

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT SAIMA CENTER POINT PHASE-II

PLOT / SURVEY NO. 134/B/1/1, MEASURING 29588.4
SQ.YDS M.A JINNAH ROAD KARACHI CANTT





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Environmental Impact
Assessment (EIA)

Saima Center Point (Phase-II)

Plot / Survey No. 134/B/1,
measuring 29588.4 Sq.Yds M.A
Jinnah Road Karachi Cantt

Prepared for:
Mega Residency (Pvt.) Ltd

Prepared by:
EHS Services

Date:
November 2025

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Environmental Impact Assessment (EIA)

Saima Center Point
(Phase-II)

Plot / Survey No. 134/B/1, measuring
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Karachi Cantt

EXECUTIVE SUMMARY

Project Overview:

Saima Centre Point (Phase-II) is a significant G+37 storey residential and commercial high-rise development initiated by Mega Residency (Pvt.) Ltd. Located at Survey No. 134/B/1, M.A Jinnah Road, Karachi Cantt, the project spans 29588.4 Sq. Yards and is poised to substantially enhance Karachi's urban landscape. The comprehensive building plan, including Basement-II to 37th Floor with rooftop infrastructure, has received formal endorsement from the Karachi Cantonment Board (KCB). An Environmental Impact Assessment (EIA) study has been formally submitted to the Sindh Environmental Protection Agency (SEPA) for approval, reflecting the project's commitment to sustainable development principles.

EIA Findings and Environmental Context:

The EIA process involved a thorough review of literature, stakeholder engagement, baseline data analysis, and expert judgment to assess potential impacts. The study confirms the project site is strategically located within an established commercial zone, devoid of environmentally sensitive areas such as protected wildlife sanctuaries, historical sites, or significant ecological systems. Consequently, the project is projected to have a negligible impact on local biodiversity. The land status is secure, with all requisite No-Objection Certificates (NOCs) and letters of intent from service providers diligently secured by the proponent.

Key Operational Requirements and Integrated Solutions:

Upon completion, the project is estimated to require approximately 584,130 gallons of water per day and 2.5 MW of electrical power. The design incorporates robust, self-contained systems to ensure operational independence and sustainability, including:

- **Power:** Independent backup power generation capabilities.
- **Water Supply:** A sophisticated water supply system augmented by a hyper-filtration plant. Payments for KWSC connection have been made.
- **Wastewater Management:** A comprehensive sewage treatment, grey water recycling, and responsible disposal system (460,000 gallons/day projected), featuring at-source treatment, separate plumbing for grey/black water, and grease traps.



- **Solid Waste Management:** Implementation of a robust plan including grease interceptors, centralized collection via chutes, source segregation, and professional management by a dedicated contractor.
- **Parking:** Generous provision exceeding statutory requirements, accommodating 2397 cars and 2581 motorcycles.
- **Safety & Security:** State-of-the-art 24-hour security systems (surveillance, access control) and advanced active life safety and fire control systems (sprinklers, standpipes, detection, suppression, pressurization).

Challenges and Mitigation Strategies:

While the project features significant integrated sustainability measures, the EIA identified critical challenges requiring external support and mitigation:

- **Water Scarcity:** Despite payment for a KWSC connection, severe delays in the K-IV water supply project pose a significant risk to Karachi's overall water supply. To mitigate this, a comprehensive groundwater investigation was conducted, revealing excellent groundwater potential (100 gpm expected from a test borehole into Alluvium, Gaj, and Manchar formations). Further investigation into wastewater recycling and potable water regeneration from groundwater is recommended.
- **Traffic Impact:** The project is projected to generate 2,228 PM peak trips, primarily from residential units. Although internal parking is adequate, these trips are expected to generate queues at the site entrance, potentially leading to inadequate levels of service and operational delays on the surrounding road network. Targeted mitigation measures are therefore required to improve overall traffic performance. Recommendations include: Provide dedicated lanes for: Residents with RFID access, Visitors, Deliveries / logistics vehicles. Use ANPR, RFID, and fast-scan systems to reduce delays.
- **Utility Infrastructure:** While the proponent has made necessary financial contributions for utility services and broader infrastructural development, it is imperative that municipal and utility authorities proactively augment existing facilities well in advance of the project's completion to prevent undue burden on public utilities.



Environmental Impact Assessment (EIA)

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Conclusion and Recommendation:

The Environmental Impact Assessment concludes that the Saima Centre Point (Phase-II) project's environmental effects are manageable and can be effectively addressed. The project, with its focus on self-sufficiency in power, water treatment, waste management, and enhanced safety/security, represents a positive contribution to urban development.

Therefore, this study recommends approval of the Environmental Impact Assessment (EIA) report, strictly on the condition that all suggested mitigation measures are rigorously adopted and the Environmental Management & Monitoring Plan (EMMP) is adhered to in letter and spirit by the proponent and relevant authorities. This ensures the project contributes positively to Karachi's urban fabric without compromising environmental and utility infrastructure sustainability.



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1. Introduction

Project Title: Saima Centre Point (Phase-II)

Developer: Mega Residency (Pvt.) Ltd

Location: Survey No. 134/B/1, M.A Jinnah Road, Karachi Cantt

Total Plot Area: 29588.4 Sq. Yards

Mega Residency (Pvt.) Ltd is initiating the development of Saima Centre Point (Phase-II), a prominent G+37 storey residential and commercial high-rise projected to significantly enhance Karachi's urban landscape. Situated strategically at Survey No. 134/B/1, M.A Jinnah Road, within the dynamic Karachi Cantonment Board area, this project, spanning 29588.4 Sq. Yards, constitutes a substantial advancement in urban infrastructure development.

An Environmental Impact Assessment (EIA) study has been formally submitted to the Sindh Environmental Protection Agency (SEPA) for approval, underscoring its adherence to principles of sustainable development. Illustrative representations of the project's accessibility within its surroundings are presented in Figures 1.1.

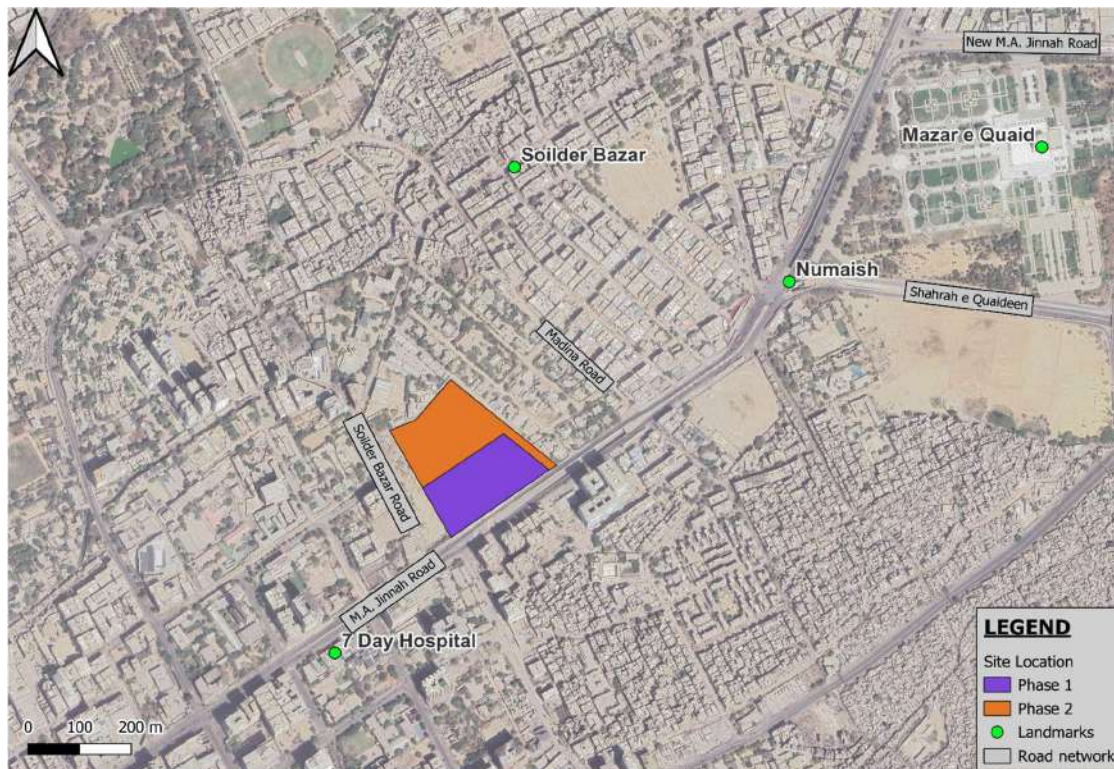


Figure 1.1: Project Location



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In its capacity as Project Proponent, Mega Residency (Pvt.) Ltd has diligently convened a specialized team comprising highly credentialed and committed professionals. This collective of experts is primarily dedicated to ensuring superior outcomes across all phases of building, construction, and development. Their steadfast dedication guarantees that every aspect of the project not only conforms to the most stringent industry benchmarks but also upholds principles of quality assurance and environmental stewardship, thereby fostering positive socio-economic contributions to the local populace and regional economy.

Significantly, the Karachi Cantonment Board (KCB) has formally endorsed the project's building plan, as evidenced by approval letter No. KCB/134/B/1/M.A.J.Rd/2119, issued on October 10, 2024. This crucial authorization affirms the project's adherence to pertinent local ordinances and its congruence with the region's urban development paradigm. The comprehensive structural design encompasses Basement-II, Basement I, Ground Floor, and 37 upper floors, along with ancillary rooftop facilities, including a stairwell tower and machinery room. Such detailed pre-construction planning ensures maximal operational efficacy, aesthetic integration, and strict adherence to paramount safety and operational protocols, thereby establishing Saima Centre Point (Phase-II) as a seminal architectural edifice within Karachi's urban panorama, anticipated to yield considerable advantages for both residential occupants and commercial enterprises.

The Project has been undertaken by a consortium of following Groups:



- Arch Vision Plus Architects
- SEM & Eleken MEP Consultant
- M/s EHS Services EIA & Traffic Consultants



1.1 Project Overview

Saima Centre Point (Phase-II) is emerging as a significant and ambitious undertaking in urban development, poised to become a landmark initiative that aims to reshape Karachi's architectural profile. This project envisions constructing an impressive **37-story high-rise building**, skillfully blending residential and commercial functions. Through its innovative design and careful planning, it seeks to create more than just a vertical living space; it aims to establish a vibrant community hub that attentively addresses the evolving demands of contemporary urban life, accommodating a diverse population and fostering a collective sense of belonging.

Centrally located along Karachi's bustling M.A. Jinnah Road, a crucial thoroughfare, the project offers outstanding access to the Green Line Bus Rapid Transit corridor, situated immediately to its south, ensuring quick and efficient transportation links. The strategic placement of the tower in such a dynamic district underscores its importance as a forward-thinking urban development. Furthermore, the site is bordered by a 30-foot-wide access road on its eastern side, which not only improves entry but also facilitates smooth vehicular and pedestrian movement, thereby cultivating an inclusive environment. This deliberate design aligns with the goals of the Karachi Transport Masterplan 2030, which strives to enhance traffic flow, urban mobility, and overall accessibility, thus setting a new benchmark for future city projects.

At the core of this visionary project is the goal to establish a self-contained residential and commercial tower, thoughtfully engineered to promote a harmonious lifestyle for its inhabitants. The ambition of this development extends beyond mere construction; it endeavors to substantially enrich Karachi's urban environment. By integrating advanced architectural features with natural elements, this structure is set to become an intrinsic part of the city's character, ensuring its strategic incorporation into the existing built landscape. The design prioritizes the safety, security, and enhanced quality of life for residents in every detail, reflecting a modern interpretation of communal living. The architectural scheme also incorporates sustainable principles, ensuring that the building is not only energy-efficient but also environmentally friendly, thereby contributing to a sustainable future for its occupants.

Detailed Specifications and Features

Project Overview:

- **Commercial Units:** The project comprises a total of 803 shops.

- **Residential Towers:** There are 8 dedicated towers within the development.

Residential Units:

- **Third Floor Units:** The 3rd floor features 32 flats.
- **Upper Floor Units (4th to 37th Floors):** A total of 2,176 flats are located across these floors.
- **Total Flats:** The entire project offers a grand total of 2,208 residential units.

Parking Facilities:

- **Car Parking Requirement:** 1,752 car parking spaces are required.
- **Car Parking Provision:** 2,397 car parking spaces are provided, exceeding the requirement.
- **Motorcycle Parking Requirement:** 2,004 motorcycle parking spaces are required.
- **Motorcycle Parking Provision:** 2,581 motorcycle parking spaces are provided, exceeding the requirement.

Vertical Transportation & Safety Systems:

- **Passenger Lifts:** 16 passenger lifts are installed for the flats.
- **Cargo Lifts:** 16 cargo lifts are available for the flats.
- **Staircases:** 8 staircases serve the residential sections.
- **Fire Escapes:** 8 dedicated fire escapes are present for safety.

1.2 Need for Environmental Impact Assessment (EIA)

The EIA study is a compulsory requirement as per the Sindh Environmental Protection Act, 2014, and its associated regulations. Under Section 17 (1) of this Act, project proponents are mandated to submit either an Initial Environmental Examination (IEE) or an Environmental Impact Assessment (EIA) and secure approval from the Sindh Environmental Protection Agency (SEPA) prior to initiating construction or operational activities. The relevant section is:

“17. (1) No proponent of a project shall commence construction or operation unless he has filed with the agency an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) and has obtained from the Agency.”

The Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021, enacted under Section 37 of the 2014 Act, categorize projects into three groups reflected in Schedules I, II, and III of the 2014 Regulations. These classifications are based on the anticipated degree of environmental impact, where projects in Schedule III are deemed potentially seriously harmful and necessitate an EIA, while those in Schedule II may have lesser effects and require an IEE.

The proposed project is categorized as I (2) under Schedule III of the 2021 Regulations, specifically concerning:

I. Urban development and tourism

(1)

(2) Residential/commercial high-rise buildings exceeding 500,000 sq. feet.

Due to the project's area surpassing 500,000 sq. feet, the EIA requirement is warranted. This assessment aims to provide a comprehensive evaluation of the environmental impacts associated with the high-rise development, enabling effective interventions. It covers various aspects such as building stability, water and wastewater management, sewage treatment, groundwater levels, solid waste management, traffic logistics, parking adequacy, safety and security measures, proximity to sensitive zones/receptors, and overall settlement density. The plan is designed to articulate the project thoroughly and propose mitigation strategies.

It has been observed that addressing environmental concerns concurrently with technical and economic considerations during all project phases aids in protecting both the micro and macro environmental and socioeconomic resources of the area.

The assessment is guided by the following objectives:

- Identify regulatory environmental protection, health, and safety requirements relevant to the proposed activities.
- Evaluate the potential environmental impacts of project activities during both construction and operation phases to identify environmental concerns.

- Recommend effective mitigation measures to integrate into project designs to reduce any identified adverse impacts.

1.3 Methodology for Environmental Assessment

The EHS Services team was officially inducted in October 2025 to conduct the Environmental Impact Assessment (EIA) for the proposed Saima Centre Point (Phase-II) project. The assessment employed the following methodology to evaluate the impacts of various activities:

- A team of EHS Services experts, including an Environmental Assessment Specialist, carried out a reconnaissance survey to identify critical environmental, social, and ecological aspects of the area.
- Information related to production activities within the affected area was collected to delineate the microenvironment of the project.
- The collected data was utilized to identify hazards related to safety, health, and the environment, as well as the associated risks involved in different project activities.
- Potential environmental impacts were screened using a checklist method to prepare the EIA report in accordance with SEPA guidelines.

The environmental assessment focused on comparing the environmental quality before and after the establishment of the project. To achieve this, a baseline profile of the project area was developed through the collection of data on the physical, ecological, and socioeconomic environment at M.A. Jinnah Road, which delineates the project's microenvironment. After screening for potential environmental impacts, the report outlines the necessary mitigation measures. Additionally, the report includes the Environmental Management Plan (EMP), which will guide the Project Proponent throughout the project lifecycle. The EMP aims to maintain compliance with health, safety, and environmental legislations while managing environmental, safety, occupational risks, and social issues arising from project activities.

The report is structured as follows:

1. Introduction to Project and EIA Processes
2. Description of Project
3. Overview of National and Provincial Legislation & Guidelines relevant to the project and to this EIA
4. Description of Environment of Project Area
5. Public Consultation & Participation
6. Screening of Potential Environmental Impacts & Mitigation Measures
7. Environmental Management and Monitoring Plan (EMP)
8. Conclusion and Recommendations

2. Description of Project

2.1 Project Setting & Statutory Approvals

The Saima Centre Point (Phase-II) project is situated on Plot/Survey No. 134/B/1, M.A Jinnah Road, Karachi Cantt, covering an area of 29588.4 sq. yards. This location is centrally positioned within the Central Business District (CBD) on M.A Jinnah Road, an area where the Karachi Cantonment Board has rolled out its densification initiative. The site benefits from excellent accessibility, primarily via M.A Jinnah Road, which connects directly to the green line bus rapid transit corridor on its immediate South. The Karachi Cantonment Board (KCB) has commendably furnished the area with essential infrastructure facilities.



Figure 2.1: Current status of the Plot

This project is slated for a commercial plot under the jurisdiction of the Karachi Cantonment Board. The plot's lease remains valid and includes a provision for renewal. Currently, the site is an open plot (refer to Figure 2.1), free from any encumbrances. The proponent has successfully secured all necessary No Objection Certificates (NOCs) and pertinent letters from the relevant authorities. To date, the proponent has obtained building plan approval from the Karachi Cantonment Board (KCB) via letter No. KCB/134/B/1/M.A.J.Rd/2119, dated October 10th, 2024. Furthermore, NOCs for electrical connection have been procured from KE (letter No. M/CCE/2025/31859, dated March 5th, 2025), from SSGC for gas supply (under letter No. Sales/NOC/MTBD.134B1/09-24, dated September 25th, 2024), and from KWSB for water (via sanction order, dated March 14th, 2025). The Civil Aviation Authority (CAA) has also issued a height clearance for 500 feet Above Ground Level (AGL) through letter No. HQCAA/1117/003/ARAS(VOL-V)/542, dated September 16th, 2024.



Environmental Impact Assessment (EIA)

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A comprehensive list of all statutory approvals and NOCs is appended in Annex-I.

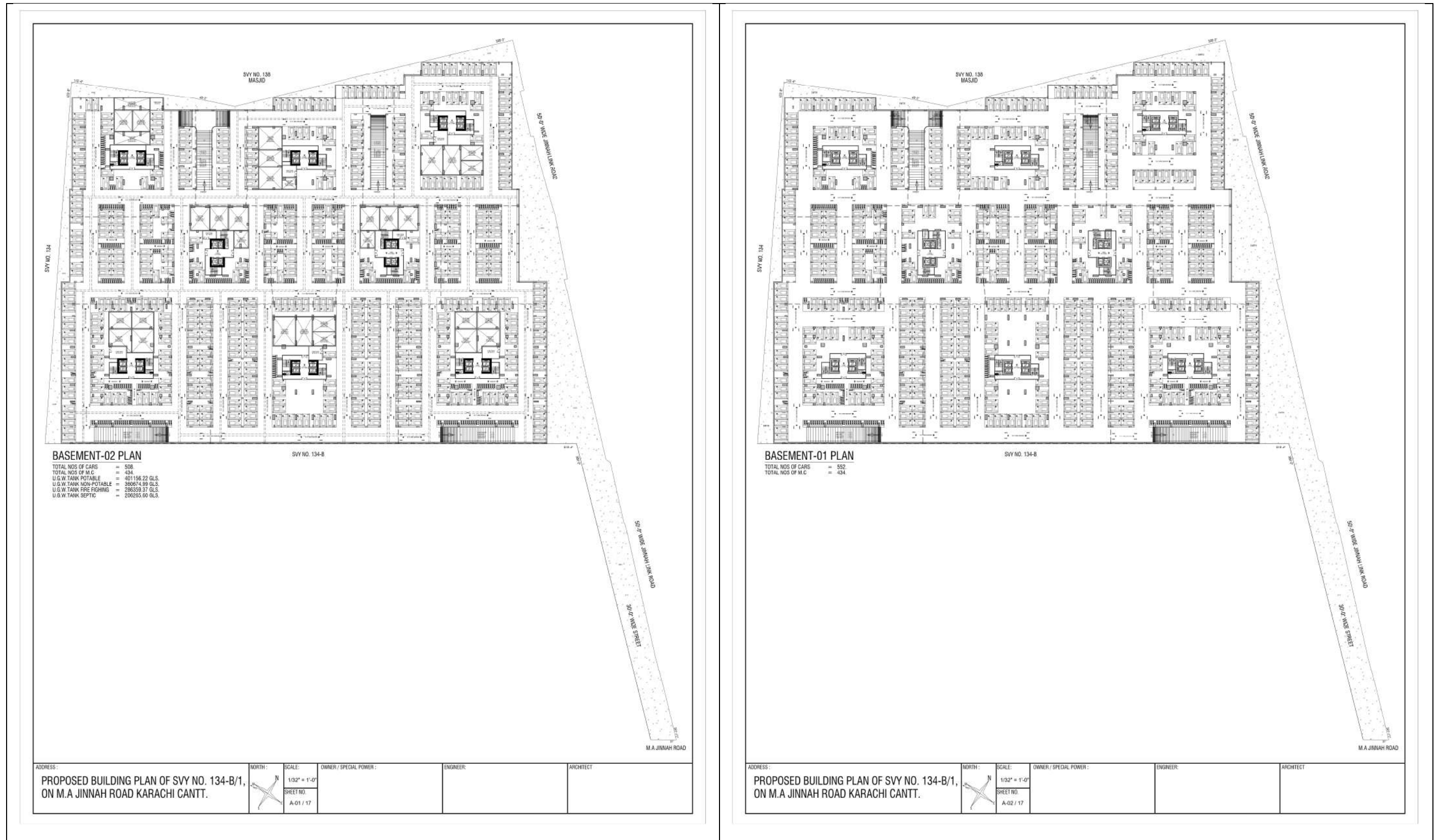
2.2 The Project

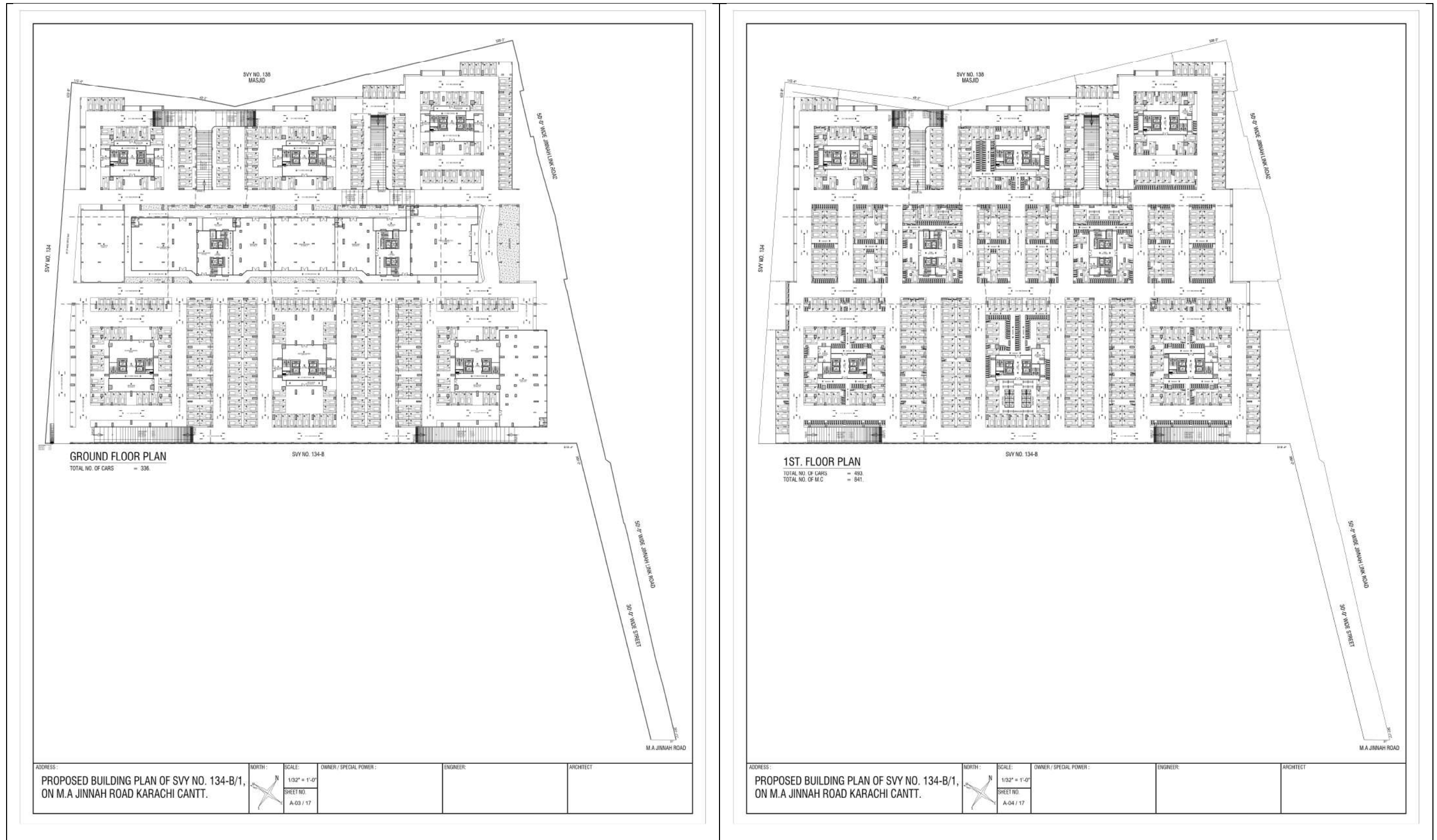
The proposed sanctioned building plan is comprehensive; it consists of a well-structured layout featuring Basement-II + Basement I + Ground Floor + 1st to 37th Floor, along with necessary infrastructure elements such as Stair Tower and Machine Room only on the Rooftop. Total built-up area and covered area of the project (F.A.R) is 5361055.30 sq.ft and 2092723.82 sq. ft respectively. This thorough design not only ensures optimal functionality and aesthetic appeal but also complies with safety and operational standards required for multi-storey buildings in urban environments. As such, this project represents more than just a construction endeavor—it signifies a transformative addition to the skyline of Karachi that promises to benefit residents and businesses alike.

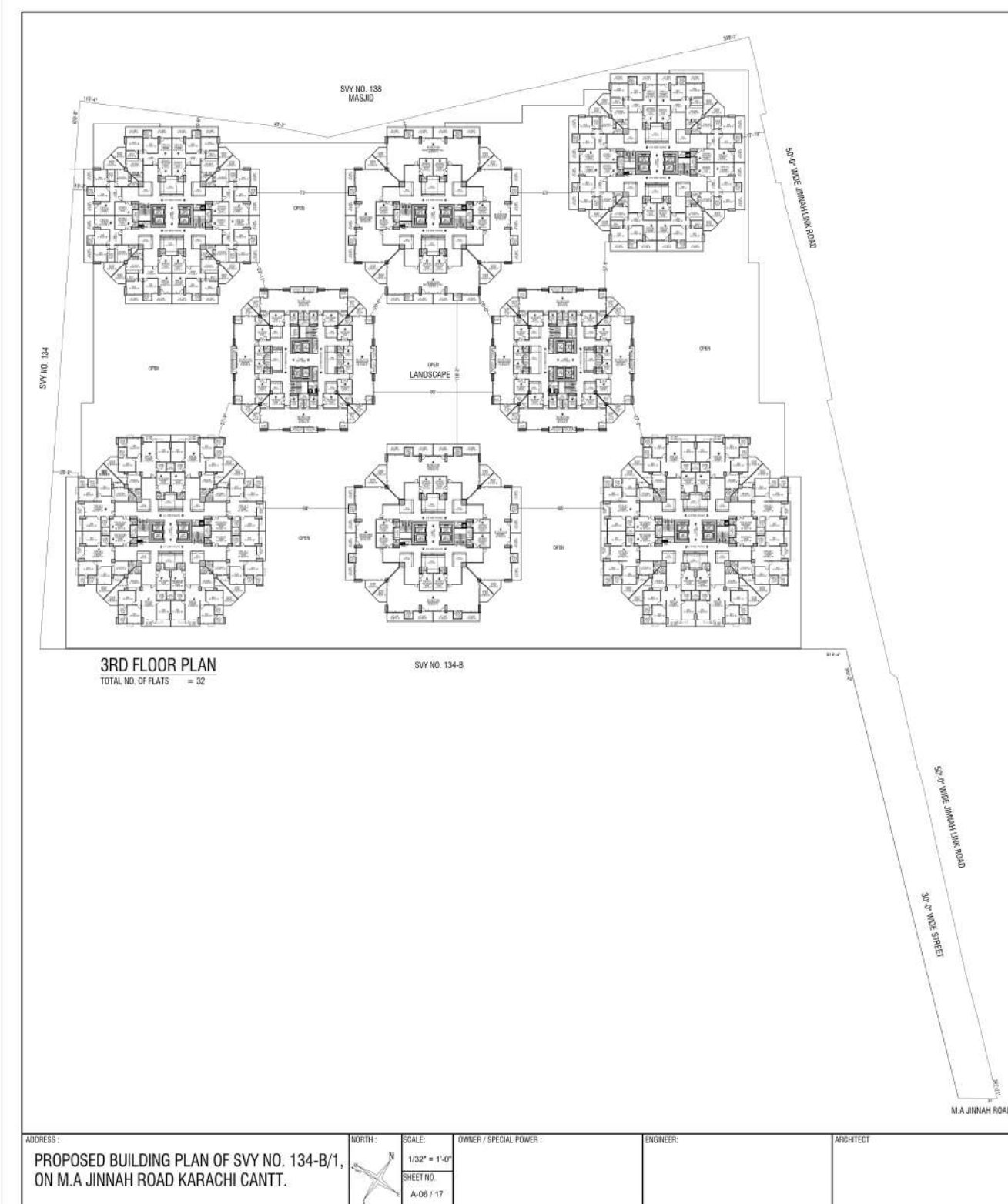
Submission Drawings are shown in figure 2.2.

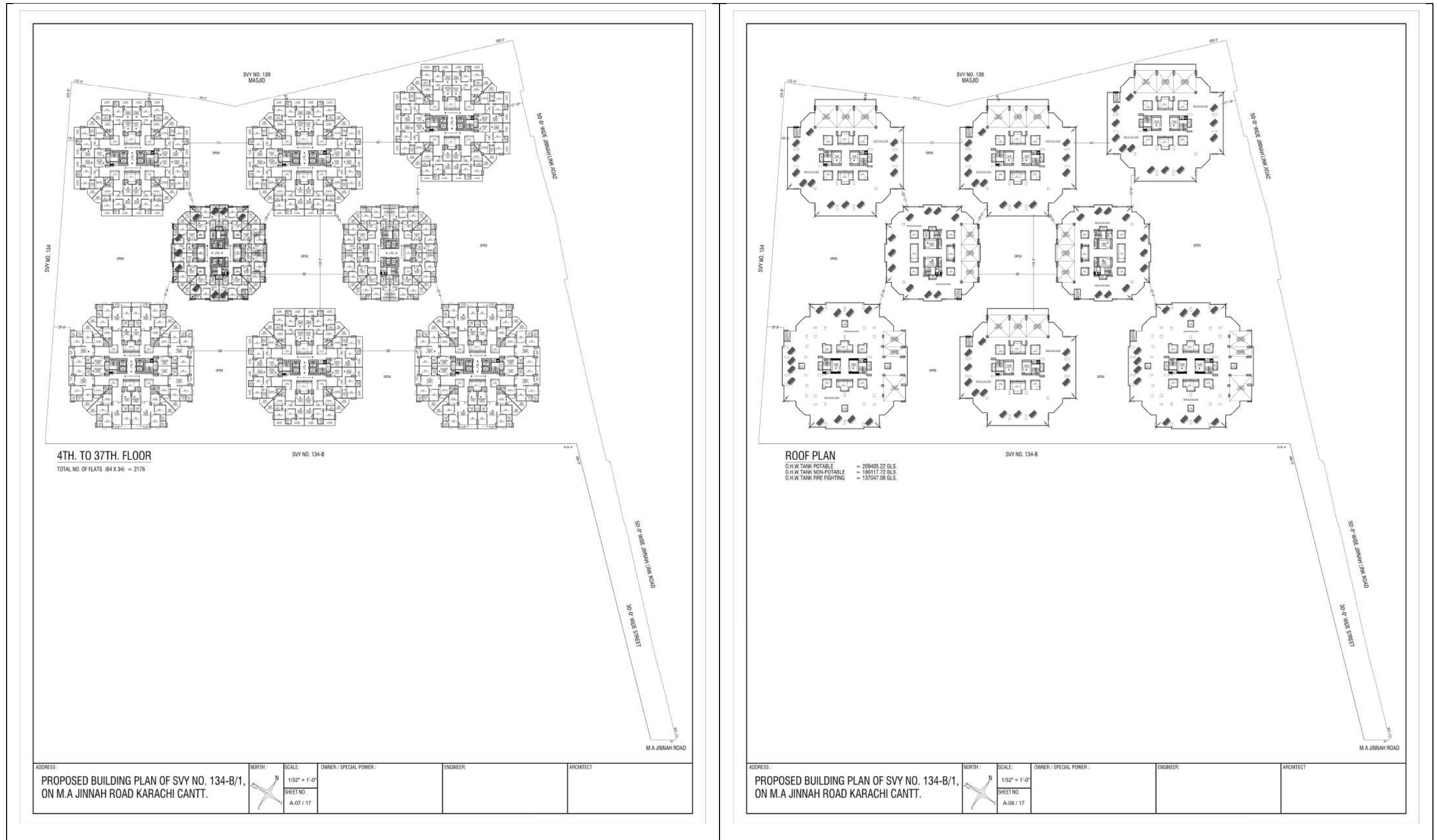
The project addresses the issues of energy & environment and provides the most effective solutions. The green systems integrated in the building design will create positive and sustainable urban image to the environment and improve social and ecological resources of Karachi.

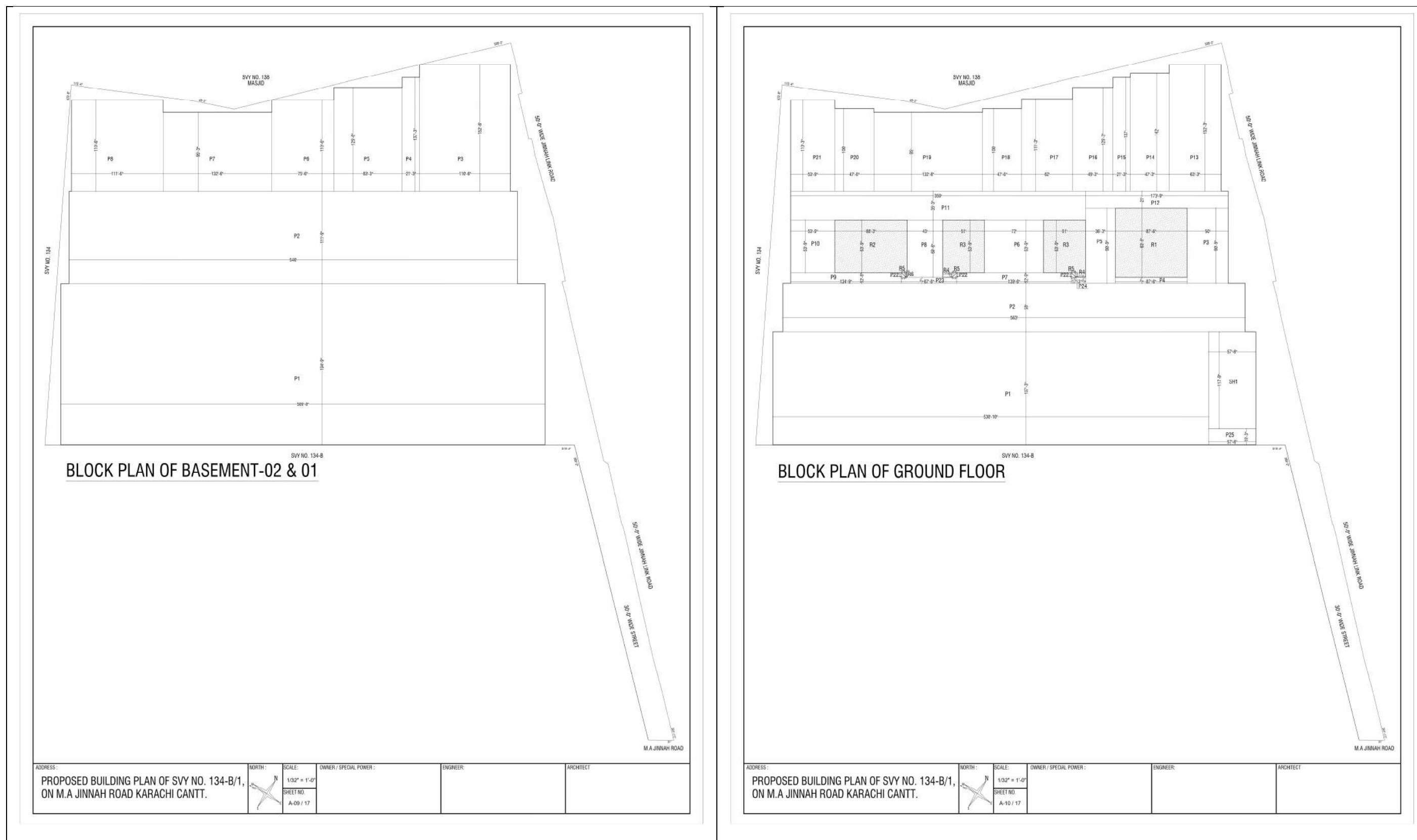


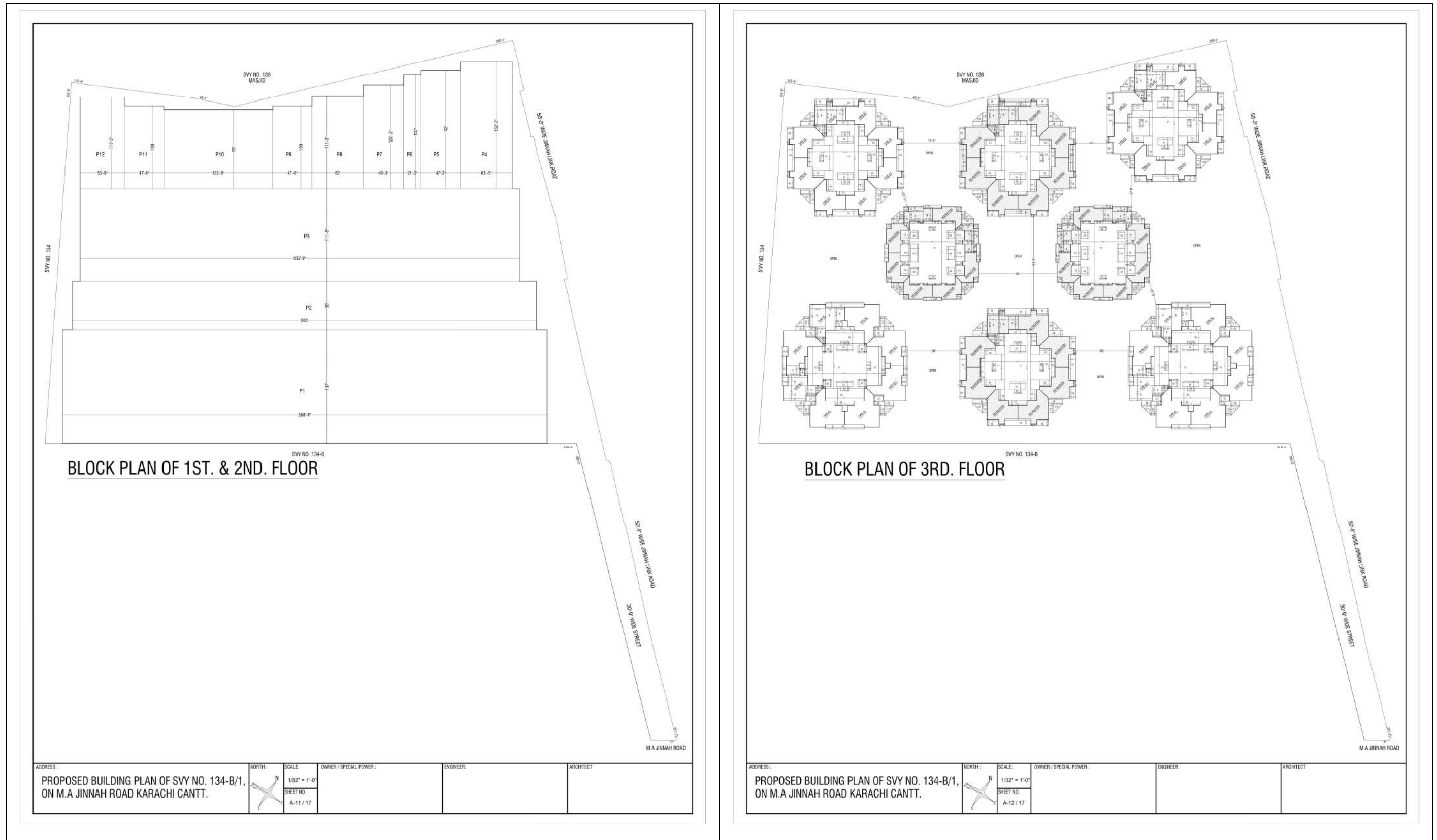


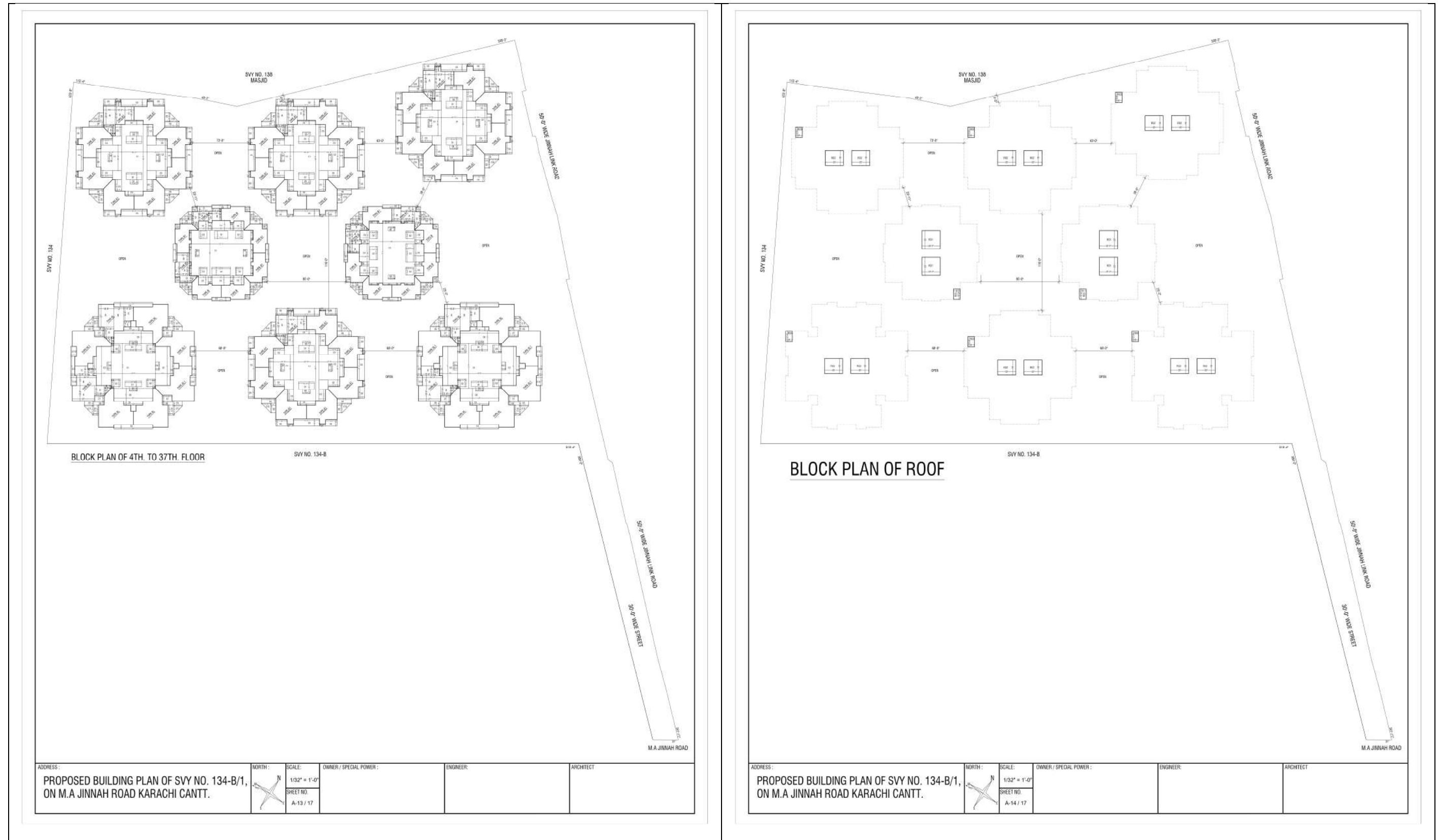












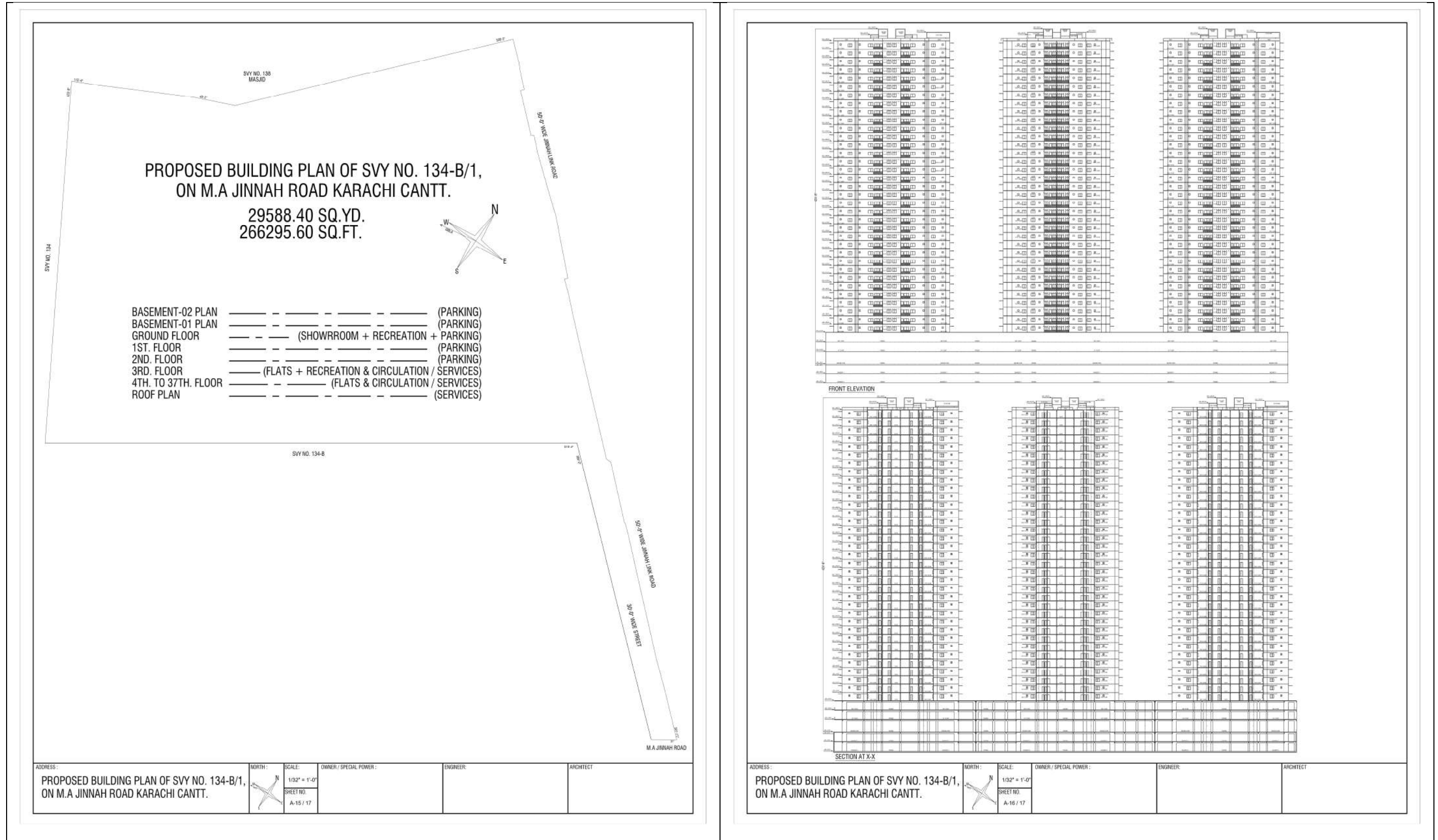


Figure 2.2: Submission Drawing

2.3 Construction & Commissioning

2.3.1 Pre-Construction Phase

This is an essential phase that provides the basis for the construction program, the methodology to be adopted and the technologies to be involved. The project site has been assessed in terms of its geology, seismicity and seismo-tectonics. A detailed geo-technical investigation was conducted and load bearing capacity of the soil was established.

A detailed soil investigation report of the project site is attached at Annex-II.

2.3.2 Construction Phase

The construction activity on the Project will commence with the approval from Sindh EPA. Besides, all necessary formalities will be fulfilled and NOCs from different departments will be obtained.

Standard & environmentally compatible construction materials (cement, sand, steel reinforcement, bricks etc.) and techniques/construction practices will be employed besides adopting Standard Operating Procedures (SOPs).

2.3.3 Standard Operating Procedures (SOPs)

2.3.3.1 Structure Works

2.3.3.1.1 Dismantling of Pile Heads:

- Correct cutting levels will be marked using survey instrument and a cut along the marking will be made with cutting disk at least 4 centimeters into the core. Pile heads will be cut using hilti breaker machines up to required depth. Debris will be removed from site using trolleys.



2.3.3.1.2 Excavation, Backfilling & Dewatering:

- Excavation of raft foundation and footings shall be carried out with mechanical means by using excavators and front-end loaders in one go. All excavated material which is unsuitable, and or is not required for backfilling, shall be disposed of from the site as directed by the Engineer through mechanical dump trucks. Earth shoring/retention for the excavation during the entire period of construction shall be carried out as required.
- After excavation for foundation removal of water (dewatering) will be performed using Donkey Pump to avoid rise of water level which may weaken strength of foundation. For backfilling works, excavated material will be backfilled in layers and compaction will be done on every layer.



2.3.3.1.3 Laying of OFM Concrete Works:

Lean Concrete:

- All non-structural concrete such as lean concrete and other binding concrete shall be carried out using ready mix concrete where cement shall be provided by Owner. This being a non-structural concrete does not require vibration however Roding, ramming and floating as required shall be performed. Curing of such concrete shall be carried out by making bunds with sand/earth on all surfaces of the concrete and pounding it with water.

Raft Foundation, Columns/Shear Wall, Beams, Slab, Lift Wall & Stairs, UG, OHWT & Septic Tank:

- All formwork activities will be carried out in accordance with the specification.

- After studying the structural drawings, the Project Engineer will plan for sizes, numbers and type of formwork to be used in consultation with the Structural Engineer, if required. Depending upon the programme, the number of repetitions will be decided.
- Availability of formwork will be checked with the Procurement Manager and decision will be taken to buy, hire or reuse formwork material.
- During fabrication of formwork shutters, all dimensions shall be cross-checked with a view to avoiding corrective action during erection.
- Paint reference numbers on all panels to ensure their use in correct positions.
- Ensure that the props, shores, waling, bearers, clamps and tie rods are the right size and at the correct spacing. The Formwork designer shall check the formwork system with respect to load imposed on it and design parameters as laid down in the specification.
- Check quality of shutter lining, tightness of bolts and wedges, built-in items, inserts and other embedment.
- Tie – rod holes to be made in the formwork shall be neat so that they can be patched or plugged later on.
- Particular attention will be paid to the rigidity and line of stop ends and joint formers.
- Remove all tie-wire clippings and nails, which may stain both the formwork and the concrete.
- Ensure that adequate access and working platforms are in place for the concreting gang and that toe boards and guardrails are provided.
- A spreader or lifting beam shall be used to prevent distortion when placing formwork.
- Adjustable steel props shall be erected in plumb and verticality of props checked using a spirit level.
- A prop should not be used if it is bent, creased or, rusted or has a bent head or base plate, damaged pin etc.
- Proper release of agent shall be used so that it can be removed without damaging the surface finish of the concrete.
- A close watch shall be kept on all wedges and fastenings. Make sure that they do not work loose. Grout loss is an indication that some movement has occurred.

Safety during Formwork Operations:

- The weights of large prefabricated sections of formwork should be marked on them so that the lifting capacity of the crane at the working radius is not exceeded. Lifting points are usually provided.
- Fire extinguishers in working order shall be in close proximity to the stored formwork.



- The quantity of concrete is calculated and requisition will be made. On the approval of requisition, the batch mix is ordered to the ready-mix concrete supplier provided with the required Compressive strength of concrete.
- The ready-mix supplier calculates the design mix of concrete required to achieve the specified strength. The required revolutions for mixing of concrete and slump are calculated by estimating the distance of ready-mix plant with the placement site. The concrete is then placed in the tilting mixer, which then transports the concrete to the required job site.
- The arrangements for placement of concrete are done at site in due course of batching and transportation of ready-mix concrete at job site. The labours are equipped with proper PPE's and required tools are provided to them for effective placement of concrete at the required area. Before the arrival of ready-mix vehicle, proper pathway is maintained to ensure the operation of vehicle at the designated location.
- The concrete shall be compacted by using mechanical vibrator for the required time. Over vibration shall be avoided in wet concrete mix to avoid segregation of concrete. On the other hand, lesser vibration might result in air voids/pockets left in concrete which may result in honey-combing of concrete.
- Approved admixture is used during large concreting activities to increase the setting time of concrete. The slump test is carried out at site to check the required slump of concrete for the activity and water-cement ratio to obtain the required workability of concrete.
- The concrete cubes/cylinders are prepared for the standard testing procedures in order to check the required compressive strength of concrete via the approved testing laboratory/in the on-site lab. A pour slip/check request shall be prepared and signed by the Engineer prior to every concreting activity for official documentation of the type and location of concrete.
- The finishing of concrete shall be done as per the required surface. If the concrete is to be placed in foundation.
- The curing of concrete will be done by wet jute bags (vertical members) or by ponding over the slab (horizontal members). The concrete shall be cured for

the required amount of time depending upon the type of structure in order to achieve its desirable strength. The curing of concrete can also be done by using self-curing compounds during the preparation of concrete (as specified /approved by the Engineer).



Fixing of Steel Reinforcement

- A bar bending schedule will be prepared by project engineer according to IFC drawings. Then it will be checked and verified by consultant's representative. After the approval of bar bending schedule, steel bars will be cut in required sizes by laborers. Steel bars will be transported to required location using hoist/ tower crane. Steel will be fixed according to drawing and will be bind using binding wires. All safety precautions will made in cutting, transporting and fixing of steel bars. Once the steel will be fixed, it will be check by consultant's representative, and will get approved for pouring of concrete.



2.3.3.2 Finishing Works

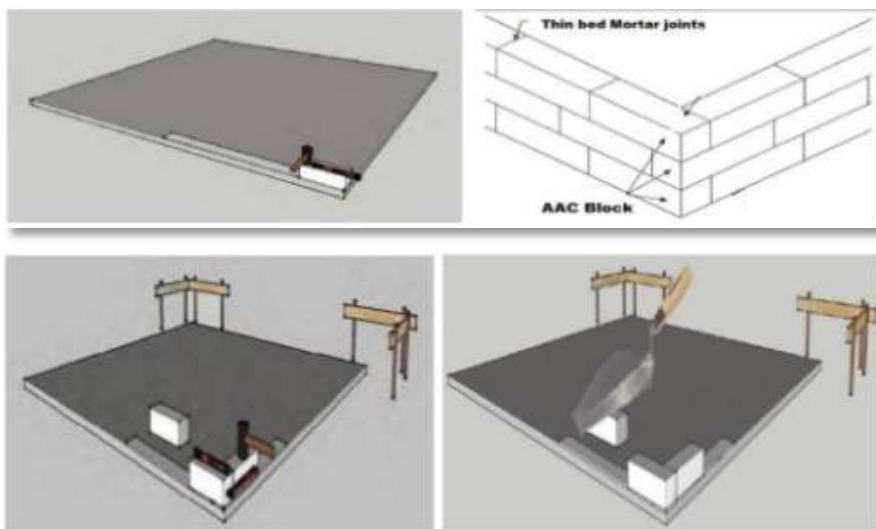
2.3.3.2.1 Masonry Works

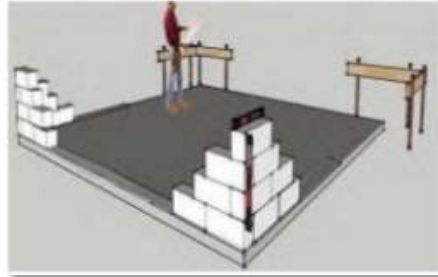
- OFM ACC Blocks installation shall start by laying out wall lines on building slab by control lines. At the highest corner of the slab, a full width ½" deep sand-cement mortar joint shall be placed using a masonry trowel. If moisture and

wicking occur, water resistance mixtures shall be added to sand-cement mortar ensuring top level of all blocks to be at the same height.



- First corner block shall now be set in sand-cement mortar and adjusted as needed. To achieve the required height, the block shall be raised or lowered by tapping down with a rubber mallet or by adding additional mortar beneath. Similarly, second corner block shall be set with $\frac{1}{4}$ " notched trowel. Subsequent steps shall be repeated for each corner using a builder's level to maintain an equal elevation. Triple check at each lead corner in all three planes shall be done.

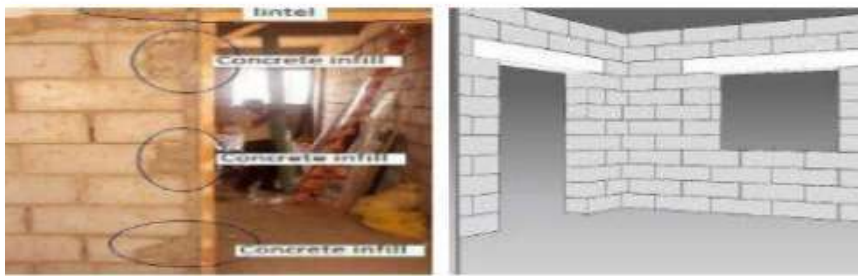
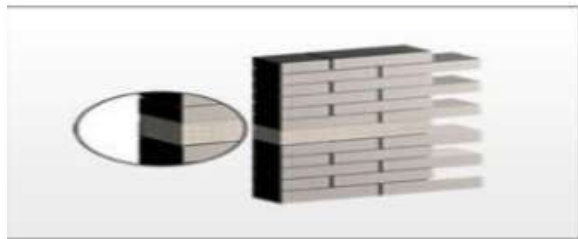




- After setting up the corners, remaining wall shall be built up with the proper measure so that no space is left between the blocks. An overlapping of the block shall be done with the center of the other blocks. After every 5-6 level of blocks a lintel has to be made with just two 6-8mm iron rod and a proper measurement has to be done to get the wall completely horizontal.



- Lintels where required shall be installed with a minimum 8" bearing (overlap). End bearings for lintel should normally be not less than 8". Concrete spreaders or pad stones shall be incorporated where stresses under lintel will exceed permissible values. Lintels shall be provided on top of doors and windows. Concrete in fill shall be recommended where door is attached to the wall.



- Anchors used with AAC shall be made of plastic or nylon. To make holes for fasteners power drills shall be used. For electrical conduits and piping

installation, a chase shall be cut using an electrical router or a chasing tool. A power drill or router can be used to install an electrical box.



2.3.3.2.2 Internal Plaster ½" thick

- Application of plaster is the final surface of structure provide leveled and / or designed surface to beautify, hide defects or repairs and protect structure, must have an appealing look. It is mainly based on the surfaces prepared prior. ½" thick plaster with a ratio of 1:4 cement sand internal plaster will be applied including approved water proofing chemical. It is important to prepare the prior surfaces well in level and plumb.



- Ceiling plaster will not be done due to use of marine ply in formwork.

2.3.3.2.3 Tiling Works

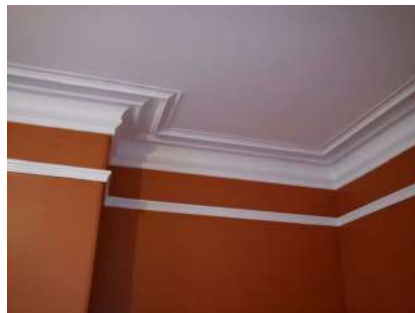
- Different floorings are proposed for multiple uses. The Tiling works include ceramic tiles in bath & kitchen and, porcelain tiles for flooring and skirting.

