinery. Night time movement would be avoided to the possible limits.	Construction Phase	Project Manager	EHS Officer
5.	**Noise**	• The impact from above mentioned activities will be mitigated by selection of good quality of generators and heavy machinery. Noise producing machinery and vehicles would not be allowed to be operated on the project site by the proponent and contractor.	Construction Phase	Project Manager	EHS Officer

Sr. No.	Anticipated Impacts	Mitigation Measures	Time Frame	Responsibility	
				Implementation	Supervision
		• While fixing generators at the work site all possible noise reducing measures would be adopted, including usage of canopy over the generator and noise-dampener pads over the foundation platform. • Noise levels of the generators and other fixed equipment would be monitored regularly and necessary maintenance would be done to control the noise levels. • Operators and workers working in proximity of heavy machinery, equipment and generators would be required to use ear plugs. • Duration of the work having potential of high noise generation would be minimized by proper project management. • Movement of the vehicle would be planned and allowed on designated routes only. Specific timings would be allocated during normal daytime working hours for movement of heavy construction machinery. Night time movement would be avoided to the possible limits.			
6.	**7.4.5 Disposal of Demolition / Construction Debris**	• Effective and instant removal will be ensured for unusable construction material such as broken bricks, damaged pipes, left over steel bars, steel cuttings, and pieces of wood, glass and plastics from the site for recycling. • Waste including concrete debris, stones, excavated rocks, soil, etc. will be not be allowed to accumulate on site and shall be removed intermittently either for using as filling material at other sites or disposal at landfill site. • Possibility of reuse of the waste concrete material and construction waste from demolition works as filling material in paving large concrete floors would be on explored.	Construction Phase	Project Manager	EHS Officer
7.	**Disturbance to the Traffic Flow**	• The proposed Project site is located along Shahrah-e-Pakistan, Karachi. The site is directly accessible through the existing road network, which comprises wide carriageways with adequate traffic-handling capacity. The surrounding road infrastructure is capable of accommodating the additional traffic generated during the construction phase of the proposed Project without causing significant congestion or disruption to existing traffic flow. • The movement of the heavy machinery to and from the project site will be planned in the off-peak hours. • Traffic rules and directions issues by the Government for movement of trucks and construction material vehicles would be complied with. • Movements of the vehicles approaching or leaving the project site would be regulated by dedicated staff to avoid any congestion or disturbance to the normal tariff flow on the main road and other approach roads.	Construction Phase	Project Manager	EHS Officer
9.	**Water Consumption and Demand**	• A complete record of water consumption during the construction and operation phase will be maintained. • Water conservation practices will be adopted to prevent wastage of water. • Water consumption will be monitored regularly. • Water quality will be regularly monitored for ensuring good quality concreting. • Water conservation practices will be adopted during the entire course of construction to keep the water demand as low as possible. • 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.	Construction Phase	Project Manager	EHS Officer

Sr. No.	Anticipated Impacts	Mitigation Measures	Time Frame	Responsibility	
				Implementation	Supervision
10.	**Soil Contamination**	• 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.	Construction Phase	Project Manager	EHS Officer
11.	**Safety of Workers and Public during Construction**	• Necessary awareness will be imparted to workers related to health and safety during construction phase. • Safety signs will be placed at prominent locations at relevant sites. • First aid facilities will be made available for the workers at site. • Necessary Personnel Protective Equipment (PPE) will be provided to the workers engaged in work having potential risk to health and safety. • The proponent would be required to have safety personnel to ensure safe working practices during construction.	Construction Phase	Project Manager	EHS Officer
12.	**Employment and Business Opportunity**	• This has positive impacts on the area and requires no mitigation. • Preference would be given to hire services of trained and awarded labor for skilled and semi-skilled work. • Preference would be given to local market for purchase of material. Preference would be given to local suppliers for procurement of construction material and machinery.	Construction Phase	Project Manager	EHS Officer
1.	**Wastewater Discharge**	• Since the proposed project will be utilized for the residential purpose, therefore, only domestic wastewater will be generated. • Non-potable water sgould be treated through sewerage treatment plant and reused for other purposes. • Proper sewerage system has been designed with adequate slopes and sewer sizes for collection and transportation of wastewater from the proposed building project to the main drain collection line sewerage system. • The sewerage network will comprise uPVC/HDPE pipes, buried underground. No open channel or drain would be designed in the project area for collection of wastewater to avoid chocking of sewage flow due to deposition of debris and solid waste. • All manholes would have covers to prevent entry of solid waste or debris that might cause chocking and disruption of sewage flow. • Exhaust vent will be provided for escape of gases from the sewerage lines as a safety measure to avoid any mishap or incident. • Water conservation strategies will be employed to avoid wastage of water.	Operation Phase	The 7 (Seven) Tower Union	The 7 (Seven) Tower Union

Sr. No.	Anticipated Impacts	Mitigation Measures	Time Frame	Responsibility	
				Implementation	Supervision
2.	**Solid Waste Disposal**	• Separated waste bin for plastic, glass, paper, food waste will be placed, so that on site segregation took place. • The solid waste shall be collected through garbage chute at dedicated site. • Handling & disposal of solid waste shall be managed by a dedicated waste management contractor. • The solid waste management plan developed will be implemented and facilities for collection, storage and transportation will be established and organized.Awareness signs will be places to educate occupants managing their solid waste properly.	Operation Phase	The 7 (Seven) Tower Union	The 7 (Seven) Tower Union
3.	**Utility Services and Consumption of Resource**	• Best quality of electrical cables and gadgets, water supply pipes and control valves will be used in the project which would require less maintenance and prevent leakages of resources.	Operation Phase	The 7 (Seven) Tower Union	The 7 (Seven) Tower Union
4.	**Fire Hazards**	• A dedicated fire tender shall be available at Project Site. • For all engineering designs, NFPA (National Fire Protection Association) codes needs to be followed. • Standard fire and smoke detection and protection devices such as alarms, fire hoses and hydrants to be provided in all critical areas. • A detailed emergency and evacuation plan shall be prepared 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 e.g., floors, anemities, services areas, parking floors etc. • Regular inspection and servicing of the extinguishers will be undertaken by a reputable service provider and record of such inspections should be maintained. • Signs such as “NO SMOKING” will be prominently displayed within the premises, especially in parts where fuel storage is involved. • Fuel will be properly stored in in an isolated and safe area. • Storage area will be accessible only for dedicated guard and building union and secondary containment shall be provided. • Oil absorbent shall be placed at the storage area to avoid and control spillage hazard. • Adequate numbers of fire extinguishers shall be kept in generator, meter station room as well as at security office.	Operation Phase	The 7 (Seven) Tower Union	The 7 (Seven) Tower Union
5.	**In-adequate Parking Floor Exhaust Ventilation**	• Proper local exhaust ventilation will be provided in parking floors. • Adequate exhaust ventilation fans will be installed on the parking floors.	Operation Phase	The 7 (Seven) Tower Union	The 7 (Seven) Tower Union

Table 8-2: Environmental Management Monitoring Plan

Environmental Issue	Monitoring Action	Timing	Monitoring Delivered By	Implemented by	Supervised by
1. Construction Period Impacts					
1.1 Soil Erosion/Dust	i. Site Inspection (Visual) Controls	During excavation activities and usage as filling material.	Copy of top soil protection actions	Project Manager	EHS- Officer
1.2 Discharge of Waste Water	i. Randomly check to ensure compliance.	Throughout the construction period.	Written and dated note indicating compliance or issue and action taken	Project Manager	EHS- Officer
1.3 Releases of Air Emissions from vehicular and machinery exhaust	i. Check maintenance log. ii. Site inspection (visual).	i. During machinery operation, ii. At maintenance location iii. Throughout construction period.	Inspection note to file for use in contractor reporting and in semi-annual audit report.	Project Manager	EHS- Officer
1.4 Noise	i. Using a portable noise meter, monitor checks conditions ii. Check noise level monitoring record iii. Site inspection (visual)	Throughout the construction period	Inspection note with noise readying results	Project Manager	EHS- Officer
1.5 Disposal of demolition and construction waste	i. Monitor to check waste handling and disposal procedure	Throughout the construction period	Note to file, signed and dated	Project Manager	EHS- Officer
1.6 Fuel Storage (Soil or ground water can be polluted by spillage of store fuel).	i. Check fuel storage record ii. Monitor to check fuel handling procedure. iii. Site inspection (visual)	Throughout construction period	Note to file, signed and dated	Project Manager	EHS- Officer
1.7 Disturbance of Traffic Flow	i. Check traffic plan available at site ii. Randomly check vehicle present at site.	Throughout construction period	Inspection note, re-findings signed and dated	Project Manager	EHS- Officer
1.8 Water Consumption	i. Check water consumption record ii. Compare water consumption	Throughout construction period	Inspection note, signed and dated	Project Manager	EHS- Officer
1.9 Safety of workers and public	i. Inspection of construction location to ensure proper use of OHS gear and contractor enforcement	Throughout the construction period	Contractor- Environmental officer	Project Manager	EHS- Officer
2. Operating Period					
2.1 Waste Water Discharge	i. Ensure treated effluent disposed in to municipal drain.	Operation/ usage period	-	Building Union	Building Union
2.2 Disposal of Solid Waste	i. Ensure proper disposal by	Operation/ usage period	-	Building Union	Building Union
2.3 Energy Usage	i. Ensure compliance	Operation/ usage period	-	Building Union	Building Union
2.4 Illumination	i. Check and compare building electric bills	Operation/ usage period	-	Building Union	Building Union
2.5 Fire Hazards	i. Check inspection and refilling record	Operation/ usage period	-	Building Union	Building Union
2.6 In-adequate Parking Floor Exhaust Ventilation	i. Check installed fan of parking floors on monthly basis	Operation/ usage Period		Building Union	Building Union
2.7 Sustainable Plantation	i. Develop trees plantation plan strategy	Throughout trees plantation Plant Strategy Period		Project Manager	-
2.8 Parking Facility	i. Parking facility entrance and exit route shall be regularly monitored	Operation/ Usage Period		Building Union	Building Union

Table 8-3: Environmental Monitoring Plan

GASEOUS AIR EMISSION PLAN					
Phase	Parameters	Source	Frequency	Standards	
Construction	CO, Smoke, Noise	Construction Machinery	Quarterly	SEQS	
WASTEWATER QUALITY SAMPLING PLAN					
Stages	Parameters	Locations	Frequency	Duration	Standards
Construction	BOD, COD, DO, TSS, TDS, pH, Oil & Grease)	Washroom points into drains	Bi-Annually	Grab sampling	SEQS
WATER RESOURCE QUALITY SAMPLING PLAN					
Stages	Parameters	Locations	Frequency	Duration	Standards
Construction	32 Parameters as per SEQS	Surface Water and Groundwater	Quarterly	Grab sampling	SEQS
DRINKING WATER QUALITY SAMPLING PLAN					
Stages	Stages	Stages	Stages	Stages	Stages
Construction	32 Parameters as per SEQS	Drinking Water Source	Monthly	Grab sampling	SEQS
NOISE LEVEL SAMPLING PLAN					
Stages	Parameters	Locations	Frequency	Duration	Standards
Construction	Decibels [dB(A)Scale]	At the interface of project and residential community	Quarterly	Continuous for 8 hours in a full working day	SEQS Noise Guidelines
		7 meters from the equipment at construction site			
SOLID WASTE SAMPLING AND CHARACTERISATION PLAN					
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	Quarterly	-	-

CHAPTER - 9: ESTIMATED ENVIRONMENTAL MANAGEMENT COST

9.1 General

This chapter deals with the costs related to the environmental and resettlement aspects of the project. This also includes the cost of additional works incorporated in the design to minimize the environmental risks. Environmental costs are based on the environmental setting, social aspect, and ecology of the surrounding area required to neutralize the impacts arising from the construction of the project.

Environmental cost comprises three main components, which are:

- Environmental Monitoring Cost during Construction
- Cost of Environment Improvement/Env. Friendly Interventions
- Environmental Management Cost

9.1.1 Construction Phase EMP Implementation Cost

During the construction phase, the environmental monitoring costs are projected to be **Rs. 7,350,000/-**. This includes various monitoring activities such as water quality testing, noise level assessments, emissions monitoring, and ambient air quality evaluations, all conducted by SEPA-approved laboratories. Each activity has defined frequencies and unit rates, contributing to the overall monitoring expenses.

9.1.2 Total Costs for EMP Implementation

The total for all estimated environmental costs, including a **10% contingency charge** of **Rs. 735,000/-** brings the overall projected budget to **Rs. 8,085,000/-**. This comprehensive financial plan underscores the project's commitment to addressing environmental and social concerns throughout its lifecycle.

Details of all these costs with their unit rates are given in Table 9-1.

Table 9-1: Estimated Environmental Cost

Sr. No.	Parameter	Mechanism	Frequency / unit	Unit Rate (PKR)	Quantity	No of samples	Cost (PKRs)	Remarks
A	**ENVIRONMENTAL MONITOIRNG COST DURING CONSTRUCTION PHASE**							
1	Water Resources/ Water Quality	Discrete grab sampling and laboratory testing of water samples by SEPA-approved laboratory for monitoring.	Quarterly (04 times/ year)	35,000	2	8	280,000	One sample from Surface Water and One sample of Groundwater
2	Drinking Water Quality	Discrete grab sampling and laboratory testing of water samples by SEPA approved Laboratory for monitoring.	Monthly	35,000	1	12	420,000	one sample from harbour site and one from Jetty area of three proposed sites
3	Noise Levels	dBA Leq. as per SEQS 2020	Monthly	2,500	3	36	90,000	At Baseline Locations
4	Emission Monitoring	Generators & Construction Machinery Stack+Noise Monitoring	Quarterly (04 times/ year)	8,000	10	40	320,000	for 36 months for 20 no's of machinery
5	Ambient Air Monitoring	Monitoring of CO, CO_2, SOx, NO_x, HC and $PM_{2.5}$ PM_{10} by SEPA approved Laboratory	Quarterly (04 times/year)	45,000	3	12	540,000	At Baseline Locations
						Sub-Total (A):	**1,650,000**	
B	**Environment Improvement/Env. Friendly Interventions**							
6	Susutainable Development Implementation				Lump Sum		3,000,000	For the Construction Phase
7	Personal Protective Equipement				Lump Sum		500,000	
	Fire Fighting Equipement Purchase and Refiling				Lump Sum		500,000	
	Plantation				Lump Sum		100,000	
						Sub-Total (B):	**4,100,000**	
C	**Environmental Management Cost**							
14	Training/Capacity Building				Lump Sum		200,000	For the Construction Phase
15	Reporting etc.				Lump Sum		200,000	
16	Environemntal Manager for one year				Lump Sum		1,200,000	
						Sub-Total (C):	**1,600,000**	
						Grand Total (A+B+C):	**7,350,000**	

Sr. No.	Parameter	Mechanism	Frequency / unit	Unit Rate (PKR)	Quantity	No of samples	Cost (PKRs)	Remarks
		Contingency Charges:	10% of Grand Total	-	-	-	**735,000**	
						Grand Total with Contingencies:	**8,085,000**	

CHAPTER - 10: CONCLUSIONS

10.1 Conclusions

The EIA of the “The (Seven) Towers” Project has been conducted with respect to environmental and social aspects using the environmental assessment guidelines and incorporating all due information and data required evaluating the possible impacts of the proposed project through comparative evaluation and assessment technique. The impacts that are likely to arise during the construction phase of the project are short termed and restricted to the project area which have been controlled and reduced through suggested mitigation measures proposed in the Environmental Management Plan (EMP). The operational phase impacts are of lesser significance and hence may be addressed through continued environmental management and sustained monitoring of the project area. The assessment was carried out keeping in view the Pakistani legislation and SEPA, 2014.

Baseline environmental and socioeconomic information was collected from a variety of sources, including reports of previous studies, published literature, and field surveys. The information collected was used to compose profiles of the natural, socioeconomic, and cultural environments likely to be affected by the project.

The proposed project activities were reviewed, and an assessment made of the potential impact of these activities on the area’s natural, socioeconomic, and cultural environments is also described in this report. Where appropriate, mitigation measures were recommended to keep the adverse environmental impact within acceptable limits.

It is therefore concluded that if the field activities, including the implementation of all mitigation measures, are carried out as described in this report, the anticipated impact of the project on the area’s natural and socioeconomic environment will be well within acceptable limits. The project will also comply with all the statutory requirements and standards listed in this report.

The project proponent shall comply with the findings, conclusions and based on the approval of the environmental assessment of the study, the proposed mitigations as suggested in the form of Environmental Management Plan for ensuring sustainable development in the project area.

The study therefore recommends that the 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.

ANNEXURE I: LAND OWNERSHIP DOCUMENTS

1488

4618

KARACHI DEVELOPMENT AUTHORITY

INDENTURE OF LEASE

BETWEEN

KARACHI DEVELOPMENT AUTHORITY

AND

MASCOT INDUSTRIAL CORPORATION LTD., KARACHI.

in respect of Plot No. LA-4-1 Block 21

Improvement Scheme No. 16. . Karachi

AKHTAR M. AWAN ARCHITECT License No. AL-01

Challan No 33, dt/ 21-6-63 22 JUN 1963 Rs 1935/=



Assistant Superintendent of Stamps
Karachi (Pakistan)

This indenture of Lease made at Karachi this 25th day of June One thousand nine hundred and Sixty three 25-6-(1963) BETWEEN THE KARACHI DEVELOPMENT AUTHORITY, incorporated by PRESIDENT'S ORDER No. 5 of 1957, hereinafter called "THE LESSOR" which expression wherever the context so admits or requires be deemed to include persons deriving title under it) of the one part AND

THE SEAL OF THE SUPERINTENDENT OF REGISTRARS KARACHI.

Mascot Industrial Corporation Ltd., Plot 1/29, Shireen Manzil, Victoria Road, Karachi, through its Director Mr. Saleem Shamsi S/o. S. Z. Shamsi

hereinafter called "THE LESSEE" which expression wherever the context so admits or requires be deemed to include the persons deriving title under ~~him/her~~ them of the other part:

WHEREAS the Lessor in exercise of the powers vested in it under the PRESIDENT'S ORDER No. 5 of 1957, has executed an Improvement Scheme, viz., the Lessor's Improvement Scheme No. 16.

and the Lessor being seized and possessed of all lands included therein free from all encumbrances, lien and attachment, has allotted a plot of land bearing No. 10-4-1 Block 21 in the said Town Expansion Scheme to the Lessee upon his application AND WHEREAS the Lessee has paid the sum of Rs. 62,680/- (Rupees Sixty Two Thousand Six Hundred Only) being the full occupancy value of the plot at the rate of Rs. 4.00 (Rupees Four only) per sq. yd. and in addition has paid a sum of Rs 970 Rupees Nine hundred Seventy Only only being one year's rent in advance for the said plot of land at the rate of One Anna per sq. yd. and is entitled to a Lease of the said plot of land for a term of 99 years. NOW THIS INDENTURE WITNESSETH as follows :—

2

1. In consideration of the rent hereinafter reserved and of the covenants by the Lessee herein contained, the Lessor does hereby lease and demise unto the Lessee ALL THAT Piece or Parcel of land bearing plot No. LA-G-1 Block 21 and measuring 15670 sq. yds. or thereabout as delineated upon the plan hereto annexed and thereon coloured pink, situate at the site of Lessor's Improvement Scheme No 16 for F.B. area in the Registration District, sub-district and City of Karachi and butted and bounded as follows :—

On the North by 200' Road
On the South by Plot number LA/4
On the East by Plot number L/30
On the West by adjoining Point of Plot No. LA/4 and 200' Road.

TO HOLD the said plot unto said Lessee for a term of 99 years commencing from 25th day of June 1963 EXCEPTING AND RESERVING unto the Lessor at all times hereafter the right of passage and running of water and soil, electricity, telephone or any other service or services from the adjoining and neighbouring lands and the buildings now erected thereon through sewers, drains, pipes and channels in or under the land hereby demised and to make connection with such sewer, drains, pipes and channels or any of them for the purpose of exercising the said right of running of water and soil YIELDING AND PAYING therefor during the said term the clear yearly rental of Rs. 980/1960/- (Rupees One thousand nine hundred & Sixty Only eighty) at the rate of... .... One .....anna per sq. yd. per annum, or part thereof payable in advance every year on or before the first day of April.

2. THE LESSEE covenants as follows :—

(1) During the continuance of the term thereby granted to Pay the respective rents and other sums of money herein reserved and made payable at the times and in the manner herein reserved.

(2) The Lessee shall Pay, in addition to the rent hereby reserved to the Lessor, or to any local authority as the Lesser may direct, all taxes, rates, assessments, duties charges and impositions of every description which now are or during the said terms shall be charged, assessed or imposed upon by the Lessor or by any lawful authority in respect of the demised land or any building, erection, structure or any matter or thing thereon.

(3) If the said rent reserved be not paid on the due date, interest at the rate of 6% per annum shall be charged upon the said rent in arrears.

(4) If at any time the said annual rent and interest thereon, if any, or additional rent and/or any other dues remain in arrears for a period of two years or over, the Lessor shall be entitled to forfeit the lease and to resume possession of the plot allotted to the Lessee.

(5) The said plot shall not be sub-divided or amalgamated with any other plot except with the previous consent in writing of the Lessor, and subject to such terms as the Lessor may from time to time impose.

(6) The Lessee shall not without the previous permission of the Lessor obtained in writing, be entitled to any right of access of light or air or any other easement to the building erected or to be erected by the Lessee on the said land hereby demised which would restrict or interfere with the user of any adjoining or neighbouring land or building or any other purpose.

(7) The Lessor shall always have right and be entiled without obtaining any consent from or making any compensation to the Lessee to deal as the Lessor may think fit with any of the land adjoining, opposite or near to the demised plot and to erect or permit to be erected on such land and building whatsoever, notwithstanding that such buildings may affect or diminish light or air which may now or at any time during the term be enjoyed by the demised plot or any part thereof.

(8) He shall construct a building on the demised plot according to the approved plan within two years from the date of possession of the plot. The said plot and the building and structures thereon shall be used for ~~residential/commercial~~ Industrial purposes only, and shall not be diverted to other use without the previous consent in writing of the Lessor. For breach of this covenant the Lessor shall be entitled to forfeit the lease and to resume the plot.

(9) At any time during the said term the Lessee shall not without the previous written consent of the Lessor erect or suffer to be erected any buildings or erections or make or construct permanent roads or ways on the demised land nor without the like consent to make any structural alteration or addition whatsoever to the buildings or erections in existence upon the demised laand. Every erection, alteration, or addition how ever necessitated or made requisite or desirable shall be according to such authoritatively approved plans, sections, elevations and specifications submitted by the Lessee as the Lessor may in writing previously approve of with or without such conditions as it may think necessary or desirable to impose and without such previous approval in writing the Lessee shall not commence any erection, alteration or addition.

(10) The Lessee shall pull down and remove forthwith any building, erection, alteration or addition erected or made in conravention of the provision hereinabove stated and in breach of the Lessee's covenants and shall immediately rectify the consequences of such breach.

(11) The Lessee shall not use the demised plot or any building or structure thereon or suffer the same to be used for any business, manufacture or occupation or for any purpose or in any manner which may beanuisance to the Lessor or the occupier of adjacent or other premises in the neighbourhood.

(12) The Lessee shall not carry on or permit to be carried on upon the demised plot or in any building or structuae thereon any business of a licensed retailer of wines or spirits, restaurant-keeper or caterer. He shall not use any part thereof as office or

business premises, place of amusement, theatre, or cinematograph and shall prevent all bad and doubtful characters being harboured therein and any gambling taking place theron.

(13) The Lessee shall maintain proper and effective arrangements for the disposal of debris and other waste, and shall at his own costs connect the house drainage system of the demised plot to the nearest public sewer.

(14) The demised plot or any building or stuctures thereon shall not be used by the Lessee for the purpose of advertising or for display of any advertisement, poster or notice.

(15) The Lessee shall keep the said plot and the buildings and structures thereon in clean and sanitary condition according to the directions of the Lessor or any Officer duly authorised by in it that behalf.

(16) The Lessee shall permit the Lessor and its contractors, agents, servants, or workmen at all reasonable times to enter upon the said plot and the buildings and structures thereon for the purpose of ascertaining the observance of these covenants or maintaing, testing, or repairing service mains, pipes, cables, drains, sewers or culrverts as may be necessary or as occassion may requirce.

(17) The Lessee shall not use or permit the use of any part of the demised plot or any building or structures thereon for public religious worship.

(18) The Lessee shall instal and maintain in effective use and operation such atrines and septic tanks and adopt such measures against the commission of nuisance as may be necessary to keep the demised plot and the building and structures thereon in a completely sanitary condition.

(19) The Lessee shall not interfere with and shall make all provisions and take all precautions against fouling electric, telephone or telegraph lines, cables, and inclines, drains or sewers or any service line communication which may at any time be upon or running through the demised plot.

(20) The Lessee will be at liberty subject to the above condition to sell transfer or assign his right in respect of the demised premises but such transfer shall in every ease be subject to the conditions of this Lease provided always that the liability of the transferor shall continue until a written notice of the transfer signed by the transferor and transferee shall have been served on the Lessor.

(21) The Lessee shall comply with all the provisions of law and shall observe all the rules and regulations of the Lessor.

(22) To indemnify and keep the Lessor well saved and harmless from and against every claim or demand howsoever arising from any act or default of the Lessee and every suit, action or proceeding in respect of the same and keep the demised land and the buildings and structures thereon free from legal process.

3. The LESSOR hereby convenants with the Lessee that the Lessee paying the rent hereby reserved and observing and performing the several convenants and stipulations herein on his part to be observed and performed may peaceably hold and enjoy the said plot hereby leased during the continuance of the term hereby granted without any interruption or eviction by or on the part of the Lessor or any person or persons rightfully claiming from, under or in trust for the Lessor. Provided that nothing herein contained shall limit or restrict the user of any land or building in the neighbourhood of the demised plot.

4. PROVIDED ALWAYS and its hereby agreed and declared as follows :-

(1) If and whenever the said yearly rents hereby reserved or any part thereof or any other dues payable by the Lessee shall be in arrear for 21 days after the same shall have become due (whether lawfully demanded or not) or whenever the Lessee, shall at any time fail or neglect to perform or observe any of the convenants conditions or agreements herein contained and on his part to be observed and performed then it shall be lawful for the Lessor or any person or persons duly authorised by it in that behalf into or upon the demised land or any part thereof in the name of the whole to re-renter and to take possession of the same and all buildings, erections, building materials and the like thereon and peaceably to hold and enjoy thenceforth without prejudice to any right of action or remedy of the Lessor in respect of any antecedent breach of any convenants by the Lessee hereinbefore contained.

2. If on the expiry of the period of Lease, the Lessee shall be desirous of renewing the lease, he shall be entitled to a renewal of the lease, for such further period and upon such revised terms as the Lessor may determine on condition of his paying, at the time of renewal, such revised rents as may by fixed by the Lessor with a right to a fresh renewal on the expiration of each period of renewal. But should the Lessee not desire such renewal, or not consent to any of the conditions imposed by the Lessor as aforesaid or should the lease be forfeited on account of breach of any of the conditions thereof as above stated, the said plot hereby leased shall revert to the Lessor. and all buildings fixtures, erections and all building materials or the like thereon, shall on such expiration or determination of the Lease become the absolute property of the Lessor, provided that for a period of six months from the date of such reversion the Lessee shall have the right to remove all such buildings, erections, building materials or like as are his property. Any building, erection, building materials or the like not removed within the said period. shall become the absolute property of the Lessor free from all encumbrances and without payment of any compensation whatsoever by the Lessor for or in respect of the same.

(3) Any notice shall be deemed to have been sufficiently served on the Lessee if forwarded to him by registered post addressed to his last known address or if delivered by hand at the demised plot. A notice sent by registered post shall be deemed to have been given at the time when in due course of post it would be delivered at the address to which it is sent.

6

IN WITNESS whereof the parties above named have hereunto set their respective hands and seals at Karachi on the day, month and the year first above mentioned.

Signed, sealed and delivered by the within named KARACHI DEVELOPMEMT AUTHORITY in the presence of:

Land Manager
KARACHI DEVELOPMENT AUTHORITY

Administrative Officer (Lands)
Karachi Development Authority

Assistant Accounts Officer
KARACHI DEVELOPMENT AUTHORITY

The Common Seal of : KARACHI DEVELOPMENT AUTHORITY.

The Seal of the K.D.A. was affixed hereto this 25th day of June 1963

(A. A. JAFRI)
Chief Administrative Officer,
Secretary,
KARACHI DEVELOPMENT AUTHORITY
Karachi Development Authority
LESSOR

Signed and delivered by the within named

MASCOT INDUSTRIAL CORPORATION Ltd.

through its Director
SALEEM SHAMSIE
LESSEE :

In presence of :

K Haroon E.H. Jaffer

(SALEEM SHAMSIE)
LESSEE :
Director

Tanzeem Press, Karachi.

Serial No... 5447.....,
Presented at the office of the
District Registrar of Karachi between
the hours of....1...and...2...a.m/p.m
on the...25.....6.....1963...

Sub-Registrar Karachi.

RECEIVED FEES as follows
Registration fee Rs. 346-00
Copying fee (folios) " 3-00
Postal charges "
Endorsement fee "
Total Rs. 349-00

Sub-Registrar, Karachi.

Mr. Ahmad Hosain s/o Ashraf Ali Muslim 28, Service, V-B-6/11, Paposh Nagar, Karachi, known to the s/s D.R. on behalf of Mr. A. A. Jafari s/o Syed Mohd. Razi Chief Administrative Officer (Lands & Estate) Karachi Development Authority under a General Power of Attorney, authenticated under section 33, Regn Act in the office of the District Registrar, Karachi on 17-5-61.

2. Mr. Saleem Shamsi s/o S. 2. Shamsi Muslim 26 Company Director, 30, 37/39 Noorani Housing Society, Karachi. executing party: the above admit- executin

Shamsi

Abdul Hasan Ext. Jaffri Muslim Merchant, Noorani Housing Society, Karachi to the

States that he personally knows the above executant and identifies.
Date 25/6 1963

Sub-Registrar, Karachi.

AKHTAR NAWAZ
License No AL-01[illegible]
ARCHITECT

K.D.A.

KARACHI DEVELOPMENT AUTHORITY
Lands & Estates Deptt

No. KDA/L.S.-II/39/63/1533. Dated 18-3-63

To

M/s. Mascot Industries Corporation Ltd,
Sehgal Chambers, 28, Victoria Road
Karachi-3.

ALLOTMENT ORDER

Sub: Allotment of land in Light Industrial Area in KDA Scheme No. 16, Federal 'B' Area

Ref: Your application for Industrial plot measuring..3..~~sq yds~~/acres.

.....

The Karachi Development Authority has been pleased to allot to you ~~by ballot~~ plot No. LA-4 in Block No. 21 measuring about 3 ~~sq yds~~/acres in the Light Industrial Area of Scheme No. 16, Federal 'B' Area on enclosed Terms and Conditions.

After the said plot has been measured and the exact area determined, you will be required to pay the Occupancy Value within one month from the date of issue of scuh call for payment.

All payments should be made by Bank Draft/Pay Order or Challan in favour of Karachi Development Authority.

16-3-63

Administrative Officer-II (HIKMAT KHAN)
Lands & Estates Deptt Administrative Officer.

Copy to:

1. A A O (R) Lands & Estates for entry into Revenue Register and acknowledgement.
2. Executive Engineer Scheme No. 16 kindly forward Site Plan showing Area at an early date.

Administrative Officer-II
Lands & Estates Deptt

S/

KARACHI DEVELOPMENT AUTHORITY
LANDS & ESTATES DEPTT.

Regn No. Ind/2095
Block No. 21
Plot No. LA-411
Category Light Ind.

13-4-63
Dated

Scheme No. 16

POSSESSION ORDER

To

M/s. Masqat Industrial Corpn Ltd.
Jaffer Chambers, 28, Victoria Road,
Karachi - 3.

Dear Sir/~~Madam~~

In continuation of allotment Order No. KDA/L-5-II/39/63/1533 dated 18.3.63 the demarcation of the plot allotted to you having been completed, please take over possession within 30 days of this Possession Order. Plesse contact the Executive Engineer E.&.L.C. Divison at his, Field Office situated in Scheme No. 16 between 9-30 a. m. to 12-30 p. m. on Monday or Thursday to take over possession at site.

Formal taking over possession will entitle you to enter upon the land and carry out constructions after previous sanction of the plan, but the land will continue to vest in the Karachi Development Authority and you cannot encumber the land in any manner till such time as the lease is executed, or an agreement to lease has been executed.

The balance of Occupancy Value amounting to Rs. 31,340/- will be payable in 2 equal yearly instalments at the interval of 12 months.

A 99 years Lease will be granted to you on payment of full Occupancy Value. The Lease will be executed at your cost.

A copy of the Site Plan is enclosed.

All payments will be made by Bank Draft/Pay Order in favour of Karachi Development Authority, Karachi.

In your own interest you should take over possession within the period specified above, Please note that in any case the period of recovery of next instalment will run from the date of the expiry of 30 days notice. The Ground rent @-1/- per sq. yd. will be payable in advance on the date notice expires, failing which interest @ 6% per annum will be charged on outstanding dues.

Yours faithfully,

AKHTAR NAWAZ ARCHITECT License No AL-01[illegible]

(Hikmatullah Khan)
Administrative Officer-II
Lands & Estates Deptt.

Copy to:

1. The Executive Engineer Scheme No. 16.
2. The Architect, with a copy of the Site Plan.
   The Building Plan will be sanctioned after the same has been cleared by Lands & Estates Deptt.

Karachi Development Authority
Director Land Management
3rd Floor Civic Center Gulshan-e-Iqbal Karachi…

No. KDA/DLM/AD.BP/2023/353/L Dated: 28-4-/2023.

Doc Info

To,
Deputy Director,
Single Window Facility,
SBCA.

Subject: **Verification of Title Documents and Status of Land Forwarded for approval of building Plans in respect of plot no. La-4/1 / measuring area 15670 sq yards Gulberg, Karachi.**

This is to inform you that as per this office record

Plot No:	La-4/1
Area of plot: (Sq. Yards)	15670
Status of Plot:	VACANT
Department / Lessor:	KDA Authority
Building Type:	Commercial
Plot Address:	LA-4/1, Block-21, Scheme-16, Federal B Area, Karachi.
Stands lease / mutation in the name of	M/s Mascot Industrial Corporation (pvt) Ltd, Through Its Director Ashraf Ali Sayeed
s/o w/o s/o h/o	Yousuf Ali Sayeed

who has paid upto date dues of plot in question, thus nothing of outstanding against the said property and the subject plot is exist in the layout plan / revised layout plan issued vide layout Letter No: _____ Dated: From: _____

Remarks : _____

E-Forwarding : FOR-252735929

28/04/2023

Signature with stamp of Designated Person

Assistant Director B.P (KDA)

KARACHI DEVELOPMENT AUTHORITY

ENGINEERING WING

SITE PLAN FOR PLOT NO. LA/4/1 BLOCK NO. 21 SEC. NO. Sch-16

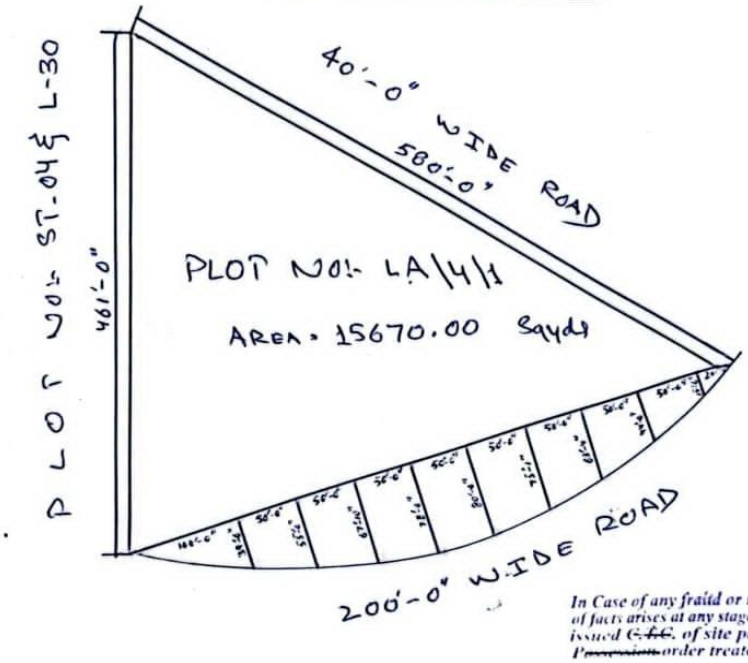
TYPE "LA" FOR ~~RESIDENTIAL~~ ~~COM/INDUSTRIAL~~ 15670.00 SQ. YDS F.B. AREA

(1) Roff Letter No:- KDA/LM/AD(LUB)2021/268, Dated:- 21-05-2021,
(2) Roff Letter No:- KDA/LM/AD(LUB)2021/314, Dated:- 01-6-2021,
(3) Asst Dir(Com) Letter No:- SMPA/Com/2021/80/L, Dated:- 30-6-2021,
(4) LAN Officer Roff No:- KDA/LO/Lan/2021/725/L, Dated:- 28-6-2021,
(5) Honorable High Court-CP.No:- D-1014 of 2021,
(6) As per Directive & Competent Authority vide Roff No:- PA/Secy/KDA/2022/154/, Dated:-09-3-2022,

DIRECTION

N

COMMERCIALIATION



In Case of any fraud or mis concealment of facts arises at any stage for this plot this issued C.F.C. of site plan and ~~Tehmil Parwanna~~ order treated as cancelled.

AREA IN SQ. YDS. 15670.00 RATE ..... Per SQ. YD. SCALE –
Total Value Rs.....

DEMARCATED BY .....
DRAWN BY .....
CHECKED BY.....

Plot No: ~~49~~ LA/4/1. Block 21. Scheme No: 16
This Site Plan is Valid Only Subject to Verification from the Office of E.D.O. (MPGO)

ASSTT. ENGINEER
ASSISTANT EXECUTIVE ENGINEER
North Karachi Division-I
Karachi Development Authority

EXECUTIVE ENGINEER
EXECUTIVE ENGINEER
North Karachi Division
Karachi Development Authority

CS Scanned with CamScanner



MEMORANDUM EVIDENCING CHANGE OF COMMERCIALIZATION ~~RECTIFICATION~~ IN PREVIOUSLY REGISTERED DOCUMENT IN RESPECT OF LEASE HOLD PLOT OF LAND BEARING NO, LA-4/1 BLOCK 21, MEASURING 15670 SQ. YDS SITUATED AT K.D.A SCHEME 16, F.B. AREA KARACHI.

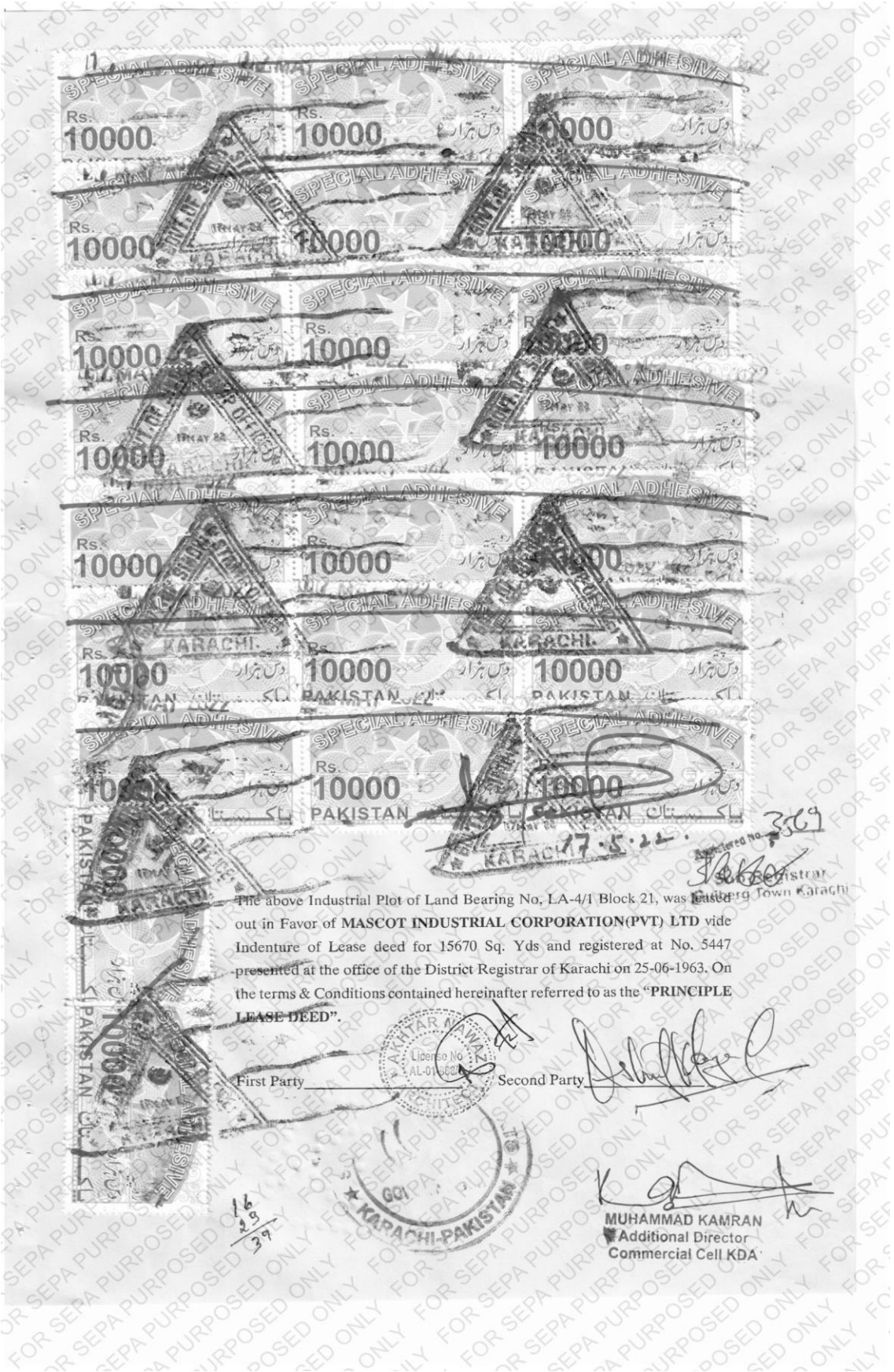
This Deed of Memorandum is Made in Karachi _____ day of _____ 2022

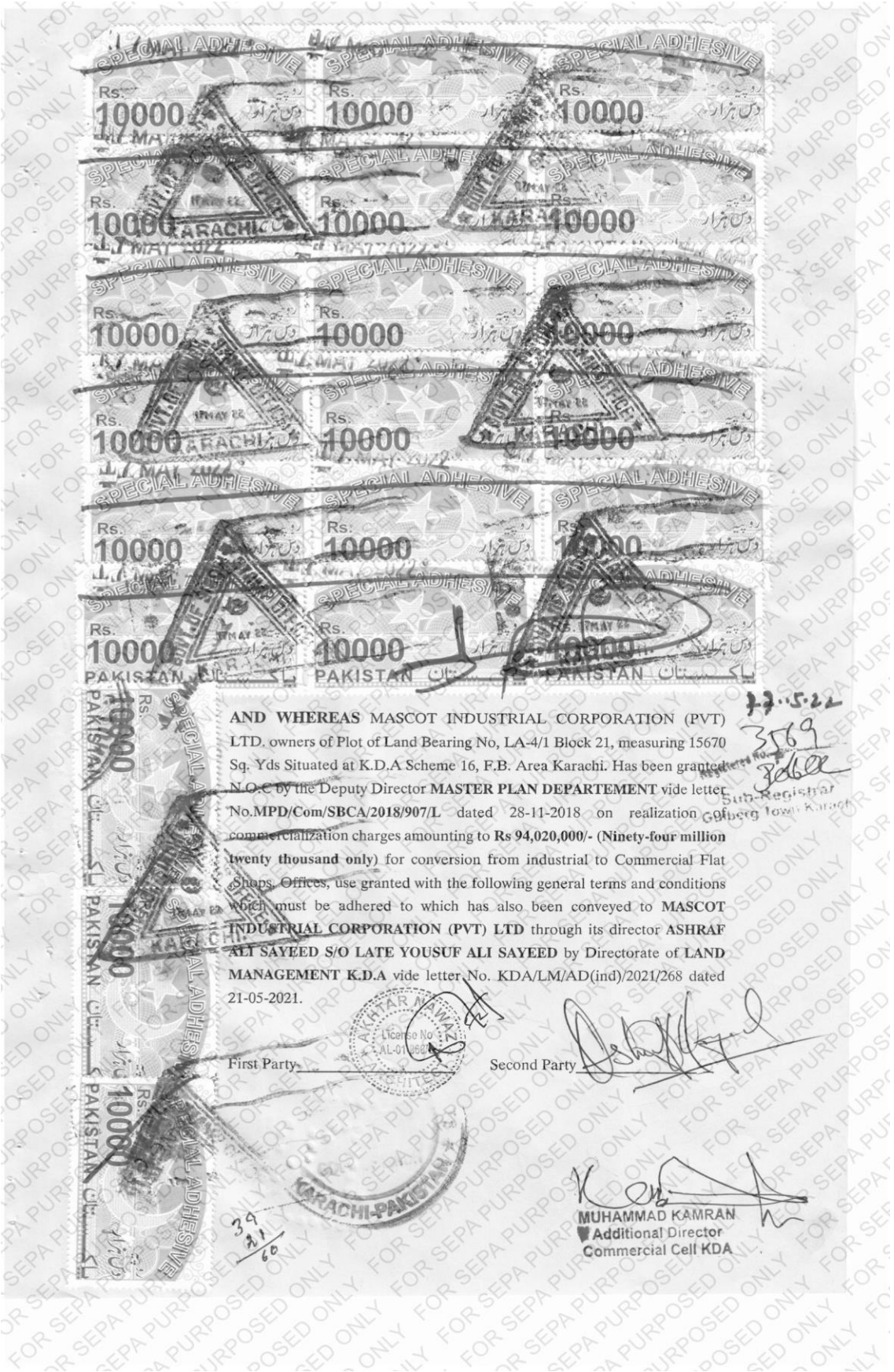
KARACHI DEVELOPMENT AUTHORITY (K.D.A) incorporated by PRESIDENT'S ORDER No.5 of 1957, hereinafter called the **FIRST PARTY/LESSOR** (which expression wherever context so admit or require be deemed to include persons derive title under it, & successor in office and assigns) of the **ONE PART.**

AND

MASCOT INDUSTRIAL CORPORATION (PVT) LTD through its director **ASHRAF ALI SAYEED S/O LATE YOUSUF ALI SAYEED** Muslim, Adult holding CNIC No. 42101-5685119-3 resident of 41-B Circular Street Phase-2 DHA Karachi. Having been acquired by way of Registered Lease Deed for a Period of 99 years in respect of Industrial Plot of Land Bearing No, LA-4/1 Block 21, measuring 15670 Sq. Yds Situated at K.D.A Scheme 16, F.B. Area Karachi. Hereinafter called the **SECOND PARTY / LESSESES** (WHICH EXPRESSION wherever the context so admits or require be deemed to mean and include his/her/their heirs, administrators, and assigns of the **OTHER PART:**

First Party _____ Second Party _____

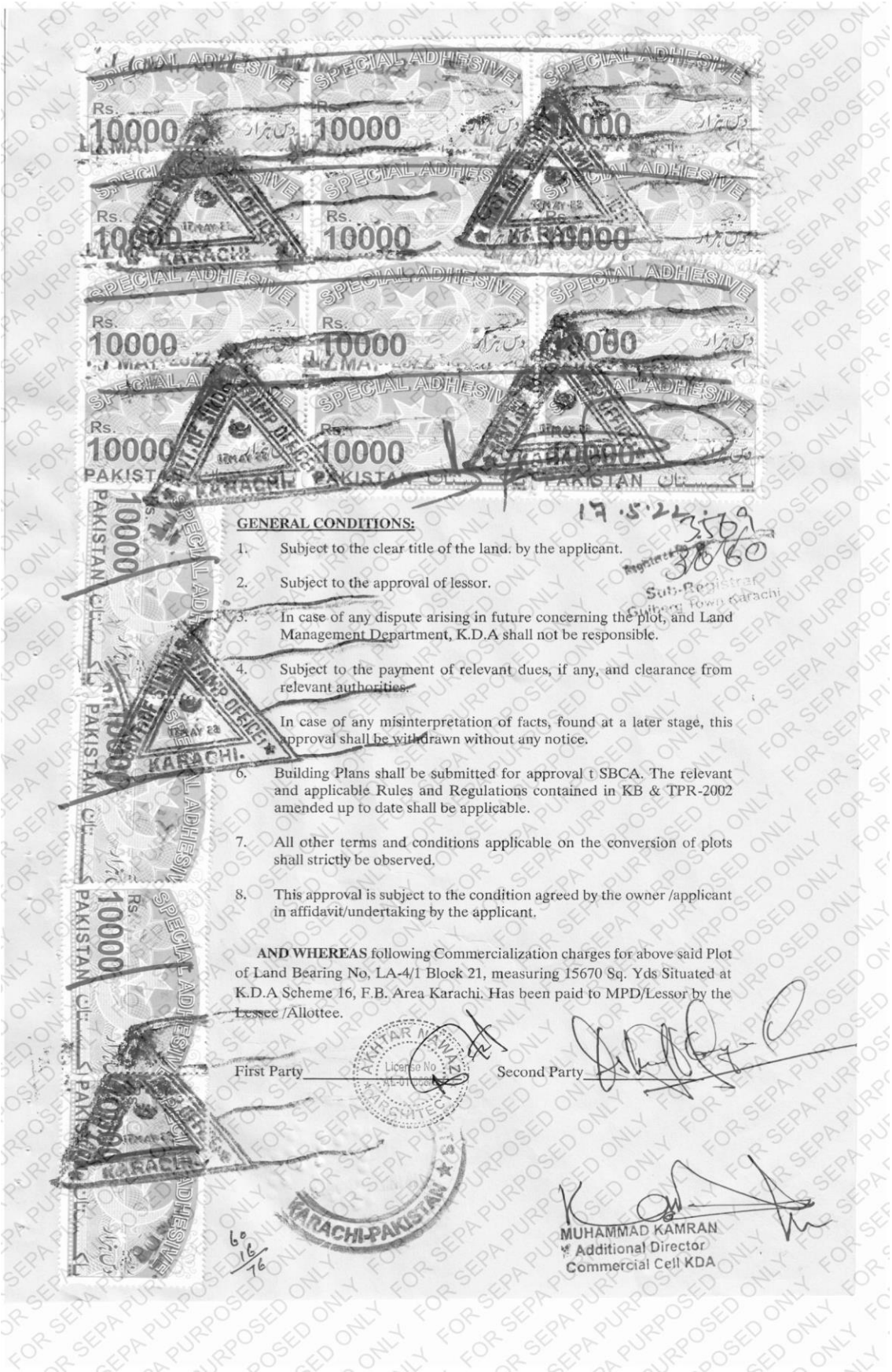

SPECIAL ADHESIVE
Rs. 10000
KARACHI
PAKISTAN
File above Industrial Plot of Land Bearing No. LA-4/1 Block 21, was leased out in Favor of MASCOT INDUSTRIAL CORPORATION(PVT) LTD vide Indenture of Lease deed for 15670 Sq. Yds and registered at No. 5447 presented at the office of the District Registrar of Karachi on 25-06-1963. On the terms & Conditions contained hereinafter referred to as the "PRINCIPLE LEASE DEED".
First Party
Second Party
AKHTAR NAWAZ
License No
KARACHI-PAKISTAN
MUHAMMAD KAMRAN
Additional Director
Commercial Cell KDA



AND WHEREAS MASCOT INDUSTRIAL CORPORATION (PVT) LTD. owners of Plot of Land Bearing No, LA-4/1 Block 21, measuring 15670 Sq. Yds Situated at K.D.A Scheme 16, F.B. Area Karachi. Has been granted N.O.C by the Deputy Director **MASTER PLAN DEPARTEMENT** vide letter No.**MPD/Com/SBCA/2018/907/L** dated 28-11-2018 on realization of commercialization charges amounting to **Rs 94,020,000/- (Ninety-four million twenty thousand only)** for conversion from industrial to Commercial Flat Shops, Offices, use granted with the following general terms and conditions which must be adhered to which has also been conveyed to **MASCOT INDUSTRIAL CORPORATION (PVT) LTD** through its director **ASHRAF ALI SAYEED S/O LATE YOUSUF ALI SAYEED** by Directorate of **LAND MANAGEMENT K.D.A** vide letter No. KDA/LM/AD(ind)/2021/268 dated 21-05-2021.