- Chemically pre polished readymade marbles would lay on a 1-1/2" thick (for flooring) and ¾" thick (for skirting) fresh layer of mortar, stuck tiles by spreading rich cement slurry over base leaving grooves between tiles grouted with colored cement slurry to match tile shade.
- Plain CC floor will spread to maintain the proper slope towards floor traps or as directed, and will make them nonporous by spreading cement slurry then would divide in squares by marking a straight string.



2.3.3.2.4 Internal Paint Works

- Application of painting of approved shades on prepared surfaces gives building a beautiful appearance to eyes; as well it protects plastered surfaces from atmospheric changes and may renew the appearance without any loss of structure.
- Process of painting will start by preparing plastered surfaces free of dents and cracks by spreading putty coat evenly and then will level by rubbing with sand paper. Plastered surfaces will be treated with lime wash before application of distemper. Where weather shield paint will be applied on exterior plastered walls or tapered surfaces.



2.3.3.2.5 Polish Work for Doors Frames Only

- Application of polishing is the process of creating a smooth and shiny surface by rubbing it or using a chemical action, leaving a surface with a significant specular reflection.
- Polish material will be shake well and then sprayed onto the surface of doors frames. Then it will be wiped immediately with a clean cloth and buffing will be continued until the required shine is achieved.



2.3.3.3 Plumbing Works - OFM

2.3.3.3.1 Water & Drainage Piping including Valves

- Pipe lines will be marked in ground line with operating drawing and supply barricading.
- Trenches will be excavated to needed depths as per operating drawings.
- Base of trench will be prepared for laying pipes, as per technical specifications.
- Pipes will be laid on the prepared base and support them at adequate intervals.
- Pipes will be tested for leaks harassed within the presence of consumer's representative and maintain a 'test certificate' punctually signed by the representatives of the client and contractor.
- Provide encasement with sand/granular material, if specified.
- Trenches will be backfilled in layers including compaction.
- Pipes will be hanged from ceiling using hanging accessories and will be joined with each other using suitable material.
- For plumbing works inside building area, pipelines will be marked on walls as shown on the working drawing.
- The walls will be chiseled to required depth using a chiseler machine.
- Piping will be assembled beginning from branch left in shaft and introduce in the wall with braces.

- Fixture will be located according to working drawing and tile-module drawings. Title modules will be marked on walls by the civil contractor.
- All openings will be plugged and pipe work will be tested for leaks under specified pressure and for required duration.
- Hot water pipes will be insulated with the specified material.
- Positions of waste outlets will be located and marked, and core drills will be made where necessary.
- Pipe headers will be assembled and connected to branches left in the shaft for this purpose.
- All open ends will be plugged to prevent ingress of construction debris.



2.3.3.3.2 Fixing of Bathroom Fixtures

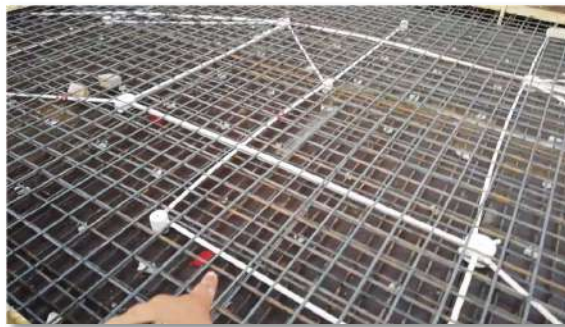
- Fixtures, taps and toilet accessories will be installed. Screws with nylon washers will be used to repair vitreous crockery and PTPE tape for installation of taps to pipe work.
- CP fittings will be checked for leaks and firmness. Proper tools will be used, so that no scratches or any other kind of damages on the chrome plated fixtures should occur.
- All bathroom fixtures including taps, basin, commode, etc. will be handled and fixed with great care to avoid its damage.



2.3.3.4 Electrical Works - OFM

2.3.3.4.1 Electrical Conduits

- Electrical conduits will be laid on shuttering, prior to the laying of concrete. Additional security will be provided near to every box and at intervals by binding short lengths of binding wires, twisted around the conduit and reinforcing steel. The conduits shall be adequately fixed to prevent excessive movement and damage during the pouring and setting of concrete and shall be protected from mechanical damage.
- Where conduits are left "open ended" prior to wiring they shall be protected by caps or plugs to prevent the ingress of building material.
- All conduits run will be designed to permit wiring to be readily installed after the complete erection of the conduits through the available draw-in, accessory and luminary suspension boxes.
- It will be ensured that conduits are not concealed until works has been inspected and approved. Ensure that conduit and fittings buried in concrete or behind plaster are protected against corrosion or electrolytic action prior to rendering.



2.3.3.4.2 Wiring

- A loop in form of wiring shall be used as far as practicable or unless otherwise indicated. Joints in conductors shall be made using insulated terminal blocks complying with requirements of this specification.
- At expansion joints adequate slack shall be left in the cable.
- Where conduits are installed for wiring by others, a draw wire shall be provided between each draw in position.
- Where three-phase circuits comprising single-core cables are installed in trucking, all cables shall be tied together at intervals.
- Cables forming part of alarm, control, communication or monitoring circuits shall have identification sleeves at their terminations. Identification shall be consistent with the relevant wiring diagrams.



2.3.3.4.3 Fixing of D.Bs Boards, Switches & Holders

- Switch boards will be fixed on previously installed boxes and wires will be connected to switches and sockets.
- Distribution boards will be fixed on locations indicated in working drawings as per approval of consultant.



2.3.3.4.4 Wiring & Fixing of Intercom

- An intercom system has one major focal point: the master station. It contains the electronic circuitry for the voice communications.
- A typical installation consists of a master station installed at a convenient location, several indoor substations, and an outdoor substation.
- In some intercom sets, all operations are controlled by the master station: power on/off, radio on/off, and call station selection.
- Wiring for intercom will be done in the same manner as electrical wiring and owner provided intercom sets will be placed/ fixed at required locations.



2.3.3.5 Construction Material and other Supplies

Main construction material to be used during the construction phase will include ready mix concrete that will be sourced through reputable companies. Additionally, paints, glass, wood, tiles, aluminum, PVC/GI pipes, concrete/cement pipes, electric cables, etc. will be used during 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. Other general supplies transported will include office & camp supplies (food etc.) fuels, oils & equipment maintenance parts.

2.3.3.6 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 will not be used.

2.4 Plumbing System

2.4.1 Design Codes & Standards

The plumbing system will be based on the following codes & standards:

- International Plumbing Code 2012.

- American Society for Plumbing Engineers (ASPE) Handbook – 2010.
- Karachi Cantonment Board Bye Laws.

2.4.2 Scope of Plumbing System

The scope of plumbing services is as follows:

- Potable Water Supply
- Soil & Wastewater Drainage
- Septic Tank/Wastewater Treatment Plant
- Storm Water Drainage
- Natural Gas Supply.
- Irrigation Water Supply

2.4.3 Estimation of Water Requirements & Storage Arrangements

The project is meticulously planned to ensure robust water management, encompassing potable, non-potable, and emergency reserves. Based on the residential and commercial components, the estimated daily potable water requirement is significant. With a total of 2208 residential flats, housing an average of 6 persons per flat, the residential population totals 13,248 individuals. At a rate of 35 gallons per person, the daily residential potable water demand is approximately 463,680 gallons. For the 803 commercial shops, assuming an average of 10 persons per shop, the commercial population is 8,030 individuals. At a rate of 15 gallons per person, the daily commercial potable water demand is approximately 120,450 gallons. Therefore, the total estimated daily potable water requirement for the entire development is approximately 584,130 gallons. This demand is well-supported by the installed infrastructure, which includes an Overhead Water Tank dedicated to potable water with a capacity of 209,405.22 gallons, ensuring an ample supply of drinking water for immediate use. Complementing this, an Underground Water Tank provides a substantial reserve of 401,156.22 gallons of potable water, designed to ensure a consistent supply of clean drinking water for all occupants. The combined potable water storage capacity of 610,561.44 gallons provides a healthy buffer above the daily estimated requirement, ensuring reliability. Furthermore, non-potable water needs are addressed by an Overhead Water Tank with a capacity of 186,117.72 gallons, serving various utility purposes, and an Underground Water Tank with 360,674.99 gallons designated for use in irrigation and other non-drinking applications. Critical fire safety preparedness is ensured through dedicated tanks, with an Overhead Water Tank holding 137,047.08 gallons and an Underground Water Tank holding 286,359.37 gallons, crucial for ensuring safety and swift response in emergency situations. Finally, waste management is efficiently handled by an Underground Water Tank (Septic) with a capacity of 206,265.60 gallons.

2.4.4 Potable Water Supply System

2.4.4.1 Source of Water

The project's primary potable water source is designated as KWSC, with the proponent having already remitted the challan fee for a regular connection. However, the actual supply from KWSC mains is contingent upon the completion of the KIV project. In response to growing water scarcity in Karachi, exacerbated by expanding requirements and climate change impacts, Mega Residency Pvt. Ltd engaged professional consultancy services. An electrical resistivity survey was subsequently performed to assess subsurface geological conditions and evaluate the area's groundwater potential.

The survey identified six primary geoelectric layers: Alluvium, Sand, Limestone, Clay, sandy limestone, weathered Manchar Formation, and fractured sandstone beds of the Middle Miocene Gaj Formation. These formations are well-established regional aquifer hosts, presenting favorable conditions for sustainable groundwater extraction. Integrated geological and resistivity interpretations from all ten ERS locations (ERS-01 to ERS-10) indicate a very good groundwater potential, characterized by notable thicknesses of water-bearing sandy and sandy-limestone strata. Resistivity signatures further confirm the presence of fresh to brackish groundwater within the target aquifer depths.

Based on this subsurface evaluation, a test borehole of 800-1000 ft is strongly recommended within the identified productive zone. The expected groundwater yield is approximately 100 US gallons per minute (gpm), subject to confirmation through drilling, geophysical logging, and pumping tests. The principal aquifers encountered, including the Alluvium (Sand Bar Deposits), Gaj Formation, and Manchar Formation, collectively form a reliable groundwater system suitable for long-term use. A detailed report providing further information is presented in the annexure.

2.4.4.2 Underground Water Storage Tanks (UGWT)

- The total domestic water storage capacity of the UGWT system will be approximately 401,156.22 gallons.
- The UGWT facility will be designed with two compartmentalized sections to enable isolation during maintenance operations.
- Water will be supplied to the UGWTs from both tanker deliveries and the municipal network, with all incoming flows subject to metering.

2.4.5 Soil & Wastewater Drainage System

- All sanitary and wastewater shall be collected through a system of horizontal drains that run-in slope and connect to vertical stacks.
- The design shall be based on a double stack system.
- All piping to run below slab and false ceiling will be done to hide these pipe runs.
- The drains from the kitchen sinks, floor drains and wash basins shall be connected to the waste piping.
- The wastewater through the wastewater risers will be stored in wastewater storage tank.
- The waste shall flow by gravity to the STP.
- The treated water will be pumped to the treated water tank.
- The treated water is then pumped to OHWT specifically designated for non-potable water storage. This wastewater will be used for Flushing of WC's.
- A makeup water supply line will be provided to the non-potable in case the wastewater treatment plant is not operational for any reason.
- The soil risers will be combined at the ground floor level via series of manholes and will then divert into a septic tank which shall be designed for a retention period of 24 hours.
- From the septic tank, the discharge will be connected to the nearby drain/nalla.
- Vents shall be taken from the main soil and waste risers.
- All balconies will have a drain outlet.

2.4.6 Storm Water Drainage System

- The storm water stacks shall be designed for a 15-minute storm water duration with a storm intensity of 3.5 in/ hour.
- The roofs of the development shall be sloped to the edges where rainwater gutters shall direct the water to drainage stacks through roof drains.
- The ultimate disposal will be from 1st floor to ground floor from where it will be lead out of the property either to the main drain channel or to the hard landscape area outside the plot.

2.4.7 Natural Gas

- Project will have provision of gas connection from SSGC.
- Natural gas supply to each unit shall be metered by installing individual gas meters.

2.4.8 Irrigation System

- The client will have the landscape designed by a specialist landscape designer.

- Design for water supply and drainage for the landscape areas shall be carried out subsequently.
- Currently, it is proposed that the irrigation for external landscape shall be carried out via treated wastewater.

2.5 Fire Fighting System

2.5.1 Design Codes & Standards

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

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

2.5.2 Scope of Fire Fighting System

- Portable Fire Extinguishers
- Fire Hose Reels
- Fire Hydrants and Landing Valves
- Automatic Fire Sprinklers
- Automatic Fire Pumps

2.5.3 Portable Fire Extinguisher

- Portable Fire Extinguishers shall be strategically located next to the fire hose reels throughout the building to cover all the spaces.
- Two types of extinguishers shall be installed
 - Dry Powder
 - Carbon Dioxide

2.5.4 Fire Hose Reel

- 1-inch dia. x 100 ft long hose reels shall be located near to stairs/in the lobby at each floor, to provide complete protection at each point on the floor for first-aid firefighting. Fire hose reels are designed to allow all occupied areas to be within the range of 20ft of the nozzle.

2.5.5 Fire Hydrants & Landing Valves

- Fire Hydrants shall be installed as per NFPA-14 and shall be located in every mid-landing in stair-cases
- These shall be provided with the quick – connect couplings compatible to Pakistan Fire Brigade use.

2.5.6 Fire Brigade Inlet Connection

- Fire Brigade inlet connection shall be provided at the Ground Level.
- These connections shall allow the Fire Brigades to their water supplies & pump into the Fire Suppression System.

2.5.7 Automatic Fire Sprinkler

- Automatic fire sprinklers shall only be installed in retails at ground floor.
- Automatic fire sprinklers operate selectively wherever there is a fire, and are the best defense against fire; one that works automatically without human intervention.

2.5.8 Automatic Fire Pumps

- Fire Pumps shall be installed and connected to the tank having fire reserves of 105,000 gal to provide one hour of in-house firefighting capability.
- Secondary reserve is also provided on roof.
- Main Pump shall be operated electrically with controller.
- Standby Pump shall be Diesel Engine operated with controller.
- Jockey Pumps shall be electrically operated with controller.
- All the Pumps shall be UL listed and FM approved.

2.6 HVAC System

2.6.1 Scope of Works

- Refrigerant Piping
- Condensate Drain Piping

2.6.2 Refrigerant Piping Works

- Refrigerant piping shall be done in each unit from the locations proposed by architect for the placement of indoor units to the outdoor units.
- All piping will be surface mounted and will only be concealed via architectural elements and features. No pipes shall be concealed in the wall.

2.6.3 Condensate Drain Piping Works

- Surface run drain line shall be connected to the nearest drains in the toilets or to the balcony drain.

2.7 Electrical Works

2.7.1 Design Codes & Standards

- BS 7671 Requirements of Electrical Installations. IET Wiring Regulations
- National Electric Code
- Pakistan Electricity Rules
- Pakistan Building Code

2.7.2 Scope of Works

The scope of work related to Electrical Works is as follow:

1- Electrical Works

- Main Electrical Distribution system
- Standby Power Supply/D. G Sets
- Earthing/Lightning Protection
- Illumination Design/Small Power
- ELV Systems comprising of:
 - Data/Tel./Cable TV/Internet
 - CCTV (In Common Areas/External Area)
 - Fire Alarm (In Common Area)
 - Intercom System

2- Vertical Transportation

2.7.3 Electrical Distribution Network

- Space for KE Sub Station as per KE specs/requirement, has been marked on ground floor.
- Individual Metering to be provided by KE.
- Meter Locations has been proposed on ground floor. Common facilities Meters also be placed in same location.
- KE power supply to individual Locations (Appt. Distribution Boards) shall be done by LV power cables running through dedicated Shafts/Electrical Rooms provided on all floors.

- For the Common Areas/Services, DB shall be located in the respective Elect Rooms/Elevators Machine Rooms.

2.7.4 Emergency Power Supply

- The Emergency power supply for the showrooms/units shall be through dedicated DG SETS.
- All lights of common areas/facilities/ elevators, Water Pumps and other critical loads to be identified will also be on emergency power supply.
- The DG sets shall be auto start/synchronized with Load.
- While KE supply shall be charged /payable to KE, Emergency Power Supply bill for the common areas /facilities shall be shared among all owners.

2.7.5 Earthing and Lightning Protection

- Earthing Design shall be based on a TN-S system in compliance with requirements.
- Lightning protection shall be designed on Faraday Cage principle or protected by Early Streamer Protection device.
- Earthing/Lightning protection shall be designed in consultation with Client's Team.

2.7.6 Lighting and Small Power

- Light points/Fan Points shall be provided in coordination with Architect and Furniture layout. Switches & sockets shall be part of furnishings by Developers.
- Parking/Common Areas /Elect. and Mechanical Spaces and Landscape, Security lighting etc. shall be designed to meet the recommended levels utilizing LED lights with individual group switching controls.
- Battery backed maintained exit lights and 10% of the lights for Emergency purposes shall be provided.
- Obstruction Light as per recommendation of CAA, if required, shall be provided on roof top.

2.7.7 Extra Low Voltage (ELV) Systems

- A complete ELV system covering VOICE/INTERNET/CABLE TV shall be provided through STRUCTURED CABLING/DISTRIBUTION DEVICES to each occupant.
- For these requirements, a flexible system shall be opted in order to minimize any additional rework on completion of infrastructure. Fiber Back Bone/PRI from PTCL and coordination with other service Facility Providers shall be done for finalization.

- For the Proposed ELV system cabling riser and passive device, ELV cabinet has been proposed on each floor. Individual Cables run and further distribution from here to each unit at designated location.
- Fire Alarm system shall be provided in common areas/recreation area.
- Manual call points/fire bell shall be provided near emergency staircases / sensitive locations. Main FACP shall be located in the control/ security room for monitoring.

2.7.8 Building Security

- Intercom from security desk at ground floor to each individual unit for facilitation to visitors/ occupants shall be provided.
- CCTV cameras at Bldg. entrance/perimeter/Lift Lobbies/stair cases shall be provided with monitoring at Security Desk on 24 Hrs. basis.
- A close circuit television (CCTV) surveillance system shall be provided to monitor activities in a large number of diverse locations simultaneously. The system will be PC based with recording facility. A bank of monitor screen will be provided in the security control room. 24-hour recording facility will also be provided.
- CCTV cameras shall be strategically placed to monitor not limited to following locations:
 - External Entrances
 - Parking Exit/Entrances
 - Lift/Stair Lobbies
- Cameras shall be of the color type and generally with fixed mounting. All cameras signals shall be wired back to a Console located at the ground floor. he Console shall house the following basic equipment.
 - Digital Video Recorders
 - LCD Monitors



2.8 Vertical Transportation

- CODES: BS / EN-81
- Building shall have 02 Nos. passenger elevators (G.F to top level) with a separate 01 elevator as a service/stretchers elevator to handle the patient during emergencies.
- Service/Stretchers Elevator shall also be fire rated and shall serve as a purpose of rescue in case of fire.

2.9 Solid Waste Disposal

All on-site solid waste will be collected daily by a designated contractor responsible for its proper disposal. Numerous trash bins will be strategically placed throughout the building. Additionally, a garbage chute system is integrated into the project's design.

2.10 Illumination

Combination of low consumption, high efficient TLD and Compact fluorescent lamps shall be used for units/showrooms (Lift Lobbies, Staircase, Electro-mechanical plant rooms, car parks, corridors and passages). The lighting layout shall be designed to meet the recommended lighting levels as per prevailing international standards.

2.10.1 Internal Lighting

The general principles that underpin the lighting scheme are listed below.

- Maximize the opportunities afforded by natural light.
- Provide adequate and appropriate levels of light for the functions and activities of different areas.
- Provide a balance between functionality, colour, texture and contrast.
- Provide an appropriate expression of the architecture within the building and outside of the building.
- Limit environmental impact and light pollution.
- Use low energy technologies wherever possible and appropriate without compromising visual comfort and utility.
- Use of long-life source to assist in the reduction of maintenance costs.
- Limit the number of lamp and equipment type to assist in the reduction of maintenance costs.
- Use automated lighting control, presence detection and similar facilities to manage energy.

- Integrate with other systems to provide for the requirements of emergency lighting, fire alarm, security and cleaning, etc.
- Integration with ceiling systems and mechanical designs.
- The appropriate lamp selection will take account of:
 - Lighting output
 - Colour rendering index
 - Colour temperature
 - Life
 - Cost in use
 - Environmental impact
 - Recommended applications
 - Flexibility of the system

2.10.2 External Lighting

The exterior lighting system serves three functions for the movement of vehicles and pedestrians over frequented route and places:

- Security
- Safety
- Representational lighting

Provide lighting for all primary & secondary roadways and other areas where pedestrian and vehicular traffic occurs. Circuits are arranged so that no single circuit failure will cause any two adjacent lights to fail.

2.10.3 Emergency Lighting

Emergency lighting is part of the safety network of any premises which also includes fire alarm, sprinkler, firefighting equipment, etc. the purpose of emergency lighting is to ensure that lighting is provided promptly, automatically and for a suitable time in a specified area when the normal power supply to the normal lighting fails (or switched “off” during fire conditions).

The emergency lighting is categorized in three sections as follows:

- Emergency escape lighting – for safe exit from location;
- Open area lighting – reducing the likelihood of panic & enabling safe movement towards escape routes;
- High risk task area lighting – illumination for the safety of people involved in a potentially dangerous process.

The emergency lighting installation will be designed to comply with the above – mentioned standards. A minimum of 1 Lux is required within defined escape routes and 0.5 Lux in open plan areas. The emergency lighting will have a minimum duration of three hours.

Emergency lighting is designed and placed on the escape route, fire alarm call points, all firefighting equipment and indicating the various obstructions to escape. The design of the escape lighting fulfils the following functions:

- To indicate clearly and unambiguously the escape routes;
- To provide illumination onto and along such routes as to allow safe movement towards and through the exists provided to a place of safety;
- To ensure that fire alarm call points and firefighting equipment provided along escape routers can be readily located and used.
- An emergency resulting from breakdown of the automatic lighting system will be dealt with by the contingency plan.

2.11 Telephone System

- Multi-pair Copper cable from PTCL will be terminated at Main Distribution Frame (MDF). This MDF will be under control of PTCL.
- Multi pair telephone cable for each floor shall run from MDF and terminated at floor IDF from where 4-pair UTP CAT-6e cable will be provided to users.
- RJ-11 telephone, simplex, telephone outlet will be provided to all units.

3. Statutory Requirements

Presented in this section are the Policy, Legal and Administrative Framework applicable to Project in the context of sustainable development. All legal provisions relevant to environmental protection applicable to the planning, construction and operation were identified under the scope of the EIA. The proponent has to be well aware of these requirements and comply with the provisions as applicable and necessary. Besides applicable laws orders of the Courts passed in recent past which have direct implications for building construction industry have also been discussed in this chapter. Legal status of the title documents, no objection certificates issued by or required from concerned departments are also vetted in this chapter.

3.1 Legal Status

The proposed project is situated on a commercially zoned plot that has been thoroughly detailed in the introductory chapter. The current lease on this plot is valid and includes provisions for renewal. The proponent has successfully obtained all required no objection certificates from relevant authorities.

Although the proponent possesses a valid lease and NOCs / letters from major utility agencies, the project must still pass a critical evaluation to ensure compliance with recent Supreme Court orders. The Supreme Court of Pakistan has consistently upheld the right to a safe environment, emphasizing that the right to a clean and healthy environment is integral to the fundamental right to dignity protected by Article 14 of Pakistan's Constitution.

In historical context, the Supreme Court's decision in the Shehla Zia vs. WAPDA case showcased the significance of these rights. Recently, in petitions related to water and sanitation issues in Sindh, the Court temporarily banned the construction of high-rise buildings in Karachi to ensure these critical infrastructures were improved. Although this ban was later modified, the conditions that led to the initial restriction remain, meaning project approvals could still be denied on these grounds. Furthermore, a complete ban on land use changes throughout Karachi was imposed by the Court in another petition, leading to significant restrictions on the conversion of plots from one use to another.

However, evaluating the current project against these two precedents suggests it is feasible, as all relevant utility agencies have confirmed the availability of infrastructure necessary for the project and it is based on a commercial plot without any land conversion issues.

3.2 Administrative Framework

Before the 18th amendment in the Constitution of Pakistan, the environmental issues were governed under the federal regime through Pakistan Environmental Protection Act, 1997. As a result of the 18th Amendment this subject is now in the exclusive domain of the provincial government. The Ministry of Environment at the federal level was abolished. Its functions related to national environmental management were transferred to the provinces. To manage the international obligations in the context of environment, a new ministry - the Ministry of Climate Change – was created at the federal level. As of now, all four provinces have enacted their own environmental protection laws.

For Sindh province, the Sindh Environmental Protection Act, 2014 (SINDH ACT NO.VIII OF 2014) was passed by the Provincial Assembly of Sindh on 24th February, 2014 and assented to by the Governor of Sindh on 19th March, 2014 and published in official gazette on Thursday March 20, 2014. (Hereinafter the Sindh Environmental Protection Act, 2014 is referred to as the “2014 Act”).

Under the 2014 Act, the Environmental Protection Council (the “EPC”) has been formed consisting of Chief Minister as Chairman with Minister in charge of Environment Protection Department, Addl. Chief Secretary, Planning & Development Department, Government of Sindh and Secretaries of Environment, Finance, Public Health Engineering, Irrigation, Health, Agriculture, Local Government, Industries, Livestock & Fisheries Forest & Wildlife, Energy, Education Departments Government of Sindh and Divisional Commissioners of Sindh. Non-official members are also included (i.e. representatives of Chamber of Commerce & Industry and from medical or legal professions etc.) along with DG, EPA & two Members of Provincial Assembly also form part of EPC.

The EPC within the framework of the 2014 Act acts as a policy making body. The functions and powers of EPC include coordination & supervision of provisions of Act, approving provincial environmental & sustainable development policies & SEQs, provide guidance for protection & conservation, consider annual Sindh Environmental Report, deal with interprovincial and federal provincial issues, provide guidance for bio safety & assist Federal Government in implementation of various provisions of UN Convention on laws on Seas (UNCLOS).

Sindh Environmental Protection Agency (the “SEPA”) establishes under the provisions of the 2014 Act is headed by Director General (DG) with the aim to exercise the powers and perform the functions assigned to it under the provisions of the 2014 Act and the rules and regulations made there under. The SEPA acts as the executive body of the provisions of the 2014 Act. It has technical and legal staff and may form advisory committees. SEPA requires preparing environmental policies, taking measures for implementation of environmental

policies, preparing Sindh Environment Report and preparing or revising Sindh Environmental Quality Standards. It also establishes systems and procedures for surveys, surveillance, monitoring, measurement, examination, investigation research, inspection and audit to prevent and control pollution and to estimate the costs of cleaning up pollution and rehabilitating the environment and sustainable development. SEPA would also take measures for protection of environment such as to promote research; issues licenses for dealing with hazardous substances, certify laboratories, identify need for or initiate legislation, specify safeguards etc. SEPA would also encourage public awareness and education regarding environmental issues. SEPA has powers to enter or inspect under a warrant issued by Environmental Protection Tribunal or a Court search at any time, any land or building etc. where there are reasonable grounds to believe that an offence has been or is being or likely to be committed. SEPA may also take samples, arrange for testing or confiscate any article in discharge of their duties.

The 2014 Act also provides for establishing Sindh Sustainable Fund derived from various sources such as voluntary contributions or fees generated etc. This fund is utilized for protection, conservation or improvement of environment.

Under the 2014 Act and rules and regulations made there under a complete framework for pre and post approval is given, which a proponent of project requires to comply with.

3.3 Statutory Framework

As stated supra after 18th Amendment in Constitution of Pakistan, 1973 subject of environmental protection is devolved to the provinces and all provinces have enacted their own provincial environmental protection acts, rules and regulations. Now all matters related to environmental protection are governed under respective provincial environmental protection laws. However, it would apposite to give here a brief history of the development of statutory environmental framework in the Country. Prior to the 18th Amendment to the Constitution of Pakistan in 2010, the legislative powers were distributed between the federal and provincial governments through two 'lists' attached to the Constitution as Schedules. The Federal list covered the subjects over which the federal government had exclusive legislative power, while the 'Concurrent List' contained subjects regarding which both the federal and provincial governments could enact laws. The subject of 'environmental pollution and ecology' was included in the Concurrent List and hence allowed both the national and provincial governments to enact laws on the subject. However, as a result of the 18th Amendment this subject is now in the exclusive domain of the provincial government. The Ministry of Environment at the federal level was abolished. Its functions related to national environmental management were

transferred to the provinces. To manage the international obligations in the context of environment, a new ministry - the Ministry of Climate Change – was created at the federal level. The PEPA 1997 is no longer applicable to the provinces. The provinces have enacted their own environmental protection laws. These provincial laws are largely based on PEPA 1997 and, hence, provide the same level of environmental protection as the parent law. Between 1993 and 2010, the Pak-EPA promulgated several rules, regulations, standards, and guidelines to implement the provisions of the PEPA 1997. The province of Sindh has made its own rules and regulations. However, sectorial guidelines made under PEPA 1997 are still useful document to benefit from.

Sindh EPA has taken lead in finalizing and notifying the Sindh Provincial rules, regulations and standards.

- On December 16, 2014, SEPA enacted the Sindh Environmental Protection Agency (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2014 (the “IEE-EIA Regulations”).
- On December 19, 2014, SEPA enacted the (i) Environmental Sampling Rules 2014, (ii) Hazardous Substances Rules, 2014, (iii) Sindh Environmental Protection (Composition of Offences and Payment of Administrative Penalty) Rules 2014, (iv) Sindh Environmental Protection Tribunal Rules, 2014, (v) Sindh Hospital Waste Management Rules, 2014, (vi) Sindh Environmental Quality Standards (Certification of Environmental Laboratories) Rules 2014, (vii) Sindh Prohibition of Non-degradable Plastic Products (Manufacturing, Sale and Usage) Rules 2014, (viii) Sindh Sustainable Development Fund (Procedure and Utilization) Rules 2014, and (ix) Sindh Environmental Quality Standards (Self-Monitoring and Reporting by Industry) Rules 2014.
- On June 28, 2016, the Sindh Environmental Industrial Waste Water, Effluent, Domestic, Sewerage, Industrial Air Emission and Ambient Air, Noise for Vehicles, Air Emissions for Vehicles and Drinking Water Quality Standards, 2015 have been notified.

For purpose of this report, the 2014 Act, Sindh Environmental Protection Agency (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2014 (“2014 Regulations”) and other relevant rules and regulations made under the 2014 Act are applicable.

3.4 Constitutional Provision

The Constitution of Pakistan is supreme law of the Country. It is one of the few constitutions in the world, which covers environmental protection and considers

it one of the fundamental rights of citizens of Pakistan. Article 9 & 14 of the Constitution bestows fundamental right to life and dignity to every citizen. The Supreme Court of Pakistan in landmark judgment in the case of Shehla Zia and others versus WAPDA (1994) referred to both these Articles and laid down the foundation of modern environmental law in Pakistan. The august Court held that the word “life” in the constitution has not been used in a limited manner. A wide meaning should be given to enable a man not only to sustain life but to enjoy it. Under the Constitution, Article 14 provides that the dignity of man and subject to law the privacy of home shall be inviolable. The fundamental right to preserve and protect the dignity of man under Article 14 is unparalleled and could be found only in few Constitutions of the world. The Constitution guarantees dignity of man and also right to “life” under Article 9 and if both are read together, question will arise whether a person can be said to have dignity of man if his right to life is below bare necessity like without proper food, clothing, shelter, education, health care, clean atmosphere and unpolluted environment.

3.5 Sindh Environmental Protection Act, 2014

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

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

- Article 11(1): ‘Subject to the provisions of this Act and the rules and regulations therein, no person shall discharge or emit or allow the discharge or emission of any effluent, waste, pollutant, noise or any other matter that may cause or likely cause pollution or adverse environmental effects, as defined in Section 2 of this Act, in an amount, concentration or level which is in excess to that specified in Sindh Environmental Quality Standards...’
- Article 11(2): ‘All persons, in industrial or commercial or other operations, shall ensure compliance with the Environmental Quality Standards for ambient air, drinking water, noise or any other Standards established under section 6(1)(g)(i); shall maintain monitoring records for such compliances; shall make available these records to the authorized person for inspection;

and shall report or communicate the record to the Agency as required under any directions issued, notified or required under any rules and regulations.'

- Article 14 (1): 'Subject to the provisions of this Act and the rules and regulations, no person shall cause any act, deed or any activity', including;
 - (b) disposal of solid and hazardous wastes at unauthorized places as prescribed;
 - (c) dumping of wastes or hazardous substances into coastal waters and inland water bodies; and
 - (d) release of emissions or discharges from industrial or commercial operations as prescribed.
- Article 15 (1): 'Subject to the provisions of this Act, no person shall operate or manufacture a motor vehicle or class of vehicles from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the Sindh Environmental Quality Standards or, where applicable, the standards established under sub-clause (i) of clause (g) of sub-section (1) of section 6'.
- Article 17(1): 'No proponent of a project shall commence construction or operation unless he has filed with the Agency an initial environmental examination or environmental impact assessment, and has obtained from the Agency approval in respect thereof'
- Article 17(2): The agency shall;
 - a) review the initial environmental examination and accord its approval, subject to such terms and conditions as it may prescribe, or require submission of an environmental impact assessment by the proponent; or
 - (b) review the environmental impact assessment and accord its approval subject to such terms and conditions as it may deem fit to impose or require that the environmental impact assessment be re-submitted after such modifications as may be stipulated or decline approval of the environmental impact assessment as being contrary to environmental objectives.
- Article 17(3): 'Every review of an environment impact assessment shall be carried out with public participation and, subject to the provisions of this Act, after full disclosure of the particulars of the project'.

- Article 17(4): ‘The Agency shall communicate its approval or otherwise within a period of two months from the date that the initial environmental examination is filed, and within a period of four months from the date that the environmental impact assessment is filed complete in all respects in accordance with the regulations, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations’.
- Article 20(1): ‘The Agency shall from time to time require the person in charge of a project to furnish, within such period as may be specified, an environmental audit or environmental review report or environmental management plan containing a comprehensive appraisal of the environmental aspects of the project’.
- Article 20(2): The report of a project prepared under sub-section (1) shall include:
 - (a) analysis of the predicted qualitative and quantitative impact of the project as compared to the actual impact;
 - (b) evaluation of the efficacy of the preventive, mitigation and compensatory measures taken with respect to the project; and
 - (c) recommendations for further minimizing or mitigating the adverse environmental impact of the project.
- Article 20(3): ‘Based on its review of the environmental audit report, the Agency may, after giving the person in charge of the project an opportunity of being heard, direct that specified mitigation and compensatory measures be adopted within a specified time period and may also, where necessary, modify the approval granted by it under section 17’.

3.6 Sindh EPA (Environmental Assessment) Regulations, 2021

The Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021, enacted under Section 37 of the 2014 Act, categorize projects into three groups reflected in Schedules I, II, and III of the 2014 Regulations. These classifications are based on the anticipated degree of environmental impact, where projects in Schedule III are deemed potentially seriously harmful and necessitate an EIA, while those in Schedule II may have lesser effects and require an IEE.

The proposed project is categorized as I (2) under Schedule III of the 2021 Regulations, specifically concerning:

I. Urban development and tourism

(1)

(2) Residential/commercial high-rise buildings exceeding 500,000 sq. feet.

Due to the project's area surpassing 500,000 sq. feet, the EIA requirement is warranted. This assessment aims to provide a comprehensive evaluation of the environmental impacts associated with the high-rise development, enabling effective interventions.

3.7 Guidelines for Public Consultation

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

- **Objectives of Public Involvement:** 'To inform stakeholders about the proposed project, to provide an opportunity for those otherwise unrepresented to present their views and values, providing better transparency and accountability in decision making, creating a sense of ownership with the stakeholders';
- **Stakeholders:** 'People who may be directly or indirectly affected by a proposal will clearly be the focus of public involvement. Those who are directly affected may be project beneficiaries, those likely to be adversely affected, or other stakeholders. The identification of those indirectly affected is more difficult, and to some extent it will be a subjective judgment. For this reason, it is good practice to have a very wide definition of who should be involved and to include any person or group who thinks that they have an interest. Sometimes it may be necessary to consult with a representative from a particular interest group. In such cases the choice of representative should be left to the group itself. Consultation should include not only those likely to be affected, positively or negatively, by the outcome of a proposal, but should also include those who can affect the outcome of a proposal';
- **Mechanism of consultations:** 'Provide sufficient relevant information in a form that is easily understood by non-experts (without being simplistic or

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

- **Timing and Frequency:** Planning for the public consultation program needs to begin at a very early stage; ideally it should commence at the screening stage of the proposal and continue throughout the EIA process;
- **Consultation Tools:** Some specific consultation tools that can be used for conducting consultations include; focus group meetings, needs assessment, semi-structured interviews; village meetings and workshops;
- **Other Important Considerations:** ‘The development of a public involvement program would typically involve consideration of the following issues; objectives of the proposal and the study; identification of stakeholders; identification of appropriate techniques to consult with the stakeholders; identification of approaches to ensure feedback to involved stakeholders; and mechanisms to ensure stakeholders’ consideration are taken into account’.

As above, the Guidelines for Public Consultation introduce effective ways to inform the contents of the project to the general public during the planning stage and that eventually consensus building toward the implementation of project is reached.

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

3.8 Sindh Environmental Quality Standards (SEQS)

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

Table 3.1 shows Sindh environmental quality standard for ambient air.

Table 3.1: Sindh Environmental Quality Standard for Ambient Air			
Pollutant	Time-weighted average	Concentration in Ambient Air	Method of measurement
Sulfur Dioxide	Annual Average*	80µgm ³	

(SO ₂)	24 hours**	120µgm ³	Ultraviolet Fluorescence Method
Oxides of Nitrogen as (NO)	Annual Average*	40µgm ³	Gas Phase
	24 hours**	40µgm ³	Chemiluminescence
Oxides of Nitrogen as (NO ₂)	Annual Average*	40µgm ³	Gas Phase
	24 hours**	80µgm ³	Chemiluminescence
O ₃	1 hour	130µgm ³	Non dispersive UV absorption méthode
Suspended Particulate Matter (SPM)	Annual Average*	360µgm ³	High volume Sampling, (Average flow rate not less than 1.1m³/minute)
	24 hours**	500µgm ³	
Respirable Particulate Matter (PM ₁₀)	Annual Average*	120µgm ³	B Ray absorption method
	24 hours**	150µgm ³	
Respirable Particulate Matter (PM _{2.5})	Annual Average*	40µgm ³	B Ray absorption method
	24 hours**	75µgm ³	
	1 hour	15µgm ³	
Lead (Pb)	Annual Average*	1µgm ³	ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	1.5µgm ³	
Carbon Monoxide (CO)	8hours**	5mg/m ³	Non Dispersive Infra Red (NDIR) method
	1hours	10mg/m ³	
*Annual arithmetic means of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.			
**24 hourly / 8 hourly values should be met 98% of the in a year. 2% of the time, it may exceed but not on two consecutive days.			

Table 3.2 shows the standards for motor vehicle noise.

Table 3.2: The Motor Vehicle Ordinance (1965) and Roles (1969)		
Parameter	Standards (maximum permissible limit)	Measuring method
Noise	85dB(A)	Sound-meter at 7.5meter from the source

Table 3.3 shows the Sindh Environmental Quality Standard for noise.

Table 3.3: Sindh Environmental Quality Standard for Noise			
S. No.	Category of Area / Zone	Limit it in dB(A) Leq*	
		Day Time	Night Time
1	Residential area (A)	55	45
2	Commercial area (B)	65	55
3	Industrial area (C)	75	65
4	Silence Zone (D)	50	45
Note: 1	Day time hours: 6.00 a. m to 10.00 p. m		
2	Night time hours: 10.00 p. m to 6.00p. m		

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

The SEQs for effluents are shown in Table 3.4.

Table 3.4: Sindh Environmental Quality Standard for Municipal & Liquid Industrial Effluents					
S. No.	Parameter	Into Inland Waters	Into Sewage Treatment	Into Sea	unit
1	Temperature or Temp. increase	<3	<3	<3	°C
2	pH value (H ⁺)	6-9	6-9	6-9	
3	Biological Oxygen Demand (BOD) ₅ at 20 °C	80	250	80	mg/l
4	Chemical Oxygen Demand (COD) _{Cr}	150	400	400	mg/l
5	Total Suspended Solids (TSS)	200	400	200	mg/l
6	Total Dissolved Solids (TDS)	3500	3500	3500	mg/l
7	Oil and Grease	10	10	10	mg/l
8	Phenolic Compounds (as Phenol)	0.1	0.3	0.3	mg/l
9	Chloride (as Cl ⁻)	1000	1000	SC	mg/l
10	Fluoride (as F ⁻)	10	10	10	mg/l
11	Cyanide (as CN ⁻) total	1.0	1.0	1.0	mg/l
12	An-ionic detergents (as MBAS)	20	20	20	mg/l
13	Sulphate(SO ₄ ²⁻)	600	1000	SC	mg/l
14	Sulphide (S ²⁻)	1.0	1.0	1.0	mg/l
15	Ammonia (NH ₃)	40	40	40	mg/l
16	Pesticides	0.15	0.15	0.15	mg/l
17	Cadmium	0.1	0.1	0.1	mg/l
18	Chromium (trivalent and hexavalent)	1.0	1.0	1.0	mg/l
19	Copper	1.0	1.0	1.0	mg/l
20	Lead	0.5	0.5	0.5	mg/l
21	Mercury	0.01	0.01	0.01	mg/l
22	Selenium	0.5	0.5	0.5	mg/l
23	Nickel	1.0	1.0	1.0	mg/l
24	Silver	1.0	1.0	1.0	mg/l
25	Total toxic metals	2.0	2.0	2.0	mg/l
26	Zinc	5.0	5.0	5.0	mg/l
27	Arsenic	1.0	1.0	1.0	mg/l
28	Barium	1.5	1.5	1.5	mg/l
29	Iron	8.0	8.0	8.0	mg/l

30	Manganese	1.5	1.5	1.5	mg/l
31	Boron	6.0	6.0	6.0	mg/l
32	Chlorine	1.0	1.0	1.0	mg/l

The SEQS for drinking water are shown in Table 3.5.

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

S.#	Properties/ Parameters	Standard Values for Pakistan	S.#	Properties / Parameters	Standard Values for Pakistan
Bacterial			Chemical		
1	All water intended for drinking (E.Coli or Thermo tolerant Coliform bacteria)	Must not be detectable in any 100 ml sample	Essential Inorganics (mg/liter)		
			3	Aluminum (Al) mg/l	≤ 0.2
			4	Antimony (Sb)	≤ 0.005
2	Treated water entering the distribution system (E.Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample	5	Arsenic (As)	≤ 0.05
			6	Barium (Ba)	0.7
			7	Boron (B)	0.3
3	Treated water in the distribution system (E.coli or thermo tolerant coliform and total coliform bacteria)	Must not be Detectable in any 100 ml sample. In case of large supplies, where sufficient samples are examined, must not be resent in 95% of the samples taken throughout any 12-month period.	8	Cadmium (Cd)	0.01
			9	Chloride (Cl-)	< 250
			10	Chromium (Cr)	≤ 0.05
			11	Copper (Cu)	2
			Organic (mg/L)		
			12	Phenolic compounds	<0.0002
			Toxic Inorganics (mg/liter)		
			13	Cyanide (CN)-	≤ 0.05
			14	Fluoride (F)	≤ 1.5
			15	Lead (Pb)	≤ 0.05
			16	Manganese (Mn)	≤ 0.5
			Physical		
4	Color	< 15 TCU	18	Nickel (Ni)	≤ 0.02
5	Taste	Non-objectionable/ Acceptable	19	Nitrate (NO ₃) ⁻	≤ 50
6	Odor	Non-objectionable/ Acceptable	20	Nitrite (NO ₂) ⁻	≤ 3
7	Turbidity	< 5 NTU	21	Selenium (Se)	≤ 0.01

8	Total Hardness as CaCO ₃	< 500 mg/l	22	Residual Chlorine	0.2-0.5 At consumer end
9	TDS	<1000			
10	pH	6.5-8.5			0.5-1.5 at source
Radioactive					
11	Alpha Emitters bq/L	0.1	23	Zinc (Zn)	5.0
12	Beta emitters	1			

3.9 Sindh Prohibition of Child Employment Act, 2017

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

3.10 Land Acquisition Act, 1894

The Land Acquisition Act, 1894 (LAA) governs land acquisition against compensation for public interest projects. It is termed as draconian law because it gives complete powers to the government to acquire the land and there is no provision for landowner to refuse transferring the land. Only remedy to a landowner is to challenge quantum of compensation, that too, through a civil court where decades pass in deciding the matter. The Act gives power to the Government to acquire the land under emergency clause under which requirement of prior public notice is exempted.

3.11 Cutting of Trees (Prohibition) Act, 1975 and the Protection of Trees and Bush Wood Act, 1949

The Cutting of Trees Act prohibits cutting or chopping of trees without prior permission of the Forest Department. Section 3 of this Act states “No person shall, without the prior written approval of the local formation commander or an officer authorized by him in this behalf, cut fell or damage or cause to cut, fell or damage any tree.”

Similarly, the Protection of Trees and Bush wood Act, 1949 prohibits cutting of trees and bush wood without permission of the Forest department. The Act was enforced to prevent unlawful removal/clearing of trees and green area for any reason without the consent of the Forest Department”.

3.12 Pakistan Panel Code, 1860 (PPC)

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

3.13 Sindh Solid Waste Management Board Act, 2014

The Sindh Solid Waste Management Board (SSWMB) was established through an Act passed by the Provincial Assembly on 10th February 2014. Subsequently, the Amended Sindh Solid Waste Management Board Act-2021 was enacted by the Provincial Assembly of Sindh on 11th December 2021.

Under these acts, the "Powers and Functions of the Board" grant the Board rights over solid waste-related issues, as well as the assets, funds, and liabilities of the Councils. The Board possesses sole rights over all kinds of solid waste within the limits of all Councils. Furthermore, the Board has the authority to grant permissions to individuals, institutions, industries, factories, workshops, and furnaces for activities such as compost making and power generation from solid waste, including the segregation of recyclable materials from waste, collection, treatment, sale and purchase, recycling, or disposal of any kinds of waste.

In the performance of its functions, the Board shall not impede or prejudice the exercise of the executive authority of the Government.

3.14 Disaster Management Act, 2010

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

3.15 The Sindh Occupational Safety and Health Act, 2017

The Sindh Occupational Safety and Health Bill 2017 has been approved by the Provincial Assembly of Sindh (Ref. Sindh Bill No. 27 of 2017) and enacted as the Sindh Occupational Safety and health Act, 2017. The Act makes provision for Occupational Safety and Health conditions at all workplaces for the protection of persons at work places against risk of injury arising out of the activities at work places and the promotion of safe, healthy and decent working environment adapted to the physical, physiological and psychological needs of all persons at work.

3.16 Laws on protection of Archaeological Sites & Cultural Heritage

After the Eighteenth amendment in the constitution the subject of “Ancient and historical monuments, archaeological sites and remains” the entry No.37 of the concurrent legislative list has also devolved to provincial legislations. There are two laws that are directly relevant for archaeological relics. The first is The Antiquities Act, 1975, which ensures the protection of Pakistan’s cultural resources. Since separate provincial Act has not been enacted yet the Antiquities Act, 1975 shall remain enforce in Sindh under Article 270AA(6) of the Constitution of Pakistan, 1973. The second is The Sindh Cultural Heritage (Preservation) Act, 1994, which is the provincial law for the protection of cultural assets. Its objectives are similar to those of the Antiquity Act.

3.17 Antiquities Act, 1975

The act ensures the protection of cultural resources in Pakistan. It is designed to protect antiquities from destruction, theft, negligence, unlawful excavation, trade and export. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments etc. The Act prohibits new construction in the proximity of a protected antiquity and empowers the Government of Sindh to prohibit excavation in any area, which may contain articles of archaeological significance. The developers are obligated to ensure that no activity is undertaken within 61 m (200 ft) of a protected antiquity, and to report to the GoPS’s Dept. of Archaeology if any archaeological discovery made during the course of the project.

3.18 The Sindh Cultural Heritage (Preservation) Act, 1994

The Sindh Cultural Heritage (Preservation) Act, 1994 is the provincial law for the protection of cultural assets. According to KB&TPR 2002, any building declared as a Heritage Building by the GoS, under the above-mentioned preservation Act (1994) shall not be considered for approval by the KBCA, except with the prior

approval of the department designated as such by the Government of Sindh. Under the Act an Advisory Committee is formulated to overlook and subsequent right of Acquisition of a protected heritage of architectural, historical, archaeological or national value, custodian/guardianship rights for preservation and declaration of protected heritage, evaluation of ownership rights, take legal action against any offender who attempts to damage, destroy, remove, deface, alter or imperil the protected heritage or to build on or near the site. It also details the purchase, maintenance and repair works of a protected heritage under the government's jurisdiction. The advisory committee may also receive voluntary donations towards the cost of maintenance of a protected heritage site. The act also establishes the right of access to certain protected heritage sites, penalties for violators, formulation of rules and provides protection to the persons working under this Act.

3.19 Sindh Condominium Act, 2014

The purpose of Act is to regulate the services, amenities, façade, parking and common areas in public sale projects by the residents, union or society of the project through the registered maintenance companies in the Province of Sindh. Under the Act maintenance of the project for one after obtaining completion certificate shall be the responsibility of the builder against prescribed maintenance fee charged from the allottees. Section 3 of the Act provides complete mechanism how builder will maintain the building for one year, and who will maintain thereafter etc. The Act further provides for responsibilities and rights of maintenance societies, and company, provision for insurance of the building.

3.20 Cantonment Act 1924

This Act enacted to consolidate and amend the law relating to the administration of cantonments. The Act consists of 292 sections and six schedules, which governs establishment of cantonment boards, duties and discretionary functions of board, appointment of officers including executive officer, election, taxation (property), public safety, water supply, drainage and lighting, burial and burning grounds, hospitals and dispensaries, markets etc, power and procedures for penalties and appeals, and rules and regulation making powers. Chapter XI of the Act relates to control over building, streets, boundaries, trees etc. and details powers of the Board in respect of building construction permission and procedure thereof. Section 178A prohibits erecting or re-erecting a building without previous sanction of the Board. Section 186 of the Act confers powers to make bye-laws for building erecting and matters ancillary thereto.

3.21 Civil Aviation Rules, 1994

The Civil Aviation Rules 1994 has mandated it for all the builders and developers to obtain No Objection Certificate (NOC) from Civil Aviation Authority (CAA) under rule 68, section-3 of Civil Aviation Rules, 1994 for “Height Clearance” for projects/buildings within the radius of 25km 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”.



3.22 Sindh Drinking Water Policy, 2017

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

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

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

- The execution of component-sharing model for government programs and projects shall be promoted to ensure financial sustainability and community and private sector involvement in development and O&M.
- Low cost technologies in water and sanitation, that are easy and cost-effective to maintain shall be developed and used.

Goals and Objectives:

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

Objectives:

- Introduce legislative measures and regulations to create an enabling framework for safely managed drinking water supply, regulation of water usage, extraction, treatment, transportation and distribution.
- Ensure that all drinking water resources and supply systems are protected with community involvement.
- Develop district level drinking water availability plans for urban and rural areas to ensure improved planning for equitable access.
- Enhance the coverage of safely managed drinking water supply in the province to achieve the Sustainable Development Goals (SDGs) targets of universal access.
- Develop criteria for installation of new drinking water supply schemes and ensure that all new schemes are safely managed, rationalized and constructed through need-based criteria so that all areas and communities are served.
- Develop standardized service delivery models for both urban and rural drinking water supply schemes to improve efficiency, cost-effectiveness, monitoring & sustainability.
- Develop mechanisms for reuse, recycle and recharge of wastewater for other municipal and productive uses.

- Ensure that all drinking water supply systems are designed and constructed in line with the national drinking water quality standards and all municipal discharges comply with National Environment Quality Standards (NEQS).
- Install water treatment plants at existing drinking water supply schemes where required and incorporate water treatment facilities in all new drinking water supply schemes.
- Ensure development of water safety plans for all drinking water supply systems.
- Develop and sustain regular drinking water quality monitoring & surveillance, and institute mechanisms for remedial action.
- Increase public awareness about water borne and water related diseases (including polio), nutrition and hygiene, and enhance the role of communities for household water treatment/storage, water safety and conservation, and safe hygiene practices.
- Ensure that drinking water supply projects are nutrition sensitive and integrated in health, nutrition and school health programs.
- Institutionalize Water, Sanitation & Hygiene (WASH) in schools (infrastructure and 3 starts) and introduce curricular change to incorporate health, nutrition and hygiene and improve safe water and sanitation practices among school children.
- Institute adaptation measures and disaster risk reduction and mitigation strategies to minimize the impact of climate events on drinking water supply system.

3.23 Sindh Sanitation Policy, 2016

The goal of the Provincial Sanitation policy is to ensure that the entire population of Sindh has access to a safely managed sanitation service and sanitary environment that is also nutrition- sensitive and hygienic. The motto of the policy was 'Saaf Suthro Sindh' (Neat and Clean Sindh). The Policy sets targets to achieve its motto. For instance, eradication of Open Defecation from Sindh Province by 2025, while 70% villages of 13 high priority districts achieve the status of open defecation free by 2020; create and develop wastewater treatment mechanisms to cover 75% of urban areas and 40% in rural areas by 2025, and implement integrated solid waste management with 100% coverage in urban areas and 60% in rural areas of Sindh by 2025. A WASH behavior change and communication strategy has also been developed for sustainable and safe

hygiene environment by 2025 to enhance the living standards of the people of Sindh.

3.24 Groundwater (Extraction, Consumption & Management), Regulations - 2024

In 2024, the Board of Karachi Water & Sewerage Corporation established the Groundwater (Extraction, Consumption, and Management) Regulations under the authority of section 47 of the KW&SC Act 2023. These regulations apply to the entire Karachi Division and any additional areas specified by the Government. Under these regulations, "Consideration of Applications for Grant of License" requires that applicants declare their existing sources of water supply, such as the KW&SC network, bores, tube wells, wells, tankers, or any other provisions, along with the intended quantity needed through the prescribed application form. Misleading or incorrect information shall lead to the rejection of the application. To assess existing sources and proposed extraction connections (bore, tube wells) or suppliers, KW&SC field staff or authorized agents are permitted to enter premises and record flows, including the inspection of tanks and inflow points.

3.25 Karachi Strategic Development Plan 2020

Karachi Strategic Development Plan (KSDP) 2020 was formulated in 2007 as the official development plan of the City District Government of Karachi (CDGK). This is the first ever approved development plan which has now a legal status under Section 40 of the Sindh Local Government Ordinance 2001 in contrast to the previous master plans. The contents of KSDP 2020 consist of following 7 chapters and they are summarized as follows:

(1) Introduction/Outline

1) Coverage of the Plan: Whole City District of Karachi, consisting of 18 Towns, 6 cantonments, and Federal and provincial governments land-holding agencies; approximately 3,600 sq.km, of which 1,300 sq.km is urbanized (built-up) area.

2) Critical Issues in Land Planning and Municipal Control: The land planning and municipal control is fragmented into about twenty agencies, such as 6 Cantonment Boards, Karachi Port Trust, Port Qasim Authority, Defence Housing Authority, Pakistan Steel, Pakistan Railways, Export Processing Zone, Sindh Industrial Trading Estate, Government Sindh, City District Government Karachi, Lyari Development Authority, Malir Development Authority, cooperative housing societies and private owners, with overlapping powers/functions and utter lack of coordination. The share of CDGK is only 31% of the total area.

3) Vision for Karachi: “Transforming Karachi into a world class city, an attractive economic center with a decent life for Karachiites”.

4) Plan Objectives: In order to achieve the vision, the Plan consists not only of physical renewal plans but equally invoking the spirit and commitment of both leaders and citizens to realize a more prosperous, secure & sustainable future.

- Finding out Karachi’s advantages/potential for future development
- Promoting a holistic vision towards sustainable growth
- Identifying and addressing key issues in social, economic, environment & urban infrastructure sectors
- Setting out strategic framework against the backdrop of current conditions
- Framing the development plans and programs
- Putting in place an effective, collaborative institutional arrangement with participation of all stakeholders

5) Status and Role: KSDP 2020 has a legal status under SLGO for guiding city’s growth in a planned and coordinated manner, and is mandatory for all agencies, stakeholders to follow the plan.

6) Time Span of the Plan: The operational time span for the plan extends to the year 2020 within the scope of Pakistan’s Vision 2030. The plan will be further extended to 2030 to cover the city’s region that includes part of surrounding districts of Thatta, Jamshoro and Lasbella.

(2) Summary of Land Use Plan, KSDP 2020

Major points of land use plan/strategy are:

Page 1-4 “The spatial needs for commerce, industry, housing and infrastructure development to cope with future population growth (15.2 million in 2005 to 27.6 million in 2020; 4% of AAGR) will be provided through a set of policies and programs, as follows”:

1) Spatial Growth Strategy (Basic)

- **Densification:** Saddar, Jamshed, North Nazimabad, Gulberg, SITE and Shah Faisal Towns

- **Densification & Infill:** Gulshan-e-Iqbal, Landhi, Korangi, New Karachi Towns, DHA & Cantonments
- **Infill and Expansion:** Baldia, Malir, Orangi and Gadap Towns
- **Status Quo:** Lyari and Liaquatabad Towns

2) Various Land development policies and Strategies

In addition to the basic strategy (spatial growth), following several individual land development policies/strategies were considered and proposed in the plan.

- **Regeneration of the Inner City**
- **Promotion of Mixed-Use Development**
- **Permit and Guide Vertical Development and Densification**
- **Enable Densification and Vertical Development of Existing Residential Areas**
- **Development of New Urban Centers**
- **Policy for Urban Renewal**
- **Integration of Civil Areas of Cantonment and other Land-Ownning Agencies**
- **Incorporation of Existing Goths into the Urban Fabric**
- **Development of Industrial Zones**
- **Decentralization of financial districts**
- **Additional site for international airport**
- **Special Purpose Zone along Northern bye-pass**
- **Development of Education city**
- **Additional spaces for graveyards and landfill sites for garbage**

3.26 Building Code of Pakistan, Fire Safety Provisions 2016

The Building Code of Pakistan-Fire Safety Provisions-2016 provide rules for fire prevention, life safety in relation to fire and fire protection of building and

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

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

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

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

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

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

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

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

3.27 Guidelines for Sensitive and Critical Area, October 1997

The above guidelines list up a number of areas subject to protection in terms of sensitive ecosystems and archaeological importance. In Appendix II of the Guidelines, a list of eight Archaeological Sites and Monuments, of which four of them are National Monuments, in Karachi is provided. Further, there are 203 sites declared as "Protected Heritage" within Karachi District.

None of such sites however exist within the microenvironment / Corridor of Impact (COI) of the proposed Project.

4. Description of Environment

This section delves into the intricate environmental and socioeconomic landscape of the Project area, dissecting both its immediate surroundings (microenvironment) and the broader regional context (macroenvironment).

The Project is strategically positioned within the macroenvironment of District South, which serves as Karachi's bustling central business district. This dynamic expanse is home to some of Karachi's most venerable and historically rich localities, including Kharadar, Meethadar, Jodia Bazar, Bolton Market, and Nanakwara. The origins of Kharadar ("Salty Gate") and Mithadar ("Sweet Gate") trace back to pre-colonial times, named after two gates erected in 1792—the Sweet Gate facing the Lyari River and the Salty Gate opening towards the Arabian Sea, both of which were later dismantled by the British. The macroenvironment also boasts a significant collection of colonial architecture, such as Frere Hall, Karachi Grammar School, Empress Market, Sindh Club, and St. Andrews Church, each a testament to the city's layered past.

Within this broader context lies the project's microenvironment: Depot Lines, an integral part of Karachi Cantonment. Established in August 1942 by the British Indian Army and subsequently taken over by the Pakistan Army in 1947, the Cantonment operates as a crucial military base and a self-sufficient residential establishment. Notably, it functions independently of the Karachi Metropolitan Corporation, maintaining its own water supply and electricity infrastructure. It houses Karachi Cantt, Pakistan's largest and busiest railway station, a vital hub for transportation. The Cantonment is geographically defined by the built environment of the Garden area to its north, Faisal Cantonment and Karachi Cantt station to the south, S.M.C.H.S to the east, and the Arts Council of Pakistan and Sindh Assembly Buildings marking its far western boundary. Prominent landmarks within Karachi Cantt include its railway station, Muhammad Ali Jinnah Road, Shahrahe Faisal, the Finance and Trade Centre, Fleet Club, and Services Club.

A pivotal element of the microenvironment's urban fabric is Muhammad Ali Jinnah Road, often referred to as M.A. Jinnah Road. Formerly known as Bunder (or Bandar, "Port") Road, this historic artery is one of the city's oldest and most significant, extending from the urban core directly to the port docks. Renamed in honor of Pakistan's founder, Muhammad Ali Jinnah, it is adorned with numerous iconic landmarks, including the Merewether Clock Tower, the Karachi Municipal Corporation Building, the Shri Swaminarayan Mandir temple, and the revered Mazar-e-Quaid (Jinnah Mausoleum), collectively showcasing Karachi's diverse cultural and architectural heritage.

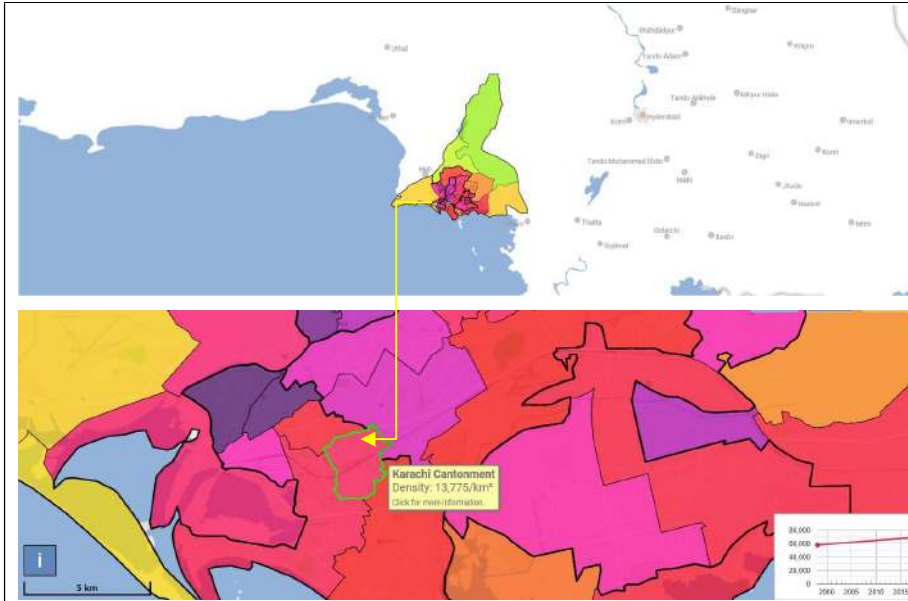


Figure 4.1: Karachi Cantonment

4.1 Microenvironment Specifics

The Project, Saima Centre Point (Phase-II), is precisely located at Plot / Survey No. 134/B/1 on M.A Jinnah Road, within Karachi Cantt, spanning an area of 29,588.4 square yards. This site holds a prime position within the Central Business District (CBD) along M.A Jinnah Road, an area where the Karachi Cantonment Board has strategically implemented its densification plan. The locality benefits from an exceptionally robust connectivity network, with M.A Jinnah Road providing seamless access to the Green Line Bus Rapid Transit corridor situated immediately to the south. The Karachi Cantonment Board has diligently developed this region with essential infrastructure facilities. The microenvironment is already a highly commercialized zone, bustling with a multitude of established commercial and financial centers. To its south, southeast, and east, the surrounding blocks are characterized by a vibrant mix of commercial and financial institutions alongside modern residential high-rises. Furthermore, the built environment is comprehensively supported by the bus rapid transit corridor, meticulously designed to cater to future traffic movement needs as outlined in the Karachi Transport Masterplan 2030.



Figure 4.2: Project Area

4.2 Physical Resource

Detailed description of the physical resources existing in the area is stated in the following sections. Major areas covered under physical resources are; topography, geology, soil conditions, climate, surface and ground water resources, and seismology. Most of the information is collected from authentic secondary resources besides primary data collection for critical aspects. Respective departments were contacted by the project team members and information was collected with the help of checklist. Other studies and reports were referred and reviewed for the verification of information.

4.2.1 Climatic Condition

Karachi's climate features intensely hot and dry summers, transitioning to mild winters marked by sporadic yet considerable monsoon rainfall. The southwest monsoon season is active from April through October, bringing a significant shift in wind direction and substantial precipitation across much of the Indian Subcontinent. The peak heat occurs between mid-March and June, while January represents the year's coldest point, with temperatures typically descending to around 10°C. Karachi experiences an average annual rainfall of approximately 217.3 mm, with nearly 80% of this occurring during the monsoon

period. For instance, in 2025, Karachi recorded a monsoon season with 304.4 mm of rain, exceeding the historical average.

Seasonal Overview:

- **Summer (mid-March to mid-June):** Characterized by high temperatures, this season also brings moderate rainfall and humidity, alongside strong winds blowing consistently from the southwest to the northeast.
- **Summer Monsoon (mid-June to mid-September):** Temperatures remain elevated during this period, which is defined by significant rainfall, high humidity, and strong southwesterly to northeasterly winds.
- **Post-Monsoon Summer (mid-September to mid-November):** This season features moderate temperatures and reduced rainfall. Winds generally blow from the southwest to the northeast, with a directional shift observed towards the end of the period.
- **Winter (mid-November to mid-March):** Cooler, dry conditions dominate, accompanied by low humidity and a noticeable decrease in wind speed. Winds transition from a northeast-to-southwest direction, eventually shifting to the northwest by late winter.

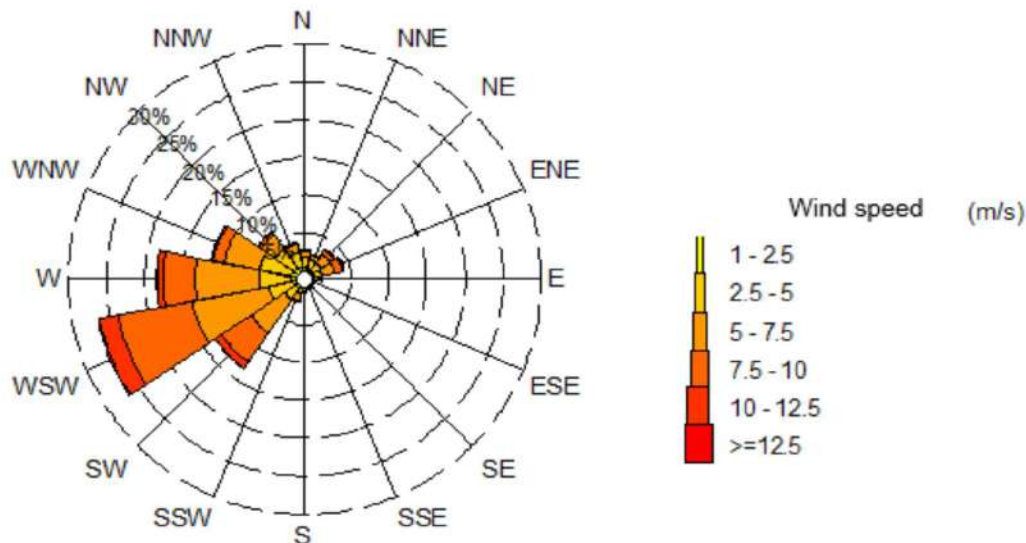


Figure 4.3: Annual Wind Rose

4.2.2 Urban Heat Island (UHI) Effect

An urban heat island (UHI) characterizes metropolitan regions where temperatures are distinctly elevated above those of surrounding natural landscapes. This phenomenon, driven by human activities, results in a noticeable thermal discrepancy, particularly accentuated at night and during periods of calm winds. The UHI effect intensifies during summer and winter seasons. Large cities, housing over a million inhabitants, may register average air temperatures 1–3°C higher than their rural counterparts, with nocturnal differences sometimes soaring to 12°C.

The ramifications of urban heat islands for local populations are extensive, encompassing elevated peak energy consumption in summer, increased costs for air conditioning, degraded air quality, and magnified greenhouse gas emissions. Furthermore, they pose significant health risks, including heat-related illnesses, and can adversely affect water quality.

Causes of the Urban Heat Island Effect:

The fundamental cause of the UHI effect lies in the unique thermal and radiative properties of urban construction materials. Concrete and asphalt, ubiquitous in city pavements and rooftops, readily absorb short-wave solar radiation throughout the day. Unlike natural surfaces, these materials retain this absorbed energy, slowly re-emitting it as long-wave radiation during the night. This altered energy balance within metropolitan areas hinders nocturnal cooling, leading to persistently elevated temperatures. For instance, this mechanism significantly contributed to the exceptionally high minimum temperatures observed in Karachi during past heatwave events.

In Karachi, several specific factors intensify the UHI phenomenon:

- **Diminished Evapotranspiration:** A scarcity of green spaces and vegetation reduces natural cooling through evapotranspiration, leading to a loss of shade, reduced arboreal cooling, and decreased carbon dioxide sequestration.
- **Aggravated Urban Geometry:** The proliferation of tall structures amplifies the UHI by creating numerous surfaces that reflect and absorb solar radiation, thus increasing thermal mass. This "urban canyon effect" also obstructs natural air circulation, impeding convective cooling.
- **Waste Heat Emissions:** Significant heat output from vehicular traffic, air conditioning units, industrial activities, and other anthropogenic sources

further exacerbates urban warming. Moreover, high concentrations of urban pollutants can modify atmospheric radiative properties, thereby intensifying the UHI.

Beyond merely elevating temperatures, UHIs can fundamentally alter local meteorological conditions, impacting wind patterns and humidity levels. Notably, in Karachi, this effect has been a substantial factor in the increase of heat-related fatalities. Projections based on future climate scenarios indicate a likely escalation in the frequency and intensity of such extreme events as global temperatures continue their upward trend.

Karachi's populace is exceptionally susceptible to extreme heat events. A devastating heatwave struck the city in June 2015, marked by relentlessly high temperatures both day and night, which had severe consequences for its inhabitants. Post-event analyses of heat-related mortalities revealed distinct vulnerability clusters, primarily linked to inadequate housing, high population density, low-income demographics, and limited educational access.

Such hot, arid conditions pose threats to agricultural yields, drive up energy consumption, and necessitate public advisories recommending minimal sun exposure during peak daylight hours. Climate scientists have issued stern warnings: the recent extreme heat episodes observed across Pakistan and India are unprecedented, with forecasts suggesting even more severe occurrences in the future, exacerbated by accelerating climate change.

In response to these challenges, Karachi's 2017 Heatwave Management Plan outlines comprehensive preparedness and response protocols for forthcoming heat seasons. Complementing these immediate measures, long-term strategies advocate for significant advancements in urban development, building design, and energy policies to alleviate the city's thermal burden. These specific actions encompass:

- The execution of Karachi's Strategic Development Master Plan 2020 (SDMP 2020).
- The establishment of land use regulations tailored to Karachi's specific urban context.
- The careful designation of high-rise development zones, ensuring robust supporting infrastructure for transport, water supply, and the integration of green spaces.

- A thorough revision of existing building and land use regulations to foster green urbanization and encourage the emergence of multiple city centers to ease current congestion.
- Substantial investment in sustainable transportation solutions, aimed at improving the overall urban environment.

Addressing the persistent challenges presented by urban heat islands necessitates a multifaceted approach to urban planning and a robust enhancement of community resilience, particularly within megacities like Karachi.

4.2.3 Geology & Soil Conditions

According to AH Kazmi, the entire lower Indus plain whose fringes comprise the Karachi Plain is underlain by Eocene limestone¹. It was deposited in a shallow sea, the remnant of the Tethys seaway, which was gradually eclipsed as a result of northward drifting of the Indo-Pakistan plate and its ultimate collision with the Eurasian plate to the north. The shoreline of the Indus plain had, during the Oligocene and Miocene era, a north-south orientation and extended from the area presently occupied by the Kirthar fore deep up to Karachi and beyond. A relatively shallow sea washed its shores. According to Kazmi as well as DeJong², it is likely that a number of offshore islands, formed parallel to the coastline as a result of the earliest phase of Himalayan Orogeny, dotted this sea. Between these islands and the Indus coastline the sea formed a relatively shallow and narrow gulf which is most likely the Kirthar Gulf. The Middle Miocene phase of Himalayan orogeny suddenly obliterated the Kirthar Gulf, moving the coastline rapidly to the vicinity of Karachi. The Kirthar Fore deep replaced the Kirthar gulf. This fore deep may have been occupied by one of the major streams of the Indus plain, most probably the Lyari, if not by Indus itself. Geological investigations of coastal area suggest the presence of only Middle and Tertiary rock formations comprising fresh and slightly weathered recent and sub-recent shoreline deposits. Principal constituents of these deposits are the inter-bedded sandstone and shale together with subordinate amounts of large size gravels or conglomerate.

¹ (Geology of the Indus Delta, AH Kazmi, in Marine Geology & Oceanography of Arabian Sea and Coastal Pakistan, ed. BU Haq, JD Milliman, Van Nostrand Reinhold Company, New York 1984)

² (A. Farah and KA DeJong, Geodynamics of Pakistan, 1979)

Subsurface Characteristics:

Subsoil investigation has revealed that top 1.5-2.0m consist of fill material comprising of sandy silt, gravel and concrete pieces (only in BH-1, BH-4 and BH-6), and overburden soil comprising of medium to dense, silty SAND/sandy SILT, interbedded with clay. This is generally underlain by very dense, sandy GRAVEL/BOULDERS, dense to very dense, silty SAND/sandy SILT (weathered rock) and SANDSTONE/CONGLOMERATE pieces. Beneath this weathered rock material is a thick layer of hard, coarse-grained SANDSTONE/CONGLOMERATE up to a depth range of 11-18m. This is followed by medium hard, SILTSTONE/CLAYSTONE interbedded with sandstone that continue upto the investigated depth of 40.0 m.

Major subsurface deposits can be described as follows:

- Brown, medium to dense, silty SAND/sandy SILT, interbedded with clay
- Brown, very dense, sandy GRAVEL/ BOULDERS (residual)
- Brown, very dense, silty SAND/sandy SILT (weathered rock)
- Brown hard coarse-grained SANDSTONE/CONGLOMERATE pieces, interbedded with sandy clay and gravel (weathered rock)
- Brown, hard, coarse-grained SANDSTONE, highly fractured
- Brown, hard CONGLOMERATE, highly fractured
- Brown, medium hard, SILTSTONE/CLAYSTONE, interbedded with sandstone.

The exact sequence of occurrence of these deposits is shown on boreholes appended to this report. Ground water table was encountered at the depth of about 9-12.0 m below the existing ground level.



Figure 4.4: BH Locations at the site

4.2.4 Seismicity

The Sindh Building Control Authority designates Karachi as **Zone 2B**. Historical data regarding seismic occurrences and geological surveys suggest that Karachi is in a zone where moderate earthquakes with magnitudes between 5.0 and 6.0 can be expected, related to intensities on the Modified Mercalli Scale of between VII and VIII. Thus, Karachi is acknowledged as a zone at *moderate earthquake risk*.

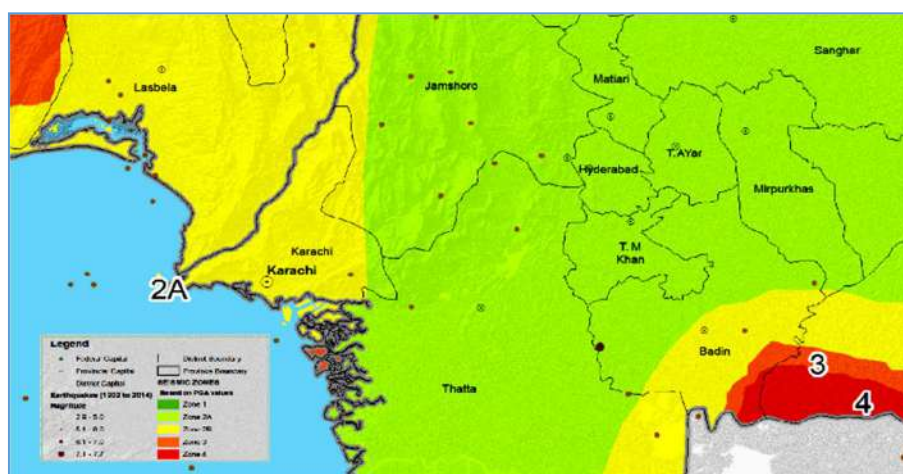


Figure 4.5: Seismic Zones between Karachi³

According to Uniform Building Code (1997), the soil profile falls in **S_B** category corresponding to **rock**. Following table gives seismic zone, seismic zone factor, soil profile type and seismic coefficients.

Seismic Zone	Zone Factor (z)	Soil Profile Type	Seismic Coefficient (C _a)	Seismic Coefficient (C _v)
2B	0.20	S _B	0.20	0.20

4.2.5 Ambient Air & Noise Quality

Primary source of air pollution on and along the major corridors of Karachi is transport sector, so the primary pollutants in ambient air quality in the City in general and project area in particular are directly linked with fuel consumption.

According to available estimates, country's consumption of petroleum products has shown exponential growth, of which one-half is consumed by the transport

³ Map data source(s): PMD, GSP, Pakistan Engineering Council – Prepared by Al hasan Systems Private Limited

sector. The high content of Sulphur in diesel (0.5-1 %) and furnace oil (1-3.5 %) is a major contributor to air pollution. Vehicular emissions are major source of PM_{2.5} and these fine particulates are responsible for respiratory problems in Karachi. The number of diesel trucks and buses have increased and a major share of the emission load from motor vehicles can be attributed to low quality diesel fuel and oil burning two-stroke engines.

Karachi has also witnessed an increase in vehicles fueled by compressed natural gas (CNG) in recent years and many formerly diesel fueled vehicles have been converted to run on CNG which has added another burden on the existing airshed besides causing public safety issue. Buses and trucks cause significant air pollution and since the main sources of pollutants are traffic, and traffic has increased on the major corridors including the mass transit corridors (project area), it is assumed that air quality has deteriorated as a result.

The primary pollutants Oxides of Nitrogen (NO_x), Sulphur dioxide (SO₂) particulate matter (PM₁₀, PM with diameter of 10 microns or smaller and PM_{2.5}, i.e. PM 2.5 microns or smaller) and carbon monoxide (CO). Most of the PM emissions (>80%) comes from diesel-run vehicles. Sindh Environmental Quality Standards (SEQS) for these parameters in addition to lead (Pb) and ozone (O₃) are set by the Government and have been promulgated at provincial level by the Government of Sindh as well as standards for vehicle emissions in line with Euro II. Finally, the Government has promulgated tailpipe emissions standards. All these standards are discussed in Section 03 of this EIA.

Studies undertaken between 1987 and 1994 had raised concern on the deteriorating air quality and noise levels. Studies over the past decade, had quantified the problem and identified the tremendous growth in volume of traffic as the main factor responsible for increasing congestion all over Karachi roads and aggravating the problem. A 1990 survey⁴ monitored CO at 9-10 ppm along the busy urban streets; maximum NO₂ concentrations were 0.3-0.5 ppm during the daytime; with an ozone maximum around noon of 40 ppb and 50 ppb, below WHO's interim quality guideline. A 2005 study⁵ that shows hourly readings over 24 hours for O₃, SO₂, CO and NO₂ measured at five locations in Karachi. O₃ concentrations were well within the WHO guideline of 100 µg/m³ 8-hr average; NO₂ and SO₂ also were well within the WHO guideline of 200 µg/m³ (1-hr average) and 20 µg/m³ (24-hr), respectively.

The Feasibility Study and Development of a Transport Control Plan of Karachi Metropolis (May 2007) presented data for these parameters of air quality for three locations on M A Jinnah Road between Numaish and Tower. At that time

⁴ Ghauri et.al. 1994

⁵ Hashmi et.al.

all five parameters (NO_x, SO₂, PM₁₀, PM_{2.5} and CO) were found to exceed the NEQS. This study has highlighted the increasing level of NO_x, PM & CO to critical limits as the major environmental problem created by the Transport Sector. The main findings of this study are that the pollution load that is being mainly contributed by operation of trucks and buses on diesel oil, and the rickshaws on two stroke engines is composed of NO_x and PM whose concentration has increased to critical limits while that of CO is approaching these limits at almost all the intersections in the Metropolitan area. High Noise level and rise in temperature and humidity are other irritants that are annoying for the living environment in general but the corridor of impact along the middle and northeast sections of the roads in particular.

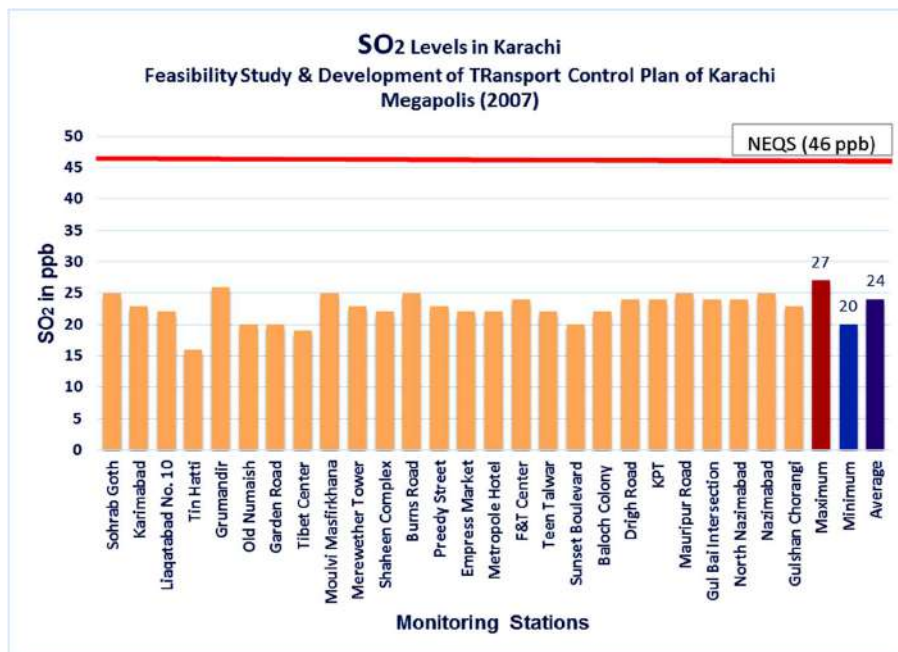


Figure 4.6: SO₂ Levels in Karachi

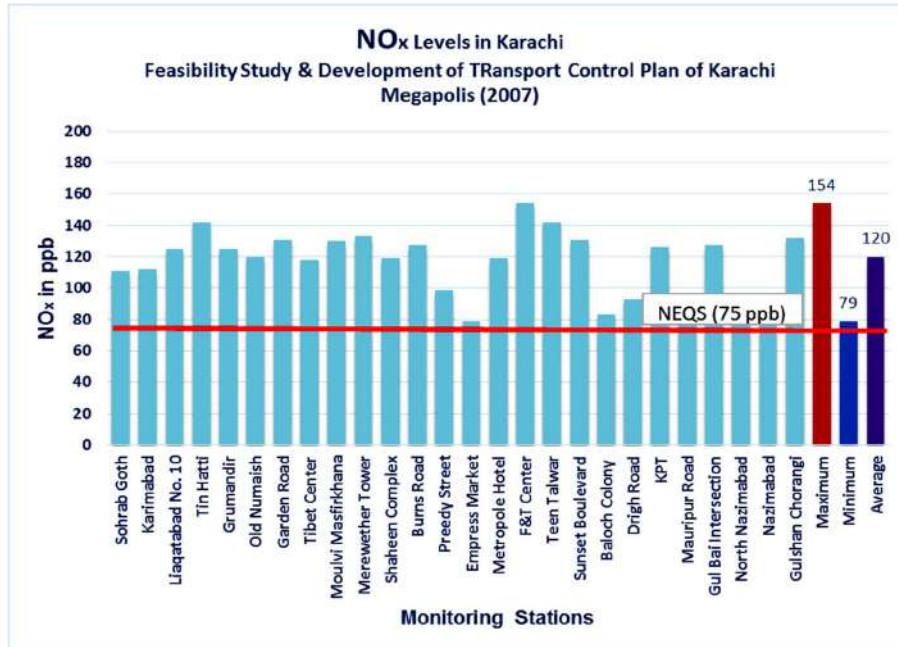


Figure 4.7: NO_x Levels in Karachi

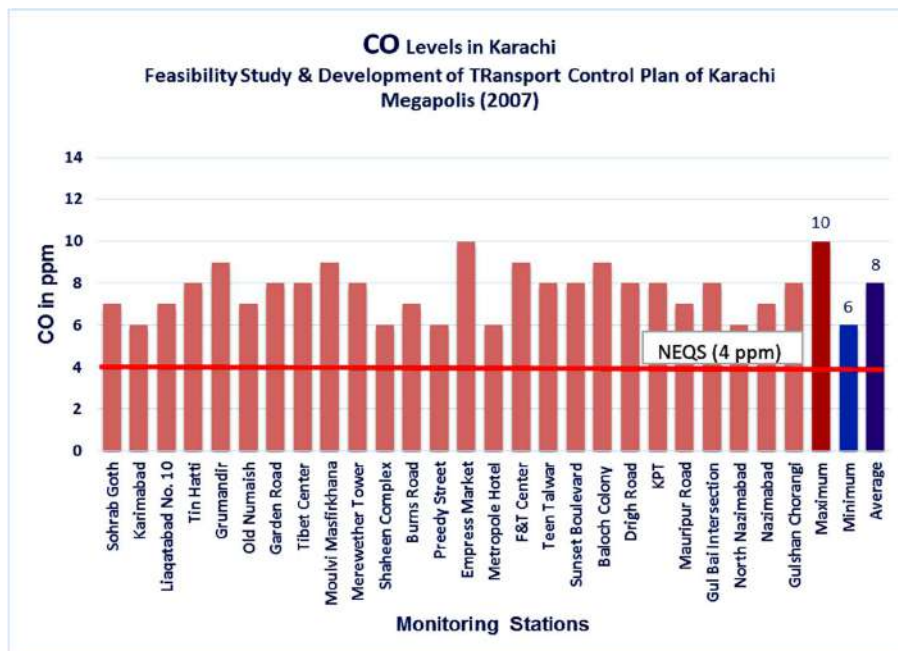


Figure 4.8: CO Levels in Karachi

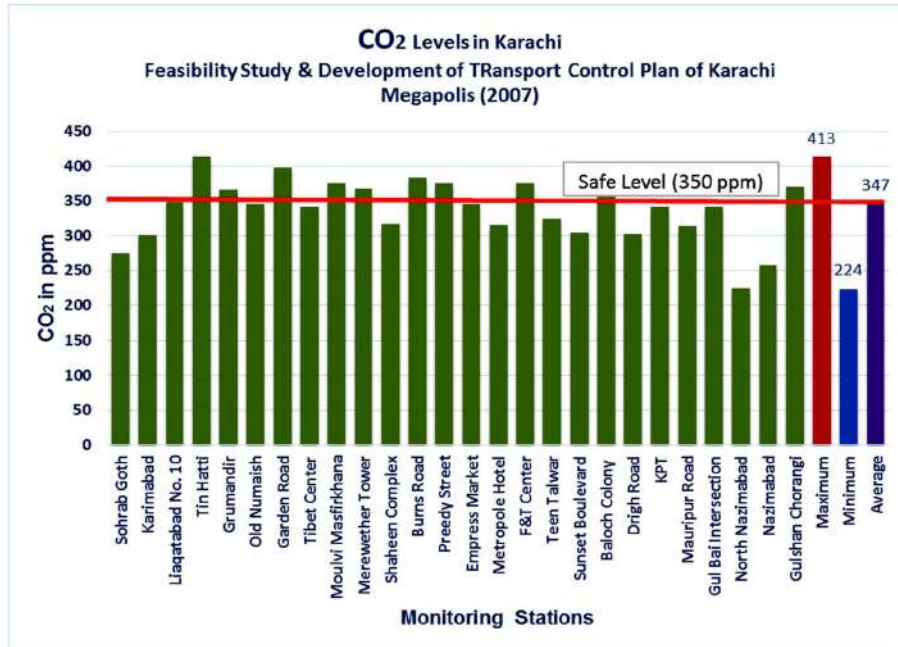


Figure 4.9: CO₂ Levels in Karachi

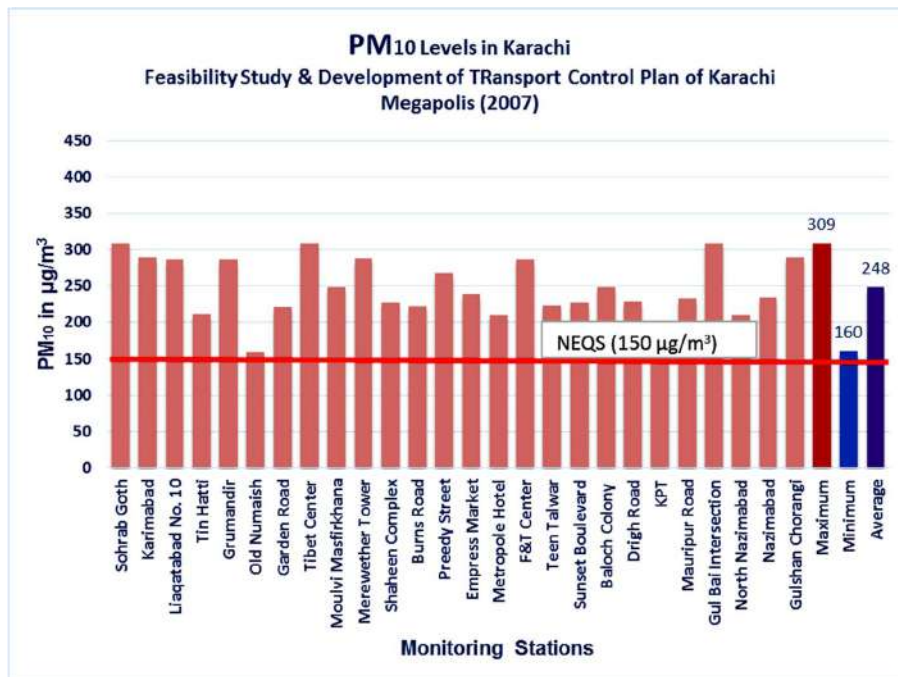


Figure 4.10: PM₁₀ Levels in Karachi

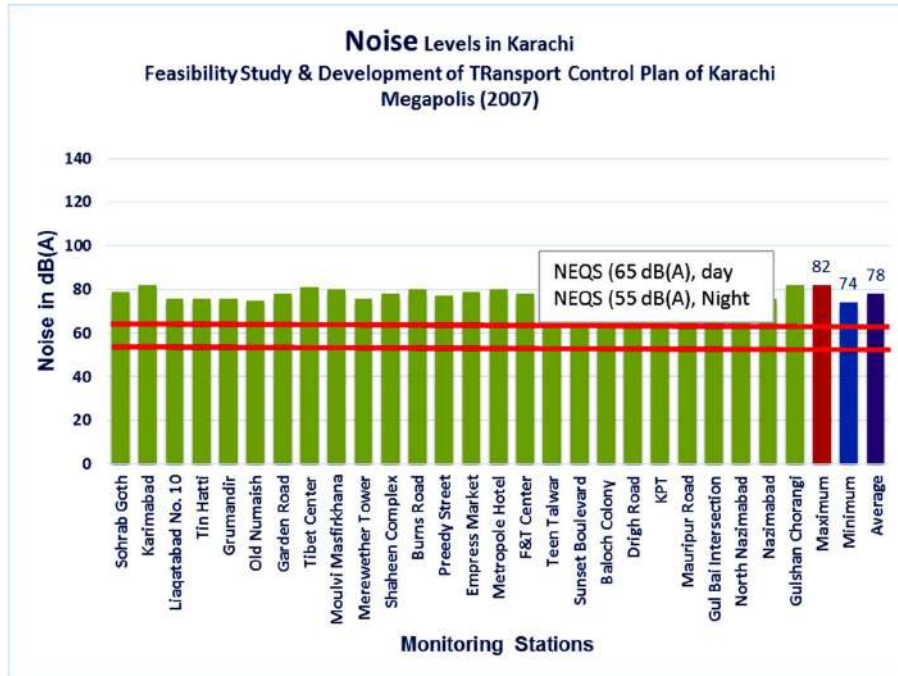
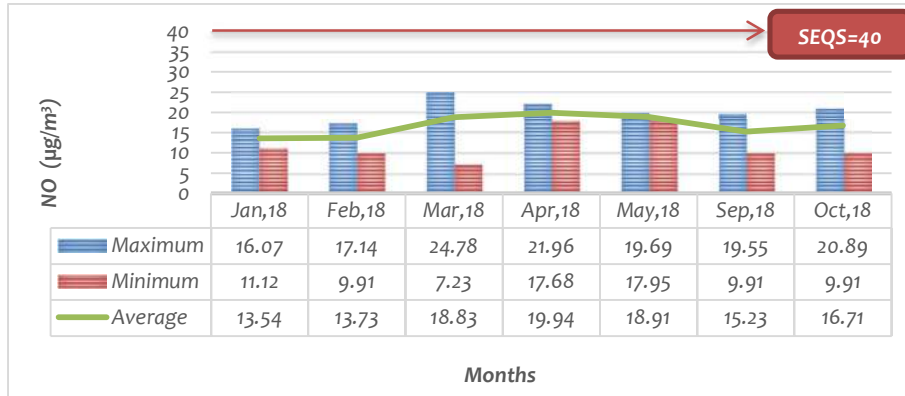


Figure 4.11: Noise Levels in Karachi

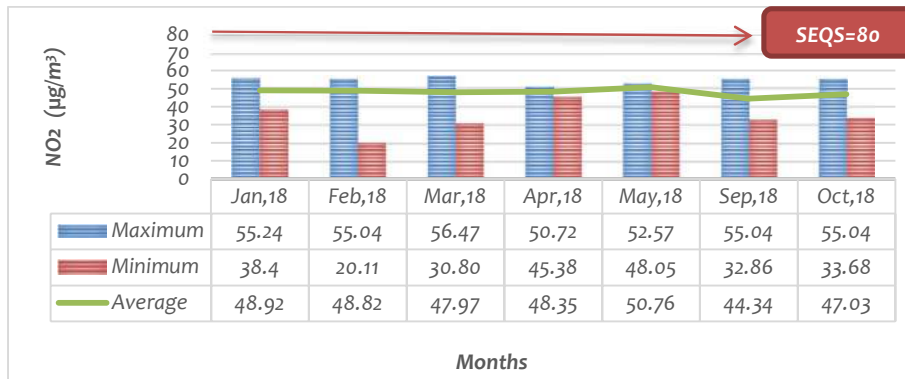
Finally, another report⁶ quotes the World Bank's data with the following maximum values: PM_{2.5} 201 µg/m³; SO₂ 173 µg/m³; NO₂ 122 µg/m³; O₃ 86 µg/m³; CO₂ mg/m³. For reference, WHO's interim target for PM_{2.5} is 35 µg/m³, whereas its guideline is 10 µg/m³. WHO guideline for O₃: 100 µg/m³ 8-hour mean. Both NO₂ and SO₂ are within WHO's guideline for short term average concentration. (200 and 400 µg/m³ respectively). Data by this same author show excessive levels of PM at major intersections, including some along the BRT corridor, as well as SO₂, NO_x, O₃ and CO, all exceeding WHO limits, based on data taken by SUPARCO in 2004.

The Sindh Environmental Protection Agency (SEPA) monitored and published ambient air quality data on their website for a limited period in 2018. The findings clearly indicate that dust levels significantly surpass the limits established by SEQS. This concerning situation can be attributed to the rampant deforestation and the unrestricted movement of vehicles along major roads in Karachi.

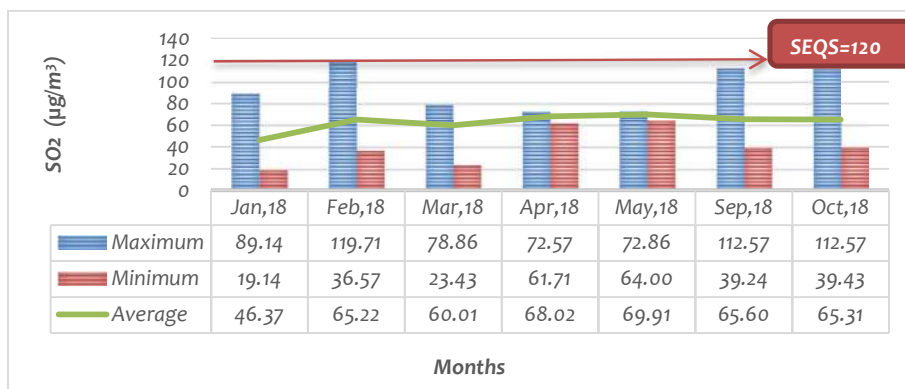
⁶ Kalwar 2014



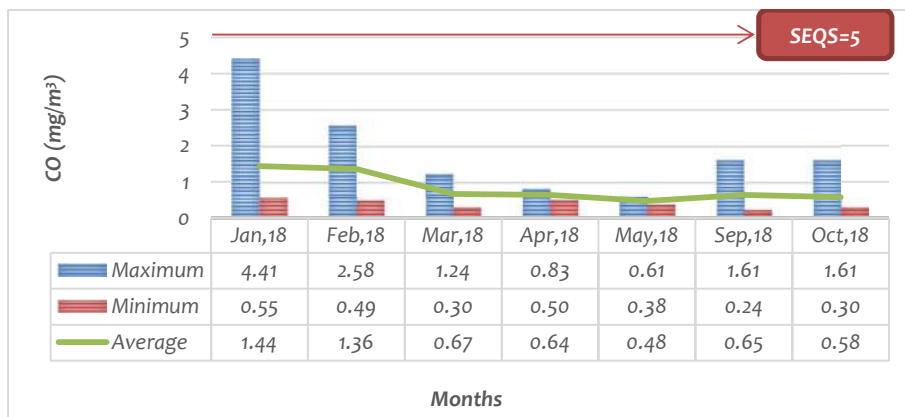
Source: EPA Sindh



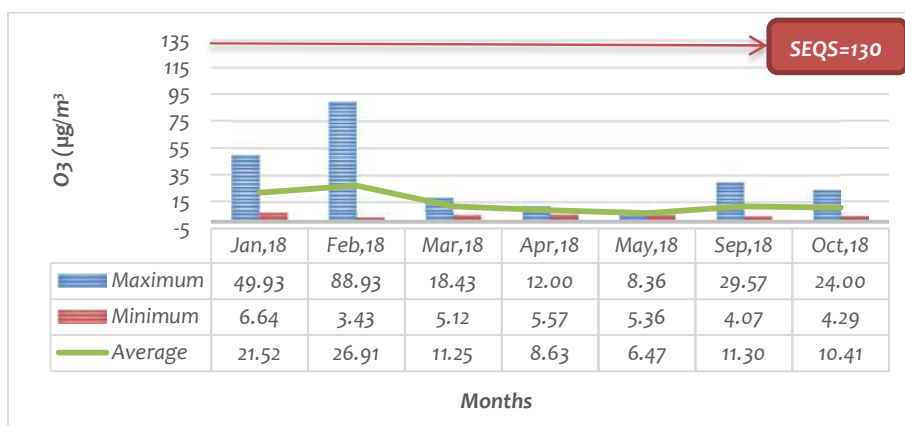
Source: EPA Sindh



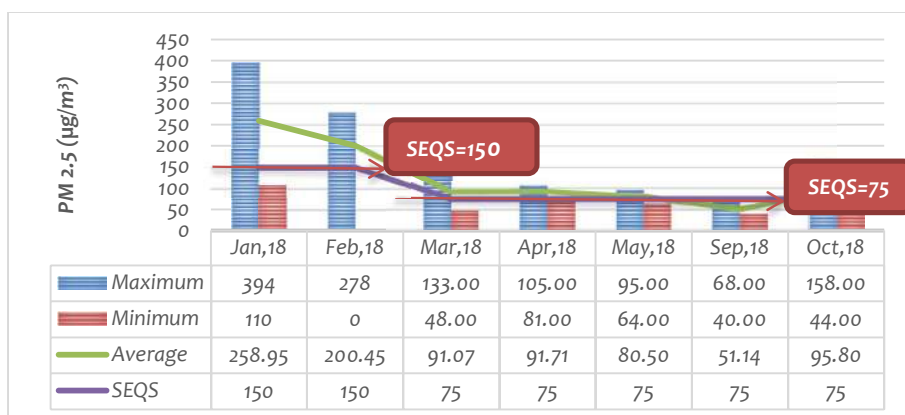
Source: EPA Sindh



Source: EPA Sindh



Source: EPA Sindh



Source: EPA Sindh

Figure 4.12: Ambient Air Quality of Karachi (Source: SEPA Monitoring Station)

Air quality data was meticulously gathered over a four-day period, from January 23 to 26, 2018, as part of the Detailed Engineering Design and Environmental Impact Assessment (EIA) conducted for the Bus Rapid Transit (BRT) Project. This crucial data collection took place specifically at the Tayyab Mosque, strategically located in one of the most heavily travelled sections adjacent to the prominent People's Secretariat Chowrangi and the historically significant Mausoleum. The significance of this location cannot be understated, as it is not only a hub of daily commuter traffic but also a focal point of civic activity, making the air quality in this area an important public health concern.

The gaseous parameters were analyzed as 24-hour averages, carefully compiled from hourly readings meticulously taken by SUPARCO utilizing its advanced mobile monitoring van, equipped with state-of-the-art technology for precise measurement. For the assessment of particulates and lead, a comprehensive high-volume sample was collected over a continuous 24-hour period, ensuring that the data reflected the true nature of air quality in this bustling urban environment. Although the reported values for various air quality indicators fell within the relevant SEQS (Sindh Environmental Quality Standards) limits, it is noteworthy that the particulate concentrations were markedly elevated. Specifically, PM₁₀ was recorded at 128 µg/m³, PM_{2.5} at 49 µg/m³, and Suspended Particulate Matter (SPM) at a concerning level of 390 µg/m³, raising alarms about potential health implications for the local population.

The Pakistan Air Quality Initiative (PAQI) has been measuring particulate matter (PM_{2.5}) levels in Karachi since October 2016. The measurements show a PM_{2.5} concentration of 47 micrograms per cubic meter of air (µg/m³) for October to December 2016. The World Health Organization (WHO) prescribes 10 µg/m³ as the guideline value for ambient air. Exceeding this value leads to serious public health issues.

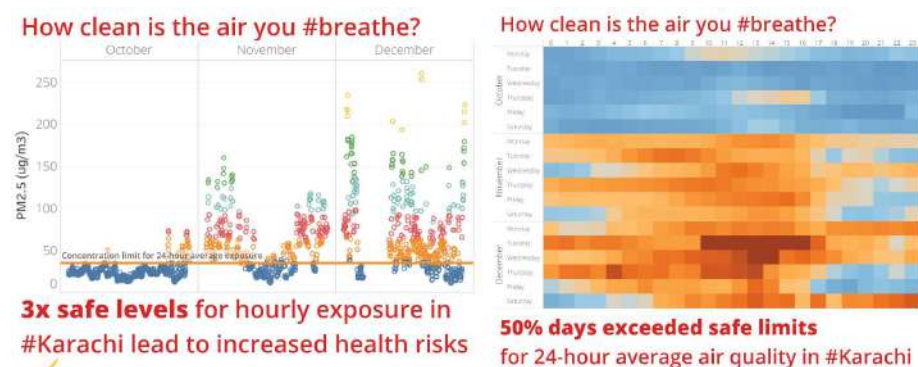


Figure 4.13: How Clean is Karachi's Air

Karachi's air quality is nearly 5x above this level, and twice the value for daily exposure. That is also 3x the safe levels recommended by the National Environmental Quality Standards for Ambient Air by the Pakistan Environmental Protection Agency (Pak-EPA).

The PAQI reports reveal Karachi faces severe, worsening air pollution, with 2024's average PM_{2.5} levels over nine times the WHO guideline, driven mainly by transport (33%) and industry (49%), causing health crises, with winter spikes significantly worse than monsoon levels, yet official monitoring and action remain insufficient.

Key Findings from PAQI Reports:

- **Severe Pollution Levels:** In 2024, Karachi's annual average PM_{2.5} was 46.2 µg/m³, far exceeding WHO guidelines (10 µg/m³) and national standards.
- **Major Sources:** Industry contributes 49% of particulate matter (PM_{2.5}), while transport adds 33%, with yearly emissions totalling 39.11 kilotons of PM_{2.5}.
- **Seasonal Impact:** Pollution spikes dramatically in winter (e.g., 4.3 times higher than monsoon levels in 2023-2024).
- **Health Emergency:** The high pollution levels create a constant public health emergency, leading to rising respiratory infections.

EHS Services also monitored the critical parameters in ambient air quality in the microenvironment of project area of Saima Centre Point (Phase-II) on 12th November 2025.

An assessment of ambient air quality at the Saima Centre Point (Phase-II) site classified the air-shed as unpolluted with respect to particulate matter concentrations. Specifically, SPM/TSP, PM₁₀, and PM_{2.5} concentrations were recorded at 133 µg/m³, 45 µg/m³, and 15 µg/m³, respectively. Furthermore, concentrations of sulfur dioxide (SO₂) at 8.6 µg/m³, nitric oxide (NO) at 8.8 µg/m³, nitrogen dioxide (NO₂) at 14.2 µg/m³, carbon monoxide (CO) at 0.2 mg/m³, and ozone (O₃) at 19.1 µg/m³ were all found to be within the permissible limits stipulated by the SEQS. This observation is attributed to the site's relative off-set from pollutant emissions, particularly vehicular traffic emanating from M.A. Jinnah Road.



However, ambient noise levels, which ranged from 57 dB(A) to 74 dB(A), were found to be in excess of the SEQS [SEQS Limits: 55/45 dB(A) Leq Day/Night. These are the SEQS Limits for Residential Area (A) Category Zone Sindh Environmental Protection Act, 2014 No. PAS/Legis-B-06/2014] standards. Consequently, the impact of traffic-related emissions and noise originating from the roads adjacent to the project site is anticipated to constitute a significant environmental disturbance, necessitating mitigation strategies to be integrated into the project's architectural design, as well as its construction and operational phases.



4.2.6 Water Resources, Water Quality and Drainage

4.2.6.1 Hydrogeology of Karachi

Hydrogeologically, the city of Karachi lies in the Hab River Basin and the Malir River Basin. The Malir River Basin is drained by the Malir River and the Lyari River. The aquifer of Karachi is, therefore, mainly recharged by seepage from Hab River, Hab Dam as well as the Malir and the Lyari Rivers. The Hab River lies on the western frontier of Sindh and for some distance the boundary between Sindh and the Baluchistan provinces. It 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, a number of 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 are contributing to the groundwater recharge in Karachi. The first possible source is the rainfall. As the city of Karachi suffers from deficit of precipitation (only rainfall), the contribution to shallow groundwater storage from rain is very little. However, rainfall in the hinterlands and other areas surrounding Karachi may significantly contribute to the groundwater flow-system. The two freshwater sources are the Hab Lake/Hab Dam and the Indus River. Water from Hab 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 are also contributing to groundwater storage as a fourth recharge source. Seawater intrusion along Karachi coast is the fifth possible source.

Shallow Groundwater: Physico-chemical data of shallow groundwater (depth less than 30 meters) shows that the shallow wells, located in the vicinity of coast and in the proximity of polluted rivers, have relatively higher values of electrical conductivity, salinity and population of Coliform bacteria. The shallow groundwater is moderately saline, representing electrical conductivity values in the range of 1.1 to 1.9 mS/cm and salinity in the range of 1 ppt. The pH of shallow groundwater varies from mildly acidic (~6.3) to mildly alkaline values (~7.9). Areas with quite poor sanitary conditions have relatively low values of pH (~6.3 to 6.8). Shallow groundwater below 20 meters is slightly reducing. The dissolved oxygen is in the range of 1.5 to 7.9 mg/L. Turbidity of shallow groundwater varies between 3.6 NTU and 95 NTU. The concentration of HCO_3^- (356-514ppm, n=4), Cl^- (82-169 ppm, n=4) and SO_4^{2-} (38-117 ppm, n=4) in shallow groundwater is very reasonable. The mean chemical concentrations of Cl^- , SO_4^{2-} and HCO_3^- in shallow groundwater are as follows:

- Mean Cl^- (Shallow Groundwater): 132.8 ± 36.5 ppm (n=4)
- Mean SO_4^{2-} (Shallow Groundwater): 63.3 ± 36.7 ppm (n=4)
- Mean HCO_3^- (Shallow Groundwater): 423 ± 67.4 ppm (n=4)

The range of variation in stable isotope content of total dissolved inorganic carbon (TDIC) and oxygen in Lyari River water is as follows:

- $\delta^{18}\text{O}$ (Shallow Groundwater) -6.3 to -5.8 ‰ V-SMOW (n=8)
- $\delta^{13}\text{C}$ (TDIC-Shallow Groundwater): -16.5 to -5.5 ‰ PDB (n=8)

The mean stable isotope content of ^{18}O and ^{13}C in shallow groundwater is as follows:

- Mean $\delta^{18}\text{O}$ (Shallow Groundwater): $-5.9 + 0.32$ ‰ V-SMOW (n=8)
- Mean $\delta^{13}\text{C}$ (TDIC-Shallow Groundwater): $-10.1 + 3.3$ ‰ PDB (n=8)

The stable-isotope results indicate that the shallow / phreatic aquifers are recharged by a mixture of fresh waters of Indus River and Hab River (draining spring water and flooded rainwater), as well as polluted Lyari and Malir rivers and their feeding drains (both under natural infiltration conditions and artificially induced infiltration conditions) and, to a much smaller extent, from direct recharge of local precipitation.

Deep Groundwater: In general, Deep groundwater is mostly saline and has high electrical conductivity (range: 1.9- 19.1 mS/cm) and salinity (range: 1.7-7.4 ppt), as compared to shallow groundwater.

Based on hydro chemical data of water samples collected from pumping wells, it is assumed that the shallow mixed deep groundwater discharged by large-scale pumping wells mainly represents the deep groundwater from confined

aquifer. The mean chemical concentrations of Cl^- , SO_4^{2-} and HCO_3^- in shallow mixed deep groundwater are as follows:

- Mean Cl^- (Deep Groundwater): 2169.2 + 1828.0 ppm (n=9)
- Mean SO_4^{2-} (Deep Groundwater): 458.4 + 691.4 ppm (n=9)
- Mean HCO_3^- (Deep Groundwater): 353.6 + 215.4 ppm (n=9)

The range of variation in stable isotope content of total dissolved inorganic carbon (TDIC) and oxygen in shallow mixed deep groundwater is as follows:

- $\delta^{18}\text{O}$ (Deep Groundwater): - 6.2 to -4.2 ‰ V-SMOW (n=10)
- $\delta^{13}\text{C}$ (TDIC – Deep Groundwater): -13.2 to -0.3 ‰ PDB (n=10)

The mean stable isotope content of ^{18}O in shallow mixed deep groundwater is as follows:

- Mean $\delta^{18}\text{O}$ (Deep Groundwater): -5.3 + 0.7‰ V-SMOW (n=10)
- Mean $\delta^{13}\text{C}$ (TDIC- Deep Groundwater): -10.5 + 3.7‰ PDB (n=10)

The hydro chemical and stable isotope results indicate that the confined aquifer hosts a mixture of rainwater from hinterlands and surrounding regions around coastal Karachi, as well as sea trapped water / seawater, through intrusion under natural infiltration conditions or under induced recharge conditions.

Groundwater Recharge Characteristics/Sea water Intrusion: Presently, coastal Karachi is known to have five sources of recharge to its groundwater reserves.

- (i) Rainfall,
- (ii) Indus River water supply
- (iii) Hab-River & Hab Lake water supply
- (iv) Polluted Lyari and Malir rivers/ contributory channels draining mixtures of domestic industrial and agricultural wastewater, composed of pre-said three sources
- (v) Seawater.

The possibilities of major contribution to groundwater recharge of shallow/phreatic aquifer directly by local rainfall seems very small, due to very poor frequency of rainfall events and rainfall intensities in the Karachi and high evaporation rates. The long-term (15 years annual record) mean monthly average precipitation for Karachi is between 0-15 mm during the months of January to June, 23 – 91 mm during the months of July to September, and 0-7 mm during the months of October to December. The remaining four sources play a significant role in recharge of the shallow aquifer-system and deep groundwater system (confined aquifer) in coastal Karachi. Unpolluted seawater of Karachi coast is characterized by a $\delta^{18}\text{O}$ value of ~ +1 ‰ VSMOW and a chloride content of ~23000 ppm. Both the Lyari River and Malir River waters, as well as the Indus River water and the Hab Lake water, have extremely very low aqueous contents of chloride and sulfate ions as compared to seawater. The average mean value of $\delta^{18}\text{O}$ in polluted river waters is ~ 5 ‰ V-SMOW and in shallow groundwater is -5.9 ‰ V-SMOW. The relatively deeper ground waters

representing confined aquifer have a mean $\delta^{18}\text{O}$ value of -4.3‰ VSMOW and excessively high values of aqueous chloride and sulfate.

4.2.6.2 Greater Karachi Bulk Water Supply System

To supply the city of Karachi with 280 MGD of water supply, the Greater Karachi Bulk Water Supply Scheme was designed in 1953. The scheme was modeled and divided into four equal phases on the basis of population projection till the year 2000. Each scheme, with the design rate of 70 MGD, comprised of open canals, covered conduits, a tunnel, siphons, pumping stations and mains to supply water from the Keenjhar Lake. The details are discussed below and shown in Figure 4.14.

1st Phase

- Proposed raw-water pumping at Dhabeji to bring 70 MGD of water from Keenjhar Lake and water treatment plant of 70 MGD at COD Hills, Karachi.
- Development of complete water conveyance system comprising of a 280 MGD lined canal, a conduit of equal capacity up to Pipri and of 140 MGD capacity up to Karachi.
- Work on 10 MG reservoir at COD Hills along with the distribution net-work.
- It started in 1954 and completed in 1961 at a total cost of PKR 185 million.

2nd Phase

- It included construction of a 70 MGD pump house at Dhabeji, laying of 84" dia pre-stressed pipe siphons, a 25 MGD pump house at pipri and two water treatment plants of 25 and 45 MGD along with 10 MG reservoirs at Pipri and COD Hills respectively.
- Work for this phase was awarded in 1969 and completed in early 1971 at a total cost of PKR 200 million.

3rd Phase

- It included the construction of a 70 MGD pumping station at Dhabeji, two pumping stations along with water treatment plants of 25 MGD capacity each at North East Karachi and Pipri, 84"dia pipe siphons, three balancing reservoirs and the distribution mains.
- - A reservation for supply of 22 MGD of un-filtered water to Karachi Steel has also been made under this phase.
- - Work for this phase started in 1975 and completed in 1978 with the total cost of PKR 750 million.

4th Phase

- Due to financial constraints, 4th Phase works were divided into two parts.
- Under this phase improvement of lined canal, modifications of the present Dhabeji Pumping Stations, laying of 84" dia pipe syphons, construction of a 25 MGD pump house and clarification units at Pipri were commissioned.
- Also, improvement of the secondary distribution network and installation of domestic meters in K.D.A. Scheme No.1 & 5 were taken up with the assistance of World Bank and all the works were completed in June, 1987 at a total cost of PKR 360 million.

- After this phase, the city's water supply increased by 50 MGD.

Hub Water Supply System

- The Hub dam was constructed by WAPDA on Hub River to from 1963-1981
- At Stage-I, 90 MGD pump house, two steel pressure mains one 20 MG reservoir, trunk mains and primary treatment of lake water by screening and chlorination were completed in August, 1982 at a total cost of PKR 260 million.
- Stage-II included the improvement of secondary distribution network and construction of a 90 MGD water treatment plant.

5th Phase (Greater Karachi Bulk Water Supply Scheme)

- Karachi's water supply system has expanded considerably in this phase. As discussed in initial four phases, Karachi was getting 280 MGD of water.
- Then 100 MGD water were added to the system through K-II supply project which were completed in 1998 with the assistance of World Bank.
- Through a bulk water supply project, the city got another 40 MGD of water in 2000.
- K-III 100 MGD Water Supply Project, further added into the existing supply which were completed in 2006 with the assistance of GoP.
- Now, the K-IV water project has been planned to fill the gap between the city's demand and supply of water.
- Approved on July 10, 2014 with the proposed design capacity of supplying an additional 650 MGD of water to Karachi. K-VI will be completed in three phases at a cost of PKR 25.6 billion rupees.

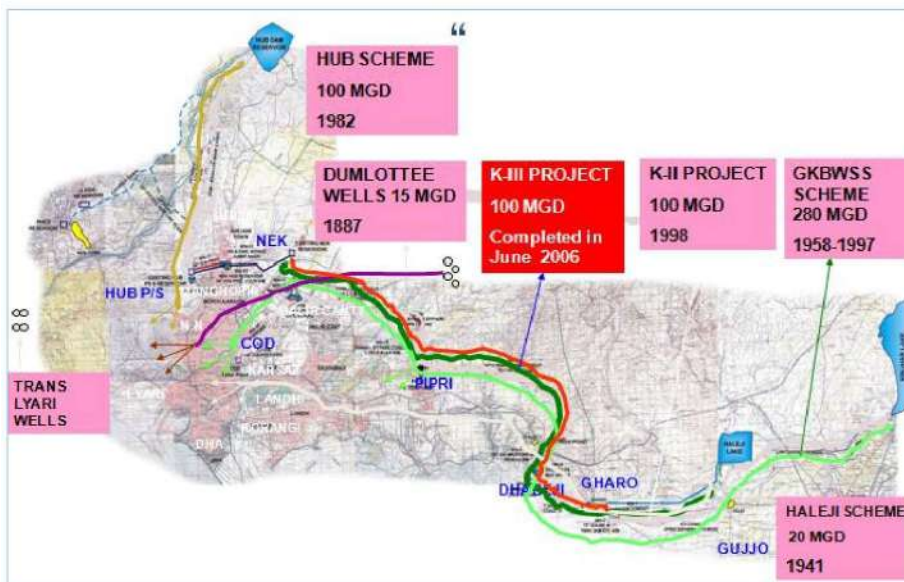


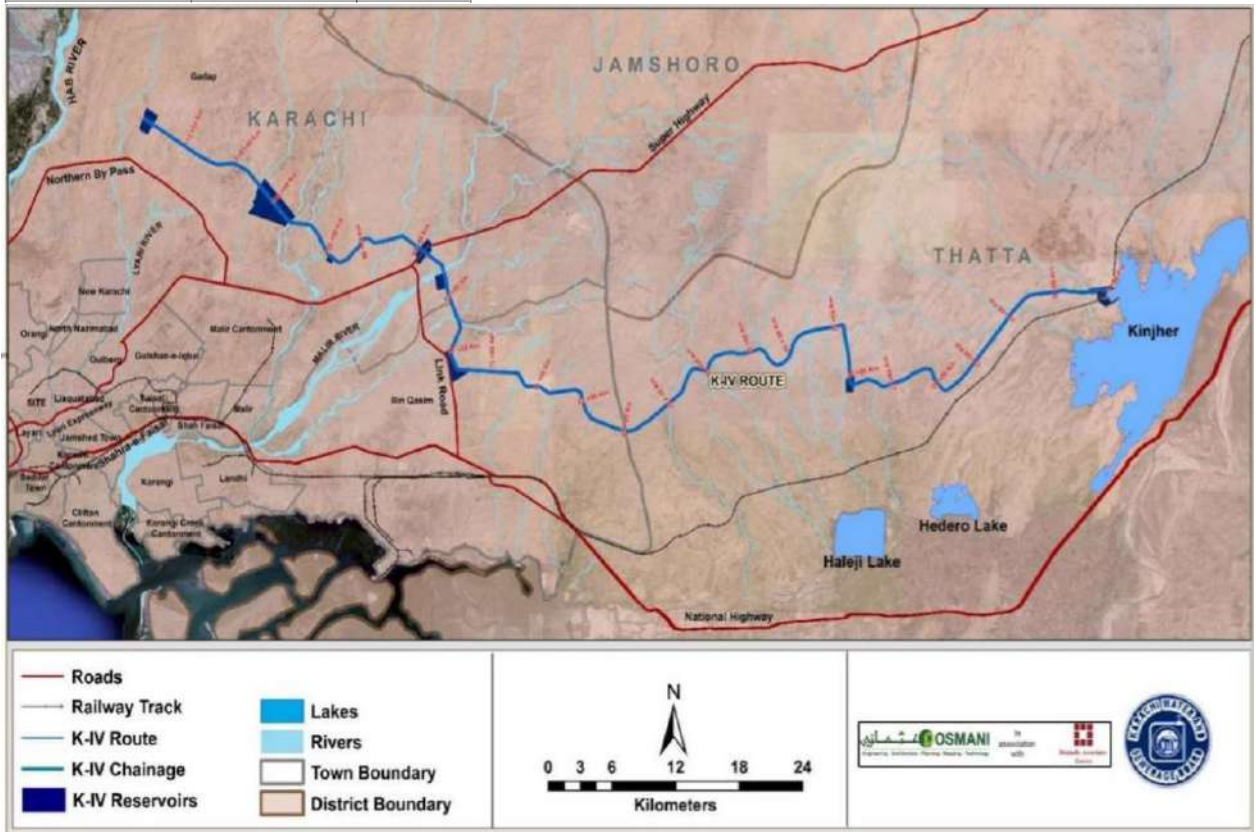
Figure 4.14: Water Supply System of Karachi (Glimpse from Past to Present)
Source: KW&SB (2019)

4.2.6.3 Proposed Bulk Water Supply Scheme

K-IV, is a municipal infrastructure project being jointly developed by the Provincial and Federal Governments in Karachi, Pakistan, to augment the city's daily water supply. This project is divided into three phases and each phase will increase water supply capacity. Details of K-IV are shown in Figure 4.15.