First Party _____ Second Party _____

MUHAMMAD KAMRAN
Additional Director
Commercial Cell KDA



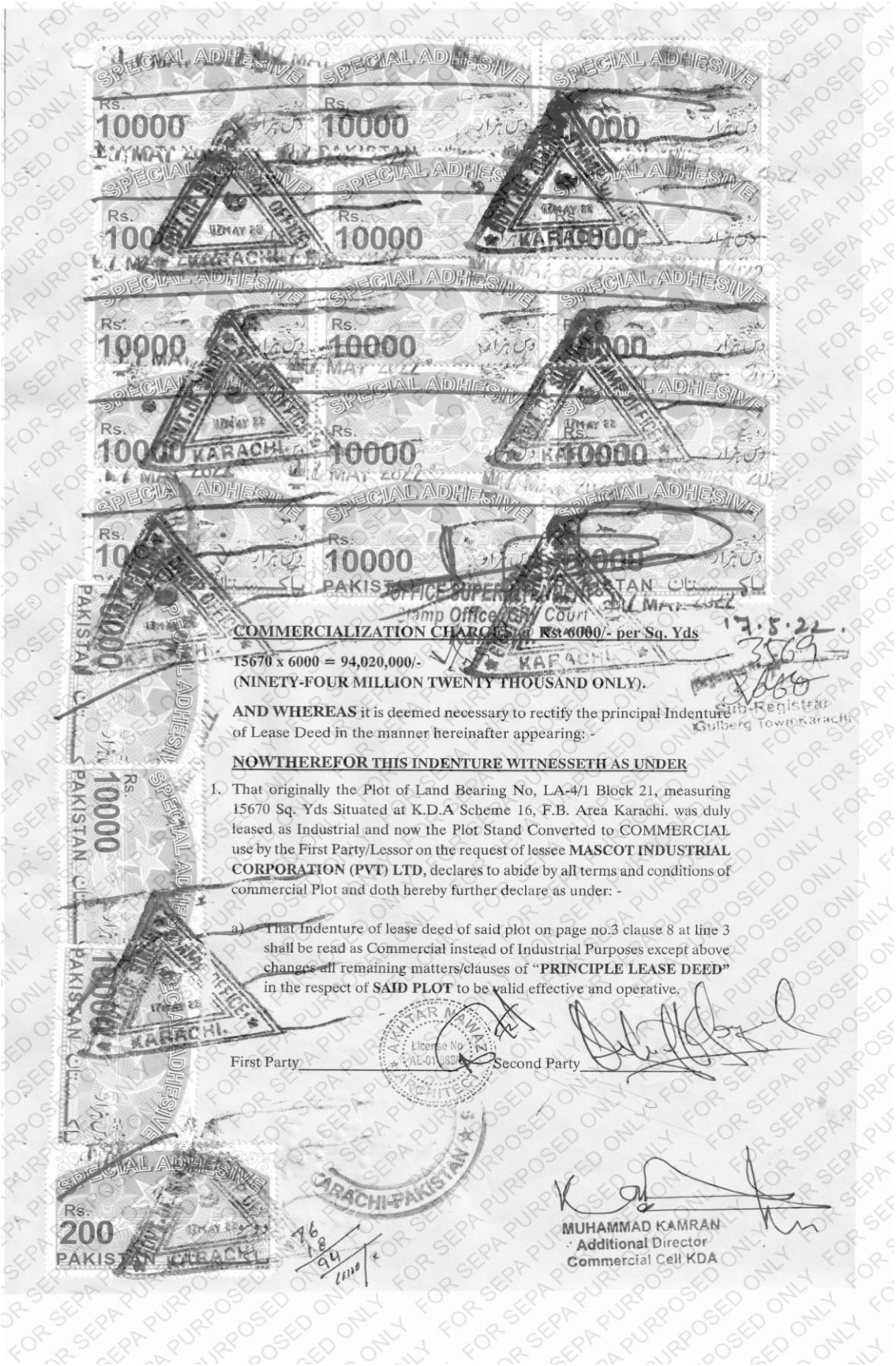
GENERAL CONDITIONS:

1. Subject to the clear title of the land. by the applicant.
2. Subject to the approval of lessor.
3. In case of any dispute arising in future concerning the plot, and Land Management Department, K.D.A shall not be responsible.
4. Subject to the payment of relevant dues, if any, and clearance from relevant authorities.
5. In case of any misinterpretation of facts, found at a later stage, this approval shall be withdrawn without any notice.
6. Building Plans shall be submitted for approval t SBCA. The relevant and applicable Rules and Regulations contained in KB & TPR-2002 amended up to date shall be applicable.
7. All other terms and conditions applicable on the conversion of plots shall strictly be observed.
8. This approval is subject to the condition agreed by the owner /applicant in affidavit/undertaking by the applicant.

AND WHEREAS following Commercialization charges for above said Plot of Land Bearing No, LA-4/1 Block 21, measuring 15670 Sq. Yds Situated at K.D.A Scheme 16, F.B. Area Karachi. Has been paid to MPD/Lessor by the Lessee /Allottee.

First Party _____ Second Party _____

MUHAMMAD KAMRAN
Additional Director
Commercial Cell KDA



COMMERCIALIZATION CHARGES @ Rs.6000/- per Sq. Yds

15670 x 6000 = 94,020,000/-
(NINETY-FOUR MILLION TWENTY THOUSAND ONLY).

AND WHEREAS it is deemed necessary to rectify the principal Indenture of Lease Deed in the manner hereinafter appearing: -

NOWTHEREFOR THIS INDENTURE WITNESSETH AS UNDER

1. That originally the Plot of Land Bearing No, LA-4/1 Block 21, measuring 15670 Sq. Yds Situated at K.D.A Scheme 16, F.B. Area Karachi. was duly leased as Industrial and now the Plot Stand Converted to COMMERCIAL use by the First Party/Lessor on the request of lessee **MASCOT INDUSTRIAL CORPORATION (PVT) LTD**, declares to abide by all terms and conditions of commercial Plot and doth hereby further declare as under: -

a) That Indenture of lease deed of said plot on page no.3 clause 8 at line 3 shall be read as Commercial instead of Industrial Purposes except above changes all remaining matters/clauses of "**PRINCIPLE LEASE DEED**" in the respect of **SAID PLOT** to be valid effective and operative.

First Party _____ Second Party _____

MUHAMMAD KAMRAN
Additional Director
Commercial Cell KDA

SCHEDULE OF PROPERTY

WHEREAS the said commercial plot Land Bearing No, LA-4/1 Block 21, measuring 15670 Sq. Yds Situated at K.D.A Scheme 16, F.B. Area Karachi.in Territorial Jurisdiction of F.B industrial area Police Station Karachi within the Territorial Jurisdiction and registration of district Central (Gulberg Town) Karachi.

ON THE NORTH BY 200 FT WIDE ROAD
ON THE SOUTH BY 40 FT WIDE ROAD
ON THE EAST BY PLOT NO L/30
ON THE WEST BY 200 FT WIDE ROAD

IN WITNESSES where of the Parties here to have set and subscribed their respective hands at KDA Karachi on this day month and year above mentioned.

Payment received in KDA Cash
Plot / Qtr No. LA(4/1)
Block / Sector 21
Scheme No. 16 Township
Ground Rent paid upto
Receipt No 22358 Dated 9.6.2022
Lease Register Sr. No. 4237/L P. No. 57

Signed, Sealed & delivered by the within named K.D.A. In the presence of Sd/- vide

Assistant Director Rev. Deptt. K.D.A

The Common Seal of Karachi Development Authority

(Checked by) Signature

Name: Nadeem Ahmed

Sup.dt/Dealing Clerk

Signed & delivered by the within named

The Seal of the K.D.A) was affixed hereon this ____ day of _____ 2022

LESSEE
MASCOT INDUSTRIAL CORPORATION (PVT) LTD
through its Director
ASHRAF ALI SAYEED S/O LATE YOUSUF ALI SAYEED

MUHAMMAD KAMRAN
Additional Director
Asst.ADDL. DIRECTOR (COM-CELL)
(Director Estate & Land Management)
K.D.A.
LESSOR/FIRST PARTY

Sub-Registrar
Gulberg Town Karachi

WITNESSES

1. Name Muhammad Jawed S/o Abdul Razzaq
CNIC 42101-0954832-7

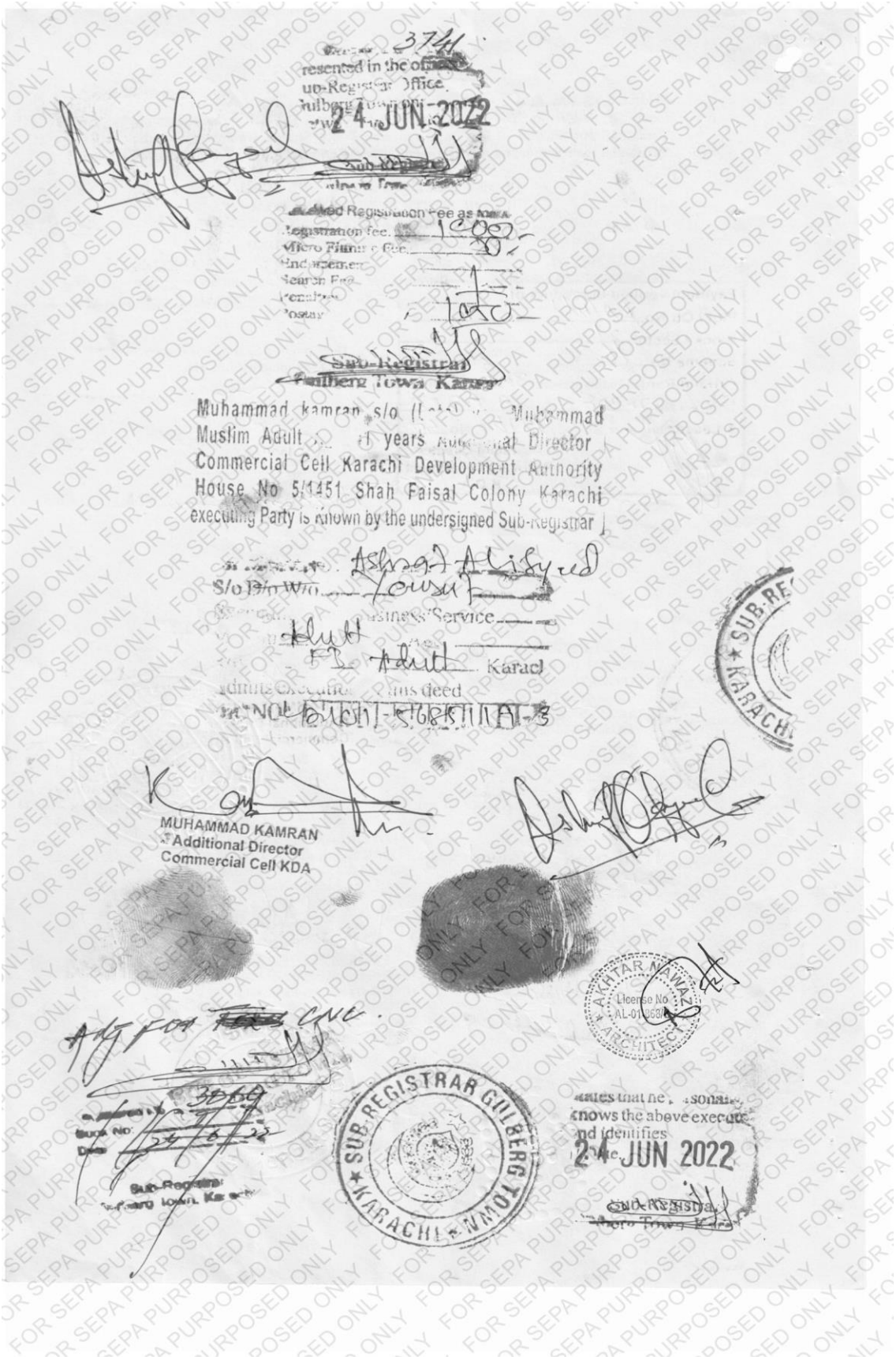
2. Name Iqbal Hussain
CNIC 42301-0849373-9

PLOT OF LAND BEARING NO, LA-4/1
BLOCK 21, MEASURING 15670 SQ. YDS
SITUATED AT K.D.A SCHEME 16, F.B.
AREA KARACHI.

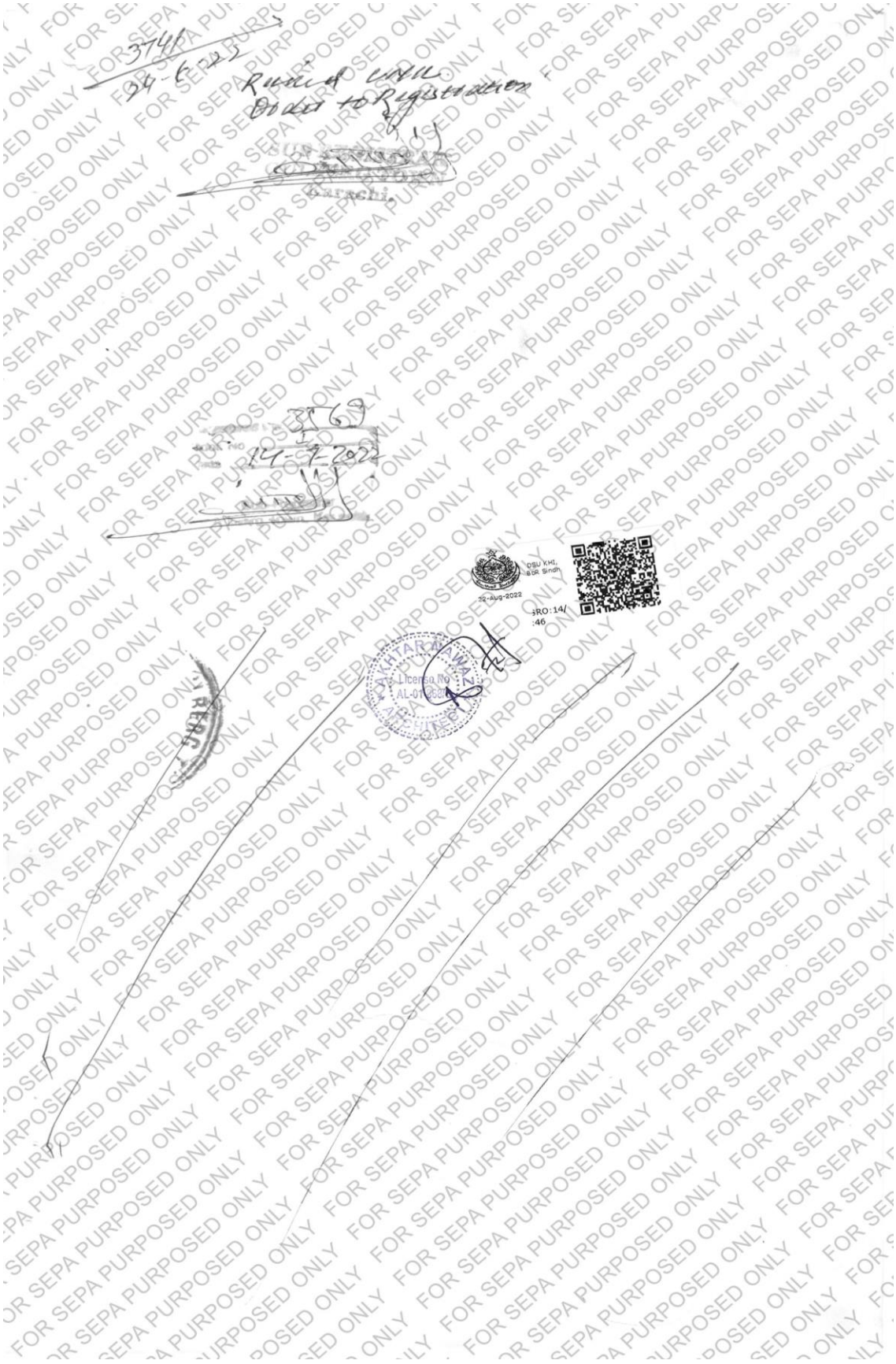
LESSEE/SECOND PARTY
MASCOT INDUSTRIAL CORPORATION (PVT) LTD through its Director ASHRAF ALI SAYEED S/O LATE YOUSUF ALI SAYEED CNIC No. 42101-5685119-3

AKHTAR NAWAZ License No. AL-01168 ARCHITECT

KARACHI-PAKISTAN


24 JUN 2022
Sub-Registrar
Gulberg Town Karachi
Muhammad kamran s/o Muhammad
Muslim Adult years Additional Director
Commercial Cell Karachi Development Authority
House No 5/1451 Shah Faisal Colony Karachi
executing Party is known by the undersigned Sub-Registrar
Business Service
Karachi
MUHAMMAD KAMRAN
Additional Director
Commercial Cell KDA
SUB-REGISTRAR GULBERG TOWN KARACHI
24 JUN 2022
Sub-Registrar


PAKISTAN National Identity Card
Name
Ashraf Ali Sayeed
Father Name
Yousuf Ali Sayeed
Gender
M
Country of Stay
Pakistan
Identity Number
42201-5685119-3
Date of Birth
15.07.1947
Date of Issue
29.06.2017
Date of Expiry
Lifetime
Holder's Signature
گمشدہ کارڈ ملنے پر قریبی لیٹر بکس میں ڈال دیں
PAKISTAN National Identity Card
Name
Iqbal Hussain
Father Name
Khair Din
Gender
M
Country of Stay
Pakistan
Identity Number
42301-0849523-9
Date of Birth
05.03.1957
Date of Issue
05.04.2017
Date of Expiry
Lifetime
Holder's Signature
گمشدہ کارڈ ملنے پر قریبی لیٹر بکس میں ڈال دیں
PAKISTAN National Identity Card
Name
Muhammad Jawed
Father Name
Abdul Aziz
Gender
M
Country of Stay
Pakistan
Identity Number
42101-0954832-7
Date of Birth
25.08.1972
Date of Issue
08.10.2020
Date of Expiry
08.10.2030
Holder's Signature
گمشدہ کارڈ ملنے پر قریبی لیٹر بکس میں ڈال دیں


Received with
Docs for Registration
Karachi
14-9-2022
DSU KHI, SBR Sindh
22-Aug-2022
SRO: 14/
:46
KHAWAJA
License No
AL-01
ARCHITECTS

ANNEXURE II: SCHEDULE OF AREA AND LAYOUT PLANS

ANNEXURE III: NOCS FROM SINDH BUILDING CONTROL AUTHORITY (SCBA)



Book No.B 17639 Serial No.B 1763840

MEMBERSHIP CERTIFICATE

abad
Association of Builders And Developers of Pakistan
Since 1972

Name & address of ~~Chamber~~ Association Association of Builders and Developers
ABAD House, ST-1/D, Block-16, Gulistan-e-Jauhar, Karachi

(Affiliated with the Federation of Pakistan Chambers of Commerce & Industry)

CERTIFIED that N.S.A. Builders & Developers (A.M.2920)
(name and address of Member Firm / Company)
Mezzanine Floor, Plot No.LA-1/A-1, Block -21 FB Area Karachi.

G.S.T. No. N/A N.T.N. No. E742770

is a member of this ~~Chamber~~ Association Association

THIS CERTIFICATE shall be valid upto the 31-12-2025 (date) unless otherwise notified to the NTN / GST Registration authority / Scheduled Bank concerned.

Receipt No. 22628

Given on this 15th day of Feb 20 25

Signature of Secretary General

Ahmed Owais Thanvi, Chairman-SR

Countersigned by
(name and designation)

SINDH BUILDING CONTROL AUTHORITY
ONE WINDOW CELL

File No: FB/PC-2/OWC/Arch:&Planning/2023/2024/31 Dated: 12/03/2024

(ARCHITECTURAL CONCEPT PLAN)
(NOT VALID FOR CONSTRUCTION)

M/S. Mascot Industrial Corporation Through Director
Ashraf Ali Sayeed (Owner/Attorney)
CNIC : 42201-5685119-3,
Address: House No, 160-C, Block-3, PECHS
Kashmir Road Karachi.

Area of plot: 15670.00 sq.yds
Gross covered area:2400407.01Sq.fts
Net area after exemptions:1146140.26Sq.fts
Category: Commercial

Professional Team:-
1. Lic. Arch: Akhtar Nawaz (AL-01-868)
2. Lic. Engr. Arif Kasam (SE-06-96)

Subject: - **ACCEPTANCE OF ARCHITECTURAL CONCEPT PLAN IN RESPECT OF PROPOSED BUILDING PLAN ON PLOT NO. LA-4/1, BLOCK-21, F.B.AREA, SCHEME-16, KARACHI.**

Reference:- REV-20230526-7, dated: 05-06-2023

The Competent Authority has been pleased to accept the Architectural Concept Plan (Not Valid for Construction) at converted commercial plot admeasuring of 15670.00 Sq.yds for Basement-2 (Parking + Services) + Basement-1 (ARS + Parking + Services) + Ground Floor (Shops + Recreation Area + Services) + 1st to 5th Floors (Parking + Services) + 6th to 19th Floors (Flats) + 20th Floor (Recreation Area + Services) + 21th to 35th Floors (Flats) + Roof (Solar Panel + Battery Room + Services) only on the basis of Circular issued by DG SBCA vide no. SBCA/PS-CE/2022/44, Dated:14-06-2022 & vide Circulation No. SBCA/ PS-CE/2024/07, Dated:24-01-2024 and relevant title documents and NOC's with the following conditions: -

1. This approval is granted on the basis of title verification in response to the letter No. SBCA/Title Verification Cell/AD/Arch:&Planning/2023/21, dated:24-05-2023, by the Assistant Director, OWC/Architectural & Planning Section, SBCA. Reply has been received through portal vide letter No.KDA/DLM/ADBP/2023/371/L, dated: 05.5.2023, from the Assistant Director (B.P) Land Management, KDA.
2. This approval is granted on the basis of change of land use /commercialization issued by Sindh Master Plan Authority (Defunt MPD) Vide No. MPD/COM/SBCA/ 2018/907/L, dated:28-11-2018, and reviewed by SMPA through portal vide letter No. MPD/COM/SMPA/2023/3251/L, dated: 27-11-2023.
3. In case of any complaint / dispute of any court matter the SBCA shall not be the party and shall not be the responsible.
4. 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 construction permit/ Final Approval.
5. NOC / Clearance from Structure Section of SBCA to obtained before Final Construction permits.
6. In case of any compliant / evidence regarding Sale / Booking of units without Sale NOC, this Architectural Concept Plan will be withdrawn and Builder License shall be cancelled by the Authority.
7. In case of any misrepresentation / concealment of facts or construction started without getting construction permit under Section 6 (1) of SBCO 1979, this approval will be withdrawn / cancelled without any notice.
8. The owner is required to produce NOC for Height Clearance, Demolition permission, Valid Builder's License, ABAD Membership, NTN Certificate, Agreements with Architect, Structure Engr., SITE Engineer Registered in PEC & Site Report / Clearance From Concerned Town before construction permit/ Final Approval or within 90 days from date of issuance of this letter.

Continued on Page/2

9. Owner/builder/Lic. Architect will produce all required NOCs and documents before final construction permit or within 90 days from issuance of this Architect Concept Plan otherwise said plan will be cancelled/Expired automatically without any notice.
10. 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.

12/03/2024

Deputy Director
One window Cell / Architectural & Planning
Head Quarters, SBCA

12/03/24

Copy for information to: -

1. Director, (District Central), SBCA.
2. Director, Structure Section, SBCA.
3. Director, IT, SBCA.
4. Chairman, ABAD.
5. Secretary to DG, SBCA.

Sindh Building Control Authority

Civic Centre, Annexe University Road,
Gulshan-e-Iqbal, Karachi-5(Pakistan)
Phones: Tel: 021-9923029
Fax: 021-99230326
www.sbca.gos.pk

PROVISIONAL BUILDER LICENSE
(NO.BL-4165)

"M/S. N.S.A. BUILDERS & DEVELOPERS"
is hereby licensed under the Sindh Building Control Ordinance-1979, as amended up to date, and as per KB & TP Regulation-2002, amended upto to date, for the purposes of above ordinance & regulations framed there under, to act as a licensed;

"BUILDER"

The license is being issued provisionally subject to the terms & conditions annexed here to and confirmation by the Licensing Committee, in its next meeting.

21/5/2024

MUJAHID ABBAS
Director
Licensing & Record Section, S.B.C.A.

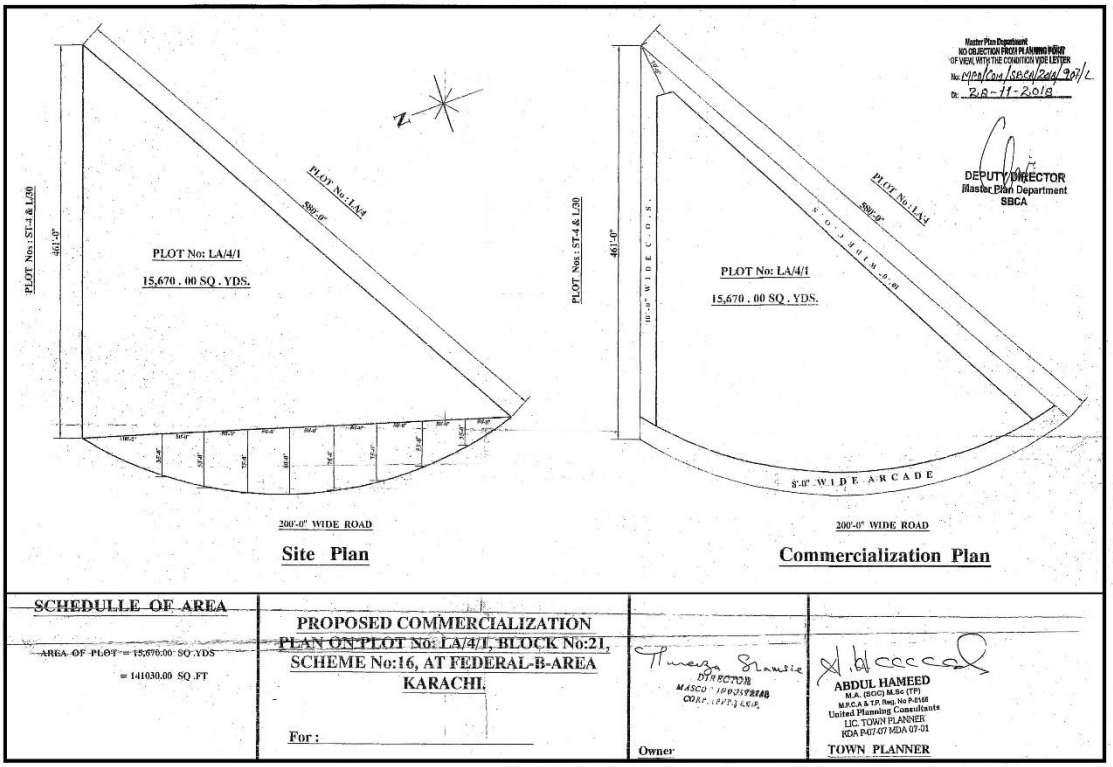
21/05/24

21/5/24

No.SBCA/Dir.(Lic. Rec.)/2024/ 283 *Dated:* 21/05 */2024.*

Proprietor :

- Ashraf Ali Sayeed, CNIC # 42201-5685119-3


PLOT No: ST-4 & L/20
46'-0"
PLOT No: LA/4/1
15,670 . 00 SQ . YDS.
PLOT No: LA/4
500'-0"
200'-0" WIDE ROAD
Site Plan
PLOT No: ST-4 & L/20
46'-0"
PLOT No: LA/4/1
15,670 . 00 SQ . YDS.
PLOT No: LA/4
500'-0"
8'-0" WIDE ARCADE
200'-0" WIDE ROAD
Commercialization Plan
DEPUTY DIRECTOR
Master Plan Department
SBCA
SCHEDULLE OF AREA
AREA OF PLOT = 15,670.00 SQ.YDS
= 141030.00 SQ.FT
PROPOSED COMMERCIALIZATION
PLAN ON PLOT No: LA/4/1, BLOCK No:21,
SCHEME No:16, AT FEDERAL-B-AREA
KARACHI.
For :
Owner
ABDUL HAMEED
M.A. (SOC) M.Sc (TP)
M.P.C.A & T.P. Reg. No P-5168
United Planning Consultants
LIC. TOWN PLANNER
KDA P-07-07 MDA 07-01
TOWN PLANNER

MASTER PLAN DEPARTMENT
SINDH BUILDING CONTROL AUTHORITY
9TH FLOOR, CIVIC CENTRE, GULSHAN-E-IQBAL. TEL: 99231159

No: MPD/Com/SBCA/2018/907/C Dated: 28-11-2018

The Director, Land
Karachi Development Authority
Karachi.

SUBJECT: N.O.C. FOR CONVERSION OF LAND USE OF PLOT NO. LA-4/1, BLOCK-21, MEASURING 15670 SQ.YDS F.B. AREA, KARACHI FROM INDUSTRIAL TO COMMERCIAL.

Reference: 1. Application No. 0598, dated 31-08-2006.
2. CDGK/KDA Wing/2008/220, dated 09-05-2008.

In compliance of Order of Hon'ble High Court of Sindh in C.P. No.D-6319 Of 2018 as well as with reference to above cited application on the subject, I am directed to inform that Competent Authority has allowed the conversion of Plot No. LA-4/1, Block-21, F.B. Area, Karachi from Industrial to Commercial. However, on the acceptance of offer letter & realization of conversion charges, NOC for conversion from Industrial to Commercial (Offices/Shops/Flats) use is hereby granted with the following terms and conditions which must be strictly adhered to:

1. Subject to the clear title of land.
2. Subject to the approval of lessor.
3. In case of any dispute arising in future concerning the plot, MPD shall not be responsible.
4. Subject to the payment of relevant dues, if any, and clearance from the relevant authorities.
5. In case of any misrepresentation of facts, found at a later stage, this approval shall be withdrawn without any notice
6. Building Plans shall be submitted for approval to SBCA. The relevant and applicable Rules and Regulations contained in KB&TPR-2002 amended upto date shall be applicable.
7. All other terms and conditions applicable on the conversion of plots shall strictly be observed.
8. This approval is subject to the condition agreed by the owner / applicant in affidavit / undertaking submitted by the applicant.

One copy of commercialization plan duly signed and stamped is enclosed.

Dy. Director
MPD

Copy to:
1. Director General, SBCA, please.
2. Senior Director Master Plan, SBCA, please.
3. Dy. Director –(PC) MPD
4. The owner.

SINDH BUILDING CONTROL AUTHORITY
ONE WINDOW CELL

No. FB/PC-2/OWC/Arch:&Planning/Construction Permit/2023/2024/ 08 Dated: 13/05/2024

M/S. Mascot Industrial Corporation Through Director
Ashraf Ali Sayeed (Owner/Attorney)
CNIC : 42201-5685119-3,
Address: House No, 160-C, Block-3, PECHS
Kashmir Road Karachi.

Area of plot: 15670.00 sq.yds
Gross covered area:2400407.01Sq.fts
Net area after exemptions:1146140.26Sq.fts
Category: Commercial

Professional Team:-
1. Lic. Arch: Akhtar Nawaz (AL-01-868)
2. Lic. Engr. Arif Kasam (SE-06-96)

Above professionals will be fully responsible for safe & sound construction in accordance with approved plan and standard specifications and ensuring all safety measures during construction for the safety of workers, neighbors and pedestrians at site as defined in KB & TPR-2002 (As amended).

SUBJECT: **CONSTRUCTION PERMIT ON PLOT NO. LA-4/1, BLOCK-21, F.B.AREA, SCHEME-16, KARACHI.**

Reference:- **REV-20230526-7, dated: 05-06-2023**

No. of Stories: **Basement-2 (Parking + Services) + Basement-1 (ARS + Parking + Services) + Ground Floor (Shops + Recreation Area + Services) + 1st to 5th Floors (Parking + Services) + 6th to 19th Floors (Flats) + 20th Floor (Recreation Area + Services) + 21th to 35th Floors (Flats) + Roof (Solar Panel + Battery Room + Services) only.**

- Change of land use / Commercialization issued by Sindh Master Plan Authority (Defunt MPD) Vide No. MPD/COM/SBCA/2018/907/L, dated:28-11-2018, and reverification by SMPA through portal vide letter No. MPD/COM/SMPA/2023/3251/L, dated: 27-11-2023 & also clarification / requirement of details and NOC from lessor point of view regarding conversion vide letter No. MPD/COM/ SMPA/2024/1163/L, dated: 13-05-2024.
- Architectural Concept Plan (Not valid for construction) vide No. FB/PC-2/OWC/Arch:&Planning/2023/2024/31, Dated: 12-03-2024.
- Structure NOC No. SBCA/DD/(STR)/2024/40, Dated: 30-04-2024.
- Verification of title documents and status of land use vide letter No. SBCA/Title Verification Cell/AD/Arch:& Planning/2023/21, dated:24-05-2023, by the Assistant Director, OWC/Architectural & Planning Section, SBCA. Reply has been received through portal vide letter No.KDA/DLM/ADBP/2023/371/L, dated:05.05.2023, from the Assistant Director (B.P) Land Management, KDA.
- CAA NOC No. No. HQCAA/1117/003/ARAS(VOL-V)/184, dated:07-03-2024 (450 feet from AGL).
- PAF NOC No. AHQ/1532/2/ATS (PC-36/23), dated:15-04-2024, (450 feet from AGL).

1. The building plan for the above mentioned plot attached herewith is hereby approved and you are Permitted to carry out construction on the said plot accordingly.
2. Provided that it does not entitle you to build on land not lawfully conveyed to you and land or road of City District Government, Karachi or any other local Authority.
3. Provided that right of easement is a matter between the concerned parties with which this Authority has not concern.
4. Provided that it holds good only if the work is started within **ONE YEAR** from the date where after it shall be deemed to have lapsed.
5. A full time site engineer registered with PEC shall be deputed by the owner/builder during the execution of work.
6. Provided that rain water spouts from balconies, shops, windows doors of the building shall not Project or over hanged on public streets or the land belonging to the CDGK or local Authority.
7. Provided that the construction shall be carried out under the supervision of Lic. Engineering and Lic. Architect started above.
8. The Lic. Architect, Lic. Engineer/Owner shall be jointly and severally responsible for all the structural design and standard specification to be provided for the execution of the work.
9. Provided that plinth cornice shall not project more than 2" on any public street for ornamental purpose.

AND

10. Provided that premises shall not be used for the purpose other than the use approved by the Authority and according to the terms and condition of allotment / lease.
11. Subject to the condition that if any violation is found during / after construction, the same shall be demolished.
12. Provided that the quality control and stability of the structure slab be the responsibility of the owner /attorney and Lic. Architect / Lic. Engineer.
13. No building materials or any kind of machine shall be stores/placed for execution on road of Govt. land / footpaths during construction.

OFFICIAL COPY OF CONSTRUCTION PERMIT FOR OFFICE

Contd……/2

(2)

14. Subject to condition that all the constructional activities supervision etc. shall jointly be the responsibility of professionals & owner.
15. Fire-fighting and safety arrangements shall be provided as per existing regulations and also in accordance with international standard.
16. 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.
17. This approval is granted with the condition that owner / builder shall design / provide the provision of Broadband wiring which is MANDATORY as per Clause 25-1.9.3 of KB&TPR-2002.
18. Owner shall obtain the plinth verification through licensed professionals on prescribed form (ZP-4) upon completion of foundation as per KB&TPR from concerned Town.
19. The owner and professionals shall submit to the authority floor certificate (form ZP-5) at the time of casting of slab of each floor as per KB&TPR in concerned Town.
20. In case of any complaint / dispute or any court matter, the **SBCA** shall not be a party and shall not be responsible.
21. If at any later stage, it is found that the approval of Proposed plan was obtained with mis-representation of facts, the same will be withdraw / cancelled.
22. Owner / Attorney is bound to get the completion / occupancy plan approved from this Authority before occupation as per KB&TPR.
23. Air Raid Shelter (ARS) provided in **Basement-1** shall not be misused under any circumstances.
24. Parking as provided at **Basement-2, Basement-1, 1st Floor, 2nd Floor, 3rd Floor, 4th Floor & 5th Floor** shall not be misused under any circumstances.
25. Recreation area as provided at **Ground Floor & 20th Floor** shall not be misused under any circumstances.
26. All the construction work to be carried out strictly as per Administrative Instruction and as per KB & TPR-2002 (Amended to date) with maintaining the shear wall / columns etc. as per structure drawings.
27. Owner & License professionals will take all the precautionary measures as per KB & TPR-2002 (Amended to date) and also follow the specifications / notes mentioned by Dy. Director Structure Section, SBCA in the approval letter / structural drawings during excavation and further construction to avoid any mishap to the adjoining / surrounding buildings.
28. To achieve quality concrete of required strength for sale, sound and stable structure, the owner / builder shall use ready mix concrete from batching plant which is mandatory under clause 11-11of KB&TPR-2002 and amended up to date.
29. This approval is granted by One Window Cell / Town Planning Section only planning point of view, all other aspects like ownership / court case / complaint / dispute implementation of construction activities according to KB&TPR shall be the responsibility of concerned Town.
30. At any stage, any ambiguity / error found in the approval of building plan, the same shall be conveyed accordingly by the Town concerned.
31. 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.
32. The owner/builder shall be bound to fix the bill board at site with details of project after final construction permit. (i) Plot number (ii) No. of Floors (iii) Nature of building (iv) License professionals (v) admeasuring of plot, otherwise action shall be taken concerned district officers shall be bound take action as per law.
33. The owner is required to **Demolition permission, Allotment Order, SITE Engineer Registered in PEC & Agreements with Architect, Structure Engineer,** within 90 days from issuance of this final construction permit / Sale & Advertisement NOC from Design Section, SBCA otherwise the said plan will be Withdrawal / cancelled automatically without any notice.
34. SBCA reserve the right to obtain all fees / charges / taxes / dues remaining to owner / builder subsequently. (if applicable)

Encl:

- Approved Proposed Building Plans.

Deputy Director
One window Cell / Architectural & Planning
Head Quarters, SBCA

13/5
13/05/24

Copy for information to:-

1. Director, (District Central), SBCA.
2. Director, Design, SBCA.
3. Director, Vigilance Section, SBCA.
4. Director, I.T, SBCA.
5. Chairman, ABAD, Karachi.
6. Secretary to DG, SBCA.

SINDH BUILDING CONTROL AUTHORITY
(AUTHORITY UNDER SINDH BUILDING CONTROL ORDINANCE 1979)



Plot Address: PLOT NO. LA-4/1, BLOCK-21, FB AREA, SCHEME-16, KARACHI.
QR Generated By: Assistant Director Architecture And Planning
QR Generated at: 13-05-2024 18:36:44

Sindh Building Control Authority

Civic Centre, Annexe University Road,
Gulshan-e-Iqbal, Karachi-5(Pakistan)
Phones: Tel: 021-9923029
Fax: 021-99230326
www.sbca.gov.pk

No: SBCA/DD/(PSA&C)/361/Adv- /2024
Dated: -05-2024

M/s. Mascot Industrial Corporation
Owner of plot, through its Authorized / Director
Mr. Ashraf Ali Sayeed
CNIC No. 42201-5685119-3
and Authorized Partner of
M/s N.S.A Builders & Developers (BL-4165),
Plot No. LA-4/1, Block-21, F.B Area,
Scheme-16, Karachi.

Basement-2 (Visitor Parking + Services) + Basement-1 (ARS + Parking) + Ground Floor (Shops + Recreation + Services) + 1st & 2nd (Visitor Parking) + 3rd to 5th Floors (Parking) + 6th to 19th Floors (Flats) + 20th Floor (Recreation Area + Services) + 21st to 35th Floors (Flats) + Roof (Solar Panel + Battery Room + Services) Only. (Plot Admeasuring 15670.00 Sq. Yds.).

DATE OF COMPLETION: 31-05-2029

SUBJECT: **NO OBJECTION CERTIFICATE** FOR SALE & ADVERTISEMENT OF **FLATS & SHOPS** FOR PROJECT NAMELY **"THE 7 (SEVEN) TOWERS"** ON PLOT NO. LA-4/1, BLOCK-21, F.B AREA, SCHEME-16, DISTRICT CENTRAL KARACHI.

Ref: Your application dated: 17-05-2024

It has been directed by the Competent Authority the approval of the subject noted NOC. The copies of Approved Draft of Advertisement, Terms and Conditions and Specifications for Construction are enclosed. No addition and alteration are allowed in the approved documents at any stage:-

THIS NOC IS BEING ISSUED WITH THE FOLLOWING CONDITIONS:

1. This NOC is being issued on the basis of Building Plan / Construction Permit approved by One Window Cell / Architectural & Planning Head Quarters, SBCA vide No. FB/PC-2/OWC/Arch: & Planning / Construction Permit/2023/2024/08, Dated: 13-05-2024.
2. In case of any litigation / dispute pertain to land status / ownership / violation of approved building plan, the PSA&C Section SBCA will not be a party and this NOC will be treated as withdrawn / cancelled.
3. As per undertakings dated: 17-05-2024 submitted by the builder that the Builder shall follow the terms & conditions for allotment of units as prescribed in Chapter 5-1 of KB & TPR-2002 as amended up to date and Section-12 of SBCO 1979 amended up to date.
4. This NOC is being issued for Advertisement & Marketing purpose only. PSA&C Section SBCA is not responsible for violation in Approved Building Plan / delay in completion of project.
5. In case of any misrepresentation of facts and violation/deviation of the NOC/Approval will be treated as withdrawn / cancel without any notice.
6. In case of any dispute in ownership or enquiry / litigation, the owner and lessor would be responsible. SBCA will not be liable for it.

No: SBCA/DD/(PSA&C)/361/Adv- /2024 Dated: -05-2024

7. The owner / builder is bound to pay any Government charges even after the issuance of Sale NOC.
8. This NOC is being issued on the request of applicant / builder duly allowed by Competent Authority wherein they have undertaken that, Firm Registration Certificate, Security Deposit, Balance Scrutiny Fee and Advertisement charges shall be submitted within 30 days time after issuance of this NOC.
9. Notice Board (4'-0" X 4'-0) displaying the information material pertaining to the project should be installed at the booking office and copy of NOC, Building Plan, information regarding the covered area, Numbers of units should place on the Notice Board.
10. The Builder shall submit list of Allottees of booked units and site progress report duly verified by the Licensed Architectural and Deputy Director, concerned District on quarterly basis.
11. Builder will execute an agreement with each individual allottee on stamp paper as per the approved Model Agreement of SBCA in pursuance of Section 12 (4) of SBCO-1979 (amended up to date) within 30 days' time of booking of the unit and before issuance of allocation letter the agreement will be got countersigned and witnessed by the authorized representative of **ABAD** within 15 days otherwise builders will not be allowed to collect further payment / installments as per approved schedule of payment.
12. The concerned (District Central) SBCA, is liable for the compliance of conditions in respect of NOC for Sale and Advertisement positively & submission of NOC from SEPA through the owner before advertisement of project.

SUMMARY OF PROJECT

TYPE	FLOOR	NOS	COVERED AREAOF EACH UNIT	UNIT PRICE (EACH)
A	6TH TO 19TH & 21ST TO 35TH	116	1511.00 Sq.ft	Rs. 1,81,32,000/-
B	6TH TO 19TH & 21ST TO 35TH	58	1404.88 Sq.ft	Rs. 1,68,58,000/-
C	6TH TO 19TH & 21ST TO 35TH	174	1609.25 Sq.ft	Rs. 1,93,11,000/-
D	6TH TO 19TH & 21ST TO 35TH	464	550.38 Sq.ft	Rs. 66,04,000/-
E	6TH TO 19TH & 21ST TO 35TH	116	944.45 Sq.ft	Rs. 1,13,33,000/-
F	6TH TO 19TH & 21ST TO 35TH	232	939.08 Sq.ft	Rs. 1,12,68,000/-
G	6TH TO 19TH & 21ST TO 35TH	58	918.00 Sq.ft	Rs. 1,10,16,000/-
H	6TH TO 19TH & 21ST TO 35TH	58	923.13 Sq.ft	Rs. 1,10,77,000/-
I	6TH TO 19TH & 21ST TO 35TH	116	945.00 Sq.ft	Rs. 1,13,40,000/-
SHOPS	GROUND	04	15808.75 Sq.ft	Rs. 50,000/- Per Sq. Ft.

The above mentioned prices are not included in documentation/Transfer fee/Corner/West Open.

Deputy Director
Public Sale Advertisement
& Complaints, SBCA

Copy to: -

- Director (PSA&C), SBCA.
- Deputy Director (District Central), SBCA, with the request to provide site progress report on quarterly basis Look after the Terms & Conditions of NOC for Sale and not to be issued Plinth Verification Certificate without clearance from Public Sale Advertisement & Complaints, SBCA.
- Deputy Director (OWC/Town Planning Section), SBCA.
- Deputy Director (I.T), SBCA.....with request to please insert QR Code & uploaded in web site.
- Secretary ABAD.

ANNEXURE IV: NOC FROM MASTER PLAN DEPARTMENT & KDA

MASTER PLAN DEPARTMENT
SINDH BUILDING CONTROL AUTHORITY
9TH FLOOR, CIVIC CENTRE, GULSHAN-E-IQBAL. TEL: 9923159

No: MPD/Com/SBCA/2018/907/C Dated: 28-11-2018

The Director, Land
Karachi Development Authority
Karachi.

SUBJECT: N.O.C. FOR CONVERSION OF LAND USE OF PLOT NO. LA-4/1, BLOCK-21, MEASURING 15670 SQ.YDS F.B. AREA, KARACHI FROM INDUSTRIAL TO COMMERCIAL.

Reference: 1. Application No. 0598, dated 31-08-2006.
2. CDGK/KDA Wing/2008/220, dated 09-05-2008.

In compliance of Order of Hon'ble High Court of Sindh in C.P. No.D-6319 Of 2018 as well as with reference to above cited application on the subject, I am directed to inform that Competent Authority has allowed the conversion of Plot No. LA-4/1, Block-21, F.B. Area, Karachi from Industrial to Commercial. However, on the acceptance of offer letter & realization of conversion charges, NOC for conversion from Industrial to Commercial (Offices/Shops/Flats) use is hereby granted with the following terms and conditions which must be strictly adhered to:

1. Subject to the clear title of land.
2. Subject to the approval of lessor.
3. In case of any dispute arising in future concerning the plot, MPD shall not be responsible.
4. Subject to the payment of relevant dues, if any, and clearance from the relevant authorities.
5. In case of any misrepresentation of facts, found at a later stage, this approval shall be withdrawn without any notice
6. Building Plans shall be submitted for approval to SBCA. The relevant and applicable Rules and Regulations contained in KB&TPR-2002 amended upto date shall be applicable.
7. All other terms and conditions applicable on the conversion of plots shall strictly be observed.
8. This approval is subject to the condition agreed by the owner / applicant in affidavit / undertaking submitted by the applicant.

One copy of commercialization plan duly signed and stamped is enclosed.

AKHTAR JAWAID ARCHITECT License No AL-01[illegible]

Dy. Director
MPD

Copy to:
1. Director General, SBCA, please.
2. Senior Director Master Plan, SBCA, please.
3. Dy. Director –(PC) MPD
4. The owner.

KARACHI DEVELOPMENT AUTHORITY
DIRECTORATE OF LAND MANAGEMENT

No. KDA/LM/AD(Ind)/2021/268 Dated: 21-5- 2021

M/s Mascot Industrial Corportion Ltd.,
through its Director Mr. Saleem Shamsi,
Plot No. LA-4/1, Block-21,
Federal `B` Area, Karachi.

SUBJECT:- CONVERSION OF LAND USE OF INDUSTRIAL PLOT NO. LA-4/1, BLOCK-21, MEASURING 15670 SQ.YDS., F.B. AREA, KARACHI (FROM INDUSTRIAL TO COMMERCIAL.

In compliance of Order of Hon`ble High Court of Sidnh in CP No. D-6319 of 2018 and CP No. 1014/2021 , the Competent Authority has been pleased to issue No Objection Certificate for conversion of land use of industrial plot No. LA-4/1, Block-21, measuring 15670 sq.yds., Scheme No. 16 (F.B. Area), Karachi from **Industrial to Commercial for Shops/Flats/Offices use** as conveyed by Deputy Director, MPD, SBCA vide letter No. MPD/Com/SBCA/2018/907/L dated 28-11-2018 has accorded the approval Change of land use of said plot from Industrial to Commercial purpose, on the following terms and conditions:-

1. Subject to the clear title of land.
2. Subject to the approval of lessor.
3. In case of any dispute arising in future concerning the plot, and Land Management Department, KDA shall not be responsible.
4. Subject to the payment of relevant dues, if any, and clearance from relevant authorities.
5. In case of any misinterpretation of facts, found at a later stage, this approval shall be withdrawn without any notice.
6. Building plans shall be submitted for approval to SBCA. The relevant and applicable Rules and Regulations contained in KB&TPR-2002 amended upto date shall be applicable.
7. All other terms and conditions applicable on the conversion of plots shall strictly be observed.
8. This approval is subject to the condition agreed by the owner / applicant in affidavit/ undertaking by the applicant.

AKHTAR M... License No AL-01068... ARCHITECT

ASSISTANT DIRECTOR (INDUSTRIES)
LAND DEPARTMENT, KDA

Assistant Director Industries -I
Directorate of Land Management
K.D.A.

Copy for information to:-

1. The Director General, SBCA.
2. The Deputy Director, Master Plan Department,SBCA with reference to his letter quoted above.
3. The Executive Engineer, Mansoora / Sch-16 Division, KDA.

ASSISTANT DIRECTOR (INDUSTRIES)
LAND DEPARTMENT, KDA

ANNEXURE V: NOC FROM CIVIL AVIATION AUTHORITY

AHQ/1532/2/ATS (PC - 36/23) 15 April, 2024

Director / Focal Person for CAA & PAF Desk
Sindh Building Control Authority
Civic Centre, Annexe University Road,
Gulshan-e-Iqbal, Karachi
Tel: 021-99230329

NOC FOR HEIGHT CLEARANCE AS PER ICAO OLS AT PLOT NO LA-4/1, BLOCK-21, KDA SCHEME-16, FEDERAL B AREA, KARACHI

1. Reference letter No SBCA/CAA & PAF Desk/P/2024/214 dated 04 March, 2024.

2. It is apprised that the undermentioned site has been evaluated as per zone-based criteria devised in Aeronautical Study of Karachi city with respect to Jinnah International Airport (JIAP): -

Site Name / Location	Site Coordinates	Approved Height (AGL)
Plot No LA-4/1, Block-21, KDA Scheme-16, Federal B Area, Karachi	245636.19 N 670506.10 E 245639.52 N 670509.16 E 245636.68 N 670511.20 E	**137.15 m (450 ft)**

3. The site mentioned in Para 2 above is **"CLEAR"** and be provided with NOC for construction of building / infrastructure.

4. It is highlighted that the height clearance is subject to following terms and conditions: -

(a) Height of the building / infrastructure including signboards, water tanks, antenna etc. shall not exceed the height approved in Para 2.

(b) No variation in the site and height of building is allowed.

(c) Garbage / refuse shall be kept in covered containers and disposed of properly to eliminate fire / bird hazards.

(d) Height Clearance from DAAR, Headquarters Civil Aviation Authority must be obtained before issuance of NOC. Height cleared by PAF or CAA whichever is lower will be considered as final permissible height.

(e) Obstruction lights shall be installed as per ICAO / PCAA specified criteria.

(f) AHQ will not accept any liability for any loss, damage or inconvenience suffered due to noise or other effects of aviation related activities or any other claim.

(g) Any other condition imposed by the Govt of Pakistan shall also be adhered to.

5. This NOC is only related to the clearance / permissible height at proposed location in Para 2 and does not absolve the holder for fulfilling requirement of other concerned departments. Moreover, any omission due to submission of incorrect data or marginal error **shall not entitle** the holder for any claim whatsoever in future. **In addition, at any stage if, any dispute of land on the said survey numbers arises with PAF, this NOC shall be cancelled immediately.** Please ensure that the terms and conditions of the NOC are strictly adhered to.

(SUMREEN USMAN)
Group Captain
Director Air Traffic Services
Air Headquarters, Islamabad
Tel: 051-9502351

Copy to: -

1. PAF Base, Faisal **(Base Commander)** : Kindly ensure adherence to terms & conditions by the applicant.
2. PAF Base, Faisal **(OC ATC Sqn)**

HEADQUARTERS
PAKISTAN CIVIL AVIATION AUTHORITY
JINNAH INTERNATIONAL AIRPORT
INSPECTORATE BUILDING
KARACHI-75200, PAKISTAN
Tel: (92-21) 99072649
Fax: (92-21) 99242671
e-mail: sadl.as@caapakistan.com.pk

Ref: HQCAA/1117/003/ARAS (VOL-V)/184 *Date: 7th March, 2024*

HEIGHT CLEARANCE NOC ISSUED BY
SINDH BUILDING CONTROL AUTHORITY (SBCA)

1. Kindly refer to your letter No. SBCA/CAA & PAF Desk/P/2024/214 dated 4th March, 2024.

2. It is informed that WGS Coordinates and site elevation of Plot No. LA-4/1, Block-21, KDA Sch-16, Federal B-Area, Karachi (245636.19N 670506.10E, 245639.52N 670509.16E & 245636.68N 670511.20E) received vide above referred letter have been assessed and **450 Feet AGL** or **559 Feet AMSL** height permitted by Sindh Building Control Authority (SBCA) is correct in accordance with Rule-68 of CARs 1994.

3. Clearance from Director Air Traffic Services, Air Headquarters PAF, Islamabad must also be obtained before the start of work. It is further informed that copy of the final NOC issued to the applicant shall be shared with Pakistan CAA and PAF.

(JOHN WILLIAM)
Additional Director
Aerodrome Standards

To,
ENGR./PLANNER BADARUDDIN,
Focal Person For CAA & PAF Desk SBCA.
Sindh Building Control Authority, Civic Centre Annexe,
University road, Gulshan-e-Iqbal.,
KARACHI.

Sindh Building Control Authority

Civic Centre Annexe, University Road,
Gulshan-e-Iqbal, Karachi-5 (Pakistan)
Phones: Tel: 021-9923029
Fax: 021-99230326
www.sbca.gov.pk

No: SBCA / CAA & PAF Desk / 2024/214
Dated: 22/04/2024

To,

DIRECTOR,
Architecture & Planning Section,
Sindh Building Control Authority,
Head Quarter, Karachi.

SUBJECT: **NOC FOR HEIGHT CLEARANCE UNDER OBSTRUCTION LIMITATION SURFACE STUDY OF CIVIL AVIATION RULES.**

Reference: **Your forwarding letter No. SBCA/Dir/OWC/Arch. & Planning/2024/20, Dated: 20-02-2024**

The request for issuing allowable height under Civil Aviation's Obstruction & Limitation Surface Study for **450** Feet was examined under the policy notified by the AUTHORITY. Pursuant to approval of the Competent Authority i.e. Worthy DG SBCA, the provisional height clearance for flying safety purpose was allowed for **450 Feet Above Ground level (AGL)** OR **559 Feet AMSL** for building including overhead Water Tank, Antenna, NEON Signboard etc. on roof top at **Plot No. LA-4/1, Block-21, KDA Sch-16, Federal B Area, Karachi. (245636.19N 670506.10E, 245639.52N 670509.16E & 245636.68N 670511.20E).**

Now, PAF vide letter No. **AHQ/1532/2/ATS (PC-36/23), Dated: 15-04-2024** & PCAA letter No. **HQCAA/1117/003/ARAS (VOL-V)/184, Dated: 07-03-2024** has cleared the evaluation of SBCA's CAA & PAF Desk and grant of NOC under rule 68 of PCAA rules, therefore it is conveyed that on **Plot No. LA-4/1, Block-21, KDA Sch-16, Federal B Area, Karachi,** the allowable height under OLS study PCAA rules 68, is **450 feet** (AGL) or **559 feet** (AMSL) on following conditions.