K-IV Project; Part of Greater Karachi Water Supply Scheme, Indus Water from Keenjhar Lake to Karachi City		
Phase	Capacity	Proposed Completion Year
K-IV Phase-1	260 MGD	Year 2018
K-IV Phase-2	260 MGD	Year 2022
K-IV Phase-3	130 MGD	Year 2025

Figure 4.15: K-IV Bulk Water Supply Schemes Karachi



4.2.6.4 Present Water Supply and Sewerage System

The water supply and sewerage system in the macroenvironment is managed by Karachi Water Supply & Sewerage Board (KW&SB). Present water supply system of Karachi City has a supply capacity of 560 mgd. Actually, as of the end of year 2006, the KW&SB supply bulk water of about 630 mgd beyond the capacity as

shown in following Table. Out of 630 mgd, water of 209 mgd is supplied without filtration, which is equivalent to one third of actual supply amount of 630 mgd.

Water is collected and treated by the conventional water treatment plants and distributed by a system which is at least 40-45 years old with some new distribution facilities in the city. The outdated system along with improper operation and maintenance causes the issue of revenue loss. In addition, there is no metering for retail customers and only 25 percent of commercial and industrial customers have a metered supply. The water supply is irregular due to power failure at KW&SB pumping stations which further increases the problems in water distribution system. Moreover, almost 40 per cent of the population lives in slums with limited water supply & poor sanitary infrastructure.

Figure 4.16 presents the detailed water distribution in Karachi.

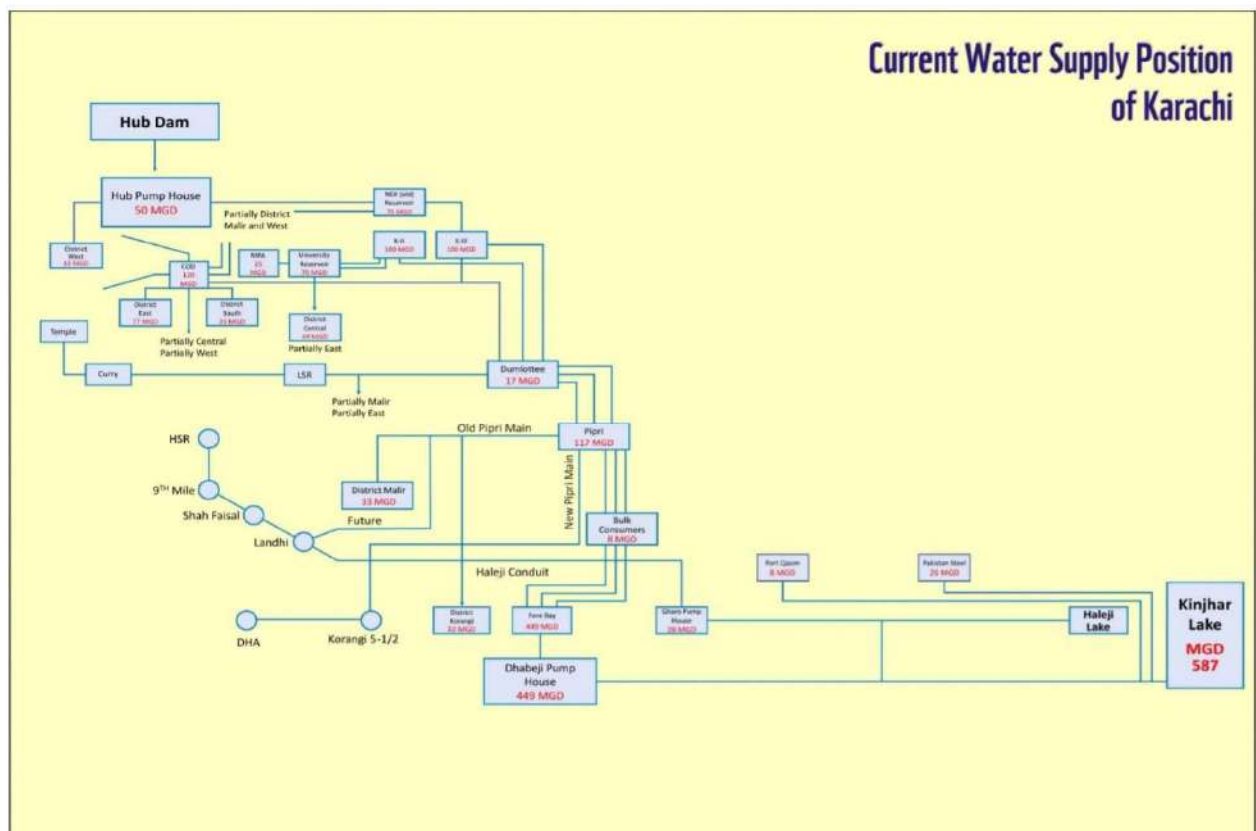


Figure 4.16: Current Water Distribution System in Karachi from Hub Reservoir and Keenjhar Lake

Table 4.1: Present Water Supply Capacity			
Supplied from		Rated Capacity	Actual Supply
Gharo Filtration Plant		20 mgd	30 mgd
Pipri Filtration Plant	with Filtration	100 mgd	102 mgd
	without Filtration	-	32 mgd
Dumlottee Conduit (without Filtration)	from Wells	20 mgd	0 mgd
	from GK/K-III Systems	-	17 mgd
NEK Old Filtration Plant		25 mgd	5 mgd
NEK New Filtration Plant		100 mgd	100 mgd
COD Filtration Plant	with Filtration	115 mgd	104 mgd
	without Filtration	-	48 mgd
Hub Filtration Plant		80 mgd	80 mgd
Supply without Filtration (from K-III System)		100 mgd	95 mgd
Supply without Filtration (from GK System)		-	17 mgd
Total		560 mgd	630 mgd

4.2.6.5 Water Supply Network

Karachi water and sewerage corporation (KWSC) is the organization responsible for water transmission and distribution across the city. Indus river system authority (IRSA) provides water to Sindh, therefore, this river indirectly becomes part of water supply system for the city. River Indus feeds water to the Lake Keenjhar. From Keenjhar, water through conduits goes to Haleji, Gharo, Port Qasim, Steel Mills and then to Dhabeji pumping station. From Dhabeji Pumping station, water is pumped to different pumping stations to supply water among all six districts of the city by using electrical pumping motors. Water from Hub Dam is supplied to Hub Pump House through Hub Canal and then supplied to NEK, Old Reservoir and different areas of the city. Karachi's water supply infrastructure comprises of 25 bulk water reservoirs, 150 pumping stations, 8 water-filtration plants, 75 kilometers of canals, over 11,000 kilometers of pipeline, 20 sewage-pumping stations, 3 sewage treatment plants, and over 250,000 manholes. Almost 1.13 million domestic connections and 9,317 bulk customers in Karachi are provided water supply and sewerage services (Figure 4.17). In informal settlements and industries, the most of the water demand is met through non-piped systems, including private water tankers. Almost 24 hydrants have been licensed to the private parties by KWSC. Out of these 24 hydrants, only 10 are operational while the rest were closed as per a recent Supreme Court Order. unregulated hydrants are rampantly spread across the city. KWSC introduced amendments to discourage the illegal use of hydrants. Since 2009, it has dismantled over 948 illegal hydrants in an effort to confront the illegal use of water. Now six regulated and meter hydrants supply water to the city. Despite that, the issue of unregulated hydrants needs attention. There are two distribution channels for Karachi, mainly Northern and Southern Channels.

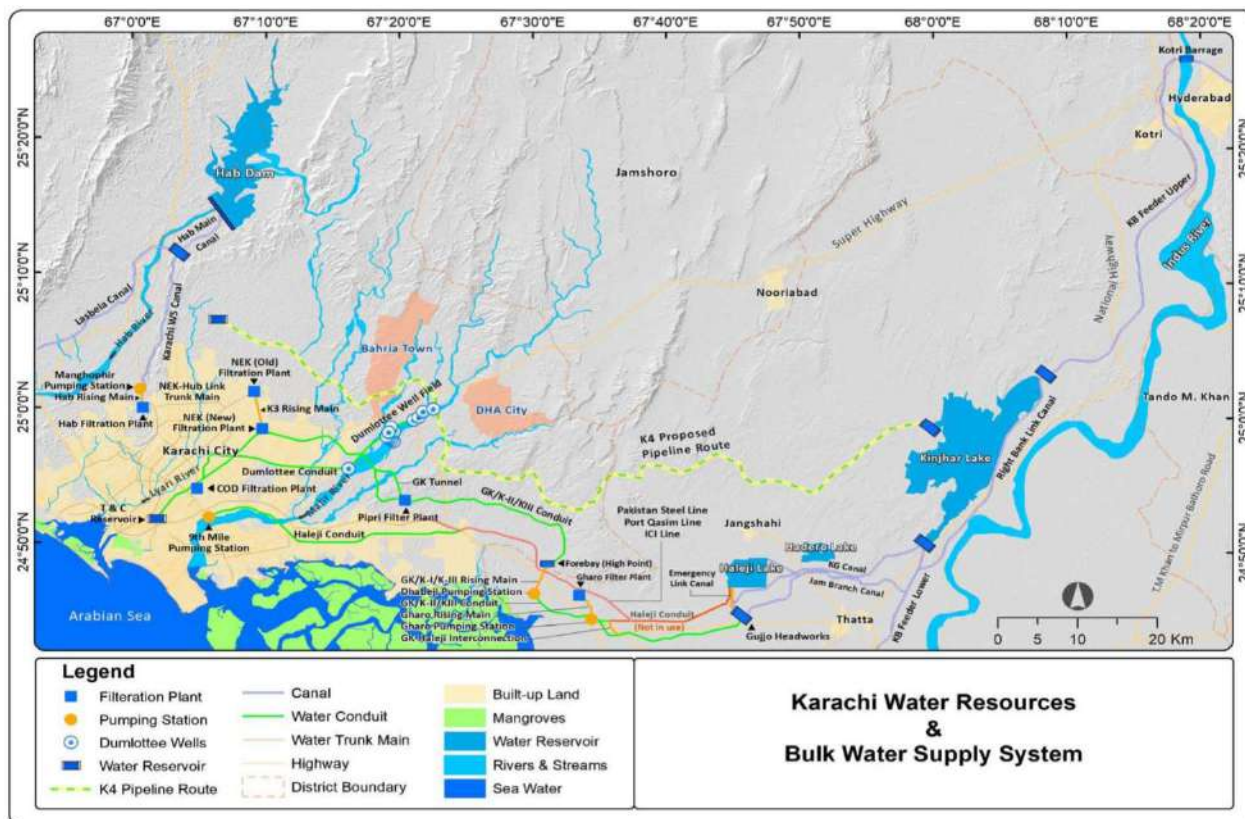


Figure 4.17: Karachi Water Resources and Bulk Water Supply System

4.2.6.6 Water demand and supply with past trends and future trends

Karachi predominantly depends on the River Indus for its water supply, particularly due to the reduced inflow from the Hub Dam. Currently, the city receives about 580 million gallons per day (MGD) from the River Indus, while its actual requirement ranges between 820 and 1,200 MGD per World Health Organization (WHO) standards, indicating that Karachi is only meeting approximately 50% of its water needs.

The K-IV water supply project, which consists of three phases, is critical to addressing this issue. Phase I aims to add an additional 260 MGD to the existing supply network but remains incomplete, exacerbating the water demand and supply gap. Phases II and III are planned to contribute another 260 MGD and 130 MGD, respectively; however, delays are anticipated for these phases as well. Even upon completion of the K-IV project, it is expected that the city will

continue to face water shortages, and the situation is projected to worsen without additional measures being implemented to rectify the current challenges.

4.2.6.7 Surface water and Groundwater Quality Assessment

The water scarcity in Karachi is largely attributed to the rapid population growth and industrial activities, compelling residents to rely on alternative water sources such as privately-owned groundwater systems. These sources extract, process, and sell groundwater at significantly high costs. Unfortunately, the quality of this groundwater is poor, primarily due to over-extraction by farmers, infiltration of domestic wastewater, contamination from industrial chemicals, and seawater intrusion, which make it unsafe for human consumption without adequate treatment.

A study conducted by the Pakistan Council of Research in Water Resources (PCRWR) during 2015-2016 revealed alarming water quality issues in Karachi. Out of 28 water samples taken from various sources, 24 were contaminated with E. coli, indicating that approximately 86% of Karachi's water is unfit for consumption. The most likely cause of this bacterial contamination is the discharge of sewage, which often runs parallel to drinking water pipelines, leading to contamination due to poor maintenance and pipe breakages. Notably, no significant improvement in water quality was observed from 2002 to 2015.

Additionally, another analysis of surface and groundwater samples found that nearly 88% of the sources exceeded the World Health Organization's recommended lead levels. A World Bank study across 18 towns in Karachi revealed that 89% of blood samples showed lead levels higher than WHO guidelines. Elevated lead exposure has been linked to learning disabilities in children, posing substantial socioeconomic challenges for future generations.

4.2.6.8 Ground Water Potential in the Macroenvironment

An electrical resistivity survey was performed to evaluate the subsurface geological conditions and assess the area's groundwater potential. The survey revealed six primary geoelectric layers, consisting of Alluvium, Sand, Limestone, Clay, sandy limestone, weathered Manchar Formation, and fractured sandstone beds of the Middle Miocene Gaj Formation. These formations are well-established regional aquifer hosts, exhibiting conditions favorable for sustainable groundwater extraction.

4.2.6.9 Sewerage system of Karachi

To enhance the sewerage system of Karachi and mitigate pollution in natural water bodies, the Karachi Water and Sewerage Corp (KWSC) is implementing the Greater Karachi Sewerage Plan (S-III). This initiative seeks to improve the environmental conditions of the city through a comprehensive system for the collection, treatment, and disposal of wastewater from municipal and industrial sources. Sewage will be transported via a reinforced concrete pipe to the River Lyari and Malir, eventually being discharged into the sea.

Key Components of the Project:

- **Malir Trunk Sewer:** 5 contract packages totaling 22.74 km in length.
- **Lyari Trunk Sewer:** 8 contract packages spanning 33.32 km.
- **Upgrading and Capacity Enhancement of Sewage Treatment Plant** from 51 to 100 MGD at Haroonabad SITE.
- **Upgrading and Capacity Enhancement of Sewage Treatment Plant** from 54 to 180 MGD at Muaripur.
- **Construction of a New Sewage Treatment Plant** in Korangi with a capacity of 180 MGD.

The treatment of sewage, a previously neglected issue, received renewed attention from the water commission, culminating in the restoration of Sewage Treatment Plant-III (77 MGD) in June 2018. Although the completion of Treatment Plant-I (100 MGD) was anticipated in 2019, it remains unfinished, despite prior commitments made to the Judicial Commission. Additionally, Sewage Treatment Plant-IV (180 MGD), expected to be operational by December 2020, has yet to be completed. In June 2025, the Chief Minister of Sindh instructed KWSC to ensure the full operational status of the TP-I component of the S-III project by the end of August and to expedite the work on TP-IV for completion within a year.

Recent updates highlight that the Haroonabad TP1, located in the SITE Industrial Area, is currently operational and undergoing testing as of December 2025. Described as a "game-changer," this plant aims to recycle sewage for industrial use, targeting a supply of approximately 1 million gallons per day (MGD) to the SITE area by the end of December 2025. This initiative is expected to reduce industrial production costs while conserving clean public water. Furthermore, secondary treatment for 20 MGD has been successfully completed, with plans to eventually treat up to 100 MGD of sewage. TP1 primarily caters to major districts, including SITE, North Nazimabad, North Karachi, Gulberg, and Liaquatabad.

Another treatment facility was established in DHA Phase VIII to manage sewage from both DHA Phase VIII and Clifton Cantt. This facility became operational in 2014 with a capacity of 2.4 MGD, currently processing 1.2 MGD of sewage from DHA Phase VIII.

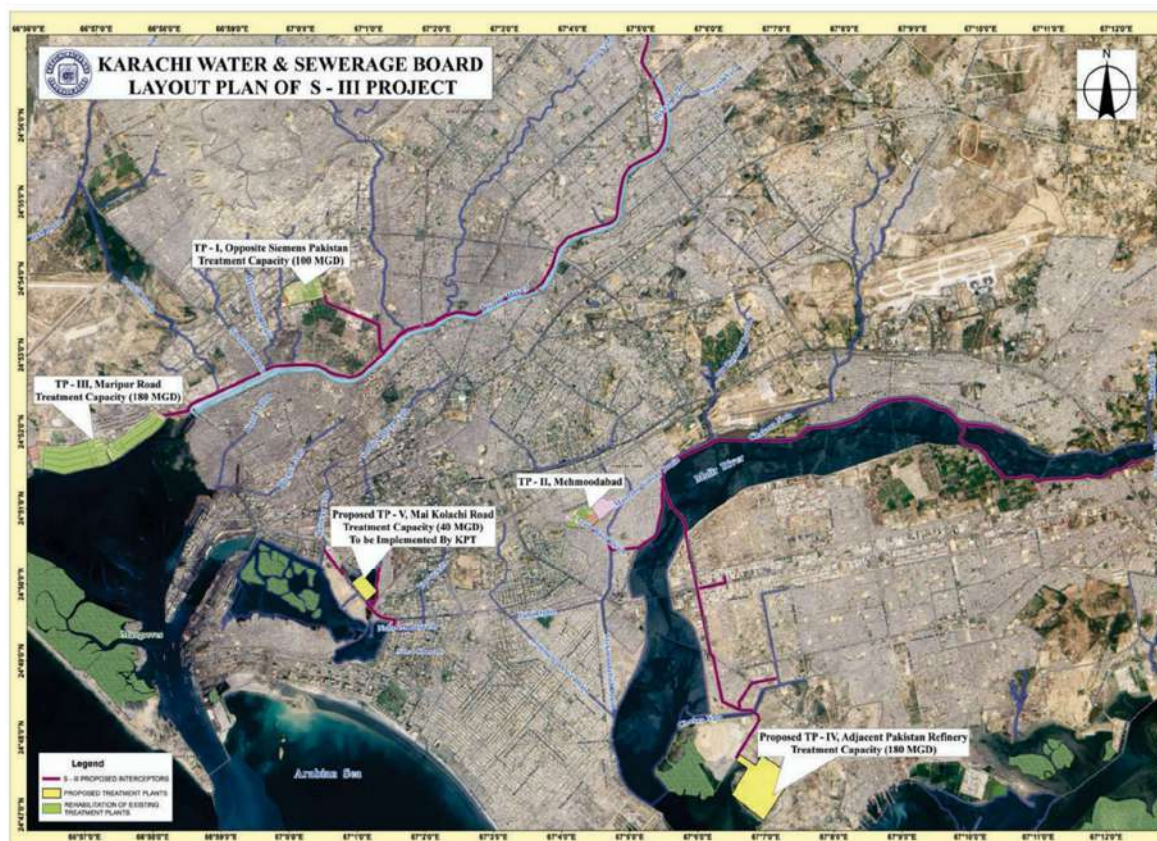


Figure 4.18: Layout Plan of S-III

4.2.6.10 Collection and Disposal Mechanism

Sewage is collected through a network of pipes and open channels and is discharged into water bodies via rivers and nullahs. In Karachi, untreated wastewater, which includes domestic sewage and industrial effluents, is released into the Lyari and Malir rivers, eventually reaching the coastal areas. Of the 475 million gallons per day (MGD) of wastewater generated, approximately 420 MGD remains untreated, with part of it flowing into the sea through a 232 km long Main nullah and a 1000 km network of local drains. These nullahs primarily feed into the two key rivers, Malir and Lyari.

Currently, there exists a significant disparity between the volume of wastewater produced and the capacity of treatment facilities. The amount of wastewater

generated in Karachi surpasses the treatment plants' capabilities, with an estimated 417-425 MGD being discharged into the sea untreated.

4.3 Description of Ecological Environment

Jafri (1966) remains the foundational reference for Karachi's flora, having cataloged 72 families, 249 genera, and 403 species, exclusive of commonly cultivated or naturalized taxa. Subsequent research by Hussain et al. (2010) and others has documented significant species loss. Their assessment indicates that over 35% of the species originally detailed in Jafri's Flora of Karachi now qualify for inclusion in the Red Data Book, categorized as extinct, endangered, vulnerable, rare, indeterminate, or generally threatened (Hussain et al., 2010).

Hussain et al. (2010) specifically identify 16 native threatened tree species, 11 threatened shrub species, and 29 threatened understory shrub species. Additionally, 11 woody climbers and seven herbaceous climbers are categorized as threatened, as are a number of herbaceous plant species. Among trees, *Tecomella undulata* has become locally extinct, alongside three other endangered tree species, and *Mimosa hamata* is classified as rare.

Historically, the Karachi University campus offered the most comprehensive representation of the city's flora. However, by 2010, extensive eradication had occurred, leaving protected and enclosed areas such as Malir cantonment, Shah Faisal cantonment, Masroor Airport, Korangi, and the PAF base as the primary remaining repositories for Karachi's native and indigenous plants (Hussain et al., 2010).

Karachi's principal habitats include arid hills and low-lying sandy areas situated within and between the Lyari and Malir rivers. Hillside vegetation primarily consists of camelthorn (*Prosopis spicigera*), wild caper (*Capparis decidua*), and large succulents like *Euphorbia caudicifolia*. Sandy areas typically feature sparse cover from small trees such as *Acacia senegal*, *Zizyphus nummularia*, and *Prosopis cineraria* (mesquite), along with shrubs like *Leptadenia pyrotechnica*, *Colotropis procera*, *Rhazya stricta*, *Inula grantioides*, *Zygophyllum simplex*, and *Sueda fruticosa*. Calcareous hills host species such as *Vernonia cinerascens*, *Commiphora wightii*, *Grewia tenax*, and *Euphorbia caducifolia*. Shallow slopes with varied soils at low altitudes are populated by trees including *Zizyphus nummularia*, *Salvadora oleoides*, and *Capparis deciduas*. Common shrubs in these areas are *Grewia tenax*, *Seddera latifolia*, and *Rhazya stricta*, found alongside grasses such as *Ochthochloa compressa*, *Cymbopogon jawarancuss*, and *Aristida funiculata*.

The most common native vegetation combination in Karachi City comprises *Prosopis cineraria* (mesquite), *Indigofera oblongifolia* (a perennial shrub found in diverse habitats including grassland, bushland, and sandy soils), and *Euphorbia caducifolia* (a succulent growing profusely on sandy soils).

Native plants are destroyed through brush clearing and 'cleanliness drives,' often undertaken by those unaware of the ecological value of the eradicated flora. Consequently, habitats have shrunk, and species numbers have been reduced, placing many on the threatened species list.

Development activities, particularly the construction of the BRT Corridor, have substantially removed vegetative cover and reduced the biodiversity of terrestrial fauna and flora within the Saima Centre Point (Phase-II) Project's macroenvironment. While shoreline flora species still present are not listed on the IUCN Red List of Endangered Species, remaining native terrestrial vegetation primarily comprises various bushes and shrubs. Some introduced vegetation failed to sustain due to a lack of official interest. Given the water shortage, available vegetation is irrigated with sewage effluent.

EMC (2015) identified nine tree types, 10 shrubs, and two grasses as likely present in the Green Line alignment area. A subsequent tree count for the Green Line identified 72 tree types. Vegetation on hill slopes and hillsides mainly comprises camel thorn (*Prosopis spicigera*), wild caper (*Capparis decidua*), and large succulents such as *Euphorbia caudicifolia*. Overall, the survival of animals and plants in Karachi's natural environment is challenging due to severe arid conditions, extensive land clearance, and other impacts of urbanization.

Urban sprawl has induced significant ecological risk through land clearance and the removal of natural vegetation from the plains to accommodate development. Extensive drought damage, evident from land clearing activities, has forced surviving natural vegetation in these areas to adapt to harsh conditions. While wide distribution of vegetation generally ensures the survival of botanical species, the promotion of vegetation was not an objective for any development activity in the Towns. Furthermore, no ecological risk assessment was conducted to identify the long and short-term risks associated with tree felling, and necessary mitigation measures were neither recommended nor adopted. Consequently, no organized replantation of original trees or shrubs has been observed.

Much of the natural fauna has succumbed to urbanization. Consequently, only a few birds are typically found roosting in trees along roadway medians.

4.4 Description of Built Environment in Context of Proposed Mass Transit System

Karachi is currently experiencing an uncontrolled phase of rapid urbanization and motorization, placing immense strain on its transport infrastructure. Critically, all transport-related initiatives within the city are fundamentally geared towards easing chronic traffic congestion and fostering sustainable urban development. The city's current public transport system is notably insufficient; it constitutes a mere 4.5% of the total vehicle fleet, serves approximately 42% of passenger demand, and largely lacks dedicated lanes. This contrasts sharply with private vehicles, which represent 36% of the vehicular traffic but carry only 21% of passengers. Further fragmenting the system, para-transit modes account for 10% of the fleet and 8% of passengers, while contract carriages, comprising 2% of the fleet, surprisingly transport 10% of total passengers (*JICA Person Trip Study, 2005*).

To address these transportation externalities, a strategic shift towards a sustainable transportation system is essential. This imperative underpins comprehensive urban planning efforts, including the Karachi Strategic Development Plan (KSDP) 2020 and the JICA-led Karachi Transportation Improvement Project (KTIP) master plan up to 2030. These plans prioritize safe, efficient mobility, improved public mass transportation, and infrastructure development that supports planned land use changes and strengthens links between central and polycentric commercial nodes. The KTIP specifically proposes the revitalization of the Karachi Circular Railway (KCR), two Mass Rapid Transit (MRT) lines (Blue and Brown), and six critical Bus Rapid Transit (BRT) lines: Green, Red, Yellow, Orange, Aqua, and Purple.

Among these, Green Line BRT stands out as a pivotal project. Its proposed route commences at Municipal Park with a rotary U-turn lane, extending along M.A. Jinnah Road towards Gurumandir. From Gurumandir, the alignment proceeds northward along Business Recorder Road, Nawab Siddique Ali Khan Road, Shahrah-e-Shershah Suri, and Shahrah-e-Usman, passing significant landmarks such as Numaish, Board Office, and Nagan Chowrangi. Notably, the Green Line BRT shares a common corridor with the Blue Line BRT between Municipal Park and Gurumandir.

The primary objectives of the Green Line project are clear: to provide a reliable, safe, affordable, high-quality, and fast BRT bus service; to enhance the quality of life for Karachi's commuters; to vastly improve the overall public transport system; to establish dedicated infrastructure enabling efficient bus operations with exclusive right-of-way for a significant portion of the route; and to substantially reduce travel times. This project entails constructing a dedicated

busway in the median of the roads, with stations positioned centrally in both at-grade and elevated sections. This design facilitates high-speed operations (25 Km/h) and offers high capacity (29,400 passengers per hour per direction). Furthermore, the system's design incorporates passing lanes, allowing for future expansion and the introduction of direct or express services as demand grows.

The Green Line is strategically designed to integrate seamlessly within Karachi's broader transport network. It is planned to connect with the Orange Line BRT at Board Office Chowrangi, the KCR near Board Office, the Blue Line near Gurumandir, the Red Line BRT near Mazar-e-Quaid, and the Yellow Line BRT near Numaish in Saddar. By establishing these crucial interconnections and linking population centers to the city center, the Green Line, as part of Karachi's comprehensive transport strategy, is set to significantly contribute to easing traffic congestion and facilitating robust urban development.

4.5 Socioeconomic Environment

The proposed project site is located within Corridor-6 of the 1995 Karachi Mass Transit Corridors master plan. Corridor-6 encompasses inner-ring towns such as Saddar, Jamshed, Lyari, Liaquatabad, Gulshan-e-Iqbal, and Gulberg. These areas are characterized by a highly diverse mix of land uses, hosting significant governmental, regional industrial, and commercial activities.

Saddar, located in the heart of Karachi, is a prominent area renowned for its colonial-era architecture, with numerous 19th century buildings designed by British architects. Its name, derived from the word "Saddar" meaning "head" or "centre," fittingly reflects its status as Karachi's commercial hub. The broader Saddar area encompasses several historic and renowned Karachi localities, including Kharadar, Mithadar, Jodia Bazar, Bolton Market, and Nanakwara. Kharadar (Salty Gate) and Mithadar (Sweet Gate) boast a pre-colonial history, named after two gates erected in 1792. The Sweet Gate faced the Lyari River, while the Salty Gate opened towards the Arabian Sea; both were subsequently dismantled by the British.

Saddar's macroenvironment is often referred to as a "VIP town" due to its concentration of vital financial, commercial, and governmental institutions. It stands out for its historical buildings, including the official residences of the governor and chief minister, the Sindh Assembly, City, Sessions, and High Courts, the Supreme Court's Registry, and Quaid-e-Azam's Residence. Additionally, it hosts Karachi's main markets, the headquarters of various banks, and several diplomatic missions.

The project site's population primarily comprises elites, high-level decision-makers, and the upper-middle class, along with service providers. This demographic is largely literate and highly educated, holding influential positions within their organizations and society.

Total Population: Approximately 2.33 million, based on the most recent census.

Saddar Town: This sub-division has a population of 159,363 and is characterized by the high density typical of Karachi's colonial core.

Housing conditions in urban Saddar predominantly feature solid concrete or cement structures. While most buildings are robust, some older constructions on M.A. Jinnah Road's periphery incorporate traditional wooden elements. Newer residential developments, including flats, can also be found on M.A. Jinnah Road, notably near Wazir Mansion.

Public transportation in Saddar is extensive due to the area's high activity. The advent of ride-hailing services like Uber, Careem, and Bykea has further enhanced commuting convenience. Local rickshaws and taxis are readily available at major stops such as Metro Saddar and Al Madina.

Saddar is well-connected to the rest of Karachi via numerous public bus and coach routes, including lines 4-M, 11-A, 11-E, 11-D, 17-H, 17-I, 17-K, 1-L, 2-K, 4-B, 4-C, 4-G, 4-L, 6-B, C, and W-3. These services can be accessed from key stops like Metro Saddar, Al Madina, Frere Market, Tower, Haji Camp, and Sultanabad.

For intercity travel, several private bus and coach stations operate in the area, with popular options including:

- Daewoo Bus Service Station
- Faisal Movers Bus Service Station
- Blue Lines Luxury Coach Service Bus Stop

Markets: As Karachi's primary business district, Saddar boasts a wealth of shopping centers and markets. The iconic Empress Market, the city's oldest and a colonial architectural marvel, remains a popular destination, also housing a vibrant pet market. The "Mobile Market of Saddar" specializes in new and used cell phones and accessories.

Bazaars like Zainab Market, a favorite among Karachiites for unstitched cloth and diverse goods, are also prominent. Other notable markets include Regal

Market, Cooperative Market, Leather Market, Electronic Market, Bohri Bazar, and the renowned Rainbow Centre for media equipment.

Mosques, Temples, and Churches: Saddar is home to a diverse array of religious sites. Among its numerous mosques, the Taheri Masjid serves the Dawoodi Bohra Muslim community, and the Jamia Masjid-e-Khizra is another significant landmark. Other notable mosques include Jamia Masjid Makki, Aqsa Masjid, Jama Masjid Salih Sadar, Masjid Ahl-e-Hadees, Minara Masjid, Kutchi Memon Masjid, Jamia Masjid Millia, Jama Mosque Dar us Salam, and Qadri Masjid.

The area also features several prominent churches, such as St. Andrew's Church (near Zaibunnisa Street), Saint Patrick's Cathedral, Holy Trinity Cathedral, and St. Lawrence's Church. Additionally, Saddar hosts several temples, including HJ Behrana Dar-e-Meher (a large Parsi Fire Temple), Shri Swaminarayan Mandir, Panchmukhi Hanuman Temple, and Devi Mata Temple.

Schools, Colleges and Universities: The project area benefits from excellent educational facilities across all levels, supported by effective management systems promoting higher education. The female literacy rate is comparable to males, and technical skills training is robust. Skilled labor (e.g., drivers, mechanics) constitutes less than 10% of the population.

Saddar hosts numerous well-reputed schools offering both Matriculation and O-levels/A-levels, including:

- St. Patrick's Girls' High School
- Bai Virbaiji Soparivala Parsi High School (BVS)
- Karachi Grammar School
- The Mama Parsi Girls' Secondary School
- St. Joseph's Convent School
- Habib Girls' School
- Army Public School

Other notable schools are Husamiyah School, Rose Petal School (AKU-EB), Nasra School Main Campus, Guard Public School, Hyderi Public School, and Gerald's Academy School.

Saddar is also a hub for Karachi's leading higher education institutions, such as St. Joseph's College for Women, D. J. Sindh Government Science College, Sindh Muslim Government Arts and Commerce College, Government College of Commerce & Economics, and Sindh Muslim Law College. The National Academy of Performing Arts (NAPA) provides specialized training in music and arts.

Furthermore, top-ranking institutes offering professional degrees in business, medicine, and arts include:

- Dow University of Health Sciences (DUHS)
- Institute of Business Administration (IBA) city campus
- Arts Council Institute of Arts & Crafts (ACIAC)

Banks: Saddar Town offers extensive banking facilities with numerous branches of major banks, all providing ATM services and functional offices.

Key banks include:

- **Gazdarabad:** JS Bank Ltd, Faysal Bank
- **Zaibunnisa Street:** Advans Pakistan Microfinance Bank Ltd, Soneri Bank, Summit Bank
- **West of Empress Market:** Muslim Commercial Bank (MCB) Limited, Sindh Bank, Meezan Bank, United Bank
- **Preedy Street & Mansfield Street:** At least two branches of Habib Bank Ltd (HBL)
- **Throughout Saddar:** Several branches of the state-owned National Bank of Pakistan.

Clinics and Hospitals: While lifestyle-related diseases such as hypertension, heart attack, diabetes, liver disease, depression, and cancer are commonly reported, Saddar Town boasts adequate and high-standard health facilities, ensuring convenient access for residents.

Prominent hospitals providing extensive and prompt care include:

- **OMI (Orthopaedic & Medical Institute):** Located on Depot Lines M.A. Jinnah Road, OMI is a leading hospital offering services across cardiology,

obstetrics, radiology, orthopedics, general surgery, pediatrics, urology, gastroenterology, and nephrology, complete with ICU and ER facilities.

- **Civil Hospital:** A landmark on M.A. Jinnah Road.
- **Neurospinal & Cancer Care Institute (NCCI):** Dedicated to cancer patients, NCCI provides advanced services like Gamma Knife, Synergy-S, PET CT, MRI, CT Scan, Deep Brain Stimulation (DBS), and EEG.
- **Sindh Institute of Urology and Transplantation (SIUT):** A renowned institution near Saddar, SIUT is unique in Karachi for its kidney transplantation services, along with dialysis and ER facilities.
- **Hamdard University Hospital (Taj Complex)**
- **7-Days Hospital**

Other established hospitals in close proximity include Sindh Institute of Skin Diseases, JJ Hospital, Parsi General Hospital, ISM Hospital, and Burhani Hospital. Additionally, RC Veterinary Hospital provides specialized care for pets.

Malls: Saddar Town's malls are generally more budget-friendly than upscale retail centers, offering excellent discounts. Madina City Mall and The Centre Shopping Mall, both near Abdullah Haroon Road, are ideal for value shopping. The Atrium Mall stands out as the most popular, featuring international and local brands alongside multiplex cinemas, known for introducing 3D movies to the city. Gul Plaza, famed for its crockery and garment stores, is situated on M.A. Jinnah Road in Gazdarabad.

Restaurants and Bakeries: Saddar's vibrant culinary scene offers a wide array of cuisines, from local "desi" dishes to Chinese, Italian, and more, catering conveniently to the area's office workers. Chullu Kabab Sistani is widely considered Saddar's most popular restaurant, alongside other renowned establishments like Café Darakshan, Zahid Nehari, Nadia Café, Italiano Pizza, Al Harmain Restaurant, Rex Restaurant, and Taj Restaurant & Bar B Q.

The area is also known for its bakeries, famous for items like hot cross buns and Easter eggs; Misquita Bakery (near CIA Centre), Crispo Bakery, and Bread Centre are particularly well-regarded. Additionally, numerous shops offer "nimco" and dry fruits.

Sports Facilities: Saddar offers a variety of sports and fitness facilities. For general fitness, residents can choose from establishments like Chain of Flex

Gym, YouFit Gym, Shapes Health Club, Get Lean: Men and Women Gym, and Fit Girl Center. Martial arts enthusiasts are also well-catered for, with top-rated karate and taekwondo clubs such as Gym and Karate Club, Tai Karate Centre, Karachi Taekwondo Academy, and the National Institute of Karate-Do Pakistan.

Parks: Saddar provides residents with several parks for leisure activities, strolling, and jogging, including Jahangir Park (near Empress Market), Nishtar Park, and Burns Gardens. A notable historical landmark is Frere Hall, located near Fatima Jinnah Road. Originally a residence of Fatimah Jinnah, it has been transformed into a museum and park, now a popular attraction for both locals and tourists.

Employment: The I.I. Chundrigar Road and the adjacent M.A. Jinnah Road form a major employment hub, hosting critical businesses and government offices such as the State Bank, Stock Exchange, National Bank, Police Headquarters, PTCL, and the Head Post Office, alongside numerous bank headquarters and private companies.

A survey conducted near the project site revealed that most workers are non-residents primarily engaged in small businesses or corporate employment. Small businesses encompass commercial shops (including a significant number of mobile shops), food carts, pan shops, small restaurants, and auto-service shops. The survey indicated that 92% of respondents were involved in retail (shop owners, managers, helpers) or service provision (telecommunication, internet, TV cable, banking), with 3% offering recreational services, and the remainder engaged in restaurants, vending, and other commercial sector activities.

Road Network & Traffic Conditions: The project is situated on M.A. Jinnah Road, an area characterized by a mix of commercial and residential buildings. M.A. Jinnah Road features a 5+5 lane carriageway with a narrow median. Ongoing road construction significantly impacts traffic flow, which is already high due to the area's dense land-use distribution. While road conditions are generally adequate, providing footpaths for pedestrians, the footpaths themselves are in disrepair.

Observations during reconnaissance noted minimal permanent encroachment on M.A. Jinnah Road. However, current on-road parking temporarily extends onto both the carriageway and footpaths, a situation expected to be resolved upon completion of the construction work.

The traffic count conducted at the mid-block of M.A Jinnah Road directed from Tower captured the following volumes as presented in the chart. It can clearly be shown that the peak hour of this direction is at 04:00 – 05:00pm.

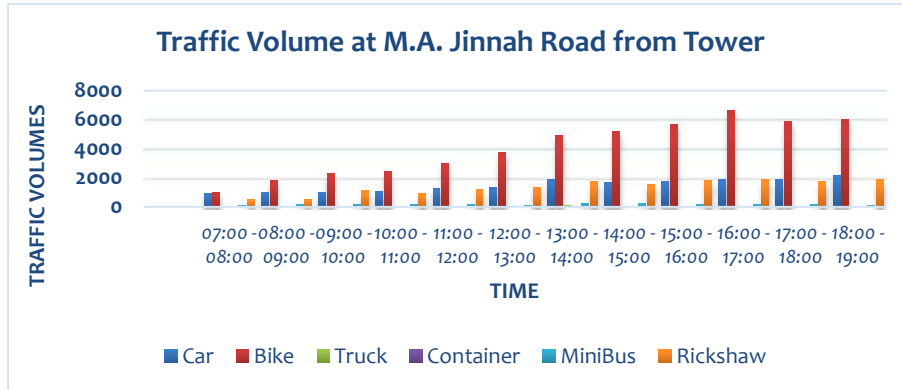


Figure 4.19: Traffic Volume at M.A. Jinnah Road from Tower

The traffic count conducted at the mid-block of M.A Jinnah Road directed towards Tower captured the following volumes as presented in the chart. It can clearly be shown that the peak hour of this direction is at 11:00am – 12:00pm.

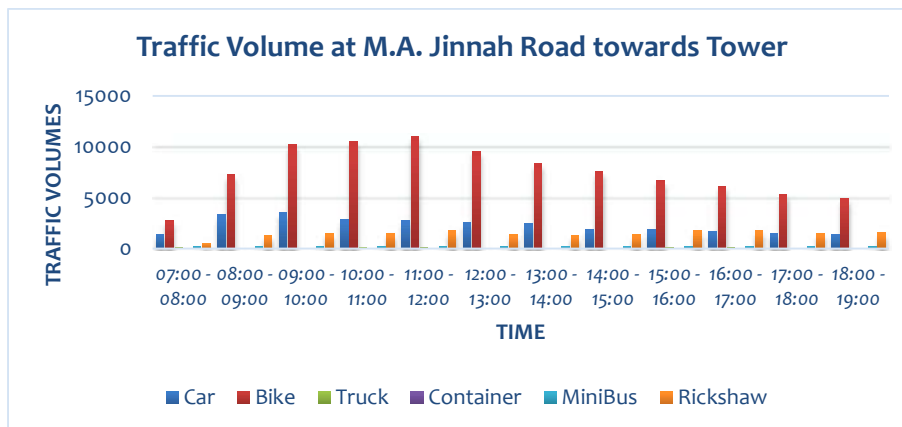


Figure 4.20: Traffic Volume at M.A. Jinnah Road towards Tower

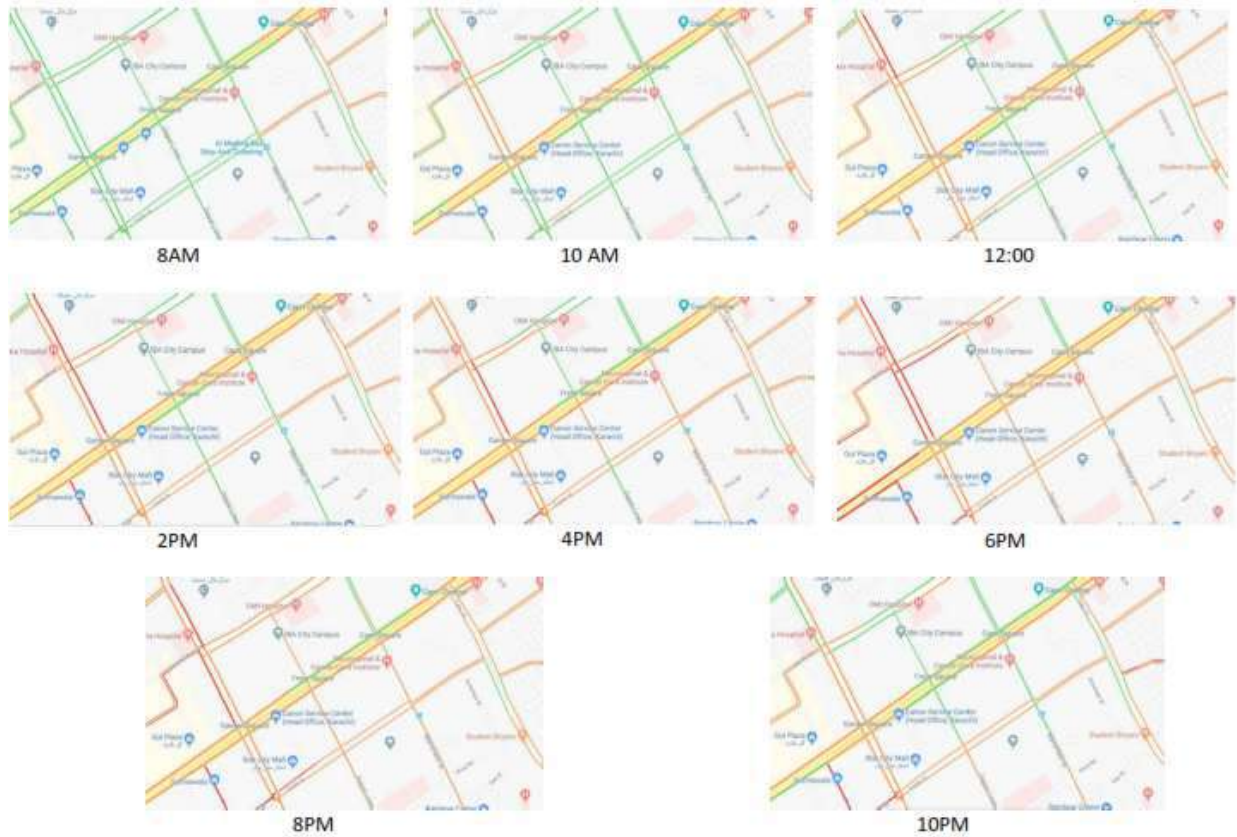


Figure 4.21: Map Representing the Traffic Variations along the Project Area during various time intervals

5. Public Consultation

Consultation was conducted in two stages for the Saima Centre Point (Phase-II) Project. During the EIA Scoping, a Background Information Document (BID) about the project design was shared with the most relevant stakeholders to get feedback on aspects related to design, construction & completion and during the project operations. The comments solicited from stakeholders were helpful in the screening of the potential environmental & social aspects of the project.

In the second stage, a 'Neighborhood Survey' was conducted to identify residential and commercial interests in the area that may face direct impacts from the proposed development. In preparation for the Neighborhood Survey, a 'Project Brief' was prepared highlighting the salient features of the project and the project location. The survey was conducted in two stages. The first stage comprised a reconnaissance survey whereby all stakeholders that either reside or work in the project vicinity were identified in reference to the proposed project location. Relevant public service institutions directly involved in service provision in the areas were also identified at this stage. During the second stage, a social survey field team engaged the area residents, commercial interests and public service institutions. Those stakeholders who were not available at the first attempt, were re-visited on the same day or followed-up for their comments during the next few days. During each meeting, the project team introduced the project to the stakeholders, recorded their concerns and suggestions and provided contact details to enable stakeholders to share further comments over email or in writing.

5.1 Consultation Feedback

The comments, concerns and suggestions received from stakeholders during the consultation meetings have been collated in this section. The concerns and suggestions of stakeholders have been segregated into two specific categories based on the responses during the consultation process: i) Residents & Business Operators, and ii) Professional Engineers & Experts from Institutions.



Consultation with Neighborhood



Consultation with SEPA



Consultation with Environmental
Activists



Consultation with FPIP-CEO



Consultation with SMIU, Chairperson
Environmental Science Dept



Consultation with COO, Rescue 1122

5.2 Observations/Views of the Residents & Business Operators

- **Future Urban Development and Quality of Life:** While the business community and residents largely welcome new urban developments, acknowledging the demand for quality residential & commercial buildings and recreational areas and anticipating commercial growth post-mass transit activation, there are significant concerns. Prevailing mismanagement, marked by overcrowding and haphazard planning, is feared to deter public engagement due to issues like parking queues and extended waiting times, thereby compromising the intended benefits of urban development.
- **Accountability in Development Charges and Bye-Law Enforcement:** Business operators, despite complying with building bye-laws through betterment charge payments, point to illegal commercial activities in non-commercial zones as a major source of infrastructure damage. These unauthorized operations, failing to adhere to mandatory permissions, overburden roads and utility services, resulting in substantial financial losses for the government exchequer and severe civic issues.
- **Integrated Parking and Traffic Management Solutions:** Projects such as Saima Centre Point (Phase-II) are lauded for exceeding required parking provisions,

effectively addressing challenges arising from large-scale plot densification. However, stakeholders emphasize the necessity of a comprehensive approach to parking and traffic management, advocating for collaboration among all densifying entities to formulate a unified traffic management system tailored to the densification process. There is a recognized imperative for the master plan department to proactively conceive and mandate the provision of parking plazas on densified roads. Furthermore, the entry and exit points for parking facilities must be meticulously designed to prevent disruption to existing traffic flows, particularly during peak hours.

- *Unmitigated Construction Nuisances:* Construction activities frequently generate excessive noise pollution, particularly during initial phases, and significant dust, contaminating surrounding areas. Stakeholders demand strict adherence to specific construction timings, prohibiting night-time operations, and implementing comprehensive dust minimization strategies, including maximal coverage during site preparation. Continuous and proper disposal of construction debris through certified contractors is also deemed crucial, alongside prompt site restoration to acceptable aesthetic standards. Residents advocate for transparent communication and confidential consultation regarding all developmental activities, and stakeholders specifically seek assurances against breaches of their security and privacy.
- *Environmental and Socio-Economic Degradation:* Major construction projects, notably the Green Line, have inflicted considerable environmental and socio-economic damage. Businesses have incurred losses, school children and hospital visitors have experienced heightened stress, and affected individuals have been compelled to relocate. A primary contributing factor is the failure of responsible authorities to implement effective management and monitoring plans, allowing contractors to operate without adequate oversight, thereby degrading both the social and physical environment.
- *Protracted Construction and Public Hardship:* Residents express profound apprehension regarding the sluggish pace of construction along the Green Line corridor. The project's significant delay has severely worsened traffic conditions and highlighted the inadequacy of public transport infrastructure. The community stresses that the prolonged suffering endured during construction will be intensified if recommended mitigation measures are not diligently implemented.
- *Sewerage and Stormwater Drainage Issues:* While the sewerage system has seen some improvements, recurring blockages in stormwater drains lead to significant urban submergence during heavy rainfall. There is a clear demand for all new projects to incorporate comprehensive sewerage treatment systems with provisions for recycling.

- **Inadequate Solid Waste Management:** Representatives from private schools have reported critical failures in solid waste management, with waste collection points frequently situated directly in front of school premises. This practice poses substantial health risks to students and negatively impacts the aesthetic environment of school buildings, which are sensitive receptors.
- **Non-Compliance with Regulations and Illegal Commercialization:** A prevalent disregard for building bye-laws and zoning regulations is observed. While many business operators adhere to payment of betterment charges, extensive commercial activities are illegally conducted in non-commercial areas. This not only causes severe damage to infrastructure but also contributes to road congestion and overloads amenity/utility services. Such unauthorized operations result in significant financial losses for the government. Furthermore, it is observed that many completed projects violate approved plans by repurposing designated parking areas into additional commercial spaces.
- **Mismanagement of Public Funds:** Significant concerns have been raised regarding land-owning agencies collecting substantial development and service charges from builders—funds considered public money—without subsequently investing these amounts into infrastructure improvements or amenities. These collected sums are believed to be more than sufficient for constructing adequate services but appear to be unutilized.
- **Uncontrolled Densification and Infrastructure Strain:** Rapid urban densification is perceived as politicized, leading to the proliferation of large structures without adequate infrastructural support. This has severely strained existing utility services and exacerbated traffic congestion, further compounded by an already insufficient public transport infrastructure. This densification has also resulted in the indiscriminate removal of vegetation and encroachment on open spaces, leading to a significant loss of green areas, parks, and playgrounds, often under the guise of development. Private developers' compensatory provisions for recreation within buildings are deemed insufficient, highlighting a need for CSR plans to include supervision of public green spaces.

5.3 Observations/Views of the Institutional Stakeholders

- Adherence to international codes and standards for fire escape routes and emergency exits is paramount. Recent fire incidents in Karachi underscore the necessity for every high-rise building to be equipped with a dedicated firefighting system for each floor and a fire alarm for every unit.
- Construction debris has become a significant component of Karachi's solid waste problem. This issue arises from inadequate solid waste collection

systems that are ill-equipped to manage construction waste, leading to substantial accumulations.

- A severe lack of public awareness regarding traffic laws exacerbates congestion and increases accident rates. While mass-transit plans and management measures are important, without basic road law awareness and compliance, these issues will persist. Recent increases in traffic fines are positive steps, but positive incentives for drivers and targeted educational initiatives on traffic rules and road safety benefits could significantly improve the situation.
- The proposed development is anticipated to enhance property values across the area, benefiting both residential and commercial property owners, as well as the real estate sector. With increasing foreign investments, including CPEC, the demand for residential cum commercial buildings is also projected to rise. Such developments are crucial for meeting the demand for high-quality, safe, secure, and convenient housing, particularly for international residents.
- The deteriorating condition of public utilities presents a significant challenge for both current and future developments. Recent incidents, such as bursting water lines and consistent power outages in various parts of Karachi, serve as stark warnings for upcoming projects.
- Stakeholders expressed considerable apprehension regarding the insufficiency of emergency evacuation and firefighting provisions. Issues include absent hydrants and denied access for firefighting teams. Given the growing frequency of fire incidents in high-rises, every such development must incorporate robust firefighting capabilities and comprehensive emergency evacuation plans.
- The depletion of green spaces and the promotion of invasive species contribute to various health problems. It is imperative that every builder and developer contributes to the provision of greenery to mitigate the urban heat island effect.
- In the absence of reliable municipal water supply, builders and developers are increasingly relying on groundwater resources. This has led to widespread groundwater extraction and unmonitored Reverse Osmosis (R.O.) treatment, raising concerns about potential soil subsidence in an area already stressed by significant mass shifts. Consequently, water tankers have become a ubiquitous sight.
- Betterment charges collected by authorities should be specifically earmarked for enhancing water supply, sewage disposal systems, traffic

intersections, and overall infrastructure in affected areas. Despite resident protests over the lack of piped water, the Sindh Government appears reluctant to address the water provision crisis for Karachiites. Infrastructure deficiencies are pervasive; roads are often unfit for vehicles yet experience congestion far exceeding their capacity.

- Development activities within the Central Business District (CBD) are severely hampered by existing deficiencies in infrastructure and essential facilities. There is a projected substantial increase in demand for utilities such as water, sewage disposal, electricity, and gas, yet no comprehensive master plan has been prepared by the relevant agencies to address this. Residents are already vocal about water shortages, but authorities are constrained by the inadequate infrastructure of the Karachi Water & Sewerage Corporation (KW&SC), which reportedly continues to disregard judicial commission directives.
- Urgent remodeling of all critical traffic intersections is required. Furthermore, alternative solutions, such as grade separation, must be promptly evaluated and implemented.
- The escalating number of vehicles on already congested roads intensifies existing traffic flow and parking challenges. A crucial next step involves conducting a realistic demand forecast and establishing multiple parking plazas at key commercial locations. The financial burden of implementing traffic management plans should be equitably distributed among all builders and developers.
- The decision to densify major roads without an overarching master plan has directly led to severe road congestion and exacerbated parking problems. The influx of vehicles from residents, their visitors, retailers, and their customers further strains the system, compounding congestion on already saturated roads and at peak-hour intersections. Moreover, delays in completing projects like the Green Line have adversely affected local businesses, forcing some to cease operations.
- A fundamental question arises: Is there a guiding master plan for the ongoing commercialization, densification, and decongestion efforts? The current approach of strip commercialization and densification appears to be an ad-hoc response to the complex challenges of rapid urbanization. To effectively manage urban sprawl, the expanding city of Karachi urgently needs to broaden its physical area.
- Institutional stakeholders have expressed concerns that the prevalent trend of constructing high-rise buildings in already commercialized arterial roads across Karachi, without a cumulative corridor assessment, fundamentally



Environmental Impact Assessment (EIA)

Saima Center Point (Phase-II)

Plot / Survey No. 134/B/1, measuring
29588.4 Sq.Yds M.A Jinnah Road
Karachi Cantt

conflicts with sustainability principles and is poised to generate significant socio-economic issues. The consensus among these stakeholders was that any commercialization policy should have been preceded by a Strategic Environmental Assessment (SEA), identified as a critical prerequisite for Karachi's future development.



6. Screening of Potential Environmental Impacts and Mitigation Measures

This section outlines the environmental screening methodology used to pinpoint ecological factors and evaluate how different operations affect the physical, biological, and social environments. This screening process involved a comprehensive literature review, consideration of environmental and social concerns raised by stakeholders, analysis of both primary and secondary baseline data, and expert judgment to assess the potential impacts of these activities on the Project's physical, biological, and socioeconomic conditions. To counter the identified potential negative impacts, specific mitigation measures have been proposed to reduce, minimize, or compensate for them, and their adoption is highly recommended. The report further acknowledges the notable increase in construction activity within the area of interest over recent years.

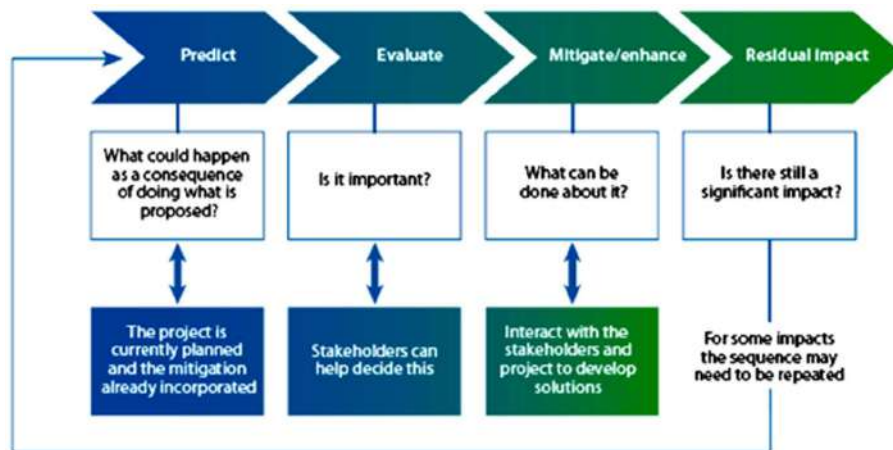


Figure 6.1: Impact Assessment Approach

6.1 Screening of Potential Environmental Impacts in Siting of Project

The Saima Center Point Phase II project, an ambitious mixed-use development, is strategically proposed on a prime commercial plot nestled within the esteemed jurisdiction of the Karachi Cantonment Board. This particular location was meticulously selected for its commercial viability and strategic importance within the urban landscape of Karachi. The plot's leasehold status is not only currently valid and fully secured, but crucially, it also includes robust provisions for its future renewal, thereby guaranteeing the long-term sustainability and operational continuity of the Saima Center Point Phase II project without impending tenure concerns. This ensures a stable foundation for investment and development. The project proponent has diligently secured all the requisite no-objection certificates (NOCs) from relevant regulatory

bodies, along with formal letters of intent from various service providers, unequivocally demonstrating their commitment to furnishing essential amenities. These crucial approvals underscore the project's adherence to all local regulations and signify the proactive engagement with key stakeholders to ensure comprehensive urban infrastructure support.

Fundamentally, this Project is meticulously designed to directly address the pressing needs of a discerning segment of the urban population that actively prioritizes and seeks enhanced levels of safety, robust security measures, and a tangible improvement in their overall quality of life amidst the challenges of modern urban living. It aims to create an environment where these fundamental aspirations are not just met but exceeded, offering a sanctuary of peace and convenience. This burgeoning demand for secure, high-quality living and commercial spaces has already been astutely recognized and capitalized upon by numerous other forward-thinking builders and developers. Consequently, there has been a noticeable surge in the construction of diverse residential and commercial ventures, strategically positioned along Karachi's bustling major thoroughfares and vital economic corridors, indicating a clear market trend that Saima Center Point Phase II is poised to further enhance and contribute to.

A thorough assessment of the immediate microenvironment reveals a reassuring absence of any environmentally sensitive areas. This includes no protected sites such as wildlife sanctuaries, game reserves, or national parks within the vicinity. Furthermore, there are no identified archaeological, historical, or cultural heritage sites in its immediate neighborhood, ensuring that the project's siting is entirely free from any environmental or cultural sensitivities that might typically arise during large-scale urban development. This pristine context allows for construction without disrupting precious natural or historical assets. Consequently, the project's development is projected to have a negligible impact on local biodiversity; no significant flora or fauna species will be disturbed, primarily because the chosen site is situated squarely within an established commercial zone. This urbanized setting is naturally devoid of any substantial or protected ecological systems, ensuring that the construction activities will not encroach upon sensitive habitats or threaten valuable ecosystems.

Upon its anticipated completion, the Saima Center Point Phase II project is estimated to have substantial operational requirements, necessitating approximately 584,130 gallons of water per day and a considerable 2.5 MW of electrical power. These figures reflect the expansive scale and comprehensive amenities planned for the development, highlighting the need for robust utility infrastructure to support its full functionality. Notably, the proposed project is meticulously designed as a highly self-contained and resilient building,

integrating advanced systems to ensure operational independence and sustainability. This includes robust, independent back-up power generation capabilities, a sophisticated water supply system augmented by a hyper-filtration plant, and a comprehensive sewage treatment, grey water recycling, and responsible disposal system. Furthermore, the design generously incorporates more than the statutorily required parking space, addressing a common urban challenge and enhancing user convenience. These integrated systems underscore a commitment to self-sufficiency and environmental responsibility. Crucially, the project proponent has already proactively remitted the necessary financial contributions and due amounts to the concerned municipal and utility authorities. These payments are specifically designated for the establishment and provision of essential utility services, as well as for the broader infrastructural development of the surrounding area, signaling a committed partnership in urban improvement. It is therefore imperative and anticipated that these authorities will meticulously plan and diligently implement the necessary augmentation of existing facilities and infrastructure well in advance of the project's completion. Failure to proactively enhance these services means that this significant urban densification, rather than genuinely facilitating an improvement in the quality of life for residents and users, could inadvertently place an undue and unsustainable burden on the local environment and existing public utilities, potentially undermining the project's positive impact.