1. The allowable height of the building under PCAA OLS study is should not be more than **450 Feet (Four Hundred & Fifty feet only)** Above Ground level (AGL) OR **559 feet (Five Hundred & Fifty-Nine feet only)** Above Mean Sea Level (AMSL) including overhead water tank, antenna, neon signs board etc. on roof top of the building.
2. Obstruction light must be provided on top of the building in accordance with the specification contained in para 6.2 of chapter 06 of **AERODROME STANDARDS MANUAL OF PAKISTAN (ASMP).**
3. The refuse shall not be kept open but always be stored in covered containers to ensure that birds are not attracted.
4. Sindh Building Control Authority Civil Aviation & PAF Desk, SBCA reserves the right to cancel the said NOC if the terms and Conditions are not complied with and the NOC will be treated as canceled.
5. This NOC is only valid for **HEIGHT CLEARANCE FOR FLIGHT SAFETY PURPOSES under the rules of PCAA and may not be considered as the NOC for construction.**
6. This Clearance is only related to the permissible height with regards to PCCA's OLS Study at proposed location and does not absolve the holder for fulfilling requirement of other concerned departments. Moreover, any omission due to submission of incorrect data or marginal error **SHALL NOT ENTITLE** the holder for any claim whatsoever, in future. **In addition, at any stage if, any dispute of land on the said survey numbers arises, this clearance shall stand canceled immediately.**
7. The issuance of PROVISIONAL NOC by SBCA is subject to reverification by CAA/PAF under the procedure approved by the Aviation Division Islamabad. In case any difference arises, the allowable height verified by CAA/PAF shall prevail and the height allowed by SBCA shall be treated as withdrawn/cancelled.
8. This NOC regarding determination of allowable height of the proposed building is subject to condition that the plot is free from all encumbrances and does not violate/ contradict any of the orders of Honorable High/ Supreme Court. The concerned office of the SBCA to ensure before issuance of any Construction Permit/ NOC that issuance of such NOC construction permit is not against the order of Honorable Courts, more particularly CP No. 815/2016 of Honorable Supreme Court of Pakistan and the compliance of Notification No. **SBCA/PS-CE/2021/44, Dated: 22-03-2021** shall be made where ever required. The directorate of OWC to ensure please.
9. The One Window Cell, SBCA to ensure that necessary fee is fully paid before issuance of NOC/ Permit.
10. The Completion of work is also required to be notified to HQCAA for the issuance of notices to the Aviators. After completion of the subject building, the builder/ owner shall forward a completion report (along with authenticated AMSL/ AGL height of top of the building from Survey of Pakistan) to Air Headquarters, Islamabad (Director Air Traffic Service) and CAA & PAF Desk, SBCA.

22/04/24

ENGR. / PLANNER BADARUDDIN
Focal Person for CAA & PAF Desk

Copy for information to:
1. ADG (Planning), SBCA
2. Additional Director, Aerodrome Standards Branch, Head Quarter CAA
3. Director Air Traffic Services, Air Headquarters PAF, Islamabad
4. Director, Public Sale / Advertisement & Complaint Section, SBCA
5. Director, Structure Section, SBCA
6. PS to DG, SBCA
7. Mr. Ashraf Ali Sayeed (Owner)

ANNEXURE VI: GEOTECHNICAL INVESTIGATION

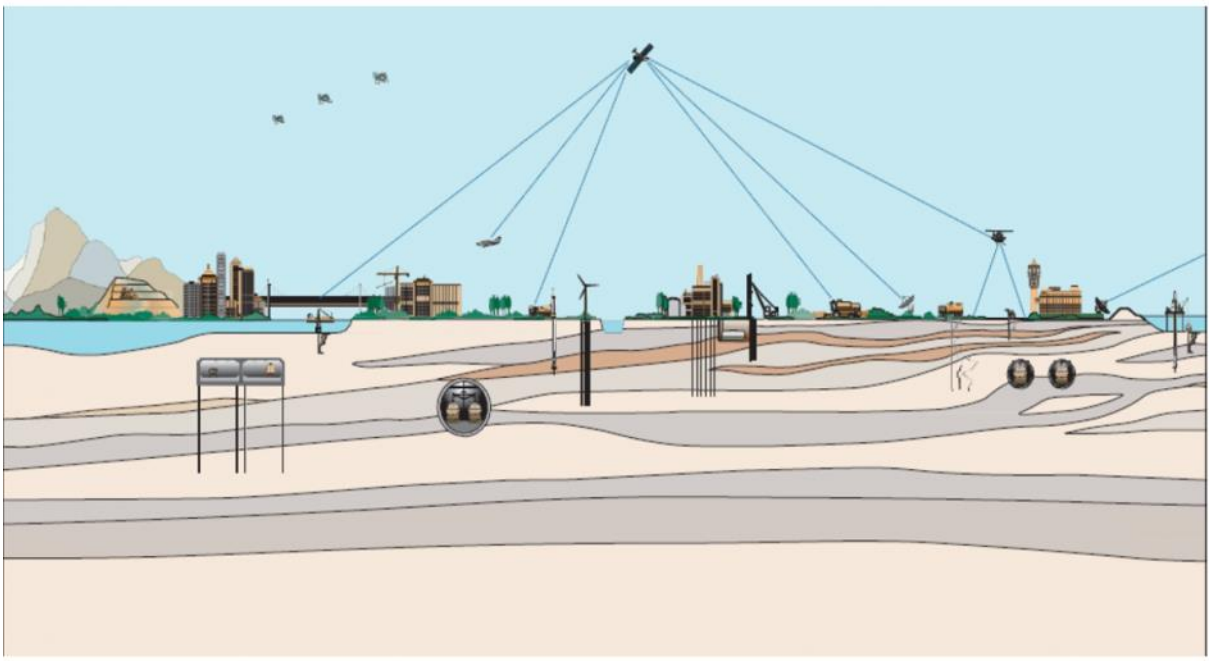
SOIL TESTING SERVICES
Geotechnical Engineers and Testing Laboratory

Report No. K21-1339-101

GEOTECHNICAL INVESTIGATION REPORT FOR CONSTRUCTION OF MULTI STOREY BUILDINGS AT PLOT # LA4/1, BLOCK 21, F.B. AREA, SCHEME 16, KARACHI

(REV. 0.0, DATED: JUNE 28, 2021)

CLIENT: Mr. Muhammad Jawed Abdul Aziz



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	28/06/2021

PROJECT: Geotechnical Investigation Report for Construction of Multi Storey Building at Plot # LA4/1, Block 21, F.B. Area, Scheme 16, Karachi

	NAME	SIGNATURE	DATE
PREPARED BY: (Project Engineer)	Syed Muhammad Hasan		
REVIEWED BY: (Project Manager)	Abdur Rehman		
APPROVED BY: (General Manager)	Naveed Anwer		

ISSUE/REVISION INDEX

Issue Code	Revision					Revision Details
	No.	By	Rev'd.	App.	Date	
RD	00	SMH	AR	NA	28/06/2021	

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 multi storey buildings at plot # LA4/1, block 21, F.B. Area, Scheme 16, Karachi was carried out in order to determine the geotechnical parameters of the subsurface deposits. Scope of field work included drilling of ten boreholes; two up to the depth of 40.0 meters, three up to the depth of 30.0 meters and five up to the depth of 20.0 meters below the existing site grade. Soil and rock 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 '*medium dense to very dense*, fine to coarse grained sand', '*dense to very dense,* gravel', '*hard,* sandy clay, '*extremely weak to weak*, sandstone', '*extremely weak to very weak*, mudstone' and '*extremely weak to very weak*, partially weathered, claystone'. Groundwater table was not encountered in the boreholes drilled at the site during the time of this geotechnical investigation.

Keeping these conditions under consideration:

- Net Allowable bearing pressures have been given for shallow foundations at the depth of 1.5 to 2.0 meters below the existing ground level for ancillary structures.
- Gross Allowable bearing pressures have been given for shallow foundations at the depth of 8.0 – 8.5 meters below the existing ground level for main structures.
- Allowable pile capacities have been provided for different diameters and various lengths.
- Earth pressure parameters for excavation support system and earth retention have been provided.
- Seismic soil profile has been taken as *'S_C'* for the foundations in accordance with UBC-97.

The exposure of underground concrete to aggressive chemicals is found to be '*negligible'* for sulphates and chlorides which have influenced the selection of cement for underground concreting and it is recommended to use *Ordinary Portland Cement* for all underground concrete works.

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1. INTRODUCTION

Planning for the construction of multi storey buildings at plot # LA4/1, block 21, F.B. Area, Scheme 16, Karachi is underway. In order to determine the geotechnical parameters of the subsurface deposits, *M/s. Soil Testing Services (STS)* were entrusted by *Mr. Muhammad Jawed Abdul Aziz* to carry out the geotechnical investigation at site.

Scope of field work included drilling of ten boreholes; two up to the depth of 40.0 meters, three up to the depth of 30.0 meters and five up to the depth of 20.0 meters below the existing site grade. Elevation of the drilling platform at each borehole location was noted with respect to the mean sea 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. 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 Federal B. Area in the neighbourhood of Sohrab Goth Fire Station. Other nearby landmarks include As Asif Bus Terminal, Lucky Energy Private Limited and Allama Iqbal Government Boys Higher Secondary School.

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.



Figure 2.1 Satellite Image of site (Courtesy: Google Earth)

3. GROUND CONDITIONS

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

- Sand
- Gravel
- Clay
- Sandstone
- Mudstone
- Claystone

Following sub-sections describe the strength characteristics of the geological units and the groundwater conditions. Rocks are classified as per BS-5930.

3.1 SAND

Deposits of fine to coarse grained sand were encountered in all the boreholes drilled at the site. State of compactness according to SPT 'N' counts has been determined to be *'medium dense 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 '*SP-SM* 'and '*SM*'. Table 3.1 summarizes the details of these deposits.

Table 3.1: Deposits of Sand

Borehole No.	Depth (meter)
BH-01	0.0 – 7.6
BH-02	0.0 – 9.5
BH-03	0.0 – 6.5
BH-04	0.0 – 9.5
BH-05	0.0 – 5.0 6.5 – 10.5
BH-06	0.0 – 2.0
BH-07	0.0 – 9.0
BH-08	0.0 – 7.7

Borehole No.	Depth (meter)
BH-09	0.0 – 3.5 6.2 – 7.8
BH-10	0.0 – 3.5 9.5 – 12.5

3.2 GRAVEL

Deposits of fine to coarse grained sand were encountered in four boreholes drilled at the site. State of compactness according to SPT 'N' counts has been determined to be *'dense 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 '*GM* '. Table 3.2 summarizes the details of these deposits.

Table 3.2: Deposits of Gravel

Borehole No.	Depth (meter)
BH-03	6.5 – 12.5
BH-08	7.7 – 12.2
BH-09	3.5 – 6.2
BH-10	3.5 – 9.5

3.3 CLAY

Deposits of sandy clay were encountered in two of the boreholes drilled at the site. State of compactness according to SPT 'N' counts has been determined as *'very stiff to hard'*. The grain size analysis of these deposits was carried out in the laboratory. Unified Classification System (UCS) classifies these deposits as *'CL'*. Table 3.3 summarizes the details of these deposits.

Table 3.3: Deposits of Clay

Borehole No.	Depth (meters)
BH-05	5.0 – 6.5
BH-06	2.0 – 8.0

3.4 SANDSTONE

Deposits of claystone were encountered in all 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 *'extremely weak to weak'* rock. Table 3.4 summarizes the details of these deposits.

Table 3.4: Deposits of Sandstone

Borehole No.	Depth (meters)
BH-01	7.6 – 19.5
BH-02	9.5 – 21.0
BH-03	12.5 – 30.0
BH-04	9.5 – 18.0
BH-05	10.5 – 20.0
BH-06	10.5 – 20.0
BH-07	9.0 – 20.0
BH-08	12.2 – 20.0
BH-09	7.8 – 20.0
BH-10	12.5 – 20.0

3.5 MUDSTONE

Deposits of claystone were encountered in three 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 *'extremely weak to very weak'* rock. Table 3.5 summarizes the details of these deposits.

Table 3.5: Deposits of Mudstone

Borehole No.	Depth (meter)
BH-01	19.5 – 30.0
BH-02	21.0 – 30.0
BH-06	8.0 – 10.5

3.6 CLAYSTONE

Deposits of claystone 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 *'extremely weak to very weak'* rock. Table 3.6 summarizes the details of these deposits.

Table 3.6: Deposits of Claystone

Borehole No.	Depth (meters)
BH-01	30.0 – 40.0
BH-02	30.0 – 40.0
BH-04	18.0 – 30.0
BH-05	20.0 – 30.0

3.7 GROUNDWATER CONDITIONS

Groundwater table was not encountered up to the maximum explored depth of 40.0 meters below the existing ground level in the boreholes drilled at the site at the time of this geotechnical investigation.

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. As per the information provided by the client, following areas are proposed for construction at the project site:

Table 4.1: Details of proposed structures and foundations

Structure(s)	Proposed Foundation Type
Ancillary Structures	Shallow Foundation
2B+G+35	Deep Foundation (Piled raft)

Keeping in view the subsoil conditions prevailing at the site and the loads expected to be transferred to the foundations, recommendations for both shallow and deep foundations are provided. Following sections discusses recommendations for shallow and deep foundations, in detail.

4.1 DESIGN PARAMETERS

Design soil parameters at the site are based on grain size, material type and SPT N-values. The design soil parameters for the profiles used in our analysis are tabulated below:

Table 4.2: Engineering Design Parameters

Layer Depth Below EGL (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/m^3)	Modulus of Elasticity, E (kN/m^2)
Top	Bottom							
1.5	3.0	1.5	19	Sand	-	31°	18.0	17,000
3.0	6.0	3.0	25	Clay	100	-	18.0	15,000
6.0	9.0	3.0	34	Clay	150	-	18.0	21,000
9.0	13.0	4.0	40	Sand	-	36°	19.0	50,000
13.0	40.0	27.0	-	Rock	100	-	21.0	150,000

4.2 DESIGN CRITERIA FOR SHALLOW FOUNDATIONS

A suitable shallow foundation for any structure must satisfy two basic independent criteria with respect to the underlying foundation soils. First, the foundation must have an adequate factor of safety against exceeding the bearing capacity of the foundation soils. Second the vertical movements of the foundation due to settlement or swelling of the foundation soils must be within tolerable limits for the structure.

Dynamically loaded foundations, such as those supporting vibrating machinery, must satisfy additional criteria as follows:

- vibrations transmitted to the foundation soils must not cause excessive settlement of the structures or its surroundings;
- vibrations of the dynamically loaded structure, and its surroundings, must not interfere with planned operations and adjacent structures.

The foundation bearing pressures should be limited so that settlements do not exceed tolerable limits for the structures.

4.3 ALLOWABLE BEARING PRESSURES FOR SHALLOW FOUNDATION

The allowable bearing pressure for shallow footings i.e. isolated and raft foundations supported on natural soils/rocks at the site will be limited either by the settlement tolerance of individual structures, or by the bearing capacity of the soil, depending on the foundation width and depth of influence. Typically, for shallow isolated footings, the bearing pressure should be limited so that the total foundation settlement does not exceed 25 mm, with differential settlements of about 50 percent of the total settlement, or so that the bearing capacity is not exceeded, whichever is the lower of the two values.

The ratio of differential to total settlements for raft foundations on sand is typically half that of an isolated footing (Terzaghi, Peck and Mesri, 1996). Consequently, the amount of settlement that a raft foundation can tolerate is twice that of an isolated foundation, usually 50 mm. However, the actual settlement tolerance of various structures should be defined by the structural engineer.

We estimated the allowable bearing pressure of planned isolated and raft foundations as the lower of the two values calculated based on settlement and shear criteria. Table 4.3 gives the net allowable bearing pressures for shallow foundations at depth of 1.5 – 2.0 meters below existing ground level for ancillary structures.

Table 4.3: Net Allowable Bearing Pressures for Shallow Foundation

Structure	Minimum Embedment Below Existing Ground Level (meter)	Isolated Foundation (KPa / tsf)	Raft Foundation (KPa / tsf)
Ancillary Structures	1.5	70.0 / 0.70	90.0 / 0.90
	2.0	60.0 / 0.60	80.0 / 0./80

Gross allowable bearing pressures for shallow foundations at the depth of 8.0 – 8.5 meters below existing ground level for main structures are provided in table 4.4.

Table 4.4: Gross Allowable Bearing Pressures for Shallow Foundation

Structure	Minimum Embedment Below Existing Ground Level (meter)	Raft Foundation (KPa / tsf)
2B+G+35	8.0 - 8.5	420.0 / 4.20

Proper drainage shall be provided to avoid infiltration of water into foundation soil. It should be ensured that the foundation is not placed on the fill material. The settlement of isolated and raft foundation due to allowable pressure has been estimated to be within the allowable limit of 25mm (1-inch) and 50mm (2-inches) respectively.

4.4 MODULUS OF SUBGRADE REACTION

The modulus of subgrade reaction, k_s, may be required to design raft foundations. The modulus principally depends on the soil stiffness, raft foundation stiffness and foundation size.

We recommend computing the modulus of subgrade reaction values for raft foundations at the site using the allowable bearing pressures that could be obtained from the bearing pressures presented in this report and the following equation:

$$k_s = \frac{1}{A} (SF)\, q_a$$

where:

k_s = Modulus of subgrade reaction, kN/m^2/m;

SF = Factor of safety;

q_a = Allowable bearing pressure, kPa; and

A = Allowable settlement, m.

The above equation assumes that the rafts will tend towards flexible rather than rigid behaviour. For perfectly rigid rafts the modulus values obtained from the above equation should be doubled.

Mat foundations will behave as:

Perfectly rigid if h/B > 1/5

Perfectly flexible if h/B < 1/55

where:

h = thickness of raft foundation; and

B = width of raft foundation

Table 4.5: Modulus of subgrade reaction based on allowable bearing pressure

Structure(s)	Minimum Embedment below EGL (meter)	Modulus of subgrade reaction (MN/m^3/tcf)
Ancillary Structures	1.5	5.4 / 16.2
	2.0	4.8 / 14.4
2B+G+35	8.0 - 8.5	25.2 / 75.6

4.5 EARTH RETAINING STRUCTURE

All measures shall be taken to provide safety to adjacent structures. Properly designed excavation support system should be constructed prior to deep excavation.

Earth pressure parameters required for the design of structure to retain the excavation are given in *Table 4.6*.

Table 4.6: Earth Pressure Parameters

Strata	Φ' (Undisturbed)	k_a (Coefficient of active earth pressure)	k_p (Coefficient of passive earth pressure)
Sand	31°	0.320	3.125
Clay	0°	1.00	1.00
Sand	36°	0.260	3.853

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 0.60, 0.76 and 0.90 meter diameter drilled concrete piles are presented below in *Table 4.7*.

Table 4.7: Allowable Pile Capacities

Diameter (mm)	Length (m) below Cut-Off Level	Tension (kN)	Compression (kN)
600.0	15.0	1296	1578
	20.0	2583	3148
	25.0	4115	4680
760.0	15.0	1641	2095

Diameter (mm)	Length (m) below Cut-Off Level	Tension (kN)	Compression (kN)
760.0	20.0	3271	4179
	25.0	5212	6120
900.0	15.0	1944	2580
	20.0	3874	5147
	25.0	6172	7445

**Pile cut-off level is approximately 8.0 meters below the existing ground level*

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 4.7 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 600 mm, 760 mm and 900 mm 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.

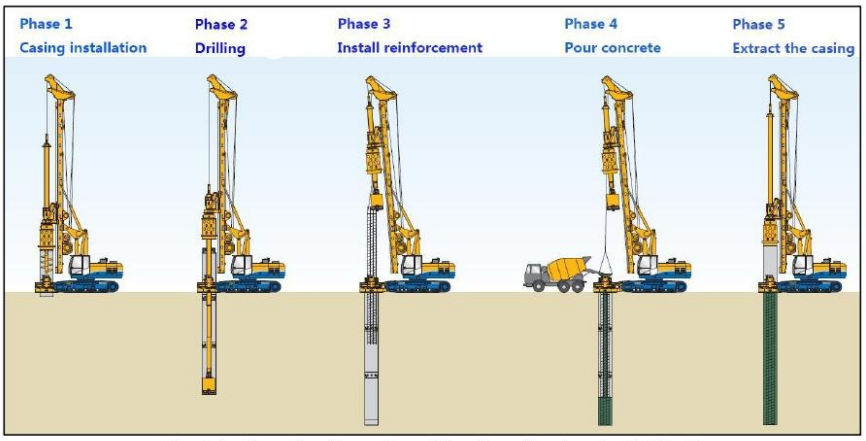


Fig 4.1: Construction of cast in situ piles by straight rotary

4.9 SOIL PROFILE TYPE (ACCORDING TO UBC-97)

Chapter 16, Division V, Section 1636 of UBC-97 deals with the determination of Soil Profile Types. Design practice involves using seismic parameters of zone 2B for the area under consideration.

4.9.1 SEISMIC ZONE FACTOR

Table 16-I of UBC-97 defines the seismic zone factor to be used in choosing seismic coefficients for a location. The seismic zone factor **"Z"** will be taken as 0.20.

4.9.2 SOIL PROFILE TYPE

Table 16-J of UBC-97 defines the soil profile types to be used for determining seismic coefficients. Based on the field data obtained from sub-soil exploration, the soil profile will be taken as **"S_C"**.

4.9.3 SEISMIC COEFFICIENTS

Seismic coefficients are as under:

For S_C: C_a = 0.24 & C_V = 0.32

4.10 TYPE OF CEMENT

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

5. CONCLUSIONS

Geotechnical Investigation for construction of multi storey buildings at plot # LA4/1, block 21, F.B. Area, Scheme 16, Karachi was carried out in order to determine the geotechnical parameters of the subsurface deposits. Scope of field work included drilling of ten boreholes; two up to the depth of 40.0 meters, three up to the depth of 30.0 meters and five up to the depth of 20.0 meters below the existing site grade. Soil and rock samples were collected during the field investigation. Laboratory testing on these samples has been carried out in the lab and includes determination of index parameters through sieve analysis test, Atterberg Limits, density, moisture content, direct shear test, unconfined compression test, point load test etc. Chemical characteristics of soil samples collected have also been assessed through determination of sulphate content, chloride content and pH.

Keeping in view the subsoil conditions prevailing at the site and the loads expected to be transferred to the foundations and as per the project specifications, recommendations for both shallow (including and raft foundation) and deep foundation (bored cast in-situ pile foundation) are provided. Exposure to chloride and sulphate salts is '*negligible'* for soil samples, therefore, *Ordinary Portland Cement (OPC)* should be used for underground concreting.

Appendix A

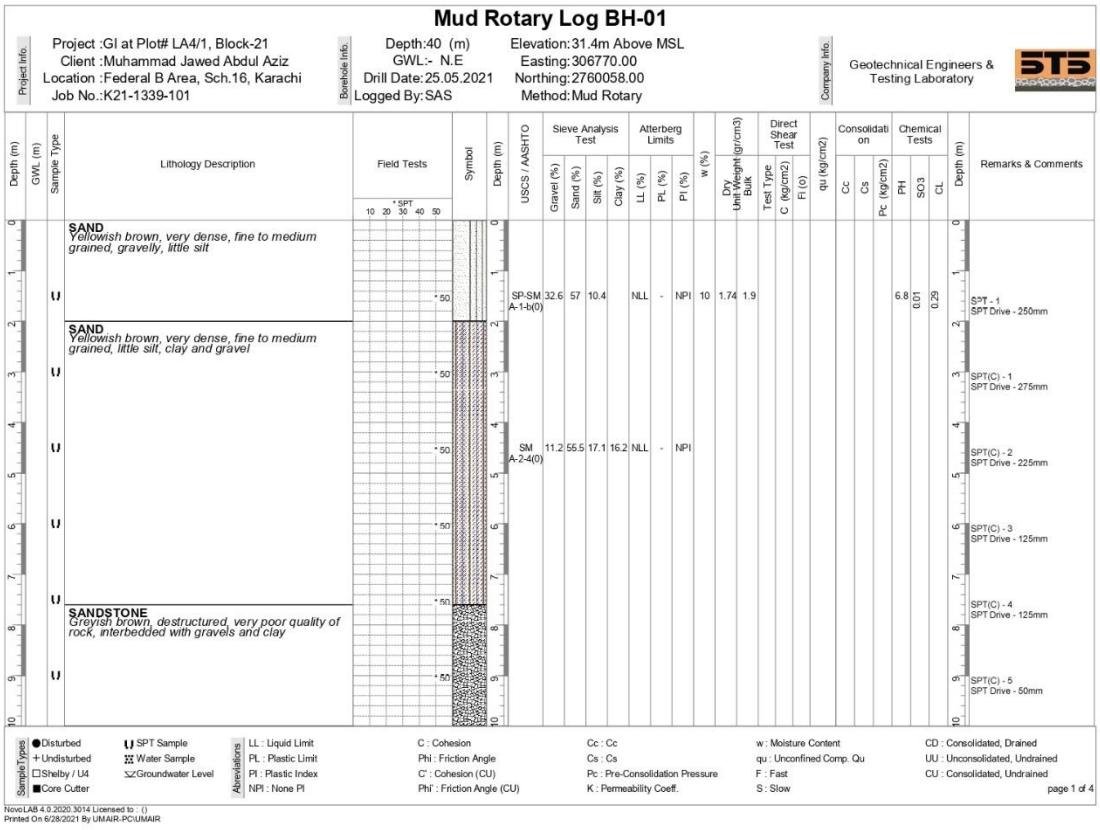
Borehole Location Plan

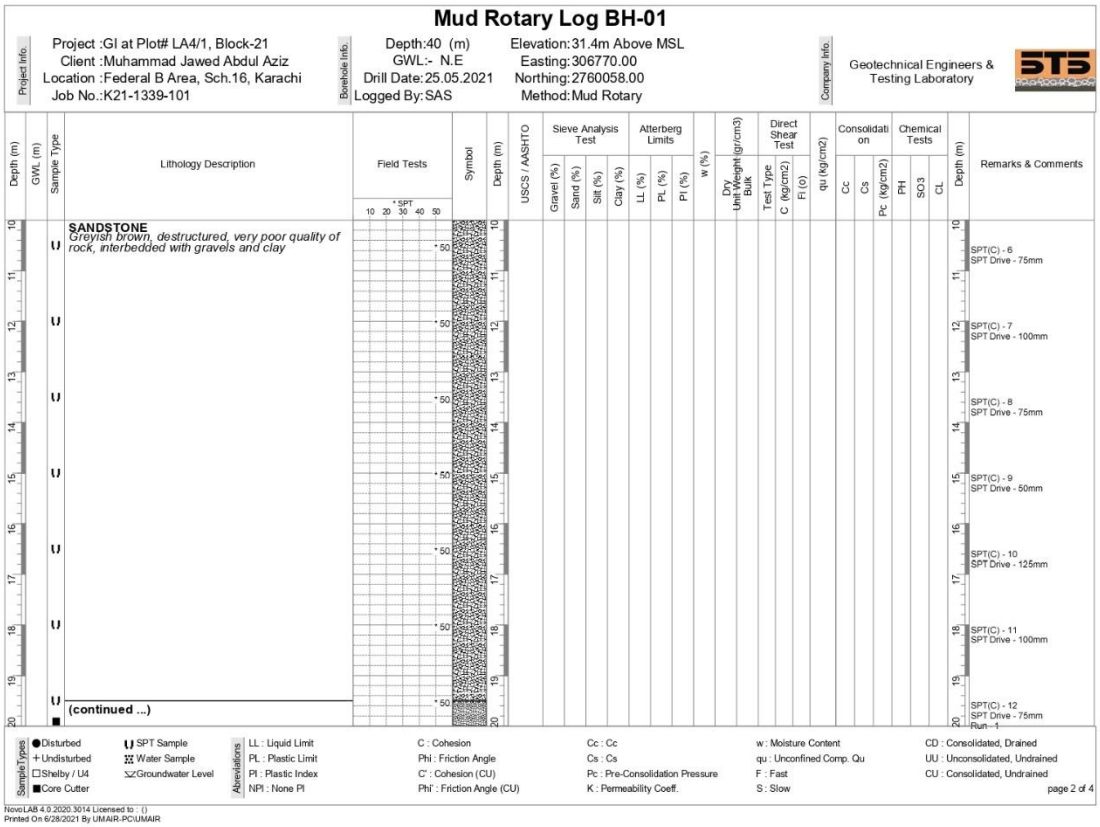


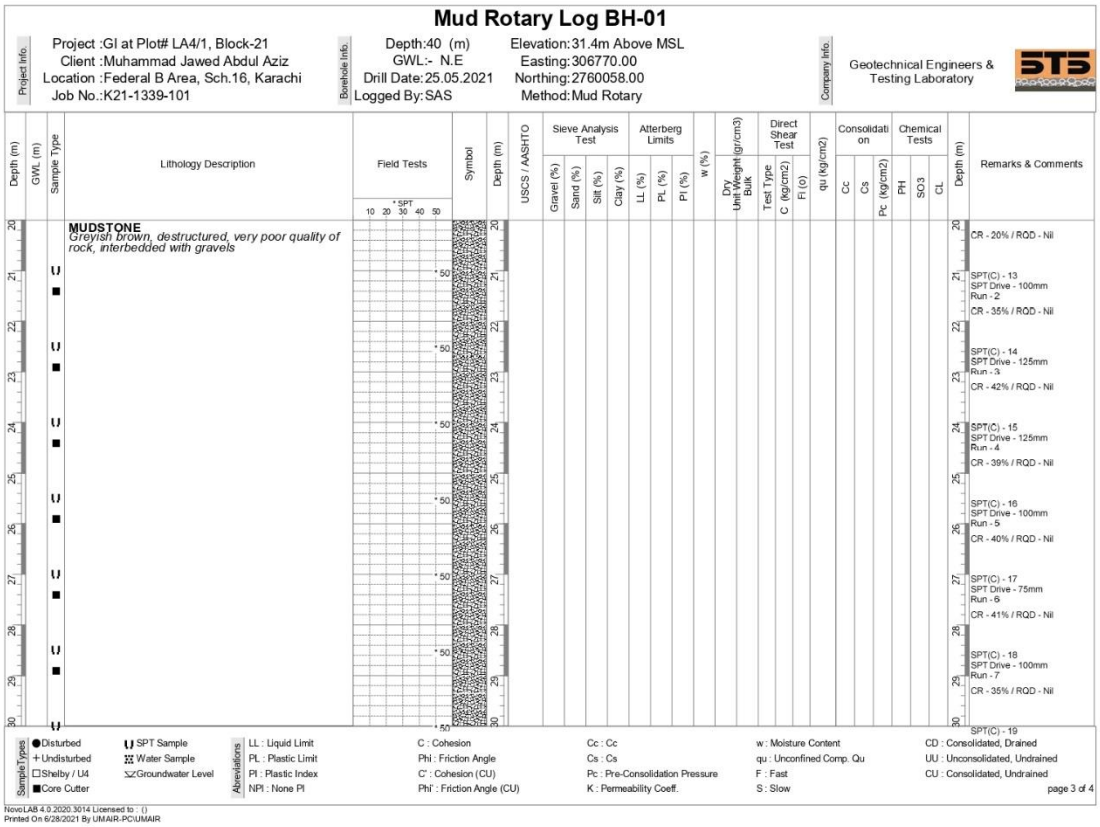
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Mr. Muhammad Jawed Abdul Aziz	Geotechnical Investigation for Construction of 2B+G+35 Building at Plot # LA4/1, Block 21, F.B. Area, Karachi	

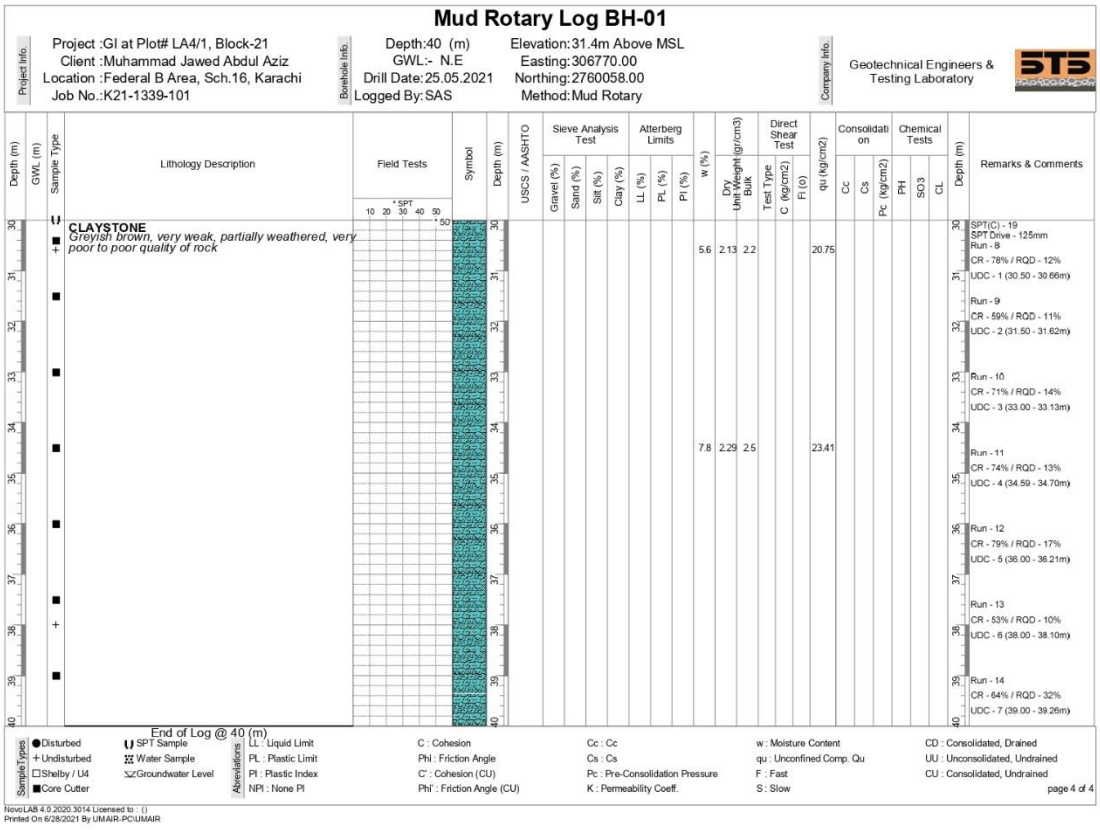
Appendix B

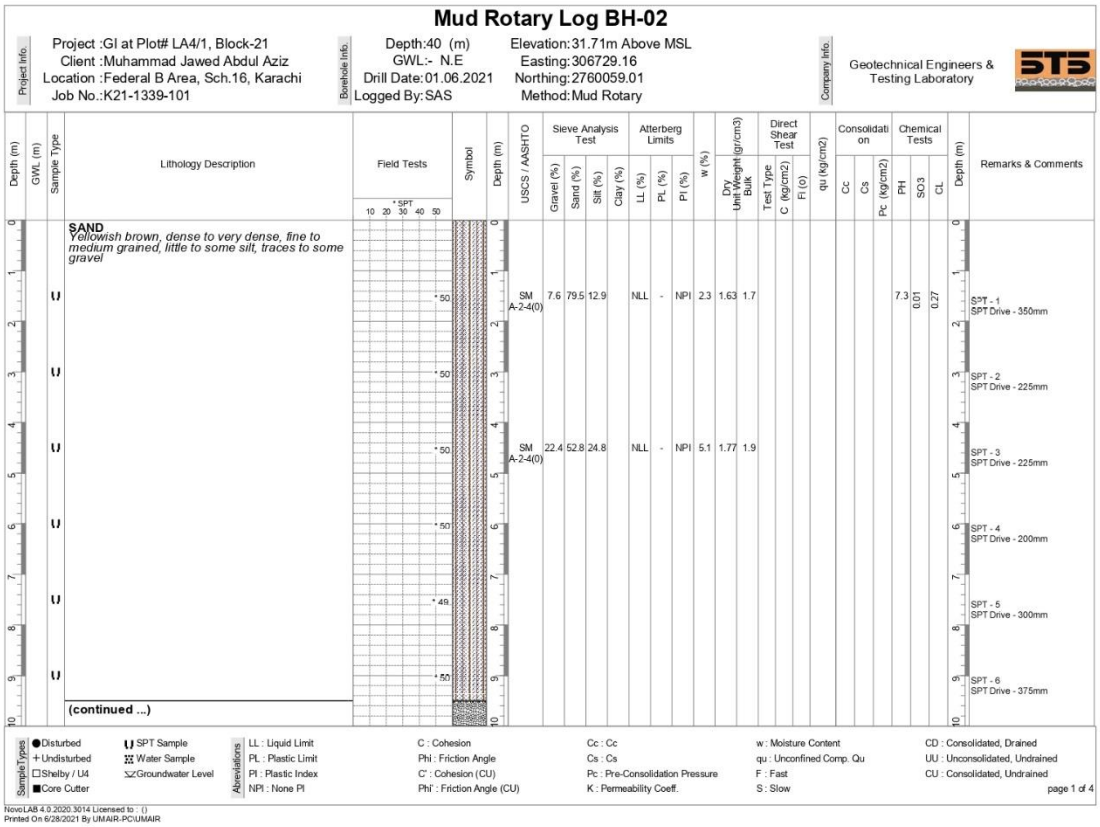
Borehole Logs

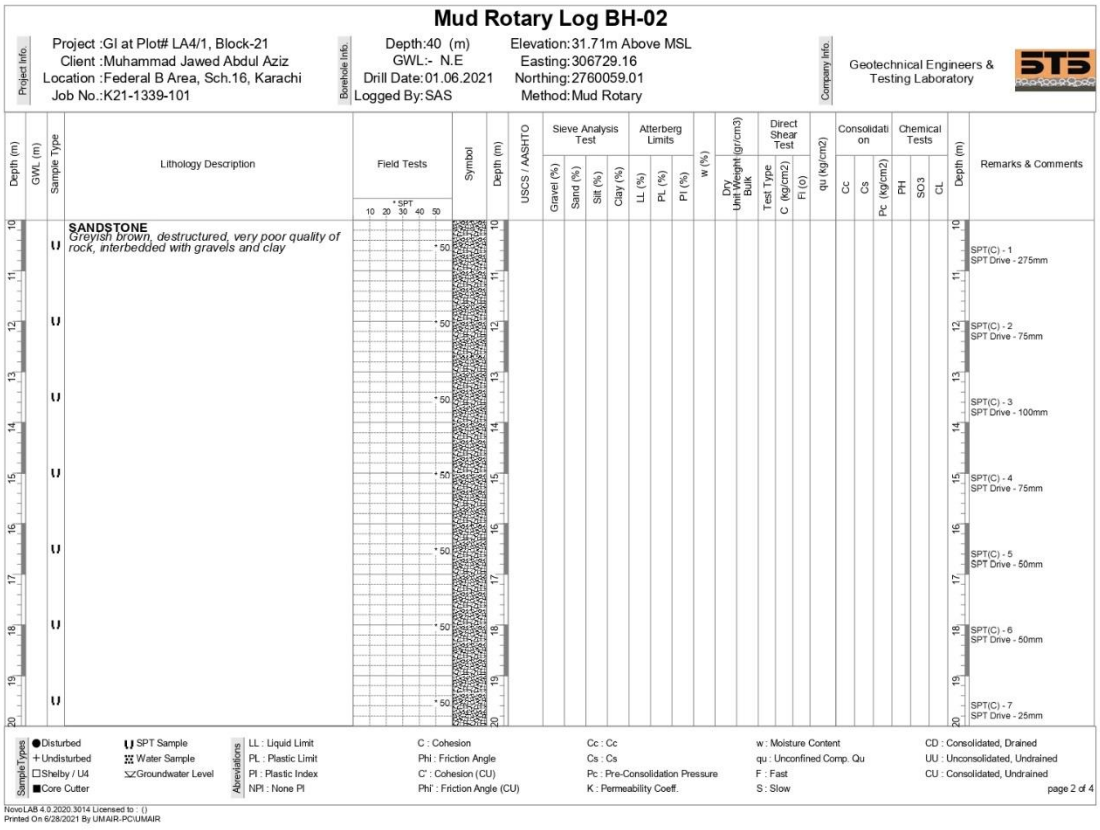

Mud Rotary Log BH-01
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:40 (m)
GWL:- N.E
Drill Date:25.05.2021
Logged By:SAS
Elevation:31.4m Above MSL
Easting:306770.00
Northing:2760058.00
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
SAND
Yellowish brown, very dense, fine to medium grained, gravelly, little silt
SAND
Yellowish brown, very dense, fine to medium grained, little silt, clay and gravel
SANDSTONE
Greyish brown, destructured, very poor quality of rock, interbedded with gravels and clay
SP-SM A-1-b(0)
SM A-2-4(0)
SPT - 1 SPT Drive - 250mm
SPT(C) - 1 SPT Drive - 275mm
SPT(C) - 2 SPT Drive - 225mm
SPT(C) - 3 SPT Drive - 125mm
SPT(C) - 4 SPT Drive - 125mm
SPT(C) - 5 SPT Drive - 50mm
page 1 of 4

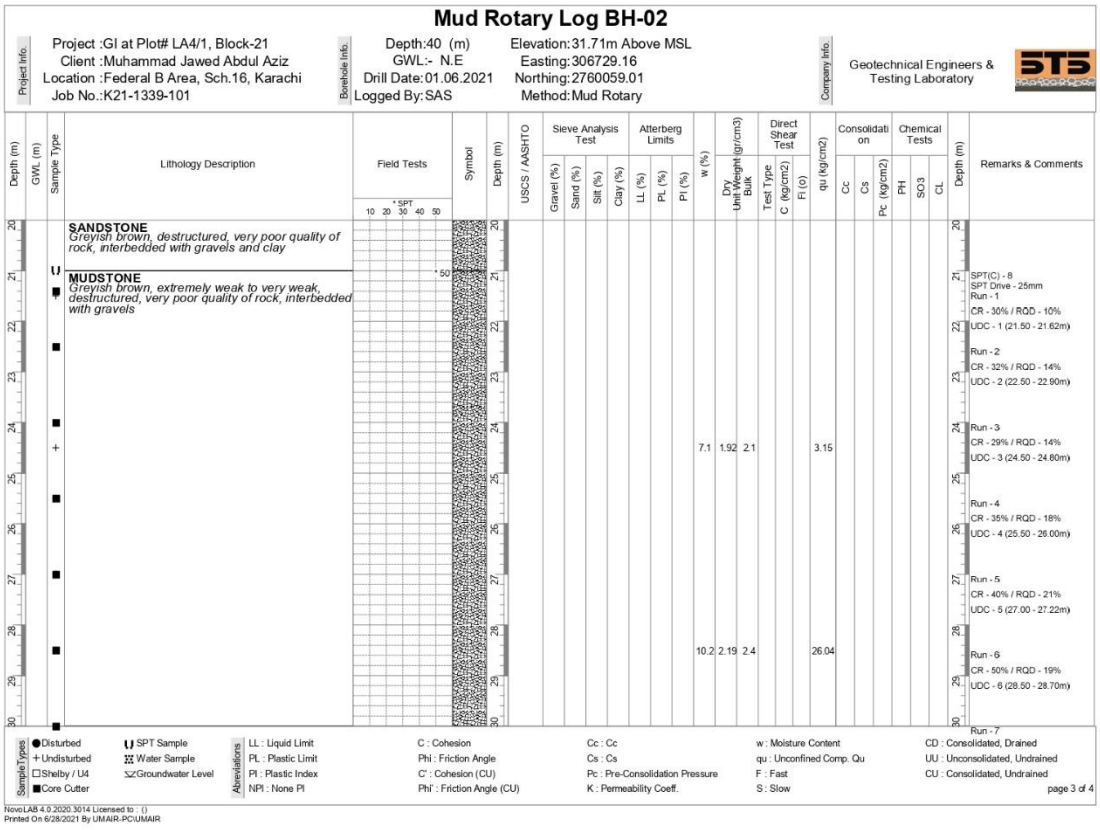

Mud Rotary Log BH-01
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:40 (m)
GWL:- N.E
Drill Date:25.05.2021
Logged By:SAS
Elevation:31.4m Above MSL
Easting:306770.00
Northing:2760058.00
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
SANDSTONE
Greyish brown, destructured, very poor quality of rock, interbedded with gravels and clay
(continued ...)
SPT(C) - 6 SPT Drive - 75mm
SPT(C) - 7 SPT Drive - 100mm
SPT(C) - 8 SPT Drive - 75mm
SPT(C) - 9 SPT Drive - 50mm
SPT(C) - 10 SPT Drive - 125mm
SPT(C) - 11 SPT Drive - 100mm
SPT(C) - 12 SPT Drive - 75mm
Run - 1
page 2 of 4

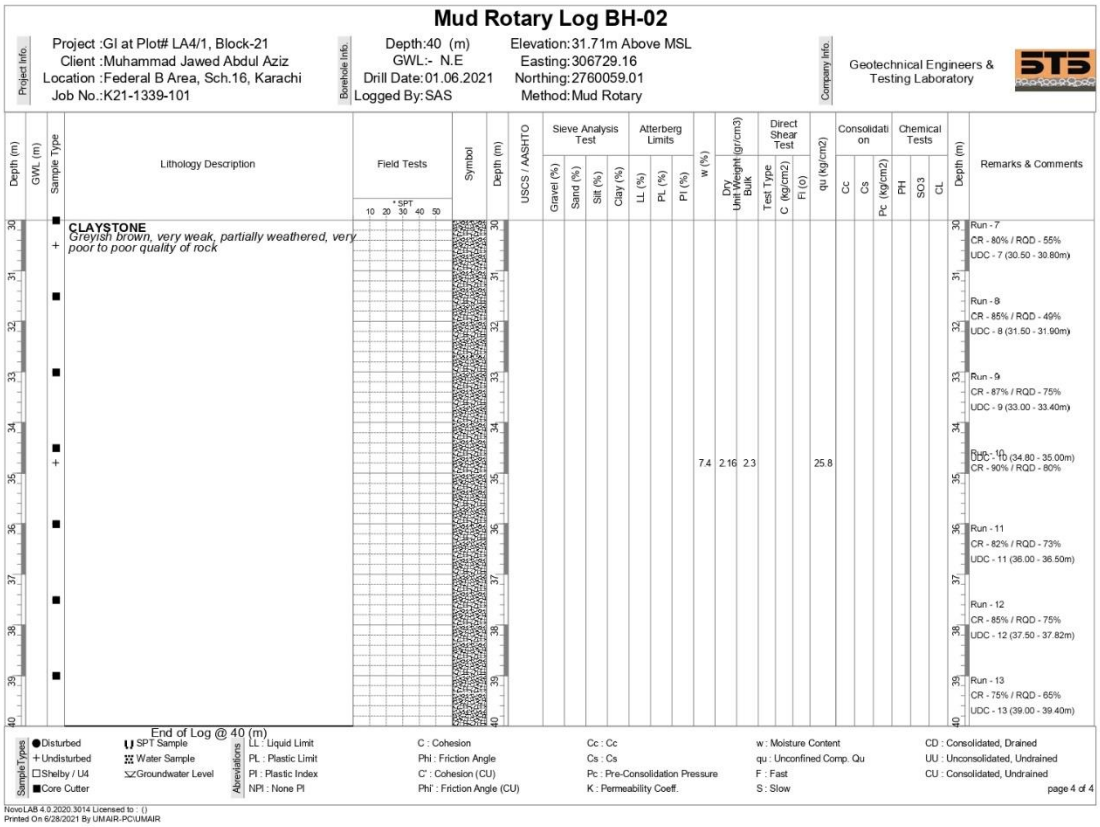

Mud Rotary Log BH-01
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:40 (m)
GWL:- N.E
Drill Date:25.05.2021
Logged By:SAS
Elevation:31.4m Above MSL
Easting:306770.00
Northing:2760058.00
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
MUDSTONE
Greyish brown, destructured, very poor quality of rock, interbedded with gravels
CR - 20% / RQD - Nil
SPT(C) - 13
SPT Drive - 100mm
Run - 2
CR - 35% / RQD - Nil
SPT(C) - 14
SPT Drive - 125mm
Run - 3
CR - 42% / RQD - Nil
SPT(C) - 15
SPT Drive - 125mm
Run - 4
CR - 39% / RQD - Nil
SPT(C) - 16
SPT Drive - 100mm
Run - 5
CR - 40% / RQD - Nil
SPT(C) - 17
SPT Drive - 75mm
Run - 6
CR - 41% / RQD - Nil
SPT(C) - 18
SPT Drive - 100mm
Run - 7
CR - 35% / RQD - Nil
SPT(C) - 19
page 3 of 4

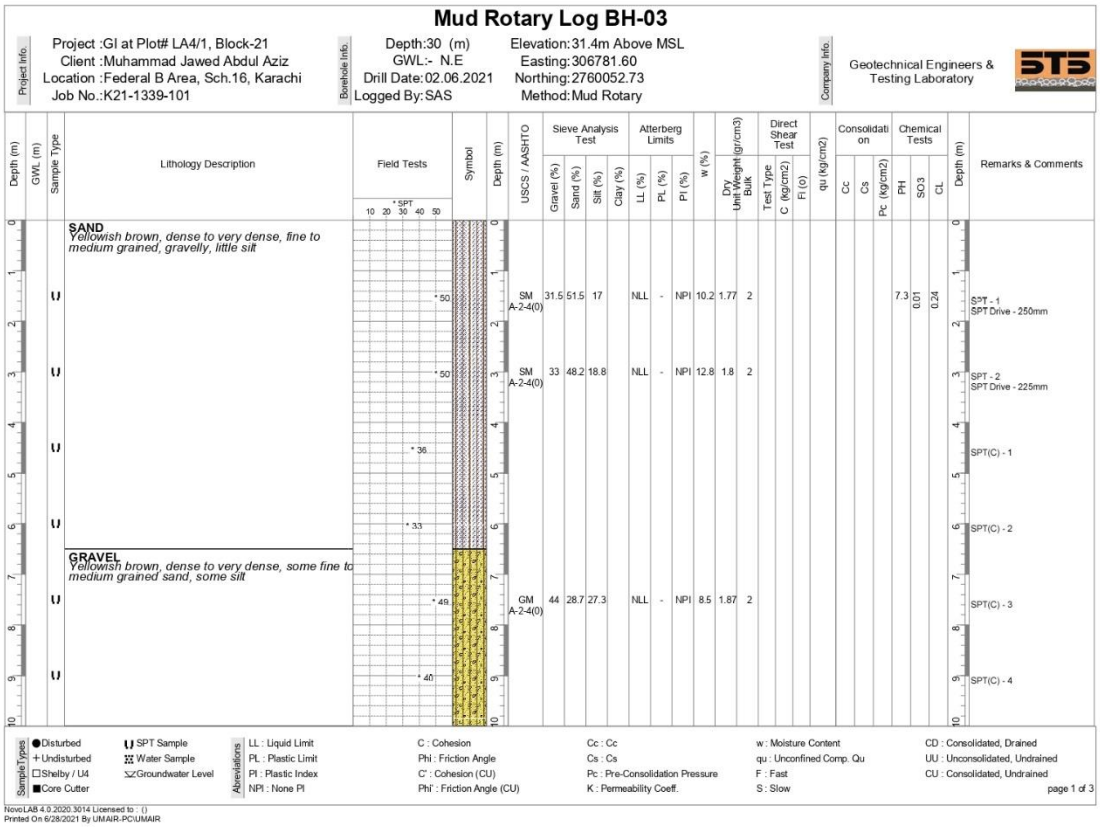

Mud Rotary Log BH-01
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:40 (m)
GWL:- N.E
Drill Date:25.05.2021
Logged By:SAS
Elevation:31.4m Above MSL
Easting:306770.00
Northing:2760058.00
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
CLAYSTONE
Greyish brown, very weak, partially weathered, very poor to poor quality of rock
End of Log @ 40 (m)
SPT(C) - 19
SPT Drive - 125mm
Run - 8
CR - 78% / RQD - 12%
UDC - 1 (30.50 - 30.66m)
Run - 9
CR - 59% / RQD - 11%
UDC - 2 (31.50 - 31.62m)
Run - 10
CR - 71% / RQD - 14%
UDC - 3 (33.00 - 33.13m)
Run - 11
CR - 74% / RQD - 13%
UDC - 4 (34.59 - 34.70m)
Run - 12
CR - 79% / RQD - 17%
UDC - 5 (36.00 - 36.21m)
Run - 13
CR - 53% / RQD - 10%
UDC - 6 (38.00 - 38.10m)
Run - 14
CR - 64% / RQD - 32%
UDC - 7 (39.00 - 39.26m)
page 4 of 4

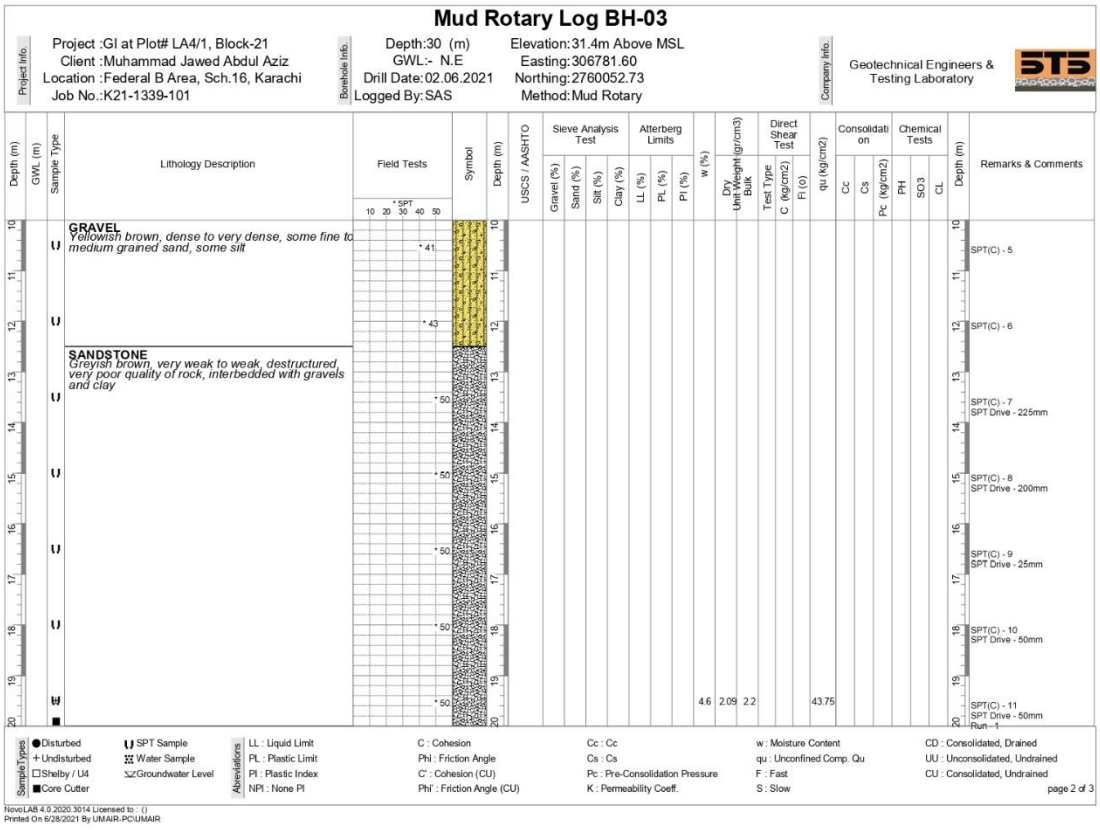

Mud Rotary Log BH-02
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:40 (m)
GWL:- N.E
Drill Date:01.06.2021
Logged By:SAS
Elevation:31.71m Above MSL
Easting:306729.16
Northing:2760059.01
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
SAND
Yellowish brown, dense to very dense, fine to medium grained, little to some silt, traces to some gravel
(continued ...)
SM A-2-4(0) 7.6 79.5 12.9 NLL - NPI 2.3 1.63 1.7 7.3 0.01 0.27
SM A-2-4(0) 22.4 52.8 24.8 NLL - NPI 5.1 1.77 1.9
SPT - 1 SPT Drive - 350mm
SPT - 2 SPT Drive - 225mm
SPT - 3 SPT Drive - 225mm
SPT - 4 SPT Drive - 200mm
SPT - 5 SPT Drive - 300mm
SPT - 6 SPT Drive - 375mm
page 1 of 4