Through the meticulous incorporation of a comprehensive, state-of-the-art 24-hour security system meticulously integrated throughout the entire building, the project designers have proactively addressed and effectively alleviated any potential concerns regarding the invasion of privacy. This advanced security infrastructure, encompassing surveillance and access control, is designed to instill a profound sense of safety and tranquility, ensuring that occupants feel secure without compromising their personal space or peace of mind. Consequently, by integrating all these thoughtful design elements and strategic considerations, the Saima Center Point Phase II Project is poised to definitively achieve its overarching objective: to deliver a truly secure and safe residential and commercial building situated at an exceptionally attractive and desirable location within Karachi, setting a new benchmark for urban living and commerce. The realization of such a robust and positively impactful development will serve as a clear and compelling indicator, not only of the project's successful execution but also of the profound achievement of its foundational objectives, contributing significantly to the urban fabric and the well-being of its future inhabitants and businesses.

6.2 Assessment of Impacts at the Construction and Operation stages

6.2.1 Demolition of Structure(s)

The Saima Centre Point (Phase-II) site is an undeveloped, open parcel of land, entirely free of permanent structures both on-site and in the immediate vicinity. This condition facilitates the direct commencement of construction activities, beginning with comprehensive land development and excavation. Throughout the construction phase, the Sindh Environmental Protection Agency (SEPA) and the Karachi Cantonment Board will be consistently informed of all project proceedings.

6.2.2 Building Stability

Foundation type selection is determined by subsoil conditions, structural characteristics, and applied loads. As per the Consultant's data, the proposed building towers will incorporate two basements, with their base planned at approximately 10.0 m below the current ground level.

Borehole analysis indicates that the top 1.5-2.0 m consists of fill material, including sandy silt, gravel, and concrete pieces (observed specifically in BH-1, BH-4, and BH-6), alongside overburden soil composed of medium to dense, silty sand/sandy silt, interbedded with clay. This layer typically overlies very dense sand, gravel, and boulders, followed by dense to very dense, silty sand/sandy silt (classified as weathered rock) and fragments of sandstone/conglomerate. Beneath this weathered rock lies a substantial stratum of hard, coarse-grained sandstone/conglomerate, extending to depths ranging from 11-18 m. Further below, medium-hard siltstone/claystone, interbedded with sandstone, persists down to the explored depth of 40.0 m.

Given the prevalent subsoil conditions and anticipated structural loads, a raft foundation is recommended for the proposed structure. However, if structural loads are substantial and foundational requirements are not adequately addressed by a raft, a pile foundation option may be pursued.

- Allowable (gross) bearing capacity of raft foundation (with double basement) placed at 10.0 m depth below the existing ground level should be adopted as 6.00 tons/ft²
- Allowable capacity of 1000mm dia pile with 20m total length should be adopted as 470 MT.

6.2.3 Erosion of Soil

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

Mitigation Measure

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

6.2.4 Excavation

Foundation construction will necessitate deep excavation, creating a void that could compromise the integrity of the surrounding soil. To ensure excavation stability and protect adjacent building foundations, soil retention measures, such as bracing or shoring, will be implemented during basement construction. Maintaining a dry excavation is critical, requiring work to be scheduled during the dry season. Given the groundwater table at approximately 11 meters, robust waterproofing is essential to prevent moisture ingress into both the retention system and the basement.

Mitigation Measures:

- A comprehensive engineering study of sub-soil structures and an impact analysis of surrounding properties have been completed.
- The construction site has been securely fenced and obscured to minimize visual impact.
- During basement construction, excavation cuts will be continuously monitored, with shoring and bracing deployed as necessary. Excavation will be exclusively conducted during the dry season.
- The neighborhood will receive early notification of the project via prominent signage. The site will be fully enclosed to contain fugitive dust emissions within the immediate vicinity. IMC will conduct continuous monitoring of activity impacts, proactively addressing potential dust fall hazards for nearby residents.

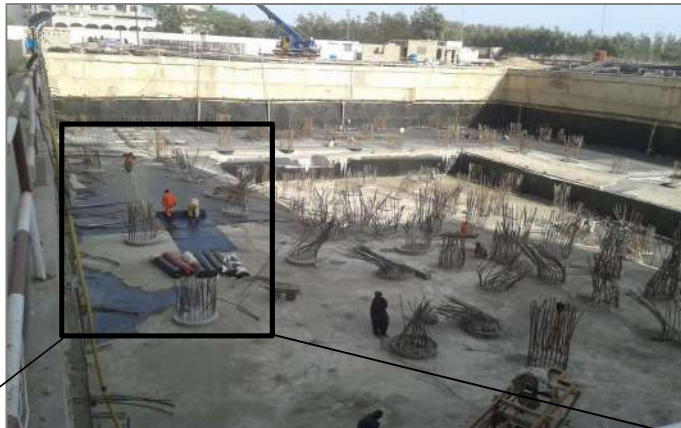


Figure 6.2: Highrise basement water proofing with PVC geomembrane

6.2.5 Construction Waste

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

Mitigation Measure

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

6.2.6 Topography and Geology

The project, a proposed 37 storey structure on a compact site, necessitates rigorous planning and evaluation of the soil's load-bearing capacity to ensure structural stability. Considering the substantial anticipated structural loads and existing sub-soil conditions, a raft foundation has been specified. This design choice effectively guarantees the project's stability and is not expected to exert additional stress on the sub-soil structure, thus precluding any significant environmental impacts.

6.2.7 Air Quality

The major source of air pollution during the construction phase will be dust emission due to earth works and gaseous emissions from construction equipment. The major source of air pollution during the operation phase when the Project is functional will be the pollutant emissions from the stand-by generator in case of power breakdown and vehicular emissions from the entry

and exit of owners and visitor's vehicles besides the emissions on and along M.A Jinnah road.

Impacts from each source and proposed mitigation measures are likely to be as follows:

Dust Emission: Particulate matter emitted during construction activities results in deterioration of ambient air quality in the vicinity of the source and is usually a nuisance to the neighborhood and the communities in the neighborhood besides the construction workers. Dust emission from construction site is a concern particularly if the site is near sensitive receptors (residential areas, schools & hospitals). The main health hazards emanate from particles smaller than 10 microns (PM₁₀) in particular PM_{2.5} as they are respirable. These particles are sufficiently charged to assume the properties of aerosols which on reaching the receptors have heavy impact on the respiratory system and on the surface of furnishings of the living environment. The impact on the environment would be considered significant if there is an increase in suspended particulate matter within and beyond the boundaries of the project site due to activities at the site, or if the dust affects local property or results in complaints from the community.

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

Mitigation Measure

The following mitigation measures have been recommended:

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

- The exposure of construction workers to dust needs to be minimized by provision of dust masks and mandating the workers to wear them.

Vehicle & Equipment Exhaust: Combustion exhaust from vehicles & construction equipment can affect the ambient air quality of the site surroundings. The impact would be potentially significant when the ambient air quality deteriorates due to emissions from construction equipment and machinery or the construction generators etc. beyond the guidelines especially at the environmental receptors such as schools, hospitals and residential areas in the neighborhood. The exhaust emissions will include particulate matter (PM), hydrocarbons, oxides of nitrogen, sulphur, and carbon (NO_x, SO₂, CO_x).

Mitigation Measure

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

6.2.8 Construction Noise

Heavy construction work, particularly involving machinery, will inevitably produce fluctuating and intermittent noise. While commuters on M.A Jinnah Road (a vital connection to the green line bus rapid transit corridor) and local residents may experience some disturbance, daytime noise can be a nuisance, and nighttime disruptions carry a serious risk of sleep deprivation.

It is vital to recognize the psychology of sound: even a 3 dB change is clearly perceptible, while a 10 dB shift is perceived as a significant doubling or halving of volume. The impending construction and eventual completion of the G+37 storey Saima Centre Point (Phase-II) is set to significantly increase ambient noise levels. Without proper site fencing and acoustic shielding to contain this sound,

this surge in noise threatens vulnerable populations, such as schoolchildren, women, and hospital patients.

Baseline 24-hour monitoring at the project site uncovered average noise levels consistently above 70 dB(A). This starkly contravenes the Sindh Environmental Quality Standards, which establish maximum limits of 55 dB(A) for residential areas and 65 dB(A) for commercial zones during the day, and considerably lower thresholds of 45 dB(A) (residential) and 55 dB(A) (commercial) at night.

Mitigation Measures

- Enforce stringent operational controls on noisy equipment to adhere to the designated daytime (65 dB(A)) and nighttime (55 dB(A)) noise limits for living environments.
- Mitigate equipment noise at its origin through superior design, combined with regular maintenance and prompt repairs of all construction machinery.
- Ensure the deployment of efficient silencers and mufflers on all vehicles and backup generators to curb their noise output.
- Utilize noise-reduction devices as necessary and whenever technically possible.

6.2.9 Water Sourcing

Water consumption during construction activities is projected to have a negligible impact on the availability of water for other environmental or living needs. Nonetheless, the project is committed to implementing stringent water conservation practices throughout both its construction and operational phases.

During the initial construction phases, water will primarily be supplied via tanker trucks, drawing from the KWSC water supply system. The widespread availability of commercial ready-mix concrete significantly mitigates the project's early-stage water requirements. Potable water for drinking will be sourced from reputable bottled water suppliers.

The Saima Centre Point (Phase-II) Tower is estimated to require approximately 580,000 gallons of water per day during its operational phase. While the Proponent has fulfilled the necessary payment to KW&SB for a regular connection, stakeholders have raised significant concerns regarding the severe delays impacting the K-IV water supply project. This critical three-phase initiative, designed to address Karachi's widening water demand-supply gap, is facing substantial setbacks. K-IV Phase-I, originally slated to add 260 MGD to the existing network and targeted for completion by 2018, remains only 20 percent complete. Similarly, Phases-II and III, intended to contribute an additional 260 MGD and 130 MGD respectively, are also anticipated to experience delays. These persistent challenges suggest that Karachi will continue to face acute water

shortages even after the eventual completion of K-IV, a situation that demands immediate mitigating measures.

In response to the prevailing water scarcity, the proponent proactively engaged geo-professionals to conduct a comprehensive groundwater investigation survey at the site. Integrated geological and resistivity interpretations from all ten ERS locations (ERS-01 to ERS-10) confirm excellent groundwater potential. This potential is attributed to significant thicknesses of water-bearing sandy and sandy-limestone strata. Furthermore, resistivity signatures indicate the presence of fresh to brackish groundwater within the targeted aquifer depths. Based on this thorough subsurface evaluation, a test borehole, 800-1000 feet deep, is strongly recommended within the identified productive zone. This borehole is expected to yield approximately 100 US gallons per minute (gpm), subject to verification through drilling, geophysical logging, and pumping tests. The primary aquifers identified – including the Alluvium (Sand Bar Deposits), Gaj Formation, and Manchar Formation – collectively form a robust and reliable groundwater system capable of supporting long-term usage.

Given the inadequate and unassured water supply to Karachi's core areas, it becomes imperative to explore sustainable water management strategies. Specifically, investigating options for wastewater recycling and the regeneration of potable water from groundwater resources through appropriate treatment technologies is crucial for ensuring future water security.

Mitigation Measures:

- **Rigorous Monitoring:** Comprehensive records of water consumption will be meticulously maintained throughout both the construction and operational phases.
- **Advanced Water Conservation Technologies:**
 - **Smart Water Management Systems:** Implementation of sensor-based and automatic control systems to monitor and optimize water flow for irrigation and restroom facilities, utilizing real-time data for significant waste reduction.
 - **Water-Efficient Fixtures:** Installation of low-flow faucets (reducing flow to 1.5 gallons per minute), dual-flush toilets, and water-efficient showerheads to achieve substantial water savings.
 - **Greywater Recycling Systems:** Deployment of a greywater recycling system to collect, treat, and reuse water from sinks,

showers, and washing facilities for irrigation and toilet flushing, thereby significantly reducing fresh water demand.

- **Rainwater Harvesting:** Design and integration of systems to collect, filter, and store rainwater for non-potable uses such as landscape irrigation and cooling systems, decreasing reliance on municipal water supplies.
 - **Green Infrastructure:** Incorporation of permeable pavements and green roofs to enhance stormwater management, promote rainwater infiltration, reduce strain on drainage systems, and improve aesthetics.
- **Operational Efficiency and Maintenance:**
- **Public Awareness Campaigns:** Implementation of awareness initiatives to foster water-conserving behaviors among occupants, contributing to a reduction in the building's overall water consumption.
 - **Leak Detection and Repair:** Regular inspection and prompt repair of water supply lines to minimize wastage.
 - **Water-Efficient Sanitary Fittings:** Consistent utilization of low-flush toilets, water-efficient shower heads, and faucet aerators throughout the project's lifecycle.
- **Specialized Water Treatment:** Reverse Osmosis (RO) reject water will undergo appropriate treatment and be managed by SEPA-certified contractors.



Figure 6.3: Brine Treatment System

6.2.10 Soil Contamination

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

Mitigation Measure

- Fuel oils, lubricants, and chemicals will be stored in covered dyked areas, underlain with impervious lining. The construction site(s) will be provided with hard cover or tarpaulin lining to prevent contamination of soil.
- Washing and maintenance of vehicles and equipment will only be carried out at designated areas.
- Regular inspections will be carried out to detect leakages in construction vehicles and equipment.

- Appropriate implements such as shovels, plastic bags and absorbent materials will be made available near fuel and oil storage areas for removal of oil and contaminated soil.
- Contaminated soil will be removed and properly disposed after treatment such as by incineration by SEPA certified contractor.
- Hazardous Substances Rules 2014 will be adhered to for storage, transfer, subsequent handling and final disposal of any chemicals/substances during the operation stage.

6.2.11 Wastewater Generation & Disposal

Construction Phase: Effluent Management

During the construction phase, rigorous management of domestic effluent is critical to prevent soil and groundwater contamination on-site and in surrounding areas. All generated wastewater will be directed into established drainage and sewerage systems.

Mitigation Measures:

- All wastewater will be channeled to the nearest designated drain or sewerage system via a septic tank.
- Sewage will be strictly separated from other waste streams to prevent cross-contamination.

Operation Phase: Wastewater Management Strategy

Upon becoming operational, Saima Centre Point (Phase-II) is projected to generate approximately 460,000 gallons of wastewater daily, primarily consisting of sewage. Minor quantities of hazardous wastewater, such as oily water from maintenance activities, will also be produced.

Wastewater will originate from toilets, washrooms, laundries, and kitchens. To ensure compliance with SEQS values, it is crucial that other hazardous wastes (e.g., paints) are not mixed into this stream. Discharges from kitchens and canteens will be equipped with grease traps for separating oily waste, which will then be responsibly disposed of by SEPA-approved contractors.

An advanced, at-source treatment system will be implemented, featuring separate plumbing lines for effective grey and black water segregation:

- **Grey Water Lines:** These will collect effluent from sinks, showers, and kitchens. The objective is to recover this water for non-potable uses, including landscaping irrigation and toilet flushing.
- **Black Water Lines:** Dedicated exclusively to sewage, these lines will direct wastewater to more intensive treatment processes, ensuring adherence to stringent environmental standards.

A comprehensive wastewater management strategy is fundamental to the project's long-term operational sustainability. A well-designed and implemented system will efficiently mitigate potential adverse environmental impacts associated with wastewater generation.

- **Operational Mitigation Measures:**
 - All generated wastewater will be treated to achieve SEQS compliance.
 - Strict waste segregation protocols will be enforced to minimize solid waste ingress into the wastewater stream.
 - Water conservation strategies will be actively implemented throughout the facility to prevent wastage.

Resource Utilization: The nutrient content in recycled wastewater offers significant benefits for landscaping, potentially eliminating the need for additional fertilizer treatments. Leveraging this valuable resource for irrigating landscaping around industrial plant or commercial development provides a cost-effective and environmentally sound solution.

6.2.12 Solid Waste Generation and Management

Construction Waste: The project's construction phase is projected to generate various waste streams, primarily including packaging materials, construction scrap, excess building materials, debris, domestic waste from the construction camp, empty containers and drums, and used lubricants and chemicals.

Potential Impacts: Inadequate waste management during construction can lead to significant environmental and health impacts. These include adverse effects on worker health, soil contamination, and the degradation of surface and groundwater quality. Uncontrolled waste generation, lack of recycling, scattering of waste, improper handling, and inappropriate disposal can collectively result in severe environmental degradation. While construction waste is generally less reactive and chemically inert under normal conditions, its

handling and storage still pose minor adverse impacts, which can be controlled through effective mitigation measures.

Mitigation Measures: A comprehensive waste management plan will be developed for the construction stage, incorporating the following key elements:

- Segregation at Source: Separate bins will be provided for different waste categories (plastic, paper, metal, glass, wood, cotton) to facilitate sorting.
- Recycling Program: Recyclable materials will be separated at the source and sold to SEPA-certified waste contractors for processing.
- Non-Hazardous Waste Disposal: Non-hazardous, non-recyclable wastes, such as kitchen waste, will be disposed of at landfill sites managed by municipal authorities or approved waste managers/contractors.
- Containment: No waste will be dumped outside the project site boundary.
- Hazardous Waste Management: Hazardous wastes will be separated, stored in designated, restricted-access areas with proper marking, and disposed of by approved waste contractors.
- Material Reuse/Disposal: Surplus construction materials, including partially filled chemical and paint containers, will be returned to suppliers. Inert construction wastes will be either used onsite as fill material or sold as scrap.
- Record Keeping: Detailed records of all waste generated, disposed of, recycled, or reused during construction will be maintained in a Waste Tracking Register.
- Personnel Training: Training will be provided to all personnel on waste identification, segregation, and management protocols.

Operation Phase Waste Management (Saima Centre Point - Phase-II)

During the operation phase, Saima Centre Point (Phase-II) will generate solid waste from both residential and commercial units. The primary waste types will include food waste, paper, packaging materials, plastic bottles, and glass. Improper management and disposal of this waste pose a significant environmental threat, affecting occupants, visitors, and the surrounding environment.

Waste Generation Estimates: Based on general urban waste generation benchmarks:

- *Residential Units:* Waste generation is estimated to be approximately 0.6 kg per person per day. This figure includes food waste, paper, plastic, and other household refuse.
- *Commercial Units:* Waste generation in commercial units is highly variable depending on the type of business, but a general estimate can range from 0.5 to 2.0 kg per employee or user per day, or significantly higher volumes per establishment, primarily comprising packaging, paper, and general office/retail waste.

Current Challenges in Karachi: Solid waste management remains a persistent challenge in Karachi. Despite various proposals and implementations, a comprehensive and lasting solution has been elusive. The Sindh Solid Waste Management Board (SSWMB) is currently pursuing a holistic approach, integrating multiple strategies to partially alleviate the severe impact of waste management issues in the city.

Mitigation Measures:

To minimize the negative impacts of solid waste disposal during the operation phase, the following measures will be implemented:

- **Grease Interceptors:** Grease interceptors will be installed at all kitchen drains to effectively trap oil and grease, preventing their entry into the wastewater system.
- **Centralized Collection:** Solid waste will be collected efficiently via garbage chutes, leading to dedicated collection sites.
- **Source Segregation:** All solid waste will be segregated into organic and recyclable categories at the source to facilitate effective processing.
- **Professional Management:** A dedicated waste management contractor will be responsible for the handling and disposal of all solid waste.
- **Implementation of Waste Management Plan:** The developed solid waste management plan will be fully implemented, with established and organized facilities for waste collection, storage, and transportation.

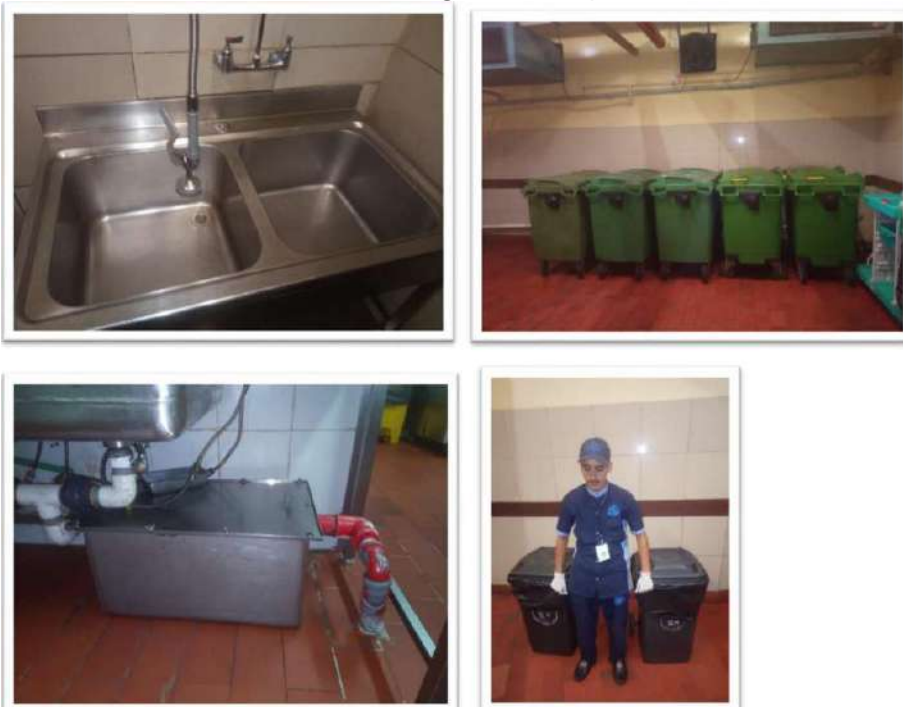


Figure 6.4: Waste Management System (Conceptual)

6.2.13 Operation of Vehicular Traffic

The project site is accessible via multiple approach roads feeding into M.A. Jinnah Road, making it reachable from different directions of the city. However, this also means that traffic flows are highly interwoven with existing congestion points, particularly during peak hours. In addition, the site's central location near Numaish Chowrangī underpass intensifies the importance of carefully designed access and egress provisions to avoid conflicts with background traffic.

In summary, while the site's location provides a strategic advantage for both residential and commercial viability, it also makes traffic management and parking provision critical considerations. A detailed understanding of the existing road network, circulation patterns, and adjacent land uses is therefore essential to accurately evaluate the project's impact and to propose suitable mitigation measures.

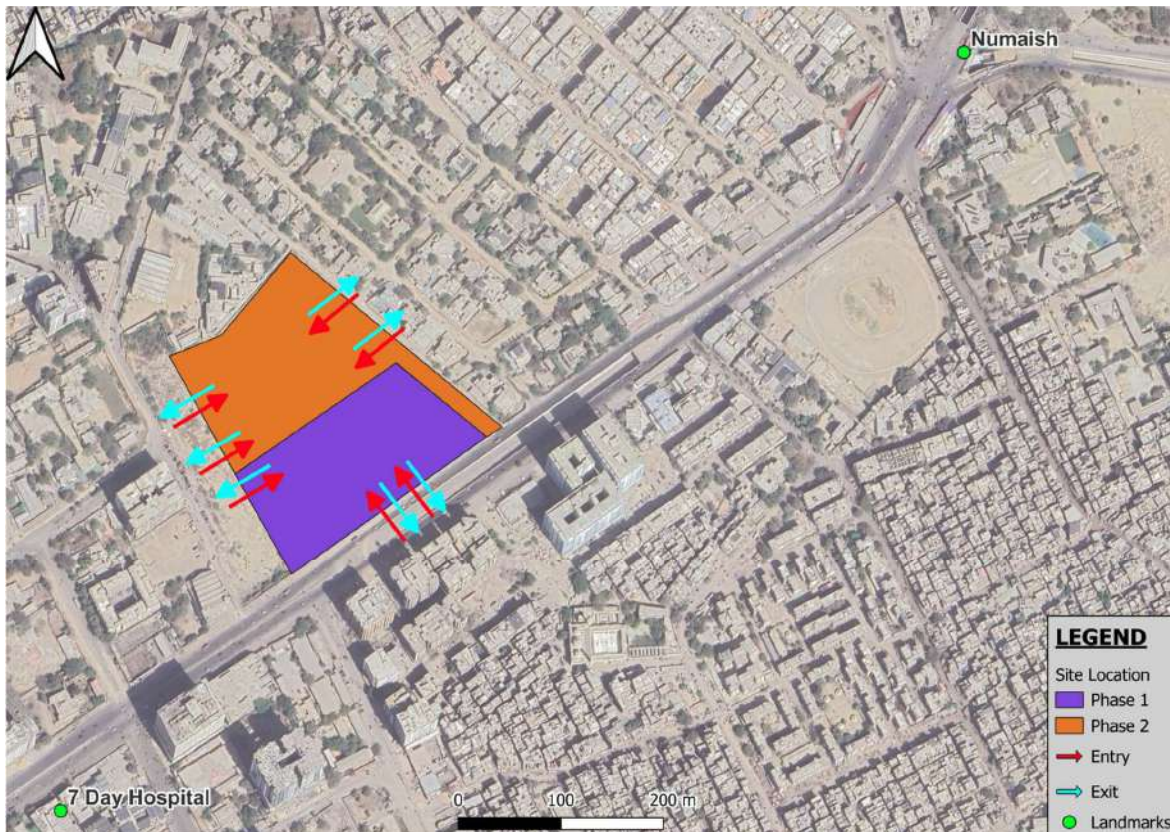


Figure 6.5: Entry and Exit

Phase-1 generates 3,097 PM peak trips, most of which originate from retail/showroom activity (1,417 trips). Residential trips contribute 1,680 trips. Inbound retail trips dominate due to an 85% arrival pattern during evening hours. Total Phase-1 inbound traffic reaches 1,960 vph, while outbound is 1,137 vph.

Phase-2 generates 2,228 PM peak trips, predominantly from residential units. Retail activity produces only 20 trips due to small floor area. Total inbound Phase-2 trips are 1,011 vph and outbound trips are 1,217 vph.

Combined project traffic equals 5,325 PM peak trips, with inbound demand at 2,971 vph and outbound at 2,354 vph. This magnitude demands well-designed access points, multiple lanes, and queue management solutions to prevent bottlenecks on M.A. Jinnah Road.

The combined effect of **background traffic (2025)** and **development-generated traffic** produces the following PM peak hour demand:

Network Traffic With Development	
Component	PM Peak Volume (vph)
2025 Background Traffic	49,490
Development Trips	5,325
Total Traffic Demand	54,815

The PM-peak inbound traffic (2,971 vph) directly affects gate performance due to mandatory security checks.

- At 15 sec processing time, queueing was severe.
- At 10 sec, conditions improve but remain critical for Phase-1.
- Outbound traffic (2,354 vph) distributes over longer periods and is less queue-sensitive but requires channelized exit lanes.

The analysis evaluates gate operational performance during the PM peak hour, which constitutes the critical design period. Two scenarios are assessed: (a) manual security check at 15 seconds per vehicle, and (b) RFID/ANPR automated processing at 3 seconds per vehicle. Mitigation measures and gate specifications are provided to ensure queue-free operation on M.A. Jinnah Road.

Scenario Comparison Summary

Parameter	Phase-1 15-sec (A)	Phase-1 3-sec (B)	Phase-2 15-sec (A)	Phase-2 3-sec (B)
Service Time (sec/veh)	15	3	15	3
Lane Capacity (veh/hr)	240	1,200	240	1,200

Gate Lanes	3	3	4	4
Flow per Gate (veh/hr)	653	653	253	253
v/c Ratio	2.72	0.544	1.053	0.211
Overflow (veh/hr)	413	0	13	0
Queue Length (m)	2,480	0	77	0
Verdict	FAIL	PASS	MARGINAL	PASS

Sensitivity — Minimum Gate Lanes Required:

The following table demonstrates the minimum number of RFID/ANPR lanes technically required to achieve $v/c < 1.0$, and confirms the recommended lane count provides an adequate operational buffer

Phase	Inbound (vph)	Min Lanes @ 3s to Avoid Queue	v/c @ Min Lanes	Recommended Lanes	v/c @ Recommended	Reserve Capacity
Phase-1	1,960	2 lanes	0.817	3 lanes	0.544	45.6%
Phase-2	1,011	1 lane	0.843	4 lanes	0.211	78.9%

NOTE:

Two RFID/ANPR lanes are technically sufficient for Phase-1 ($v/c = 0.817$, queue = 0). The third lane is recommended to provide a 20% reserve capacity buffer against peak variation and year-on-year traffic growth. For Phase-2, four lanes are specified for operational reasons (dedicated access lanes serving separate residential towers) rather than strict capacity requirements.

Key Findings and Recommendations

Finding	Detail
Manual processing is unacceptable	At 15-second service time, Phase-1 generates a 2,480 m queue per lane and Phase-2 generates a 77 m queue. Both phases fail under manual operation.
RFID/ANPR eliminates all queuing	At 3-second service time, Phase-1 $v/c = 0.544$ and Phase-2 $v/c = 0.211$. Queue length is zero in both phases under the recommended gate configuration.
Gate count is adequate	3 RFID/ANPR lanes for Phase-1 and 4 lanes for Phase-2 are sufficient, with meaningful reserve capacity (46% and 79% respectively).
RFID/ANPR is a prerequisite	Implementation of the automated gate system is a mandatory condition prior to occupation of Phase-1.

	Manual processing shall not be used as the primary access control mechanism.
Emergency access is safeguarded	With zero queuing on M.A. Jinnah Road, emergency vehicle access to the site is unobstructed at all times under normal operation.
Future growth absorbed	The reserve capacity at both phases absorbs the 2.5% annual traffic growth rate for a minimum of 15 additional years before gate reconfiguration is required.

Parking Requirements

Both phases require **over 3,500 car spaces** and **approximately 4,000 motorcycle spaces**.

Phase-1 Provided Parking

Level	Cars	MC
B2	516	627
B1	237	684
3 rd	393	500
4 th	393	500
5 th	393	500
6 th	393	500
7 th	393	500
Total	2,718	3,811

Phase-2 Provided Parking

Level	Cars	MC
B2	508	434
B1	552	434
GF	336	—
1F	493	841
2F	508	872
Total	2,397	2,581

Phase-1 exceeds car parking requirements by **969 spaces**, while Phase-2 exceeds by **637 spaces**. Motorcycle supply is also adequate, especially in Phase-1 where 3,811 MC spaces exceed the requirement by 1,813 spaces.

Mitigation Measures

To maintain acceptable operational performance, the following mitigation measures are recommended.

Access & Gate Improvements

1. Increase the number of inbound lanes at security checkpoints based on queue length analysis.
2. Implement 3-second optimized processing with multiple screening booths.
3. Provide dedicated lanes for:
 - Residents with RFID access
 - Visitors
 - Deliveries / logistics vehicles
4. Use ANPR, RFID, and fast-scan systems to reduce delays.

Internal Circulation Enhancements

1. Channelized entry and exit points with proper merging lengths.
2. Segregation of residential and commercial movements.
3. Provide clear wayfinding to reduce internal conflicts.

Improvements on M.A. Jinnah Road

1. Add a deceleration lane for inbound traffic entering the site.
2. Add an acceleration lane for outbound traffic merging with fast traffic stream.
3. Improve lane markings and signage to guide traffic.

Public Transport Integration

1. Maximize connectivity with Green Line BRT stations, reducing private vehicle dependency.
2. Provide pedestrian access to promote modal shift.
3. Encourage use of ride-hailing pick-up points inside the site.

Parking & Drop-off Management

1. Separate parking for residential, retail, and visitors.
2. Internal holding areas to prevent spillback onto M.A. Jinnah Road.
3. Dedicated ride-hailing bays to avoid curbside parking.

The comprehensive traffic impact assessment demonstrates that the proposed development cannot be successfully integrated into the existing transportation network without the implementation of appropriate mitigation measures, as it would otherwise result in significant adverse impacts on existing traffic circulation. While internal circulation and on-site parking are adequate, the proposed trips are expected to generate queues at the site entrance, which in turn lead to inadequate levels of service and operational delays on the surrounding road network. Therefore, targeted mitigation measures are required to improve overall traffic performance and ensure safe and efficient access.

Detailed report on Traffic Management Plan is attached at Annex.

Mitigation Measures

To effectively mitigate and manage potential traffic impacts during the construction phase, the following detailed measures will be rigorously implemented:

- *Optimized Haulage and Delivery Schedule:* To significantly reduce daytime traffic congestion and minimize disruption to regular commuter flows and local residents, all heavy construction vehicle movements, including the delivery of materials and the removal of spoil or waste, will be primarily confined to late-night hours. Specifically, these activities will be scheduled to occur between [e.g., 10:00 PM and 5:00 AM], when ambient traffic volumes are at their lowest. Any critical deliveries or necessary vehicle movements outside of these hours will require prior approval and will be managed under strict traffic control protocols to minimize impact.
- *Prohibition of Pressure Horns:* To prevent excessive noise pollution and avoid disturbing local communities, particularly during late-night operations, the fitting and use of pressure horns on all project vehicles are strictly prohibited. Vehicle operators are mandated to use standard horns only when absolutely necessary for safety warnings, in accordance with applicable traffic regulations. This measure aims to maintain a quieter environment around the construction site.

- **Regulated Vehicle Speed Enforcement:** Strict speed limits will be imposed and rigorously enforced for all project vehicles operating both within the designated construction site and on all public access roads leading to and from the site. Clear and prominent signage indicating these speed limits will be strategically placed. All drivers of project vehicles will receive mandatory briefings on safe driving practices and adherence to posted speed limits. This measure is crucial for enhancing safety for construction personnel, pedestrians, and other road users, as well as for minimizing dust generation and reducing noise levels caused by speeding vehicles. Monitoring mechanisms will be employed to ensure compliance.
- **Comprehensive Traffic Management Plan (TMP):** A detailed and dynamic Traffic Management Plan will be developed, implemented, and continuously monitored throughout the entire construction duration. This plan will encompass:
 - **Designated Access and Egress Routes:** Clearly defined and approved primary and secondary routes for all construction vehicles, strategically selected to bypass sensitive areas such as residential zones, school vicinities, and high-traffic commercial districts wherever feasible.
 - **Temporary Traffic Control Measures:** Deployment of appropriate temporary traffic control devices, including advanced warning signs, directional signage, barricades, cones, and flashing lights, to safely guide both vehicular and pedestrian traffic around the construction zone and any temporary obstructions.
 - **On-site Traffic Controllers:** Stationing of trained and certified flag persons or traffic controllers at key access points, busy intersections, and temporary road diversions to manage traffic flow efficiently, especially during periods of heavy vehicle movement or critical construction activities.
 - **Stakeholder Communication:** Establishing clear channels for regular communication with local traffic authorities, emergency services, and the public to disseminate timely information regarding significant traffic pattern changes, temporary road closures, or anticipated delays.
 - **Emergency Vehicle Access:** Ensuring that unimpeded access for emergency vehicles is maintained at all times through careful planning and coordination.

The TMP will undergo periodic reviews and updates based on evolving site conditions, observed traffic patterns, and feedback from local stakeholders and regulatory bodies.

- **Dedicated Parking and Staging Areas:** Sufficiently sized and clearly delineated parking areas will be provided both within the construction site boundaries and in designated adjacent locations. These facilities will be organized to accommodate different categories of project vehicles, including:
 - *Worker Parking:* Secure and easily accessible parking for construction personnel's private vehicles.
 - *Heavy Equipment Staging:* Designated zones for the temporary parking and staging of heavy machinery, specialized equipment, and plant.
 - *Loading and Unloading Bays:* Specific, well-marked bays designed for the efficient loading and unloading of material delivery trucks, positioned to minimize interference with public thoroughfares.

All designated parking areas will be adequately illuminated, regularly maintained, and clearly signed to ensure orderly vehicle placement and safe access.

- **Strict Prohibition of Roadside Parking:** Parking of any project-related vehicles, including worker vehicles, delivery trucks, or idle equipment, alongside public roads or within unauthorized areas is strictly prohibited at all times. This stringent measure is critical to maintaining unhindered traffic flow, ensuring clear lines of sight for all road users, preventing obstructions, and upholding local traffic ordinances. Non-compliance with this directive will result in immediate corrective action and may lead to disciplinary consequences for the responsible vehicle operators and contractors.

6.2.14 Fire Hazards and Life Safety

High-rise building fire safety remains a paramount concern, necessitating a proactive and multidisciplinary approach to life safety system design. Drawing crucial lessons from past incidents, the development of robust protective measures is essential. Architects meticulously plan fire stairs, evacuation routes, and areas of refuge, concurrently ensuring appropriate fire ratings for shafts and internal building separations. Structural engineers specify fire-retardant materials for structural integrity, while MEP consultants design sophisticated active systems for comprehensive fire detection and management, aligning with the overarching fire and life safety strategy.

Mitigation Measures:

A comprehensive array of mitigation measures has been implemented, integrating advanced active life safety and fire control systems. These systems

collectively include automatic sprinklers, standpipes, sophisticated fire detection and alarm systems, robust fire suppression capabilities, and dynamic stair and lobby pressurization systems.

- **Fire Detection and Alarm Systems:** These systems feature smoke and heat detection in critical areas, building-wide sprinkler detection with zoned flow switches, manual call points, and integrated voice evacuation signals.
- **Fire Suppression Systems:** Primary suppression is provided by automatic sprinkler systems and strategically located fire standpipe and hose systems.
- **Fire Management Systems:** These encompass active smoke management, comprehensive pressurization controls, dedicated emergency electric power, automatic elevator recall functions, integrated communication and alarm notification, and a central fire command center.

Active Smoke Control Measures:

Active smoke control strategies are multifaceted, leveraging:

- Fire control facilitated by automatic sprinklers.
- Pressurization of all designated escape stairways.
- Electromagnetic door closures for compartmentation.
- Controlled depressurization of the fire floor, achieving 12 air changes per hour through targeted extraction.
- Automatic shutdown of air handling units on all unaffected floors.

Stairwell and Lobby Pressurization:

Emergency staircases are equipped with a pressurization system designed in strict accordance with NFPA 92, seamlessly linked to the automatic fire alarm system. Redundant (duty/standby) pressurization fans are strategically located at the roof level. A modulated airflow system, utilizing variable speed fans, dynamically adjusts air supply to cater for variations in the number of open doors onto the staircase, maintaining optimal pressurization. Similarly, redundant smoke extract fans (duty/standby) are positioned on the building's rooftops.

Elevator lobbies receive continuous air supply to maintain slight pressurization during normal operation, concurrently providing necessary ventilation and

cooling. In an emergency, the air supply to these lobbies is significantly increased to achieve critical pressurization levels.

Automatic Sprinkler and Standpipe Systems:

The entire building is protected by an automatic sprinkler system, fed by dedicated pumps. This system is designed in accordance with NFPA 13 and local code requirements, proposing a combined standpipe and sprinkler system as permitted by NFPA 14. Standpipes adhere to Class I-II standards, with Class III outlet connections provided at every floor level within required stairways, both above and below grade.

Fire water tanks are integrated with the domestic water storage system to prevent water stagnation. The sprinkler detection system features zone valves directly connected to the analogue addressable fire alarm and detection system for precise monitoring and control.

6.2.15 Energy use

Electricity during construction phase will be produced from diesel generators, whereas during operation phase, power supply from K-Electric shall be made available.

A back up diesel operated generator will also be installed in case of emergency or suspension of power supply from the mains. The power produced will be significant in terms of costs both environmental and economic. Since energy produced from non-renewable resource results in CO_x, SO_x, and NO_x emissions, it is important to ensure that energy is used prudently and best management practices are adopted in building design.

Mitigation Measures

- Gensets will be installed with stand-alone or isolated foundation with proper anti-vibration packing/ pad, etc.;
- Smoke of a gensets will be channelized/emitted in a manner that it is not a nuisance in the neighborhood;
- Genset will be installed in the basement, roof top, ground floor, front/back offset of the premises/ building, in, in order of priority. However, due care will be taken so that it is not a nuisance in the neighborhood; and
- Proponent shall necessarily install a source of standby power back up for the building and installation of genset by individuals will be prohibited.

- Proper maintenance as per following can reduce the pollution level and increase the Genset life.

6.2.16 Materials Selection

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

Mitigation Measures

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

6.2.17 Disturbance to Wildlife

The project site does not have any wildlife habitat or endangered species. Therefore, no significant impacts are envisaged on the wildlife during the project construction and operation phase.

6.2.18 Potential Impacts on Socio-economic Environment

Health, Safety, and Environment (HSE) are foundational elements of the Environmental Management Plan (EMP), with continuous monitoring of environmental performance being an indispensable component. The proponent must ensure rigorous adherence to all EMP measures and guidelines, while the contractor is obligated to strictly follow Standard Operating Procedures (SOPs) for all construction activities.

It is unfortunately common for construction workers to face hazards without adequate protection. Accidents frequently occur at unsecured sites, affecting unprotected individuals. Comprehensive HSE considerations demand proactive precautions against all potential impacts, no matter how minor. Significant social concerns during the construction phase typically arise from: i) insufficient communication with stakeholders regarding the project or its schedule; ii) inadequate site cordoning, allowing unauthorized access; iii) consistent disregard or circumvention of mandatory Personal Protective Equipment (PPE) use by the construction crew; iv) a lack of pre-training for the construction crew on foreseeable hazards across project stages; and v) supervisory negligence in enforcing HSE procedures/SOPs, even when awareness training and PPEs are provided.

Safety risks escalate significantly in densely populated urban centers. Consequently, strict compliance with HSE procedures is paramount. All incidents stemming from HSE non-observance must be diligently monitored and recorded to ensure the safety of both workers and the public. To this end, the contractor must maintain comprehensive records of the Health, Safety, and Environmental Management Plan and SOPs, alongside the following specific requirements:

- Implement alternative traffic arrangements or detours as necessary, ensuring affected public and resident associations are promptly informed of diversions.
- Disseminate project information, work schedules, and alternative routes to the public through daily newspapers and local cable television services.
- Ensure project transparency by erecting public information and caution boards at the work site. These boards shall include details such as project name, cost, schedule, executing agency, contractor details, nature and schedule of work, traffic diversion information, entry restrictions, and contact details for competent officials handling public complaints.
- Restrict public access to the site through robust enclosure/barricading of the construction area, installation of warning and sign boards, and deployment of security guards 24/7.

- Guarantee the provision of essential PPEs (e.g., helmets, hand gloves, boots, masks, safety hoists for work at height) and enforce their mandatory use by all workers.
- Establish and clearly list a code of conduct and SOPs to be observed during each construction stage.
- Employ a dedicated Environmental, Health, and Safety (EHS) expert on site.
- Provide mandatory on-site Health and Safety Training for all site personnel.
- Promptly report all accidents to the relevant authorities and maintain regular, detailed records.
- Minimize temporary inconveniences caused by construction works through meticulous planning and close coordination with community members and organizations, such as Traffic Management Authorities.
- Maintain service roads in optimal condition to facilitate smooth traffic flow, and assign necessary personnel for traffic guidance and control.

The proposed project is expected to generate substantial employment during both its construction and operational phases. Approximately 200 individuals are anticipated to be employed during construction. Post-completion, the project will continue to create job opportunities, encompassing staff directly involved in the operation and management of facilities, including Saima Centre Point (Phase-II) management, personnel engaged by unit owners, shop owners, service staff, security personnel, and drivers. A significant proportion of this workforce will comprise local residents. This employment generation represents a key positive impact of the proposed development. The project is projected to foster economic uplift, elevate the standing of commercial enterprises, and improve both the social status and lifestyle of the community residing within the project's microenvironment. The creation of jobs and the promotion of business and commercial activities are additional notable features of the Saima Centre Point (Phase-II) Project.

Table 6.1: Nature and Degree of Positive Socioeconomic Impacts

Nature of positive impact	Degree of impact	Description
I. Construction Phase:		
Job opportunity	Positive Impact	Generate unskilled, semi-skilled and skilled jobs as construction laborers and other service providers.
Wider economic impact	Positive Impact	Economic impact in terms of generating opportunities for other business-like sourcing of man and material supplies for

		specialized jobs.
II. Operation Phase		
Job opportunity	Major Positive Impact	Generate large number of jobs in various positions both in managerial, supervisory and subordinate positions.
Improvement in quality of life	Major Positive Impact	Provide safe and secure environment for social, cultural, and commercial activity
Enhancement of quality of environment	Major Positive Impact	Benefit the macroenvironment by adopting Public park/greenbelt as a social responsibility

6.2.19 Cultural Resources

There are no protected or otherwise cultural or archaeological sites in the corridor of impact of the project site and hence no impact of the project will occur on cultural or archaeological resources. However, close coordination will be maintained with all relevant stakeholders during the planning and construction phase of the project.

6.2.20 Land-use and Aesthetics

The Project aligns seamlessly with the designated land-use for M.A. Jinnah Road, actively promoting urban densification. The development of multi-storey buildings directly contributes to sustainable growth by optimizing resource utilization and enhancing the overall quality of urban life. These innovative, self-contained developments, such as Saima Centre Point (Phase-II), are designed to include integrated back-up power supply, robust water supply systems, efficient sewage disposal, and ample parking facilities. All project proponents are mandated to rigorously adhere to ML&C provisions, with SEPA specifically overseeing Saima Centre Point (Phase-II) to ensure its sustainable implementation.

This expertly and sustainably designed 37-storey Saima Centre Point (Phase-II) is poised to become a prominent landmark on Karachi's skyline, significantly enriching the urban aesthetic.

As a self-contained structure, Saima Centre Point (Phase-II) integrates a comprehensive 24-hour security system throughout, effectively addressing safety and security concerns for its occupants. This unwavering commitment ensures the project successfully delivers a secure and highly desirable residential and commercial hub in a prime urban location.

6.2.21 Impacts Rating

The following Checklist for the Saima Centre Point (Phase-II) Project provides the screening of potential environmental impact on different components of ecosystem.

Screening Questions	Yes	No	Remarks
A. Project Siting			
Is the project area.....?			
Densely Populated?	√		The project is following the plan of densification by KCB
Heavy with Development Activities?	√		The densification has open doors for such development activities
Adjacent to or Within Any Environmentally Sensitive Areas?		√	Outside the corridor of impact
Cultural Heritage Site		√	Outside the corridor of impact
Protected Area		√	Outside the corridor of impact
Wetland		√	Outside the corridor of impact
Mangrove		√	Outside the corridor of impact
Estuarine		√	Outside the corridor of impact
Buffer Zone of Protected Area		√	Outside the corridor of impact
Special Area For Protecting Biodiversity		√	Outside the corridor of impact
Bay		√	Outside the corridor of impact
B. Potential Environmental Impacts			
Will The Project Cause...?			
Impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services.		√	Taking cognizance of the situation, the proponent has already paid heavy amount as its share for the augmentation of utility services of the area concerned
Deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity, and increased waste generation to the point that both manmade and natural systems are overloaded and the capacities to manage these systems are overwhelmed?	√		Densification of the roads has taken no cognizance of the centripetal force mentioned above. This omission is likely to result in catastrophes on road. The issue must be resolved through a strategic solution to a cumulative problem.
Degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)?		√	Not envisaged
Dislocation or involuntary resettlement of people		√	Not envisaged
Dislocation of indigenous		√	Not envisaged

communities and Disadvantaged population			
Degradation of cultural property, and loss of cultural heritage and tourism revenues?		✓	Not envisaged
Occupation of low-lying lands, floodplains and steep hillsides by squatters and low-income groups, and their exposure to increased health hazards and risks due to polluting industries?		✓	Not envisaged
Water resource problems (e.g. depletion/ degradation of available water supply, deterioration for surface and ground water quality, and pollution of receiving waters?		✓	Not envisaged, better management & conservation practices will be followed
Air pollution due to urban emissions?		✓	Minor
Social conflicts between construction workers from other areas and local workers?		✓	Not expected
Road blocking and temporary flooding due to land excavation during rainy season?		✓	Not envisaged but will be mitigated if some such situation emerges through better management practices
Noise and dust from construction activities?		✓	Minor but will be minimized and localized into the microenvironment through best management practices
Traffic disturbances due to construction material transport and wastes?		✓	The Project involves major construction activity. State of the art technology will be used. Construction material transportation to the site will be managed through recognized access roads and adoption of good management practices
Temporary silt runoff due to construction?		✓	Not envisaged but will be mitigated if some such situation emerges through better management practices
Hazards to public health due to ambient, household and occupational pollution, thermal inversion, and smog formation?		✓	Not envisaged but will be mitigated if some such situation emerges through better management practices and implementation of Environmental Management Plan
Water depletion and/or quality degradation?		✓	Best management practices and conservation practices will be followed in view of constraints on

Environmental Impact Assessment (EIA)

Saima Center Point
(Phase-II)

Plot / Survey No. 134/B/1, measuring
29588.4 Sq.Yds M.A Jinnah Road
Karachi Cantt

			availability
Overplaying of ground water, leading to land subsidence, lowered ground water table, and salinization?		✓	Conservation practices will be followed and excessive use will be avoided
Contamination of surface and ground waters due to improper waste disposal?		✓	Solid and Liquid waste Disposal system will be in place to prevent possible contamination of water resources
Pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems?		✓	Solid and Liquid waste Disposal system will be in place to prevent possible contamination of receiving waters.
Overall Rating		✓	No significant Impacts

7. Environmental Management Plan (EMP)

7.1 Introduction

The Environmental Impact Assessment (EIA) for the proposed development activities of Saima Centre Point (Phase-II) Project has identified potential impacts that are likely to arise during the construction and operation phases. The EIA has examined in detail both negative and positive impacts of each stage of the operation. Where adverse impacts have been identified, the EIA has recommended mitigation measures; include management and monitoring practices, physical controls, or compensation in monetary terms. The mitigation measures proposed are based on a good understanding of the sensitivity and behavior of environmental receptors, past experience, case studies, legislative controls, guidelines, & expert advice.

For any residual impacts (impacts remaining after applying the recommended mitigation measures) or for impacts in which there has been a level of uncertainty in prediction, monitoring measures have been recommended. Advice on monitoring measures required was sought from experts involved in the EIA and case studies of similar development activities at international level.

For the effective implementation and management of the mitigation measures and monitoring requirements an Environmental Management Plan (EMP) has been prepared and presented in this section. The EMP satisfies the requirements of the Pakistan Initial Environmental Examination and Environmental Impacts Assessment Review Procedures, 2014.

7.2 Objectives

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

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

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

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

7.3 Structure of the EMP

The EMP consists of the following section.

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

7.4 Legislation and Guidelines

The EIA has discussed in detail all the legislation and guidelines (chapter 3) which has relevance to the project. Mega Residency (Pvt.) Ltd shall ensure that the construction and operation of project is conducted in conformance to relevant legislations and guidelines and guidance is sought as and when required. Mega Residency (Pvt.) Ltd shall also ensure that the key project management staff is aware of these legislations and guidelines. SEQs for municipal and industrial effluents, selected gaseous pollutants from industrial sources and motor vehicle exhaust and noise are provided in Chapter 2.

7.5 Organizational Structure and Roles and Responsibilities

7.5.1 Organizational Structure

The proposed project includes the following main organization:

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



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

7.5.2 Roles and Responsibilities

7.5.2.1 General

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

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

7.5.3 Planning and Design of the Operations

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

Approvals: Obtaining Approval from SEPA will not relieve the proponent of other legal obligation and hence Mega Residency (Pvt.) Ltd and project contractors will obtain all other relevant clearance and necessary approvals required by the Government of Sindh and Relevant departments prior to commencing the respective operations.



Contractual Provision: Adherence to the requirements of the EIA and EMP in terms of environmental mitigation will be required from all project contractors and thus EMP will form part of their contract with Mega Residency (Pvt.) Ltd.

7.5.4 Implementation of the Operation

Co-ordination with Stakeholders: Mega Residency (Pvt.) Ltd will ensure that co-ordination with the regulators and other stakeholders on environmental & social matters is maintained throughout construction & operation phase of the project.

Monitoring: Mega Residency (Pvt.) Ltd and the contractors will ensure that monitoring of the project activities is carried out throughout the project. The Mega Residency (Pvt.) Ltd' site representative will monitor all project activities during the construction and operation phase. He will keep a record of all non-conformances observed and report these along with actions to Mega Residency (Pvt.) Ltd management in Karachi for further action. The site representative will also report any impacts anticipated along with his recommendation for further action.

Emergency Procedures: Mega Residency (Pvt.) Ltd and the contractors will prepare contingency plans to deal with any emergency situation that may arise during the construction and operation e.g. major oil spills, medical evacuation & communicate these to the regulatory agencies if required by these agencies.

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

Trainings: The project contractors will be responsible for the selection and training of their staff capable of completing the project activities properly and efficiently. The contractors will be responsible for providing training to their staff members according to the training programme. The training programme is discussed briefly in section 7.7.3.

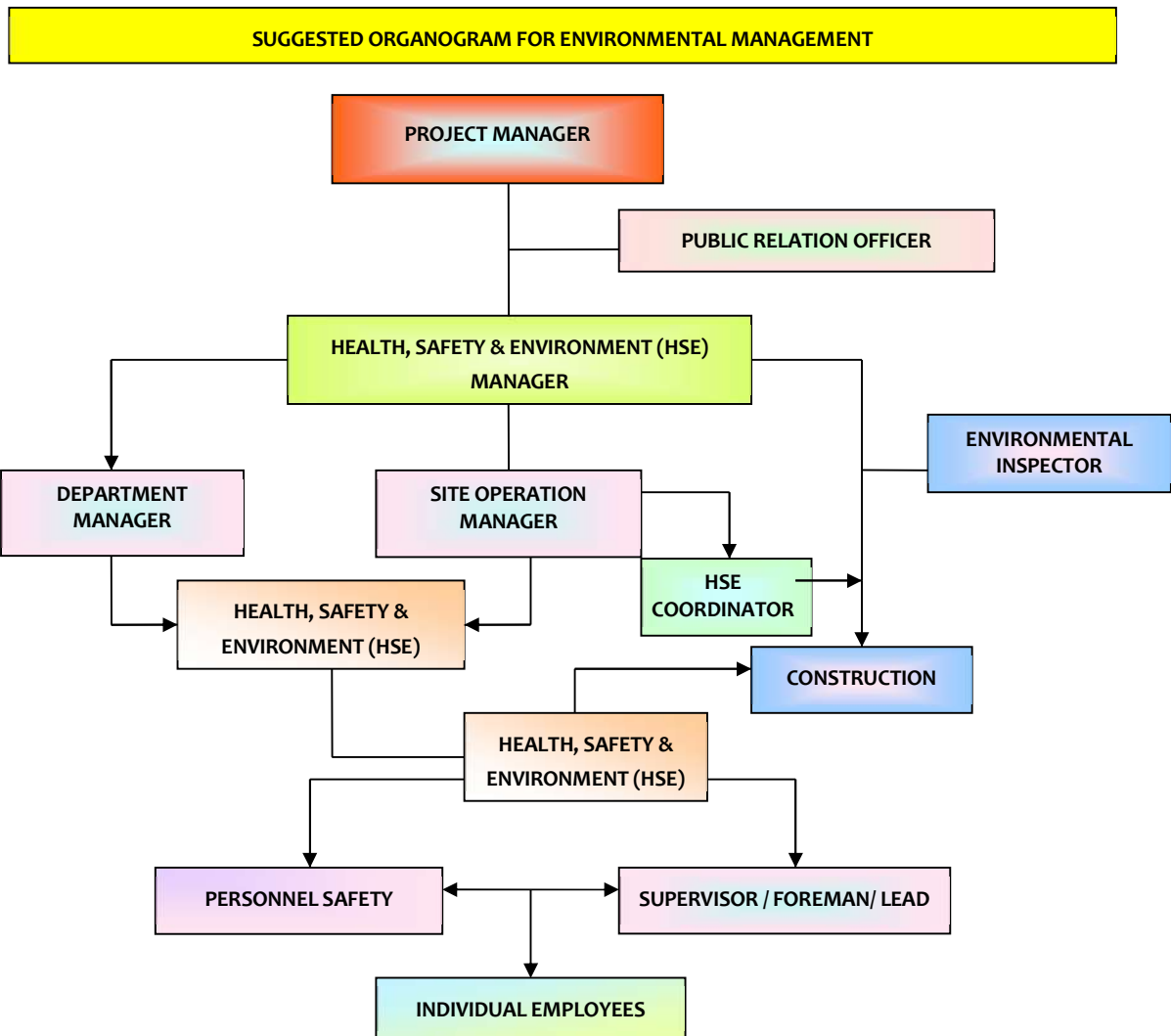
7.5.5 Communication and Documentation

Mega Residency (Pvt.) Ltd and the contractor will ensure that the communication and documentation requirements specified in the EMP are fulfilled during the construction and operation phase.

Change Management: The EIA for the proposed operation recognizes that changes in the operation or the EMP may be required during the project activities and therefore provides a Change Management Plan to manage such

changes. Overall responsibility for the preparation of change management statements will be with Proponent's site representative.

Restoration: Mega Residency (Pvt.) Ltd along with the construction contractor will be responsible for the final restoration of work areas.



7.5.6 Maintenance of the EMP

EMP needs to be revised on timely basis to keep up-to-date as per the requirements comes up regularly. Therefore, outlining the responsibilities and activities associated with the maintenance of the EMP is essential. The responsibilities of the Construction Contractor should be detailed and

procedures for requesting EMP revisions should also be outlined. EMP revision procedures must include requirements for notification of the appropriate government and municipal agencies so that their role is also played in the overall management process.

7.5.7 Environmental Health and Safety Management System

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

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

7.5.8 Health and Safety during Construction Phase

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

Potential hazards for workers in construction include:

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

7.5.9 Health and Safety during Operation Phase

Saima Centre Point (Phase-II) Tower is a high-rise development, occupational health & safety issues need to be addressed managed effectively to ensure safety of its occupants in particular and the neighborhood in general.

7.5.10 Emergency Response Plan

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

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

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

7.5.10.1 Objectives

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

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

7.5.10.2 Emergency Response Manuals

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

Emergency Contact Numbers			
S. #	Description	Image	Contact #
01	Fire Brigade		16,
02	Ambulance		2022, 1015
03	Civil Hospital		
04	Police Station		15,
05	K Electric		
06	SSGC		1199
07	Air Port		114
08	Railway		117

7.5.11 Environmental Compliance Reporting, Documentation and Trainings

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

The management will participate in the audits & inspections and investigations. The management will also be responsible for regular review of the

environmental performance of the site and site personnel, and for the reporting on the implementation of commitments made in the EMP.

In particular, there will be:

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

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

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

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

Trainings identified in EMP are given below:

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

Specific environmental training for relevant employees e.g. daily checks to maintain controls, waste minimization, etc.

7.5.12 Mitigation Management Matrix

The Mitigation Management Matrix will be used as a management & monitoring tool for implementation of the mitigation measures required by the EIA. Mitigation management matrix for construction and operation is provided in the table 7.1. The matrix lists down the following:

- The mitigation measure recommended in the EIA.
- The person/organization directly responsible for adhering to or executing the required mitigation measures.

- The parameters which will be monitored to ensure compliance with the mitigation measures;
- The timing at which the mitigation or monitoring has to be carried out.

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

7.5.13 Environmental Monitoring Programme

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

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

7.5.14 Compliance Monitoring

Compliance monitoring will be carried out to ensure compliance with the requirements of the EIA and to document and report all non-compliances. The mitigation management matrix provided in the EMP will be used as a management and monitoring tool. The contractor's HSE Officer will be responsible for monitoring the compliance of their organization with the relevant EMP requirements. Proponent's site representative will monitor the contractor's compliance and will also ensure that during construction each activity system and plan is in place for effective compliance monitoring. The site representative will make regular checks on the contractor's works; keep records of all non-compliances observed during the execution of the project activities; & the details of all remedial actions taken to mitigate the project impacts.

7.5.15 Effects Monitoring

The effects monitoring requirements have been detailed in Table 7.2. An independent monitoring consultant (IMC) will be responsible to carry out the required effects monitoring during the construction and operation phase.

7.5.16 Environmental Reporting

7.5.16.1 Final Monitoring Report (Construction Phase)

After completion of construction phase, a final monitoring report will be prepared by site representative. The report will include the following:

- Introduction.
- Details of the Project Activities.
- Natural Resource used during the Project.
- List of Non-compliances recorded.
- Effects of the Project on Communities and Physical Resources.
- Photographic Records
- Approvals provided during the project
- Change managements statements
- Trainings
- Conclusions

7.5.16.2 Annual Environmental Monitoring Reports (Operation Phase)

The project proponent shall prepare annual environmental monitoring reports describing the conduct of the operation phase for project along with details of the effects monitoring conducted annually during the operation phase of the project. The report shall be submitted to the SEPA.