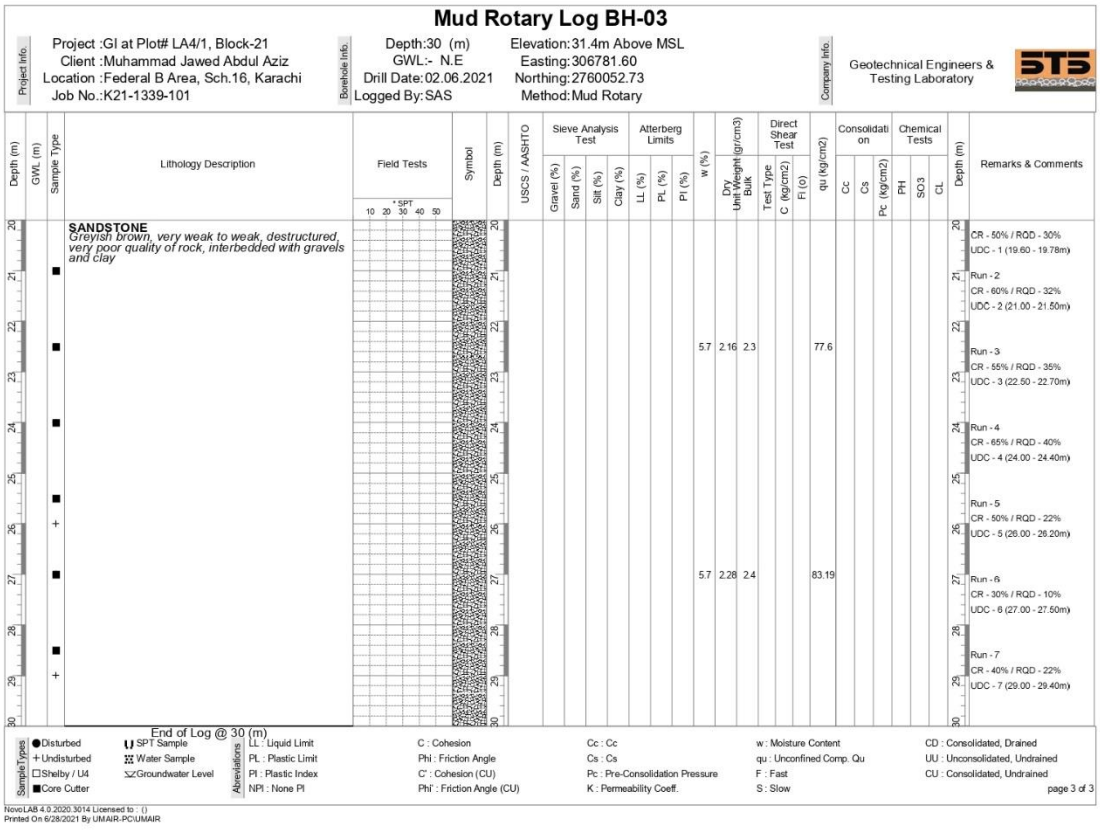

Mud Rotary Log BH-02
Project Info.
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Borehole Info.
Depth:40 (m)
GWL:- N.E
Drill Date:01.06.2021
Logged By:SAS
Elevation:31.71m Above MSL
Easting:306729.16
Northing:2760059.01
Method:Mud Rotary
Company Info.
Geotechnical Engineers & Testing Laboratory
STS
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)
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
SANDSTONE
Greyish brown, destructured, very poor quality of rock, interbedded with gravels and clay
* 50
SPT(C) - 1
SPT Drive - 275mm
SPT(C) - 2
SPT Drive - 75mm
SPT(C) - 3
SPT Drive - 100mm
SPT(C) - 4
SPT Drive - 75mm
SPT(C) - 5
SPT Drive - 50mm
SPT(C) - 6
SPT Drive - 50mm
SPT(C) - 7
SPT Drive - 25mm
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
page 2 of 4
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Mud Rotary Log BH-02
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:40 (m)
GWL:- N.E
Drill Date:01.06.2021
Logged By:SAS
Elevation:31.71m Above MSL
Easting:306729.16
Northing:2760059.01
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
SANDSTONE
Greyish brown, destructured, very poor quality of rock, interbedded with gravels and clay
MUDSTONE
Greyish brown, extremely weak to very weak, destructured, very poor quality of rock, interbedded with gravels
SPT(C) - 8
SPT Drive - 25mm
Run - 1
CR - 30% / RQD - 10%
UDC - 1 (21.50 - 21.62m)
Run - 2
CR - 32% / RQD - 14%
UDC - 2 (22.50 - 22.90m)
Run - 3
CR - 29% / RQD - 14%
UDC - 3 (24.50 - 24.80m)
Run - 4
CR - 35% / RQD - 18%
UDC - 4 (25.50 - 26.00m)
Run - 5
CR - 40% / RQD - 21%
UDC - 5 (27.00 - 27.22m)
Run - 6
CR - 50% / RQD - 19%
UDC - 6 (28.50 - 28.70m)
Run - 7
7.1 1.92 2.1 3.15
10.2 2.19 2.4 26.04
page 3 of 4


Mud Rotary Log BH-02
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:40 (m)
GWL:- N.E
Drill Date:01.06.2021
Logged By:SAS
Elevation:31.71m Above MSL
Easting:306729.16
Northing:2760059.01
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
CLAYSTONE
Greyish brown, very weak, partially weathered, very poor to poor quality of rock
End of Log @ 40 (m)
Run - 7
CR - 80% / RQD - 55%
UDC - 7 (30.50 - 30.80m)
Run - 8
CR - 85% / RQD - 49%
UDC - 8 (31.50 - 31.90m)
Run - 9
CR - 87% / RQD - 75%
UDC - 9 (33.00 - 33.40m)
Run - 10
UDC - 10 (34.80 - 35.00m)
CR - 90% / RQD - 80%
Run - 11
CR - 82% / RQD - 73%
UDC - 11 (36.00 - 36.50m)
Run - 12
CR - 85% / RQD - 75%
UDC - 12 (37.50 - 37.82m)
Run - 13
CR - 75% / RQD - 65%
UDC - 13 (39.00 - 39.40m)
page 4 of 4


Mud Rotary Log BH-03
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:30 (m)
GWL:- N.E
Drill Date:02.06.2021
Logged By:SAS
Elevation:31.4m Above MSL
Easting:306781.60
Northing:2760052.73
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
SAND
Yellowish brown, dense to very dense, fine to medium grained, gravelly, little silt
GRAVEL
Yellowish brown, dense to very dense, some fine to medium grained sand, some silt
SM A-2-4(0) 31.5 51.5 17 NLL - NPI 10.2 1.77 2 7.3 0.01 0.24
SM A-2-4(0) 33 48.2 18.8 NLL - NPI 12.8 1.8 2
GM A-2-4(0) 44 28.7 27.3 NLL - NPI 8.5 1.87 2
SPT - 1
SPT Drive - 250mm
SPT - 2
SPT Drive - 225mm
SPT(C) - 1
SPT(C) - 2
SPT(C) - 3
SPT(C) - 4
Disturbed
Undisturbed
Shelby / U4
Core Cutter
SPT Sample
Water Sample
Groundwater Level
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
page 1 of 3
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Mud Rotary Log BH-03
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:30 (m)
GWL:- N.E
Drill Date:02.06.2021
Logged By:SAS
Elevation:31.4m Above MSL
Easting:306781.60
Northing:2760052.73
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
GRAVEL
Yellowish brown, dense to very dense, some fine to medium grained sand, some silt
SANDSTONE
Greyish brown, very weak to weak, destructured, very poor quality of rock, interbedded with gravels and clay
SPT(C) - 5
SPT(C) - 6
SPT(C) - 7
SPT Drive - 225mm
SPT(C) - 8
SPT Drive - 200mm
SPT(C) - 9
SPT Drive - 25mm
SPT(C) - 10
SPT Drive - 50mm
SPT(C) - 11
SPT Drive - 50mm
Run - 1
page 2 of 3



Mud Rotary Log BH-03

Project Info.
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101

Borehole Info.
Depth:30 (m) Elevation:31.4m Above MSL
GWL:- N.E Easting:306781.60
Drill Date:02.06.2021 Northing:2760052.73
Logged By:SAS Method:Mud Rotary

Company Info.
Geotechnical Engineers & Testing Laboratory

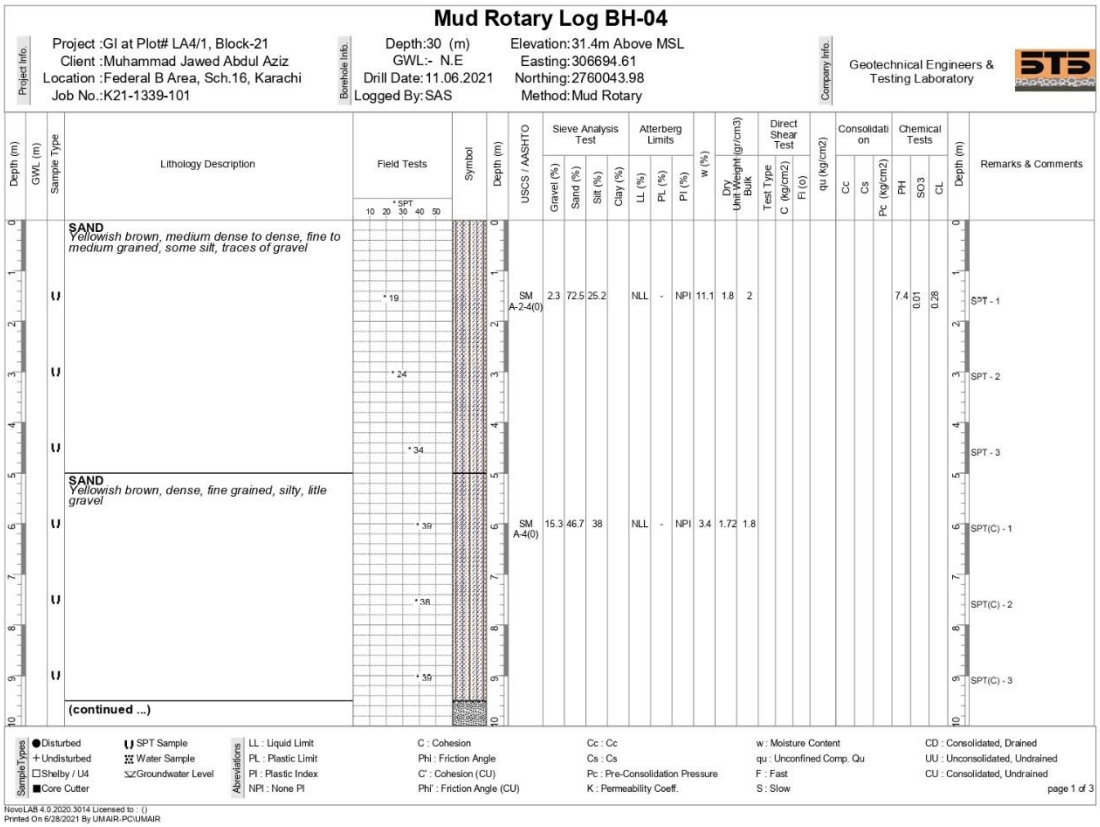
Depth (m)	GWL (m)	Sample Type	Lithology Description	Field Tests (* SPT)	Symbol	Depth (m)	USCS / AASHTO	Sieve Analysis Test: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Atterberg Limits: LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	Direct Shear Test: Test Type	C (kg/cm2)	FI (o)	qu (kg/cm2)	Consolidation: Cc	Cs	Pc (kg/cm2)	Chemical Tests: PH	SO3	CL	Depth (m)	Remarks & Comments
20			**SANDSTONE** *Greyish brown, very weak to weak, destructured, very poor quality of rock, interbedded with gravels and clay*			20																						20	CR - 50% / RQD - 30% UDC - 1 (19.60 - 19.78m)
21		■				21																						21	Run - 2 CR - 60% / RQD - 32% UDC - 2 (21.00 - 21.50m)
22		■				22									5.7	2.16	2.3				77.6							22	Run - 3 CR - 55% / RQD - 35% UDC - 3 (22.50 - 22.70m)
23						23																						23	
24		■				24																						24	Run - 4 CR - 65% / RQD - 40% UDC - 4 (24.00 - 24.40m)
25		■				25																						25	Run - 5 CR - 50% / RQD - 22% UDC - 5 (26.00 - 26.20m)
26		+				26																						26	
27		■				27									5.7	2.28	2.4				83.19							27	Run - 6 CR - 30% / RQD - 10% UDC - 6 (27.00 - 27.50m)
28		■				28																						28	Run - 7 CR - 40% / RQD - 22% UDC - 7 (29.00 - 29.40m)
29		+				29																						29	
30			End of Log @ 30 (m)			30																						30	

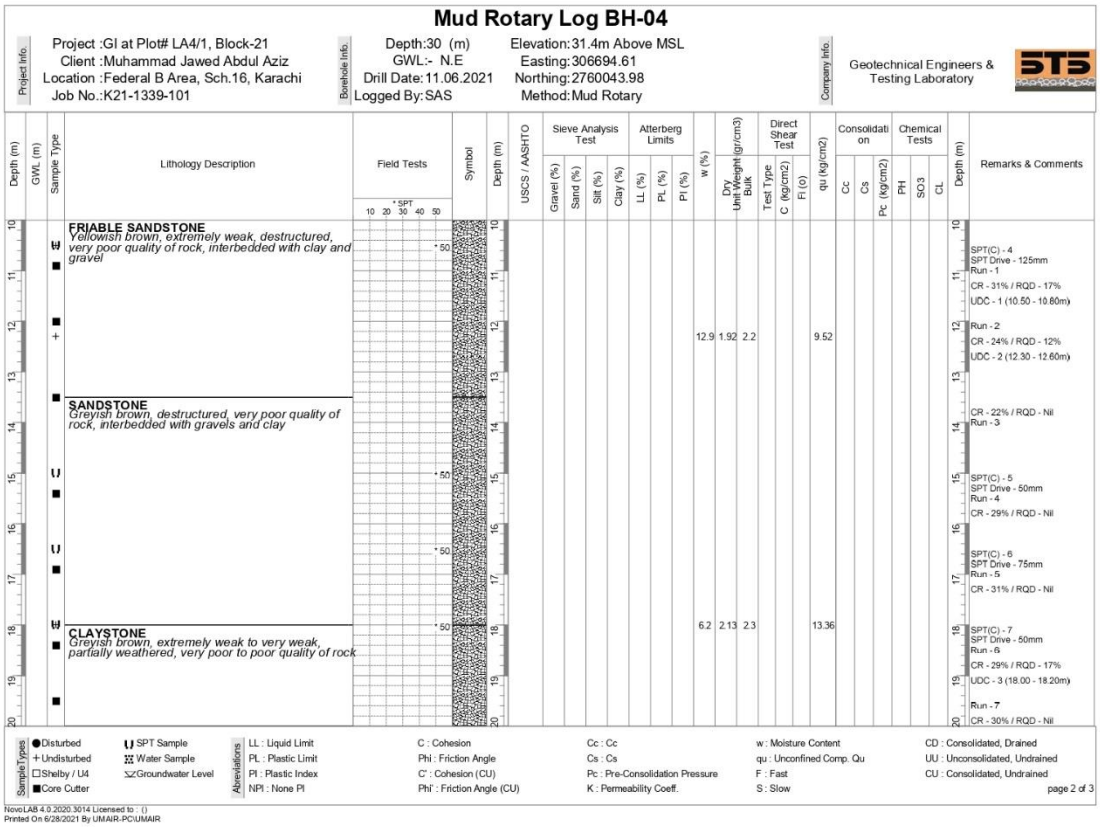
Sample Types: ● Disturbed; + Undisturbed; ☐ Shelby / U4; ■ Core Cutter; SPT Sample; Water Sample; Groundwater Level

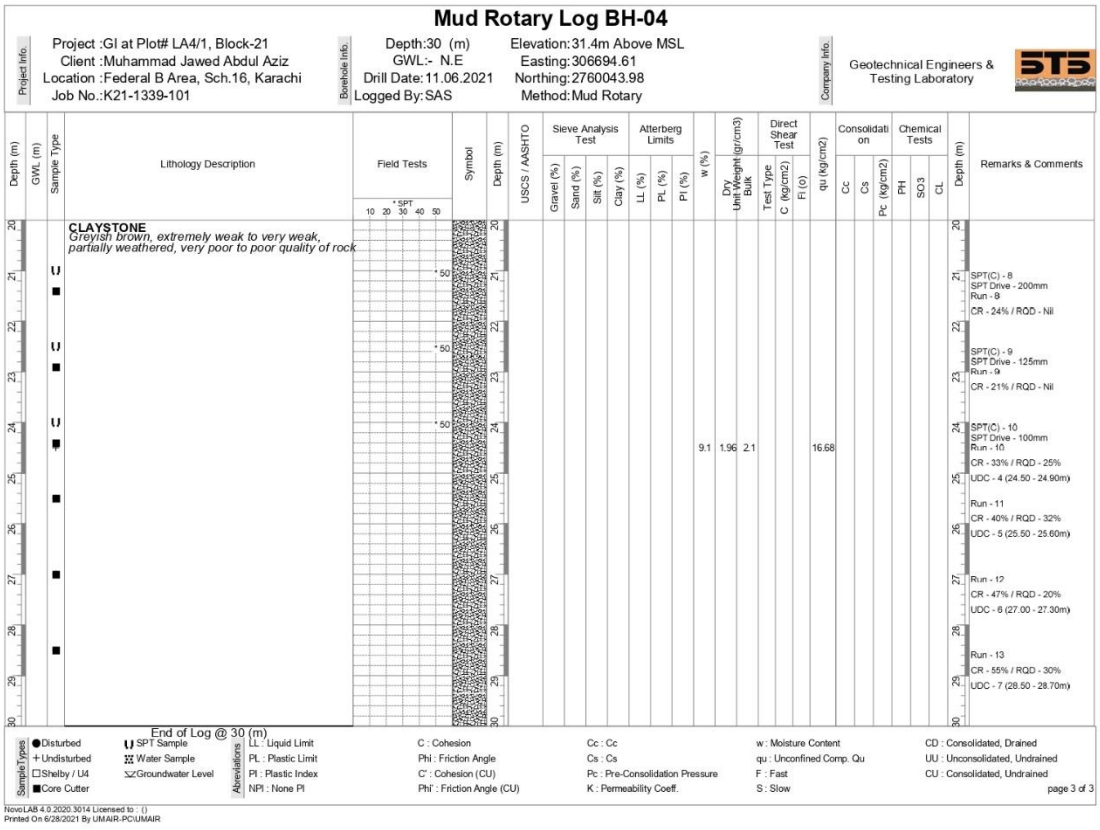
Abbreviations: LL : Liquid Limit; PL : Plastic Limit; PI : Plastic Index; NPI : None PI; C : Cohesion; Phi : Friction Angle; C' : Cohesion (CU); Phi' : Friction Angle (CU); Cc : Cc; Cs : Cs; Pc : Pre-Consolidation Pressure; K : Permeability Coeff.; w : Moisture Content; qu : Unconfined Comp. Qu; F :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

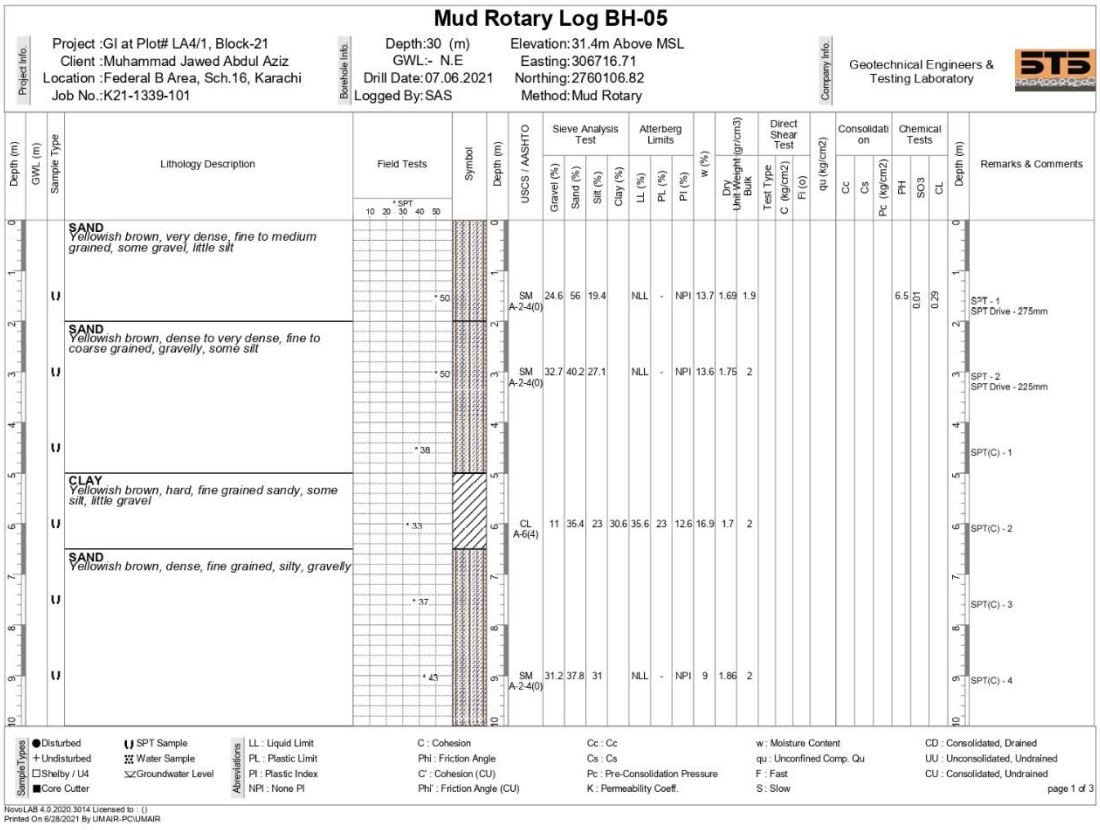
page 3 of 3

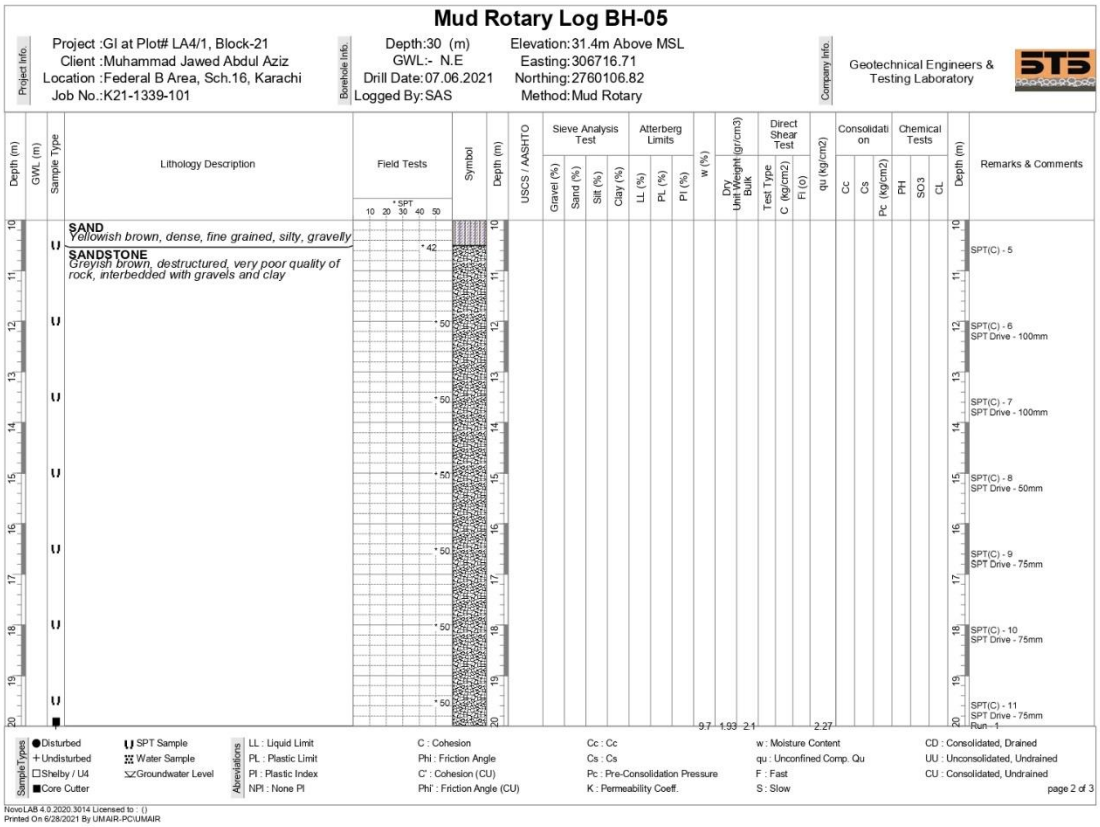
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Mud Rotary Log BH-04
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:30 (m)
GWL:- N.E
Drill Date:11.06.2021
Logged By:SAS
Elevation:31.4m Above MSL
Easting:306694.61
Northing:2760043.98
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
SAND
Yellowish brown, medium dense to dense, fine to medium grained, some silt, traces of gravel
SAND
Yellowish brown, dense, fine grained, silty, litle gravel
(continued ...)
SM
A-2-4(0)
SM
A-4(0)
SPT - 1
SPT - 2
SPT - 3
SPT(C) - 1
SPT(C) - 2
SPT(C) - 3
page 1 of 3

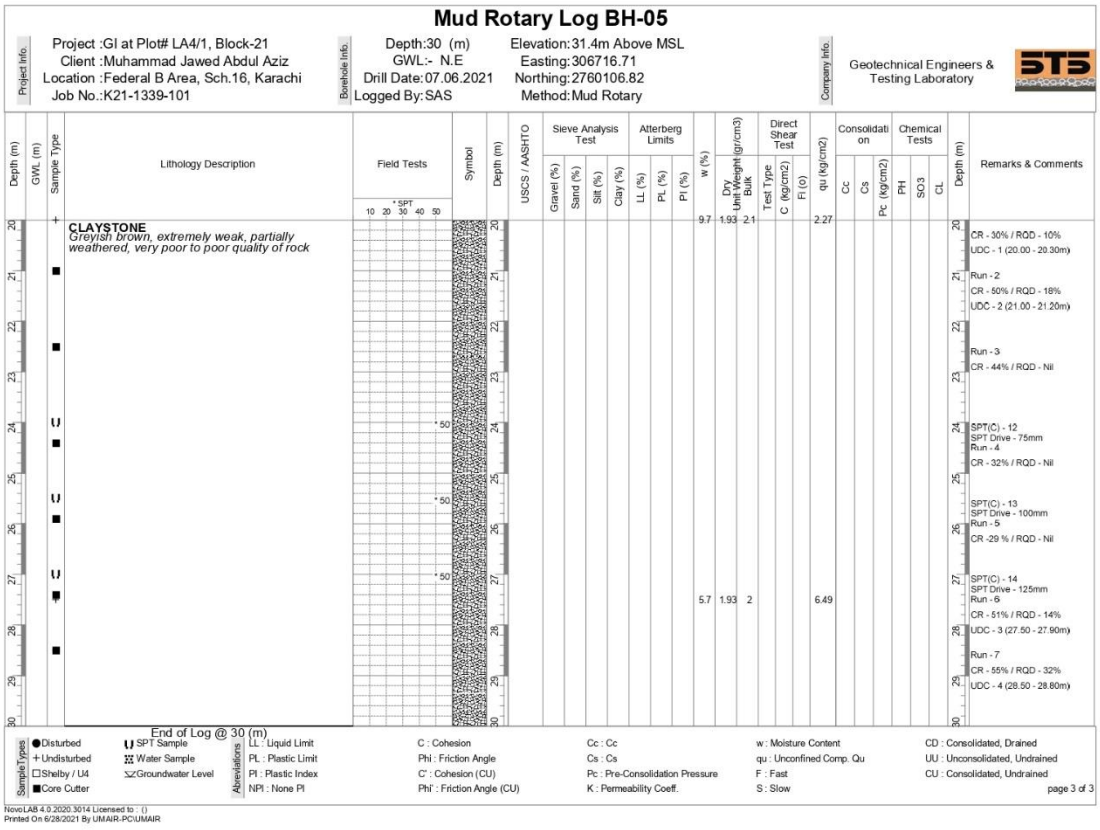

Mud Rotary Log BH-04
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:30 (m)
GWL:- N.E
Drill Date:11.06.2021
Logged By:SAS
Elevation:31.4m Above MSL
Easting:306694.61
Northing:2760043.98
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
FRIABLE SANDSTONE
Yellowish brown, extremely weak, destructured, very poor quality of rock, interbedded with clay and gravel
SANDSTONE
Greyish brown, destructured, very poor quality of rock, interbedded with gravels and clay
CLAYSTONE
Greyish brown, extremely weak to very weak, partially weathered, very poor to poor quality of rock
SPT(C) - 4
SPT Drive - 125mm
Run - 1
CR - 31% / RQD - 17%
UDC - 1 (10.50 - 10.80m)
Run - 2
CR - 24% / RQD - 12%
UDC - 2 (12.30 - 12.60m)
CR - 22% / RQD - Nil
Run - 3
SPT(C) - 5
SPT Drive - 50mm
Run - 4
CR - 29% / RQD - Nil
SPT(C) - 6
SPT Drive - 75mm
Run - 5
CR - 31% / RQD - Nil
SPT(C) - 7
SPT Drive - 50mm
Run - 6
CR - 29% / RQD - 17%
UDC - 3 (18.00 - 18.20m)
Run - 7
CR - 30% / RQD - Nil
Disturbed
Undisturbed
Shelby / U4
Core Cutter
SPT Sample
Water Sample
Groundwater Level
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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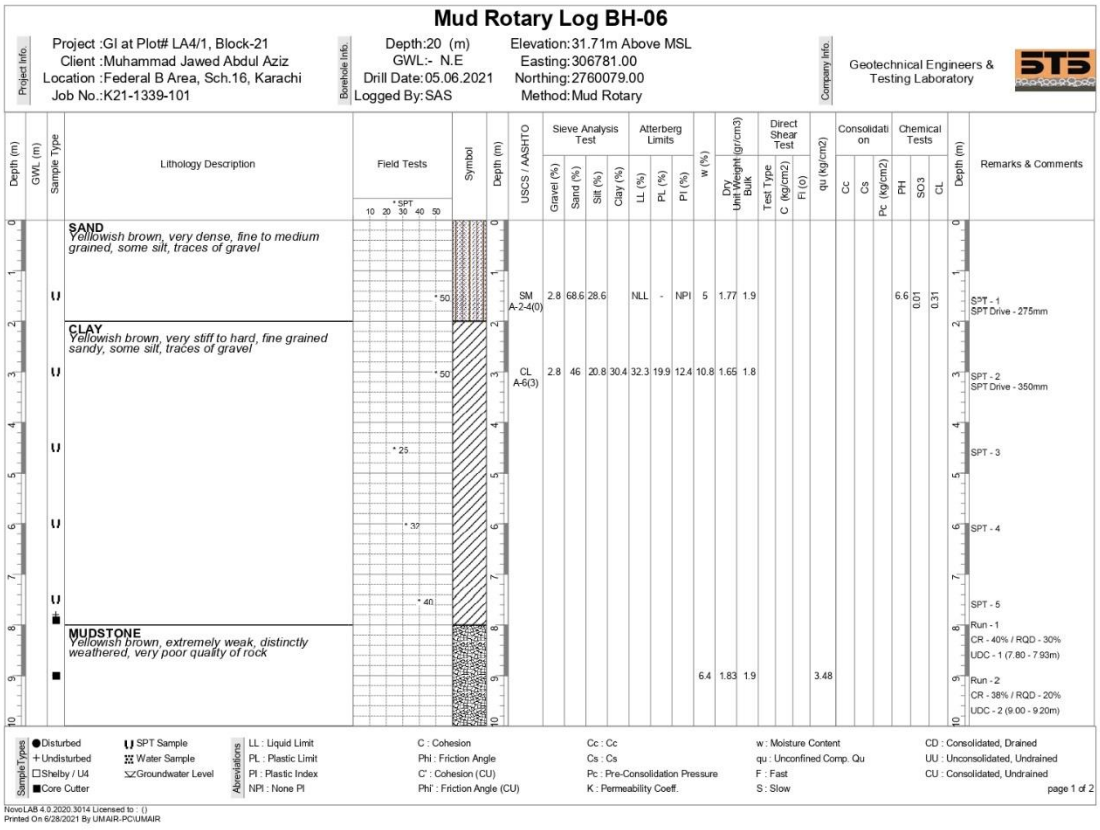

Mud Rotary Log BH-04
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:30 (m)
GWL:- N.E
Drill Date:11.06.2021
Logged By:SAS
Elevation:31.4m Above MSL
Easting:306694.61
Northing:2760043.98
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
CLAYSTONE
Greyish brown, extremely weak to very weak, partially weathered, very poor to poor quality of rock
End of Log @ 30 (m)
SPT(C) - 8
SPT Drive - 200mm
Run - 8
CR - 24% / RQD - Nil
SPT(C) - 9
SPT Drive - 125mm
Run - 9
CR - 21% / RQD - Nil
SPT(C) - 10
SPT Drive - 100mm
Run - 10
CR - 33% / RQD - 25%
UDC - 4 (24.50 - 24.90m)
Run - 11
CR - 40% / RQD - 32%
UDC - 5 (25.50 - 25.60m)
Run - 12
CR - 47% / RQD - 20%
UDC - 6 (27.00 - 27.30m)
Run - 13
CR - 55% / RQD - 30%
UDC - 7 (28.50 - 28.70m)
page 3 of 3


Mud Rotary Log BH-05
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:30 (m)
GWL:- N.E
Drill Date:07.06.2021
Logged By:SAS
Elevation:31.4m Above MSL
Easting:306716.71
Northing:2760106.82
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
SAND
Yellowish brown, very dense, fine to medium grained, some gravel, little silt
SAND
Yellowish brown, dense to very dense, fine to coarse grained, gravelly, some silt
CLAY
Yellowish brown, hard, fine grained sandy, some silt, little gravel
SAND
Yellowish brown, dense, fine grained, silty, gravelly
SPT - 1
SPT Drive - 275mm
SPT - 2
SPT Drive - 225mm
SPT(C) - 1
SPT(C) - 2
SPT(C) - 3
SPT(C) - 4
page 1 of 3



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Mud Rotary Log BH-05
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:30 (m)
GWL:- N.E
Drill Date:07.06.2021
Logged By:SAS
Elevation:31.4m Above MSL
Easting:306716.71
Northing:2760106.82
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
CLAYSTONE
Greyish brown, extremely weak, partially weathered, very poor to poor quality of rock
End of Log @ 30 (m)
CR - 30% / RQD - 10%
UDC - 1 (20.00 - 20.30m)
Run - 2
CR - 50% / RQD - 18%
UDC - 2 (21.00 - 21.20m)
Run - 3
CR - 44% / RQD - Nil
SPT(C) - 12
SPT Drive - 75mm
Run - 4
CR - 32% / RQD - Nil
SPT(C) - 13
SPT Drive - 100mm
Run - 5
CR -29 % / RQD - Nil
SPT(C) - 14
SPT Drive - 125mm
Run - 6
CR - 51% / RQD - 14%
UDC - 3 (27.50 - 27.90m)
Run - 7
CR - 55% / RQD - 32%
UDC - 4 (28.50 - 28.80m)
page 3 of 3

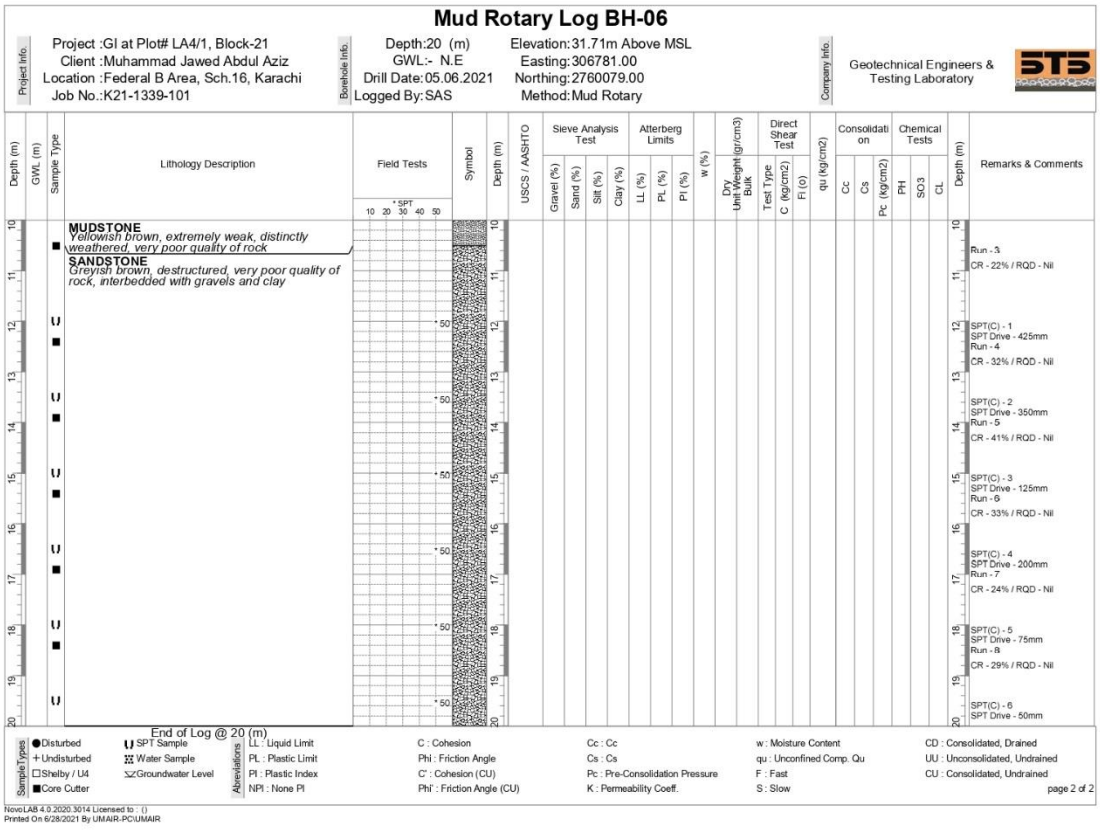


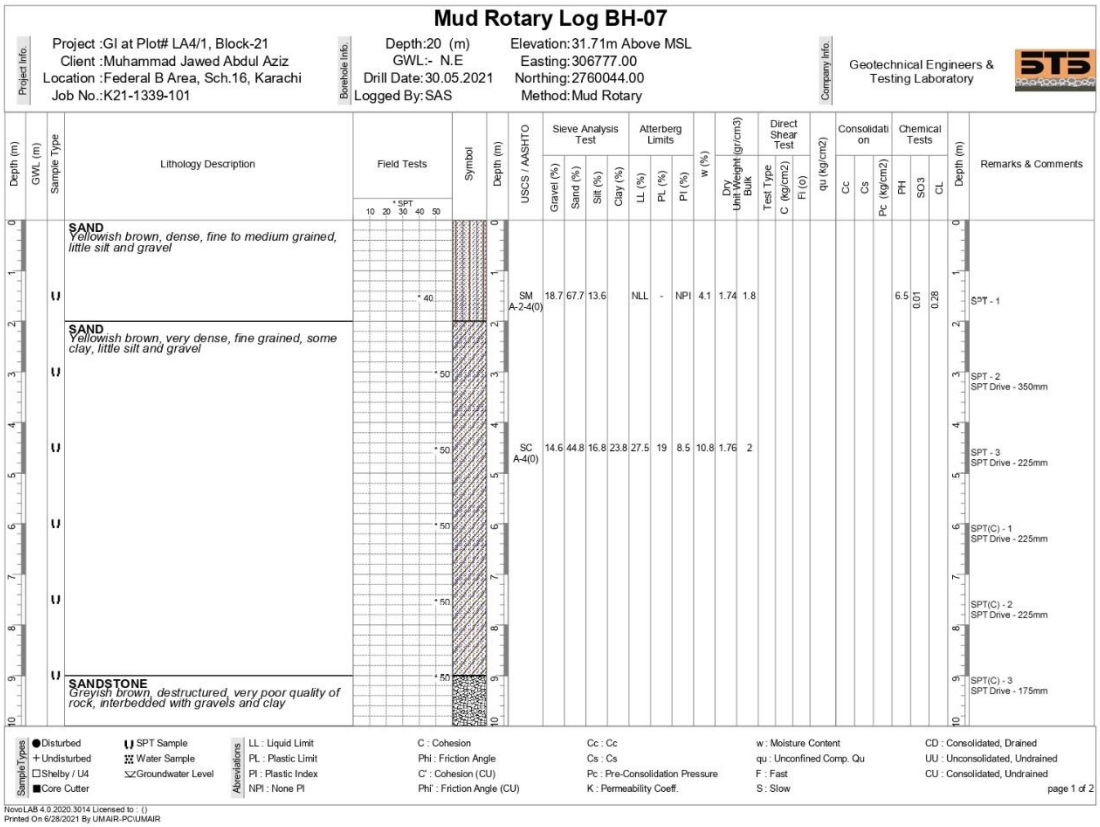
Depth (m)	USCS / AASHTO	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	LL (%)	PL (%)	PI (%)	w (%)	Dry Unit Weight (gr/cm3)	Bulk	qu (kg/cm2)	PH	SO3	CL
1	SM A-2-4(0)	2.8	68.6	28.6		NLL	-	NPI	5	1.77	1.9		6.6	0.01	0.31
3	CL A-6(3)	2.8	46	20.8	30.4	32.3	19.9	12.4	10.8	1.65	1.8				
9									6.4	1.83	1.9	3.48			

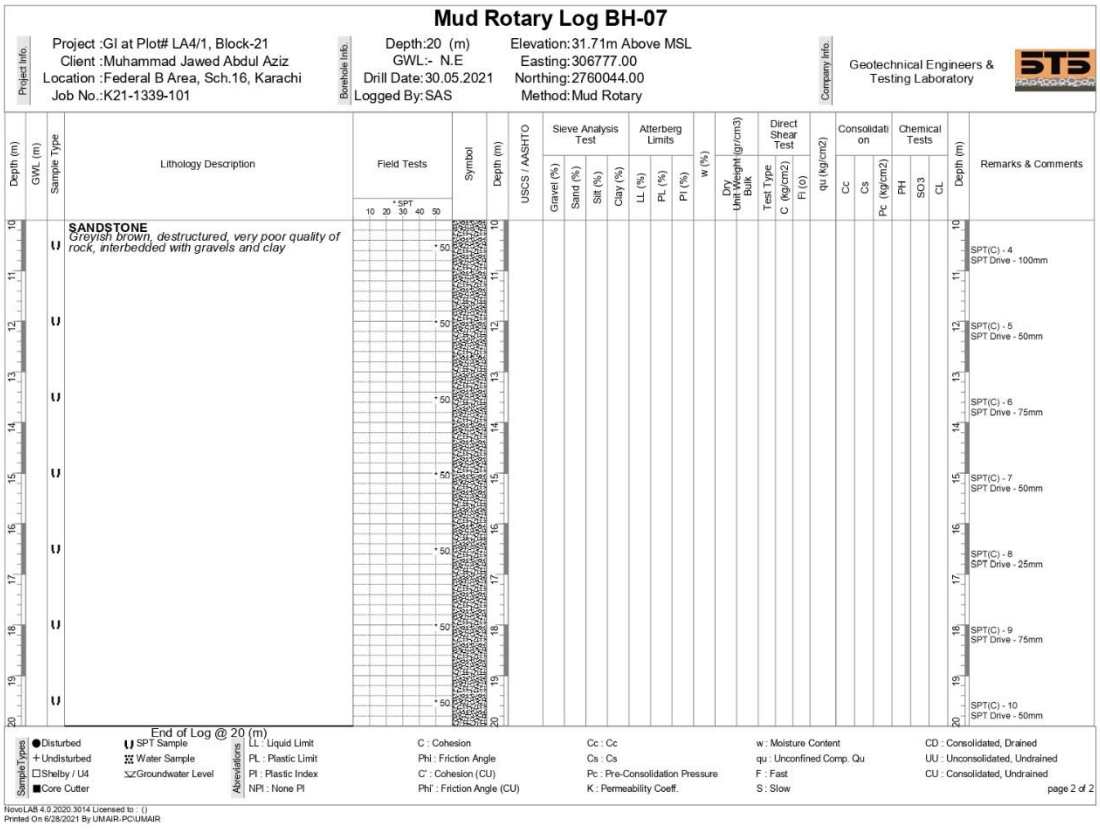
Sample Types: Disturbed; SPT Sample; Undisturbed; Water Sample; Shelby / U4; Groundwater Level; Core Cutter

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

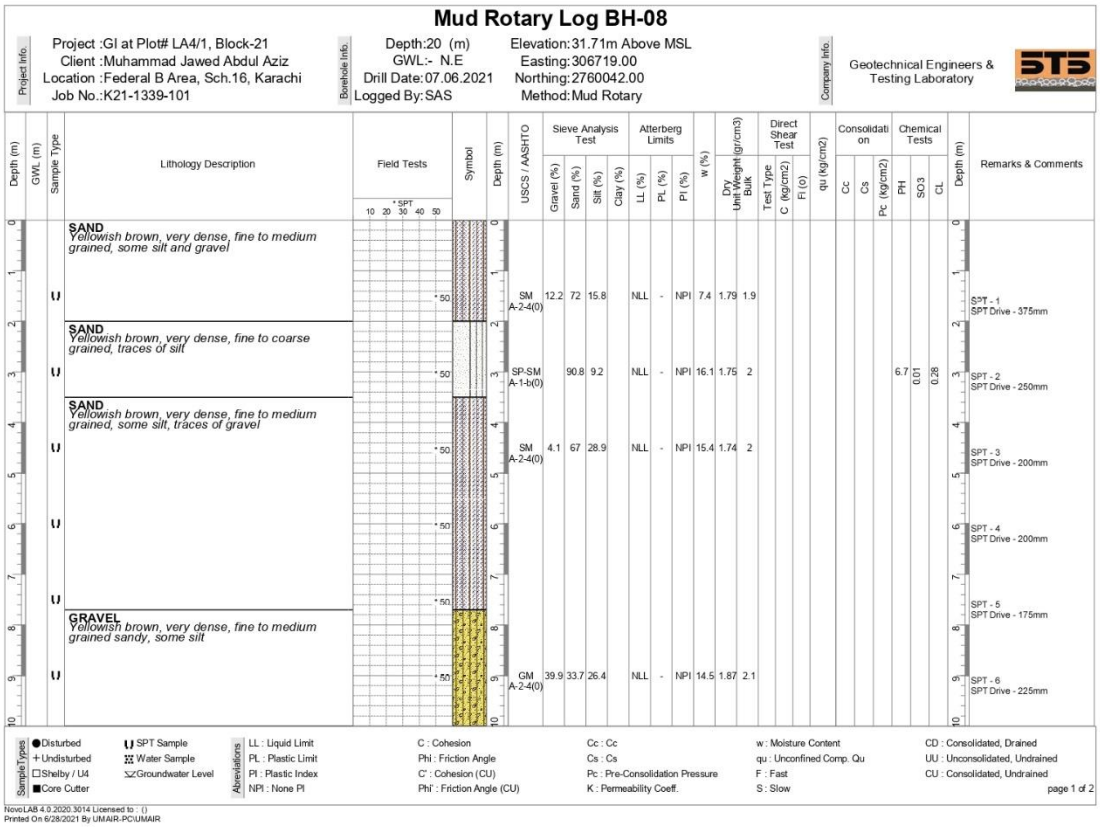
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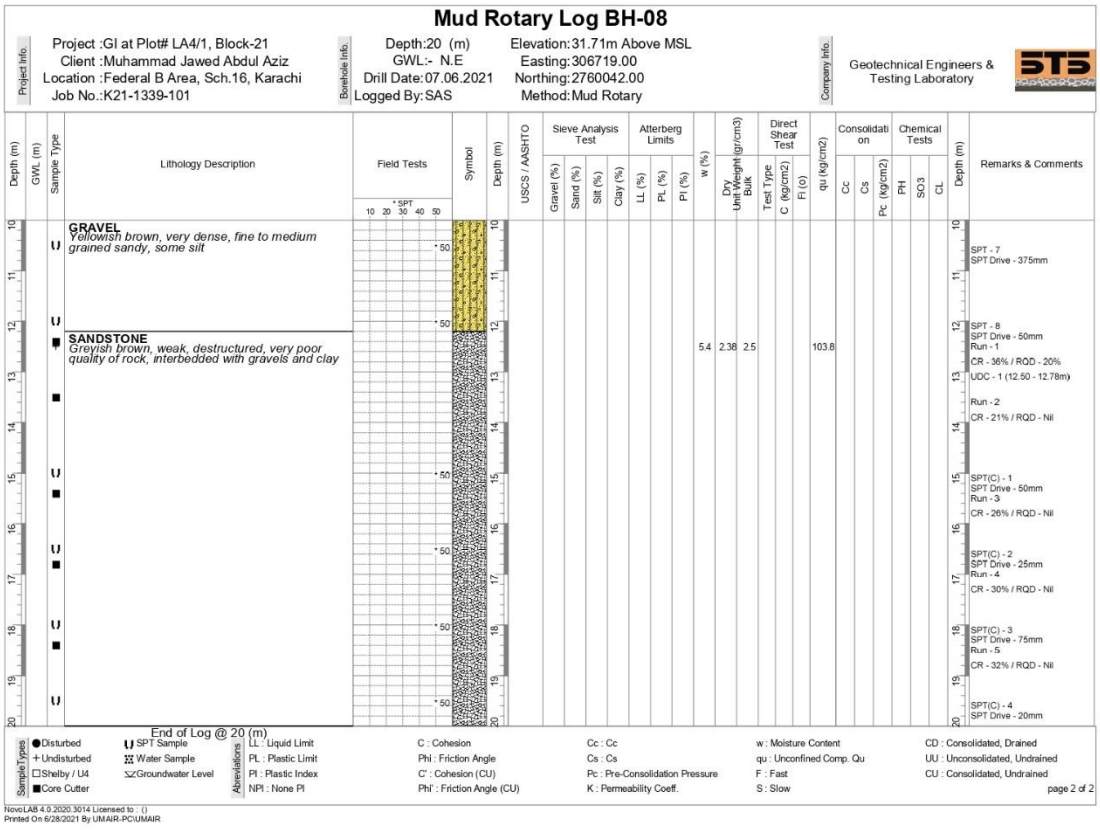

Mud Rotary Log BH-06
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:20 (m)
GWL:- N.E
Drill Date:05.06.2021
Logged By:SAS
Elevation:31.71m Above MSL
Easting:306781.00
Northing:2760079.00
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
MUDSTONE
Yellowish brown, extremely weak, distinctly weathered, very poor quality of rock
SANDSTONE
Greyish brown, destructured, very poor quality of rock, interbedded with gravels and clay
End of Log @ 20 (m)
Run - 3
CR - 22% / RQD - Nil
SPT(C) - 1
SPT Drive - 425mm
Run - 4
CR - 32% / RQD - Nil
SPT(C) - 2
SPT Drive - 350mm
Run - 5
CR - 41% / RQD - Nil
SPT(C) - 3
SPT Drive - 125mm
Run - 6
CR - 33% / RQD - Nil
SPT(C) - 4
SPT Drive - 200mm
Run - 7
CR - 24% / RQD - Nil
SPT(C) - 5
SPT Drive - 75mm
Run - 8
CR - 29% / RQD - Nil
SPT(C) - 6
SPT Drive - 50mm
page 2 of 2

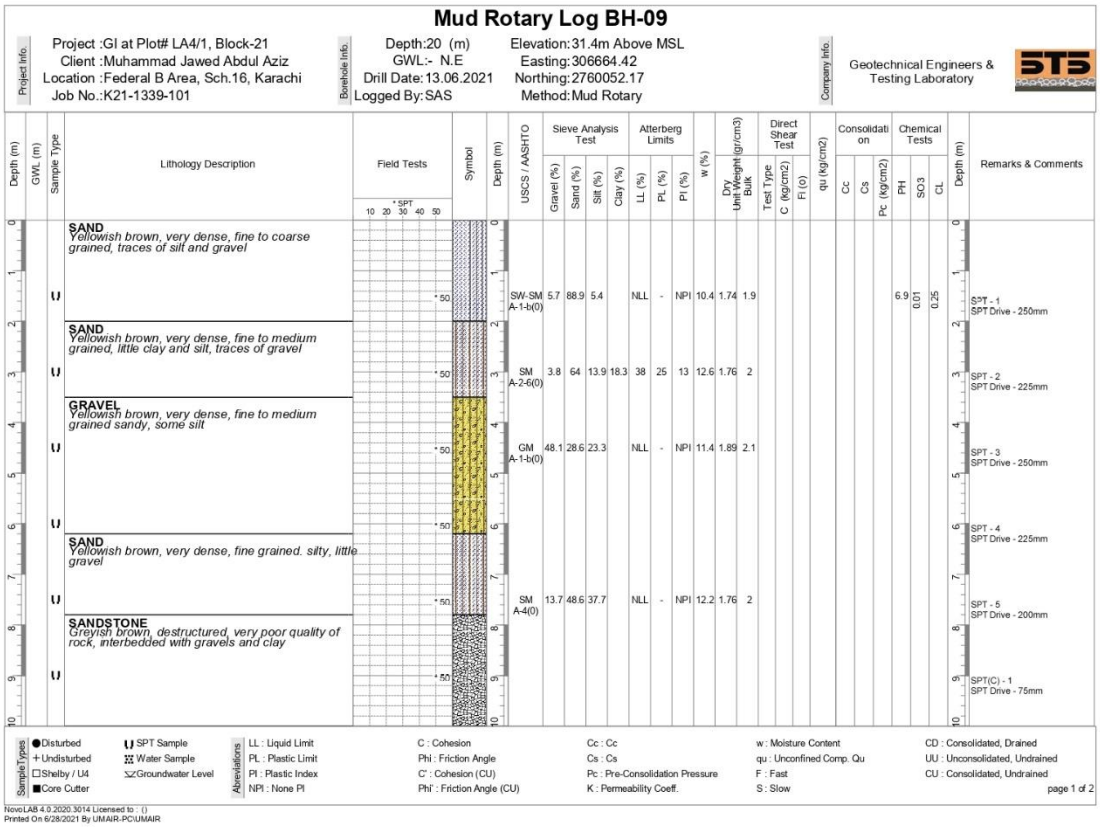

Mud Rotary Log BH-07
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:20 (m)
GWL:- N.E
Drill Date:30.05.2021
Logged By:SAS
Elevation:31.71m Above MSL
Easting:306777.00
Northing:2760044.00
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
SAND
Yellowish brown, dense, fine to medium grained, little silt and gravel
SAND
Yellowish brown, very dense, fine grained, some clay, little silt and gravel
SANDSTONE
Greyish brown, destructured, very poor quality of rock, interbedded with gravels and clay
SM A-2-4(0)
SC A-4(0)
SPT - 1
SPT - 2 SPT Drive - 350mm
SPT - 3 SPT Drive - 225mm
SPT(C) - 1 SPT Drive - 225mm
SPT(C) - 2 SPT Drive - 225mm
SPT(C) - 3 SPT Drive - 175mm
Disturbed
Undisturbed
Shelby / U4
Core Cutter
SPT Sample
Water Sample
Groundwater Level
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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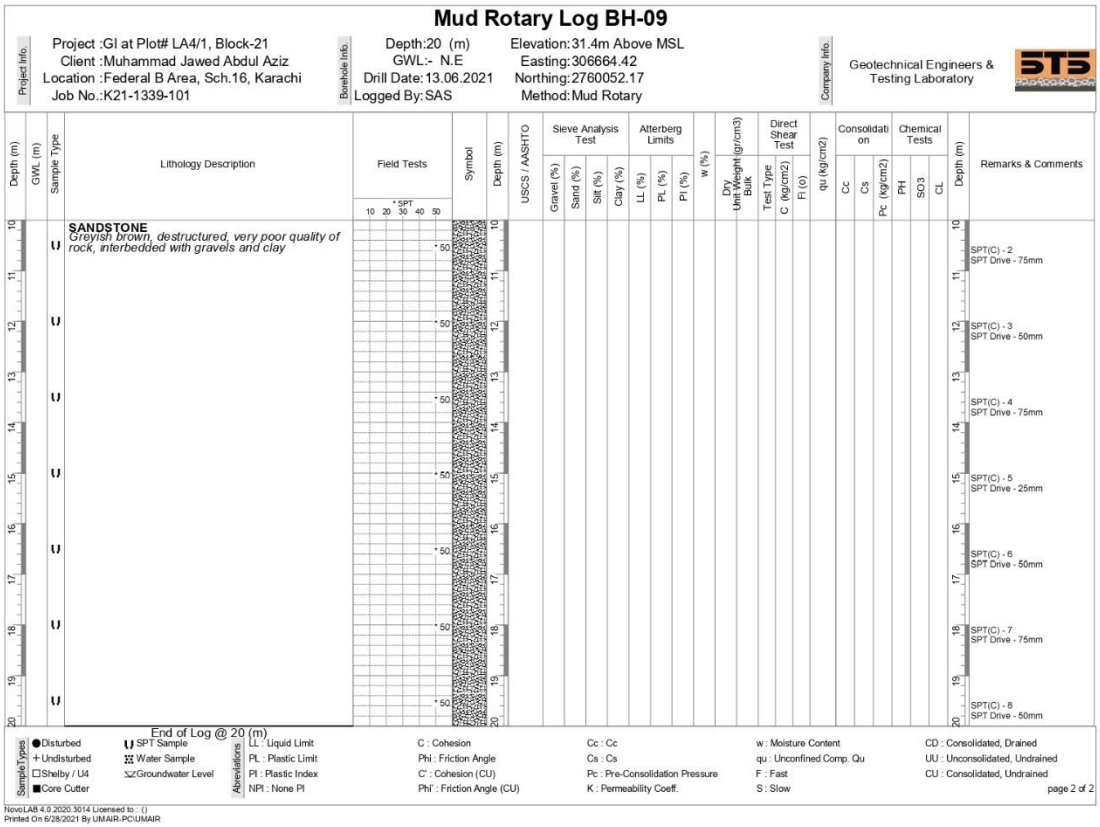


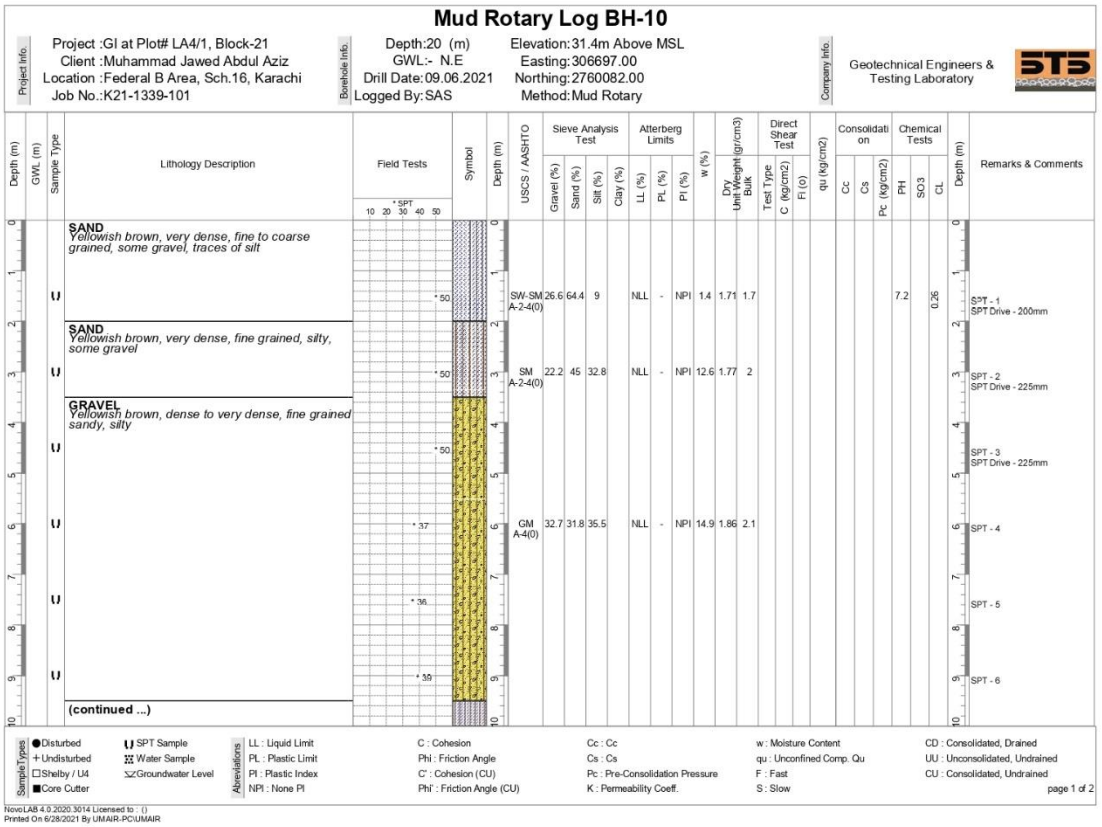
Annexure - VI 181

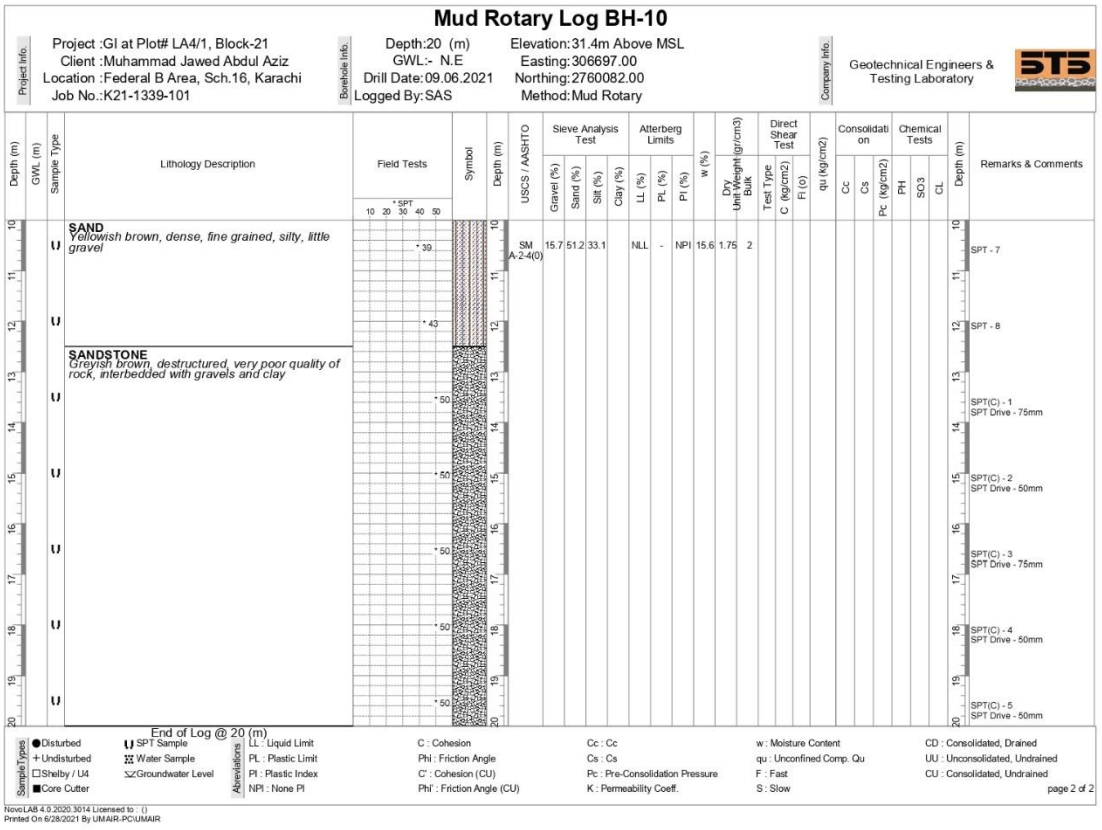

Mud Rotary Log BH-08
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:20 (m)
GWL:- N.E
Drill Date:07.06.2021
Logged By:SAS
Elevation:31.71m Above MSL
Easting:306719.00
Northing:2760042.00
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
SAND
Yellowish brown, very dense, fine to medium grained, some silt and gravel
SAND
Yellowish brown, very dense, fine to coarse grained, traces of silt
SAND
Yellowish brown, very dense, fine to medium grained, some silt, traces of gravel
GRAVEL
Yellowish brown, very dense, fine to medium grained sandy, some silt
SM A-2-4(0) 12.2 72 15.8 NLL - NPI 7.4 1.79 1.9
SP-SM A-1-b(0) 90.8 9.2 NLL - NPI 16.1 1.75 2
SM A-2-4(0) 4.1 67 28.9 NLL - NPI 15.4 1.74 2
GM A-2-4(0) 39.9 33.7 26.4 NLL - NPI 14.5 1.87 2.1
SPT - 1 SPT Drive - 375mm
SPT - 2 SPT Drive - 250mm
SPT - 3 SPT Drive - 200mm
SPT - 4 SPT Drive - 200mm
SPT - 5 SPT Drive - 175mm
SPT - 6 SPT Drive - 225mm
Disturbed
Undisturbed
Shelby / U4
Core Cutter
SPT Sample
Water Sample
Groundwater Level
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-08
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:20 (m)
GWL:- N.E
Drill Date:07.06.2021
Logged By:SAS
Elevation:31.71m Above MSL
Easting:306719.00
Northing:2760042.00
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
GRAVEL
Yellowish brown, very dense, fine to medium grained sandy, some silt
SANDSTONE
Greyish brown, weak, destructured, very poor quality of rock, interbedded with gravels and clay
End of Log @ 20 (m)
SPT - 7
SPT Drive - 375mm
SPT - 8
SPT Drive - 50mm
Run - 1
CR - 36% / RQD - 20%
UDC - 1 (12.50 - 12.78m)
Run - 2
CR - 21% / RQD - Nil
SPT(C) - 1
SPT Drive - 50mm
Run - 3
CR - 26% / RQD - Nil
SPT(C) - 2
SPT Drive - 25mm
Run - 4
CR - 30% / RQD - Nil
SPT(C) - 3
SPT Drive - 75mm
Run - 5
CR - 32% / RQD - Nil
SPT(C) - 4
SPT Drive - 20mm
page 2 of 2


Mud Rotary Log BH-09
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:20 (m)
GWL:- N.E
Drill Date:13.06.2021
Logged By:SAS
Elevation:31.4m Above MSL
Easting:306664.42
Northing:2760052.17
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
SAND
Yellowish brown, very dense, fine to coarse grained, traces of silt and gravel
SAND
Yellowish brown, very dense, fine to medium grained, little clay and silt, traces of gravel
GRAVEL
Yellowish brown, very dense, fine to medium grained sandy, some silt
SAND
Yellowish brown, very dense, fine grained. silty, little gravel
SANDSTONE
Greyish brown, destructured, very poor quality of rock, interbedded with gravels and clay
SW-SM A-1-b(0) 5.7 88.9 5.4 NLL - NPI 10.4 1.74 1.9 6.9 0.01 0.25
SM A-2-6(0) 3.8 64 13.9 18.3 38 25 13 12.6 1.76 2
GM A-1-b(0) 48.1 28.6 23.3 NLL - NPI 11.4 1.89 2.1
SM A-4(0) 13.7 48.6 37.7 NLL - NPI 12.2 1.76 2
SPT - 1 SPT Drive - 250mm
SPT - 2 SPT Drive - 225mm
SPT - 3 SPT Drive - 250mm
SPT - 4 SPT Drive - 225mm
SPT - 5 SPT Drive - 200mm
SPT(C) - 1 SPT Drive - 75mm
Disturbed
Undisturbed
Shelby / U4
Core Cutter
SPT Sample
Water Sample
Groundwater Level
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
page 1 of 2
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Mud Rotary Log BH-09
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:20 (m)
GWL:- N.E
Drill Date:13.06.2021
Logged By:SAS
Elevation:31.4m Above MSL
Easting:306664.42
Northing:2760052.17
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
SANDSTONE
Greyish brown, destructured, very poor quality of rock, interbedded with gravels and clay
End of Log @ 20 (m)
SPT(C) - 2 SPT Drive - 75mm
SPT(C) - 3 SPT Drive - 50mm
SPT(C) - 4 SPT Drive - 75mm
SPT(C) - 5 SPT Drive - 25mm
SPT(C) - 6 SPT Drive - 50mm
SPT(C) - 7 SPT Drive - 75mm
SPT(C) - 8 SPT Drive - 50mm
page 2 of 2


Mud Rotary Log BH-10
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:20 (m)
GWL:- N.E
Drill Date:09.06.2021
Logged By:SAS
Elevation:31.4m Above MSL
Easting:306697.00
Northing:2760082.00
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
SAND
Yellowish brown, very dense, fine to coarse grained, some gravel, traces of silt
SAND
Yellowish brown, very dense, fine grained, silty, some gravel
GRAVEL
Yellowish brown, dense to very dense, fine grained sandy, silty
(continued ...)
SW-SM A-2-4(0)
SM A-2-4(0)
GM A-4(0)
SPT - 1
SPT Drive - 200mm
SPT - 2
SPT Drive - 225mm
SPT - 3
SPT Drive - 225mm
SPT - 4
SPT - 5
SPT - 6
page 1 of 2


Mud Rotary Log BH-10
Project :GI at Plot# LA4/1, Block-21
Client :Muhammad Jawed Abdul Aziz
Location :Federal B Area, Sch.16, Karachi
Job No.:K21-1339-101
Depth:20 (m)
GWL:- N.E
Drill Date:09.06.2021
Logged By:SAS
Elevation:31.4m Above MSL
Easting:306697.00
Northing:2760082.00
Method:Mud Rotary
Geotechnical Engineers & Testing Laboratory
SAND
Yellowish brown, dense, fine grained, silty, little gravel
SANDSTONE
Greyish brown, destructured, very poor quality of rock, interbedded with gravels and clay
End of Log @ 20 (m)
SM
A-2-4(0)
15.7
51.2
33.1
NLL
-
NPI
15.6
1.75
2
SPT - 7
SPT - 8
SPT(C) - 1
SPT Drive - 75mm
SPT(C) - 2
SPT Drive - 50mm
SPT(C) - 3
SPT Drive - 75mm
SPT(C) - 4
SPT Drive - 50mm
SPT(C) - 5
SPT Drive - 50mm
page 2 of 2

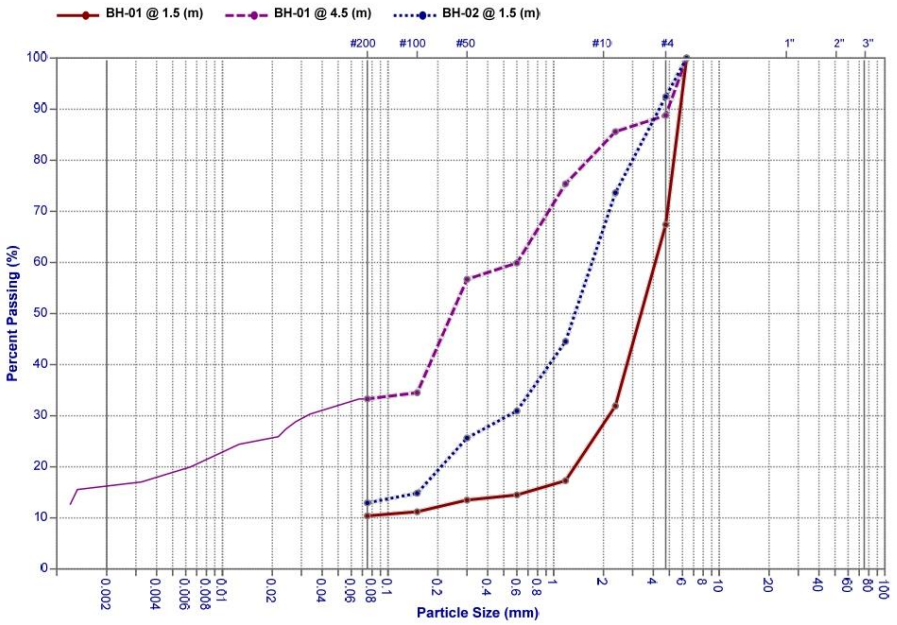
Appendix C

Laboratory Test Results

Sieve Analysis Test

Project : GI at Plot# LA4/1, Block-21
Client : Muhammad Jawed Abdul Aziz
Job No.: K21-1339-101
Location : Federal B Area, Sch.16, Karachi

ASTM C136



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobble
-	10.4	57	32.6	-
16.2	17.1	55.5	11.2	-
-	12.9	79.5	7.6	-

Classification

Borehole	Sample Depth (m)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
BH-01	1.5	-	2.156	3.371	4.106	14.896	-	-	-	N/A	SP-SM	A-1-b(0)
BH-01	4.5	0.001	0.032	0.243	0.603	1.698	603	-	-	N/A	SM	A-2-4(0)
BH-02	1.5	-	0.531	1.344	1.706	2.175	-	-	-	N/A	SM	A-2-4(0)

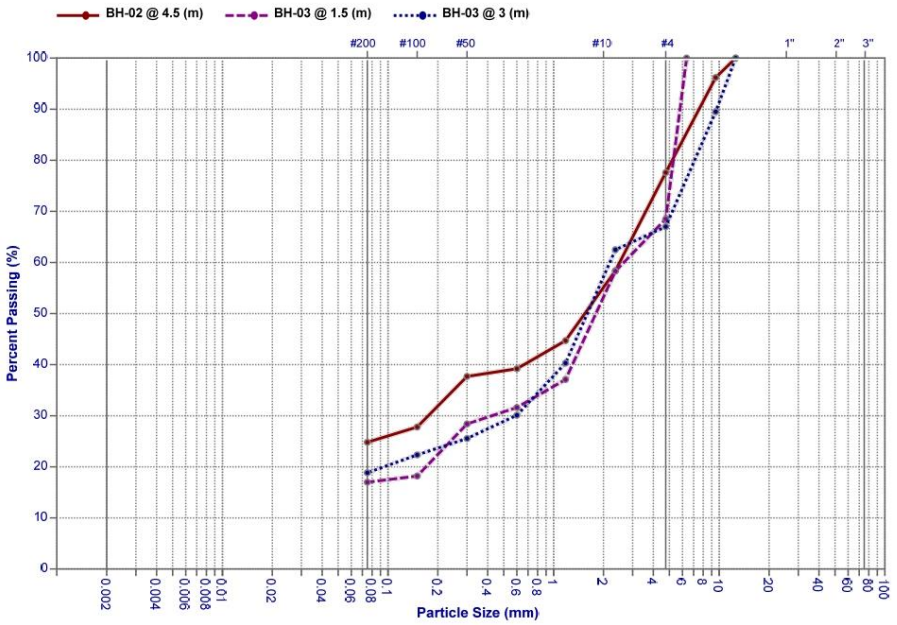
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Sieve Analysis Test

Project : GI at Plot# LA4/1, Block-21
Client : Muhammad Jawed Abdul Aziz
Job No.: K21-1339-101
Location : Federal B Area, Sch.16, Karachi

ASTM C136



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobble
-	24.8	52.8	22.4	-
-	17	51.5	31.5	-
-	18.8	48.2	33	-

Classification

Borehole	Sample Depth (m)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
BH-02	4.5	-	0.175	1.543	2.502	0.163	-	-	-	N/A	SM	A-2-4(0)
BH-03	1.5	-	0.424	1.799	2.652	0.892	-	-	-	N/A	SM	A-2-4(0)
BH-03	3	-	0.591	1.597	2.183	2.133	-	-	-	N/A	SM	A-2-4(0)

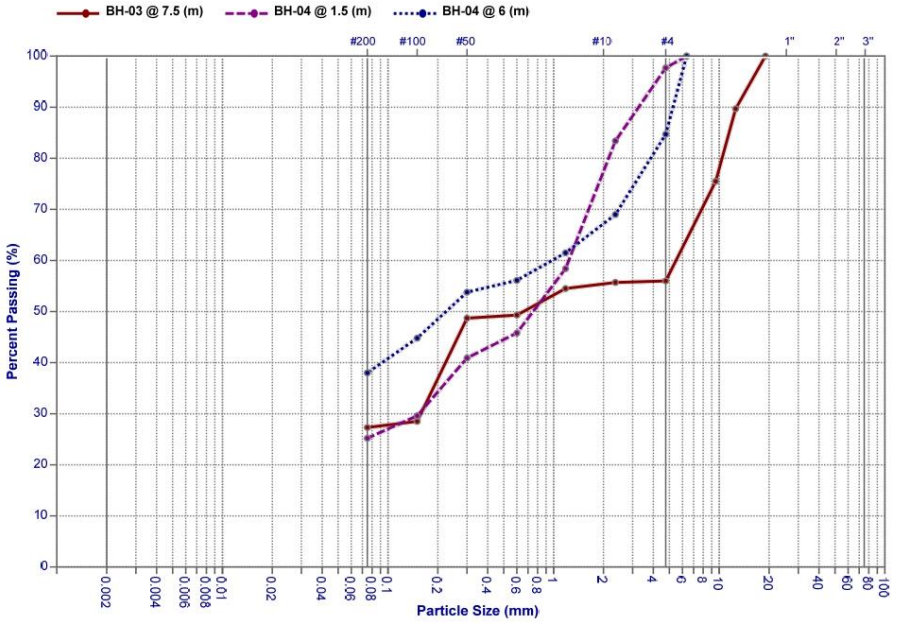
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Sieve Analysis Test

Project : GI at Plot# LA4/1, Block-21
Client : Muhammad Jawed Abdul Aziz
Job No.: K21-1339-101
Location : Federal B Area, Sch.16, Karachi

ASTM C136



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobble
-	27.3	28.7	44	-
-	25.2	72.5	2.3	-
-	38	46.7	15.3	-

Classification

Borehole	Sample Depth (m)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
BH-03	7.5	-	0.158	0.657	5.477	0.061	-	-	-	N/A	GM	A-2-4(0)
BH-04	1.5	-	0.154	0.752	1.234	0.256	-	-	-	N/A	SM	A-2-4(0)
BH-04	6	-	-	0.224	0.978	-	-	-	-	N/A	SM	A-4(0)

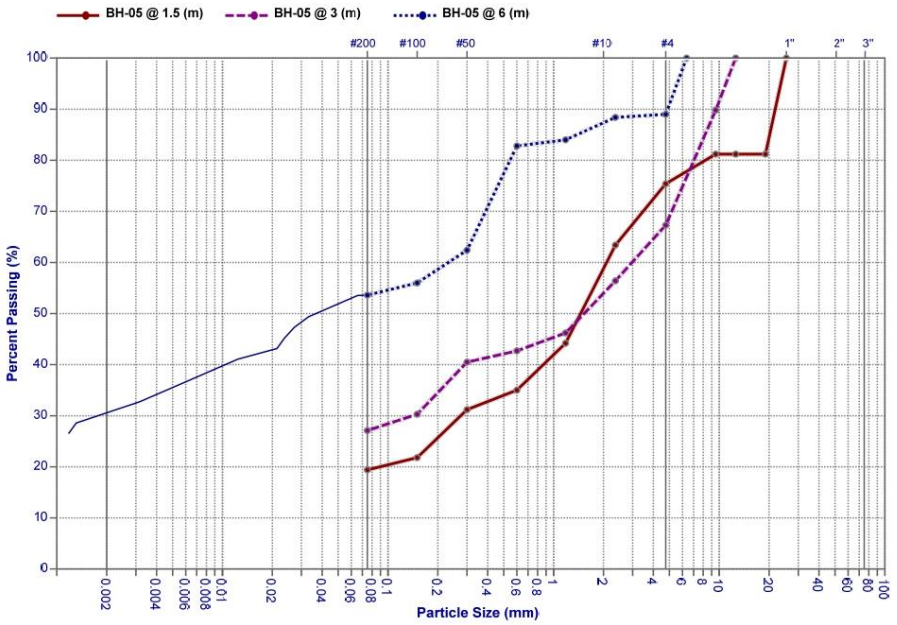
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Sieve Analysis Test

Project : GI at Plot# LA4/1, Block-21
Client : Muhammad Jawed Abdul Aziz
Job No.: K21-1339-101
Location : Federal B Area, Sch.16, Karachi

ASTM C136



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobble
-	19.4	56	24.6	-
-	27.1	40.2	32.7	-
30.6	23	35.4	11	-

Classification

Borehole	Sample Depth (m)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
BH-05	1.5	-	0.275	1.455	2.087	0.483	-	-	-	N/A	SM	A-2-4(0)
BH-05	3	-	0.141	1.528	2.973	0.089	-	-	-	N/A	SM	A-2-4(0)
BH-05	6	0.001	0.002	0.037	0.231	0.017	231	35.6	12.6	N/A	CL	A-6(4)

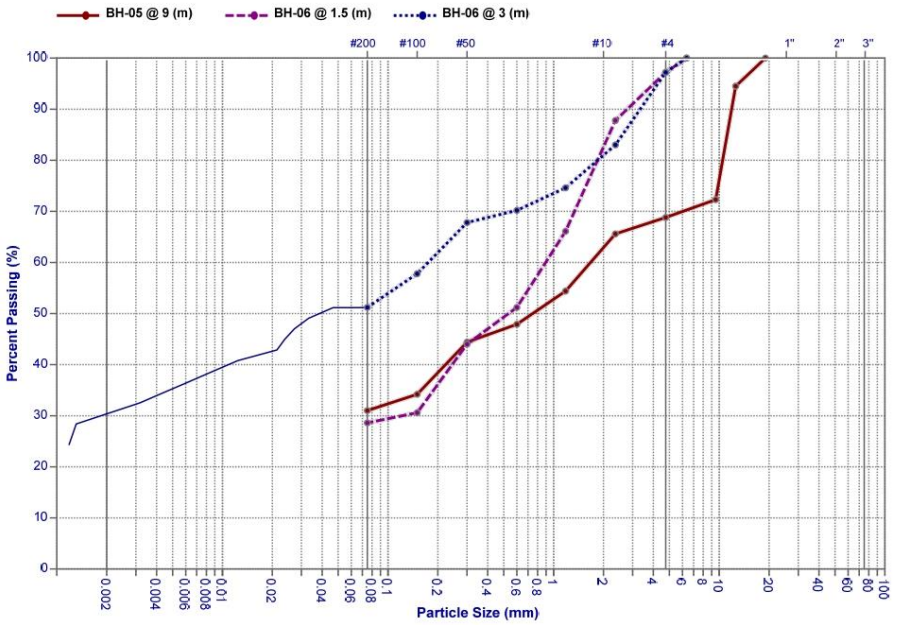
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Sieve Analysis Test

Project : GI at Plot# LA4/1, Block-21
Client : Muhammad Jawed Abdul Aziz
Job No.: K21-1339-101
Location : Federal B Area, Sch.16, Karachi

ASTM C136



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobble
-	31	37.8	31.2	-
-	28.6	68.6	2.8	-
30.4	20.8	46	2.8	-

Classification

Borehole	Sample Depth (m)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
BH-05	9	-	-	0.747	1.669	-	-	-	-	N/A	SM	A-2-4(0)
BH-06	1.5	-	0.122	0.535	0.895	0.222	-	-	-	N/A	SM	A-2-4(0)
BH-06	3	0.001	0.002	0.039	0.175	0.023	175	32.3	12.4	N/A	CL	A-6(3)

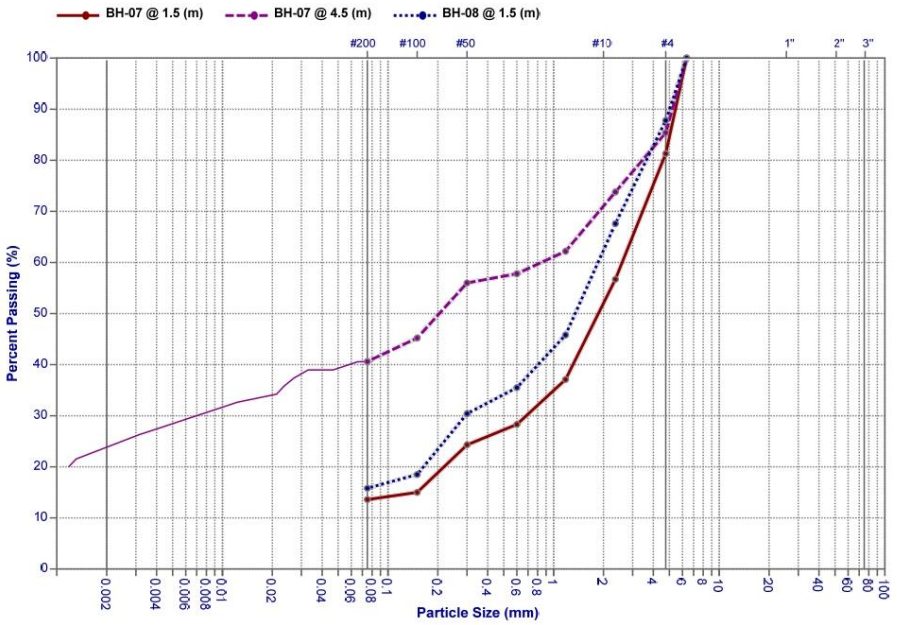
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Sieve Analysis Test

Project : GI at Plot# LA4/1, Block-21
Client : Muhammad Jawed Abdul Aziz
Job No.: K21-1339-101
Location : Federal B Area, Sch.16, Karachi

ASTM C136



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobble
-	13.6	67.7	18.7	-
23.8	16.8	44.8	14.6	-
-	15.8	72	12.2	-

Classification

Borehole	Sample Depth (m)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
BH-07	1.5	-	0.684	1.862	2.592	2.375	-	-	-	N/A	SM	A-2-4(0)
BH-07	4.5	0.001	0.007	0.204	0.841	0.058	841	27.5	8.5	N/A	SC	A-4(0)
BH-08	1.5	-	0.293	1.349	1.853	0.61	-	-	-	N/A	SM	A-2-4(0)

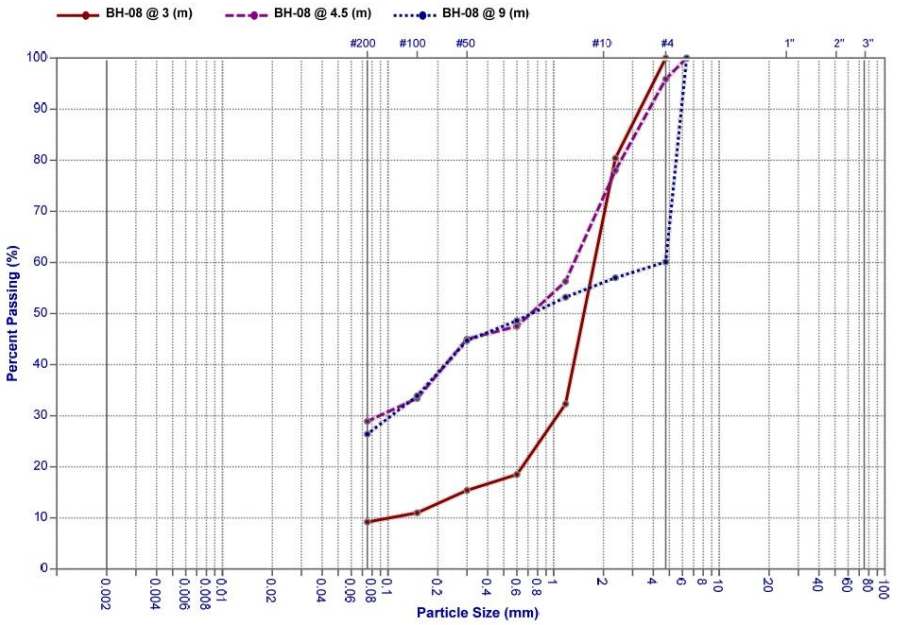
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Sieve Analysis Test

Project : GI at Plot# LA4/1, Block-21
Client : Muhammad Jawed Abdul Aziz
Job No.: K21-1339-101
Location : Federal B Area, Sch.16, Karachi

ASTM C136



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobble
-	9.2	90.8	-	-
-	28.9	67	4.1	-
-	26.4	33.7	39.9	-

Classification

Borehole	Sample Depth (m)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
BH-08	3	0.102	1.054	1.523	1.759	6.192	17.245	-	-	N/A	SP-SM	A-1-b(0)
BH-08	4.5	-	0.089	0.727	1.328	0.08	-	-	-	N/A	SM	A-2-4(0)
BH-08	9	-	0.105	0.737	4.644	0.032	-	-	-	N/A	GM	A-2-4(0)

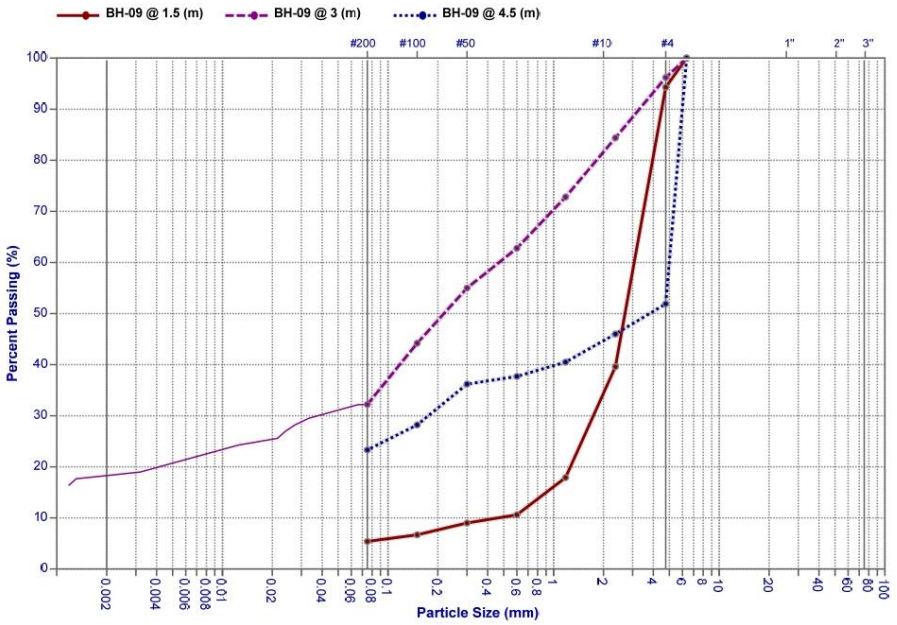
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Sieve Analysis Test

Project : GI at Plot# LA4/1, Block-21
Client : Muhammad Jawed Abdul Aziz
Job No.: K21-1339-101
Location : Federal B Area, Sch.16, Karachi

ASTM C136



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobble
-	5.4	88.9	5.7	-
18.3	13.9	64	3.8	-
-	23.3	28.6	48.1	-

Classification

Borehole	Sample Depth (m)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
BH-09	1.5	0.463	1.737	2.696	3.063	2.128	6.616	-	-	N/A	SW-SM	A-1-b(0)
BH-09	3	0.001	0.038	0.218	0.468	3.085	468	38	13	N/A	SM	A-2-6(0)
BH-09	4.5	-	0.175	3.792	1	0.408	-	-	-	N/A	GM	A-1-b(0)

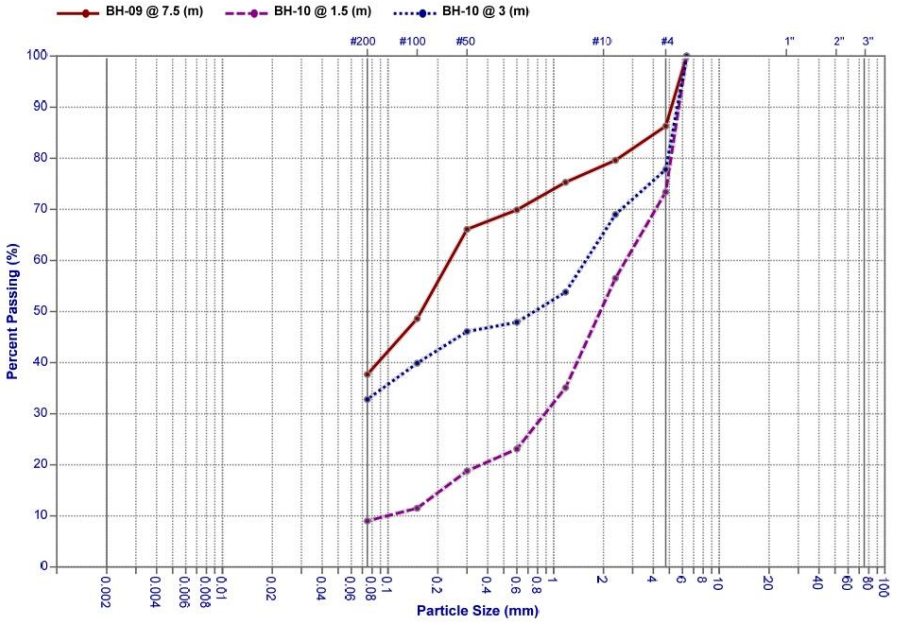
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Sieve Analysis Test

Project : GI at Plot# LA4/1, Block-21
Client : Muhammad Jawed Abdul Aziz
Job No.: K21-1339-101
Location : Federal B Area, Sch.16, Karachi

ASTM C136



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobble
-	37.7	48.6	13.7	-
-	9	64.4	26.6	-
-	32.8	45	22.2	-

Classification

Borehole	Sample Depth (m)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
BH-09	7.5	-	-	0.159	0.236	-	-	-	-	N/A	SM	A-4(0)
BH-10	1.5	0.099	0.885	1.912	2.728	2.9	27.556	-	-	N/A	SW-SM	A-2-4(0)
BH-10	3	-	-	0.763	1.566	-	-	-	-	N/A	SM	A-2-4(0)

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Sieve Analysis Test

Project : GI at Plot# LA4/1, Block-21
Client : Muhammad Jawed Abdul Aziz
Job No.: K21-1339-101
Location : Federal B Area, Sch.16, Karachi

ASTM C136



Particle Distribution (%)

Clay	Silt	Sand	Gravel	Cobble
-	35.5	31.8	32.7	-
-	33.1	51.2	15.7	-

Classification

Borehole	Sample Depth (m)	D10 (mm)	D30 (mm)	D50 (mm)	D60 (mm)	Cc	Cu	LL (%)	PI (%)	Disp. (%)	USCS	AASHTO
BH-10	6	-	-	0.581	1.823	-	-	-	-	N/A	GM	A-4(0)
BH-10	10.5	-	-	0.161	0.271	-	-	-	-	N/A	SM	A-2-4(0)

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ATTERBERG LIMITS TEST

ASTM D4318

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-05
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	6 (m)
Job No.:	K21-1339-101	Classification :	CL | A-6(4)
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	SPT Split Spoon

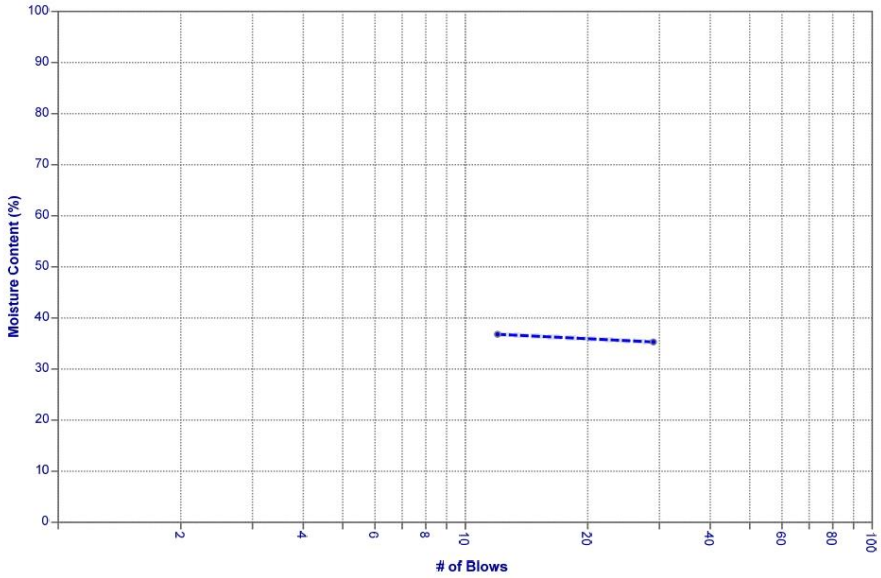
Liquid Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	# of Blows	Moisture Content (%)
10.85	25.5	21.56	12	36.8
11.56	29.55	24.86	29	35.3
				-

Plastic Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	Moisture Content (%)
7.56	15.22	13.79	23

LL = 35.6 % **PL = 23 %** **PI=12.6**



USCS Soil Description : Low Plasticity Clay With Sand
AASHTO Soil Description : Clayey soils (4)

Tested By :

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ATTERBERG LIMITS TEST

ASTM D4318

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-06
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	3 (m)
Job No.:	K21-1339-101	Classification :	CL | A-6(3)
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	SPT Split Spoon

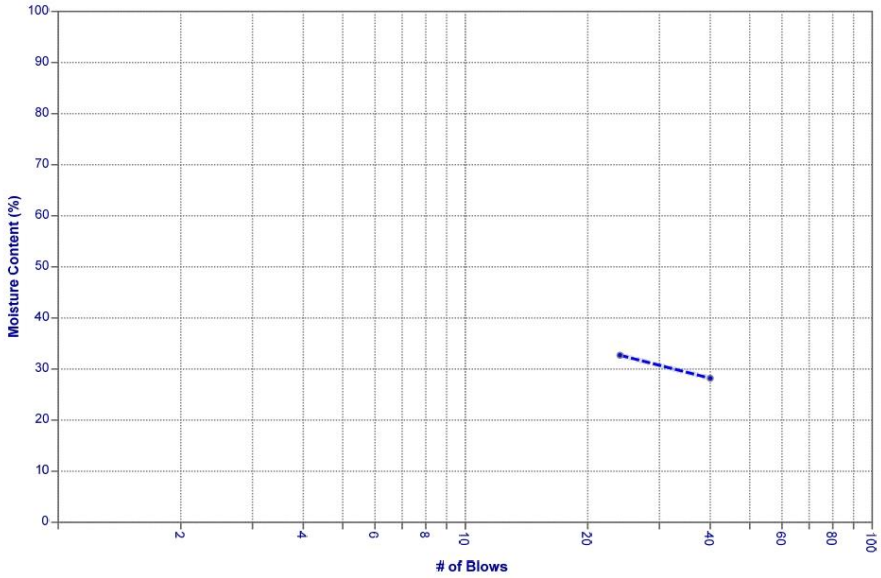
Liquid Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	# of Blows	Moisture Content (%)
11.46	21.76	19.22	24	32.7
12.5	21.63	19.62	40	28.2
				-

Plastic Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	Moisture Content (%)
9.78	18.23	16.83	19.9

LL = 32.3 % **PL = 19.9 %** **PI=12.4**



USCS Soil Description : Low Plasticity Clay With Sand
AASHTO Soil Description : Clayey soils (3)

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ATTERBERG LIMITS TEST

ASTM D4318

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-07
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	4.5 (m)
Job No.:	K21-1339-101	Classification :	SC | A-4(0)
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	SPT Split Spoon

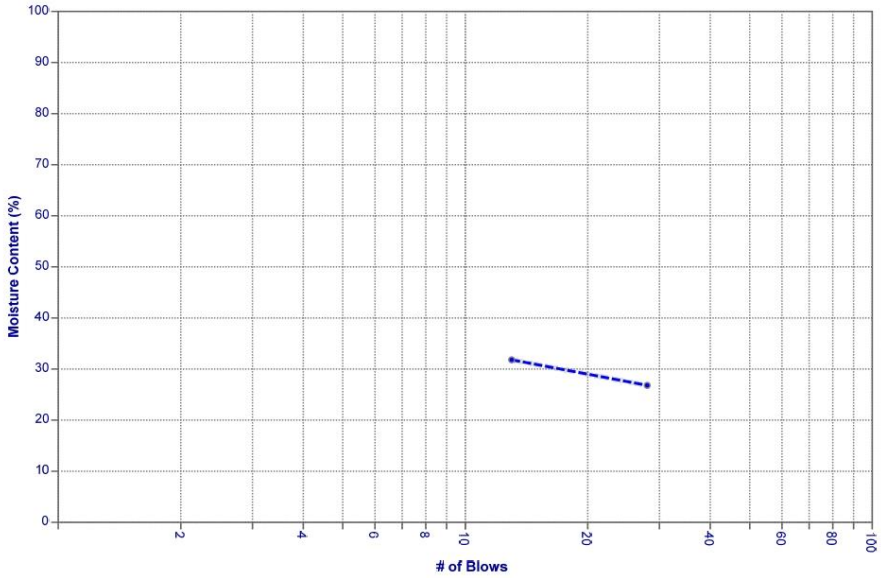
Liquid Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	# of Blows	Moisture Content (%)
14.07	28.65	25.13	13	31.8
20.5	33.67	30.89	28	26.8
				-

Plastic Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	Moisture Content (%)
21.94	29.27	28.1	19

LL = 27.5 % **PL = 19 %** **PI=8.5**



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

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ATTERBERG LIMITS TEST

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-09
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	3 (m)
Job No.:	K21-1339-101	Classification :	SM | A-2-6(0)
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	SPT Split Spoon

ASTM D4318

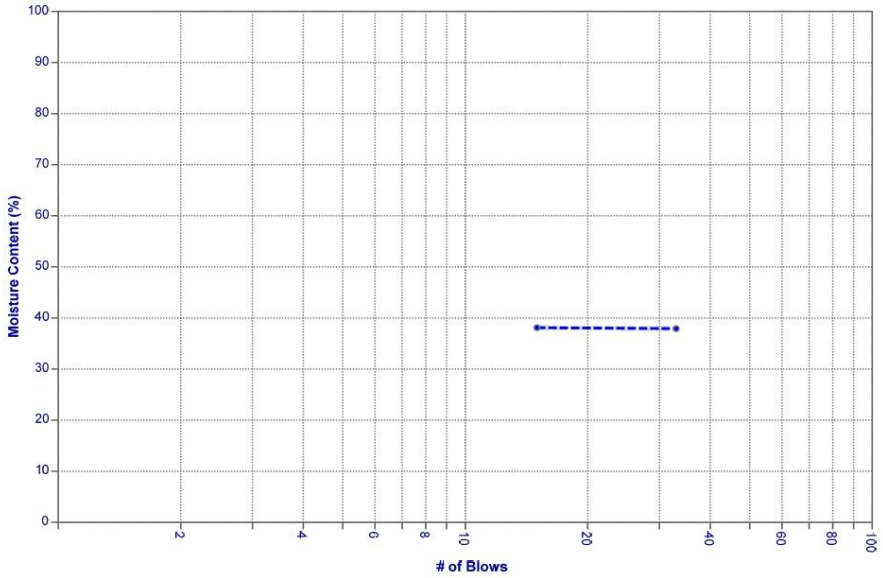
Liquid Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	# of Blows	Moisture Content (%)
8.98	20.69	17.46	15	38.1
14.14	25.43	22.33	33	37.9
				-

Plastic Limit

Cont. W (gr)	Cont. + Wet Soil W (gr)	Cont. + Dry Soil W (gr)	Moisture Content (%)
10.58	18.89	17.23	25

LL = 38 % **PL = 25 %** **PI=13**



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

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Density & Moisture Test

Project : GI at Plot# LA4/1, Block-21
Client : Muhammad Jawed Abdul Aziz
Job No.: K21-1339-101
Location : Federal B Area, Sch.16, Karachi

ASTM D4643, D2216

Borehole	Sample Depth (m)	Moisture Content (%)	Dry Density (gr/cm3)	Wet Density (gr/cm3)
BH-01	1.5	10.02	1.74	1.91
BH-01	30.59	5.6	2.13	2.25
BH-01	34.5	7.8	2.29	2.47
BH-02	1.5	2.35	1.63	1.67
BH-02	4.5	5.08	1.77	1.86
BH-02	24.5	7.1	1.92	2.06
BH-02	28.5	10.2	2.19	2.41
BH-02	34.8	7.4	2.16	2.32
BH-03	1.5	10.23	1.77	1.95
BH-03	3	12.75	1.8	2.02
BH-03	7.5	8.46	1.87	2.03
BH-03	19.5	4.6	2.09	2.19
BH-03	22.5	5.7	2.16	2.28
BH-03	27	5.7	2.28	2.41
BH-04	1.5	11.09	1.8	2
BH-04	6	3.39	1.72	1.77
BH-04	12.3	12.9	1.92	2.17
BH-04	18	6.2	2.13	2.26
BH-04	24.5	9.1	1.96	2.14
BH-05	1.5	13.67	1.69	1.92
BH-05	3	13.55	1.75	1.98
BH-05	6	16.85	1.7	1.98
BH-05	9	8.96	1.86	2.03
BH-05	20	9.7	1.93	2.12
BH-05	27.5	5.7	1.93	2.04
BH-06	1.5	4.98	1.77	1.85
BH-06	3	10.77	1.65	1.83
BH-06	9	6.4	1.83	1.95
BH-07	1.5	4.14	1.74	1.81
BH-07	4.5	10.76	1.76	1.95
BH-08	1.5	7.41	1.79	1.92
BH-08	3	16.11	1.75	2.04
BH-08	4.5	15.4	1.74	2
BH-08	9	14.46	1.87	2.14
BH-08	12.5	5.4	2.38	2.51
BH-09	1.5	10.42	1.74	1.93
BH-09	3	12.55	1.76	1.99
BH-09	4.5	11.45	1.89	2.1
BH-09	7.5	12.2	1.76	1.98
BH-10	1.5	1.42	1.71	1.74
BH-10	3	12.64	1.77	1.99
BH-10	6	14.85	1.86	2.13
BH-10	10.5	15.65	1.75	2.03

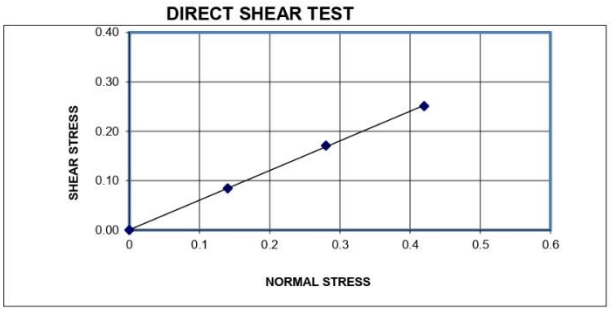
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SOIL TESTING SERVICS

Project	:	GI at Plot# LA4/1, Block-21	Borehole	:	BH-01
Client	:	Muhammad Jawed Abdul Aziz	Sample Depth	:	4.5 (m)
Job No.	:	K21-1339-101	Classification	:	SM
Location	:	Federal B Area, Sch.16, Karachi	Sample Type	:	SPT Split Spoon

NORMAL STRESS (kg/cm^2)	SHEAR STRESS (kg/cm^2)
0.00	0.00
0.14	0.08
0.28	0.17
0.42	0.25
Cohesion (c)	0.00
Angle of friction (Φ)	30.87