7.5.17 Change Management Plan

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

7.5.17.1 Changes to the EMP

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

- A meeting will be held between Mega Residency (Pvt.) Ltd and the concerned project contractors. During the meeting, the proposed addition to the EMP will be discussed and agreed upon by all parties.

- Based on the discussion during the meeting, a change report will be produced collectively, which will include the additional EMP clause and the reasons for the addition.
- The report will be signed by all parties and will be filled at the site office: A copy of the report will be sent to Mega Residency (Pvt.) Ltd and contractor head offices.
- All relevant project personnel will be informed of the addition.

7.5.17.2 Changes to the Operation

The change management system recognizes three orders of changes:

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

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

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

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

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

7.5.18 Training Programme

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

7.5.18.1 Objectives

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

7.5.18.2 Roles and Responsibilities

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

7.5.18.3 Training Programme

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

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

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

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

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

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

Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
1	Land Use and Soils			
1.1	The construction activities will be planned to minimize disturbance to soil	Mega Residency (Pvt.) Ltd, CC	Monitoring compliance	During construction phase
1.2	To the extent possible, equipment and materials would be staged in areas that have already been disturbed	Mega Residency (Pvt.) Ltd, CC	Monitoring compliance	During construction phase
1.3	Movement of construction equipment will be restricted to work areas only to avoid unnecessary disturbance to soil	CC	Monitoring compliance	During construction phase
1.4	Routes of water tankers, dumper trucks and other project vehicles will be monitored for any signs of soil disturbance & road damage	CC	Monitoring compliance	During construction phase
1.5	Area showing signs of unstabilised soil conditions will be compacted and watered	Mega Residency (Pvt.) Ltd, CC	Monitoring compliance	During construction phase
1.6	The assessment of settlement within affected zone due to dewatering will be conducted prior to dewatering	CC	Monitoring compliance	During construction phase
1.7	The affected zone of settlement, if identified will be monitored regularly during dewatering activity	Mega Residency (Pvt.) Ltd, CC	Monitoring compliance	During construction phase
1.8	Proper drainage will be provided to construction camp, construction site, especially near excavations and around proposed facility	CC	Monitoring compliance	During construction phase
1.9	Vehicle speed will be regulated and monitored to avoid excessive dust emissions	CC	Monitoring compliance	During construction phase
1.10	Total land uptake by the project and associated facilities will be kept to the minimum	Mega Residency (Pvt.) Ltd, CC	Monitoring compliance	During construction phase

Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
1.11	Periodic trainings will be provided to drivers on mitigation measures related to off-road travel and speed limits	Mega Residency (Pvt.) Ltd, CC	Check training records	During construction phase
1.12	The Project will have a storm water collection system so that the storm water effluent has minimal sediment load	Mega Residency (Pvt.) Ltd, CC	Monitoring compliance	During design and construction phase
2	Air Quality			
2.1	Dust Emissions			
2.1.1	Water will be sprinkled daily or when there is an obvious dust problem on all exposed surfaces to suppress emission of dust. Frequency of Sprinklings will be kept such that the dust remains under control, particularly when wind is blowing towards the receptors	CC	Monitoring compliance	During construction phase
2.1.2	Dust emissions from soil piles and aggregate storage stockpiles will be reduced by appropriate measures. These may include: → Keeping the material moist by sprinkling of water at appropriate frequency → Erecting windshield walls on three sides of the piles such that the wall project 0.5m above the pile, or → Covering the pile, for example with tarpaulin or thick plastic sheets, to prevent emissions. → Locating stock piles out of the wind direction	CC	Monitoring compliance	During construction phase

Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
2.1.3	All roads within the proposed Project will be paved as early as possible after the commencement of construction work. Until the roads are paved, they will be sprinkled regularly to prevent dust emission. Other temporary tracks within the site boundary will be compacted and sprinkled with water during the construction works.	Mega Residency (Pvt.) Ltd, CC	Monitoring compliance	During construction phase
2.1.4	Project traffic will maintain a maximum speed limit of 20km/hr on all unpaved roads within the proposed site area.	Mega Residency (Pvt.) Ltd, CC	Check speed of vehicles	During construction phase
2.1.5	Construction materials that are susceptible to dust formation will be transported only in securely covered trucks to prevent dust emission during transportation.	CC	Monitoring compliance	During construction phase
2.1.6	The exposure of construction workers to dust will be minimized by provision of dust masks.	CC	Check for dust masks	During construction phase
2.2	Vehicle Equipment and Exhaust.			
2.2.1	All vehicles, generators and other equipments used during the construction will be properly tuned and maintained in good working condition in order to minimize emission of pollutants.	Mega Residency (Pvt.) Ltd, CC	Maintenance records of vehicles and equipments	During construction phase
2.2.2	The stack height of the generators during operation phase will be vented through vertical stacks to minimize exposure at ground level	CC	Monitor compliance	During construction phase
2.3	Generator Emissions			

Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
2.3.1	The option of using natural gas as fuel in the back-up generators should be explored.	Mega Residency (Pvt.) Ltd, Generator Vendor	Monitor compliance	During design phase
2.3.2	The generator will be properly tuned and maintained in good working condition in order to minimize exhaust emissions	Mega Residency (Pvt.) Ltd	Check maintenance records	During operation phase
2.3.3	The diesel generator should be used for a very short duration with the power switched back to the main power supply as quickly as possible.	Mega Residency (Pvt.) Ltd	Monitoring compliance	During operation phase
2.3.4	NOx emission reduction techniques should be employed on a regular basis	Mega Residency (Pvt.) Ltd	Monitor NOx emissions	During operation phase
3	Construction Noise			
3.1	Reduce equipment noise at source by proper design, maintenance and repair of construction machinery and equipment	Mega Residency (Pvt.) Ltd, CC	Check maintenance records	During construction phase
3.2	Minimize noise from vehicles and power generators by use of proper silencers and mufflers.	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction phase
3.3	Use noise-abating devices wherever needed and practicable.	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction phase
4	Water Sourcing			
4.1	A complete record of water consumption during construction and operation phase will be maintained	Mega Residency (Pvt.) Ltd, CC	Check water consumption records	During construction and operation phase
4.2	If a new water well is to be installed, it will be designed to abstract water preferably from deep aquifer not being used by local communities	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction phase

Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
4.3	Water conservation program will be initiated to prevent wastage of water.	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction and operation phase
4.4	The water supply lines will be checked and repaired for leaks in order to reduce wastage of water.	Mega Residency (Pvt.) Ltd, Maintenance Contractor	Check maintenance records	During operation phase
4.5	Recycle grey water for use for toilet flushing	Mega Residency (Pvt.) Ltd	Monitor compliance	During operation phase
4.6	Ensure that water efficient sanitary fittings are used throughout the development e.g. low flush toilets, water efficient shower heads, and aerators on faucets	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction and operation phase
5	Soil Contamination			
5.1	Fuels, lubricants, and chemical will be stored in covered bounded areas, underlain with impervious lining	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction phase
5.2	Maintenance of vehicles and equipment will only be carried out designated areas. The area will be provided with hard surface or tarpaulin will be spread on the ground to prevent contamination of soil	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction phase
5.3	Vehicles will only be washed at designated areas.	CC	Vehicle Inspection record	During construction phase
5.4	Regular inspections will be carried out to detect leakage in construction vehicles and equipment	Mega Residency (Pvt.) Ltd, CC	Check inspection / maintenance records	During construction phase
5.5	Appropriate arrangements, including shovels, plastic bags and absorbent materials, will be available	CC	Monitor compliance	During construction phase

Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
	near fuel and oil storage areas			
5.6	Contaminated soil will be removed and properly disposed after treatment such as incineration etc.	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction phase
6	Traffic			
6.1	Heavy traffic during construction phase will come to the project site during late night hours.	Mega Residency (Pvt.) Ltd, CC	Traffic record	During construction phase
6.2	Project vehicles shall not be fitted with pressure horns	CC	Monitor compliance	During construction phase
6.3	During construction, regulate speed of vehicles	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction phase
6.4	Designated parking areas will be provided for different type of project vehicles within and around the project site	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction phase
6.5	Manage vehicle movement to avoid traffic jam and long queues	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction and operation phase
6.6	Prepare, implement and monitor the traffic management plan	Mega Residency (Pvt.) Ltd	Monitor compliance	During construction and operation phase
6.7	Vehicles to use designated parking areas during operational phase.	Mega Residency (Pvt.) Ltd	Monitor compliance	During operation phase
6.8	Parking of vehicles alongside the road should be prohibited at all time.	Mega Residency (Pvt.) Ltd	Monitor compliance	During construction and operation phase
7	Wastewater Generation			
7.1	Wastewater Generation During Construction			
7.1.1	Wastewater generated at the campsites will be stored temporarily in septic systems comprising of	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction phase

Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
	septic tanks from where it will be routed to a nearest drain/sewerage system.			
7.1.2	At the time of restoration, septic tanks will be dismantled in place and backfilled with at least 1m of soil cover above the surrounding natural surface level	CC	Monitor compliance	After the completion of construction phase
7.2	Wastewater Generation During Operation			
7.2.1	The grey water will be recycled to be re-used again in toilets and kitchens etc.	Mega Residency (Pvt.) Ltd	Monitor compliance	During operation phase
7.2.2	Black water will be temporary stored in septic tanks and will be discharged into a nearby out fall sewer via trunk sewer	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During design, construction & operation phase
7.2.3	Waste segregation measures would be employed to minimize entry of solid waste into the wastewater stream	Mega Residency (Pvt.) Ltd	Monitor compliance	During operation phase
7.2.4	Water conservation strategies will be employed to avoid wastage of water	Mega Residency (Pvt.) Ltd	Monitor compliance	During operation phase
8	Solid Waste Generation and Management			
8.1	Solid Waste Generation and Management During Construction			
8.1.1	Separate bins will be placed for different types of wastes- plastics, paper, metal, glass, wood, and cotton.	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction phase
8.1.2	Recyclable material will be separated at source. The recyclable waste will be sold to waste contractors for recycling	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction phase
8.1.3	Non-hazardous non-recyclable wastes such as construction camp kitchen wastes will be disposed off in landfill site through	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction phase

Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
	municipal administration or approved waste contractor.			
8.1.4	No waste will be dumped at any location outside the proposed site boundary.	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction phase
8.1.5	All hazardous waste will be separated from other wastes. Hazardous wastes will be stored in designated areas with restricted access and proper marking. Hazardous wastes will be disposed of through approved waste contractors.	Mega Residency (Pvt.) Ltd, CC	Check hazardous waste disposal records	During construction phase
8.1.6	Surplus construction materials including partially filled chemical and paint containers will be returned to suppliers. Inert construction wastes will be disposed of onsite as fill material or sold as scrap to contractors.	Mega Residency (Pvt.) Ltd, CC	Check waste records	During construction phase
8.1.7	Records of all waste generated during the construction period will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register	Mega Residency (Pvt.) Ltd, CC	Check waste record register	During construction phase
8.1.8	Training will be provided to personnel for identification, segregation, and management of waste	Mega Residency (Pvt.) Ltd, CC	Check training records	During construction phase
8.2	Solid Waste Generation and Management During Operation			
8.2.1	Waste generation will be minimized by adopting waste management strategy of reduce, reuse and recycle	Mega Residency (Pvt.) Ltd	Monitor compliance	During operation phase
8.2.2	A waste management plan will be prepared, implemented and monitored for the safe	Mega Residency (Pvt.) Ltd	Monitor compliance	During operation phase

Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
	collection, storage and treatment/disposal of the building waste			
8.2.3	Records of all waste generated will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register	Mega Residency (Pvt.) Ltd	Check waste tracking register	During operation phase
8.2.4	Training will be provided to personnel for identification, segregation, and management of waste	Mega Residency (Pvt.) Ltd	Check training records	During operation phase
8.2.5	All inert and non-hazardous construction wastes will be disposed to the existing tipping sites within or outside of the city limits	Mega Residency (Pvt.) Ltd, Waste Contractor	Monitor compliance	During operation phase
8.2.6	Hazardous wastes will be disposed through waste management contractors who will identify suitable disposal options for these wastes such as recycling, metal recovery, incineration or bioremediation etc.	Mega Residency (Pvt.) Ltd, Waste Contractor	Monitor compliance	During operation phase
8.2.7	Various waste containers for waste collection should be placed at appropriate locations in the building	Mega Residency (Pvt.) Ltd	Monitor compliance	During operation phase
8.2.8	Waste storage areas should be located within the facility and sized to the quantities of waste generated, with the following design considerations: Hard, impermeable floor with drainage, and designed for cleaning/disinfection with available water supply, Secured by locks with restricted access designed for access and regular cleaning by authorized cleaning staff and vehicles Protected from sun, and	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During operation phase

Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
	inaccessible to animals/Rodents Equipped with appropriate lighting and ventilation Segregated from food supplies and preparation areas Equipped with supplies of protected clothing, and spare bags/containers			
9	Seismicity			
9.1	No specific mitigation measures other than to construct the facility in accordance with UBC Zone 2B	Mega Residency (Pvt.) Ltd, Structure Design Consultant, CC	Monitor compliance	During project design phase
10	Sustainability			
10.1	Best practice of energy efficiency will be incorporated in the building design	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During project design phase
10.2	Buildings to be constructed with high levels of thermal insulation	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During project design phase
10.3	Ensure that HVAC system, refrigeration equipment and fire suppression equipment do not contain HCFC's or Halons	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During project design phase
11	Socio-Economic Impacts			
11.1	Deliveries should be programmed to arrive and routed to minimize disturbance to sensitive receptors	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction phase
11.2	Designated parking areas will be provided for different type of project vehicles within and around project site	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction & operation phase
11.3	Areas earmarked for amenity and commercial infrastructure will not be used for other purposes after construction	Mega Residency (Pvt.) Ltd	Monitor compliance	During construction & operation phase

Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
11.4	Employment preference will be given to residents of the project area	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction & operation phase
11.5	Local contractors will be given preference for hiring equipment and machinery during operation	Mega Residency (Pvt.) Ltd, CC	Monitor compliance	During construction & operation phase
11.6	Ensure maximum quantity of water to be treated and reused in order to lessen its burden on the existing sewerage system.	Mega Residency (Pvt.) Ltd	Monitor compliance	During design, construction & operation phase
11.7	Locals, surrounding business and city government are kept on the same page during all stages of the development of the project.	Mega Residency (Pvt.) Ltd	Monitor compliance	During construction phase
11.8	A complaint register will be maintained on site during construction to record complaints of the nearby residents.	Mega Residency (Pvt.) Ltd	Provision of complaint register	During construction phase

Table 7.2: Environmental Monitoring Plan					
Ambient Air Quality Sampling Plan					
Phase	Parameters	Locations	Frequency	Duration	Standards
Construction	SO _x , NO _x , CO, O ₃ , Smoke, PM ₁₀	At the interface of project site and receptors	Twice Monthly	Continuous for 8 hours* in a full working day	NAAQS (USEPA)
Operation	SO _x , NO _x , CO, O ₃ , Smoke, PM ₁₀	At the interface of project site and receptors	Quarterly	Continuous for 8 hours* in a full working day	SEQS (Pak EPA)
Drinking Water Quality Sampling Plan					
Stages	Parameters	Locations	Frequency	Duration	Standards
Construction	Heavy metals, TDS, TSS, pH, Total Coliform, Faecal Coliform	Ground water source and other sources	Monthly	Grab sampling	WHO drinking water quality guidelines

Table 7.2: Environmental Monitoring Plan

Operation	Heavy metals, TDS, TSS, pH, Total Coliform, Faecal Coliform	Drinking water sources	Quarterly	Grab sampling	WHO drinking water quality guidelines
Wastewater Quality Sampling Plan					
Stages	Parameters	Locations	Frequency	Duration	Standards
Construction	BOD, COD, DO, TSS, TDS, pH, NO ₃ , SO ₄ , Oil & Grease)	Camp site discharge points into drains	Twice Monthly	Grab sampling	SEQS (Pak EPA)
Operation	BOD, COD, DO, TSS, TDS, pH, NO ₃ , SO ₄ , Oil & Grease)	Effluent from wastewater treatment plant	Twice Monthly	Composite sampling / Grab sampling	SEQS (Pak EPA)
Noise Level Sampling Plan					
Stages	Parameters	Locations	Frequency	Duration	Standards
Construction	Decibels [dB(A)Scale]	At the interface of project site & receptors	Twice Monthly	Continuous for 8 hours in a full working day	WHO Noise Guidelines
		7 m from the equipment at construction site			
Operation	Decibels [dB(A)Scale]	At the interface of project site & facing road	Quarterly		Continuous for 8 hours in a full working day
		7 m from the equipment at construction site			
Solid Waste					
Stages	Parameters	Locations	Frequency	Duration	Standards
Construction	Waste generation rate, waste composition; recyclables and non-recyclables, hazardous waste	At main solid waste collection point from where the waste is transported from site	Monthly	24-hour sample collected during week days	EPA

Table 7.2: Environmental Monitoring Plan

Operation	Waste generation rate, waste composition; recyclables and non-recyclables, hazardous waste	At waste transfer facility of the project site prior to off-site disposal	Quarterly	24-hour sample collected during week days and holidays	EPA

Table 7.3: Sample Forms for Ambient Air Quality Monitoring Record

Items		Measured Value (Mean)	Measured Value (Max.)	SEQS	Remarks (Measurement Point, Frequency, Method, etc.)	Comments*
SO ₂	Annual Average			80 µg/m ³		
	24 hours			120 µg/m ³		
NO ₂	Annual Average			40 µg/m ³		
	24 hours			80 µg/m ³		
NO	Annual Average			40 µg/m ³		
	24 hours			40 µg/m ³		
CO	8 hours			5.0 mg/m ³		
	1 hour			10 mg/m ³		
Lead Pb	Annual Average			1.0 µg/m ³		
	24 hours			1.5 µg/m ³		
O ₃	1 hour			130 µg/m ³		
Suspended	Annual Average			360 µg/m ³		
SPM	Annual Average			360 µg/m ³		
	24 hours			500 µg/m ³		
Respirable particulate matter PM ₁₀	Annual Average			120 µg/m ³		
	24 hours			150 µg/m ³		
Respirable particulate matter PM _{2.5}	Annual Average			40 µg/m ³		
	24 hours			75 µg/m ³		

* (H=High, L=Low)

Table 7.4: Stack Emissions

CO, SO _x , NO _x , Smoke							
Location	S.#	Parameters	Date	Time (Hrs: Min)	Result (mg/Nm ³)	SEQS (mg/Nm ³)	Comments*

1	CO				800	
2	SO _x				1700	
3	NO _x				600	
4	Smoke				40% or 2 Ringlemann Scale or equivalent smoke number	
5	PM ₁₀				500	

* (H=High, L=Low)

Table 7.5: Sample Forms for Waste Water Quality Monitoring Record

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	SEQS	Remarks (Measurement Point, Frequency, Method, etc)
pH	pH			6-10	
TSS (Total Suspended Solids)	mg/L			150	
TDS (Total Dissolved Solids)	mg/L			3500	
BOD ₅	mg/L			80	
COD	mg/L			150	
Oil and Grease	mg/L			10	
Phenols	mg/L			0.1	
Chloride	mg/L			1000	
Cyanide	mg/L			2	
Sulphate	mg/L			600	
Sulphide	mg/L			1.0	
Ammonia	mg/L			40	
Fluoride	mg/L			10	
Pesticides	mg/L			0.15	
Cadmium	mg/L			0.1	
Chromium	mg/L			1.0	
Copper	mg/L			1.0	
Lead	mg/L			0.5	
Mercury	mg/L			0.01	
Selenium	mg/L			0.5	
Nickel	mg/L			1.0	
Total Toxic metals	mg/L			2.0	
Zinc	mg/L			5.0	
Arsenic	mg/L			1.0	
Barium	mg/L			1.5	
Iron	mg/L			8.0	
Silver	mg/L			1.0	

Manganese	mg/L			1.5	
Boron	mg/L			6.0	
Chlorine	mg/L			1.0	
An-ionic detergents	mg/L			20	
Temperature	°C			40° ≤ 3°	

Table 7.6: Sample Form for Noise Quality Monitoring Record

Location	S. #	Date	Time (Hrs: Min)	Analysis Result [dB(A)Scale]	SEQS [dB(A)Scale]*	Comments**
	1				55 (Day) / 45 (Night)	
	2				55 (Day) / 45 (Night)	
	3				55 (Day) / 45 (Night)	
	4				55 (Day) / 45 (Night)	
	5				55 (Day) / 45 (Night)	
	6				55 (Day) / 45 (Night)	
	7				55 (Day) / 45 (Night)	
	8				55 (Day) / 45 (Night)	

** (H=High, L=Low)

Table 6.7: Sample Form for Drinking Water Quality Monitoring Record

Location	Date	Parameters	Sindh Environmental Quality Standards (mg/l)	Analysis Result (mg/l)	Comments*
		Color	< 15 TCU		
		Taste	Non-objectionable/ Acceptable		
		Odor	Non-objectionable /Acceptable		
		Turbidity	< 5 NTU		
		Total Hardness as CaCO ₃	< 500 mg/l		
		TDS	<1000		
		pH	6.5-8.5		
		Aluminum (Al) mg/l	≤ 0.2		
		Antimony (Sb)	≤ 0.005		
		Arsenic (As)	≤ 0.05		
		Barium (Ba)	0.7		
		Boron (B)	0.3		
		Cadmium (Cd)	0.01		
		Chloride (Cl ⁻)	< 250		
		Chromium (Cr)	≤ 0.05		
		Copper (Cu)	2		
		Phenolic compounds	<0.0002		

Table 6.7: Sample Form for Drinking Water Quality Monitoring Record					
		Cyanide (CN) ⁻	≤ 0.05		
		Fluoride (F)	≤ 1.5		
		Lead (Pb)	≤ 0.05		
		Manganese (Mn)	≤ 0.5		
		Mercury (Hg)	≤ 0.001		
		Nickel (Ni)	≤ 0.02		
		Nitrate (NO ₃) ⁻	≤ 50		
		Nitrite (NO ₂) ⁻	≤ 3		
		Selenium (Se)	≤ 0.01		
		Residual Chlorine	0.2-0.5 At consumer end 0.5-1.5 at source		
		Zinc (Zn)	5.0		
		All water intended for drinking (E.Coli or Thermo tolerant Coliform bacteria)	0.0 cfu/ 100 ml		
		Treated water entering the distribution system (Ecoli or thermo tolerant coliform and total coliform bacteria)	0.0 cfu/ 100 ml		
		Treated water in the distribution system (E.coli or thermo tolerant coliform and total coliform bacteria)	0.0 cfu/ 100 ml		

(cfu=Coliform Unit), * (H=High, L=Low)

Table 6.8: Sample Form for Solid Waste Monitoring Record
(Domestic/residential/commercial solid wastes)

Location: _____, Date: _____, Source: _____ (domestic/commercial)

Total Quantity (kg)	Components	Weight (as discarded)	% by weight (as discarded)	Recyclables	Non- recyclables	Organic waste
	Food/kitchen waste					
	Plastics					
	Metals					
	Paper					
	Textile/Rugs					
	Cardboard					
	Glass					
	Rubber					
	Other					
Total						

Generation Rate:

For domestic or residential units $\text{Total waste generated} = \frac{\text{Total waste generated}}{\text{No of persons in units}}$ kg/capita/day

For commercial units $\text{Total waste generated} = \frac{\text{Total waste generated}}{\text{Total floor area of unit}}$ kg per unit area

Summary:

- Total Waste Generated (as collected) = _____ kg
- Recyclable waste quantity = _____ kg
- Non-Recyclable waste quantity = _____ kg
- Organic waste quantity = _____ kg
- %age of Recyclables = _____ %
- %age of Non-recyclables = _____ %
- %age of Organic waste = _____ %
- Total waste sent for recycling = _____ kg
- Total waste sent for landfill = _____ kg

Comments:

Table 6.9: Sample Form for Solid Waste Monitoring Record (Hazardous solid wastes)

Location: _____, Date: _____, Source: _____ (domestic/commercial)

Total Quantity (kg)	Hazardous waste Components	Weight (as discarded)	% by weight (as discarded)	Characteristics (corrosive, toxic, explosive, etc.)	Non-recyclables (requiring disposal)	Recyclables
Total						

Generation Rate:

Whichever of the following applies:

For domestic or residential units Total waste generated = _____ kg/capita/day

No of persons in units

For commercial units Total waste generated = kg per unit area

Total floor area of unit

Summary:

- Total Waste Generated (as collected) = _____ kg
- Recyclable waste quantity = _____ kg
- Non-Recyclable waste quantity = _____ kg
- %age of Recyclables = _____ %
- %age of Non-recyclables = _____ %
- Total waste sent for recycling = _____ kg
- Total waste sent for disposal = _____ kg

Comments:

7.6 Standard Operating Procedures (During Construction phase)

7.6.1 Wastewater/ Storm water management

(1) Purpose of Wastewater/storm water Management

The purpose of the adopted procedure is to provide guidelines and simplify the process of categorizing, quantifying, managing, and disposing of wastewater wherever and whenever arising during the project's construction phase. Wastewater management is a critical component of operating policies. Wastewater management includes the proper disposal / recycling and reuse of the wastewater generated during construction and operation phase.

(2) Scope

Wastewater as part of construction operation will be managed as per this procedure. An integrated wastewater management system for Saima Centre Point (Phase-II) project is essential to reduce wastewater.

Substitute techniques must be investigated, including source reduction, recycling and reuse wherever possible with a view towards maximizing the benefits and minimizing the cost of each method of wastewater management.

(3) Procedure

Main concern to manage the wastewater is listed below:

- Eliminate wastewater production wherever possible.
 - Minimize wastewater production.
 - Recycle or Reuse
 - Wastewater disposal in an environmentally safe manner through adequately designed facility
 - Proper drainage of Storm water
- a) **Wastewater Minimization:** Generation of wastewater will be minimized through the following steps taken by working personnel at the facility:
- Through efficient use of raw water (minimizing the wastewater).
 - Reuse of wastewater after treatment.
- b) **Storage and Handling:** Wastewater shall be stored/retained in specifically designed facility or storage tanks till proper treatment at sewage treatment plant is sought and subsequently disposed of.
- c) **Segregation:** Wastewater used in construction will be segregated from wastewater originating from latrines used by construction staff.
- d) **Recycling:** Reuse of wastewater is a best way to reduce the quantity of the wastewater that requires subsequent treatment and disposal. Construction wastewater may be reused in construction activity because it is generally Non-hazardous.

- e) **Treatment:** Wastewater originates from latrines used by construction staff requires treatment through retention in septic tanks and through primary and secondary treatment processes.
- f) **Disposal:** Proper disposal should be done following the treatment through discharge into water bodies or sewerage system where available.

(4) Wastewater Management Options

- All storm water run-off from construction sites will be inspected for the sediment load and may be directed to sedimentation basins to remove suspended solids (e.g., silt);
- Sewage may be collected and temporarily stored in tank(s) until it is transported to a designated wastewater treatment facility;
- Standard mobile sewage tankers may be engaged to collect and transport sewage from portable latrines and temporary storage tanks;
- Direct discharge will only be considered as a contingency option.

7.6.2 Solid Waste Management Plan

(1) Purpose

The purpose of this procedure is to provide guidelines and simplify the process of categorizing, managing and disposing of solid wastes. Waste management includes the proper handling, collection, storage, manifesting, transportation, and disposal/recycling of the solid waste generated. The procedure is designed to assist in the management's wide effort to provide protection to the environment and to comply with environmental laws and regulations regarding proper waste management.

(2) Scope

The waste management plan has been developed to ensure that the Management of solid waste generated as a result of the construction is consistent, efficient, and in conformance with the laws and regulations.

With respect to monitoring, the waste management sets out the following objective:

- To monitor and inspect waste management-related facilities and activities directly resulting from executing the scope of the contract in order to ensure compliance with the WMP. Guidelines for proper handling, categorization,

recording, minimization, recycling and disposal of all types of waste associated with company operations and projects are part of this procedure.

(3) Definitions

- a) **Waste:** Any material, for which no further use is intended, is considered a waste. It can be solid, semi-solid or liquid. Additionally, abandoned materials and materials intended to be recycled are considered wastes. It is very important to understand this concept, because even though something is going to be recycled, it must be managed as a waste until it is actually recycled.
- b) **Hazardous Waste:** Waste is categorized as a hazardous waste if it has one or more of the following properties:
- Ignitability (flash point less than 60°C);
 - Corrosivity (pH less than or equal to 2.0, or greater than or equal to 12.5);
 - Reactivity (inherently unstable under ordinary conditions or when exposed to water);
 - Irritability (when in contact with body causes inflammation)
 - Toxicity (may cause risk of injury to health of organisms or the environment.)
- c) **Non-hazardous Waste:** The wastes are categorized as non-hazardous wastes, if they do not possess any of the hazardous characteristics as defined above. However, non-hazardous waste may still present hazards to employees who handle them. All recommended safety and handling practices must be followed.

(4) Procedure

Priorities to manage the waste are listed below:

- Eliminate waste production whenever and wherever possible. Use the material only for its intended purpose on site
 - Minimize waste production
 - Reuse
 - Dispose of waste through properly designed waste disposal facility.
- a) **Waste Minimization:** To minimize waste, the following steps shall be taken by all personnel working on sites (during construction phase):

- Only the needed amount of materials shall be ordered. Before purchasing hazardous material, all alternatives for non-hazardous material should be explored.
 - Prior consideration shall be given to the sizes of containers available when ordering products that could potentially generate waste. The intent is to avoid unused products and/or their containers from becoming wastes that require special handling.
- b) **Waste Categorization:** All wastes generated at facilities shall be categorized in two major categories (i.e. Hazardous wastes and Non-hazardous wastes) as per the definitions in section above. Each category has different types of requirement for handling, storage and disposal.
- c) **Labelling**
- Name of the waste (e.g., waste oil, solvents, paints).
 - Waste category (e.g., toxic, ignitable).
 - Facility name and address (disposal site, etc.).
 - Date of waste accumulation: (date when waste was placed in drum).
 - Wastes are segregated and located in designated areas to optimize control; storage areas.
- d) **Segregation:** The scheme of segregation is as follow:
- All hazardous waste if found shall be segregated from other types of hazardous wastes as well as non-hazardous wastes at the point of generation of waste.
 - Food waste shall be collected in separate containers.
 - All containers must be clearly labeled. The label must clearly mention the name or type of waste. Also, if the waste is hazardous, it should be clearly labeled on the container along with its hazardous characteristics (e.g. flammable, toxic, radioactive, etc.). This is important to workers and to emergency response teams, who need to know what they are dealing with. Missing or unreadable labels must be replaced.
- e) **Storage and Handling**

- Waste shall be temporarily stored at waste storage facility that will be sent for recycling or off-site disposal shall be temporarily stored at designated site(s) within the building premises.
- The oily sludge, contaminated soil shall be stored in containers
- All other wastes awaiting disposal shall be kept in closed containers/boxes separately. Care must be taken to prevent wastes giving rise to secondary environmental problems, such as odors or soil and groundwater contamination through rainwater leaching.
- All stored wastes must be clearly labeled with type of waste and warning signs.
- Daily estimates of hazardous and non-hazardous waste and volumes generated on site.
- Waste segregation, waste storage containers, general housekeeping and the provision of adequate resources will be monitored.
- All workers handling wastes shall use proper PPE.

f) Reuse

Construction waste can be reused in other construction projects & excavated material can be reused in backfilling.

g) Disposal

Disposal becomes the only available alternatives, if reuse and recycling options are exhausted. A material should be classified as a waste for disposal only if no other useful purpose can be identified and if the material cannot be beneficially reused or recycled. The choice of a suitable disposal option for any waste depends on both environmental and economic considerations. The final disposal can only be off-site disposal facilities due to limited space available.

It requires properly designed and well-operated commercial waste disposal facilities such as sanitary landfill. All such facilities should be explored and evaluated for possible future use.

(5) Recording & Reporting

The management has to record the information about source, composition, quantity, and final disposal of the waste. This information is needed for regulatory compliance, risk assessment and setting reduction targets and objectives as well as corporate statistics. The routine track of waste shall be recorded.

7.6.3 Air and Noise Emissions

(1) Purpose

The purpose of this guideline is:

- To monitor contents of polluting substances in the atmospheric air;
- To control observance of approved limiting permissible emissions at man-made sources;
- To monitor natural sources and a number of man-made sources of emission at work sites at the construction phase;
- To identify sources of noise emissions and control noise pollution;
- To monitor noise emissions.

(2) Scope

Scope of work includes:

- Evaluation of present ambient air quality and noise level at existing area.
- Evaluation of impact of traffic movement at the proposed site and noise level.
- Evaluation of impacts on roads and in the adjacent area due to construction.
- Evaluation of impacts of air emissions and noise from various stationary sources.
- Recommendations for mitigation techniques to redress the expected impacts both for design phase.

(3) Definitions

Air pollution may be referred to as contamination of pollutants dispersed in air affecting ambient air quality that may be deleterious to life and property.

In common use the word noise means unwanted sound or noise pollution. Excessive noise permanently damages hearing, but a continuous low-level sound can be dangerous too.

(4) Procedure

Air emissions (continuous or non-continuous) from facilities such as power generators are comprising of principal gases (greenhouse gases) which typically include carbon monoxide (CO), carbon dioxide (CO₂), water vapors and other gases such as nitrogen oxides (NO_x), and, in case of sour gases, sulphur dioxide

(SO₂). Air quality impacts should be estimated by the use of baseline air quality assessments and atmospheric dispersion models to establish potential ground level ambient air concentrations during facility design and operations planning. These studies should ensure that no adverse impacts to human health and the environment result. All reasonable attempts should be made to maximize energy efficiency and design facilities to minimize energy use. The overall objective should be to reduce air emissions and evaluate cost-effective options for reducing emissions that are technically feasible.

Also, vehicular emissions and noise due to traffic movement in and around the complex facility may of concern to be mitigated and monitored. Atmospheric conditions that may affect noise levels include humidity, wind direction, and wind speed. Vegetation, such as trees, and walls can reduce noise levels. Installation of acoustic insulating barriers can be implemented, where necessary.

(5) Noise and Air Emissions Management Options

Noise and air emissions monitoring includes;

- Monitoring of air and noise emissions.
- Pollution control technology assessment,
- Emission inventory development,
- Development of parametric monitoring, periodic monitoring, and compliance assurance monitoring.

(6) Air and Noise Quality Monitoring

Refer attached Environmental Monitoring Plan for details of air and noise quality monitoring at the Saima Centre Point (Phase-II) project site during construction phase.

- a) **Performance Indicator:** Monitoring results of ambient air shall show the concentration of pollutant in ambient air.
- b) **Record and Comments:** Record would be kept with the laboratory report attached.

7.7 Standard Operating Procedures (During Operational Phase)

7.7.1 Wastewater Management

(1) Purpose of Wastewater Management

The purpose of this procedure is to provide guidelines and simplify the process of categorizing, managing, and disposing of wastewater wherever and whenever arising during the project's operational phase. Wastewater management includes the proper disposal/recycling & reuse of the wastewater generated during operation phase.

(2) Scope

Wastewater generation as part of operational activity will be managed as per this procedure. An effective wastewater management system for Saima Centre Point (Phase-II) building is essential to reduce wastewater. Substitute techniques must be investigated, including source reduction, recycling and reuse wherever possible with a view towards maximizing the benefits and minimizing the cost of each method of wastewater management.

(3) Definitions

- a) **Wastewater:** All water arising after use/consumption from the Project which can encompass a wide range of potential contaminants and concentrations.
- b) **Hazardous Wastewater:**
 - All wastewater comes in the category of hazardous wastewater. If it has one or more of the following properties:
 - Oily water
 - Toxicity (wastewater containing laboratory testing chemicals, antibiotics etc.)
 - Concentration of contaminants too high above safe acceptable limits
- c) **Non-hazardous Wastewater:** All wastewaters are categorized as non-hazardous wastes, if they do not possess any of the hazardous contaminant mainly comprising of consumed water arising from washing area and sanitary wastewater.

(4) Procedure

Main concern to manage the wastewater is listed below:

- Eliminate wastewater production wherever possible.

- Minimize wastewater production.
 - Recycle or Reuse
 - Wastewater disposal in an environmentally safe manner through adequately designed facility
- a) **Wastewater Minimization:** Generation of wastewater will be minimized through the following steps taken by working personnel at the facility:
- Through efficient use of raw water (minimizing the wastewater).
- b) **Storage and Handling:** Wastewater shall be stored/retained in specifically designed facility or storage tanks till appropriate treatment is sought and subsequently disposed of.
- c) **Segregation:** Hazardous wastewater shall be segregated from Non-hazardous wastewater.
- d) **Recycling:** Recycling of Non-hazardous wastewater is a best way to reduce the quantity of the total wastewater that requires subsequent treatment and disposal. Non-hazardous wastewater may be used in the cooling plants and for horticulture purposes.
- e) **Treatment**
- Treatment of wastewater through retention in septic tanks and through primary and/or secondary treatment processes.
 - Some of the wastewater may be reused as mentioned in recycling of wastewater. The treated water should comply with Sindh Environmental Quality Standards (SEQS).
- f) **Disposal**
- Proper disposal should be done following the treatment through discharge into water bodies or sewerage system where available.

(5) Drinking Water Quality and Wastewater Monitoring Plan

Refer attached Environmental Monitoring Plan for details of drinking water quality and wastewater monitoring plan.

a) Performance Indicator

Monitoring results of water quality shall show the extent of contamination in the drinking water and shall regulate and maintain the quality of potable water for establishing its suitability for human consumption as per WHO guidelines for drinking water quality.

Monitoring results of wastewater quality shall show the concentration of pollutants in the sewage water and potential for contamination of ground water if not disposed of properly.

b) Record and Comments

Record of analysis reports shall be maintained.

7.7.2 Solid Waste Management Plan

(1) Purpose

The purpose of this procedure is to provide guidelines and simplify the process of categorizing, managing, and disposing of solid wastes. Waste management is a critical component of management's operating policies. Waste management includes the proper handling, collection, storage, manifesting, transportation, and disposal / recycling of the solid waste generated.

(2) Scope

The waste management plan has been developed to ensure that the Management of solid waste generated as a result of operation is consistent, efficient, and in conformance with the laws and regulations.

(3) Definitions

- a) Waste:** Any material, for which no further use is intended, is considered a waste. It can be solid, semi-solid or liquid. Additionally, abandoned materials and materials intended to be recycled are considered wastes. It is very important to understand this concept, because even though something is going to be recycled, it must be managed as a waste until it is actually recycled.
- b) Hazardous Waste:** Waste is categorized as a hazardous waste if it has one or more of the following properties:

- Ignitability (flash point less than 60°C);
 - Corrosivity (pH less than or equal to 2.0, or greater than or equal to 12.5);
 - Reactivity (inherently unstable under ordinary conditions or when exposed to water);
 - Irritability (when in contact with body causes inflammation)
 - Toxicity (may cause risk of injury to health of organisms or the environment.)
- c) **Non-hazardous Waste:** The wastes are categorized as non-hazardous wastes, if they do not possess any of the hazardous characteristics as defined above. However, non-hazardous waste may still present hazards to employees who handle them. All recommended safety & handling practices must be followed.

(4) Procedure

Priorities to manage the waste are listed below:

- Eliminate waste production whenever and wherever possible.
 - Minimize waste production
 - Reuse
 - Dispose of waste through properly designed waste disposal facility.
- a) **Waste Minimization:** To minimize waste, the following steps shall be taken by all personnel working on sites:
- Only the needed amount of materials shall be ordered. Before purchasing hazardous material, all alternatives for non-hazardous material should be explored.
 - Prior consideration shall be given to the sizes of containers available when ordering products that could potentially generate waste. The intent is to avoid unused products and/or their containers from becoming wastes that require special handling.
- b) **Waste Categorization:** All wastes generated at facilities shall be categorized in two major categories (i.e. Hazardous wastes and Non-hazardous wastes) as per the definitions in section above. Each category has different types of requirement for handling, storage and disposal.
- c) **Labelling**
- Name of the waste (e.g., chemical waste, solvents, paints, biomedical etc.).

- Waste category (e.g., toxic, ignitable).
- Facility name and address (disposal site, etc.).
- Date of waste accumulation: (date when waste was placed in drum).
- Wastes are segregated and located in designated areas to optimize control; storage areas.

d) Segregation: As there are no hazardous wastes envisaged in the project therefore segregation among the waste will be done as per their matter.

The scheme of segregation is as follow:

- All hazardous waste if found shall be segregated from other types of hazardous wastes as well as non-hazardous wastes at the point of generation of waste.
- Laboratory chemical waste is also to be segregated into chlorinated and non-chlorinated solvents.
- Non- hazardous waste consists of containers, shipping cartons, bags, reject, broken bottles, rejected cartons, labels, strips, corrugated boxes, paper etc.

e) Storage and Handling

- All waste from floor and equipment is to be collected using vacuum cleaners.
- All containers must be properly and clearly labeled. The label must clearly mention the name or type of waste. Also, if the waste is hazardous, it should be clearly labeled on the container along with its hazardous characteristics (e.g. flammable, toxic, radioactive, etc.). This is important to workers and to emergency response teams, who need to know what they are dealing with. Missing or unreadable labels must be replaced.
- Non-hazardous waste shall be temporarily stored at waste storage facility that will be sent for recycling or off-site disposal shall be temporarily stored at waste storage facilities available at different sites such as junkyard, scrap yard, pits, etc.
- All other wastes awaiting disposal shall be kept in closed containers/boxes separately. Care must be taken to prevent wastes giving rise to secondary environmental problems, such as odors or soil and groundwater contamination through rainwater leaching.
- Daily estimates of hazardous and non-hazardous waste and volumes generated on site.
- Waste segregation, waste storage containers, general housekeeping and the provision of adequate resources will be monitored.

- All workers handling wastes shall use proper PPE.
- f) **Recycling:** Non-hazardous waste can be recycled and reuse to minimize the quantity of waste requiring disposal. Some of the wastes (like one side printed paper) can be reused within the facilities while others can only be recycled at off-site recycling centres.
- g) **Disposal:** Disposal becomes the only available alternatives, if reuse and recycling options are exhausted. Onsite burning or dumping of waste is strictly prohibited.

A material should be classified as a waste for disposal only if no other useful purpose can be identified and if the material cannot be beneficially reused or recycled. The choice of a suitable disposal option for any waste depends on both environmental and economic considerations. The final disposal can only be off-site disposal facilities due to limited space available.

The waste shall be disposed of through a contractor.

(5) Recording & Reporting

The management has to record the information about source, composition, quantity, and final disposal of the waste. This information is needed for regulatory compliance, risk assessment and setting reduction targets and objectives as well as corporate statistics.

The routine track of waste shall be recorded. It is the responsibility of the proponent to assign a suitable person to sign off the record of waste tracking before the waste is dispatched outside.

7.7.3 Air and Noise Emissions

(1) Purpose

The purpose of this guideline is:

- To monitor contents of polluting substances in the atmospheric air;
- To control observance of approved limiting permissible emissions at man-made sources;
- To monitor natural sources and a number of man-made sources of emission at work sites during operational phase;
- To identify sources of noise emissions and control noise pollution;

- To monitor noise emissions.
- The air emissions from backup generators should comply with the SEQs for air emissions and reported as per SEPA reporting requirements.

(2) Scope

Scope of work include

- Evaluation of present ambient air quality and noise level at existing area.
- Evaluation of impact of traffic movement at the proposed site and noise level.
- Evaluation of impacts on roads and in the adjacent area during operational phase.
- Evaluation of impacts of air emissions and noise from various stationary sources.
- Recommendations for mitigation techniques to redress the expected impacts both for design phase and operational phase.

(3) Definitions

Air pollution may be referred to as contamination of pollutants dispersed in air affecting ambient air quality that may be deleterious to life and property.

In common use the word noise means unwanted sound or noise pollution. Excessive noise permanently damages hearing, but a continuous low-level sound can be dangerous too.

(4) Procedure

Air emissions (continuous or non-continuous) from facilities such as power generators, etc. are comprising of principal gases (greenhouse gases) which typically include carbon monoxide (CO), carbon dioxide (CO₂), water vapors and other gases such as nitrogen oxides (NO_x), and, in case of sour gases, sulphur dioxide (SO₂). Air quality impacts should be estimated by the use of baseline air quality assessments and atmospheric dispersion models to establish potential ground level ambient air concentrations during facility design and operations planning. These studies should ensure that no adverse impacts to human health and the environment result. All reasonable attempts should be made to maximize energy efficiency and design facilities to minimize energy use. The overall objective should be to reduce air emissions and evaluate cost-effective options for reducing emissions that are technically feasible. Also, vehicular

emissions and noise due to traffic movement in and around the plant is to be mitigated and monitored.

Atmospheric conditions that may affect noise levels include humidity, wind direction, and wind speed. Vegetation, such as trees, and walls can reduce noise levels. Installation of acoustic insulating barriers can be implemented, where necessary.

(5) Noise and Air Emissions Management Options

Noise and air emissions monitoring includes;

- Air dispersion modeling and monitoring of air and noise emissions.
- Indoor air quality management
- Pollution control technology assessment,
- Emission inventory development,
- Development of parametric monitoring, periodic monitoring, & compliance assurance monitoring.

(6) Air and Noise Quality Monitoring

Refer attached Environmental Monitoring Plan for details of air and noise quality monitoring at the Saima Centre Point (Phase-II) project site during operation phase.

- a) **Performance Indicator:** Monitoring results of ambient air shall show the concentration of pollutant in ambient air.
- b) **Records & Comments:** Records of monitoring reports shall be maintained



Environmental Impact Assessment (EIA)

Saima Center Point
(Phase-II)

Plot / Survey No. 134/B/1, measuring
29588.4 Sq.Yds M.A Jinnah Road
Karachi Cantt

8. Conclusion

The Environmental Impact Assessment (EIA) has concluded that the Saima Centre Point (Phase-II) project's environmental effects are manageable and can be effectively addressed. This finding is dependent on the diligent execution of the Environmental Management and Monitoring Plan (EMMP), which is a vital part of the EIA document. Mitigation measures, designed to reduce, minimize, or offset potential negative impacts, have been proposed and their adoption is strongly recommended. The project itself is a self-contained entity, featuring its own backup power generation, an R.O. treatment-supplemented water supply, and a comprehensive sewage treatment, recycling, and disposal system, in addition to exceeding parking space requirements. These attributes represent a positive impact and are indicative of the project's adherence to its objectives.

Considering the city has surpassed its sustainable development limits, it is crucial for Builders and Developers to fully grasp the cumulative effects of rapid urbanization. Each project must therefore integrate robust sustainability principles, moving beyond mere survival strategies. The shift from solely profit-driven ventures to designs incorporating net-zero energy and net-zero discharge is now imperative, ensuring a shared benefit with environmental responsibility.

Therefore, this study recommends approving the Environmental Impact Assessment (EIA) report, strictly on the condition that all suggested mitigation measures are rigorously adopted and the Environmental Management & Monitoring Plan is adhered to in letter and spirit.



Environmental Impact Assessment (EIA)

Saima Center Point
(Phase-II)

Plot / Survey No. 134/B/1, measuring
29588.4 Sq.Yds M.A Jinnah Road
Karachi Cantt

Annexures

-  **Environmental Testing Reports**
-  **Statutory Approvals**
-  **Soil Investigation Report of the Project Site**
-  **Electrical Resistivity Survey (ERS) Report**
-  **Detailed Report on Traffic Study**



Analysis Report

Report # SES/ENV/ NOV/25/2965/3855-B

Date: 14-11-2025

Description

Sample Type	Ambient Air	Sampling Location	Saima Center Point Phase-II Facing residential street on back
Sampling Date	12-11-2025	Sampling Duration	24 Hours
Client Name	M/s Megatech Builders & Developers (Pvt.) Ltd		

Ambient Air Quality

Parameters	SEQS	Units	Average Results	Remarks	Methods
SO ₂	120	µg/m ³	8.6	Within Limit	Ultraviolet Fluorescence Method
NO	40	µg/m ³	8.8	Within Limit	Chemiluminescence
NO ₂	80	µg/m ³	14.2	Within Limit	
CO	05	mg/m ³	0.2	Within Limit	Non-Dispersive Infrared (NDIR)
O ₃	130	µg/m ³	19.1	Within Limit	Non-Dispersive UV Absorption Method
SPM	500	µg/m ³	133	Within Limit	β Ray Absorption Methods
PM ₁₀	150	µg/m ³	45	Above Limit	
PM _{2.5}	75	µg/m ³	14	Within Limit	
Lead	1.5	µg/m ³	BDL	Within Limit	ASS Method

Noise Quality

Noise	Day	dB(A)	Max	74	Above Limit	The level for commercial area is 70 dB(A) for Daytime and 60 dB(A) for Nighttime
			Min	57		

SEQS= Sindh Environmental Quality Standards (The Gazette of Pakistan) Registered No. EPA/TECH/739/2014.

ND= Not Detected

BDL= Below Detection Limit

Terms & Condition:

- This report is not valid for any negotiations.
- Report is valid for current batch (sample).
- This report is intended only for your guidance & not for legal purposes or for advertisement.

Field Analyst: _____

Chief Chemist: _____





FACE SHEET
Automation of Stamps & Registration
Board of Revenue, Sindh.

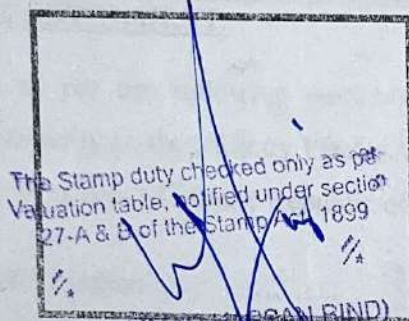
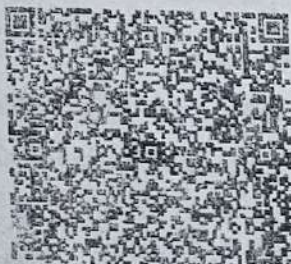
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Property Type: Open Plot Commercial Property Area: 29588.4 SQRYD
District: Karachi East
Complete Address: SURVEY/PLOT NO. 134/B/1, M.A JINNAH ROAD, KARACHI CANTONMENT
Tatuka/Town: Jamshed Town-II Deh/Area: DEPOT LINE
Computer Number: BOR - 2024 - 45 - 1578

1st Party Detail:

Full Name CNIC Mobile No
MILITARY ESTATE OFFICER through MILITARY ESTATE OFFICER 05608949490 03030036016
No More Members

2nd Party Detail:

Full Name CNIC Mobile No
MR. MUHAMMAD UMAR 42301-2306620-3 03212441112
No More Members



For Office Use Only:

RD No: 4520-1 RD Date: 27-Jun-2024 Indexing Date: 03-Jul-2024

☐ Registration Fee: 1005	☐ Advance Tax: _____
☐ CVT: _____	☐ Municipal Tax: _____
☐ Gain Tax: _____	
☐ Stamp Duty: 36615645	

Registration Fee Received
Signature (Sub Registrar) were
Checked and found correct.

Audit Observation (if any):

Inspector of Registration Offices
Karachi Division (Sub Registrar)



FACE SHEET
Automation of Stamps & Registration
Board of Revenue, Sindh.

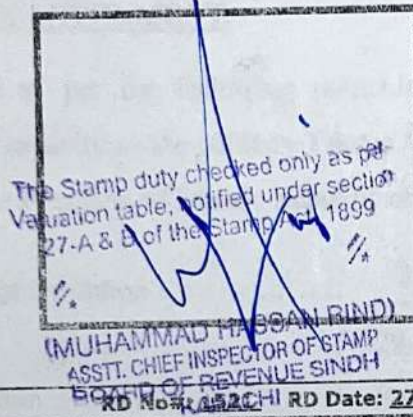
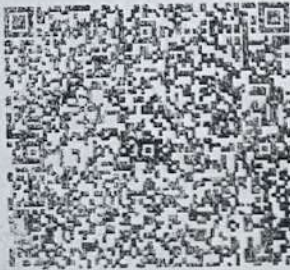
SR Office: Jamshed Town-II Deed Type: Lease Deed Doc ID: 1239533
Property Type: Open Plot Commercial Property Area: 29588.4 SQR YD
District: Karachi East
Complete Address: SURVEY/PLOT NO. 134/B/1, M.A JINNAH ROAD, KARACHI CANTONMENT
Taluka/Town: Jamshed Town-II Deh/Area: DEPOT LINE
Computer Number: BOR - 2024 - 45 - 1578

1st Party Detail:

Full Name CNIC Mobile No
MILITARY ESTATE OFFICER through MILITARY ESTATE OFFICER 05608949490 03030036016
No More Members

2nd Party Detail:

Full Name CNIC Mobile No
MR. MUHAMMAD UMAR 42301-2306620-3 03212441112
No More Members



For Office Use Only:

RD No. 4520HI RD Date: 27-Jun-2024 Indexing Date: 03-Jul-2024

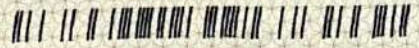
☐ Registration Fee: 1005	☐ Advance Tax: _____
☐ CVT: _____	☐ Municipal Tax: _____
☐ Gain Tax: _____	
☐ Stamp Duty: 36615645	

Registration Fee Registration were
Checked and found correct.

Audit Observation (if any):

Inspector of Registration Offices
Karachi Division (Audit Officer)

4516075



E-STAMP



حکومت سندھ



0002-2406140004824729

GoS-KHI-5E6926F006C4F726

Judicial

Rs 36,615,645/-

ion

- : Lease - 21(I)
- : Military Estate Office [00000000]
- : MEGA RESIDENCY (PRIVATE) LIMITED [C9611583]
- : Mahesh Kumar [45101-5655232-9]
- : MEGA RESIDENCY (PRIVATE) LIMITED [C9611583]
- : 14-Jun-2024, 05:17:25 PM
- : 2024BF55EDA8969C
- : 123,750 Sq. Yard
- : N/A
- : Three Crore Sixty Six Lac Fifteen Thousand Six Hundred and Forty Five Rupees Only

Duty Paid by

ate

ough Challan

uation Rate

Valuation Rate

in Words

Rate Location

: Karachi | South Karachi (All... | Depot Line | Commercial Open Plot

Land Area : 29588.4 Sq. Yard

Covered Area : N/A

Three Crore Sixty Six Lac Fifteen Thousand Six Hundred and Forty Five Rupees Only

Registered No. 1521
JAMSHED TOWN-II
KARACHI



Please Write Below This Line

LEASE DEED IN SCHEDULE IX-C.

**BUILDING LEASE FOR COMMERCIAL PURPOSES FOR A TERM
OF (99) NINETY NINE YEARS RENEWABLE FOR ANOTHER
SIMILAR TERM AT THE OPTION OF THE LESSEE.**

LESSEE

Unes



[Signature]

**Military Estates Officer
Karachi Circle Karachi**



THIS INDENTURE made at Karachi on this 24th day of June, 2024 between the President of Pakistan through the Military Estates Officer, Karachi Circle, Karachi Cantonment (hereinafter called "the Lessor") of the ONE PART and **M/s. Mega Residency (Pvt) Ltd (nominee of M/s. Megatech Builders and Developers (Pvt) Limited)**, through its authorized person/Director **Mr. Muhammad Umar**, holding CNIC No.42301-2306620-3 S/o **Mr. Rahil** R/o House No.G-1, Pardesi Pride Frere Town, Clifton, Karachi (hereinafter called "the Lessee") of the OTHER PART.

WHEREAS by virtue of rules made under Section 280 of the Cantonments Act, 1924, the Military Estates Officer, Karachi Circle, Karachi Cantonment (hereinafter called the Military Estates Officer) has agreed on behalf of the Lessor with the confirmation of the Government of Pakistan, Ministry of Defence, Rawalpindi letter No.42/1992/Lands/ML&C/19-11/6/2019/D-4(A-IV) dated 24/05/2023, HQ ML&C Department, Rawalpindi letter No.42/1992/Lands/ML&C/2004, dated 25th May, 2023 & letter No.42/1992/Lands/ML&C/2019 dated 24/06/2024 to demise the plot of land hereinafter described to the lessee in manner hereinafter appearing.

NOW THIS INDENTURE WITNESSETH in consideration of the premium of **Rs.6,657.39 Million (Rupees Six Thousand Six Hundred Fifty Seven Million and Thirty Nine Hundred Thousand Only)** (Proportionate Share of total amount **Rs.13,187.79 Million**) paid on or before the execution of these presents (the receipt whereof the Lessor hereby acknowledges) and of the rent hereinafter reserved and of the covenant on the part of the Lessee hereinafter contained the Lessor doth hereby demise unto the Lessee ALL THAT plot of land containing by admeasurements **29,588.4 Sq. Yards, Survey / Plot No.134/B/1, M.A. Jinnah Road, Karachi Cantonment**, which said plot of land is more particularly described in the Schedule hereunder written and with the boundaries thereof is delineated on the plan annexed to these presents and thereon coloured RED TOGETHER with all rights easements and appurtenances whatsoever to the said plot of land belonging or in any way appertaining EXCEPTING AND RESERVING unto the Lessor all mines minerals mineral substances of every description sand and clay in or under the premises hereby demised with full right and liberty at all times to do all acts and things which may be necessary or expedient for the purpose of searching for digging working obtaining removing enjoying the same making the lessee reasonable compensation for all damage done and also all timber fruit trees and other trees (but not the fruit or leaves or fallen branches of trees cut down with the written consent of the Military Estates Officer with right of entry to mark fell cut and carry away the same TO HOLD the premises hereby unto the lessee for the term of (99) ninety nine years from the **24th May, 2023** rendering therefore the yearly rent of **Rs.1,18,354/- (Rupees One Lac Eighteen Thousand Three Hundred and Fifty Four Only)** clear of all deduction by yearly payments on the **24th May** in each year at the office of the Military Estates Officer or such other places as the Military Estates Officer shall from time to time appoint in this behalf (the first of such payment has been made on 24/06/2024).

LESSEE

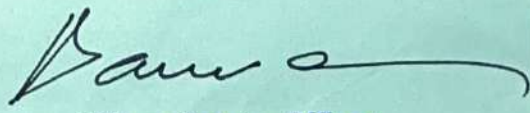
Umar



[Signature]
Military Estates Officer
Karachi Circle Karachi

I. **AND THE LESSEE DOTH / LESSEES DO hereby covenant with the Lessor:-**

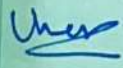
1. To pay unto the Lessor the yearly rent hereby reserved on the days and in the manner hereinbefore appointed.
2. From time to time and at all times to pay and discharge all rates taxes charges and assessment of every description which are now or may at any time hereafter be imposed charged or assessed upon the premises hereby demised or the buildings to be erected thereupon or the landlord or tenant in respect thereof.
3. Not to cut down any of the timber fruit trees or other trees now or other trees now or at any time hereafter growing on the premises hereby demised without the consent in writing of the Military Estates Officer but to preserve the same in good order.
4. Not to make any excavation in the land hereby demised or remove any minerals mineral substances of any description sand or clay from the said land without the consent of and in accordance with the terms and conditions prescribed by the Military Estates Officer.
5. Within twelve calendar months next after the date of these presents at his own cost to erect and finish fit for habitation/use of the premises hereby demised a Commercial building together with all necessary outhouse sewers drains and other appurtenances in accordance with a plan or plans to be approved in writing by the Cantonment Board under the provisions of the Cantonment Act and not to erect or suffer to be erected on any part of the premises hereby demised any building other than and except the Commercial building hereby demised to be erected without the previous consent in writing of the Lessor.
6. Not to make any alterations in the plan or elevation of the said Commercial building without such consent as aforesaid nor to use the same or permit the same to be used for any purpose other than that of a Commercial building.
7. At all times to keep the said Commercial building and premises in good and substantial repair and on the determination of this lease peaceably to yield up the same in such good and substantial repair to the Lessor.
8. Upon every assignment, transfer or sub-lease of the premises hereby demised or any part thereof but not less than 100 sq. yards within one calendar month thereafter to deliver a notice of such assignment, transfer or sub-lease to the Military Estates Officer setting forth the names and description of the parties to every such assignment transfer or sub-lease and the particulars and effect thereof.
9. Not to assign, mortgage, transfer or sub-lease or create any interest in the premises hereby demised in favour of a foreigner, either directly or indirectly, without the previous permission in writing of the secretary of the administrative division or a person authorized by him in this behalf



Military Estates Officer
Karachi Circle Karachi



LESSEE



II. PROVIDED ALWAYS that if any part of the rent hereby reserved, shall be in arrear or unpaid for one calendar month next after any of the days whereon the same shall have become due whether the same shall have been demanded or not or if there shall have been in the opinion of the Military Estates Officer any breach by the lessee or by any person claiming through or under them of any of the covenants or conditions hereinbefore contained then and in such case the Lessor may notwithstanding the waiver of any previous cause or right of re-entry enter upon any part of the premise hereby demised or of the building thereon in the name of the whole and thereupon the said premises and building shall remain to the use of and be vested in the Lessor and this demise shall absolutely determine and the lessee shall not be entitled to any compensation whatever.