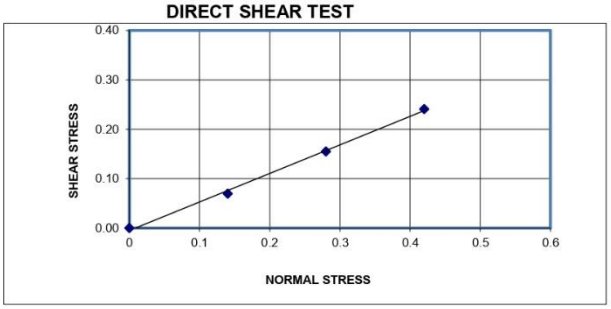


SOIL TESTING SERVICS

Project	:	GI at Plot# LA4/1, Block-21	Borehole	:	BH-02
Client	:	Muhammad Jawed Abdul Aziz	Sample Depth	:	1.5 (m)
Job No.	:	K21-1339-101	Classification	:	SM
Location	:	Federal B Area, Sch.16, Karachi	Sample Type	:	SPT Split Spoon

NORMAL STRESS (kg/cm^2)	SHEAR STRESS (kg/cm^2)
0.00	0.00
0.14	0.07
0.28	0.16
0.42	0.24
Cohesion (c)	0.00
Angle of friction (Φ)	29.85

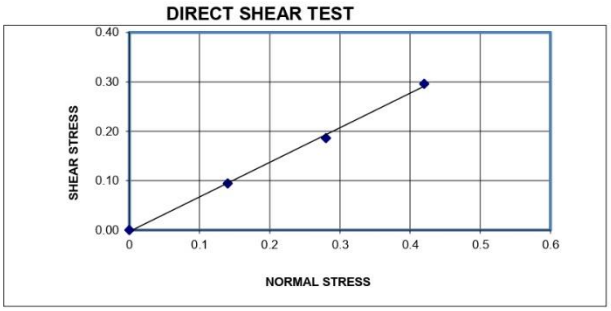
DIRECT SHEAR TEST



SOIL TESTING SERVICS

Project	:	GI at Plot# LA4/1, Block-21	Borehole	:	BH-03
Client	:	Muhammad Jawed Abdul Aziz	Sample Depth	:	7.5 (m)
Job No.	:	K21-1339-101	Classification	:	GM
Location	:	Federal B Area, Sch.16, Karachi	Sample Type	:	SPT Split Spoon

NORMAL STRESS (kg/cm^2)	SHEAR STRESS (kg/cm^2)
0.00	0.00
0.14	0.09
0.28	0.19
0.42	0.30
Cohesion (c)	0.00
Angle of friction (Φ)	35.18

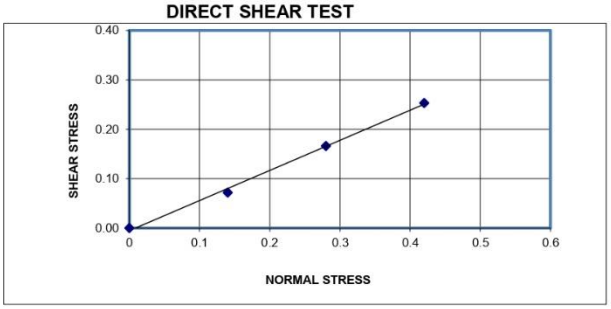


SOIL TESTING SERVICS

Project	:	GI at Plot# LA4/1, Block-21	Borehole	:	BH-04
Client	:	Muhammad Jawed Abdul Aziz	Sample Depth	:	6.0 (m)
Job No.	:	K21-1339-101	Classification	:	SM
Location	:	Federal B Area, Sch.16, Karachi	Sample Type	:	SPT Split Spoon

NORMAL STRESS (kg/cm^2)	SHEAR STRESS (kg/cm^2)
0.00	0.00
0.14	0.07
0.28	0.17
0.42	0.25
Cohesion (c)	0.00
Angle of friction (Φ)	31.07

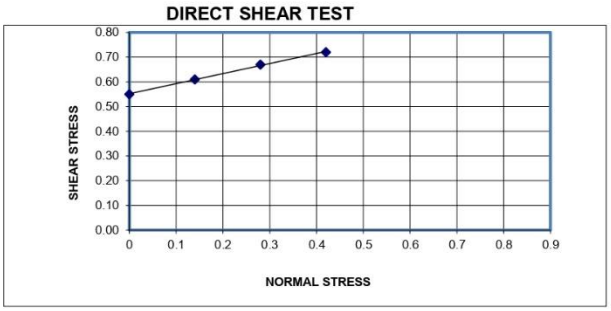
DIRECT SHEAR TEST



SOIL TESTING SERVICS

Project	:	GI at Plot# LA4/1, Block-21	Borehole	:	BH-05
Client	:	Muhammad Jawed Abdul Aziz	Sample Depth	:	6.0 (m)
Job No.	:	K21-1339-101	Classification	:	CL
Location	:	Federal B Area, Sch.16, Karachi	Sample Type	:	SPT Split Spoon

NORMAL STRESS (kg/cm^2)	SHEAR STRESS (kg/cm^2)
0.00	0.55
0.14	0.61
0.28	0.67
0.42	0.72
Cohesion (c)	0.55
Angle of friction (Φ)	22.04

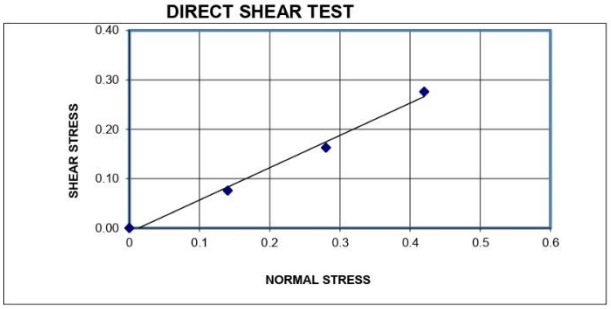


SOIL TESTING SERVICS

Project	:	GI at Plot# LA4/1, Block-21	Borehole	:	BH-10
Client	:	Muhammad Jawed Abdul Aziz	Sample Depth	:	10.5 (m)
Job No.	:	K21-1339-101	Classification	:	SM
Location	:	Federal B Area, Sch.16, Karachi	Sample Type	:	SPT Split Spoon

NORMAL STRESS (kg/cm^2)	SHEAR STRESS (kg/cm^2)
0.00	0.00
0.14	0.08
0.28	0.16
0.42	0.28
Cohesion (c)	0.00
Angle of friction (Φ)	33.31

DIRECT SHEAR TEST



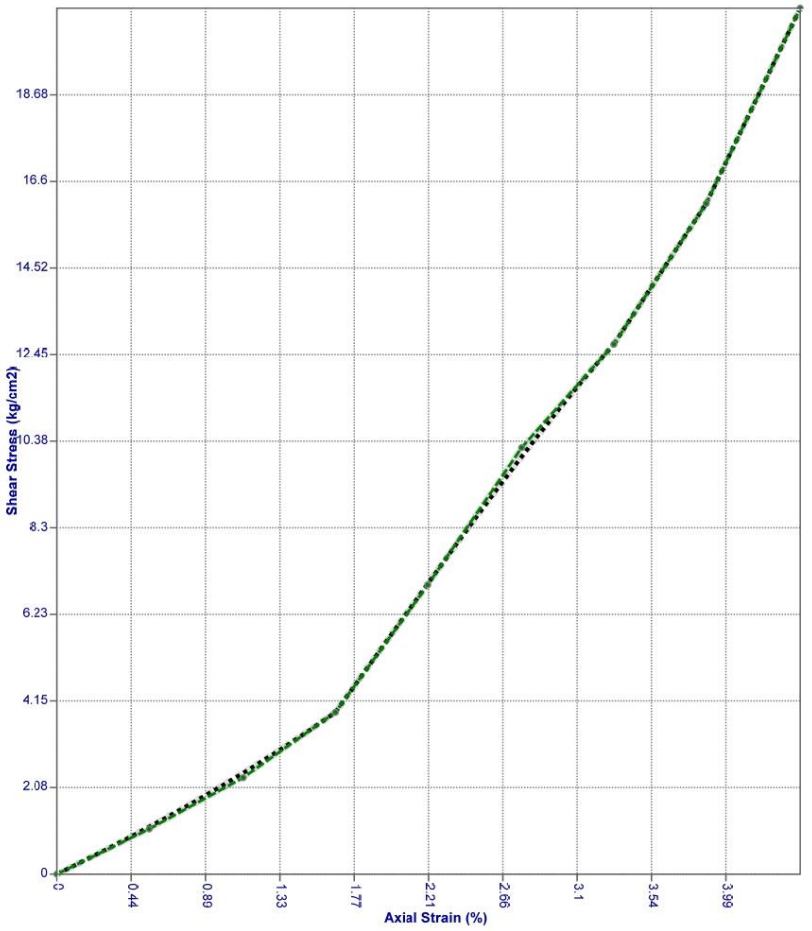
Unconfined Compression Test

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-01
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	30.59 (m)
Job No.:	K21-1339-101	Rock Name :	Claystone
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	Undisturbed

ASTM D2938

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)
5.622	9.035	1	Moist	5.6	2.13	20.75	10.38



USCS Soil Description :
AASHTO Soil Description :

Tested By :

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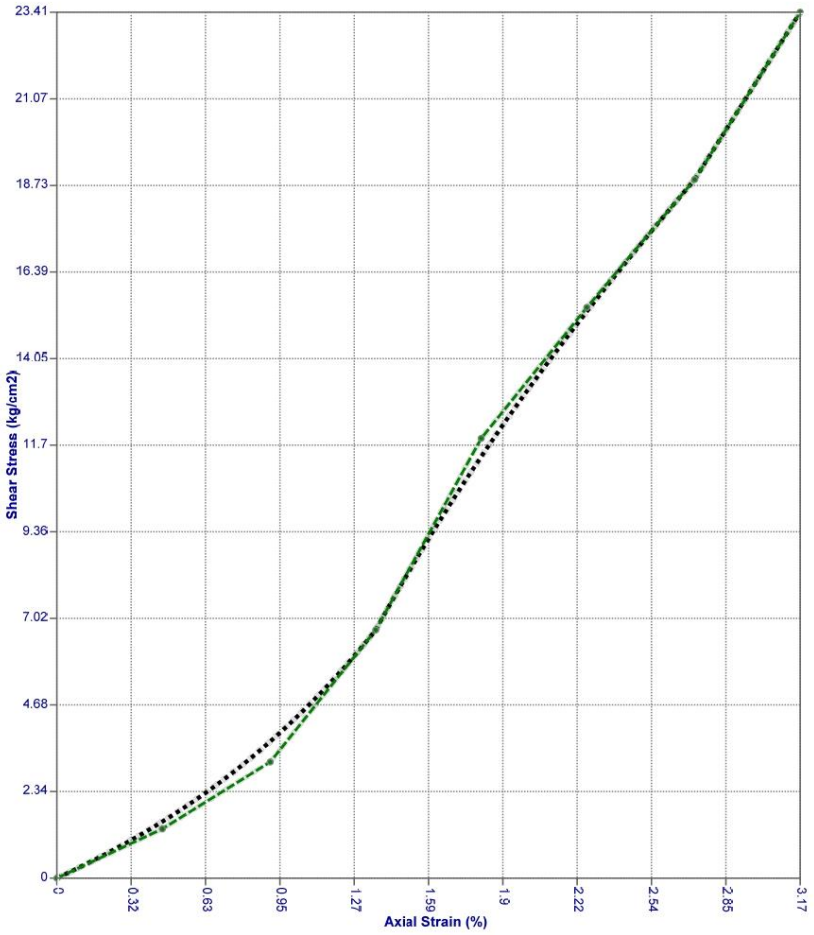
Unconfined Compression Test

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-01
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	34.5 (m)
Job No.:	K21-1339-101	Rock Name :	Claystone
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	Undisturbed

ASTM D2938

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)
5.522	11.043	1	Moist	7.8	2.29	23.41	11.7



USCS Soil Description :
AASHTO Soil Description :

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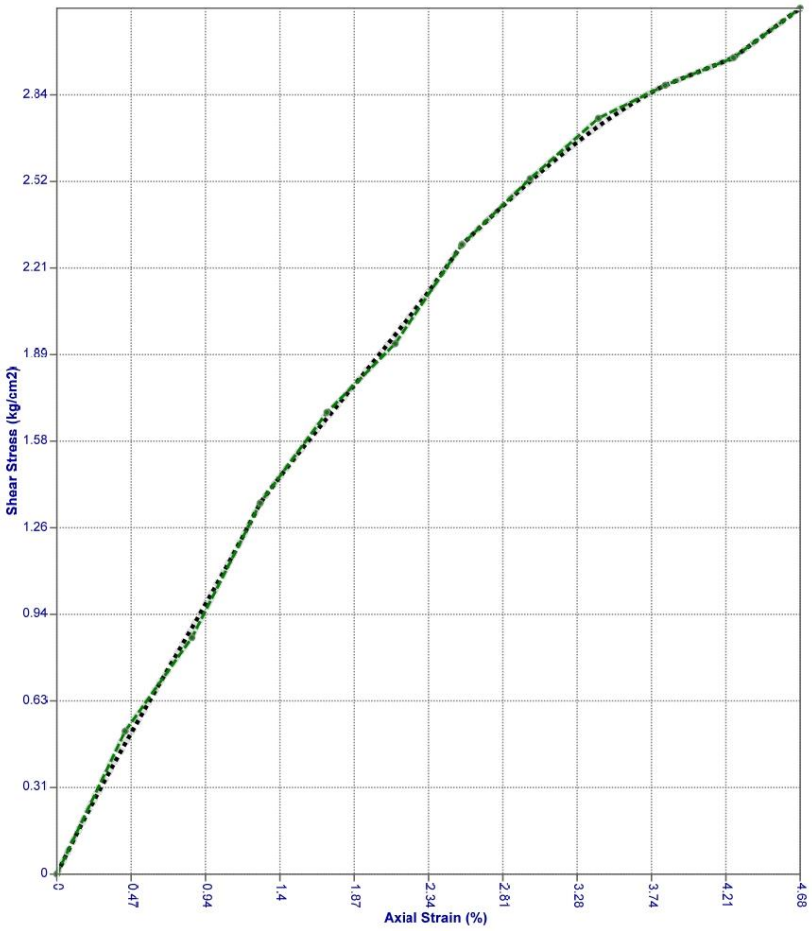
Unconfined Compression Test

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-02
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	24.5 (m)
Job No.:	K21-1339-101	Rock Name :	Mudstone
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	Undisturbed

ASTM D2938

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)
6.626	11.746	1	Moist	7.1	1.92	3.15	1.58



USCS Soil Description :
AASHTO Soil Description :

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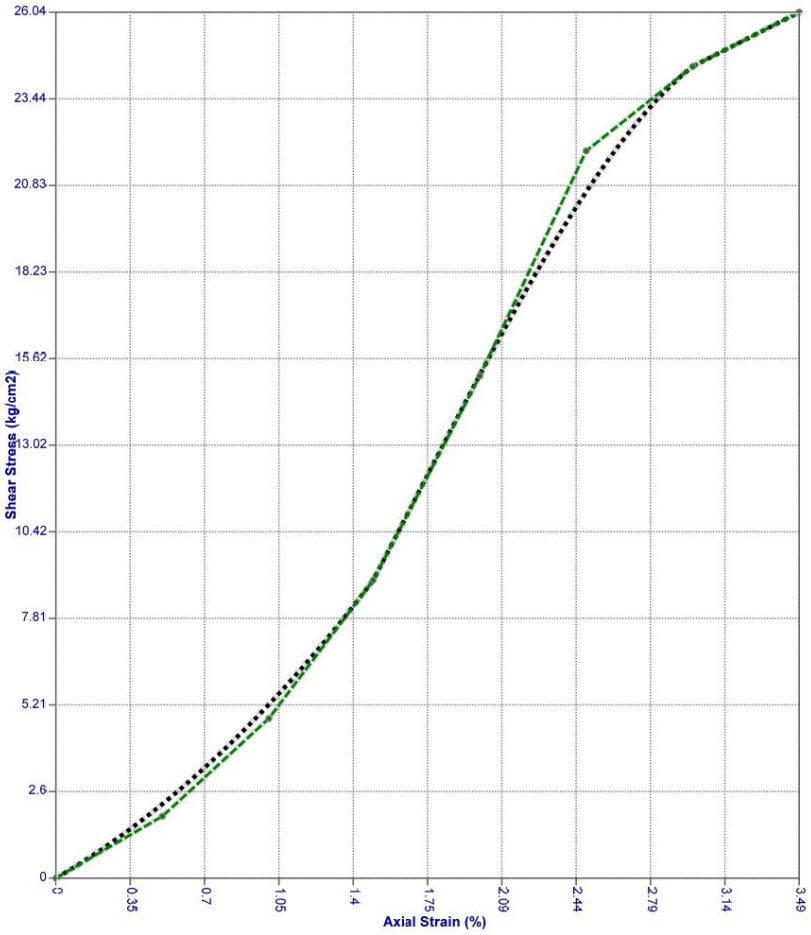
Unconfined Compression Test

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-02
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	28.5 (m)
Job No.:	K21-1339-101	Rock Name :	Mudstone
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	Undisturbed

ASTM D2938

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)
5.02	10.04	1	Moist	10.2	2.19	26.04	13.02



USCS Soil Description :
AASHTO Soil Description :

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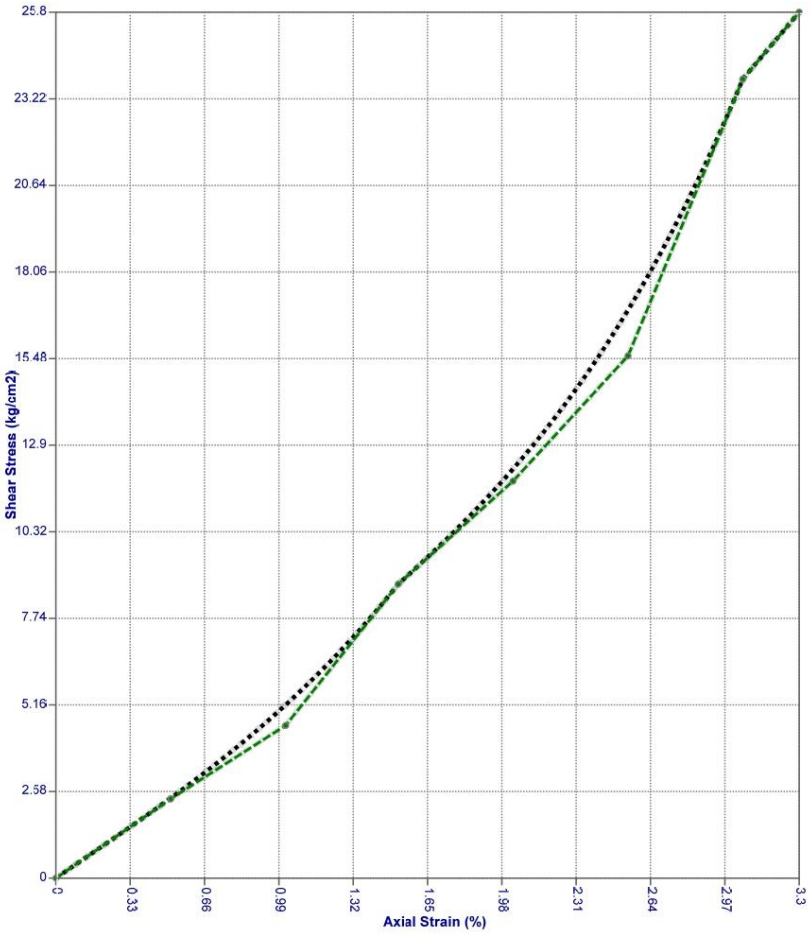
Unconfined Compression Test

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-02
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	34.8 (m)
Job No.:	K21-1339-101	Rock Name :	Claystone
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	Undisturbed

ASTM D2938

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)
5.02	9.838	1	Moist	7.4	2.16	25.8	12.9



USCS Soil Description :
AASHTO Soil Description :

Tested By :

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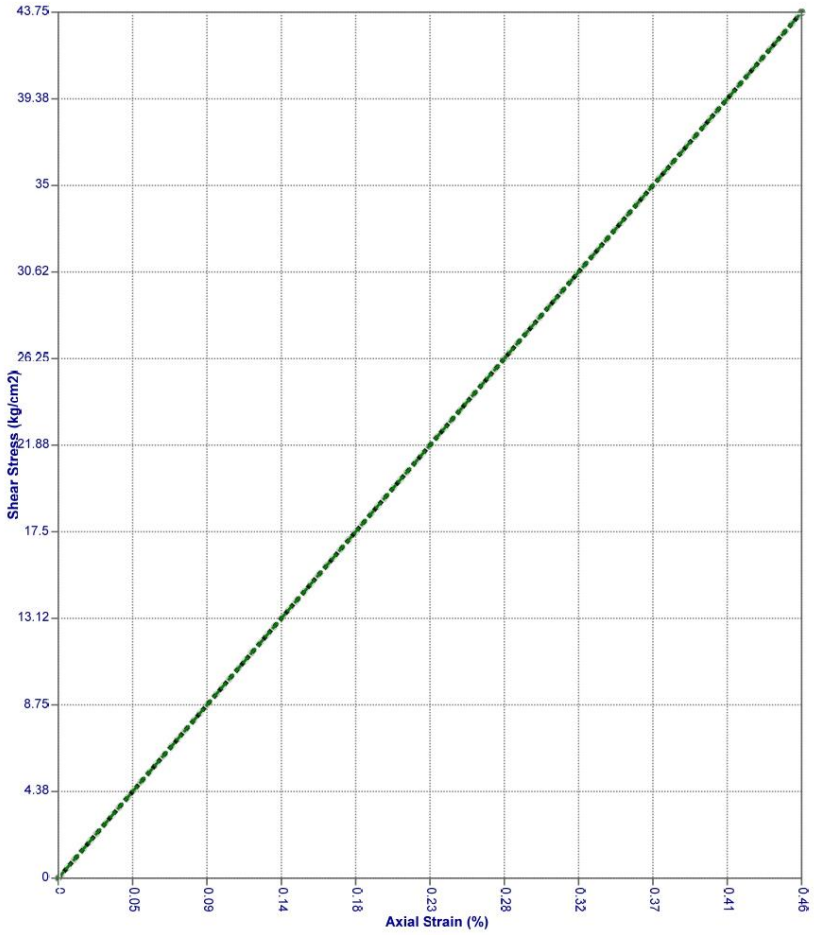
Unconfined Compression Test

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-03
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	19.5 (m)
Job No.:	K21-1339-101	Rock Name :	Sandstone
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	Undisturbed

ASTM D2938

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)
6.032	10.965	1	Moist	4.6	2.09	43.75	21.88



USCS Soil Description :
AASHTO Soil Description :

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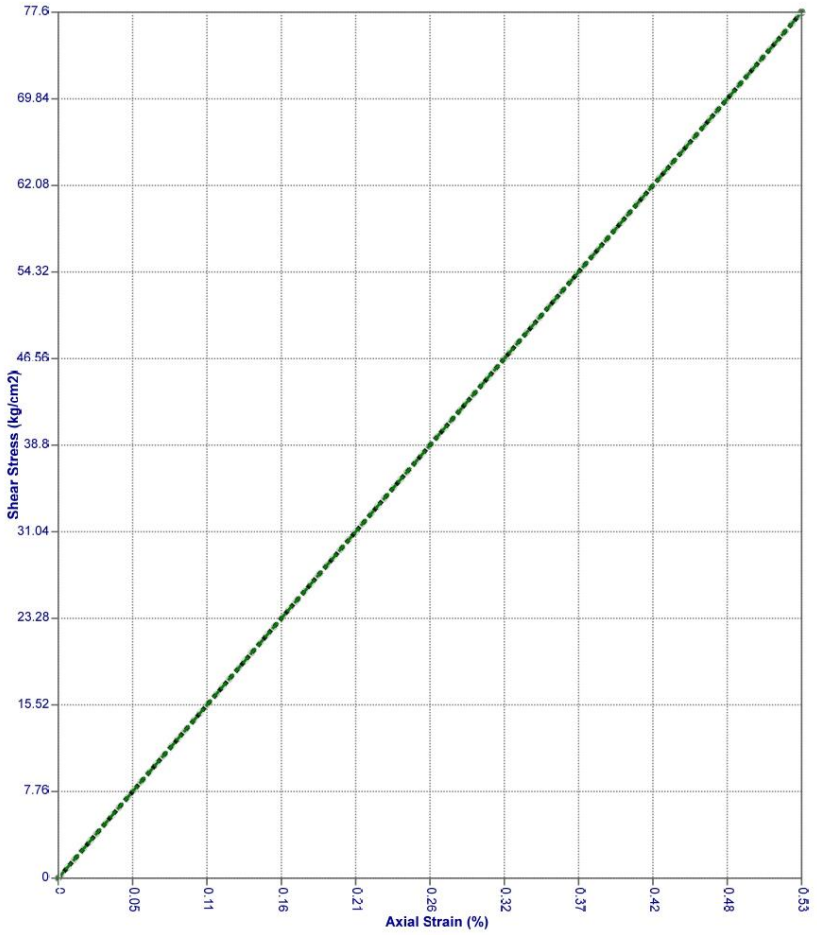
Unconfined Compression Test

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-03
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	22.5 (m)
Job No.:	K21-1339-101	Rock Name :	Sandstone
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	Undisturbed

ASTM D2938

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)
5.02	9.44	1	Moist	5.7	2.16	77.6	38.8



USCS Soil Description :
AASHTO Soil Description :

Tested By :

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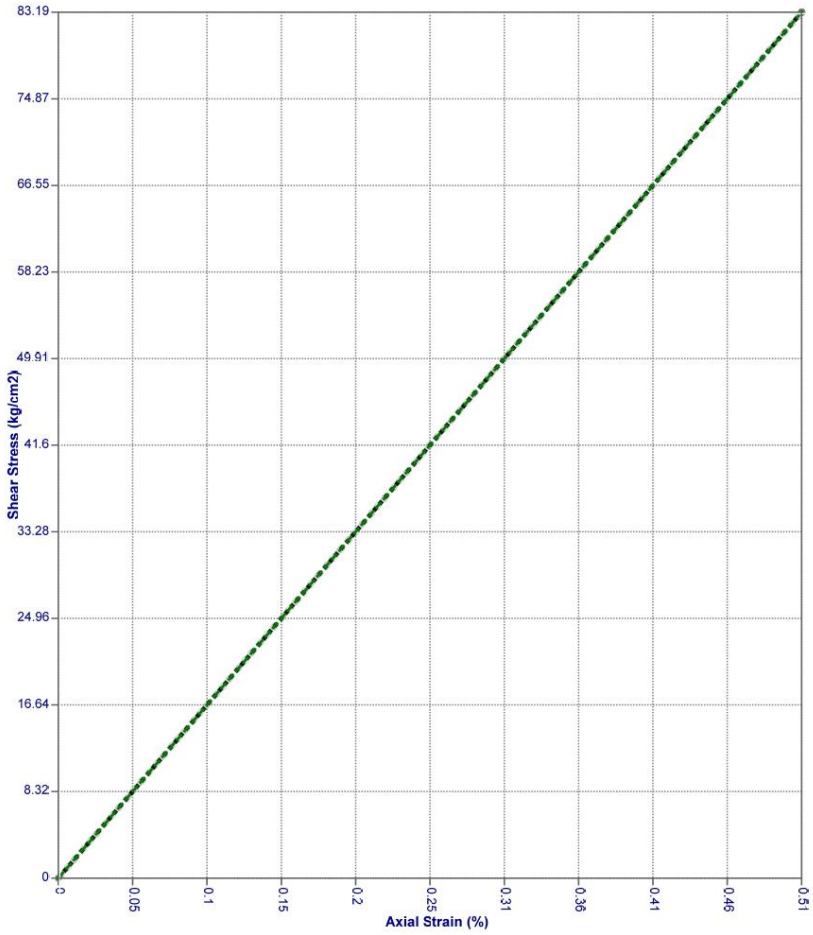
Unconfined Compression Test

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-03
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	27 (m)
Job No.:	K21-1339-101	Rock Name :	Sandstone
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	Undisturbed

ASTM D2938

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)
5.02	9.75	1	Moist	5.7	2.28	83.19	41.6



USCS Soil Description :
AASHTO Soil Description :

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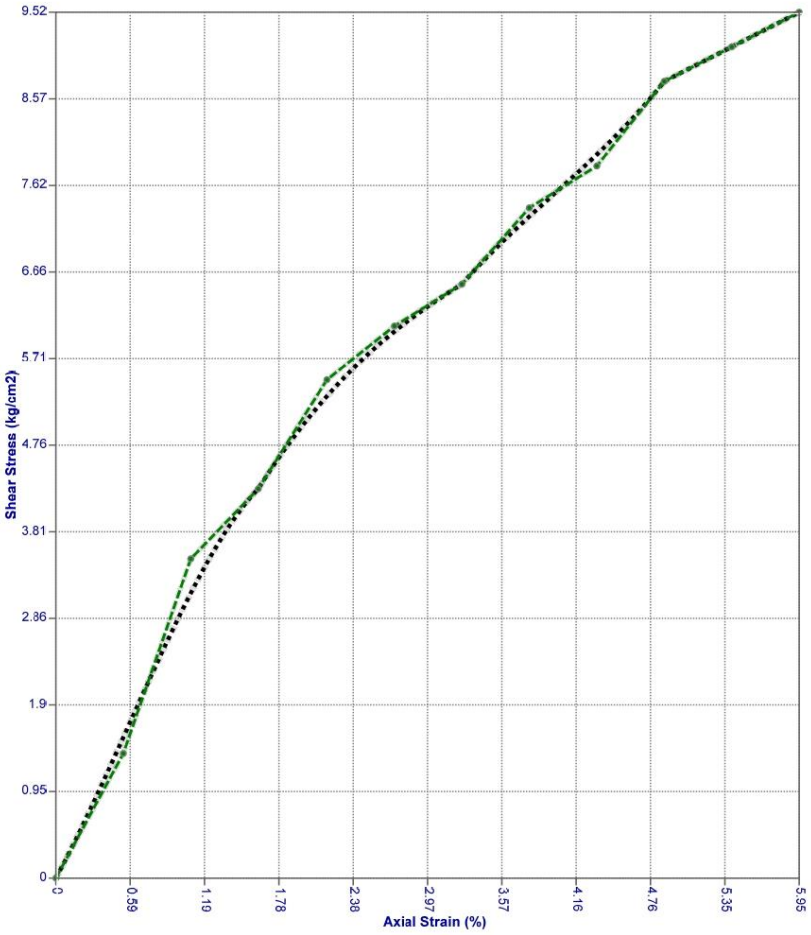
Unconfined Compression Test

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-04
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	12.3 (m)
Job No.:	K21-1339-101	Rock Name :	Sandstone
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	Undisturbed

ASTM D2938

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)
4.718	9.236	1	Moist	12.9	1.92	9.52	4.76



USCS Soil Description :
AASHTO Soil Description :

Tested By :

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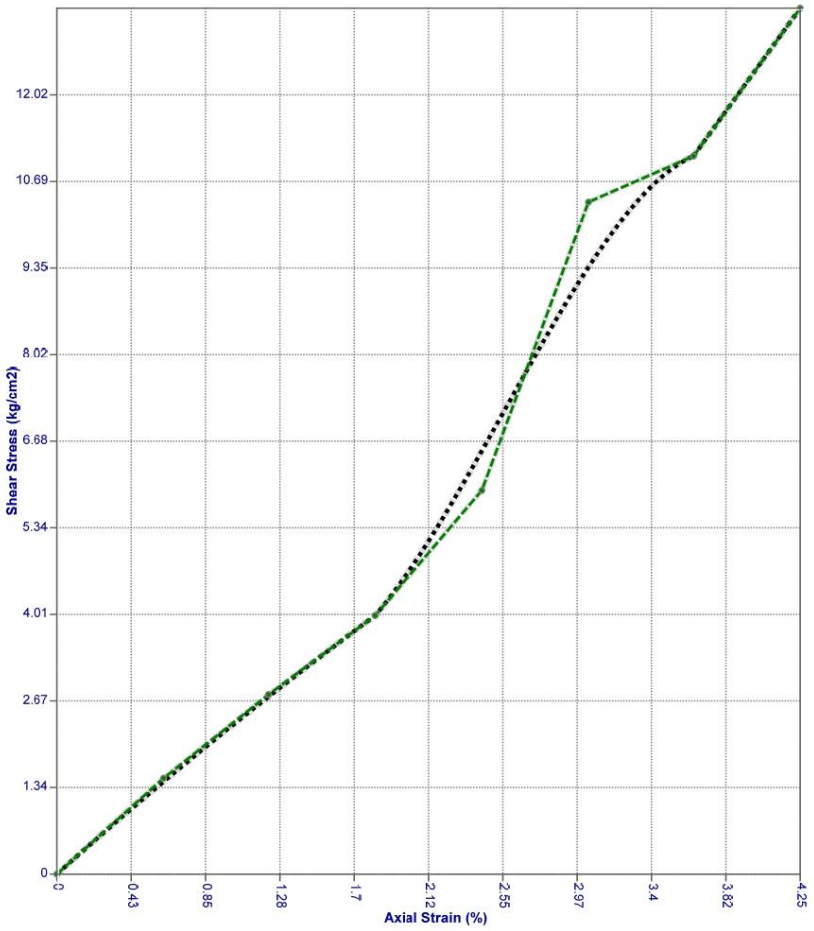
Unconfined Compression Test

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-04
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	18 (m)
Job No.:	K21-1339-101	Rock Name :	Claystone
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	Undisturbed

ASTM D2938

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)
4.718	8.232	1	Moist	6.2	2.13	13.36	6.68



USCS Soil Description :
AASHTO Soil Description :

Tested By :

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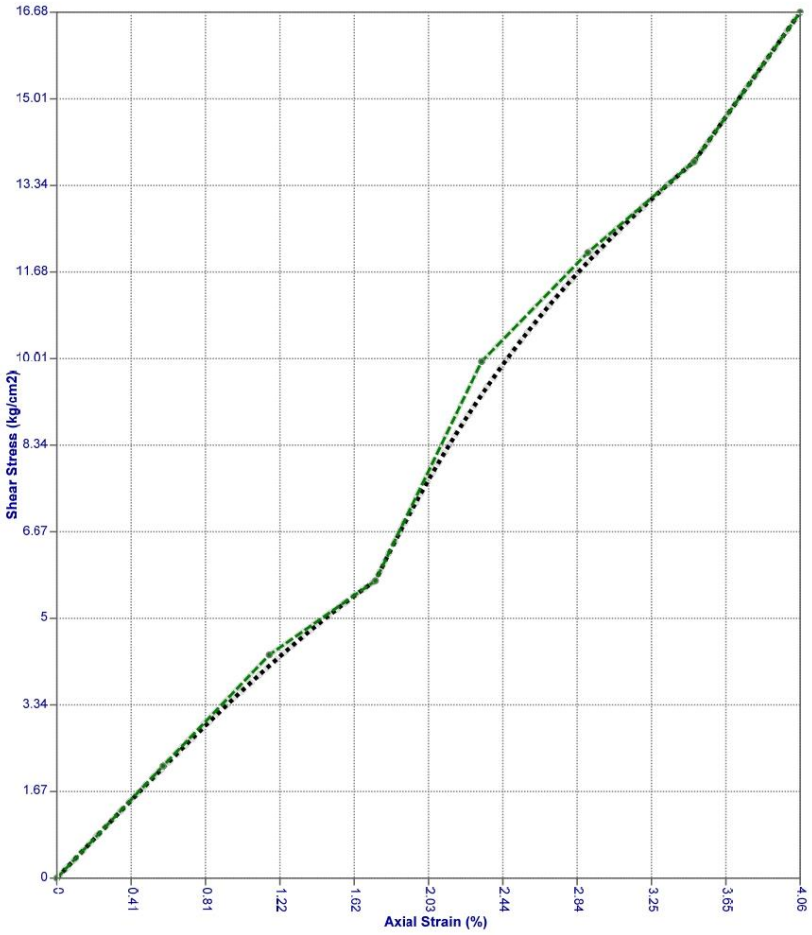
Unconfined Compression Test

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-04
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	24.5 (m)
Job No.:	K21-1339-101	Rock Name :	Claystone
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	Undisturbed

ASTM D2938

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)
4.718	8.624	1	Moist	9.1	1.96	16.68	8.34



USCS Soil Description :
AASHTO Soil Description :

Tested By :

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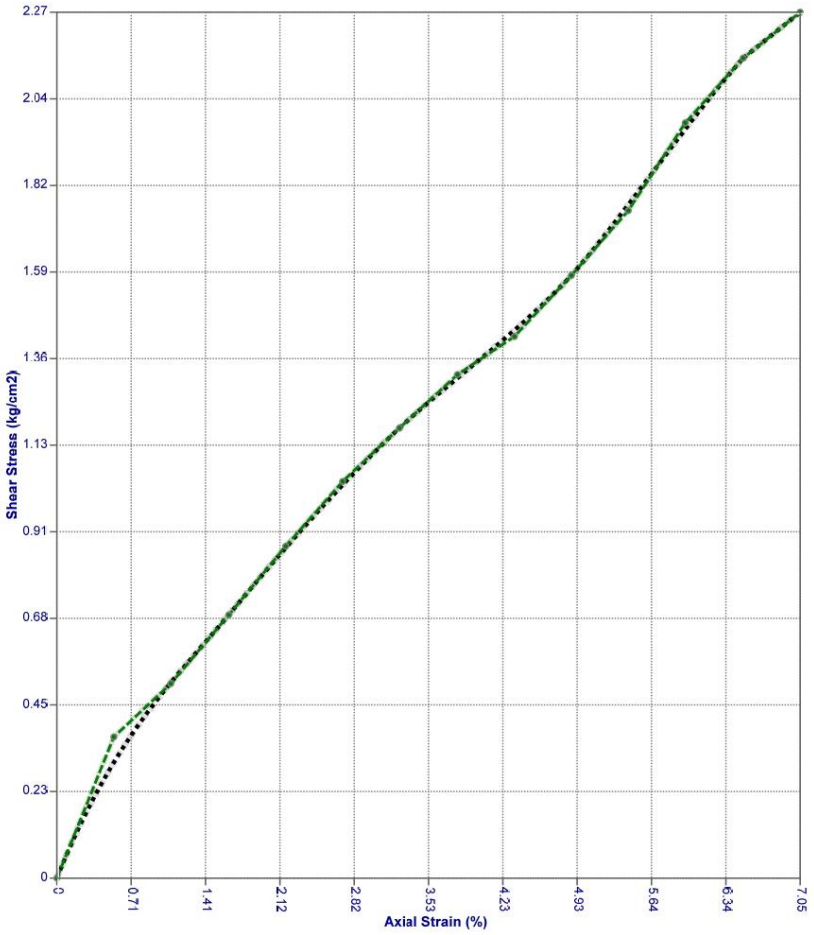
Unconfined Compression Test

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-05
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	20 (m)
Job No.:	K21-1339-101	Rock Name :	Claystone
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	Undisturbed

ASTM D2938

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)
5.865	9.221	1	Moist	9.7	1.93	2.27	1.13



USCS Soil Description :
AASHTO Soil Description :

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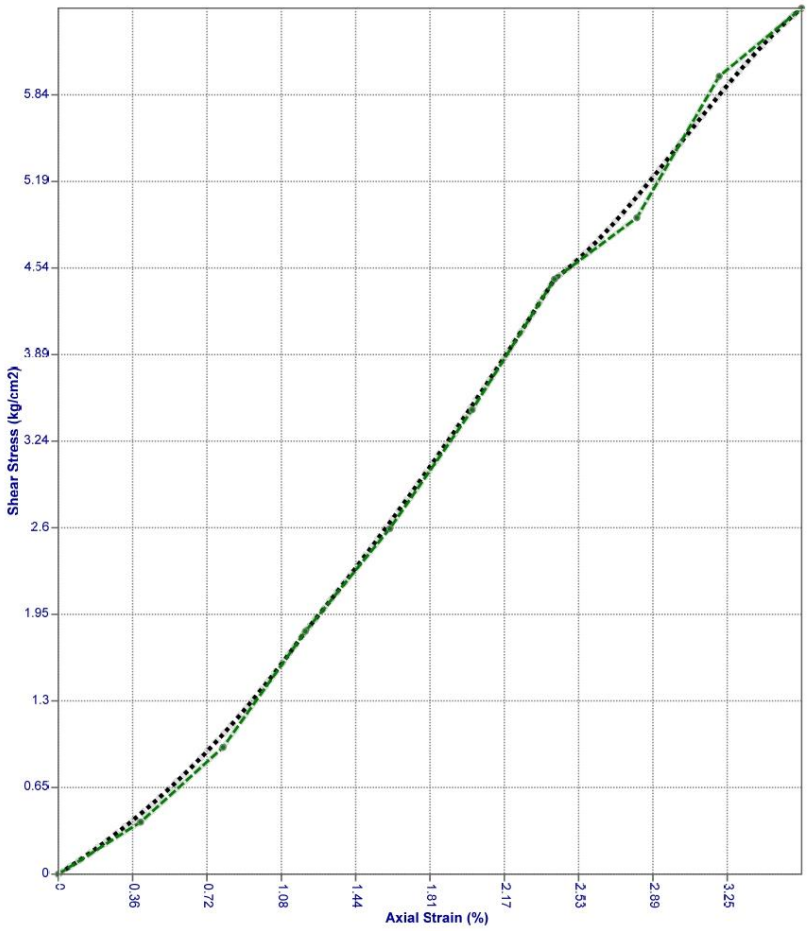
Unconfined Compression Test

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-05
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	27.5 (m)
Job No.:	K21-1339-101	Rock Name :	Claystone
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	Undisturbed

ASTM D2938

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)
6.224	12.449	1	Moist	5.7	1.93	6.49	3.24



USCS Soil Description :
AASHTO Soil Description :

Tested By :

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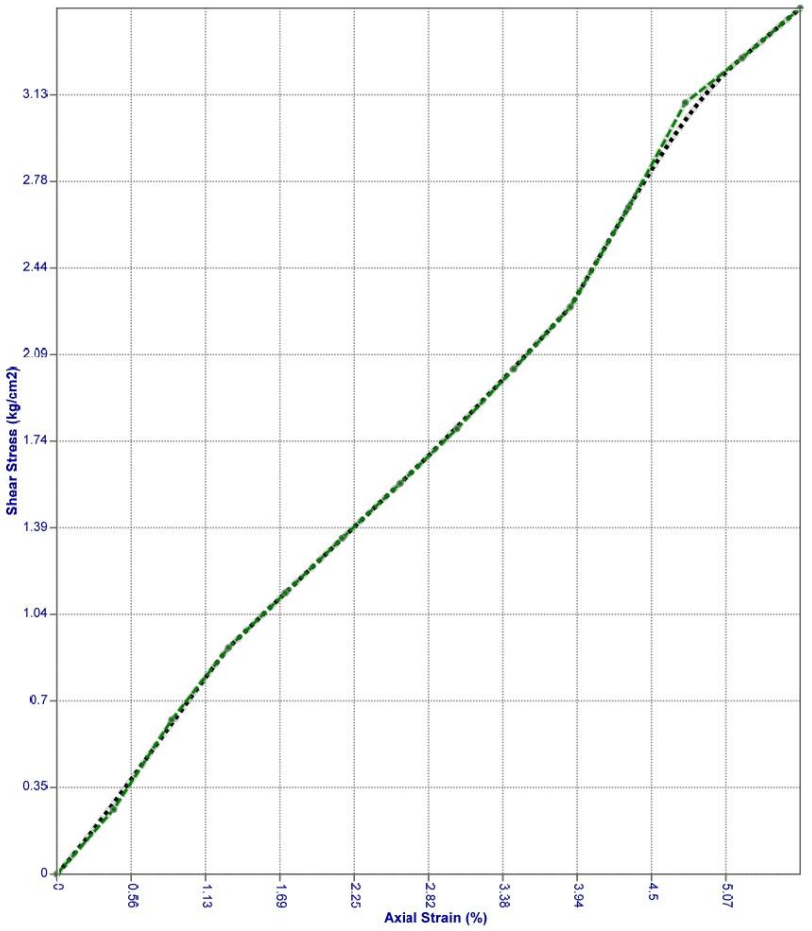
Unconfined Compression Test

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-06
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	9 (m)
Job No.:	K21-1339-101	Rock Name :	Mudstone
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	Undisturbed

ASTM D2938

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)
6.22	11.554	1	Moist	6.4	1.83	3.48	1.74



USCS Soil Description :
AASHTO Soil Description :

Tested By :

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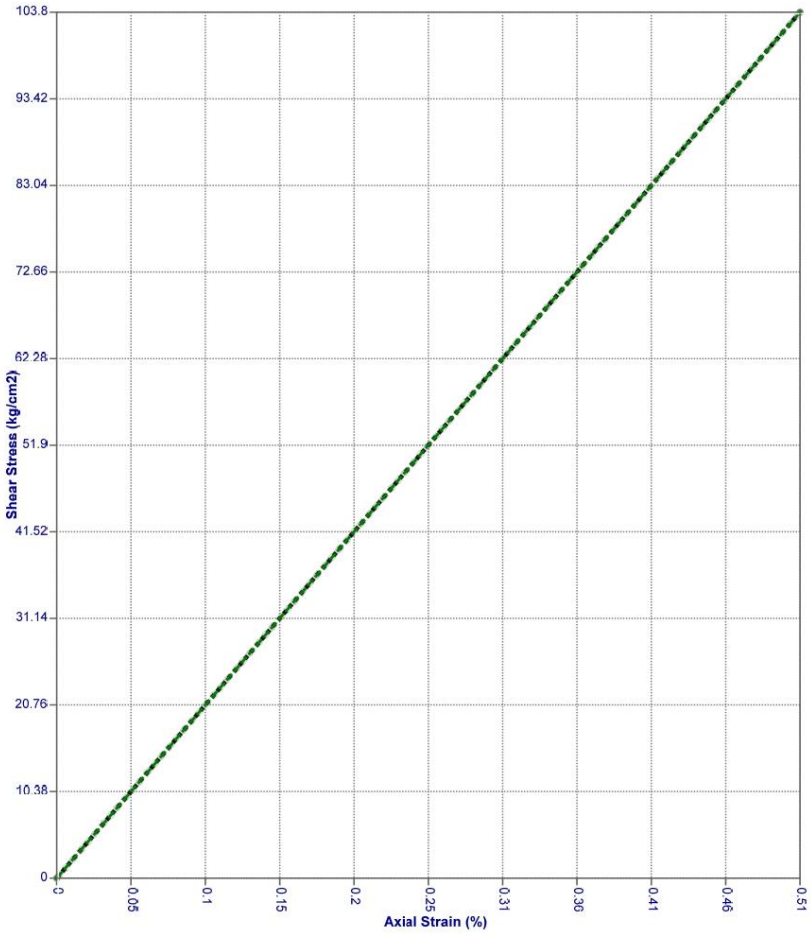
Unconfined Compression Test

Project :	GI at Plot# LA4/1, Block-21	Borehole :	BH-08
Client :	Muhammad Jawed Abdul Aziz	Sample Depth :	12.5 (m)
Job No.:	K21-1339-101	Rock Name :	Sandstone
Location :	Federal B Area, Sch.16, Karachi	Sample Type :	Undisturbed

ASTM D2938

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)
5.02	9.76	1	Moist	5.4	2.38	103.8	51.9



USCS Soil Description :
AASHTO Soil Description :

Tested By :

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POINT LOAD TEST

Project : GI at Plot# LA4/1, Block-21
Client : Muhammad Jawed Abdul Aziz
Job No.: K21-1339-101
Location : Federal B Area, Sch.16, Karachi

Soil Testing Services

Borehole	Sample Depth (m)	Point Load Index (Is_{50} Mpa)
BH-01	8.5	1.544
BH-01	13	1.221
BH-01	18	2.065
BH-01	22	0.911
BH-02	12	1.285
BH-02	19	1.744
BH-03	14	0.968
BH-04	15.5	1.855
BH-05	12.5	0.896
BH-06	13	1.566
BH-06	17	2.014
BH-07	11	2.442
BH-07	18	1.935
BH-09	10	1.552
BH-09	16	1.430
BH-10	14	1.224
BH-10	19	1.068

Chemical Test Results

Project : GI at Plot# LA4/1, Block-21
Client : Muhammad Jawed Abdul Aziz
Job No.: K21-1339-101
Location : Federal B Area, Sch.16, Karachi

ASTM D516, D512, D1293

Borehole	Sample Depth (m)	Description	Value
BH-01	1.5	pH value	6.79
BH-02	1.5		7.31
BH-03	1.5		7.29
BH-04	1.5		7.36
BH-05	1.5		6.49
BH-06	1.5		6.62
BH-07	1.5		6.49
BH-08	3		6.69
BH-09	1.5		6.94
BH-10	1.5		7.21
BH-10	1.5	Sulphate Content (%)	0.01
BH-01	1.5		0.01
BH-02	1.5		0.01
BH-03	1.5		0.01
BH-04	1.5		0.01
BH-05	1.5		0.01
BH-06	1.5		0.01
BH-07	1.5		0.01
BH-08	3		0.01
BH-09	1.5		0.01
BH-01	1.5	Chloride Content (%)	0.29
BH-02	1.5		0.27
BH-03	1.5		0.24
BH-04	1.5		0.28
BH-05	1.5		0.29
BH-06	1.5		0.31
BH-07	1.5		0.28
BH-08	3		0.28
BH-09	1.5		0.25
BH-10	1.5		0.26

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Appendix D

General Information on Testing Procedures

A. DRILLING, FIELD TESTING & SAMPLING

The field testing program consisted of drilling works, rock coring and in-situ testing including Standard Penetration Test (SPT), collection of soil samples using soil sampler and collection of rock samples using double tube core barrel. The following sections describe these activities in further detail.

A.1. DRILLING METHOD

All the boreholes were 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 Details of Boreholes

Borehole No.	Borehole Depth (meters)	Water table Depth (meters)	Coordinates
BH-01	40.0	Not encountered	E: 306770.00 N: 2760058.00
BH-02	40.0	Not encountered	E: 306729.16 N: 2760059.01
BH-03	30.0	Not encountered	E: 306781.60 N: 2760052.73
BH-04	30.0	Not encountered	E: 306694.61 N: 2760043.98

Borehole No.	Borehole Depth (meters)	Water table Depth (meters)	Coordinates
BH-05	30.0	Not encountered	E: 306716.71 N: 2760106.82
BH-06	20.0	Not encountered	E: 306781.00 N: 2760079.00
BH-07	20.0	Not encountered	E: 306777.00 N: 2760044.00
BH-08	20.0	Not encountered	E: 306719.00 N: 2760042.00
BH-09	20.0	Not encountered	E: 306664.42 N: 2760052.17
BH-10	20.0	Not encountered	E: 306697.00 N: 2760082.00



Figure A-1: Drilling Works in progress

A.2. FIELD TESTING

Field testing carried out at the site includes Standard Penetration Test (SPT). Soil samples were extracted from the boreholes with the help of "SPT sampler for all types of soils". Following sections indicate the processes carried out in each of the field tests.

A.2.1. STANDARD PENETRATION TESTS

The standard penetration tests (SPT) were carried out at interval of 1.0 - 1.5 meter in the overburden above the bedrock. The standard penetration test was carried out by "Safety" type sliding hammer. Split-spoon sampler was used in cohesive and fine granular soils to conduct SPT.

The standard penetration test was carried out by an assembly of the following parts:

- Drive-weight assembly, consisting of a drive head and a 63.5kg impact hammer, a hammer fall guide and the drop system. The drop mechanism will ensure a constant free fall of 760mm.
- Drive rods connect the drive-weight assembly to the sampler.
- The split spoon sampler was used to carry out the test, along with retrieving disturbed samples.

The base of the borehole was made clean and reasonably undisturbed at the test elevation. Following precautions were taken during the testing sequence:

- The level of water or bentonite slurry was maintained at a sufficient level above the groundwater level, to ensure any entry of water through the bottom of the borehole.
- The casing was not driven below the level at which the test will start.

The test was executed in the following steps:

- The sampler and the drive rods were lowered in the borehole and the hammer assembly added to it.
- The sampler is penetrated over seating drive of 150mm and the numbers of blows are recorded.
- In the same way the sampler is driven over a test drive of 300mm in two increments of 150mm.
- 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



Figure A-3: 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-4: Soil Sample in Split Spoon Sampler



Figure A-5: Soil Sample in 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-6: Rock core Samples Preserved in Core Boxes

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 twenty nine (29) soil samples were carried out as per *ASTM D 422*.

B.2. LIQUID AND PLASTIC LIMITS

The liquid and plastic limits of soil are parameters that define the state of the soil at different water content levels. The liquid limit is the water content above which the soil goes from solid phase to liquid phase and the plastic limit indicates the water content below which the soil mass makes the transition from a plastic, remould able solid to a brittle mass which cannot be remoulded any more. The difference in the water contents at Liquid and Plastic limits is termed as the plasticity index and it is a measure of the plasticity of the soil under consideration. The samples used for determining the limits are finer than the "#40 US sieve". The limits were determined in accordance with the *ASTM D-4318*.

Liquid and plastic limits of four (04) samples extracted from boreholes were carried out in accordance with the given procedure.

B.3. 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 forty three (43) samples was determined in accordance with *ASTM 2216-05*.

B.4. 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 & rock is always smaller than its particle density. Density of forty three (43) samples was determined in accordance with the procedure described in ASTM D 7263-09.

B.5. DIRECT SHEAR TEST

The direct shear test involves, placing a test sample in a rectangular box having two portions, the top portion can move while the lower portion is fixed. The sample is consolidated under a normal load. Also, double drainage is ensured by placing porous stones on the top and bottom of the sample. Hence, the test may be carried out under drained conditions. The shear strength of a remoulded sample is measured by applying a horizontal force which pushes the top part of rectangular box, the sample is sheared to failure and the normal and shear stresses at the point of failure are noted down. The shear box test (or the direct shear test) suffers from various limitations the most prominent of which is the forced failure plane formed due the configuration of the apparatus; this might result in concealing the actual plane of failure. As, the tests are carried out on disturbed samples and since only the stresses at the point of failure are determined the test results cannot be reliably used in describing the strength characteristics of the ground. The ASTM D 3080-04 was followed for the performance of static direct simple shear tests.

B.6. 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 ranging between 2.27 Kg/cm^2 - 103.8 Kg/cm^2. The results of the unconfined compression test are summarized in Appendices.

B.7. POINT LOAD INDEX

The point load tester is used to determine the Point Load Strength Index. This index provides a method for establishing rock strength classification. The index can also be used to determine the rock anisotropy as well as to predict other rock strength properties, such as uniaxial tensile and compressive strengths. The point load test is carried out in accordance with ASTM D 5731 – 16. . The results of the point load test are summarized in Appendices.

B.8. 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 rock samples:

- 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

Appendix E

Pile Capacity Calculations

(A) - CALCULATION OF ALLOWABLE SKIN FRICTION :

Depth	Strata 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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-2	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-3	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-4	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-5	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-6	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6-7	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-8	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8-9	Cohesive	0.60	1	18.0	9.0	0	100	-	0.5	-	-	0	0.00	1.000	2.0	47	47
9-10	Cohesive	0.60	1	18.0	27.0	0	100	-	0.5	-	-	0	0.00	1.000	2.0	47	94
10-11	Cohesionless	0.60	1	19.0	45.5	30	-	-	-	-	-	30	0.58	0.500	2.0	12	107
11-12	Cohesionless	0.60	1	19.0	64.5	30	-	-	-	-	-	30	0.58	0.500	2.0	18	124
12-13	Cohesionless	0.60	1	19.0	83.5	30	-	-	-	-	-	30	0.58	0.500	2.0	23	147
13-14	Cohesionless	0.60	1	19.0	102.5	30	-	-	-	-	-	30	0.58	0.500	2.0	28	175
14-15	Cohesionless	0.60	1	19.0	121.5	30	-	-	-	-	-	30	0.58	0.500	2.0	33	208
15-16	Rock	0.60	1	21.0	141.5	30	-	250	-	0.70	0.65	-	-	-	2.0	107	315
16-17	Rock	0.60	1	21.0	162.5	30	-	250	-	0.70	0.65	-	-	-	2.0	107	422
17-18	Rock	0.60	1	21.0	183.5	30	-	250	-	0.70	0.65	-	-	-	2.0	107	530
18-19	Rock	0.60	1	21.0	204.5	30	-	250	-	0.70	0.65	-	-	-	2.0	107	637
19-20	Rock	0.60	1	21.0	225.5	30	-	250	-	0.70	0.65	-	-	-	2.0	107	744
20-21	Rock	0.60	1	21.0	246.5	30	-	500	-	0.60	0.65	-	-	-	2.0	184	928
21-22	Rock	0.60	1	21.0	267.5	30	-	500	-	0.60	0.65	-	-	-	2.0	184	1112

(A) - CALCULATION OF ALLOWABLE SKIN FRICTION :

Depth	Strata 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)
22-23	Rock	0.60	1	21.0	288.5	30	-	500	-	0.60	0.65	-	-	-	2.0	184	1296
23-24	Rock	0.60	1	21.0	309.5	30	-	500	-	0.60	0.65	-	-	-	2.0	184	1480
24-25	Rock	0.60	1	21.0	330.5	30	-	500	-	0.60	0.65	-	-	-	2.0	184	1663
25-26	Rock	0.60	1	21.0	351.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	306	1970
26-27	Rock	0.60	1	21.0	372.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	306	2276
27-28	Rock	0.60	1	21.0	393.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	306	2583
28-29	Rock	0.60	1	21.0	414.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	306	2889
29-30	Rock	0.60	1	21.0	435.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	306	3196
30-31	Rock	0.60	1	21.0	456.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	306	3502
31-32	Rock	0.60	1	21.0	477.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	306	3808
32-33	Rock	0.60	1	21.0	498.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	306	4115
33-34	Rock	0.60	1	21.0	519.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	306	4421
34-35	Rock	0.60	1	21.0	540.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	306	4728
35-36	Rock	0.60	1	21.0	561.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	306	5034
36-37	Rock	0.60	1	21.0	582.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	306	5341
37-38	Rock	0.60	1	21.0	603.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	306	5647
38-39	Rock	0.60	1	21.0	624.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	306	5953
39-40	Rock	0.60	1	21.0	645.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	306	6260

(A) - CALCULATION OF ALLOWABLE SKIN FRICTION :

Depth	Strata 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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-2	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-3	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-4	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-5	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-6	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6-7	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-8	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8-9	Cohesive	0.76	1	18.0	9.0	0	100	-	0.5	-	-	0	0.00	1.000	2.0	60	60
9-10	Cohesive	0.76	1	18.0	27.0	0	100	-	0.5	-	-	0	0.00	1.000	2.0	60	119
10-11	Cohesionless	0.76	1	19.0	45.5	30	-	-	-	-	-	30	0.58	0.500	2.0	16	135
11-12	Cohesionless	0.76	1	19.0	64.5	30	-	-	-	-	-	30	0.58	0.500	2.0	22	157
12-13	Cohesionless	0.76	1	19.0	83.5	30	-	-	-	-	-	30	0.58	0.500	2.0	29	186
13-14	Cohesionless	0.76	1	19.0	102.5	30	-	-	-	-	-	30	0.58	0.500	2.0	35	221
14-15	Cohesionless	0.76	1	19.0	121.5	30	-	-	-	-	-	30	0.58	0.500	2.0	42	263
15-16	Rock	0.76	1	21.0	141.5	30	-	250	-	0.70	0.65	-	-	-	2.0	136	399
16-17	Rock	0.76	1	21.0	162.5	30	-	250	-	0.70	0.65	-	-	-	2.0	136	535
17-18	Rock	0.76	1	21.0	183.5	30	-	250	-	0.70	0.65	-	-	-	2.0	136	671
18-19	Rock	0.76	1	21.0	204.5	30	-	250	-	0.70	0.65	-	-	-	2.0	136	807
19-20	Rock	0.76	1	21.0	225.5	30	-	250	-	0.70	0.65	-	-	-	2.0	136	943
20-21	Rock	0.76	1	21.0	246.5	30	-	500	-	0.60	0.65	-	-	-	2.0	233	1175
21-22	Rock	0.76	1	21.0	267.5	30	-	500	-	0.60	0.65	-	-	-	2.0	233	1408

(A) - CALCULATION OF ALLOWABLE SKIN FRICTION :

Depth	Strata 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)
22-23	Rock	0.76	1	21.0	288.5	30	-	500	-	0.60	0.65	-	-	-	2.0	233	1641
23-24	Rock	0.76	1	21.0	309.5	30	-	500	-	0.60	0.65	-	-	-	2.0	233	1874
24-25	Rock	0.76	1	21.0	330.5	30	-	500	-	0.60	0.65	-	-	-	2.0	233	2107
25-26	Rock	0.76	1	21.0	351.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	388	2495
26-27	Rock	0.76	1	21.0	372.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	388	2883
27-28	Rock	0.76	1	21.0	393.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	388	3271
28-29	Rock	0.76	1	21.0	414.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	388	3660
29-30	Rock	0.76	1	21.0	435.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	388	4048
30-31	Rock	0.76	1	21.0	456.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	388	4436
31-32	Rock	0.76	1	21.0	477.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	388	4824
32-33	Rock	0.76	1	21.0	498.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	388	5212
33-34	Rock	0.76	1	21.0	519.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	388	5600
34-35	Rock	0.76	1	21.0	540.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	388	5988
35-36	Rock	0.76	1	21.0	561.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	388	6377
36-37	Rock	0.76	1	21.0	582.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	388	6765
37-38	Rock	0.76	1	21.0	603.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	388	7153
38-39	Rock	0.76	1	21.0	624.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	388	7541
39-40	Rock	0.76	1	21.0	645.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	388	7929

(A) - CALCULATION OF ALLOWABLE SKIN FRICTION :

Depth	Strata 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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-2	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-3	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-4	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-5	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-6	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6-7	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-8	Basement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8-9	Cohesive	0.90	1	18.0	9.0	0	100	-	0.5	-	-	0	0.00	1.000	2.0	71	71
9-10	Cohesive	0.90	1	18.0	27.0	0	100	-	0.5	-	-	0	0.00	1.000	2.0	71	141
10-11	Cohesionless	0.90	1	19.0	45.5	30	-	-	-	-	-	30	0.58	0.500	2.0	19	160
11-12	Cohesionless	0.90	1	19.0	64.5	30	-	-	-	-	-	30	0.58	0.500	2.0	26	186
12-13	Cohesionless	0.90	1	19.0	83.5	30	-	-	-	-	-	30	0.58	0.500	2.0	34	220
13-14	Cohesionless	0.90	1	19.0	102.5	30	-	-	-	-	-	30	0.58	0.500	2.0	42	262
14-15	Cohesionless	0.90	1	19.0	121.5	30	-	-	-	-	-	30	0.58	0.500	2.0	50	312
15-16	Rock	0.90	1	21.0	141.5	30	-	250	-	0.70	0.65	-	-	-	2.0	161	473
16-17	Rock	0.90	1	21.0	162.5	30	-	250	-	0.70	0.65	-	-	-	2.0	161	634
17-18	Rock	0.90	1	21.0	183.5	30	-	250	-	0.70	0.65	-	-	-	2.0	161	794
18-19	Rock	0.90	1	21.0	204.5	30	-	250	-	0.70	0.65	-	-	-	2.0	161	955
19-20	Rock	0.90	1	21.0	225.5	30	-	250	-	0.70	0.65	-	-	-	2.0	161	1116
20-21	Rock	0.90	1	21.0	246.5	30	-	500	-	0.60	0.65	-	-	-	2.0	276	1392
21-22	Rock	0.90	1	21.0	267.5	30	-	500	-	0.60	0.65	-	-	-	2.0	276	1668

(A) - CALCULATION OF ALLOWABLE SKIN FRICTION :

Depth	Strata 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)
22-23	Rock	0.90	1	21.0	288.5	30	-	500	-	0.60	0.65	-	-	-	2.0	276	1944
23-24	Rock	0.90	1	21.0	309.5	30	-	500	-	0.60	0.65	-	-	-	2.0	276	2219
24-25	Rock	0.90	1	21.0	330.5	30	-	500	-	0.60	0.65	-	-	-	2.0	276	2495
25-26	Rock	0.90	1	21.0	351.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	460	2955
26-27	Rock	0.90	1	21.0	372.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	460	3414
27-28	Rock	0.90	1	21.0	393.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	460	3874
28-29	Rock	0.90	1	21.0	414.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	460	4334
29-30	Rock	0.90	1	21.0	435.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	460	4793
30-31	Rock	0.90	1	21.0	456.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	460	5253
31-32	Rock	0.90	1	21.0	477.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	460	5713
32-33	Rock	0.90	1	21.0	498.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	460	6172
33-34	Rock	0.90	1	21.0	519.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	460	6632
34-35	Rock	0.90	1	21.0	540.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	460	7092
35-36	Rock	0.90	1	21.0	561.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	460	7551
36-37	Rock	0.90	1	21.0	582.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	460	8011
37-38	Rock	0.90	1	21.0	603.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	460	8470
38-39	Rock	0.90	1	21.0	624.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	460	8930
39-40	Rock	0.90	1	21.0	645.5	30	-	1000	-	0.50	0.65	-	-	-	2.0	460	9390

ALLOWABLE END BEARING RESISTANCE :

Socket Strata	Diameter of Pile (mm)	Length of Pile below cut-off level (m)	Nϕ	q_{UC} (kN/m^2)	FOS	Q_{END} (kN)
Rock	600	15.0	3.0	500.0	3.0	283
Rock	600	20.0	3.0	1000.0	3.0	566
Rock	600	25.0	3.0	1000.0	3.0	566
Rock	760	15.0	3.0	500.0	3.0	454
Rock	760	20.0	3.0	1000.0	3.0	907
Rock	760	25.0	3.0	1000.0	3.0	907
Rock	900	15.0	3.0	500.0	3.0	636
Rock	900	20.0	3.0	1000.0	3.0	1273
Rock	900	25.0	3.0	1000.0	3.0	1273

SOIL TESTING SERVICES

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ANNEXURE VII: ESTIMATED WATER REQUIREMNT AND STORAGE CAPACITY

PROPOSED BUILDING : THE 7 TOWERS
Plot # LA/4/1 Block-21. Federal. B Area, Karachi.
KARACHI

Date: 06-05-2026

WATER SUPPLY SYSTEM

DAILY & WEEKLY WATER REQUIRMENTS

S.No	A	Apartments	Occupancy	Apts	Total Nos Of Person	Recommended Daily water	Daily Water Required	Potable Water		Non Potable Water (Recycle Grey Water)	
			Person	Nos.		Gal/Day/Person	Gal(us)/Day	Gal/Day/Perso	Gal(us)/Day	Gal/Day/Pers	Gal(us)/Day
1	T-1	Three Beds Apartment	6	232	1392	35	48,720	25	34,800	10	13,920
2	T-2	Three Beds Apartment	6	116	696	35	24,360	25	17,400	10	6,960
3	T-3	Three Beds Apartment	6	232	1392	35	48,720	25	34,800	10	13,920
4	T-7	Tow Beds Apartment	4	232	928	35	32,480	25	23,200	10	9,280
5	T-4	Two Beds Apartment	4	232	928	35	32,480	25	23,200	10	9,280
6	T-6	Five Beds Apartment	10	116	1160	35	40,600	25	29,000	10	11,600
7		Four Beds Apartment	8	58	464	35	16,240	25	11,600	10	4,640
8	T-5	Four Beds Apartment	8	174	1392	35	48,720	25	34,800	10	13,920
		MAINTENANCE STAFF	100	1	100	15	1500	10	1000	5	500
		A = TOTAL OF DAILY DOMESTIC WATER REQUIRED			8452		293,820		209,800		84,020

	B	COMMON AREAS AMENITIES	Area	Occupants	Total Nos Of Person	Recommended Daily water	Daily Water Required	Potable Water		Non Potable Water (Recycle Grey Water)	
			Sft.	Nos.		Gal/Day/Person	Gal(us)/Day	Gal/Day/Perso	Gal(us)/Day	Gal/Day/Pers	Gal(us)/Day
1	GF	SECURITY	2500	35		15	521	10	347	5	174
2	GF	PRAYER HALL	5000	250		10	2500	6	1500	4	1000
3	GF	ABULUTION AREA	1000	250		10	2500	6	1500	4	1000
4	GF	RO PLANT-01	1150	16		15	240	10	160	5	80
5	GF	RO PLANT-02	1150	16		15	240	10	160	5	80
6	GF	LNG PLANT-01	1150	16		15	240	10	160	5	80
7	GF	LNG PLANT-02	2300	32		15	479	10	319	5	160
8	GF	EMERGANCY CLINIC	1250	17		15	260	10	174	5	87
9	GF	LADIES PORLER	675	9		15	141	10	94	5	47
10	GF	CANTEEN	2300	100		15	1500	10	1000	5	500
11	GF	GENTS SALOON	400	6		15	83	10	56	5	28
12	GF	LAUNDERAY	350	5		15	73	10	49	5	24
13	GF	MILK SHOP	350	5		15	73	10	49	5	24
14	GF	BACKERS	300	4		15	63	10	42	5	21
15	GF	SUPER MART	5200	72		15	1083	10	722	5	361
16	GF	BANK-01	2100	29		15	438	10	292	5	146
17	GF	BANK-02	1500	21		15	313	10	208	5	104
18	GF	COMMUNITY HALL-01	4000	100		15	1500	10	1000	5	500
19	GF	COMMUNITY HALL-02	4000	100		15	1500	10	1000	5	500
20	GF	PENTRY	425	6		10	59	6	35	4	24
21	GF	GARDEN	1000	14		10	139	6	83	4	56
22	FF	BATH ROOMS-01	10Nos	50		10	500	6	300	4	200
23	SF	BATH ROOMS-02	10Nos	50		10	500	6	300	4	200
26	20F	RECREATION AREA	25Nos	50	1253	10	500	6	300	4	200
		B = TOTAL DAILY DOMESTIC WATER REQUIRED					15443		9849		5594
		GRAND TOTAL DAILY DOMESTIC WATER REQUIRED = A+B					309263		219649		89614

	C	COMMON AREAS RECREATIONS	Area	Dis	Recommended Weekly Water Requirement	Weekly Water Required
			Sft.	Nos.	Gal / Week	Gal(us)/ Week
24	GF	FOUNTAIN AREA	3000	1	75000	75000
25	RT	BABY POOLS (T-1)	625	2	15000	30000
26	RT	SHOOWR (T-1)	36	6	25	150
27	RT	BABY POOLS (T2)	625	2	15000	30000
28	RT	SHOOWR (T-2)	36	6	25	150
29	RT	BABY POOLS (T-3)	625	2	15000	30000
30	RT	SHOOWR (T-3)	36	6	25	150
31	RT	BABY POOLS (T-7)	625	2	12000	24000
32	RT	SHOOWR (T-7)	36	6	25	150
33	RT	BABY POOLS (T-4)	625	2	12000	24000
34	RT	SHOOWR (T-4)	36	6	25	150
35	RT	BABY POOLS (T-6)	625	2	15000	30000
36	RT	SHOOWR (T-6)	36	6	25	150
37	RT	BABY POOLS (T-5)	625	2	15000	30000
38	RT	SHOOWR (T-5)	36	6	25	150
		C = TOTAL WEEKLY DOMESTIC WATER REQUIRED				274050
		D = GRAND TOTAL DAILY + WEEKLY DOMESTIC WATER REQUIRED = (A+B) + C				583313

A		OVER HEAD WATER TANK CAPACITY	Gal(us)
1	T-1	Potable Water Storage -1	14,918
		Potable Water Storage-2	14,918
		Non Portable (Recycle Grey Water)	11,550
		Fire Fighting Reserved	11,550
		OHWT CAPACITY FOR T-1 Gal(US)	67,854
2	T-2	Potable Water Storage -1	11,068
		Potable Water Storage-2	11,068
		Non Portable(Recycle Grey Water)	9,487
		Fire Fighting Reserved	9,487
		OHWT CAPACITY FOR T-2 Gal(US)	52,178
3	T-3	Potable Water Storage -1	14,918
		Potable Water Storage-2	14,918
		Non Portable	11,550
		Fire Fighting Reserved	11,550
		OHWT CAPACITY FOR T-3 Gal(US)	67,854
4	T-7	Potable Water Storage -1(Nos 02) = 14025 + 14025	28,050
		Potable Water Storage-2 (Nos 02) = 9350 + 9350	18,700
		Non Portable(Recycle Grey Water)	8,800
		Fire Fighting Reserved	8,800
		OHWT CAPACITY FOR T-4 Gal(US)	83,050
5	T-4	Potable Water Storage -1 (Nos 02) = 14025 + 14025	28,050
		Potable Water Storage-2 (Nos 02) = 9350 + 9350	18,700
		Non Portable(Recycle Grey Water)	8,800
		Fire Fighting Reserved	8,800
		OHWT CAPACITY FOR T-5 Gal(US)	83,050
6	T-6	Potable Water Storage -1 (Nos 02) = 9088 + 9088	18,176
		Potable Water Storage-2 (Nos 02) = 9088 + 9088	18,176
		Non Portable(Recycle Grey Water)	8,078
		Fire Fighting Reserved	8,078
		OHWT CAPACITY FOR T-6 Gal(US)	70,684
7	T-5	Potable Water Storage -1 (Nos 02) = 8842 + 8842	17,684
		Potable Water Storage-2 (Nos 01) =	8,842
		Non Portable(Recycle Grey Water)	8,800
		Fire Fighting Reserved (Nos 02) = 6587 + 6587	13,174
		OHWT CAPACITY FOR T-7 Gal(US)	57,342

B		5TH FLOOR WATER TANK CAPACITY	Gal(us)
1	T-1	Potable Water Storage -1	15,585
		Potable Water Storage-2	16,136
		Non Portable(Recycle Grey Water)	12,568
		Fire Fighting Reserved	11,261
		FFWT CAPACITY FOR T-1 Gal(US)	71,686
2	T-2	Potable Water Storage -1	15,539
		Potable Water Storage-2	15,539
		Non Portable(Recycle Grey Water)	0
		Fire Fighting Reserved	0
		FFWT CAPACITY FOR T-2 Gal(US)	46,617
3	T-3	Potable Water Storage -1	15,585
		Potable Water Storage-2	16,136
		Non Portable(Recycle Grey Water)	12,568
		Fire Fighting Reserved	11,261
		FFWT CAPACITY FOR T-3 Gal(US)	71,686
4	T-7	Potable Water Storage -1	32,489
		Potable Water Storage-2	0
		Non Portable(Recycle Grey Water)	15,134
		Fire Fighting Reserved	15,134
		FFWT CAPACITY FOR T-4 Gal(US)	62,757
5	T-4	Potable Water Storage -1	32,489
		Potable Water Storage-2	0
		Non Portable (Recycle Grey Water)	15,134
		Fire Fighting Reserved	15,134
		FFWT CAPACITY FOR T-5 Gal(US)	62,757
6	T-6	Potable Water Storage -1	40,679
		Potable Water Storage-2	0
		Non Portable(Recycle Grey Water)	19,693
		Fire Fighting Reserved	23,512
		FFWT CAPACITY FOR T-6 Gal(US)	83,884
7	T-5	Potable Water Storage -1	24,700
		Potable Water Storage-2	24,700
		Non Portable (Recycle Grey Water)	15,919
		Fire Fighting Reserved	15,919
		FFWT CAPACITY FOR T-7 Gal(US)	105,938

C		UNDER GROUND WATER TANK CAPACITY	Gal(us)
1	T-1	Potable Water Storage -1	29,056
		Potable Water Storage-2	21,434
		Non Portable (Recycle Grey Water)	15,185
		Fire Fighting Reserved	15,185
		UGWT CAPACITY FOR T-1 Gal(US)	102,294
2	T-2	Potable Water Storage -1	19,682
		Potable Water Storage-2	19,682
		Non Portable(Recycle Grey Water)	15,363
		Fire Fighting Reserved	15,363
		UGWT CAPACITY FOR T-2 Gal(US)	89,772
3	T-3	Potable Water Storage -1	29,056
		Potable Water Storage-2	21,434
		Non Portable(Recycle Grey Water)	15,185
		Fire Fighting Reserved	15,185
		UGWT CAPACITY FOR T-3 Gal(US)	102,294
4	T-7	Potable Water Storage -1	23,427
		Potable Water Storage-2	23,427
		Non Portable(Recycle Grey Water)	18,391
		Fire Fighting Reserved	18,391
		UGWT CAPACITY FOR T-4 Gal(US)	107,063
5	T-4	Potable Water Storage -1	23,427
		Potable Water Storage-2	23,427
		Non Portable (Recycle Grey Water)	18,391
		Fire Fighting Reserved	18,391
		UGWT CAPACITY FOR T-5 Gal(US)	107,063
6	T-6	Potable Water Storage -1	40,679
		Potable Water Storage-2	0
		Non Portable(Recycle Grey Water)	19,693
		Fire Fighting Reserved	23,512
		UGWT CAPACITY FOR T-6 Gal(US)	83,884
7	T-5	Potable Water Storage -1	24,700
		Potable Water Storage-2	24,700
		Non Portable(Recycle Grey Water)	15,919
		Fire Fighting Reserved	15,919
		UGWT CAPACITY FOR T-7 Gal(US)	105,938

D		TOTAL WATER STORAGE TANK CAPACITY PER	Gal(US) Storage	Gal(US) Demand/Day	Storage (Days)
1	T-1	Potable Water Storage -1	112,047	34,800	3
		Potable Water Storage-2	0		
		Non Portable (Recycle Grey Water)	39,303	14,400	3
		Fire Fighting Reserved	37,996		
		Total Water Tank Storage Capacity For T-1 Gal(US)	189,346	34,800	6
2	T-2	Potable Water Storage -1	92,578	17,400	5

		Potable Water Storage-2	0		
		Non Portable(Recycle Grey Water)	24,850	7,200	3
		Fire Fighting Reserved	24,850		
		Total Water Tank Storage Capacity For T- 2 Gal(US)	142,278	17,400	9

3	T-3	Potable Water Storage -1	59,706	24,000	2
		Potable Water Storage-2	0		
		Non Portable(Recycle Grey Water)	39,303	9,600	4
		Fire Fighting Reserved	37,996		
		Total Water Tank Storage Capacity For T- 3 Gal(US)	137,005	24,000	7

4	T-7	Potable Water Storage -1	126,093	36,000	4
		Potable Water Storage-2	0		
		Non Portable (Recycle Grey Water)	42,325	14,400	3
		Fire Fighting Reserved	42,325		
		Total Water Tank Storage Capacity For T- 4 Gal(US)	210,743	36,000	6

5	T-4	Potable Water Storage -1	126,093	18,000	7
		Potable Water Storage-2	0		
		Non Portable(Recycle Grey Water)	42,325	7,200	6
		Fire Fighting Reserved	42,325		
		Total Water Tank Storage Capacity For T- 5 Gal(US)	210,743	18,000	13

6	T-6	Potable Water Storage -1	117,710	12,000	10
		Potable Water Storage-2	0		
		Non Portable(Recycle Grey Water)	47,464	4,800	10
		Fire Fighting Reserved	55,102		
		Total Water Tank Storage Capacity For T- 6 Gal(US)	220,276	12,000	20

7	T-5	Potable Water Storage -1	125,326	12,000	10
		Potable Water Storage-2	0		
		Non Portable (Recycle Grey Water)	40,638	4,800	8
		Fire Fighting Reserved	45,012		
		Total Water Tank Storage Capacity For T- 7 Gal(US)	210,976	12,000	19

E		GRAND TOTAL WATER STORAGE TANK CAPACITY OF ENTIRE PROJECT VS DAILY USAGES	Gal(US)	Gal(US) Demand/Day	Storage (Days)
1		Potable Water Storage	759,553	219,649	3
		Non Portable (Recycle Grey Water)	276,208	89,614	3
		Fire Fighting = 2.5 linch Dia Fire Hoserail 250gpm X 2Nos X 7Towers = 3500gmp = 300000gpm / 3500gpm = 85m / 60m = 1.42h Reserved	285,606	90m	0
		Grand Total Water Tank Storage Capacity Gal(US)	1,321,367	309,263	7

G		DAILY WATER REQUIREDVER FOR RO PLANT	Gal(us)
1		RO PLANT - 1	100,000
		RO PLANT - 2	100,000
		DAILY DOMESTIC WATER REQUIREDVER FOR R O PLANT	200,000

H		DAILY WATER REQUIREDVER FOR TREATMENT PLANT	Gal(us)
1		STP Capacity (Recycle Grey Water)	100,000
		DAILY WATER REQUIREDVER FOR TREATMENT PLANT	100,000

F		TOTAL WATER STORAGE SUMPIT TANK CAPACITY OF PROJECT	Gal(US)
1		Sumpit Tank - 1 = 3000 X 03 =	9,000
		Grand Total Water Storage Sumpit Tank Capacity Gal(US)	9,000

ANNEXURE VIII: ELECTRICITY AND LOAD ESTIMATIONS FOR THE PROPOSED PROJECT

ELECTRICAL LOAD SHEET APPARTMENT (ON AREA BASIS) 7-TOWER PROJECT

S No	Description	Approx Area (sqft)	Qty (No)	Watt/sft	Connected Load (kw)	Total Connected Load (kw)	Watt/sft As Per K-Elect.	Demand Load (kw) As Per K-E Standards	Total Demand Load (kw) As Per K-E Standard
1	TOWER - 1								
	APARTMENTS								
1	Appartment Type B - (2-Beds , Drawing and lounge) (8th to 31th Floor)	800	264	6.5	5.2	1373	3.4	2.7	713
2	Lobby / Staircase (8th to 31th Floor)	1,690	24	0.75	1.27	30.42	0.7	1.10	26.36
3	Passenger Lift (15hp)	-	3	0.00	11.00	33.00	0.0	11.00	33.00
4	Water Transfer Pump (15hp)	-	2	0.00	11.00	22.00	0.0	11.00	22.00
	RECREATION								
5	Prayer Area (7th Floor)	5,610	1	2.0	11.2	11	2.0	11.2	11
6	Mechanical / Generator Room / Electrical Panel Room (7th Floor)	1,206	1	0.75	0.90	0.90	0.7	0.84	0.84
7	Imam Room/ Mozin Room /Mayyat Room (7th Floor)	2841	1	2.00	5.68	5.68	2.0	5.68	5.68
8	Lift Lobby / Passage Area (7th Floor)	1450	1	0.75	1.09	1.09	0.7	1.02	1.02
	TOTAL LOAD - TOWER-1					1477			813
2	TOWER - 2								
	APARTMENTS								
1	Appartment Type C - (2-Beds and lounge) (8th to 31th Floor)	600	192	6.5	3.9	749	3.8	2.3	432
2	Lobby / Staircase (8th to 31th Floor)	1,200	24	0.75	0.90	21.60	0.7	0.78	18.72
3	Passenger Lift (15hp)	-	4	0.00	11.00	44.00	0.0	11.00	44.00
4	Water Transfer Pump (15hp)	-	2	0.00	11.00	22.00	0.0	11.00	22.00
	RECREATION								
5	Ladies Gym/Gents Gym/ Indoor Game / Children Play Area (7th Floor)	2,190	1	10.0	21.9	22	10.0	21.9	22
6	Mechanical / Generator Room / Electrical Panel Room (7th Floor)	1,380	1	0.75	1.04	1.04	0.7	0.97	0.97
7	Lift Lobby / Passage Area/ Emergency Stair Case (7th Floor)	1042	1	0.75	0.78	0.78	0.7	0.73	0.73
	TOTAL LOAD - TOWER-2					860			540

3	TOWER - 3								
	APATMENTS								
1	Appartment Type B - (2-Beds , Drawing and lounge) (8th to 31th Floor)	800	264	6.5	5.2	1373	3.4	2.7	713
2	Lobby / Staircase (8th to 31th Floor)	1,730	24	0.75	1.30	31.14	0.7	1.12	26.99
3	Passenger Lift (15hp)	-	3	0.00	11.00	33.00	0.0	11.00	33.00
4	Water Transfer Pump (15hp)	-	2	0.00	11.00	22.00	0.0	11.00	22.00
	RECREATION								
5	Community Hall / Meeting / Conference / Gathering Room (7th Floor)	6,777	1	10.0	67.8	68	10.0	67.8	68
6	Mechanical / Generator Room / Electrical Panel Room (7th Floor)	1,200	1	0.75	0.90	0.90	0.7	0.84	0.84
7	Lift Lobby / Passage Area/ Emergency Stair Case (7th Floor)	1980	1	0.75	1.49	1.49	0.7	1.39	1.39
	TOTAL LOAD - TOWER-3					1529			865

ELECTRICAL LOAD SHEET APPARTMENT (ON AREA BASIS) 7-TOWER PROJECT

4	TOWER - 4								
	APARTMENTS								
1	Appartment Type A - (3-Beds, Drawing and lounge) (8th to 31th Floor)	1,100	144	6.5	7.2	1030	3.1	3.4	493
2	Lobby / Staircase (8th to 31th Floor)	1,200	24	0.75	0.90	21.60	0.7	0.78	18.72
3	Passenger Lift (15hp)	-	3	0.00	11.00	33.00	0.0	11.00	33.00
4	Water Transfer Pump (15hp)	-	2	0.00	11.00	22.00	0.0	11.00	22.00
	RECREATION								
5	Ladies Gym/Gents Gym/ Indoor Game / Children Play Area (7th Floor)	3,888	1	10.0	38.9	39	10.0	38.9	39
6	Mechanical / Generator Room / Electrical Panel Room (7th Floor)	1,110	1	0.75	0.83	0.83	0.7	0.78	0.78
7	Lift Lobby / Passage Area/ Emergency Stair Case (7th Floor)	1700	1	0.75	1.28	1.28	0.7	1.19	1.19
	TOTAL LOAD - TOWER-4					1147			607
5	TOWER - 5								
	APARTMENTS								
1	Appartment Type B - (2-Beds , Drawing and lounge) (8th to 31th Floor)	800	192	6.5	5.2	998	3.4	2.7	518
2	Lobby / Staircase (8th to 31th Floor)	1,100	24	0.75	0.83	19.80	0.7	0.72	17.16
3	Passenger Lift (15hp)	-	2	0.00	11.00	22.00	0.0	11.00	22.00
4	Water Transfer Pump (15hp)	-	2	0.00	11.00	22.00	0.0	11.00	22.00
	RECREATION								
5	Ladies Gym/Gents Gym/ Indoor Game / Children Play Area (7th Floor)	4,000	1	10.0	40.0	40	10.0	40.0	40
6	Mechanical / Generator Room / Electrical Panel Room (7th Floor)	1,260	1	0.75	0.95	0.95	0.7	0.88	0.88
7	Lift Lobby / Passage Area/ Emergency Stair Case (7th Floor)	1180	1	0.75	0.89	0.89	0.7	0.83	0.83
	TOTAL LOAD - TOWER-5					1104			621
6	TOWER - 6								
	APARTMENTS								
1	Appartment Type C - (2-Beds and lounge) (8th to 31th Floor)	600	192	6.5	3.9	749	3.8	2.3	432
2	Lobby / Staircase/ lift area (8th to 31th Floor)	1,400	24	0.75	1.05	25.20	0.7	0.91	21.84
3	Passenger Lift (15hp)	-	4	0.00	11.00	44.00	0.0	11.00	44.00
4	Water Transfer Pump (15hp)	-	2	0.00	11.00	22.00	0.0	11.00	22.00
	RECREATION								
5	Ladies Gym/Gents Gym/ Indoor Game / Children Play Area (7th Floor)	2,160	1	10.0	21.6	22	10.0	21.6	22
6	Mechanical / Generator Room / Electrical Panel Room (7th Floor)	1,010	1	0.75	0.76	0.76	0.7	0.71	0.71
7	Lift Lobby / Passage Area/ Emergency Stair Case (7th Floor)	1563	1	0.75	1.17	1.17	0.7	1.09	1.09
	TOTAL LOAD - TOWER-6					864			543

ELECTRICAL LOAD SHEET APPARTMENT (ON AREA BASIS) 7-TOWER PROJECT

7	**TOWER - 7**								
	APARTMENTS								
1	Appartment Type D - (1-Beds and lounge) (8th to 31th Floor)	400	384	6.5	2.6	998	5.0	2.0	768
2	Lobby / Staircase (8th to 31th Floor)	1,670	24	0.75	1.25	30.06	0.7	1.09	26.05
3	Passenger Lift (15hp)	-	4	0.00	11.00	44.00	0.0	11.00	44.00
4	Water Transfer Pump (15hp)	-	2	0.00	11.00	22.00	0.0	11.00	22.00
	RECREATION								
5	Ladies Gym/Gents Gym/ Indoor Game / Children Play Area (7th Floor)	3,380	1	10.0	33.8	34	10.0	33.8	34
6	Mechanical / Generator Room / Electrical Panel Room (7th Floor)	741	1	0.75	0.56	0.56	0.7	0.52	0.52
7	Lift Lobby / Passage Area/ Emergency Stair Case (7th Floor)	1308	1	0.75	0.98	0.98	0.7	0.92	0.92
	TOTAL LOAD - TOWER-7					**1130**			**895**
8	**RESIDENTIAL PARKING**								
1	Parking - 01 (3rd- Floor)	122,000	1	0.40	48.80	48.80	0.4	48.80	48.80
2	Parking - 02 (4th- Floor)	122,000	1	0.40	48.80	48.80	0.4	48.80	48.80
3	Parking - 03 (5th- Floor)	122,000	1	0.40	48.80	48.80	0.4	48.80	48.80
4	Parking - 04 (6th- Floor)	122,000	1	0.40	48.80	48.80	0.4	48.80	48.80
	TOTAL LOAD (PARKING 1-4)					**195**			**195**
	GRAND TOTAL LOAD (TOWER-1 -7)					**8306**			**5080**
PROPOSED TRANSFORMER @ 80% DIVERSITY		4 x 1000 KVA							

ANNEXURE IX: TRAFFIC IMPACT STUDY

2026

Traffic Impact Study – Plot # LA-4/1, Block 21, F.B. Area



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1. Introduction

The framework of this chapter encompasses the introduction, site, and study area of the project with detailed focus on the need of study, objectives, and scope of work, which is necessary for understanding the project.

1.1 Project Overview

The proposed development comprises a large-scale mixed-use project admeasuring approximately 141,030 sq. ft. The scheme includes a comprehensive vertical zoning arrangement with Basement-2 & 1, 1st to 5th floors are designated for parking and services. The ground floor is planned for shops, recreational areas. The upper levels of 6th to 19th and 21st to 35th floors designated for residential flats, whereas the 20th floor is for recreational amenities and services, culminating in a roof level equipped with solar panels, battery room, and essential services. Furthermore, the proposed project consists of 07 residential towers, offering a variety of unit configurations with 2, and 3-bedroom apartment designs, catering to diverse residential needs and enhancing the overall functional and market appeal of the development.

Table 1: Project Description Chart

General Project Description		
Sr.	Floor	Description
1	Basement 2	parking and services
2	Basement 1	parking and services
3	Ground	shops, recreational areas
4	1st - 5th	parking and services
5	6th to 19th	Flats
6	20th	recreational amenities and services
7	21st - 35th	Flats
8	Roof	solar panels, battery room, and essential services

1.2 Project Study Area

The project study area is located at the Sohrab Goth Interchange, a major urban transport node forming the northern gateway of Karachi. This interchange connects key arterial corridors including Shahrah-e-Pakistan, the M-9 Motorway, and access to the Lyari Expressway. Due to this strategic connectivity, the area serves as a primary entry and exit point for intercity traffic traveling between Karachi and other regions of Sindh and Punjab.

The interchange comprises multiple grade-separated elements, including loops, ramps, and directional connectors, designed to facilitate uninterrupted traffic movement across major corridors. The surrounding area includes important landmarks such as the Sohrab Goth Bus Stop, a major intercity transport hub, the Sohrab Goth Fire Station, and religious facilities like Jamia Masjid Gulshan-e-Umer. Additionally, the proximity of the Sabzi Mandi (vegetable market) significantly influences freight and goods movement in the area.

1.2.1 Existing Condition

Despite its strategic importance and developed interchange infrastructure, the existing conditions of the project area reflect considerable operational challenges. The corridor experiences extremely high traffic volumes with a heterogeneous mix of vehicles, including

private cars, motorcycles, buses, and a significant proportion of heavy vehicles such as trucks and trailers. This results in frequent congestion, especially during peak hours, along with weaving conflicts at merging and diverging sections.

The presence of the nearby Sabzi Mandi intensifies freight activity, while informal public transport operations at the Sohrab Goth Bus Stop—such as unregulated bus stopping and rickshaw stands—create additional roadside friction. Encroachments along service roads, lack of organized parking, and insufficient traffic control measures further reduce effective road capacity. Pedestrian infrastructure is minimal, leading to unsafe crossing conditions and increased risk of accidents.

From a socio-economic perspective, the surrounding locality consists of dense and largely unplanned settlements, predominantly inhabited by low-income communities. Informal economic activities, including roadside vending, small businesses, and transport-related services, are common and play a vital role in local livelihoods. However, these also contribute to congestion, environmental degradation, and inefficient land use.

Overall, the area presents a contrast between large-scale transport infrastructure and limited urban management. Issues such as weak enforcement, inadequate maintenance, safety concerns, and occasional law-and-order challenges further affect operational efficiency. Consequently, while the interchange supports regional mobility, the local traffic environment remains stressed and requires integrated planning and management interventions.



Figure 1: Project Façade



Figure 2: Project Location Map

1.3 Significance of Traffic Impact Study

Traffic Impact Study (TIS) is a technical appraisal of the traffic and safety implications relating to the specific developments that would generate significant additional traffic. TIS entails a study which is conducted during the development phase of a project to determine the impacts of traffic generated by the proposed development on the surrounding road network and the improvements needed in the transportation system in order to mitigate those impacts.

1.3.1 Objectives of Study

Majorly TIS deals with an overall impact generated by any new project or due to redevelopment of a particular project. The aims and objectives to be targeted in a typical Traffic Impact Study are:

- To assess the impact produced by the project on the nearby road network
- To evaluate the traffic circulation pattern within the facility and in its influential contour
- To assess the parking facilitation at the project
- To estimate the relative Volme-to-Capacity and administer the areas of improvement through which progress in smooth flows can bae achieved
- To evaluate the traffic issues and suggest adequate and applicable recommendations in the regard so as to improve the traffic management operations
- To propose suitable modifications on the basis on analyses conducted

1.3.2 Scope of Work

The scope of work entails to the set of tasks necessarily required to fulfill the set objectives. For the TIS the scope of work includes:

- Conductance of Traffic Surveys at nearby junctions
- Estimation of Trip Generation
- Parking Demand Analysis
- Access Gate Performance Analysis
- Volume-to-Capacity Ratio Analysis
- Solutions and Recommendations in regard to analyses
- Documentation in the form of Report

1.4 REPORT CONTENT

A typical Traffic Impact Study consists of a number of analyses which are carried according to the nature of the building. However, the necessary content are enlisted as:

- Purpose and Objectives of the respective traffic impact study
- A brief description of the site location and study area
- Present conditions in the subjected area
- Estimation of Trip generation
- Traffic condition resulting from the development building
- Projected future traffic volumes
- Relative Traffic Analyses
- Impact Assessment with respective Recommendations

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2. Methodology

The context of this chapter includes a brief description of the approach methodology for traffic impact study of project. Since every project is unique and exclusive than other, it is necessary to understand the area specific characteristics of traffic and other maneuvering aspects such that improved solutions can be accustomed. Through the following methodology we provide efficient, effective and economical assessment of the proposed development.

2.1 Project Commencement

The project is kicked off with detailed external and internal meetings through which the workforce and relevant task schedules are finalized on the basis of overall characteristics of the project. The general methodology of a typical Traffic Impact Study is categorized into five stages for a systematical approach towards the designed scope of works. These are as follows:

2.1.1 Reconnaissance Study

Reconnaissance Study are carried out through a series of preliminary inspection surveys of the nearby vicinity of the project area. The data gained through these surveys consists of information regarding the existing land-use, traffic and road conditions. The road geometry and pavement situations affecting the traffic flows are identified. During reconnaissance the vintage points for mounting cameras in order to conduct other extensive traffic surveys are finalized. All the gathered data is recorded through notes and photographs.

2.2 STAGE I – Data Collection

Data collection exercise for the particular project is carried out through two major categories. The data gathered is recorded and further processed to achieve required products.

2.2.1 Data from Feild Surveys

Traffic Surveys highlight the specific numbers of traffic and their movement pattern through which the impact generated may be assessed. Based on the area critical features, the number and types of surveys required are finalized and conducted.

2.2.1.1 Traffic Count Surveys

Traffic Count Surveys are constructed to determine the traffic volume which emphasize on the movements and numbers of roadway vehicles along with their classifications. Such a data is preliminary recorded to attain the feasibility of a particular road network. However, extended evaluation of Traffic count Data is useful to deduce critical flows, peak time periods and traffic volume trends.

Video cameras are used for recording traffic movement, which are mounted on a vintage point from where a clear scene can be captured. The video is then rendered and processed for counting traffic movement in each direction. The outcomes are then recorded in excel spreadsheets with respect to each direction.

2.2.1.2 Similar Area Parking Survey

Similar area parking survey is conducted in order to generate the parking factor for the proposed development. One or more buildings with similar characteristics as of the proposed development are selected and parking survey is carried out. Parking Factors are derived from this survey and applied to the proposed building to evaluate the parking demand.

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2.2.1.3 Road Network Inventory Survey

Road Inventory Surveys help in assessment of Road geometry and provides with the data that describes the physical elements of the road system. These also includes inspection of existing road assets. The details acquired through road inventory are further incorporated in evaluation of Volume-to-Capacity Ratio.

2.2.2 Building Specific Data

Data collection from Client consists of architectural drawings showing the characteristics of the project building. These include land-use distribution (residential, commercial or both), amenity facilitation, parking supply, internal circulation, access points as well as the roads connected with the access points. An overall inventory as proposed in the design is evaluated through this data which further assists in estimation of trip rates and land-use specific trends of the particular project.

2.3 STAGE II – Data Processing

Data provided by the client and surveys which are conducted during the traffic impact study lead to the essential statistics for examining the traffic impacts of the proposed project. Mentioned below is the list of immediate outcomes of collected data:

Traffic Volume: The number of vehicles on the specific road network is used as an input for LOS Analysis, Capacity Analysis, Assessment of varying traffic management measures and Parking management.

Modal Split: The designation of classified vehicles percentages in the total volumes is required to estimate trip generation and plan various traffic operations.

Available Road Capacity: The encroachment surveys are conducted to analyze the difference in the lane capacity and the actual operational capacity of the particular road.

Parking Supply Inventory: Information of available parking capacity is obtained from the proposed drawings and available documents, to aid the estimation of deficiency or efficiency in parking supply.

Detailed Road Inventory: Information about the typical road geometrical features is obtained through inventory survey.

2.4 STAGE III – Data Analyses

It is essential to put forward reliable information through collected data and hence relevant data analyses are carried out. The following analysis further leads into development of suitable recommendations for the proposed project.

2.4.1 Estimation of Parking Demand

Parking is considered as an important yet critical factor of any particular construction. Hence parking demand is estimated through area of each floor of the building for commercial land-use implied through an appropriate parking factor.

2.4.2 Comparsion of Parking Supply And Demand

A comparison between the supply and demand is led to assess the traffic impact of the proposed project on the surrounding land use. If the parking stalls are coming out to be

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additional then it can be catered for guest or disabled parking, while the deficiency in comparison must be reduced by some additional modifications for parking.

2.4.3 Access Gate Queue Length Analysis

For the purpose of a careful and accurate forecast of traffic operations at the approach road of the facility following steps are followed.

- Queue Capacity - refers to the availability of space at the access lane for the vehicles arriving or departing the facility
- Readjustment of the capacity - Involves the geometrical considerations which will lead to the recommendations for the improvement of queue capacity
- Peak Hour at Access Gate - will be evaluated to encounter the requirements of ultimate traffic.

2.4.4 Volume-to-Capacity Ratio Analysis

The volume-to-capacity (v/c) ratio is an indication of how well traffic flow is being accommodated by the road network. This ratio is a principle influencing factor to evaluate the Level of Service of a particular junction and eventually in evaluation of the impact upon the influential area road network.

V/C ratios are estimated through scenario development on the;

- Existing Condition
- No Built Condition – Growth Rate
- Built Condition – Growth Rate

2.5 STAGE IV – Major Outcomes

The results of each individual analyses and their aftermaths are observed in this stage. Any requirement of further analysis is highlighted and worked upon. Suggestions with respect to the analysis carried out are foretold concluding the impact generated by the proposed building.

2.6 STAGE V – Recommendations

After data processing and analyses, the estimation for the traffic impact of proposed development and the impact of overall traffic on the project vicinity, alternatives will be suggested. These alternatives can be traffic management alternatives, traffic control changes, stretching peak hour using time shifts, and minor to major geometric changes, parking adjustments etc. Along with applicable alternatives, the significance of any further studies are also added as a prominent part of Traffic Impact Study Recommendations.

2.7 Consolidated Final Report

The complete procedure to plan, execute and analyze the project prerequisites will be accorded systematically in the report. The content of the report initiates with outline of the existing conditions then concentrates on the factors that implicate assessment and finally evaluates these factors to be further used in implementation of relevant task. The results of sequential analyses are concluded in the terms of Post Construction LOS with all the suitable recommendations to improve and manage traffic in present and future situations.

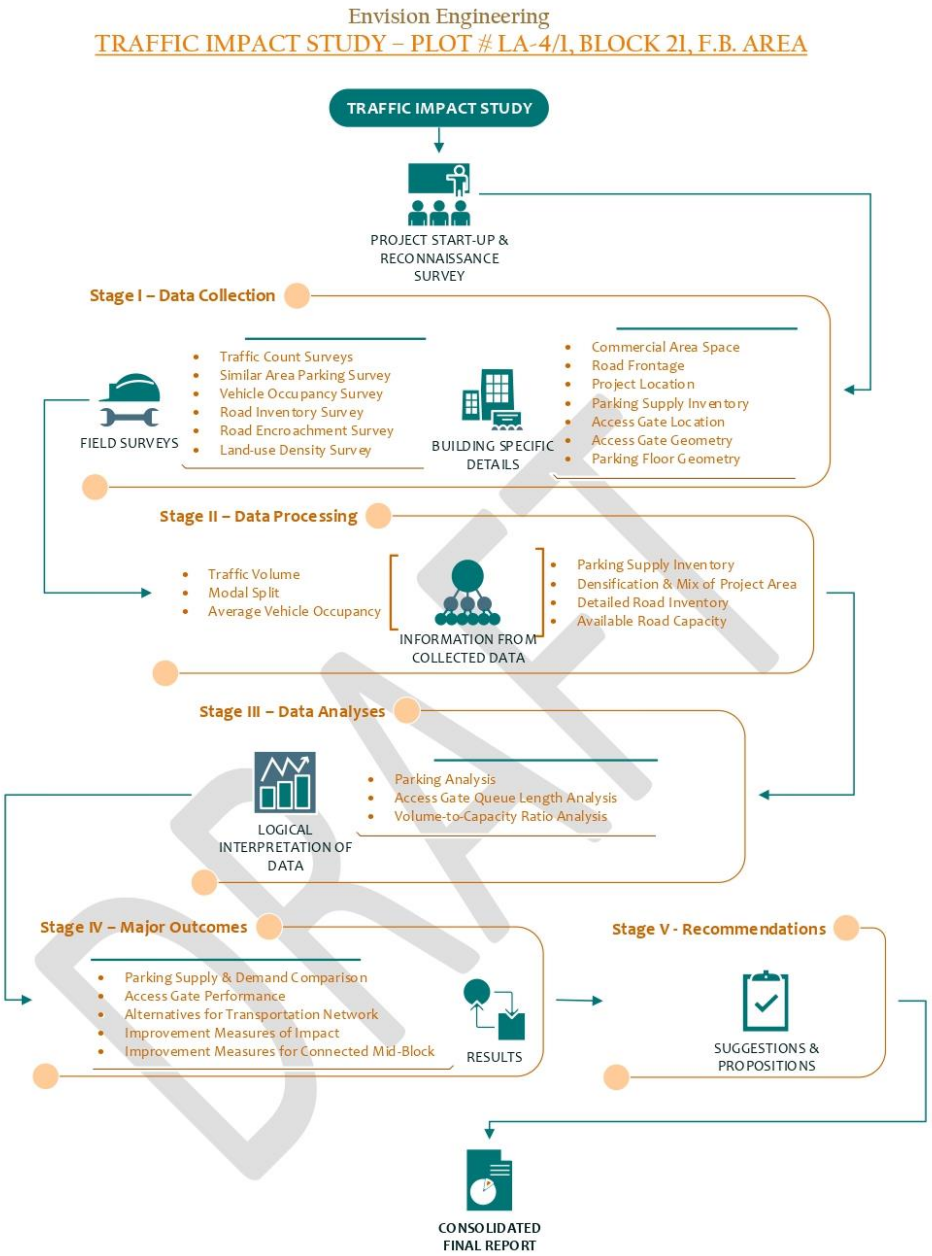


Figure 3: Methodological Flow Chart



3. Data Collection

This chapter encompasses the outcomes of all tasks performed in order to collect on-field data for comprehensive, precise and detailed analysis. Following surveys are performed during the course of study. Details of each survey is described in the subsequent sections.

The data collected via field surveys mainly consist of following surveys:

- Reconnaissance Survey
- Traffic Count Surveys
- Similar Area Parking Survey
- Road Inventory Survey

The information collected for this study during the data collection exercise is mentioned below:

3.1 Reconnaissance Survey

The reconnaissance survey of the project area highlights its importance as a major gateway of Karachi, connecting the city with national highways and intercity routes. The Sohrab Goth interchange carries heavy traffic volumes, including a high proportion of freight and public transport, resulting in frequent congestion, especially near merging points and informal stopping areas.

Road infrastructure is generally wide and grade-separated; however, operational issues such as mixed traffic, weak lane discipline, and worn markings affect efficiency and safety. Pedestrian movement is largely unmanaged despite nearby settlements, adding further risk.

The surrounding area has a mixed land-use pattern, including dense residential neighborhoods, small-scale commercial activities, and transport-related businesses. The locality supports a largely working-class population, with strong reliance on public and para-transit, and a noticeable presence of informal economic activity.

Key positives include its strategic regional connectivity, high-capacity road infrastructure, and multiple access routes. With improved traffic management and enforcement, the overall performance of this critical junction can be significantly enhanced.