III. PROVIDED ALSO that the Lessor will, at the request and cost of the Lessee at the expiry of the term of years hereby granted execute a new lease for the premises hereby demised by way of renewal for another term of Ninety nine (99) years only, at double the rate of the rent hereby reserved.

IV. PROVIDED ALSO that the expression "Lessor" and the "Lessee" hereinbefore used shall unless such an interpretation be inconsistent with the context include in the case of the former his successors and assigns in the case of the latter their heirs personal representatives and assigns.

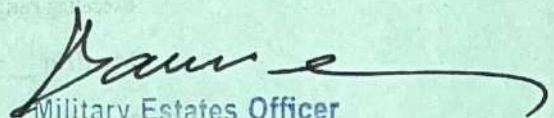
The Schedule above referred to

ALL THAT piece and parcel of land situated at Karachi Cantonment recorded in the General Land Register of the Cantonment as Survey No.134/B/1, and bounded:-

ON THE NORTH BY:	Survey No.138.
ON THE SOUTH BY:	Survey No.134/B/M.A. Jinnah Road.
ON THE EAST BY:	Road.
ON THE WEST BY:	Survey No.134.

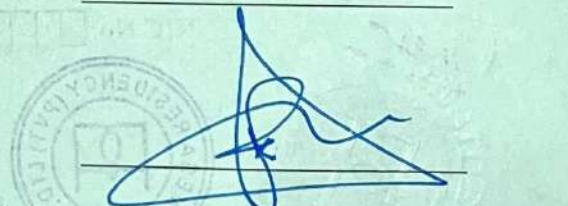
IN WITNESS whereof the parties have here to set their hands the day and year first written above.

Signed by:
Military Estates Officer, Karachi
Circle, Karachi Cantonment on
behalf of the President of of Pakistan
in the presence of


Military Estates Officer
Karachi Circle Karachi

in the presence of:
Mr. Abdul Sattar Larr Dy. MEO.
MEO Office, Karachi Circle, Karachi.

Signed by the Lessee:
M/s. Mega Residency (Pvt) Ltd,
(nominee of M/s. Megatech Builders
and Developers (Pvt) Limited)
through its authorized person/Director
Mr. Muhammad Umar S/o Mr. Rahil

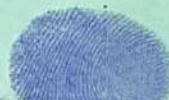



LESEE

In the presence of
WITNESS: Aneel Kumar S/o Gurdino Mal
CNIC:42301-7876297-5

0322-8296797

In the presence of
WITNESS: Sunny Kumar S/o Darshan Ram
CNIC:45101-1691468-1



WITNESS

S. No: 1813
Presented in the office of
Sub-Registrar Office-II, 0
Jamshed Town on: 25/05/24
Between 12 to 1pm

Ches
[Signature]
Sub-Registrar-II
Jamshed Town, Karachi

Received Registration Fee as Follows

Registration Fee: _____
Micro Filming Fee: _____
Endorsement Fee: _____
Search Fee: _____
Penalties u/s 25/34 _____
Postage Charges: _____

[Signature]
Sub-Registrar-II
Jamshed Town, Karachi

His Official Capacity Exempt From
Personal Appearance Under Section 88 Of
The Registration Act 1898. His Signature
Known To The Under Signed Sub-Registrar
Karachi

Mr: Mrs: Miss: Mohammad Umar

S/o D/o W/o: Lahid

Executing Party Business/ Service _____

Muslim [Signature]

Age: 25

R/o 4-1/2 G-2 Freer Town Karachi

Admit: Executive of this deed.

NIC No: 42301-2306420-3

In an capacity shown in the deed

Mr: Mrs: Miss: _____

S/o D/o W/o _____

Executing Party Business/ Service _____

Muslim _____

Age: _____

R/o _____ Karachi

Admit: Executive of this deed.

NIC No: _____



Ches
Note: Kept Ad. for ward
of Nic card, Photo.

[Signature]
SUB-REGISTRAR-II
JAMSHED TOWN
KARACHI

States that he/she personally
knows the above executant
and identifies 25-6-2024

[Signature]
Sub-Registrar-II
Jamshed Town, Karachi

-2-

note: Received NIC Shani, Dhoto
hence deed order for
Registration in date 27-06-2024

1813
25/06/2024
M. AMIN MEMON
Advocate High Court
SAC No. 3055 Kar
102-10th Floor Near City Centre Karachi
Cell No. 0300-3777276

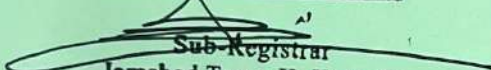


SUB-REGISTRAR-II
JAMSHED TOWN
KARACHI

Registered No. 1521

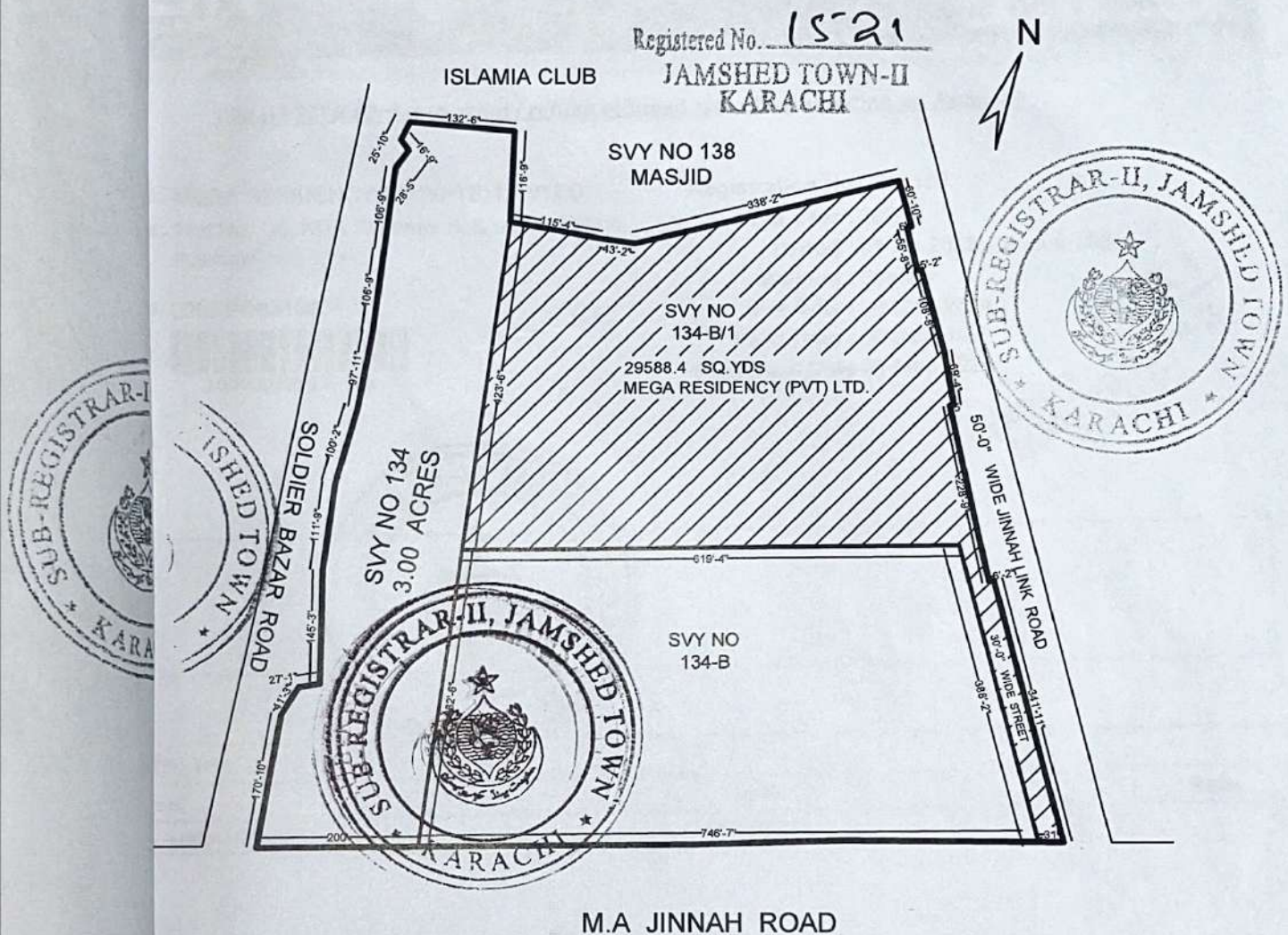
Book No. I

Date: 27-06-2024


Sub-Registrar
Jamshed Town-II, Karachi



SITE PLAN OF SVY NO. 134-B/1
MA JINNAH ROAD KARACHI CANTT.



SVY NO 134-B/1 (AREA = 29588.4 SQ.YDS)



Handwritten signature
R / DRAFTSMAN
ESTATE OFFICE
CIRCLE KARACHI

Handwritten signature
LESSEE

Handwritten signature
Military Estates Officer
Karachi Circle Karachi



KARACHI CANTONMENT BOARD

259, R.A. Lines, Sarwar Shaheed Road, Karachi Cantt

Tel: 021-99332968, Fax: 021-99332969,

Email: kcb8616@gamil.com Website: <http://www.cbkarachi.gov.pk/>

Face book Page: <https://www.facebook.com/KarachiCB/>



File No. KCB/134/B/1/M.A.J.Rd/2119 .

Dated: 10 Oct, 2024

To

M/s Mega Residency (Pvt) Ltd
Through its Director Mr. Muhammad Umar,
Plot No. G-6, KDA Scheme-5, Block-9,
Clifton, Karachi.

Subject: APPROVAL OF PROPOSED BUILDING PLAN HAVING 08 X TOWERS CONSISTS OF BASEMENT-II + BASEMENT-I + GROUND FLOOR + 1ST TO 37th FLOOR IN RESPECT OF PLOT / SURVEY NO. 134/B/1, MEASURING 29588.4 SQ.YDS M.A JINNAH ROAD, KARACHI

Reference: Your application dated 12/07/2024.

2. The proposed building plan in respect of Plot / Survey No. 134/B/1, M.A Jinnah Road, Karachi, measuring 29588.4 Sq.Yds have been sanctioned by the Board vide its Resolution No. 05 dated 18/09/2024 and subsequently vetted & approved by DML&C Karachi as per guidelines / SOP vide their letter No. 5/750-B/DKR/Vol-I/KAR/02/4203 dated 30/09/2024. The proposed sanctioned building plan consists of Basement-II + Basement-I + Ground Floor + 1st to 37th Floor alongwith Stair Tower & Machine Room only.

3. The approval of building plan is subject to fulfillment of all codal/legal formalities including the following, but not limited to:-

- i. You will either deposit balance scrutiny fee amounting to Rs. 9,72,21,114/- within (09) months before the closing F.Y 2024-25 in (09) equal installments.
- ii. The building shall be constructed strictly in accordance with the approved drawings/specification and bye-laws of the KCB.
- iii. The specification shall be adhered to as per the recommendation of Structural Engineer / Vetting Engineer of the project.
- iv. All relevant NOC's must be submitted before start of construction at site.
- v. Completion period of building is SEVEN YEARS from the date of commencement of work at site and said date must be notified to the Cantonment Board.

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- vi. The sanctioned building plan and building byelaws of Karachi Cantonment Board must be adhere to in every respect.
- vii. Architect & Structural Engineer of the project will supervise construction of the building to ensure that the sanctioned plan is adhered to in all respects and no deviation shall take place.
- viii. It will be the responsibility of the builder / lessee to intimate the Karachi Cantonment Board in writing about their schedule of construction.
- ix. All precautions measures for safety of adjoining building must be taken before excavation of basement. Any mishap in this regard will be responsibility of the builder / lessee and certificate / undertaking in this regard will be provided to this office before starting the excavation work at site.
- x. The builder / lessee / attorney shall intimate the Board prior to every important stage i.e foundation layout, plinth-level, ground floor level and so on. Cantt Staff shall verify the basic outline i.e. COS, Arcade, passage and height etc. in accordance with the approved plan.
- xi. Conditions imposed while conversion of plot issued by ML&C Department are to be followed.
- xii. MEP (mechanical electrical & plumbing) Engineer must be hired for the project and his designed & drawings duly signed by them must be at site while visiting Engineering Staff of this office for assurance & verification of its compliance.
- xiii. Adequate arrangements for surface drainage, sanitation and pollution free environment is to be made for the project.
- xiv. The Board has authority to withdraw / cancel the approved building plan at any stage, if; it comes in the knowledge that construction is being carried out against approved plan.
- xv. After completion of the building an intimation under section 74 of the Cantonment Act, 1924 (IIInd of 1924) must be given for assessment of ARV of the building.
- xvi. Passage / ramp must be provided for disable persons.
- xvii. Privacy of Adjoining buildings should not be disturbed.

C.E.O

- xviii. No building material will be stacked on any road/public street/road side berm/Government or CB land and footpath etc. or area reserved for public use without permission of this office.
- xix. Parking space (i.e. its width and length) shall not be converted into any other purpose because it is not regularizable.
- xx. Latest fire fighting arrangement/ facilities must be provided under the guideline of MEP engineers and as per Building Bye Laws of the KCB and also all design NFPA (National Fire Protection Authority) Codes will be followed standard fire and smoke detection and protection devices such as alarms, sprinkles, fire hose, and hydrants to be provided at all critical location in project.
- xxi. Karachi Cantonment Board shall not be responsible for any mishap either to human life or to the adjoining properties that may arise due to the said construction work etc.
- xxii. Proper entry / Exit be provided to the proposed construction.
- xxiii. Violation of compulsory open space, no. of story height, width & slope of ramp, passage, arcade and ventilation duct etc. shall not be accepted by the Board and liable to be withdrawal of approval of building plan.
- xxiv. Karachi Cantonment Board will not be responsible for arrangement of water for construction of the building as well as for provision of drinking water or disposal of sewerage water.
- xxv. You will be responsible to also rectify (during and after construction) all defects in the building as & when pointed out by the Cantonment Executive Officer or the Cantonment Engineer. (this refers to all defects whether pointed out during construction or even after construction has been completed and completion certificate issued).
- xxvi. You shall also comply with all regulations made by the Government (from time to time) in all matters regarding construction of your building and development of external / internal facilities therein and in all other matters regarding your building / site. In case such regulations made by the Government result in any losses to you (monetary or otherwise) the same shall not be compensated by Cantonment Board Karachi (in any way) but shall be entirely at your risk & cost.

- xxvii. In case there is any complaint by any party or any person residing in the neighborhood regarding the height of the building, public privacy, easement rights etc, or complaints on any other aspect of the building or plan (as approved vide this letter by the Cantonment Board) then the Cantonment Board Karachi shall not be responsible for settlement of such disputes. In such event you will have to satisfy all public complaints yourself and shall do whatever is necessary to ensure that public complaints are redressed to their (i.e. complaints) fullest satisfaction.
- xxviii. Please ensure that there is no construction / encroachment on adjoining land, road etc. In case any such construction / encroachment is detected, sanction accorded to your building plan vide this letter shall stand cancelled at your risk & cost.
- xxix. The height, compulsory open space, nos. of storey, projections, passages arcade and parking floor should be as per approved building plan.
- xxx. You will provide the name of resident Engineer alongwith his PEC registration Certificate, Electrical Supervisor alongwith his license prior to commencement of work.
- xxxi. Fire-fighting equipment should be provided at all critical location in project.
- xxxii. To submit drawings of Fire-fighting system duly vetted by the fire safety engineer before start of construction.
- xxiii. Detailed **Structural Drawings, Detailed Electrical, Plumbing, Fire Exit Drawings/Fire Escape Plan/Emergency Exit Plan** in accordance with the Architectural Drawings to be submitted before the start of construction as already asked to you vide this office letter No. KCB/134/B/1/M.A.J.Rd/2088 dated 03/10/2024.
- xxiv. That no construction is started at site without vetting of structural drawings etc.
- xxxv. This approval shall be liable to be cancelled / withdrawn if any stage it comes into the notice of the undersigned / Karachi Cantonment Board that any of the above mentioned condition has not been met by the Owner / Builder / Architect / Structural Engineer etc.

C.E.C

xxxvi. Following handicap provision be incorporated in project.

- a) Provision of ramps.
- b) Provision of accessible parking spaces.
- c) Installing accessible toilets.
- d) Adjusting counter height at receptions.
- e) Improving signage.

5. This is purely a "Municipal Sanction" and is only admissible subject to fulfillment of all condition mentioned above and further, it does not convey to you any authority to encroach upon any land or right of easement of any person in any manner. The builder / lessee attorney is total responsible for the adequate stability of the structure and proper arrangement of sewerage line, water supply & gas / ventilation system for the entire project. Structural Engineer and Vetting Engineer are also responsible for the stability of the project in totality. **This office has no responsibility with regard to Structural Stability and MEP arrangements neither today nor in future.**

6. The Board is competent to impose any other terms and conditions in addition to these terms & conditions if any from time to time.

7. One sets of the sanctioned Building Plan are returned herewith duly cleared from Architectural point of view only.

8. A copy of approved building plans shall be required to be kept at site which shall be produced on demand by the Cantonment Board's representative.


Cantonment Executive Officer
Karachi Cantonment

Copy to: -

1. The DML&C, Karachi

2 The MEO, Karachi

3 Revenue Supdt, KCB

4 Concerned Cantt Overseer,
Surveyor & Building Checker

Alongwith approved building plans
of the subject project.

For direction to make necessary entire in the building progress register of every stage i.e. plinth level, roof level of ground floor, as well as roof level of above floors and digital photographs of the construction stages ibid & to keep close watch over construction work (at site) and ensure that there is no violation of any of the aforesaid terms and conditions of approved building plan and also make efforts for submission of certificate of different stages of construction by the owner / lessee. In case of failure, construction work may be stopped without fail.

5 Master File.



Sui Southern Gas Company Limited

M/s Mega Residency (Pvt) Ltd.
Mr. Muhammad Umar (Director)
Plot No. 134/B/1, measuring 29,588.4 Sq-Yards
M.A Jinnah Road, Karachi.

Sales/NOC/MTBD.134B1/09-24
25 September 2024

Subject: PROVISIONAL NO OBJECTION CERTIFICATE

Dear Sir,

This refers to your letter received in Sales department on 26 August 2024 regarding issuance of No Objection Certificate (NOC) on the basis of Karachi Cantonment Board letter vide No. KCB/134/B/1/M.A.J.Rd/1271 dated 05 Aug 2024 in respect of proposed (high rise building, B1 & B2 + G + 01 to 37 floors) Project at Plot No. 134/B/1, measuring 29,588.4 sq-yards, M.A Jinnah Road, Karachi.

It is inform you that gas requirements will be considered as and when project will actually need the connections subject to fulfilling the following conditions and prevailing Government / Company Policy:

- The provisional NOC is being issued at your request and not a commitment on SSGC part for supply of gas to the project in future.
- RLNG will be supplied to the project (subject to availability), as per prevailing GOP policy and tariff notified by OGRA / Competent authority.
- On the basis of provisional NOC, customer, authorized representative / residents will not be entitled to claim gas connection from SSGC.
- Case will only be processed for gas connections on receiving formal application after verification of the completion plan from relevant authority, physical survey and completion of all formalities/ documents as per prevailing Government/Company Policy
- You will clear all outstanding dues / claims related to the premise, if any.
- You will provide all required documents, approved proposed construction plan and completion plan duly approved by the competent authority (SBCA / Cantonment Board), whichever authority has the jurisdiction. NOC from SBCA in accordance with SSGC requirement for gas connection.
- You will complete all formalities and technical requirements.
- SSGC reserves the right to withdraw NOC at any stage and SSGC can modify / review the above terms and conditions at any time in future.

Yours Faithfully,
For Sui Southern Gas Company Ltd.


Malik Javaid Usman Hamoka
Deputy General Manager (Sales)



KARACHI WATER & SEWERAGE BOARD

Deposit Challan

Assessment & Evaluation R. R. G. Department

The Manager Allied Bank
Civic Centre Branch
Karachi.

6819

PROVISIONAL

Print Date : 30-May-2025

Due Date : 13-Jun-2025

Print By : 022358-8

Application Form No : 1093

File / Voucher Date : 30-May-2025

Application Name : MR. MUHAMMAD UMER

Contact No :

Cell No. :

CNIC : 42301-2306620-3

Project Name :

Nature of Business :

Particulars : Payable amount for New Connection of Water

Address Line 1 : PLOT NO. 134-B/1 M.A. JINNAH ROAD

Address Line 2 : KARACHI

NOTE
The word "BOARD" may be read as "CORPORATION" in pursuance of the Sindh Act-XVIII of 2023 namely "The Karachi Water and Sewerage Corporation Act 2023."

Sanction Certificate will be issued after verification of plan from SBCA & other constituent bodies in compliance order of Hon'ble Sindh High Court in CP. No D-2136/2018 Dated: 07-12-2023

پانی زندگی ہے، اسکی حفاظت کیجئے
سوچئے! ہم پانی آپ استعمال کرتے ہیں کیا اس کا بل ادا کرتے ہیں؟

Cheque / PO No: _____

Cheque / PO Date: _____

S No.	Description	KWSC Bank A/C No.	Narration	Amount
1	Connection Service Charges	0010001461490081		8,04,825
2	Security Deposits	0010001461490081		80,483
			Total Amount	8,85,308

Total Area of Plot : 29588.4 - SQ YARD

Size of Connection : 1.00 Inch DIA

Source : 08 INCH DIA

Total No. of Floors : B+G+21

DIRECTOR
Assessment & Evaluation
Dy. Director A & E
K.W. & S.C.
Karachi Water & Sewerage Corporation

Challan generated on the basis of information provided in the prescribed Water / Sewerage connection Application Form by the applicant and Engineering Department KW&SC. In case of revision in the tariff structure, the same shall be applicable to your case from the date of the revised tariff. If any amount found payable due to detection of error, the same shall be recovered from the applicant.

Payable at ALLIED BANK CIVIC CENTRE BRANCH ONLY/



Applicant Copy



KARACHI WATER & SEWERAGE BOARD

Deposit Challan

Assessment & Evaluation R. R. G. Department

The Manager Allied Bank
Civic Centre Branch
Karachi.

6819

PROVISIONAL

Print Date : 30-May-2025

Due Date : 30-Jun-2025

Print By : 022358-8

Application Form No : 1093



File / Voucher Date : 30-May-2025

Application Name : MR. MUHAMMAD UMER

Contact No :

Cell No. :

CNIC : 42301-2306620-3

Project Name :

Nature of Business :

Particulars : Payable amount for New Connection of Sewerage

Address Line 1 : PLOT NO. 134-B/1 M.A. JINNAH ROAD

Address Line 2 : KARACHI

SEWERAGE
CONNECTION
CHARGES

NOTE
The word "BOARD" may be read as "CORPORATION" in pursuance of the Sindh Act-XVIII of 2023 namely "The Karachi Water and Sewerage Corporation Act 2023."

Sanction Certificate will be issued after verification of plan from SBCA & other constituent bodies in compliance order of Hon'ble Sindh High Court in CP. No D-2136/2018 Dated: 07-12-2023



Cheque / PO No: _____

Cheque / PO Date: _____

S No.	Description	KWSC Bank A/C No.	Narration	Amount
1	Sewerage Charges	0010001461490075		14,39,499
			Total Amount	14,39,499

Total Area of Plot : 29588.4-SQ YARD

Area Residential : 22,597 - Sqr Ft.

Area Commercial : 412,042 - Sqr Ft.

Total Area : 0 - Sqr Ft.

Dy. Director A & E

Karachi Water & Sewerage Corporation

DIRECTOR

Assessment & Evaluation
K.W. & S.C

Challan generated on the basis of information provided in the prescribed Water / Sewerage Connection Application Form by the applicant and Engineering Department KW&SB.
In case of revision in the tariff structure, the same shall be applicable to your case from the date of effect of the revised tariff.
If any amount found payable due to detection of error, the same shall be recovered from the consumer.
Payable at ALLIED BANK CIVIC CENTRE BRANCH ONLY/



Applicant Copy



To,

✓
Mr. Muhammad Umar,
Mega Residency (Pvt) Ltd.
Address: Plot No. G-6, KDA,
Scheme-5, Block-9, Clifton,
Karachi.
Contact No. 0321-2838271.

Sub: PROVISION OF SITE CO-ORDINATES IN WGS-84:

Ref: i) GIC Karachi letter No. 992-T/42-A-2, dated 13-08-2024.
ii) Your letter No. Nil, dated 05-08-2024.

With reference to your letter cited above at Sl. (ii), following WGS-84 co-ordinates and heights of under mentioned site are sent herewith for further necessary action at your end, please.

Company/Station Name	Point ID	Latitude	Longitude	A.M.S.L (Height in Meter)
PLOT NO. 134/B/1, M.A JINNAH ROAD, KARACHI CANTT., KARACHI.	MU-01	24°52'09.53"	67°01'45.25"	12.25
	MU-02	24°52'12.92"	67°01'42.99"	12.29
	MU-03	24°52'13.39"	67°01'44.26"	11.28
	MU-04	24°52'13.08"	67°01'50.56"	12.15
	MU-05	24°52'16.01"	67°01'46.94"	11.42



(AFTAB NAZIR AHMED)
DEPUTY DIRECTOR

Copy for information & necessary action:

- The Director Geo Informatics Centre, Survey of Pakistan, **Karachi.**
- Additional Director, Aerodrome Standards Branch, Headquarters Pakistan Civil Aviation Authority (PCAA), Inspectorate Building, Jinnah International Airport, Karachi.
- Assistant Director, Navigation, Directorate of Air Traffic Services (ATS), Air Headquarters, Islamabad.
- Sindh Building Control Authority (SBCA), Civic Centre Annexe, University Road, Gulshan-e-Iqbal, Karachi.

Ref. No. M/CCE/2025/

31859

Dated: 05th March, 2025

Muhammad Umar (Director)
M/S Mega Residency (Private) Limited
Plot No. G6, KDA Scheme 5, Block 9, Clifton, Pakistan
Tel: 0300-8310924

Subject: NOC FROM K-ELECTRIC IN RESPECT OF LEASEHOLD COMMERCIAL PLOT NO. 134/B/1, M.A. JINNAH ROAD, KARACHI CANTONMENT (MEASURING 29,588.4 SQ YARDS).

This refers to the request for No Objection from **MEGA RESIDENCY** received in new connection department of KE Vide our inward No: **30235** on **23-08-2024**, we would like to inform you that KE has exclusivity for the supply of Electricity in its distribution territory that covers the entire city of Karachi and some parts of Baluchistan as per the Distribution License issued by NEPRA dated July 21, 2003.

KE has the obligation to provide electricity Connection to any and all Applicant that meets the criteria as spelled out in the NEPRA Eligibility Criteria for consumer of Distribution Companies Regulations, 2003. Consequently, the supply of electricity connection for the premise mentioned above would be subject to availability of KE 132/11 kV and LT Network in the area, the loading condition of Grid and Feeder and the fulfilment of all new connection formalities and procedures of KE by the applicant.

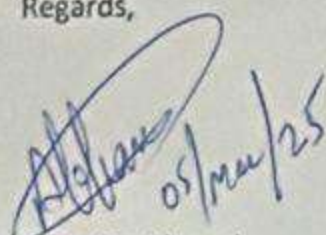
The obligations on the part of applicant in addition to cost and documentary requirements include the following;

- Make available sub-station space to KE where the covered area of premise (industry, commercial, residential) exceeds 25,000 sq. feet (2323 Sq. m) and/or the Assessed load exceeds 400 kW as per the dimensions specified in KE Letter Ref No: M/S&BD/9824-A dated 12th November 2019 communicated to SBCA.
- Make available appropriate size of land facing 60 feet on roadside for the construction of the Dedicated Grid Station as per KE's Standard Specifications and policies, where the Assessed load exceeds 5 MW.

In view of the above, K-Electric has "**NO OBJECTION**" for providing Electricity Connection to the Applicant at the subject Premise if he fulfils all the above requirements

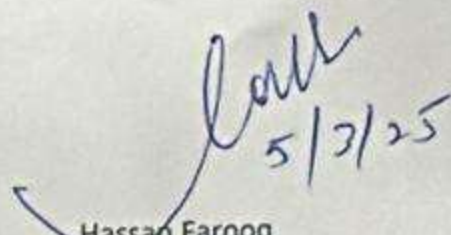
K-Electric assures the best services at all the times.

Regards,


05/mar/25

Affan Bin Ahmed
Assistant Engineer
Corporate Customer Experience

021-38701932 (Ext: 6121)


5/3/25

Hassan Farooq
Assistant Manager
Corporate Customer Experience

021-38701932 (Ext: 6143)

K-Electric Limited

39-B KE House, Sunset Boulevard, DHA, Phase II (Ext, Karachi, Pakistan | (+92 21) 111-537-211)

M/S MEGA RESIDENCY (PVT) LIMITED

**R E P O R T
O N
GEOTECHNICAL INVESTIGATION
FOR
BUILDING TOWERS
ON SURVEY # 134-B/1, M. A. JINNAH ROAD
KARACHI CANTT., KARACHI**

OCTOBER, 2024

***GEOTECHNICAL
SERVICES***

**Civil & Geotechnical Engineers
Testing Laboratory**

**52/3, Darul Aman Society, Haider Ali Road,
Off Shaheed-e-Millat Road, Karachi.**

Tele: (9221) 34532851 – 34535607

Email: info@geotechnicalservices.com.pk

**R E P O R T
O N
GEOTECHNICAL INVESTIGATION
FOR BUILDING TOWERS
ON SURVEY # 134-B/1, M.A JINNAH ROAD
KARACHI CANTT.
K A R A C H I**

C O N T E N T S

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2.	PROGRAM OF INVESTIGATION	2
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A P P E N D I X

**R E P O R T
O N
GEOTECHNICAL INVESTIGATION
FOR BUILDING TOWERS
ON SURVEY # 134-B/1, M.A JINNAH ROAD
KARACHI CANTT.
K A R A C H I**

1. INTRODUCTION:

M/s Mega Residency (Private) Limited have planned to construct building towers on Survey #134-B/1, M.A Jinnah Road, Karachi Cantt, Karachi. The project shall comprise of six towers each having two basements plus ground plus 37storeys.

M/s Yakoob & Rameez Associates are providing consultancy services for the project.

In order to obtain geotechnical information for the design of foundations, it was considered necessary to carry out subsoil investigation at the project site. '*Geotechnical Services*' were assigned the job of subsoil investigation. The report was prepared in October, 2024.

The program of investigation comprised of drilling eight boreholes. The boreholes depth varied from 30.0-40.0m.

In order to ascertain the degree of compactness / consistency of substrata, standard penetration tests (SPTs) were performed at various depth horizons. Moreover core samples were extracted using double tube core barrel.

Selected soil and water samples were sent to the laboratory of '*Geotechnical Services*' Karachi, for the evaluation of geo-engineering characteristics.

This report presents a review of subsoil investigation performed at the project site. The field and laboratory test data has been analyzed for the evaluation of allowable bearing pressure. The recommendations regarding the type and bearing capacity of foundations are incorporated in the report.

The report also incorporates borehole location plan, borelogs, field/laboratory test results and photographs.

2. PROGRAM OF INVESTIGATION:

Field Investigation:

The program of subsurface investigation at the project site consisted of executing eight boreholes. The boring was accomplished by rotary method.

Following is the break-up of borehole depths with respect to co-ordinates:

Boring Number.	Co-ordinates		Investigated Depth (m)
	Northing	Easting	
BH-1B	24°52'11.31"	67° 01'45.19"	30.0
BH-2B	24°52'12.35"	67° 01'46.82"	30.0
BH-3B	24°52'13.47"	67° 01'48.61"	40.0
BH-4B	24°52'12.56"	67° 01'45.40"	30.0
BH-5B	24°52'13.56"	67° 01'46.99"	40.0
BH-6B	24°52'12.75"	67° 01'44.12"	40.0
BH-7B	24°52'13.81"	67° 01'45.61"	30.0
BH-8B	24°52'15.21"	67° 01'46.73"	30.0

The locations of these boreholes are shown on borehole location plan appended to this report.

Standard penetration tests (SPTs) were performed at various depth horizons wherever found feasible. These tests were performed in accordance with ASTM Designation D-1586. This test gives indication of degree of compactness/consistency of granular/cohesive substrata. The 'N'-values are shown on borelogs appended to this report.

Disturbed samples were obtained through split spoon sampler used in the standard penetration tests. These samples were carefully examined to identify the soil types at various depths. The samples were placed in plastic containers, marked with borehole number, depth and subsequently, dispatched to the laboratory

Core samples were extracted by means of double tube core barrel. After each run of the core barrel, percent core recovery and rock quality designation (RQD) were determined. The cores were stored in wooden core boxes. Wooden markers indicating depth and run numbers were inserted between each core run. The core boxes were, then, transported to the laboratory for testing. Some of the cores were sealed with molten wax and treated as undisturbed sample.

Laboratory Testing:

In order to arrive at a rational evaluation of the geotechnical properties of the substrata, a program of laboratory testing was undertaken in the laboratory of Geotechnical Services.

Following physical and chemical tests were performed on representative soil and water samples:

- Grain size analysis
- Atterberg Limits
- Moisture Content
- Unconfined Compression
- Bulk Density
- Total Salts
- Sulphate content
- Chloride content
- pH value

The results of laboratory tests are appended to this report.

Observations were regularly made in boreholes to determine the position of ground water table. The position of water table is indicated on the borelogs.

3. SUBSURFACE CHARACTERISTICS:

Subsoil investigation has revealed that top 1.5-2.0m consist of fill material comprising of sandy silt, gravel and concrete pieces (only in BH-1, BH-4 and BH-6), and overburden soil comprising of medium to dense, silty SAND/sandy SILT, interbedded with clay .This is generally underlain by very dense, sandy GRAVEL/BOULDERS, dense to very dense, silty SAND/sandy SILT (weathered rock) and SANDSTONE/CONGLOMERATE pieces. Beneath this weathered rock material is a thick layer of hard, coarse-grained SANDSTONE/CONGLOMERATE up to a depth range of 11-18m. This is followed by medium hard, SILTSTONE/CLAYSTONE interbedded with sandstone that continue upto the investigated depth of 40.0 m

Major subsurface deposits can be described as follows:

- Brown, medium to dense, silty SAND/sandy SILT, interbedded with clay
- Brown, very dense, sandy GRAVEL/ BOULDERS (residual)
- Brown, very dense, silty SAND/sandy SILT (weathered rock)
- Brown hard coarse grained SANDSTONE/CONGLOMERATE pieces, interbedded with sandy clay and gravel (weathered rock)
- Brown, hard, coarse-grained SANDSTONE, highly fractured
- Brown, hard CONGLOMERATE, highly fractured
- Brown, medium hard, SILTSTONE/CLAYSTONE, interbedded with sandstone.

The exact sequence of occurrence of these deposits is shown on boreholes appended to this report.

Ground water table was encountered at the depth of about 9-12.0 m below the existing ground level.

4. FOUNDATION RECOMMENDATIONS:

4.1 General:

Foundation is a structural member that supports the loads of a structure and distributes them over the substrata on which it rests. In order to be satisfactory, the foundation should satisfy the following requirements:

- a) The foundation must be safe against the possibility of shear failure
- b) The foundation must not undergo excessive differential settlement

Calculations have been made to check allowable soil pressure for both the shear and settlement criteria.

Keeping in view the stratigraphy of the area and field and laboratory test results, the allowable pressures have been computed.

4.2 Foundation Type:

The selection of foundation type depends upon the subsoil conditions, type of structure, and structural loads.

According to the information furnished by the Consultant, the proposed building towers will have two basements whose base may be placed at depth of about 10.0 m depth below the existing ground level.

A study of boreholes shows that top 1.5-2.0m consist of fill material comprising of sandy silt, gravel and concrete pieces (only in BH-1, BH-4 and BH-6), and overburden soil comprising of medium to dense, silty SAND/sandy SILT, interbedded with clay. This is generally underlain by very dense sand GRAVEL/BOULDERS, dense to very dense, silty SAND/sandy SILT (weathered rock) and SANDSTONE/CONGLOMERATE pieces. Beneath this weathered rock material is a thick layer of hard, coarse-grained SANDSTONE/CONGLOMERATE up to a depth range of 11-18m. This is followed by medium hard, SILTSTONE/CLAYSTONE interbedded with sandstone that continue upto the investigated depth of 40.0 m

Taking into account the subsoil conditions and anticipated structural loads, it is recommended that the proposed structure be supported on **raft foundation**. If the structural loads are high and foundation requirements are not met, **pile foundation** may be provided.

4.3 Allowable Bearing Capacity for Raft Foundation

Field and laboratory data have been analyzed for the estimation of allowable bearing pressure for raft foundation.

Allowable (gross) bearing capacity of **raft foundation** (with double basement) placed at **10.0 m** depth below the existing ground level should be adopted as **6.00 tons/ft²**

Modulus of subgrade reaction at 10.0 m may be adopted as 240 kcf.

This bearing capacity has been computed for the condition that about 10.0 m of overburden soil will be permanently removed for the construction of basement.

Before placing foundation concrete the excavations should be carefully inspected to ensure that fill has been crossed and foundation is being placed in competent stratum. This precaution is necessary to guard against localized fills and inhomogenities.

Pile Foundation:

Table 4.1 presents allowable capacity for 1000 mm diameter pile for 18.0 m & 20.0 m lengths. These capacities are valid for vertical axial loads in compression:

TABLE 4.1

ALLOWABLE CAPACITY OF PILE
Pile Cut-off Level = -10.0 m

Pile Dia (mm)	Total Length (m)	*Effective Length (m)	Allowable** Pile Capacity (MT)
1000	18.0	8.0	410
	20.0	10.0	470

* Due to the construction of basement, the soffit of pile cap will be about 10.0 m below the existing ground level.

** The allowable capacity has been computed by applying a safety factory of 2.5 on the ultimate capacity.

Table 4.1(a) at the end of chapter present spreadsheets of statically computed allowable compression capacities of 1000 mm diameter pile. The structural engineer may select the pile length in accordance with the structural loads.

4.4 Pile Load Test:

The statically computed compression capacity given in preceding section must be verified by conducting full scale pile load tests carried to atleast two times the working load on index pile (test pile) and 1.5 times the working load in case of works pile. The test must be conducted in accordance with ASTM D-1143.

4.5 General Notes on Pile Foundation:

1. The capacities given in Table 4.1 are for vertical axial loads in compression.
2. During piling it is absolutely necessary that the bearing stratum is properly identified. Proper borelog must be maintained for each pile. Sample of bearing strata in each pile must be carefully preserved with proper marking.
3. Before commencing concreting, the bottom of borehole should be cleansed of loosened soil, mud or any other debris.
4. Concreting should be done using a tremie pipe. During concreting it should be ensured that the bottom of tremie pipe is always submerged in concrete. The precaution is necessary to prevent 'necking' of soil.
5. The concrete should have a slump of about 150mm so that it may freely pass through the tremie pipe. If necessary, a plasticizer must be used in concrete to improve workability.

4.6 Stability of Excavation:

During excavation for the basement 10.0 m deep, special care must be taken. This precaution is necessary to avoid slope failure. It will be necessary to provide shoring to the excavation walls. Failure to do this may result in land sliding that might endanger the lives of workers. This may be done by proper shoring / bracing. If necessary, contiguous tangent piles may be installed to retain the excavation cuts.

During construction stability of excavation must be carefully monitored and it must be ensured that the excavation is done in dry season.

4.7 Seismic Coefficients:

According to the Uniform Building Code (1997), the soil profile falls in 'S_B' category corresponding to 'rock'.

Following table gives seismic zone, seismic zone factor, soil profile type and seismic coefficients.

Seismic zone	Zone factor 'z'	Soil profile Type	Seismic Coefficient 'Ca'	Seismic Coefficient 'Cv'
2B	0.20	'S _B '	0.20	0.20

4.8 Cement Type:

Sulphate content in groundwater has been found to be excessive. It is therefore recommended that Sulphate Resistant Cement be used in concrete in contact with soil.

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For GEOTECHNICAL SERVICES

**SAIF AHMED SAEED, P.E.
B.E. (Civil), M. Engg. (AIT)
AMASCE, MIE (Pak), Consult 882**

C E R T I F I C A T E

This is to certify that I, Saif Ahmed Saeed, am submitting the soil investigation report for building towers on Survey #134-B/1, M.A Jinnah Road, Karachi Cantt, Karachi, which has been carried out under my guidance and supervision. The recommended bearing capacity is given on page 6 and summarized below:

- Allowable (gross) bearing capacity of **raft foundation** (with double basement) placed at **10.0 m** depth below the existing ground level should be adopted as **6.00 tons/ft²**
- Allowable capacity of 1000mm dia pile with 20m total length should be adopted as 470 MT.

I certify that following conditions have been observed while performing the entire soil investigation:

1. I was present at site from 02.09.24 to 26.09.24 when field work of the subsoil investigation was in progress on above site.
2. The representative of subsoil testing laboratory Mr. Umer Nazim was present at site to obtain the soil samples for laboratory testing purposes.
3. Books and references considered while giving the final recommendations are listed in the appendix of the report.
4. The borelog results are in conformity with and correlated to laboratory results.

SAIF AHMED SAEED
GEOTECHNICAL ENGINEER
PEC REGN No. CIV/2917

LIST OF REFERENCES

1. FOUNDATION ANALYSIS & DESIGN

BY J.E. BOWLES

2. FOUNDATION DESIGN & CONSTRUCTION

BY M.J. TOMLINSON

3. SOIL MECHANICS & FOUNDATIONS

BY PUNMIA

4. SOIL MECHANICS

BY LAMB & WHITMAN

5. FOUNDATION ENGINEERING

BY PECK, HANSON & THORNBURN

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TABLE - 4.1 (a)

10/3/2024

PILE CAPACITY CALCULATIONS**PROJECT : SURVEY # 134-B/1, MAIN M.A JINNAH ROAD, KARACHI CANTT, KARACHI**

Ground Water Depth = 0 m (Assume for Calculation)

Cutoff Level = 10 m

Pile Dia. = 1000 mm

Pile Depth (m)	Strata	Soil Parameters				Effective Pile Length (m)	Unit Weight (γ) (MT/m ³)	Overburden pressures (T/m ²)			Ultimate Capacity			Total Allowable Capacity (MT) FOS = 2.5
		C (MT/m ²)	Phi	Nc	Nq			P ₁	P ₂	P _{avg}	End Bearing (MT)	Skin Friction (MT)	Total (MT)	
0														
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11	SANDSTONE/ SILTSTONE	60	0	9	0	1	2.0	3.0	4.0	3.5	424	75	500	200
12		60	0	9	0	2	2.0	4.0	5.0	4.5	424	151	575	230
13		60	0	9	0	3	2.0	5.0	6.0	5.5	424	226	650	260
14		60	0	9	0	4	2.0	6.0	7.0	6.5	424	302	726	290
15		60	0	9	0	5	2.0	7.0	8.0	7.5	424	377	801	320
16		60	0	9	0	6	2.0	8.0	9.0	8.5	424	452	877	351
17		60	0	9	0	7	2.0	9.0	10.0	9.5	424	528	952	381
18		60	0	9	0	8	2.0	10.0	11.0	10.5	424	603	1027	411
19		60	0	9	0	9	2.0	11.0	12.0	11.5	424	679	1103	441
20		60	0	9	0	10	2.0	12.0	13.0	12.5	424	754	1178	471

A P P E N D I X

BOREHOLE LOCATION PLAN
PLOT NO. 134/B-1, M.A. JINNAH ROAD



SUBSURFACE EXPLORATION LOG

Project SURVEY # 134-B1, M.A JINNAH ROAD, KARACHI

Ground Water Depth 11.30m

Geologist S.M Umer Nazim/HSType of Boring ROTARY

Date 21.09.24 TO 23.09.24

Depth (m)	Sample No.	CLASSIFICATION	STRATUM DESCRIPTION	Elevation (m)	Dia of Casing /Hole	SPT ' N '	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (m)				
2.0	SPT-1		Fill Material comprising concrete pieces and sandy silt			45								
	SPT-2					50								
	SPT-3					50/6"					02			
6.0	SPT-4		Brown, hard, coarse grained CONGLOMERATE/SANDSTONE pieces, interbedded with sandy clay and gravel (weathered rock)			50/6"								
	SPT-5					50/6"							04	
	SPT-6					50/4"							06	
15	CORE		Brown, hard, CONGLOMERATE, interbedded with meta-sandstone			30	08						Waxed Core 6.05-6.16	
	CORE					28	Nil							08
	CORE					32	Nil							10
	CORE					36	Nil							12
	CORE					29	05							12
	CORE					31	Nil							14
	CORE					34	Nil							16
	CORE					38	17							18
20	CORE	CL-ML	Brown, medium hard SILTSTONE/CLAYSTONE, interbedded with sand, fractured to highly fractured			51	07						Waxed Core 19.90-20.03	
	CORE					19								
	CORE					20								

SUBSURFACE EXPLORATION LOG

Project SURVEY # 134-B1, M.A JINNAH ROAD, KARACHI

Ground Water Depth 11.30m

Geologist S.M Umar Nazim/HS

Type of Boring ROTARY

Date 21.09.24 TO 23.09.24

Depth (m)	Sample No.	CLASSIFICATION	STRATUM DESCRIPTION	Elevation (m)	Dia of Casing /Hole	SPT ' N '	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (m)			
	CORE	CL-ML	Brown, medium hard SILTSTONE/CLAYSTONE, interbedded with sand, fractured to highly fractured				53	20					
	CORE						47	23		22			
	CORE						42	19					
24	CORE						16.76	24				Waxed Core 24.00-24.17	
	CORE	CL-ML	Grey, medium hard SILTSTONE/CLAYSTONE, interbedded with sandstone, fractured to highly fractured				48	18					
	CORE						45	27	26				
	CORE						50	18	22.92	28		Waxed Core 27.20-27.32	
	CORE												
30	CORE						61	20		30			
			BOTTOM OF BOREHOLE										

[illegible]

SUBSURFACE EXPLORATION LOG

Project SURVEY # 134-B1, M.A JINNAH ROAD, KARACHI

Ground Water Depth 11.50m

Geologist S.M Umar Nazim/HS

Type of Boring ROTARY

Date 11.09.24 TO 12.09.24

Depth (m)	Sample No.	CLASSIFICATION	STRATUM DESCRIPTION	Elevation (m)	Dia of Casing /Hole	SPT ' N '	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (m)
	CORE	CL-ML	Brown, medium hard SILTSTONE/CLAYSTONE, interbedded with sand, fractured to highly fractured				47	18	26.26	Waxed Core 21.00-21.20
	CORE						53	27		
	CORE						60	40		
	CORE						46	19		
	CORE						52	35		
	CORE									
	CORE	CL-ML	Grey, medium hard SILTSTONE/CLAYSTONE, interbedded with sand, fractured				49	23	25.97	Waxed Core 27.22-27.39
	CORE						54	25		
30	CORE									
			BOTTOM OF BOREHOLE							

SUBSURFACE EXPLORATION LOG

Project SURVEY # 134-B1, M.A JINNAH ROAD, KARACHI

Ground Water Depth 11.40m

Geologist S.M Umer Nazim/HS

Type of Boring ROTARY

Date 08.09.24 TO 09.09.24

Depth (m)	Sample No.	CLASSIFICATION	STRATUM DESCRIPTION	Elevation (m)	Dia of Casing /Hole	SPT ' N '	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (m)
2.0	SPT-1 SPT-2 SPT-3	SM	Brown, medium dense, silty SAND/sandy SILT			11 12 50/6"				02
2.8	SPT-4	SM	Brown, very dense, silty SAND/sandy SILT (weathered rock)			50/6"				
4.5	CORE		Brown, hard, coarse grained SANDSTONE, interbedded with clay/shale, highly fractured				29	Nil	116.47	04 Waxed Core 4.55-4.65
	CORE						30	07		06
	CORE						51	17	156.22	08 Waxed Core 7.64-7.72
	CORE						33	06		
10.5	CORE						40	Nil	19.54	10 Waxed Core 10.65-10.74
	CORE						42	06		12 Waxed Core 12.20-12.29
	CORE	CL-ML	Brown, medium hard SILTSTONE/CLAYSTONE, interbedded with sand, fractured to highly fractured				44	22		14
	CORE						52	12	22.45	16 Waxed Core 15.15-15.35
	CORE						57	30		18
	CORE						58	44		
	CORE						56	41		20 Waxed Core 19.80-19.93
20									20.34	20

SUBSURFACE EXPLORATION LOG

Project SURVEY # 134-B1, M.A JINNAH ROAD, KARACHI

Ground Water Depth 11.40m

Geologist S.M Umar Nazim/HS

Type of Boring ROTARY

Date 08.09.24 TO 09.09.24

Depth (m)	Sample No.	CLASSIFICATION	STRATUM DESCRIPTION	Elevation (m)	Dia of Casing /Hole	SPT ' N '	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (m)
	CORE	CL-ML	Grey, medium hard SILTSTONE/CLAYSTONE, interbedded with sand, fractured to highly fractured				55	33		
							71	20		22
	CORE						60	33		24
	CORE						63	56	15.79	Waxed Core 24.30-24.46
	CORE						66	54		26
							51	09		28
	CORE						45	14		Waxed Core 28.80-28.98
							40	17	19.65	30
	CORE						42	07		32
							51	27		34
	CORE						43	20	25.36	Waxed Core 34.80-34.97
							65	30		36
	CORE						25	10		38
							35	20		
40	CORE									40

BOTTOM OF BOREHOLE

SUBSURFACE EXPLORATION LOG

Project SURVEY # 134-B1, M.A JINNAH ROAD, KARACHI

Ground Water Depth 11.20m

Geologist S.M Umer Nazim/HS

Type of Boring ROTARY

Date 19.09.24 TO 21.09.24

Depth (m)	Sample No.	CLASSIFICATION	STRATUM DESCRIPTION	Elevation (m)	Dia of Casing /Hole	SPT ' N '	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (m)			
	SPT-1	SM	Fill Material comprising, limestone/concrete pieces with clayey sand and fine gravel			24							
1.5	SPT-2					30							
	SPT-3					40							
3.0	SPT-4					50/6"							
4.5		GW	Brown, very dense, sandy GRAVEL/BOULDERS (residual)			50/6"				04			
	SPT-5	Brown, hard, coarse grained SANDSTONE/CONGLOMERATE pieces, with gravel (weathered rock)											
6.0	SPT-6		50/4"										
7.5	CORE		Brown, hard, coarse grained SANDSTONE, highly fractured				27	05	112.06	06 Waxed Core 6.20-6.27			
9.0	CORE						29	Nil			08		
	CORE						28	06				10 Waxed Core 10.50-10.58	
12	CORE						30	06					
	CORE		Brown, hard, coarse grained SANDSTONE, intebedded with conglomerate fragments highly fractured						12				
	CORE									33	Nil		14
	CORE									32	Nil	16	
16										37	11		
	CORE	CL-ML	Brown, medium hard SILTSTONE/CLAYSTONE, interbedded with sand, fractured to highly fractured						18				
	CORE									50	33		14.48
	CORE									47	20	20 Waxed Core 19.75-19.90	
20													

SUBSURFACE EXPLORATION LOG

Project SURVEY # 134-B1, M.A JINNAH ROAD, KARACHI

Ground Water Depth 11.20m

Geologist S.M Umar Nazim/HS

Type of Boring ROTARY

Date 19.09.24 TO 21.09.24

Depth (m)	Sample No.	CLASSIFICATION	STRATUM DESCRIPTION	Elevation (m)	Dia of Casing /Hole	SPT ' N '	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (m)
	CORE	CL-ML	Grey, medium hard SILTSTONE/CLAYSTONE, interbedded with sandstone, fractured to highly fractured				45	24	23.57	
							43	20		22
	CORE						34	21		
							40	10		24
	CORE						43	13		
							53	18		26
	CORE						44	23		
										28
	CORE									
30									21.93	Waxed Core 28.60-28.73
										30
			BOTTOM OF BOREHOLE							

SUBSURFACE EXPLORATION LOG

Project **SURVEY # 134-B1, M.A JINNAH ROAD, KARACHI**

Ground Water Depth 9.50m

Geologist S.M Umar Nazim/HSType of Boring ROTARYDate 11.09.24 TO 12.09.24

Depth (m)	Sample No.	CLASSIFICATION	STRATUM DESCRIPTION	Elevation (m)	Dia of Casing /Hole	SPT ' N '	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (m)
	CORE	CL-ML	Grey, medium hard SILTSTONE/CLAYSTONE, interbedded with sand				45	27	15.97	Waxed Core 21.23-21.38
	CORE						51	30		22
	CORE						73	40		24
	CORE						48	33		
	CORE						43	07	27.98	Waxed Core 25.80-25.91
	CORE						50	40		28
	CORE						40	23		
	CORE						55	31	24.59	30
	CORE						46	15		Waxed Core 34.80-34.97
	CORE						50	27		32
	CORE						48	23		34
	CORE						62	25		36
	CORE						32	10		38
	CORE						38	23		40
40	CORE									
BOTTOM OF BOREHOLE										

SUBSURFACE EXPLORATION LOG

Project SURVEY # 134-B1, M.A JINNAH ROAD, KARACHI

Ground Water Depth 11.40m

Geologist S.M Umer Nazim/HSType of Boring ROTARY

Date 23.09.24 TO 26.09.24

Depth (m)	Sample No.	CLASSIFICATION	STRATUM DESCRIPTION	Elevation (m)	Dia of Casing /Hole	SPT ' N '	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (m)		
0.0	SPT-1	SM	Fill comprising of sandy silt and concrete pieces			25						
0.5	SPT-2											
1.0												
1.5	SPT-3	SM	Brown, very dense, silty, fine to coarse SAND			50/6"	1.5					
2.0												
2.5	SPT-4											
3.0	CORE SPT-5	SC	Brown, very dense, clayey SAND/sandy CLAY (weathered rock)			50/6"	3.0	06				
3.5												
4.0	CORE		Brown, hard CONGLOMERATE fragments interbedded with sandstone, highly fractured				32	10		132.51	Waxed Core 6.30-6.42	4.0
4.5							4.5					
5.0	CORE						30	08		110.91	08	
5.5							5.5					
6.0	CORE						34	06			10	
6.5							6.5					
7.0	CORE						38	13		12		
7.5							7.5					
8.0	CORE						30	07		14		
8.5		8.5										
9.0	CORE	37	08	16								
9.5		9.5										
10.0	CORE	35	10	18								
10.5		10.5										
11.0	CORE	40	10	18								
11.5		11.5										
12.0		12.0										
12.5		12.5										
13.0		13.0										
13.5		13.5										
14.0		14.0										
14.5		14.5										
15.0		15.0										
15.5		15.5										
16.0		16.0										
16.5		16.5										
17.0		17.0										
17.5		17.5										
18.0		18.0										
18.5		18.5										
19.0		19.0										
19.5		19.5										
20.0		20.0										

SUBSURFACE EXPLORATION LOG

Project SURVEY # 134-B1, M.A JINNAH ROAD, KARACHI

Ground Water Depth 11.40m

Geologist S.M Umar Nazim/HS

Type of Boring ROTARY

Date 23.09.24 TO 26.09.24

Depth (m)	Sample No.	CLASSIFICATION	STRATUM DESCRIPTION	Elevation (m)	Dia of Casing /Hole	SPT ' N '	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (m)
	CORE	CL-ML	Grey, medium hard SILTSTONE/CLAYSTONE, interbedded with sand				53	27	16.77	
	CORE						50	30		22 Waxed Core 22.60-22.80
	CORE						40	35		24
	CORE						47	13	27.98	
	CORE						52	17		26
	CORE						48	25		28
	CORE						50	20	24.59	Waxed Core 28.75-28.96
	CORE						48	17		30
	CORE						52	14		32
	CORE						50	20		34
	CORE						46	18		36
	CORE						65	25		
	CORE						38	10		38
40	CORE						35	17		40

BOTTOM OF BOREHOLE

SUBSURFACE EXPLORATION LOG

Project SURVEY # 134-B1, M.A JINNAH ROAD, KARACHI

Ground Water Depth 9.30m

Geologist S.M Umer Nazim/HS

Type of Boring ROTARY

Date 16.09.24 TO 19.09.24

Depth (m)	Sample No.	CLASSIFICATION	STRATUM DESCRIPTION	Elevation (m)	Dia of Casing /Hole	SPT ' N '	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (m)												
	SPT-1	SM	Brown, medium to dense, silty SAND/sandy SILT, trace gravel			18				02												
	SPT-2					25																
	SPT-3					40																
3.0	SPT-4					50																
4.5		SM	Brown,very dense, silty SAND/sandy SILT, trace gravel				50/6"				04											
	SPT-5		Brown, hard, coarse grained SANDSTONE, highly fractured			50/4"																
	SPT-6																					
7.5	CORE																					
9.0	CORE						Brown, hard, CONGLOMERATE, highly fractured	38	05	149.91	06 Waxed Core 6.25-6.33											
			Brown, hard, CONGLOMERATE, highly fractured				30	07		158.54	08											
	CORE						Brown, hard, coarse grained SANDSTONE, highly fractured	40				07	10 Waxed Core 10.50-10.66									
	CORE																					
12	CORE																					
			Brown, hard, CONGLOMERATE, highly fractured						38	Nil				12								
15	CORE						Brown, hard, coarse grained SANDSTONE, intebedded with conglomerate fragments highly fractured	40				15			14							
																CL-ML		51	10		16	
	CORE																					
	CORE								57	Nil												
20																						

SUBSURFACE EXPLORATION LOG

Project SURVEY # 134-B1, M.A JINNAH ROAD, KARACHI

Ground Water Depth 9.30m

Geologist S.M Umar Nazim/HS

Type of Boring ROTARY

Date 16.09.24 TO 19.09.24

Depth (m)	Sample No.	CLASSIFICATION	STRATUM DESCRIPTION	Elevation (m)	Dia of Casing /Hole	SPT ' N '	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (m)
21.0	CORE		Brown, hard, coarse grained SANDSTONE, intebedded with conglomerate fragments, highly fractured				40	Nil		
	CORE	CL-ML	Brown, friable to medium hard SILTSTONE/CLAYSTONE, interbedded with sand, fractured to highly fractured				51	16	7.75	Waxed Core 21.16-21.28
	CORE						45	27		22
	CORE						60	20		24
	CORE						53	33	23.07	Waxed Core 25.75-25.91
	CORE						60	30		26
	CORE						52	20		28
30	CORE									30
			BOTTOM OF BOREHOLE							

SUBSURFACE EXPLORATION LOG

Project SURVEY # 134-B1, M.A JINNAH ROAD, KARACHI

Ground Water Depth 11.50m

Geologist S.M Umer Nazim/HS

Type of Boring ROTARY

Date 02.09.24 TO 07.09.24

Depth (m)	Sample No.	CLASSIFICATION	STRATUM DESCRIPTION	Elevation (m)	Dia of Casing /Hole	SPT ' N '	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (m)				
	SPT-1	SM	Brown, medium to dense, silty, fine to coarse SAND			15								
	SPT-2					39					02			
	SPT-3					37								
3.0	SPT-4					45					04			
	SPT-5	50/6"												
4.8														
	SPT-6		Brown, hard, CONGLOMERATE, interbedded with sandstone			50/6"	41	27		90.55	06 Waxed Core 6.10-6.18			
	CORE					42						07	08 Waxed Core 7.62-7.72	
9.0	CORE													43
	CORE					35						Nil	12 Waxed Core 12.20-12.29	
	CORE	33	06				14 Waxed Core 13.50-13.64							
15	CORE					40		19			16 Waxed Core 15.13-15.23			
	CORE	41	15				173.90					18 Waxed Core 16.50-16.66		
	CORE					37		11						
	CORE	32	Nil											
19.5	CORE													
20														20

SUBSURFACE EXPLORATION LOG

Project SURVEY # 134-B1, M.A JINNAH ROAD, KARACHI

Ground Water Depth 11.50m

Geologist S.M Umar Nazim/HS

Type of Boring ROTARY

Date 02.09.24 TO 07.09.24

Depth (m)	Sample No.	CLASSIFICATION	STRATUM DESCRIPTION	Elevation (m)	Dia of Casing /Hole	SPT ' N '	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (m)
	CORE		Brown, hard, coarse grained META-SANDSTONE, highly fractured to fractured				27	Nil	271.78	Waxed Core 21.04-21.14 22 24 26 28 30
	CORE						35	12		
	CORE						28	06		
	CORE						45	15		
	CORE						20	07		
	CORE						25	05		
	CORE						22	10		
30	CORE									
			BOTTOM OF BOREHOLE							

PROJECT : SURVEY # 134-B/1, M.A. JINNAH ROAD, KARACHI

**DATE: Oct. 02. 2024.
L.R. No.: 416/24**

GRAIN SIZE ANALYSIS (PER CENT FINER BY WEIGHT)
SIEVE SIZES IN mm

HYDROMETER
(DIA IN mm)

S No	BH NO.	SAMPLE	DEPTH (m)	75.0	37.5	19.0	9.50	4.75	2.36	1.18	0.600	0.300	0.150	0.075	.05	.01	.002	.001
1.	BH-1B	DS	4.50-6.00	-	100	84	72	70	69	67	65	62	61	54	46	32	24	12
2.	BH-2B	SPT-3	2.00	-	-	-	-	-	-	100	99	97	83	59	48	28	12	03
3.	BH-4B	SPT-2	3.00	-	-	-	100	90	70	49	38	28	24	21	-	-	-	-
4.	BH-5B	SPT-3	2.00	-	-	-	100	96	86	66	56	32	20	15	-	-	-	-
5.	BH-6B	SPT-3	4.50	-	-	-	100	94	81	69	62	34	23	19	-	-	-	-
6.	BH-7B	SPT-2	1.50	-	-	-	100	97	92	83	77	68	61	53	44	26	12	03
7.	BH-8B	SPT-3	2.00	-	-	-	100	96	80	59	39	25	20	17	-	-	-	-

PROJECT : SURVEY # 134-B/1, M.A. JINNAH ROAD, KARACHI

DATE: Oct. 02. 2024.