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3.2 Traffic Count Survey

Traffic Count Survey was carried out to interpret the traffic volumes which will feed into the proposed project area, in this case Shahra-e-Pakistan. The details of these are given as follows:

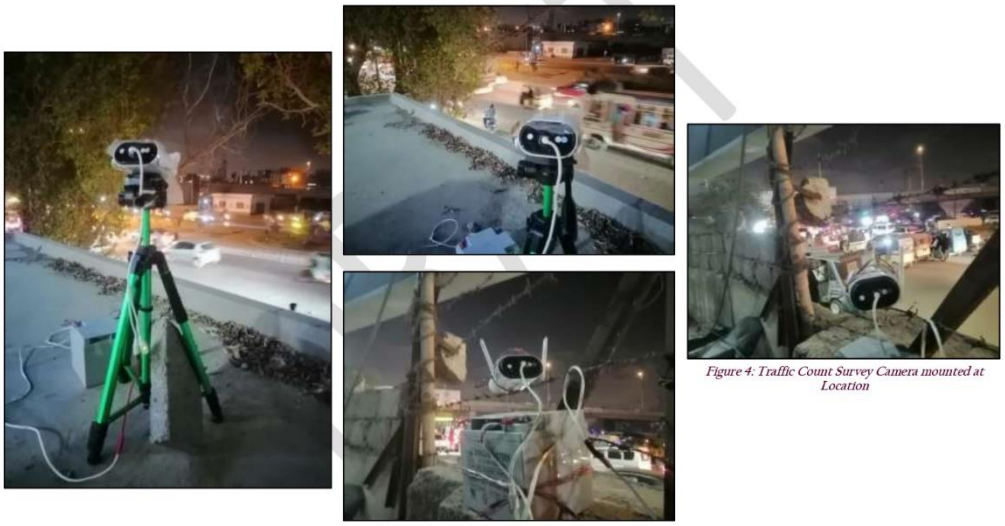
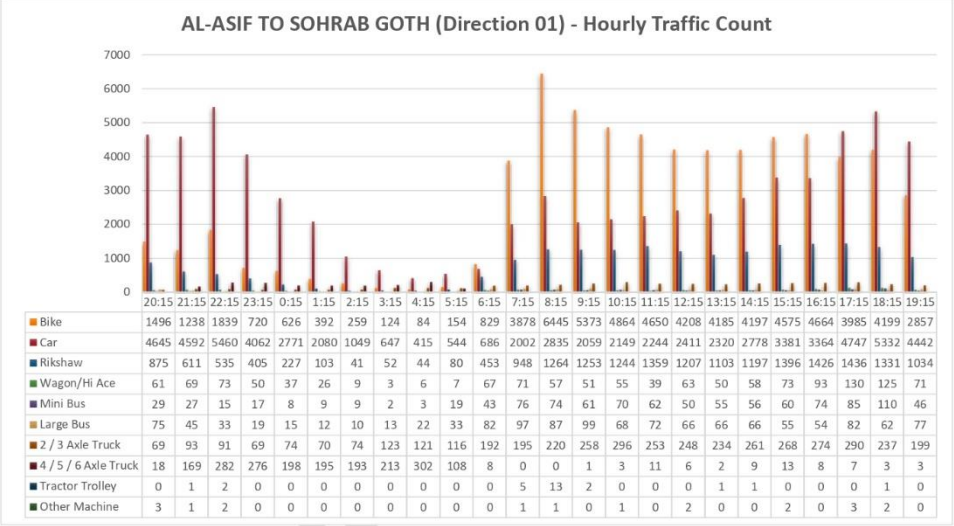
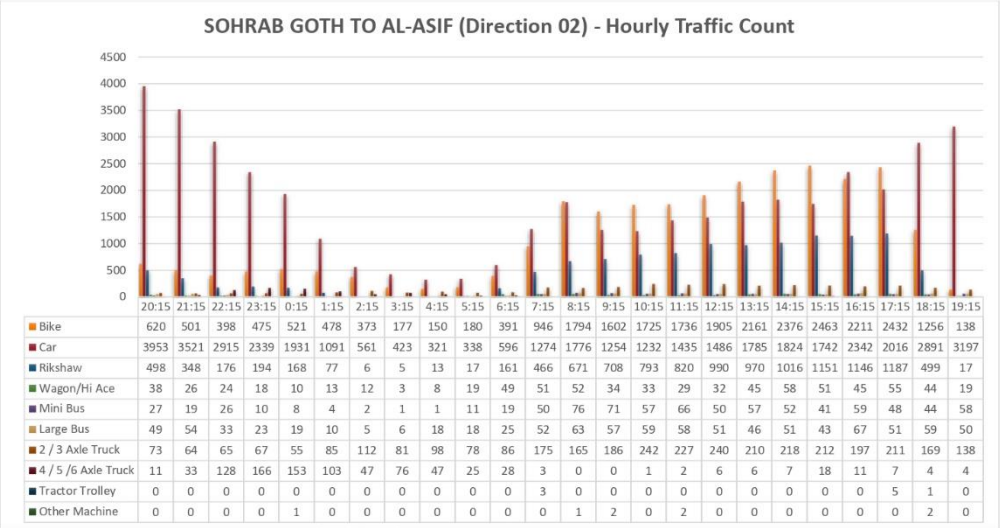


Figure 4: Traffic Count Survey Camera mounted at Location



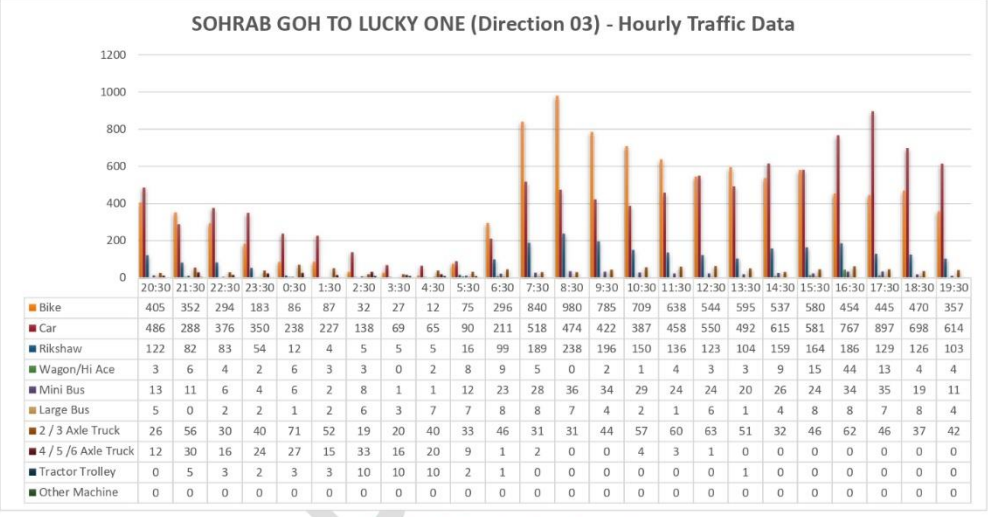
	20:15	21:15	22:15	23:15	0:15	1:15	2:15	3:15	4:15	5:15	6:15	7:15	8:15	9:15	10:15	11:15	12:15	13:15	14:15	15:15	16:15	17:15	18:15	19:15
Bike	1496	1238	1839	720	626	392	259	124	84	154	829	3878	6445	5373	4864	4650	4208	4185	4197	4575	4664	3985	4199	2857
Car	4645	4592	5460	4062	2771	2080	1049	647	415	544	686	2002	2835	2059	2149	2244	2411	2320	2778	3381	3364	4747	5332	4442
Rikshaw	875	611	535	405	227	103	41	52	44	80	453	948	1264	1253	1244	1359	1207	1103	1197	1396	1426	1436	1331	1034
Wagon/Hi Ace	61	69	73	50	37	26	9	3	6	7	67	71	57	51	55	39	63	50	58	73	93	130	125	71
Mini Bus	29	27	15	17	8	9	9	2	3	19	43	76	74	61	70	62	50	55	56	60	74	85	110	46
Large Bus	75	45	33	19	15	12	10	13	22	33	82	97	87	99	68	72	66	66	66	55	54	82	62	77
2 / 3 Axle Truck	69	93	91	69	74	70	74	123	121	116	192	195	220	258	296	253	248	234	261	268	274	290	237	199
4 / 5 / 6 Axle Truck	18	169	282	276	198	195	193	213	302	108	8	0	0	1	3	11	6	2	9	13	8	7	3	3
Tractor Trolley	0	1	2	0	0	0	0	0	0	0	0	5	13	2	0	0	0	1	1	0	0	0	1	0
Other Machine	3	1	2	0	0	0	0	0	0	0	0	1	1	0	1	0	2	0	0	2	0	3	2	0

Figure 5: Traffic Count Data Chart - Direction 01



	20:15	21:15	22:15	23:15	0:15	1:15	2:15	3:15	4:15	5:15	6:15	7:15	8:15	9:15	10:15	11:15	12:15	13:15	14:15	15:15	16:15	17:15	18:15	19:15
Bike	620	501	398	475	521	478	373	177	150	180	391	946	1794	1602	1725	1736	1905	2161	2376	2463	2211	2432	1256	138
Car	3953	3521	2915	2339	1931	1091	561	423	321	338	596	1274	1776	1254	1232	1435	1486	1785	1824	1742	2342	2016	2891	3197
Rikshaw	498	348	176	194	168	77	6	5	13	17	161	466	671	708	793	820	990	970	1016	1151	1146	1187	499	17
Wagon/Hi Ace	38	26	24	18	10	13	12	3	8	19	49	51	52	34	33	29	32	45	58	51	45	55	44	19
Mini Bus	27	19	26	10	8	4	2	1	1	11	19	50	76	71	57	66	50	57	52	41	59	48	44	58
Large Bus	49	54	33	23	19	10	5	6	18	18	25	52	63	57	59	58	51	46	51	43	67	51	59	50
2 / 3 Axle Truck	73	64	65	67	55	85	112	81	98	78	86	175	165	186	242	227	240	210	218	212	197	211	169	138
4 / 5 /6 Axle Truck	11	33	128	166	153	103	47	76	47	25	28	3	0	0	1	2	6	6	7	18	11	7	4	4
Tractor Trolley	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	5	1	0
Other Machine	0	0	0	0	1	0	0	0	0	0	0	0	1	2	0	2	0	0	0	0	0	0	2	0

Figure 6: Traffic Count Data Chart - Direction 02



	20:30	21:30	22:30	23:30	0:30	1:30	2:30	3:30	4:30	5:30	6:30	7:30	8:30	9:30	10:30	11:30	12:30	13:30	14:30	15:30	16:30	17:30	18:30	19:30
Bike	405	352	294	183	86	87	32	27	12	75	296	840	980	785	709	638	544	595	537	580	454	445	470	357
Car	486	288	376	350	238	227	138	69	65	90	211	518	474	422	387	458	550	492	615	581	767	897	698	614
Rikshaw	122	82	83	54	12	4	5	5	5	16	99	189	238	196	150	136	123	104	159	164	186	129	126	103
Wagon/Hi Ace	3	6	4	2	6	3	3	0	2	8	9	5	0	2	1	4	3	3	9	15	44	13	4	4
Mini Bus	13	11	6	4	6	2	8	1	1	12	23	28	36	34	29	24	24	20	26	24	34	35	19	11
Large Bus	5	0	2	2	1	2	6	3	7	7	8	8	7	4	2	1	6	1	4	8	8	7	8	4
2 / 3 Axle Truck	26	56	30	40	71	52	19	20	40	33	46	31	31	44	57	60	63	51	32	46	62	46	37	42
4 / 5 /6 Axle Truck	12	30	16	24	27	15	33	16	20	9	1	2	0	0	4	3	1	0	0	0	0	0	0	0
Tractor Trolley	0	5	3	2	3	3	10	10	10	2	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Other Machine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 7: Traffic Count Data Chart - Direction 03

3.3 Similar Area Parking Survey

This survey is conducted to obtain the demand of parking stalls and projected traffic volume after the application of growth factor in future, as mentioned earlier the proposed project is based on residential cum commercial building. Accordingly, the similar residential area is surveyed and following findings are obtained:

3.3.1 Residential Demand Factor

For Residential distribution the proposed drawings are thoroughly studied and the apartments are categorized as 2 & 3-bedroom flats. Through similar area survey, a parking demand factor of 1 for cars and 0.5 for MC is determined.

Table 2: Parking Generation Factor – Residential Demand

Description	2 & 3 Bed Flats
Car	1
Motorcycle	0.5

3.3.2 Commercial Demand Factor

Factors derived from the similar area parking surveys are employed for the estimation of required parking. The parking factor for commercial land-use is such that for 702 sq.ft. 01 car parking is required and for 320sq.ft. 01 motorcycle is required.

3.4 Road Inventory Survey

Road Inventory Survey is carried out to know the physical elements of the road geometry. The survey findings are later employed for geometric improvement recommendations and capacity analysis of the network. The following drawing is developed using the road inventory survey data. The wide carriageway of the project road is adequate to support large volumes of traffic and currently provides a route for almost all types of modes of transport.



Figure 8: Road Inventory Activity Pictures taken during survey



Figure 9: Road Inventory Map

3.5 Data by Client

The proposed project is located at Plot No. LA-4/1, Block 21, F.B. Area, Scheme -16, Karachi. The geographic coordinates of the project site are 24°56'39.52"N & 67°05'09.16"E. The project area is conveniently accessible from Sharah-e-Pakistan and Rashid Minhas road.

Table 3: Project details as provided by Client

Project Name	The 7 (Seven) Towers
Category	Residential-cum-commercial
Plot Area	15670 Sq Yds or 141030 Sq ft.
Gross Covered Area	2400407.01 Sq ft.
Net Area after Exemption	1146140.26 Sq ft
Storeys	B2+B1+G+35
Location	Plot No. LA-4/1, Block 21, F.B. Area, Scheme -16, Karachi.
Basement 2 Plan (Parking + Services)	Visitor Parking +11 (Portable UG Water Tanks)+ 7 (Non portable UG Water Tanks + 7 (Firefighting UG Water Tanks)
Basement 1 Plan (ARS + Parking)	Air Raid Shelter, Parking
1st to 5th Floor (Parking)	Parking + Services
6th to 19th Floor & 21st to 35th Floor (Flats)	Flats

20th Floor (Recreation Area + Services)	Ladies Gym, Gents Gym, Child Day Care, Children Play Area, Club House, Indoor Gaming
Roof Plan (Solar Panel +Battery Room + Services)	Solar Panel, 22 (Portable OH Water Tanks)+ 7 (Non portable OH Water Tanks + 7 (Firefighting OH Water Tanks), Battery Room
Total Flats	1392 Flats
Total Parking	1414 Total Cars (16 % (153 Car Spots are reserved for Motor Cycles)
Height of the building	450 ft Above Ground Level (AGL)

SCHEDULE OF PARKING			
NET ALLOWABLE AREA	1,146,430.08		Sq.ft
PROPOSED AREA	1,146,140.26		Sq.ft
NET SHOP AREA	15,808.75 Sq.ft / 1000		
	15.80 Cars Required		
APARTMENT AREA	1,130,331.51 / 1200 Sq.ft		
Apartment Required Cars	942	CARS	
Total Required Cars	958	CARS	
16% REPLACED BY M.CYCLES	153	CARS	
Space Required for Cars	805 CARS		
OR	805 CARS		

SUMMERY OF CAR PARKING SPACE	
2nd BASEMENT VISITORS PARKING	166.00
1st BASEMENT	177.00
1st FLOOR VISITORS PARKING	215.00
2nd FLOOR VISITORS PARKING	215.00
3rd FLOOR	215.00
4th FLOOR	215.00
5th FLOOR	211.00
TOTAL CARS	1414.00
REQUIRED PARKING	805.00
EXTRA VISITORS PARKING	609.00

2nd basement,1st & 2nd FLOOR RESERVED FOR VISITORS PARKING

DETAIL OF GROUND FLOOR				
A	74'-6" X 59'-9"		4,451.38	Sq.ft
B	64'-0" X 38'-3"/2		1,224.00	Sq.ft
D	64'-0" X 109'-0"		6,976.00	Sq.ft
E	28'-9" X 20'-6"		589.38	Sq.ft
F	48'-0" X 53'-6"		2,568.00	Sq.ft
C1	74'-0" X 56'-6"	(Circulation)	4,181.00	Sq.ft
C2	71'-6" X 22'-3"	(Circulation)	1,590.88	Sq.ft
C3	12'-6" X 14'-0"X2	(Circulation)	350.00	Sq.ft
C4	81'-0" X 69'-9"	(Circulation)	5,649.75	Sq.ft
C5	98'-6" X 59'-9"/2	(Circulation)	2,942.69	Sq.ft
C6	7'-6" X 4'-6"/2	(Circulation)	16.88	Sq.ft
C7	13'-6" X 22'-3"/2	(Circulation)	150.19	Sq.ft
C8	7'-6" X 21'-6"	(Circulation)	161.25	Sq.ft
C9	63'-6" X 38'-6"/2	(Circulation)	1,222.38	Sq.ft
C10	122'-9" X 109'-0"	(Circulation)	13,379.75	Sq.ft
C11	20'-6" X 20'-6"/2	(Circulation)	210.13	Sq.ft
C12	9'-6" X 20'-6"	(Circulation)	194.75	Sq.ft
C13	10'-0" X 26'-6"	(Circulation)	265.00	Sq.ft
C14	137'-3" X 15'-3"	(Circulation)	2,093.06	Sq.ft
C15	128'-9" X 18'-9"	(Circulation)	2,414.06	Sq.ft
C16	55'-0" X 54'-6"	(Circulation)	4,451.38	Sq.ft
C17	19'-6" X 11'-9"/2	(Circulation)	4,451.38	Sq.ft
C18	49'-0" X 10'-9"	(Circulation)	526.75	Sq.ft
C19	49'-0" X 29'-9"/2	(Circulation)	728.88	Sq.ft
C20	63'-6" X 84'-9"	(Circulation)	5,381.63	Sq.ft
C21	25'-3" X 41'-6"/2	(Circulation)	523.94	Sq.ft
C22	70'-6" X 36'-0"	(Circulation)	2,538.00	Sq.ft
C23	70'-6" X 49'-0"	(Circulation)	3,454.50	Sq.ft
C24	78'-6" X 36'-0"	(Circulation)	2,826.00	Sq.ft
C25	58'-0" X 20'-6"	(Circulation)	1,189.00	Sq.ft
S1	53'-6" X 36'-0"	(Service area)	1,926.00	Sq.ft
S2	74'-0" X 45'-6"	(Service area)	3,367.00	Sq.ft
S3	149'-0" X 45'-6"	(Service area)	6,779.50	Sq.ft
R1	36'-0" X 21'-6"	(Recreation area)	774.00	Sq.ft
R2	9'-6" X 75'-0"	(Recreation area)	712.50	Sq.ft
R3	25'-6" X 65'-0"	(Recreation area)	1,657.50	Sq.ft
R4	31'-0" X 19'-0"/2	(Recreation area)	294.50	Sq.ft
R5	55'-9" X 31'-0"	(Recreation area)	1,728.25	Sq.ft
R6	39'-0" X 40'-0"	(Recreation area)	1,560.00	Sq.ft
R7	27'-6" X 37'-0"	(Recreation area)	1,017.50	Sq.ft
R8	21'-3" X 29'-6"	(Recreation area)	626.88	Sq.ft
R9	59'-6" X 37'-0"	(Recreation area)	2,201.50	Sq.ft
TOTAL AREA			99,347.06	Sq.ft
AREA OF GROUND FLOOR			99,347.06	Sq.ft

Figure 10: Project Schedule of Area - Parking & Ground Floor

4. Data Analyses

The series of data collection exercise is followed by relevant analyses through which outcomes are drawn relating to various traffic activities. Based upon these outcomes significant and appropriate recommendations are advocated.

4.1 Parking Analysis

Parking is one of the major concerns in the planning as well as operational phase of a project. It is necessary to conduct Parking analysis in order to evaluate the required parking demand of the building. This evaluation will further involve the comparison of parking supply with the demand and incase of deficiency a strategy will be developed to manage the deficiency within the facility.

4.1.1 Parking Supply Inventory

The drawings of the plot conclude that parking facilitation for the project traffic provided on Basement 1 & 2 as well as 1st – 5th floors. The total supply inventory at the proposed building is:

Table 4: Project Parking Supply Inventory Chart

Parking Supply	
Car	1261
Motorcycle	153

4.1.2 Parking Demand Evaluation – Residential

Calculations for the estimation of residential distribution in the project are presented in the chart below:

Table 5: Project Parking Demand Evaluation Chart – Residential

Parking Demand Evaluation - Residential						
2, 3 Bedroom Apartment						
Floor Allotment	No. of Floors	No. of Flats	Parking Factor		Required Parking	
			Car	Bike	Car	Bike
6th - 19th, 21st - 35th	29	1392	1	0.5	1392	696

Through the evaluation it is observed that for the particular project 1392 car parking stalls and 696 bike parking stalls are required.

4.1.3 Parking Demand Evaluation – Commercial

Calculations for the estimation of residential distribution in the project are presented in the chart below:

Table 6: Project Parking Demand Evaluation Chart – Commercial

Parking Demand Evaluation - Commercial						
Floor Allotment	Distribution	Area	Parking Factor		Required Parking	
			Car	Bike	Car	Bike
Ground Floor	Shops, Recreational	76706.06	702	320	110	240

Through the evaluation it is observed that for the particular project 110 car parking stalls and 240 bike parking stalls are required. It is pertinent to note that the

The parking demand assessment has been carried out based on parking generation factors derived from surveys conducted in comparable developments within similar urban contexts. The adopted parking ratios are indicative in nature and are based on observed trends; therefore, the resulting estimates should be considered planning-level approximations rather than exact projections.

4.1.4 Parking Comparison

Comparison developed from the parking stalls provided in the proposed drawings and demand obtained from the detailed analysis is as follows:

Table 7: Parking Supply & Demand Comparison Chart

Parking Supply & Demand Comparison			
Description	**Supply**	**Demand**	**Difference**
Car	1261	1502	241
Bike	153	936	783

The comparison of parking supply and projected demand clearly indicates a substantial shortfall in available facilities, with deficits of 241 car parking spaces and 783 motorcycle parking spaces. This significant gap highlights that the existing parking provisions are inadequate to accommodate future demand, necessitating the implementation of effective parking management strategies and/or expansion of parking capacity to ensure functional and efficient operations of the development.

4.2 Access Gate Queue Length Analysis

The access gate queue length analysis is a critical component in evaluating the operational efficiency and traffic management of a facility. This study focuses on assessing the queuing patterns, peak-hour congestion, and overall capacity of entry and exit points. By analyzing queue lengths, arrival rates, and service times, the analysis provides insights into potential bottlenecks, wait times, and the effectiveness of current access control measures. The findings serve as a basis for optimizing gate operations, improving circulation, and enhancing user experience while ensuring safety and compliance with design standards.

4.2.1 Scenario 01

In the first scenario, we are assuming 56% of total traffic generation (international standards) of the building approaching at the access gate, in the peak period of 60 minutes. Service time for bikes and cars is 15 seconds.

Table 8: Project Access Gate Queue - Scenario 01 (Cars)

Arrival Scenario: 01				
Subjected Vehicle= Car, Arrival period = 60 min, Service Time= 15 sec./veh				
S. No.	Description	Inputs	Statistics	Units
1	Time Period (min)	60	3600	sec
2	95% of Demand Generation	696	390	# of cars
3	Service Time Required for vehicle	1	15	sec
4	Service Time Required for Generated Cars	390	5850	secs
5	Expected Queue for Cars		150	# of cars

Table 9: Project Access Gate Queue - Scenario 01 (Bikes)

Arrival Scenario: 01				
Subjected Vehicle= Bike, Arrival period = 60 min, Service Time= 15 sec./veh				
S. No.	Description	Inputs	Statistics	Units
1	Time Period (min)	60	3600	sec
2	95% of Demand Generation	348	195	# of bikes
3	Service Time Required for vehicle	1	15	sec
4	Service Time Required for Generated Bikes	195	2925	secs
5	Expected Queue for Bikes	No Queue is Formed		

The scenario depicts that at this particular arrival rate 150 cars will be queued at the access gate however, for bikes these are suitable operational parameters.

4.2.2 Scenario 02

In the second scenario, we are assuming 95% of total traffic generation of the building approaching at the access gate, in the peak period of 60 minutes. Service time for cars and bikes is 10 seconds.

Table 10: Project Access Gate Queue - Scenario 02 (Cars)

Arrival Scenario: 02				
Subjected Vehicle= Car, Arrival period = 60 min, Service Time= 10 sec./veh				
S. No.	Description	Inputs	Statistics	Units
1	Time Period (min)	60	3600	sec
2	95% of Demand Generation	696	390	# of cars
3	Service Time Required for vehicle	1	10	sec
4	Service Time Required for Generated Cars	390	3900	secs
5	Expected Queue for Cars		30	# of cars

Table 11: Project Access Gate Queue - Scenario 02 (Bikes)

Arrival Scenario: 02				
Subjected Vehicle= Bike, Arrival period = 60 min, Service Time= 10 sec./veh				
S. No.	Description	Inputs	Statistics	Units
1	Time Period (min)	60	3600	sec
2	95% of Demand Generation	348	195	# of bikes
3	Service Time Required for vehicle	1	10	sec
4	Service Time Required for Generated Bikes	195	1950	secs
5	Expected Queue for Bikes	No Queue is Formed		

No queue formation is observed in this scenario for bikes, however, for cars the system is unable to fully accommodate the incoming vehicle demand. There is an unmet demand of 30 vehicles. This leads to the formation of a residual queue. Therefore, without operational improvements or capacity enhancement, congestion and delays are expected to persist during peak periods.

4.3 Volume-to-Capacity Ratio Analysis

In order to estimate the V/C ratio under ideal and actual condition various road inventory surveys are carried out. For actual inventory condition, readings are obtained during peak hours. The V/C ratio indicates the proportion of the facility's capacity being utilized by current or projected traffic. Here V/C is calculated with the help of number of lanes, lane capacity, existing traffic and projected traffic volume of proposed site. Separate calculations are carried out for arrivals and departures of each arterial.

Details of the analysis and results are stated as hereunder,

4.3.1 Direction 01

The volume-to-capacity ratio of arrival flow at Shahra-e-Pakistan has been analyzed through the existing traffic, in no built condition, and in-built condition with proposed development traffic. The calculations of v/c are attached below in the table;

Table 12: V/C Ratio Evaluation – Direction 01

AL-ASIF TO SOHRAB GOTH (Direction 01)				
No. of Lanes	Capacity/Lane	Total Capacity	Traffic Volume	V/C
Existing Condition				
6	2200	13200	9753	0.74
Project No Built Condition in 2028				
6	2200	13200	10958	0.83
Project Built-in Condition in 2028				
6	2200	13200	12177	0.92

The analysis demonstrates that the corridor is currently operating at a V/C ratio of 0.74, indicating acceptable traffic conditions; however, this is being observed despite the presence of multiple potholes and overall deterioration of the road surface, which effectively reduces the functional capacity of the roadway. This suggests that the segment is already performing close to its practical threshold under substandard conditions. Looking ahead, the V/C ratio is expected to rise to 0.83 under the 2028 No-Build scenario and further to 0.92 in the Project Built scenario, bringing the corridor very close to its capacity limits. Consequently, without immediate improvements in road condition and traffic management measures, the segment is likely to experience significant congestion, delays, and reduced operational efficiency in the near future.

4.3.2 Direction 02

The volume-to-capacity ratio of departure flow is attached below in the table;

Table 13: V/C Ratio Evaluation – Direction 02

SOHRAB GOTH TO AL-ASIF (Direction 02)				
No. of Lanes	Capacity/Lane	Total Capacity	Traffic Volume	V/C
Existing Condition				
4	2200	8800	5318	0.60
Project No Built Condition in 2028				
4	2200	8800	5975	0.68
Project Built-in Condition in 2028				

4	2200	8800	7194	0.82

The analysis shows that the roadway is currently operating within acceptable capacity limits, with a V/C ratio of 0.60, indicating stable traffic flow. Under the "Build" scenario, the V/C ratio rises to 0.82 due to additional project-generated traffic; however, the roadway continues to function within capacity limits. Overall, while traffic growth is evident, the corridor is expected to maintain satisfactory performance without severe congestion, though minor traffic management measures may be beneficial in the long term.

4.3.3 Direction 03

The analysis for the third direction depicts that the roadway is currently operating under very stable and uncongested conditions at 0.34, reflecting significant available capacity. With projected traffic growth, the V/C ratio increases to 0.65; however, the corridor continues to operate within acceptable limits, maintaining smooth traffic flow and adequate reserve capacity. Overall, while an increase in demand is observed, no congestion-related concerns are anticipated in the near future.

Table 14: V/C Ratio Evaluation – Direction 03

SOHRAB GOH TO LUCKY ONE (Direction 03)				
No. of Lanes	Capacity/Lane	Total Capacity	Traffic Volume	V/C
Existing Condition				
2	2200	4400	1478	0.34
Project No Built Condition in 2028				
2	2200	4400	1661	0.38
Project Built-in Condition in 2028				
2	2200	4400	2880	0.65

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5. Conclusions & Recommendations

5.1 Project Brief

The proposed development comprises a large-scale mixed-use project with a total area of approximately 141,030 sq. ft. The scheme features a well-defined vertical zoning arrangement, with Basement Levels 2 and 1 and Floors 1 to 5 allocated for parking and building services. The ground floor is designated for retail outlets and recreational spaces, providing active frontage and community interaction.

The upper floors, from the 6th to 19th and 21st to 35th levels, are planned for residential use, while the 20th floor is reserved for recreational amenities and essential services. The development is topped by a roof level incorporating solar panels, a battery room, and other utility services to support sustainable operations.

Furthermore, the project consists of seven residential towers offering a mix of 2- and 3-bedroom apartment configurations. This variety in unit types is designed to cater to diverse residential needs, thereby enhancing the overall functionality and market appeal of the development.

Table 15: Project Description Table

General Project Description		
Sr.	Floor	Description
1	Basement 2	parking and services
2	Basement 1	parking and services
3	Ground	shops, recreational areas
4	1st - 5th	parking and services
5	6th to 19th	Flats
6	20th	recreational amenities and services
7	21st - 35th	Flats
8	Roof	solar panels, battery room, and essential services

5.2 Conclusions of Data Analyses

The data collection exercise is followed by data analyses and the results obtained are concluded as:

5.2.1 Parking Analysis

Comparison developed from the parking stalls provided in the proposed drawings and demand obtained from the detailed analysis is as follows:

Table 16: Parking Supply & Demand Comparison Chart

Parking Supply & Demand Comparison			
Description	**Supply**	**Demand**	**Difference**
Car	1261	1502	241
Bike	153	936	783

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The comparison of parking supply and projected demand clearly indicates a substantial shortfall in available facilities, with deficits of 241 car parking spaces and 783 motorcycle parking spaces. This significant gap highlights that the existing parking provisions are inadequate to accommodate future demand, necessitating the implementation of effective parking management strategies and/or expansion of parking capacity to ensure functional and efficient operations of the development.

5.2.2 Access Gate Queue Length Analysis

Two different scenarios are calibrated through variation in the arrival period of cars and bikes. According to the project demand, 95% of the total generation is taken into consideration. The results are presented in the table as follows:

Table 17: Access Gate Queue Length Analysis Summary

ACESS GATE QUEUE GENERATION		
Description	**Scenario 1**	**Scenario 2**
Car	150	30
Bike	No Queue	No Queue

The access gate queue analysis indicates a significant improvement in traffic handling between the two scenarios. In Scenario 1, a queue of 150 cars is observed, reflecting substantial congestion at the entry point. However, in Scenario 2, the queue length reduces considerably to 30 cars, demonstrating enhanced traffic flow and more efficient access management. For motorcycles, no queuing is observed in either scenario, suggesting that the existing provisions are adequate for two-wheeler movement. Overall, Scenario 2 presents a more effective solution in minimizing vehicular delays and improving access gate performance.

5.2.3 Volume-to-Capacity Ratio Anaylsis

The calculations of the ratio are carried out such that different scenarios are established. The summary chart is presented as follows depicting that even after inclusion of project traffic and growth rate factor over the time span of two years the capacity of road to facilitate such traffic volumes is adequate.

Table 18: Volume-to-Capacity Ratio Analysis Summary

Description	Existing Condition	Project No-Built Condition	Project Built Condition
Direction 01	0.74	0.83	0.92
Direction 02	0.60	0.68	0.82
Direction 03	0.34	0.38	0.65

The comparative assessment of V/C ratios across all three directions indicates that, under existing conditions, the road network is generally operating within acceptable limits, with Direction 01 already exhibiting relatively higher utilization (0.74) compared to Direction 02 (0.60) and Direction 03 (0.34). However, it is important to note that in Direction 01, this level of service is being achieved despite deteriorated road conditions and the presence of multiple potholes, which effectively reduce the operational capacity and signify that the corridor is already nearing its practical threshold.

Future projections show a consistent increase in V/C ratios across all directions under both No-Build and Project Built scenarios. Direction 01 is expected to approach critical capacity conditions (0.92), while Direction 02 also shows a notable rise to 0.82, indicating moderate to heavy traffic conditions. Direction 03, although comparatively less stressed, experiences a significant increase under the Project scenario (0.65), reflecting growing traffic pressure on the network.

Overall, the results highlight a clear trend of increasing congestion levels, emphasizing that while the network may technically remain within capacity limits, the combination of rising traffic demand and existing infrastructure deficiencies—particularly poor pavement conditions—will likely lead to reduced efficiency, increased delays, and a higher risk of operational breakdown if timely improvements and traffic management measures are not implemented.

5.3 Recommendations

Based on the findings of the traffic impact assessment, including V/C ratio analysis, parking demand evaluation, and access gate queue generation, it is evident that the proposed development will introduce additional pressure on an already constrained road network in the Sohrab Goth area. The surrounding corridor is characterized by high traffic volumes, mixed traffic conditions, and limited operational efficiency during peak hours. In particular, certain critical movements are already operating at or beyond acceptable capacity levels under existing conditions, and the proposed development further intensifies these challenges. In light of these observations, a set of targeted traffic management and engineering interventions is recommended to ensure safe, efficient, and sustainable operation of the surrounding network, while minimizing adverse impacts on adjacent roadways and access points.

Access Management Improvements

- Provide well-defined entry and exit points with adequate throat length to prevent spillback onto main carriageways.
- Separate ingress and egress movements to reduce conflict points at the access gate.
- It is also endorsed that different access may be provided for cars and bikes
- The project access points shall be clearly defined and properly channelized to minimize vehicular conflict points. Adequate turning radii shall be maintained to facilitate smooth ingress and egress movements, particularly during peak hours.

Queue Management at Access Gate

- Implement internal stacking space sufficient to accommodate peak-hour vehicle accumulation without affecting external traffic flow.
- Deploy trained security/traffic marshals during peak hours to regulate inflow and prevent congestion at the gate.
- Separate inbound and outbound lanes are recommended at the main access gate to improve operational efficiency and reduce internal circulation conflicts.

Road Network Improvements

- Provide channelization improvements at critical junctions to reduce friction between turning and through traffic.
- Ensure clear road markings and signage for improved lane discipline in mixed traffic conditions.
- Appropriate regulatory, warning, and directional signage shall be installed at the project access and along adjoining roadways. Pavement markings, including lane delineation and stop lines, shall be provided in accordance with standard traffic engineering practices.
- A post-occupancy traffic review is recommended after full project operation to verify projected traffic conditions
- There is presence of multiple potholes and overall deterioration of the road surface, which effectively reduces the functional capacity of the roadway. To achieve maximum road capacity, the carriageway should be upgraded to a smooth, well-maintained asphalt pavement with proper structural layers and drainage, ensuring a pothole-free and uniform surface.

Parking Management Strategy

- Implement a dynamic parking management plan to allocate spaces efficiently between residential, commercial, and recreational users.
- Introduce valet parking or automated parking guidance systems during peak demand periods.
- Reserve dedicated parking zones for high-turnover uses such as commercial and recreational facilities with shift-based management.
- Resident, visitor, and motorcycle parking areas shall be clearly demarcated to avoid operational conflicts.

Traffic Demand Mitigation

- Promote shared mobility options and ride-hailing pick-up/drop-off zones to reduce private vehicle dependency.
- Strict measures shall be adopted to prevent on-street parking or any spillover activity that may adversely impact the operational performance of adjoining roads.

Building Management

- Provide safe pedestrian walkways separated from vehicular circulation within the site.
- Clear floor numbering, directional arrows, and wayfinding signage shall be installed across all parking levels to enhance circulation efficiency and minimize internal delays.
- Adequate illumination shall be provided at access points, internal roads, and parking areas to improve nighttime visibility and safety.
- Appropriate landscaping along the site boundary is recommended to enhance visual integration with the surrounding residential environment.

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ANNEXURE X: BASELINE ENVIRONMENTAL MONITORING REPORTS

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IERL-SEPA CERTIFICATE NO.	EPA/LAB/CERTIFICATE 01/31/2022	**Reference No.**	IERL/NSA.BD/SW /03/2026
Project Name:	The Seven Towers	**Sample Description**	Surface Water
Sample Collection Date	26/03/2026	**Sampling Point:**	Storage Tank Near Booking Office at Proposed Project Site
Reporting Date	04/04/2026		
Sample Collected/Submitted by:	IERL Representative	**Coordinates:**	24.944191°N 67.43'086221°E
Report To:	M/S N.S.A Builders and Developers		

Analytical Test Report of Surface Water Quality Monitoring

S.No.	Parameter	Method	Unit	SEQS Limits	Result
1.	Temperature	APHA 2550	°C	NGVS	25.6
2.	pH @ 25°C	APHA 4500 H+B	-	6.5-8.5	7.5
3.	Odour	APHA 2150 B	-	Acceptable	Unobjectionable
4.	Color	APHA 2120 B	TCU	15	4
5.	Taste	APHA 2150 B	-	Acceptable	Unobjectionable
6.	Total Hardness	APHA 2340 C	mg/l	500	190
7.	Total Dissolved Solids	APHA 2540 C	mg/l	1000	400
8.	Turbidity	APHA 2130 B	NTU	<5	2.61
9.	Chloride	APHA 4500-Cl B	mg/l	<250	75
10.	Chlorine, Residual	APHA 4500-Cl G	mg/l	0.2 - 0.5	0
11.	Aluminum	APHA 3111 B	mg/l	0.2	BDL
12.	Antimony	APHA 3111 B	mg/l	0.005	BDL
13.	Barium (Ba)	APHA 3111 B	mg/l	0.7	BDL
14.	Boron	APHA 3111 B	mg/l	0.3	BDL
15.	Fluoride	APHA 4500-F C	mg/l	1.5	0.67
16.	Nitrate	APHA 4500-NO3- F	mg/l	0.5	0.4
17.	Nitrite	APHA 4500-NO2- E	mg/l	3	0.006
18.	Arsenic	APHA 3111 B	mg/l	<0.05	BDL
19.	Cadmium	APHA 3111 B	mg/l	0.01	BDL
20.	Chromium	APHA 3111 B	mg/l	<0.05	BDL
21.	Copper	APHA 3111 B	mg/l	2	BDL
22.	Cyanide	APHA 4500-CN- G	mg/l	0.05	BDL
23.	Lead	APHA 3111 B	mg/l	<0.05	BDL
24.	Manganese	APHA 3111 B	mg/l	0.5	BDL
25.	Mercury	APHA 3111 B	mg/l	0.001	BDL
26.	Nickel	APHA 3111 B	mg/l	<0.02	BDL
27.	Phenols	APHA 4500-P	mg/l	NoGL	BDL
28.	Selenium	APHA 3111 B	mg/l	0.01	BDL
29.	Zinc	APHA 3111 B	mg/l	5	BDL
30.	Total Coliform	APHA 9222 B	cfu	0/100ml	TNTC
31.	E-Coli	APHA 9222 D	cfu	0/100ml	24

Sample Analyzed by

Head of Imperial Environment Research Lab

Date: 04/04/26

Terms & Condition:

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IERL-SEPA CERTIFICATE NO.	EPA/LAB/CERTIFICATE 01/31/2022	**Reference No.**	IERL/NSA.BD/GW/03/2026
Project Name:	The Seven Towers	**Sample Description**	Groundwater
Sample Collection Date	26/03/2026	**Source:**	Motor pump (100ft)
Reporting Date	04/04/2026		
Sample Collected/Submitted by:	IERL Representative	**Coordinates:**	24.943740°N 67.085487°E
Report To:	M/S N.S.A Builders and Developers		

Analytical Test Report of Groundwater Quality Monitoring

S.No.	Parameter	Method	Unit	SEQS Limits	Result
1.	Temperature	APHA 2550	°C	NGVS	25.5
2.	pH @ 25°C	APHA 4500 H+B	-	6.5-8.5	6.7
3.	Odour	APHA 2150 B	-	Acceptable	Unacceptable
4.	Color	APHA 2120 B	TCU	15	11
5.	Taste	APHA 2150 B	-	Acceptable	Unacceptable
6.	Total Hardness	APHA 2340 C	mg/l	500	1810
7.	Total Dissolved Solids	APHA 2540 C	mg/l	1000	7550
8.	Turbidity	APHA 2130 B	NTU	<5	8.97
9.	Chloride	APHA 4500-Cl B	mg/l	<250	1075
10.	Chlorine, Residual	APHA 4500-Cl G	mg/l	0.2 - 0.5	0
11.	Aluminum	APHA 3111 B	mg/l	0.2	BDL
12.	Antimony	APHA 3111 B	mg/l	0.005	BDL
13.	Barium (Ba)	APHA 3111 B	mg/l	0.7	BDL
14.	Boron	APHA 3111 B	mg/l	0.3	BDL
15.	Fluoride	APHA 4500-F C	mg/l	1.5	1.31
16.	Nitrate	APHA 4500-NO3- F	mg/l	0.5	0.3
17.	Nitrite	APHA 4500-NO2- E	mg/l	3	0.008
18.	Arsenic	APHA 3111 B	mg/l	<0.05	BDL
19.	Cadmium	APHA 3111 B	mg/l	0.01	BDL
20.	Chromium	APHA 3111 B	mg/l	<0.05	BDL
21.	Copper	APHA 3111 B	mg/l	2	BDL
22.	Cyanide	APHA 4500-CN- G	mg/l	0.05	BDL
23.	Lead	APHA 3111 B	mg/l	<0.05	BDL
24.	Manganese	APHA 3111 B	mg/l	0.5	BDL
25.	Mercury	APHA 3111 B	mg/l	0.001	BDL
26.	Nickel	APHA 3111 B	mg/l	<0.02	BDL
27.	Phenols	APHA 4500-P	mg/l	NoGL	BDL
28.	Selenium	APHA 3111 B	mg/l	0.01	BDL
29.	Zinc	APHA 3111 B	mg/l	5	BDL
30.	Total Coliform	APHA 9222 B	cfu	0/100ml	0
31.	E-Coli	APHA 9222 D	cfu	0/100ml	0

Sample Analyzed by

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Date: 04/04/26

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IERL-SEPA CERTIFICATE NO.	EPA/LAB/CERTIFICATE 01/31/2022	**Reference No.**	IERL/NSA.BD/AA/03/2026
Project Name:	The Seven Towers	**Sample Description**	Ambient Air Quality (8 hours)
Sample Collection Date	26/03/2026	**Sampling Point:**	Southwest Corner
Reporting Date	04/04/2026		
Sample Collected/Submitted by:	IERL Representative	**Coordinates:**	24.943223°N 67.084967°E
Report To:	M/S N.S.A Builders and Developers		

Analytical Test Report of Ambient Air Quality Monitoring

Date	Time	SO2	NO	NO2	CO	O3	PM2.5	PM10	TSP
26-03-2026	09:30 AM	30.90	20.81	40.88	2.4	40.5	55.60	120.19	307.98
	10:30 AM	34.72	23.13	42.96	2.8	55.3	58.83	122.34	315.76
	11:30 AM	37.14	26.99	43.43	3.7	57.1	61.19	125.12	319.56
	12:30 PM	39.06	27.03	45.02	3.9	64.7	65.15	129.45	336.01
	01:30 PM	38.68	30.87	46.59	4.0	68.6	67.32	133.67	356.26
	02:30 PM	34.84	32.36	47.11	4.1	70.1	70.84	137.13	376.36
	03:30 PM	35.99	34.74	46.72	4.2	87.4	73.79	141.26	412.67
	04:30 PM	41.71	36.9	48.33	4.3	90.9	74.35	147.39	399.84
SEQS		**120**	**40**	**80**	**05**	**130**	**75**	**150**	**500**
Unit		*µg/m3*	*µg/m3*	*µg/m3*	*mg/m3*	*µg/m3*	*µg/m3*	*µg/m3*	*µg/m3*
Maximum		**41.71**	**36.9**	**70.33**	**4.3**	**90.9**	**74.35**	**147.39**	**412.67**
Minimum		**30.9**	**20.81**	**40.88**	**2.4**	**40.5**	**55.6**	**120.19**	**307.98**
Average		**36.56**	**29.05**	**56.62**	**3.61**	**66.6**	**65.70**	**132.41**	**354.50**

SEQS = Sindh Environmental Quality Standards
µg/m3 = microgram per cubic meter
mg/m3 = milligram per cubic meter
*(8 Hours standard for CO)
**(01-hour standard for O3)

Imperial Environment Research Laboratory Date: 04/04/2026

Sample Analyzed by | **Head of Imperial Environment Research Lab**

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IERL-SEPA CERTIFICATE NO.	EPA/LAB/CERTIFICATE 01/31/2022	**Reference No.**	IERL/NSA.BD/AA/03/2026
Project Name:	The Seven Towers	**Sample Description**	Ambient Air Quality
Sample Collection Date	26/03/2026	**Sampling Point:**	Southeast Corner
Reporting Date	04/04/2026		
Sample Collected/Submitted by:	IERL Representative	**Coordinates:**	24.943213°N 67.086824°E
Report To:	M/S N.S.A Builders and Developers		

Analytical Test Report of Ambient Air Quality Monitoring

Date	Time	SO2	NO	NO2	CO	O3	PM2.5	PM10	TSP
26-03-2026	10:00 AM	15.87	14.98	21.34	1.90	35.0	60.98	112.32	195.45
	11:00 AM	21.10	12.09	23.45	2.10	37.3	63.65	121.98	201.34
	12:00 PM	27.67	18.43	25.56	2.88	38.6	65.23	122.12	204.06
	01:00 PM	22.09	21.23	20.76	3.76	41.3	67.12	124.65	208.34
	02:00 PM	29.23	26.67	31.12	3.79	42.7	69.98	127.54	212.11
	03:00 PM	31.56	23.19	29.23	3.99	37.9	63.78	129.35	229.45
	04:00 PM	36.34	29.92	32.34	3.45	32.4	64.34	130.23	259.34
	05:00 PM	45.09	27.45	31.98	3.78	28.1	61.86	134.11	290.09
SEQS		**120**	**40**	**80**	**05**	**130**	**75**	**150**	**500**
Unit		*µg/m3*	*µg/m3*	*µg/m3*	*mg/m3*	*µg/m3*	*µg/m3*	*µg/m3*	*µg/m3*
Maximum		**45.09**	**29.92**	**41.98**	**3.99**	**42.7**	**69.98**	**134.11**	**290.09**
Minimum		**15.87**	**12.09**	**17.34**	**1.9**	**28.1**	**60.98**	**112.32**	**195.45**
Average		**28.99**	**21.60**	**31.11**	**3.154**	**36.41**	**64.79**	**124.87**	**228.57**

SEQS = Sindh Environmental Quality Standards
µg/m3 = microgram per cubic meter
mg/m3 = milligram per cubic meter
*(8 Hours standard for CO)
**(01-hour standard for O3)

Sample Analyzed by

Head of Imperial Environment Research Lab

Date: 04/04/26

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IERL-SEPA CERTIFICATE NO.	EPA/LAB/CERTIFICATE 01/31/2022	**Reference No.**	IERL/NSA.BD/AA/03/2026
Project Name:	The Seven Towers	**Sample Description**	Ambient Air Quality
Sample Collection Date	26/03/2026	**Sampling Point:**	Northeast Corner
Reporting Date	04/04/2026		
Sample Collected/Submitted by:	IERL Representative	**Coordinates:**	24.945058°N 67.086682°E
Report To:	M/S N.S.A Builders and Developers		

Analytical Test Report of Ambient Air Quality Monitoring

Date	Time	SO2	NO	NO2	CO	O3	PM2.5	PM10	TSP
26-03-2026	10:30 AM	31.34	23.56	28.98	2.9	55.32	56.2	119.9	215.07
	11:30 AM	38.56	27.32	31.35	2.7	60.14	59.3	125.3	230.23
	12:30 PM	42.78	32.09	34.94	3.2	63.65	61.6	129.7	245.47
	01:30 PM	49.98	35.12	39.01	3.5	68.27	65.7	132.1	259.13
	02:30 PM	52.43	37.76	42.23	3.9	70.02	67.9	135.7	268.03
	03:30 PM	55.21	36.36	48.42	3.7	64.34	69.6	138.9	277.28
	04:30 PM	54.56	34.23	53.12	4.0	63.67	71.4	140.1	298.34
	05:30 PM	59.60	35.87	59.06	4.3	68.09	74.9	145.4	390.76
SEQS		**120**	**40**	**80**	**05**	**130**	**75**	**150**	**500**
Unit		*µg/m3*	*µg/m3*	*µg/m3*	*mg/m3*	*µg/m3*	*µg/m3*	*µg/m3*	*µg/m3*
Maximum		**59.6**	**37.76**	**59.06**	**4.3**	**70.02**	**74.9**	**145.4**	**390.76**
Minimum		**31.34**	**23.56**	**28.98**	**2.7**	**55.32**	**56.2**	**119.9**	**215.07**
Average		**47.54**	**32.36**	**42.51**	**3.52**	**63.88**	**65.77**	**133.24**	**279.01**

SEQS = Sindh Environmental Quality Standards
µg/m3 = microgram per cubic meter
mg/m3 = milligram per cubic meter
*(8 Hours standard for CO)
**(01-hour standard for O3)

Imperial Environment Research Laboratory Date: 04/04/26

Sample Analyzed by | **Head of Imperial Environment Research Lab**

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IERL-SEPA CERTIFICATE NO.	EPA/LAB/CERTIFICATE 01/31/2022	**Reference No.**	IERL/NSA.BD/AN/03/2026
Project Name:	The Seven Towers	**Sample Description**	Ambient Noise Quality
Sample Collection Date	26/03/2026	**Sampling Point:**	Southwest Corner
Reporting Date	04/04/2026		
Sample Collected/Submitted by:	IERL Representative	**Coordinates:**	24.943223°N 67.084967°E
Report To:	M/S N.S.A Builders and Developers		

Analytical Test Report of Ambient Noise Level Monitoring

S.No.	Sampling Location		Unit	SEQS Limits	Result dB(A)	
					Hourly	Average
1.	09:30 AM	Day Time	dB(A)	65	63	62.75
2.	10:30 AM		dB(A)	65	67	
3.	11:30 AM		dB(A)	65	58	
4.	12:30 PM		dB(A)	65	55	
5.	01:30 PM		dB(A)	65	71	
6.	02:30 PM		dB(A)	65	66	
7.	03:30 PM		dB(A)	65	58	
8.	04:30 PM		dB(A)	65	64	

***SEQS** = Sindh Environmental Quality Standards*
***dB(A)** = Decibel – A weighting*

Date: 04/04/26

Sample Analyzed by | **Head of Imperial Environment Research Lab**

Terms & Condition:

- *Report is valid for current batch (sample).*
- *This Report is not valid for any other certification, or court matters.*

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IERL-SEPA CERTIFICATE NO.	EPA/LAB/CERTIFICATE 01/31/2022	**Reference No.**	IERL/NSA.BD/AN/03/2026
Project Name:	The Seven Towers	**Sample Description**	Ambient Noise Quality
Sample Collection Date	26/03/2026	**Sampling Point:**	Southeast Corner
Reporting Date	04/04/2026		
Sample Collected/Submitted by:	IERL Representative	**Coordinates:**	24.943213°N 67.086824°E
Report To:	M/S N.S.A Builders and Developers		

Analytical Test Report of Ambient Noise Level Monitoring

S.No.	Sampling Location		Unit	SEQS Limits	Result dB(A)	
					Hourly	Average
1.	10:00 AM	Day Time	dB(A)	55	46	49.88
2.	11:00 AM		dB(A)	55	48	
3.	12:00 PM		dB(A)	55	49	
4.	01:00 PM		dB(A)	55	50	
5.	02:00 PM		dB(A)	55	51	
6.	03:00 PM		dB(A)	55	52	
7.	04:00 PM		dB(A)	55	51	
8.	05:00 PM		dB(A)	55	52	

***SEQS** = Sindh Environmental Quality Standards*
***dB(A)** = Decibel – A weighting*

Sample Analyzed by

Head of Imperial Environment Research Lab

Imperial Environment Research Laboratory Date: 04/04/26

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nqa ISO 9001 QUALITY MANAGEMENT
UKAS MANAGEMENT SYSTEMS 0015

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IERL-SEPA CERTIFICATE NO.	EPA/LAB/CERTIFICATE 01/31/2022	**Reference No.**	IERL/NSA.BD/AA/03/2026
Project Name:	The Seven Towers	**Sample Description**	Ambient Air Quality
Sample Collection Date	26/03/2026	**Sampling Point:**	Northeast Corner
Reporting Date	04/04/2026		
Sample Collected/Submitted by:	IERL Representative	**Coordinates:**	24.945058°N 67.086682°E
Report To:	M/S N.S.A Builders and Developers		

Analytical Test Report of Ambient Noise Level Monitoring

S.No.	Sampling Location		Unit	SEQS Limits	Result dB(A)	
					Hourly	Average
1.	10:30 AM	Day Time	dB(A)	65	59	64.25
2.	11:30 AM		dB(A)	65	60	
3.	12:30 PM		dB(A)	65	66	
4.	01:30 PM		dB(A)	65	63	
5.	02:30 PM		dB(A)	65	69	
6.	03:30 PM		dB(A)	65	59	
7.	04:30 PM		dB(A)	65	66	
8.	05:30 PM		dB(A)	65	72	

***SEQS** = Sindh Environmental Quality Standards*
***dB(A)** = Decibel – A weighting*

Sample Analyzed by	Head of Imperial Environment Research Lab

Imperial Environment Research Laboratory Date: 04/04/26

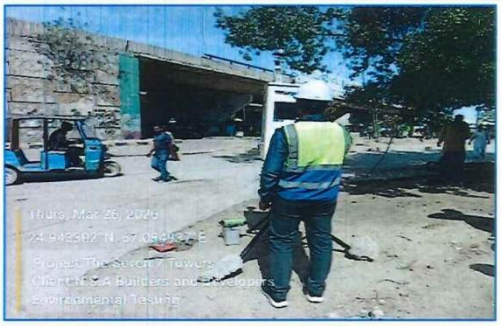
Terms & Condition:

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nqa ISO 9001 QUALITY MANAGEMENT — UKAS MANAGEMENT SYSTEMS 0015

PICTURE GALLERY

Location 01

	
Ambient Air & Noise Quality Monitoring	**Ambient Air & Noise Quality Monitoring**
	
Ambient Air & Noise Quality Monitoring	**Ambient Air & Noise Quality Monitoring**
	
Ambient Noise Quality Monitoring	**Ambient Noise Quality Monitoring**

Location 02



Ambient Air & Noise Quality Monitoring



Ambient Air & Noise Quality Monitoring



Ambient Air & Noise Quality Monitoring



Ambient Air & Noise Quality Monitoring



Ambient Noise Quality Monitoring

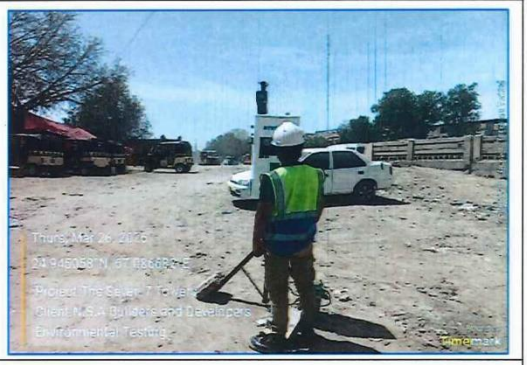


Ambient Noise Quality Monitoring

Location 03



Ambient Air & Noise Quality Monitoring



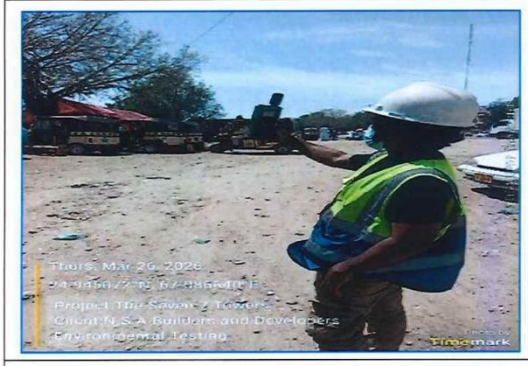
Ambient Air & Noise Quality Monitoring



Ambient Air & Noise Quality Monitoring



Ambient Air & Noise Quality Monitoring



Ambient Noise Quality Monitoring



Ambient Noise Quality Monitoring


Thurs, Mar 26, 2026
Project The Seven 7 Towers
Client N.S.A Builders and Developers
Timemark
Surface water Sampling (Storage Tank)
Groundwater Sampling