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SHEET 1 OF 2

ATTERBERG LIMITS / MOISTURE CONTENT

S. NO.	BORING NO.	SAMPLE	DEPTH (m)	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)
1.	BH-1B	DS	4.50-6.00	27	09	4.72
2.	BH-1B	Waxed Core	19.90-20.03	32	12	8.24
3.	BH-1B	Waxed Core	24.00-24.17	NON-PLASTIC	NON-PLASTIC	10.67
4.	BH-1B	Waxed Core	27.20-27.32	NON-PLASTIC	NON-PLASTIC	9.58
5.	BH-2B	Waxed Core	9.15-9.25	30	10	16.15
6.	BH-2B	Waxed Core	12.26-12.40	32	12	9.53
7.	BH-2B	Waxed Core	16.92-17.07	31	10	8.79
8.	BH-2B	Waxed Core	21.00-21.20	33	11	8.15
9.	BH-2B	Waxed Core	27.22-27.39	30	11	6.06
10.	BH-3B	Core	7.50-9.00	46	17	-
11.	BH-3B	Waxed Core	10.65-10.74	31	10	13.24
12.	BH-3B	Waxed Core	15.15-15.35	32	10	12.16
13.	BH-3B	Waxed Core	19.80-19.93	34	12	8.16
14.	BH-3B	Waxed Core	24.30-24.46	30	08	9.44
15.	BH-3B	Waxed Core	28.80-28.98	27	06	9.83
16.	BH-3B	Waxed Core	34.80-34.97	29	06	10.77

.....cont'd

PROJECT : SURVEY # 134-B/1, M.A. JINNAH ROAD, KARACHI

DATE: Oct. 02. 2024.

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SHEET 2 OF 2

ATTERBERG LIMITS / MOISTURE CONTENT

S. NO.	BORING NO.	SAMPLE	DEPTH (m)	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)
17.	BH-4B	Waxed Core	16.70-16.81	28	06	10.41
18.	BH-4B	Waxed Core	19.75-19.90	25	06	3.56
19.	BH-4B	Waxed Core	25.65-25.75	27	06	6.89
20.	BH-4B	Waxed Core	28.60-28.73	26	05	9.57
21.	BH-5B	Waxed Core	10.75-10.95	34	10	12.16
22.	BH-5B	Waxed Core	13.70-13.87	33	10	9.71
23.	BH-5B	Waxed Core	16.65-16.79	30	10	7.97
24.	BH-5B	Waxed Core	21.23-21.38	30	09	11.55
25.	BH-5B	Waxed Core	25.80-25.91	26	08	12.31
26.	BH-5B	Waxed Core	30.10-30.25	25	08	9.16
27.	BH-6B	Waxed Core	18.15-18.29	30	12	8.79
28.	BH-6B	Waxed Core	22.60-22.80	39	18	7.51
29.	BH-6B	Waxed Core	28.75-28.96	NON-PLASTIC	NON-PLASTIC	8.33
30.	BH-7B	Waxed Core	21.16-21.28	36	12	12.64
31.	BH-7B	Waxed Core	25.75-25.91	33	11	11.35

PROJECT : SURVEY # 134-B/1, M.A. JINNAH ROAD, KARACHI

DATE: Oct. 02. 2024.

L.R. No.: 416/24

SHEET 1 OF 3

UNCONFINED COMPRESSION / BULK DENSITY

S. NO.	BORING NO.	SAMPLE	DEPTH (m)	UNCONFINED COMPRESSION		BULK DENSITY (gm/cc)
				qu (kg/cm ²)	STRAIN (%)	
1.	BH-1B	Waxed Core	6.05-6.16	227.86	1.45	2.343
2.	BH-1B	Waxed Core	12.20-12.27	166.49	1.61	2.337
3.	BH-1B	Waxed Core	19.90-20.03	26.55	2.77	2.285
4.	BH-1B	Waxed Core	24.00-24.17	16.76	2.42	2.215
5.	BH-1B	Waxed Core	27.20-27.32	22.92	2.39	2.253
6.	BH-2B	Waxed Core	3.00-3.10	72.77	2.10	2.316
7.	BH-2B	Waxed Core	6.00-7.50	87.26	1.94	2.320
8.	BH-2B	Waxed Core	9.15-9.25	2.93	6.24	2.076
9.	BH-2B	Waxed Core	12.26-12.40	8.76	5.46	2.136
10.	BH-2B	Waxed Core	16.92-17.07	19.08	3.64	2.225
11.	BH-2B	Waxed Core	21.00-21.20	26.26	5.56	2.275
12.	BH-2B	Waxed Core	27.22-27.39	25.97	3.48	2.271
13.	BH-3B	Waxed Core	4.55-4.65	116.47	1.72	2.334
14.	BH-3B	Waxed Core	7.64-7.72	156.22	1.57	2.337
15.	BH-3B	Waxed Core	10.65-10.74	19.54	2.79	2.223
16.	BH-3B	Waxed Core	15.15-15.35	22.45	2.53	2.256

.....cont'd

PROJECT : SURVEY # 134-B/1, M.A. JINNAH ROAD, KARACHI

DATE: Oct. 02. 2024.

L.R. No.: 416/24

SHEET 2 OF 3

UNCONFINED COMPRESSION / BULK DENSITY

S. NO.	BORING NO.	SAMPLE	DEPTH (m)	UNCONFINED COMPRESSION		BULK DENSITY (gm/cc)
				qu (kg/cm ²)	STRAIN (%)	
17.	BH-3B	Waxed Core	19.80-19.93	20.34	2.70	2.223
18.	BH-3B	Waxed Core	24.30-24.46	15.79	7.58	2.206
19.	BH-3B	Waxed Core	28.80-28.98	19.65	3.07	2.214
20.	BH-3B	Waxed Core	34.80-34.97	25.36	2.64	2.262
21.	BH-4B	Waxed Core	6.20-6.27	112.06	1.66	2.333
22.	BH-4B	Waxed Core	10.50-10.58	179.24	1.49	2.336
23.	BH-4B	Waxed Core	16.70.-16.81	14.48	5.43	2.191
24.	BH-4B	Waxed Core	19.75-19.90	26.52	2.47	2.271
25.	BH-4B	Waxed Core	25.65-25.75	23.57	4.47	2.243
26.	BH-4B	Waxed Core	28.60-28.73	21.93	3.76	2.232
27.	BH-5B	Waxed Core	4.60-4.68	118.18	1.77	2.335
28.	BH-5B	Waxed Core	10.75-10.95	12.55	4.89	2.163
29.	BH-5B	Waxed Core	13.70-13.87	11.80	4.18	2.168
30.	BH-5B	Waxed Core	16.65-16.79	14.33	4.14	2.215
31.	BH-5B	Waxed Core	21.23-21.38	15.97	5.41	2.224
32.	BH-5B	Waxed Core	25.80-25.91	27.98	3.50	2.288

.....cont'd

PROJECT : SURVEY # 134-B/1, M.A. JINNAH ROAD, KARACHI

DATE: Oct. 02. 2024.

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SHEET 3 OF 3

UNCONFINED COMPRESSION / BULK DENSITY

S. NO.	BORING NO.	SAMPLE	DEPTH (m)	UNCONFINED COMPRESSION		BULK DENSITY (gm/cc)
				qu (kg/cm ²)	STRAIN (%)	
33.	BH-5B	Waxed Core	30.10-30.25	24.59	2.70	2.261
34.	BH-6B	Waxed Core	6.30-6.42	132.51	1.63	2.333
35.	BH-6B	Waxed Core	9.20-9.29	110.91	1.72	2.331
36.	BH-6B	Waxed Core	15.10-15.22	117.34	1.66	2.332
37.	BH-6B	Waxed Core	18.15-18.29	15.15	3.33	2.198
38.	BH-6B	Waxed Core	22.60-22.80	16.77	5.68	2.207
39.	BH-6B	Waxed Core	28.75-28.96	26.32	1.18	2.280
40.	BH-7B	Waxed Core	6.25-6.33	149.91	1.54	2.336
41.	BH-7B	Waxed Core	10.50-10.66	158.54	1.51	2.338
42.	BH-7B	Waxed Core	21.16-21.28	7.75	4.21	2.127
43.	BH-7B	Waxed Core	25.75-25.91	23.07	3.62	2.239
44.	BH-8B	Waxed Core	6.10-6.18	90.55	1.94	2.326
45.	BH-8B	Waxed Core	12.20-12.29	124.63	1.69	2.333
46.	BH-8B	Waxed Core	16.50-16.66	173.90	1.52	2.337
47.	BH-8B	Waxed Core	21.04-21.14	271.78	1.32	2.673

PROJECT : SURVEY # 134-B/1, M.A. JINNAH ROAD, KARACHI

**DATE: Oct. 02. 2024.
L.R. No.: 416/24**

CHEMICAL TESTS ON SOIL

S.NO.	BORING NO.	SAMPLE	DEPTH (m)	SULPHATE CONTENT (%)
1.	BH-3B	SPT-1	1.00	0.050
2.	BH-4B	SPT-2	3.00	0.048
3.	BH-5B	SPT-2	1.50	0.064

PROJECT : SURVEY # 134-B/1, M.A. JINNAH ROAD, KARACHI

**DATE: Oct. 02. 2024.
L.R. No.: 416/24**

CHEMICAL TESTS ON WATER

S.NO.	BORING NO.	TOTAL DISSOLVED SALTS (mg/lit)	SULPHATE CONTENT (mg/lit)	CHLORIDE CONTENT (mg/lit)	pH VALUE
1.	BH-1B	6200	340	2300	7.60
2.	BH-2B	6300	335	2350	7.60
3.	BH-3B	6000	322	2270	7.60
4.	BH-4B	65000	347	2400	7.70
5.	BH-5B	5400	310	2100	7.60
6.	BH-6B	6400	342	2500	7.70
7.	BH-7B	6800	352	2700	7.70
8.	BH-8B	4200	285	1670	7.60



BH 05



BH 06

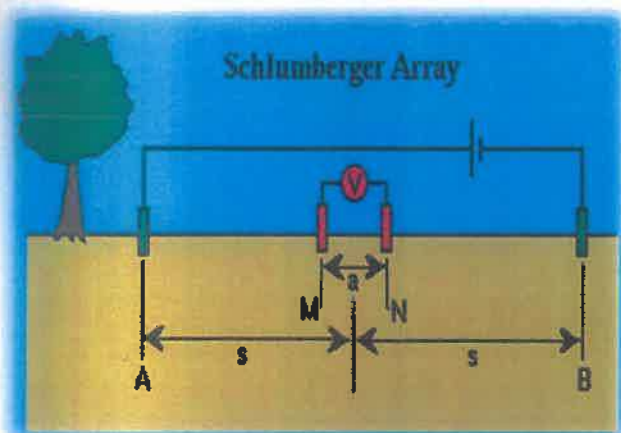


BH 08



BH 07





**ELECTRICAL RESISTIVITY SURVEY
REPORT FOR GROUND WATER
INVESTIGATION
AT
SAIMA CENTRE POINT
MUHAMMAD ALI JINNAH ROAD SADDAR**



03-12-2025



Electrical Resistivity Survey For Ground Water Aquifer Study.

CLIENT: SAIMA CENTRE POINT

CONSULTANT: MR, WAQAR ALAM (GEO-PROFESSIONAL)



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SAIMA CENTRE POINT MUHAMMAD ALI JINNAH ROAD SADDAR

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ABSTARCT

An Electrical Resistivity Survey (ERS) was conducted at **Saima Centre Point, Muhammad Ali Jinnah Road, Karachi**, to evaluate the subsurface geological conditions and assess the groundwater potential of the area. A total of **ten Vertical Electrical Soundings (VES)** were performed using the **Schlumberger electrode configuration**, achieving a depth of investigation exceeding **250 meters**. The survey was carried out with the **ABEM Terrameter**, and the processed data were interpreted to identify the lithological units and groundwater-bearing formations.

The resistivity results reveal the presence of **six major geoelectric layers**, dominated by **Alluvium, Sand, Limestone, Clay**, and deeper units of **sandy limestone, weathered Manchar Formation, and fractured sandstone beds of the Gaj Formation** (Middle Miocene age). These formations are well-known aquifer hosts in the region and exhibit conditions favorable for sustainable groundwater extraction.

The integrated geological and resistivity interpretation across all ERS locations (ERS-01 to ERS-10) indicates **very good groundwater potential**, with notable thicknesses of water-bearing sandy and sandy-limestone beds. Resistivity signatures confirm the presence of **Fresh to Brackish groundwater** within the target aquifer depths.

Based on subsurface evaluation, a **test borehole of 800–1000 ft** is strongly recommended within the identified productive zone. The expected groundwater yield is approximately **100 US gpm**, subject to confirmation through drilling, geophysical logging, and pumping tests. The principal aquifers encountered belong to the **Alluvium (Sand Bar Deposits), Gaj Formation, and Manchar Formation**, which collectively form a reliable groundwater system for long-term use.

This executive summary reflects the key findings, conclusions, and recommended actions required to successfully develop groundwater resources at the project site.



INTRODUCTION

A large quantity of water is a primary requirement of any area to meet the daily requirement of water. Saima Centre Point project having large acre land present on Muhammad Ali Jinnah Road, Saddar Karachi. Saima Centre Point Administration realized the need to explore groundwater for the Development of Project and requested the Geolog for arranging the groundwater aquifer study of the area. Geolog carried out Electrical Resistivity Survey on the request of **Saima Centre Point**, to investigate the groundwater potential in the area. Work has been carried out under supervision of Waqar Alam(Hydrogeologist).

This report presents the findings of the electrical resistivity survey for groundwater investigation conducted in study area. Schlumberger Electrode configuration was used to conduct Vertical Electrical Soundings (VES) at in the area proposed by the client, after the field survey by the team of the **GEO-PROFESSIONAL**. The area was surveyed with maximum depth of investigation of **250+ m**. Ten points Survey has been investigated locations should have been investigated for conformation, correlation and better interpretation of ERS data.

The results of the investigations obtained by using electrical resistivity software are presented in tabulated form (Table-ERS-01-ERS-10), indicating the interpreted lithology and resistivity of the subsurface layers.



LOCATION

Below point and its latitude and longitude are the actual location of survey area.

Table -01: Table shows the latitude and longitude of VES location:

Points	Latitude	Longitude	Points	Latitude	Longitude
ERS-01	24.869346°	67.030347°	ERS-02	24.869079°	67.029736°
ERS-03	24.869753°	67.030833°	ERS-04	24.869660°	67.029163°
ERS-05	24.869964°	67.029834°	ERS-06	24.870335°	67.030367°
ERS-07	24.870160°	67.028822°	ERS-08	24.870434°	67.029464°
ERS-09	24.870718°	67.029834°	ERS-10	24.869070°	67.030613°



Fig: 1 Map of study area showing location of Vertical Electrical Sounding (VES).



GEOLOGY OF THE AREA

The studied area represents the surface geological exposures ranging in age from Middle Oligocene to Miocene to Recent. The major structural control of the area is in the form of en-catchment and bank of Malir river deposits. Meanwhile, towards the super highway this anticlinal structure is followed by the syncline and the town of Karachi is a River valley deposits (Fig. 2).

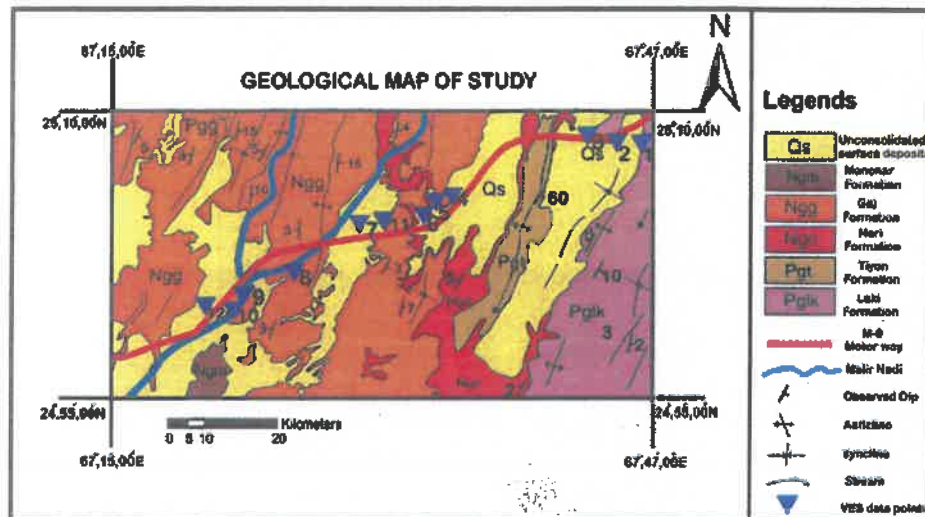


Fig. 2 Geological Map of study area showing lithology pattern



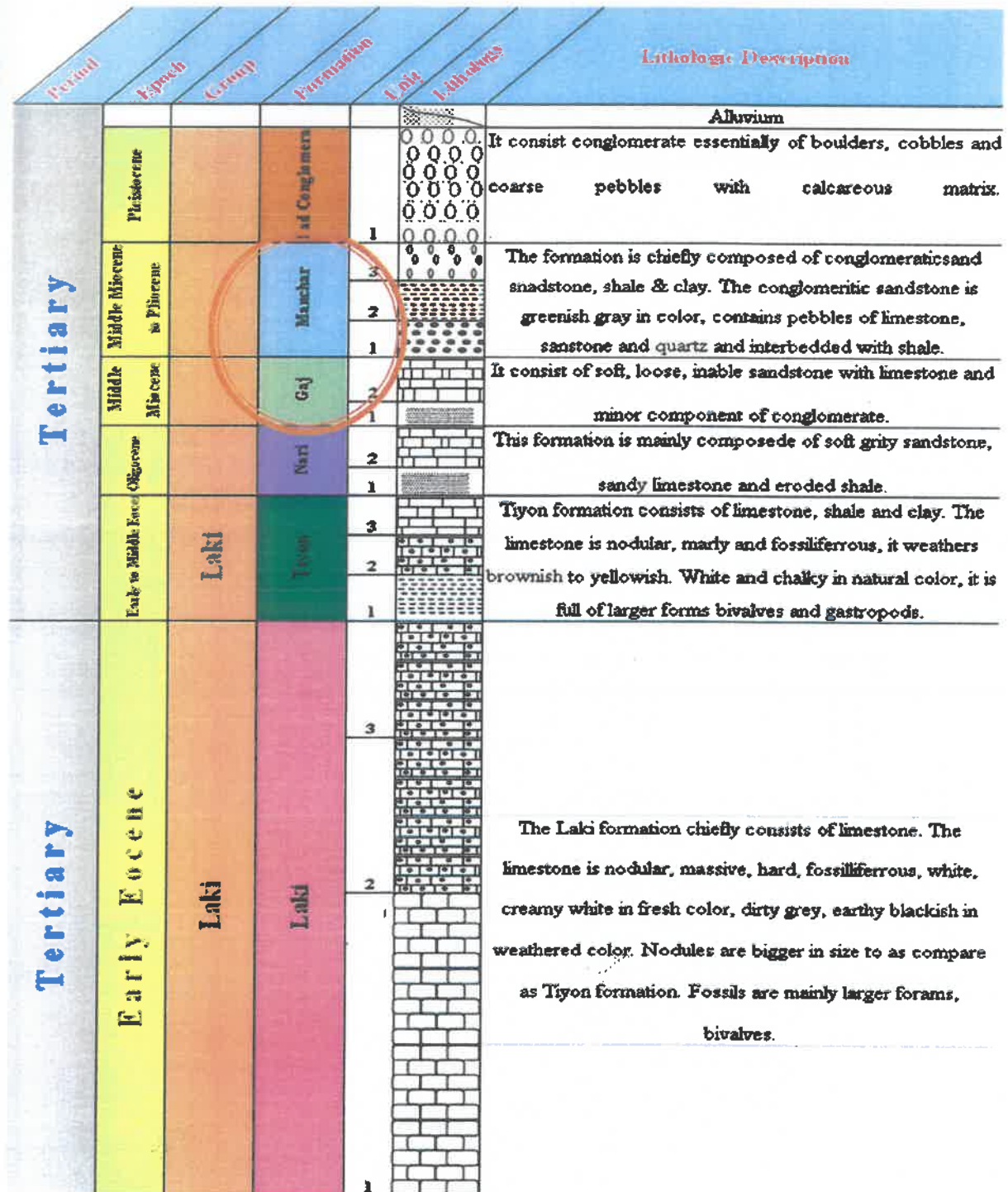


Fig: 3 Stratigraphical column of study area circle showing lithological formation of area



PURPOSE AND SCOPE OF WORK

Main purpose of this investigation is to determine the subsurface resistivity distribution by making measurements on the ground surface to delineate the aquifers. The management want to tap the groundwater to overcome the shortage of water for drinking and plantation purposes. The present investigations may help to develop the groundwater resources. The resistivity survey is conducted first time in the area which may be useful for extended groundwater studied in the area.

PRINCIPLES OF METHOD APPLIED

The earth is energized with the help of controlled power pack specially designed to provide voltage according to field requirement. The commutated D.C is passed through the outer stainless steel electrodes and the resulting potential difference is recorded by the inner electrodes.

The ratio of potential drop(ΔV) to the energized current(I) multiplied by schlumberger geometrical constant 'K' give the apparent resistivity, which is cumulative effect of the resistivities of different subsurface lithological units from the surface to the depth which the current penetrates. Apparent resistivity (ρ_a) is thus

$$\rho_a = K * (\Delta V) / I$$

Where,

ρ_a = Apparent resistivity in ohm-cm

ΔV = Potential difference millivolts

I = Current in milliamps

K = Geoelectric constant

Schlumberger configuration was used in the field to record resistivity measurement. Geometric factor 'K' for schlumberger array is calculated as:

$$K = \pi \frac{[(AB/2)^2 - (MN/2)^2]}{MN}$$

Where, AB= Distance between outer current electrodes.

MN = Distance between inner potential electrodes.



The depth for which resistivity measured, was controlled by varying the spacing between the electrodes. For depth scanning, the central point was fixed and the spacing of electrodes was gradually increased with a fixed distance interval horizontally. Thus, the depth of scanning was increased and apparent resistivity was obtained as function of depth.

INSTRUMENT USED:

The ABEM resistivity equipment was used for field measurements. The source of power to introduce current into the ground consisted of dry batteries. The copper coated steel electrodes and geo-reels with insulated copper were used during survey.



Fig: 4 ABEM Terrameter

The ABEM Terrameter is a microprocessor controlled direct current instrument (fig 2) which uses a single averaging system to obtain accurate readings without the need for high potentially dangerous power outputs. The output current is selected by a switch from one of a number of possible values. If the resistance between the current electrodes is too high from that current level to be maintained, a warning is given so that the next lower current setting can be tried. This gives good cancellation of any other potentials which may be present (self potential) within the ground or potentials due to electrochemical at the electrodes, provided these are constant or varying linearly with time. The result is displayed as the ratio of potential difference to current in ohms. Up to 64 cycles may be used. After each cycle is completed average of the number of cycles used is usually in the range 4 to 16. The averaging of number of cycles reduces error due to random electrical noise.

Stainless steel rods were used as electrodes. Electrodes spacing were measured by numbered marking on the current cables to reduce risk of gross error which can easily arise when survey tapes are used.



FIELD PROCEDURE

Electrical resistivity method is the most common geophysical techniques used for groundwater investigation which is also known as "Direct Current method". The purpose of the method is the determination of the subsurface resistivity contribution, by conducting measurements at the surface of the earth. To achieve this, electric current is inserted into the ground via two electrodes and the potential difference, which is caused by the inserted current, is measured in two other electrodes. The measured potential difference gives an image for the difficulty of the current flow through the subsurface. This is an indication of the electrical resistance of the subsurface.

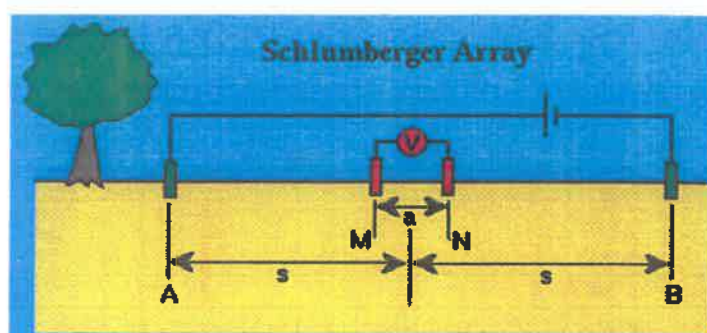


Fig: 3 Schlumberger electrode configuration

The observations were made by adopting the Schlumberger electrode configuration using Vertical Electrical Sounding technique. (Fig: 3). The current electrode spacing was increased in steps from 1.5 m to 200m. Observations were taken using the controlled current which was sent to earth between current electrodes, A & B, and Potential thus developed was measured between potential electrodes, M & N (Fig:3). The apparent resistivity values were calculated for each step and plotted on 2x3 cycle bi-logarithmic graph.

COMPUTER BASED EVALUATION OF FIELD CURVES

Apparent earth resistivity values are complex function of a number of parameters, i.e.,

- specific resistance/conductance,

Therefore, the field resistivity curves of the area give composite resistivity of the subsurface layers of different resistivities through which the current penetrated. In order to determine the thicknesses and the true resistivity values of the individual sub-surface layers, the field resistivity curves were modeled using specific software program.

MODELING OF FIELD RESISTIVITY CURVES

The resistivity field curves have been analyzed qualitatively by the empirical method in order to determine the possible number of subsurface lithological/geoelectrical layers, their tentative depth and the ranges of their approximate resistivity values (Wetzel & Mooney, 1956). This data was formatted for ASCII data file to be used in the modeling program.

RESULTS OF VERTICAL ELECTRICAL RESISTIVITY SOUNDING

The number of subsurface lithological layers, their true resistivity values and thickness have been computed through modeling process for field resistivity curve of the area and presented in Table-No. 1 The layer numbers are designated in ascending order from surface to the depth of investigation.

The trend of the resistivity field curves plotted for site indicates six geoelectric layers. The subsurface layers mainly consist of Loose Gravel and Alluvium then Sandstone, Limestone and Clay). The resistivity result shows that fresh to brackish water occurs in particular depths in the study area (Tables- 2-7).



The results of investigation for each site are presented as follows.

Table 2. Interpreted Geo-electric layers, ERS-01

Layer No.	From (m)	To (m)	Thickness (m)	Lithology
1	0	3	3	Alluvium
2	3	5	2	Limestone
3	5	8	3	Sand
4	8	15	7	Limestone
5	15	80	65	sand
6	80	120	40	clay
7	120	145	25	Limestone
8	145	160	15	clay
9	160	180	20	Sand
10	180	200	20	clay
11	200	250	50	silty sand

Table 3. Interpreted Geo-electric layers, ERS-02

Layer No.	From (m)	To (m)	Thickness (m)	Lithology
1	0	2.5	2.5	Alluvium
2	2.5	6	3.5	Limestone
3	6	9	3	Sand
4	9	17	8	Limestone
5	17	83	66	sand
6	83	115	32	clay
7	115	140	25	Limestone
8	140	165	25	clay
9	165	175	10	Sand
10	175	200	25	clay
11	200	250	50	silty sand



Table 4. Interpreted Geo-electric layers, ERS-03

Layer No.	From (m)	To (m)	Thickness (m)	Lithology
1	0	3.5	3.5	Alluvium
2	3.5	7	3.5	Limestone
3	7	12	5	Sand
4	12	19	7	Limestone
5	19	89	70	sand
6	89	122	33	clay
7	122	144	22	Limestone
8	144	170	26	clay
9	170	190	20	Sand
10	190	200	10	clay
11	200	250	50	silty sand

Table 5. Interpreted Geo-electric layers, ERS-04

Layer No.	From (m)	To (m)	Thickness (m)	Lithology
1	0	4	4	Alluvium
2	4	7.5	3.5	Limestone
3	7.5	15	7.5	Sand
4	15	20	5	Limestone
5	20	93	73	sand
6	93	130	37	clay
7	130	149	19	Limestone
8	149	173	24	clay
9	173	186	13	Sand
10	186	200	14	clay
11	200	250	50	silty sand



Table 6. Interpreted Geo-electric layers, ERS-05

Layer No.	From (m)	To (m)	Thickness(m)	Lithology
1	0	3	3	Alluvium
2	3	8	5	Limestone
3	8	14	6	Sand
4	14	19	5	Limestone
5	19	92	73	sand
6	92	132	40	clay
7	132	150	18	Limestone
8	150	171	21	clay
9	171	185	14	Sand
10	185	200	15	clay
11	200	250	50	silty sand

Table 7. Interpreted Geo-electric layers, ERS-06

Layer No.	From (m)	To (m)	Thickness(m)	Lithology
1	0	4.5	4.5	Alluvium
2	4.5	8	3.5	Limestone
3	8	16	8	Sand
4	16	21	5	Limestone
5	21	91	70	sand
6	91	128	37	clay
7	128	148	20	Limestone
8	148	172	24	clay
9	172	184	12	Sand
10	184	200	16	clay
11	200	250	50	silty sand



Table 7. Interpreted Geo-electric layers, ERS-07

Layer No.	From (m)	To (m)	Thickness(m)	Lithology
1	0	2	2	Alluvium
2	2	9	7	Limestone
3	9	15	6	Sand
4	15	23	8	Limestone
5	23	90	67	sand
6	90	125	35	clay
7	125	135	10	Limestone
8	135	171	36	clay
9	171	182	11	Sand
10	182	200	18	clay
11	200	250	50	silty sand

Table 7. Interpreted Geo-electric layers, ERS-08

Layer No.	From (m)	To (m)	Thickness(m)	Lithology
1	0	2	2	Alluvium
2	2	6.3	4.3	Limestone
3	6.3	16.7	10.4	Sand
4	16.7	19.4	2.7	Limestone
5	19.4	91.9	72.5	sand
6	91.9	133	41.1	clay
7	133	143	10	Limestone
8	143	173	30	clay
9	173	189	16	Sand
10	189	200	11	clay
11	200	250	50	silty sand



Table 7. Interpreted Geo-electric layers, ERS-09

Layer No.	From (m)	To (m)	Thickness(m)	Lithology
1	0	4.5	4.5	Alluvium
2	4.5	9	4.5	Limestone
3	9	16.5	7.5	Sand
4	16.5	22	5.5	Limestone
5	22	89	67	sand
6	89	132	43	clay
7	132	153	21	Limestone
8	153	165	12	clay
9	165	183	18	Sand
10	183	200	17	clay
11	200	250	50	silty sand

Table 7. Interpreted Geo-electric layers, ERS-10

Layer No.	From (m)	To (m)	Thickness(m)	Lithology
1	0	6	6	Alluvium
2	6	9	3	Limestone
3	9	20	11	Sand
4	20	25	5	Limestone
5	25	95	70	sand
6	95	110	15	clay
7	110	140	30	Limestone
8	140	172	32	clay
9	172	185	13	Sand
10	185	200	15	clay
11	200	250	50	silty sand



SAIMA CENTRE POINT MUHAMMAD ALI JINNAH ROAD SADDAR

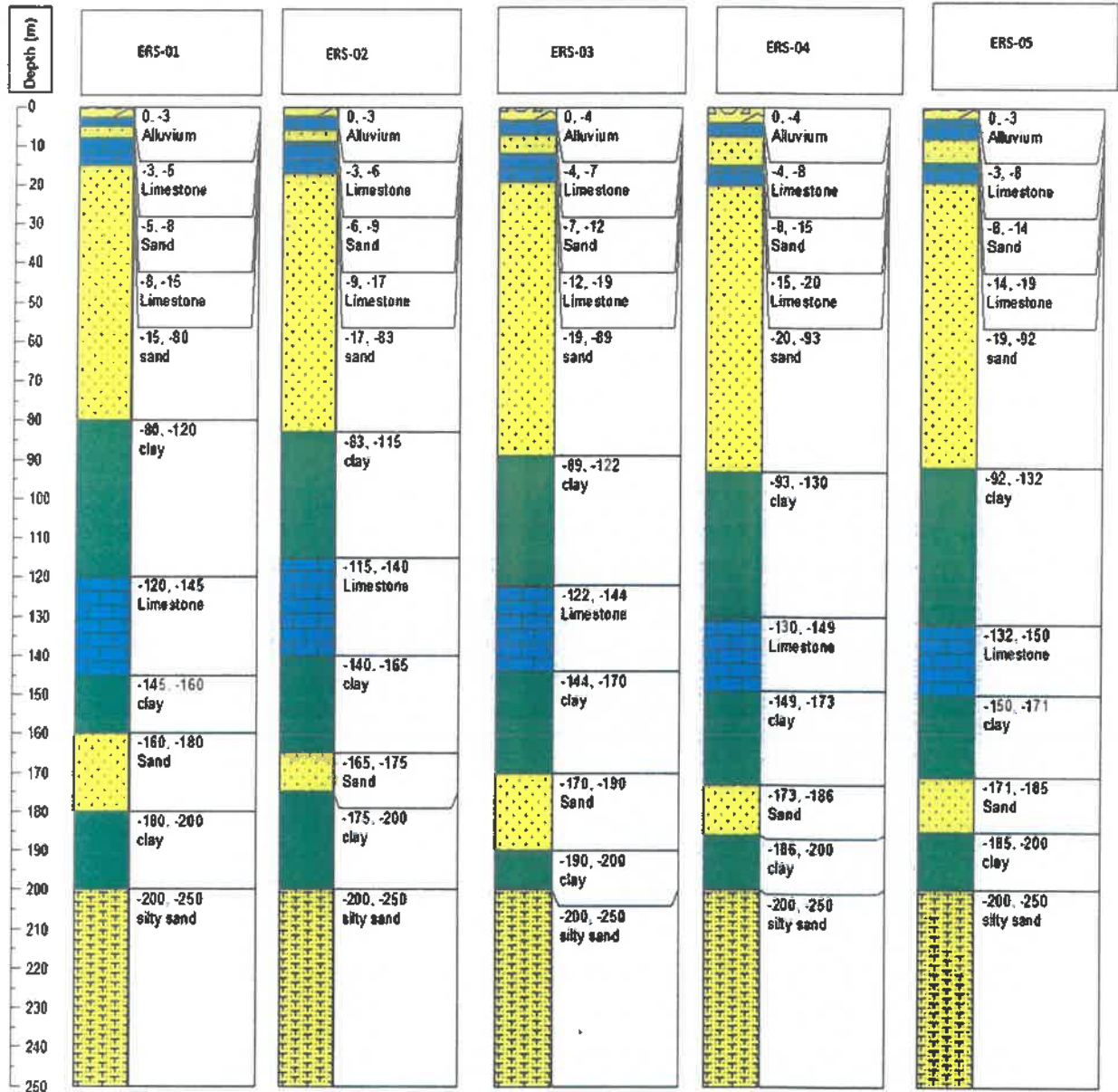


Fig:03: Shows Vertical column of survey area of ERS-01 to ERS-05.



SAIMA CENTRE POINT MUHAMMAD ALI JINNAH ROAD SADDAR

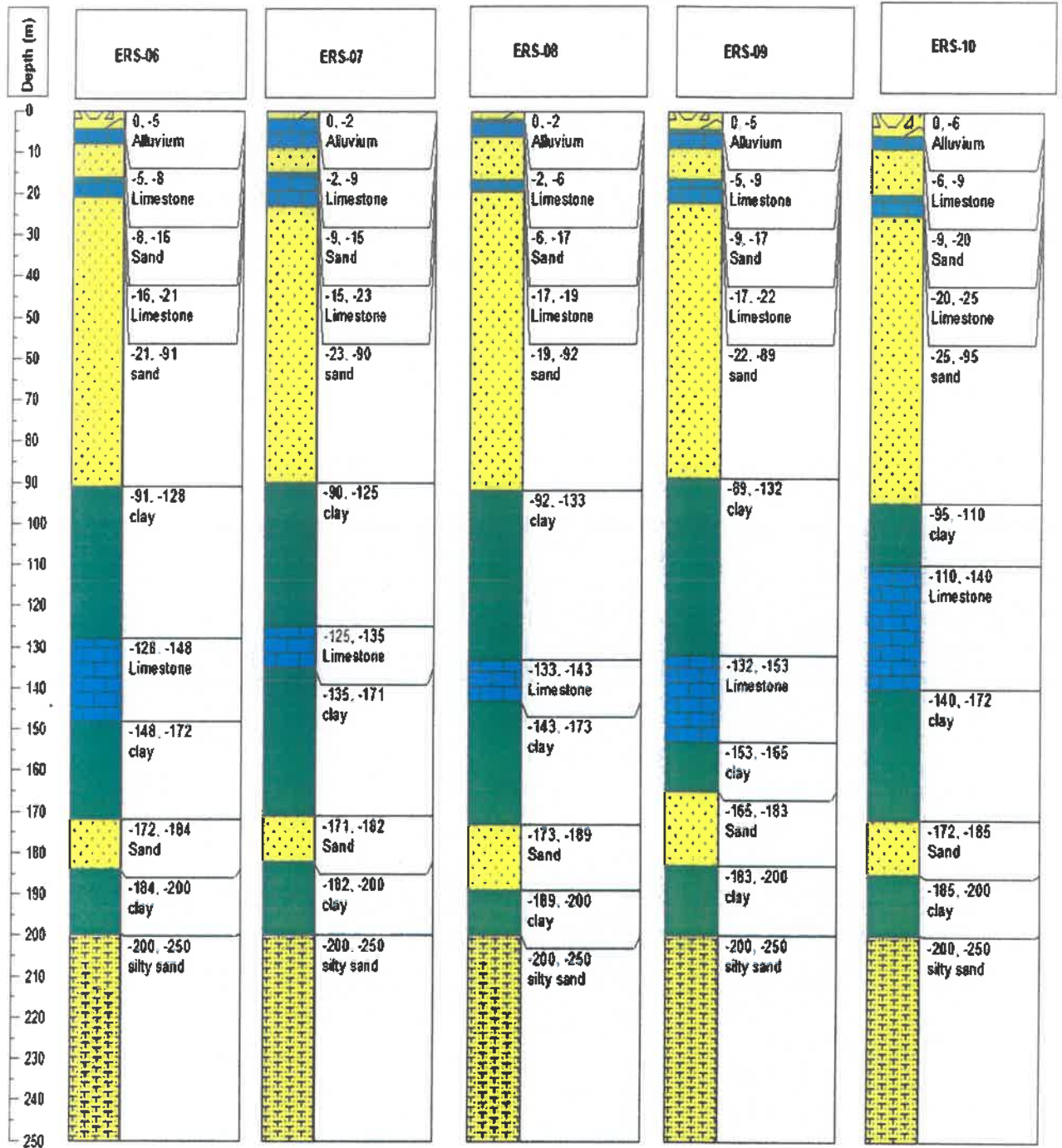


Fig:03: Shows Vertical column of survey area of ERS-06 to ERS-10.



CONCLUSIONS/RECOMMENDATIONS

The electrical resistivity survey conducted at *Saima Centre Point, M.A Jinnah Road, Saddar Karachi* successfully delineates the subsurface lithological succession and groundwater-bearing zones. The interpreted geo-electric sections confirm the presence of **mixed lithology dominated by Alluvium, Sand, Limestone, Silt, and Clay**, underlain by the **Gaj Formation and Manchar Formation**, which are recognized aquifer-bearing geological units in the Karachi region.

The resistivity signatures from all surveyed ERS locations consistently indicate the presence of **Fresh to Brackish groundwater**, generally associated with medium to high-resistivity sandy-limestone and fractured sandstone zones. **These aquifer horizons are encountered predominantly between 800 to 1000 ft, where the geological conditions become more favorable for sustainable groundwater yield.**

The overall subsurface environment reflects **moderate to strong groundwater potential**, supported by laterally continuous sand and sandy-limestone beds, overlain by alternating layers of silt and clay acting as semi-confined to confined aquifer systems.

RECOMMENDATIONS

1. Test Borehole Installation

- A test borehole of 800–1000 ft depth is strongly recommended to penetrate the main aquifer zone of the Gaj/Manchar Formation.
- **Expected discharge: Up to 80-100 US gpm**, subject to lithology encountered during drilling.

2. Geophysical Logging (Mandatory)

- Conduct **Natural Gamma Log and Resistivity Log** after drilling to accurately identify aquifer depth, thickness, and quality.
- Logging is essential to design the well screen positions and casing assembly.

3. Well Design & Supervision

- Tube-well design should be prepared by a qualified **Hydrogeologist or Geophysical Consultant**.
- Ensure proper installation of **casing, gravel pack, and sanitary sealing**.

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4. Professional Drilling Contractor

- Engage an experienced groundwater drilling contractor with the capability to drill up to 1000 ft safely and accurately.

5. Water Quality Testing

- Collect samples immediately after test pumping.
- Test according to **WHO standards / APHA (22nd Edition)** to confirm suitability for drinking, domestic, or irrigation use.

6. Aquifer Yield Verification

- Actual water yield, recharge rate, and drawdown characteristics should be determined by:
 - **Step-drawdown test**
 - **Constant-rate pumping test (8–24 hours)**
- These tests will validate sustainable yield for long-term usage.

7. Future Monitoring

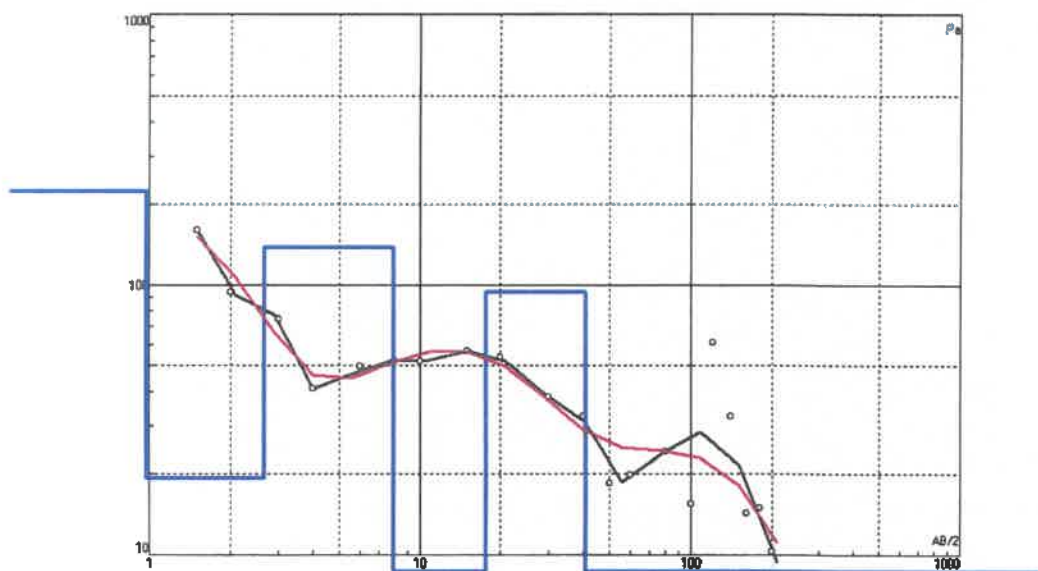
- Maintain periodic monitoring of water level and quality at least **twice a year** to assess aquifer sustainability and salinity variations.

Ammed Fay



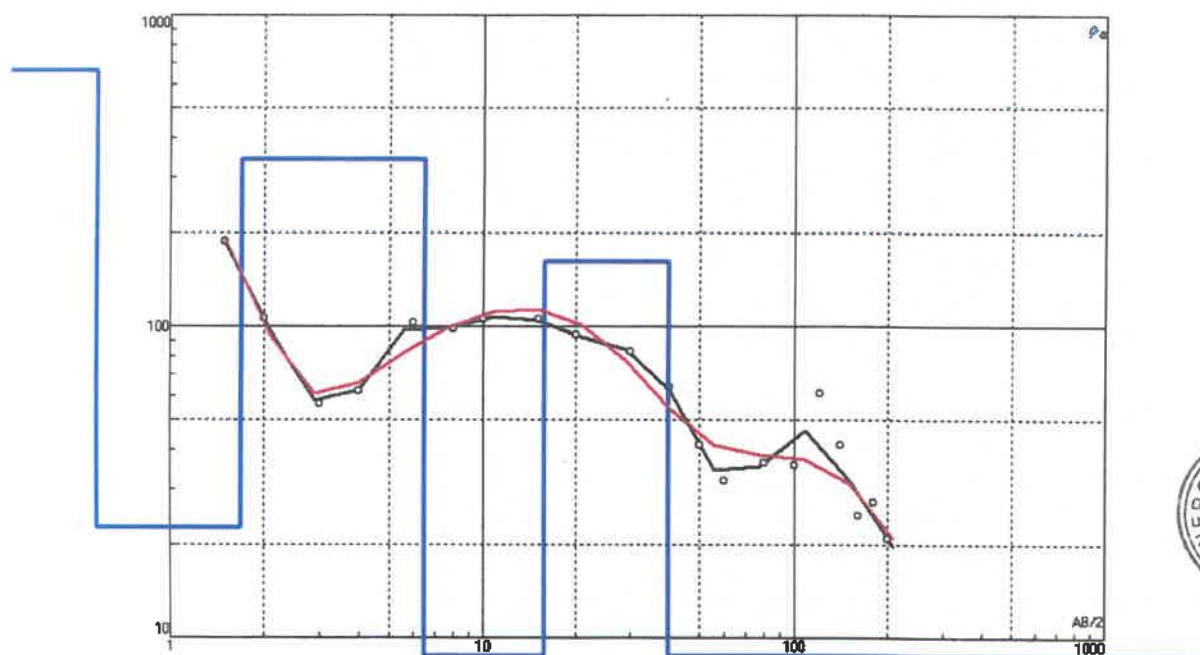
Electrical Resistivity Field Data, ER-01

AB/2(m)	MN/2(m)	constant	Resistance	Resistivity
1.50	1.00	6.28	16.82	105.71
2.00	1.00	11.78	5.27	62.14
3.00	1.00	27.49	1.80	49.45
4.00	1.00	49.48	0.55	27.13
4.00	2.00	23.56	2.36	55.69
6.00	2.00	54.98	1.23	67.47
8.00	2.00	98.96	0.71	70.27
10.00	2.00	155.51	0.45	70.09
15.00	4.00	173.57	0.44	76.61
20.00	4.00	311.02	0.23	72.78
20.00	10.00	117.81	0.71	83.15
30.00	10.00	274.89	0.22	59.41
40.00	10.00	494.80	0.10	50.40
50.00	10.00	777.54	0.04	28.63
50.00	20.00	376.99	0.05	18.49
60.00	20.00	549.78	0.04	19.85
80.00	20.00	989.60	0.02	24.01
100.00	20.00	1555.00	0.01	15.39
120.00	30.00	1484.00	0.04	60.84
140.00	30.00	2029.00	0.02	32.46
160.00	30.00	1293.00	0.01	14.22
180.00	30.00	1649.00	0.01	14.84
200.00	30.00	2047.00	0.01	10.24



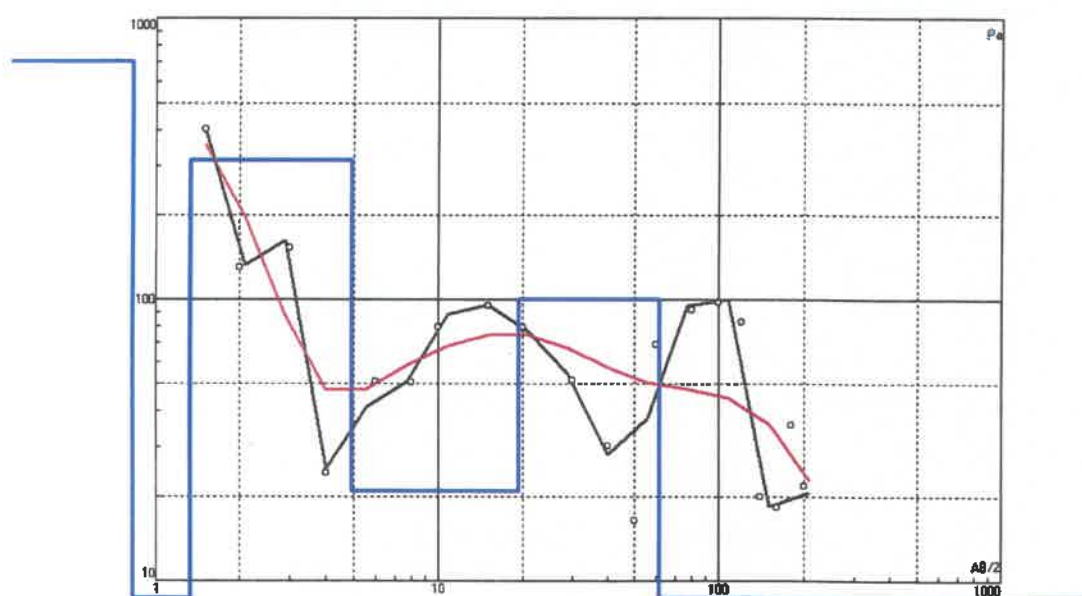
Electrical Resistivity Field Data, ER-02

AB/2(m)	MN/2(m)	constant	Resistance	Resistivity
1.50	1.00	6.28	29.96	188.23
2.00	1.00	11.78	9.01	106.11
3.00	1.00	27.49	2.05	56.37
4.00	1.00	49.48	1.25	61.92
6.00	2.00	23.56	4.37	103.01
8.00	2.00	54.98	1.78	98.04
10.00	2.00	98.96	1.06	105.07
15.00	2.00	155.51	0.68	105.07
20.00	4.00	173.57	0.54	93.78
30.00	4.00	311.02	0.27	82.88
40.00	10.00	117.81	0.54	63.47
50.00	10.00	274.89	0.15	41.70
60.00	10.00	494.80	0.06	31.78
80.00	10.00	777.54	0.05	36.50
100.00	20.00	376.99	0.09	35.78
120.00	20.00	549.78	0.11	60.84
140.00	20.00	989.60	0.04	41.50
160.00	20.00	1555.00	0.02	24.58
180.00	30.00	1484.00	0.02	27.13
200.00	30.00	2029.00	0.01	20.78



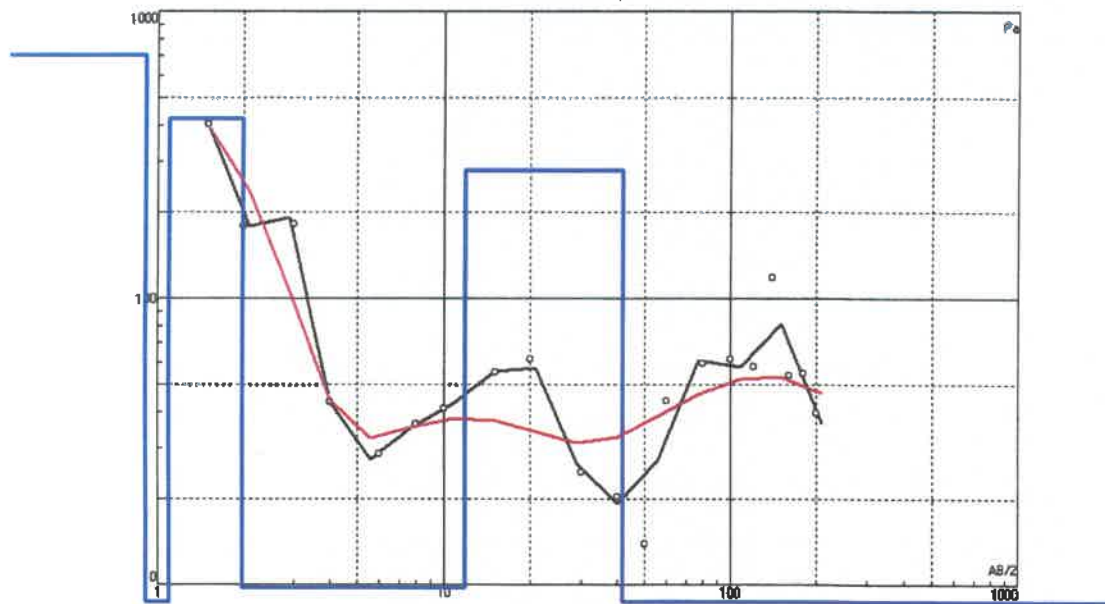
Electrical Resistivity Field Data, ER-03

AB/2(m)	MN/2(m)	constant	Resistance	Resistivity
1.50	1.00	6.28	64.75	406.87
2.00	1.00	11.78	11.08	130.58
3.00	1.00	27.49	5.56	152.95
4.00	1.00	49.48	0.49	24.34
6.00	2.00	23.56	2.17	51.07
8.00	2.00	54.98	0.92	50.57
10.00	2.00	98.96	0.81	79.67
15.00	2.00	155.51	0.61	95.18
20.00	4.00	173.57	0.46	79.67
30.00	4.00	311.02	0.17	51.58
40.00	10.00	117.81	0.26	30.25
50.00	10.00	274.89	0.06	16.47
60.00	10.00	494.80	0.14	68.69
80.00	10.00	777.54	0.12	91.49
100.00	20.00	376.99	0.26	97.08
120.00	20.00	549.78	0.15	82.88
140.00	20.00	989.60	0.02	19.97
160.00	20.00	1555.00	0.01	18.27
180.00	30.00	1484.00	0.02	35.78
200.00	30.00	2029.00	0.01	21.83



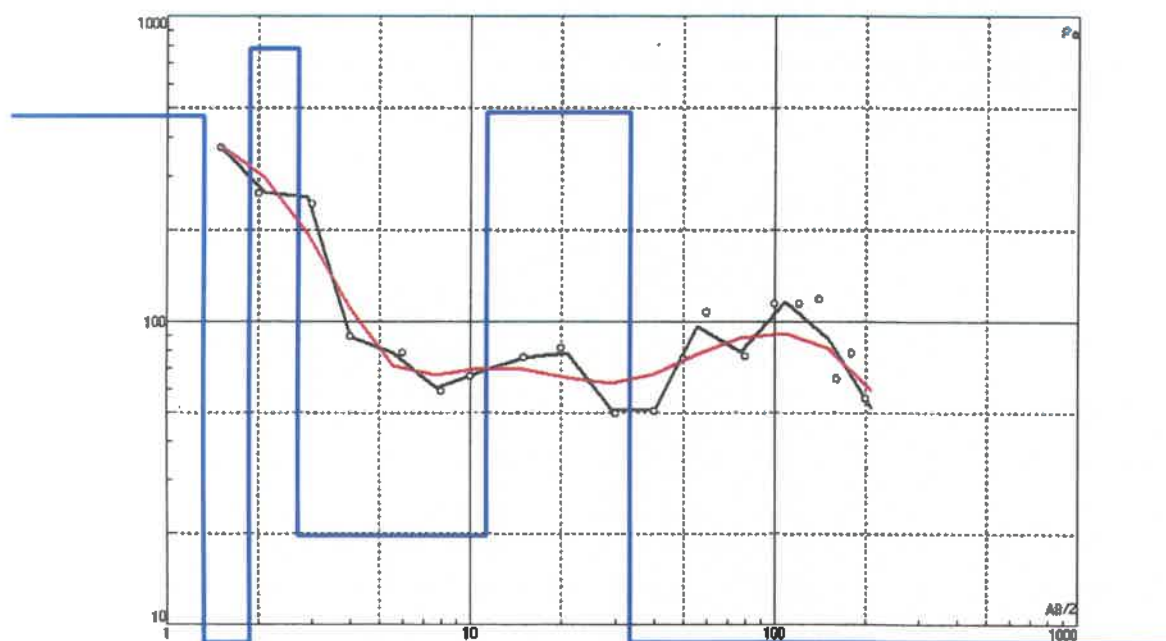
Electrical Resistivity Field Data, ER-04

AB/2(m)	MN/2(m)	constant	Resistance	Resistivity
1.50	1.00	6.28	64.75	406.87
2.00	1.00	11.78	15.06	177.39
3.00	1.00	27.49	6.58	180.93
4.00	1.00	49.48	0.88	43.39
6.00	2.00	23.56	1.22	28.79
8.00	2.00	54.98	0.66	36.50
10.00	2.00	98.96	0.42	41.09
15.00	2.00	155.51	0.36	55.27
20.00	4.00	173.57	0.36	61.62
30.00	4.00	311.02	0.08	24.58
40.00	10.00	117.81	0.17	20.37
50.00	10.00	274.89	0.05	13.92
60.00	10.00	494.80	0.09	44.03
80.00	10.00	777.54	0.08	59.23
100.00	20.00	376.99	0.16	61.62
120.00	20.00	549.78	0.10	57.50
140.00	20.00	989.60	0.12	118.30
160.00	20.00	1555.00	0.03	53.66
180.00	30.00	1484.00	0.04	54.73
200.00	30.00	2029.00	0.02	39.89



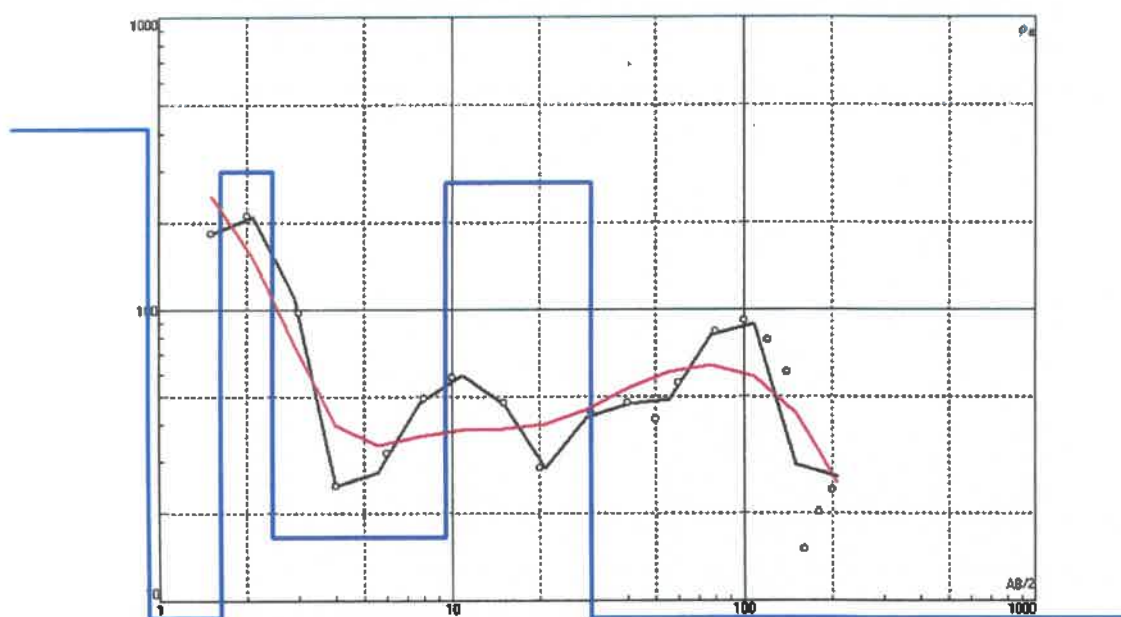
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AB/2(m)	MN/2(m)	constant	Resistance	Resistivity
1.50	1.00	6.28	59.24	372.24
2.00	1.00	11.78	22.36	263.40
3.00	1.00	27.49	8.85	243.37
4.00	1.00	49.48	1.80	88.82
6.00	2.00	23.56	3.35	78.89
8.00	2.00	54.98	1.07	58.65
10.00	2.00	98.96	0.67	66.03
15.00	2.00	155.51	0.49	75.83
20.00	4.00	173.57	0.47	81.26
30.00	4.00	311.02	0.16	49.58
40.00	10.00	117.81	0.43	50.57
50.00	10.00	274.89	0.27	75.08
60.00	10.00	494.80	0.22	107.16
80.00	10.00	777.54	0.10	76.58
100.00	20.00	376.99	0.30	113.71
120.00	20.00	549.78	0.21	113.71
140.00	20.00	989.60	0.12	118.30
160.00	20.00	1555.00	0.04	64.74
180.00	30.00	1484.00	0.05	78.89
200.00	30.00	2029.00	0.03	55.82



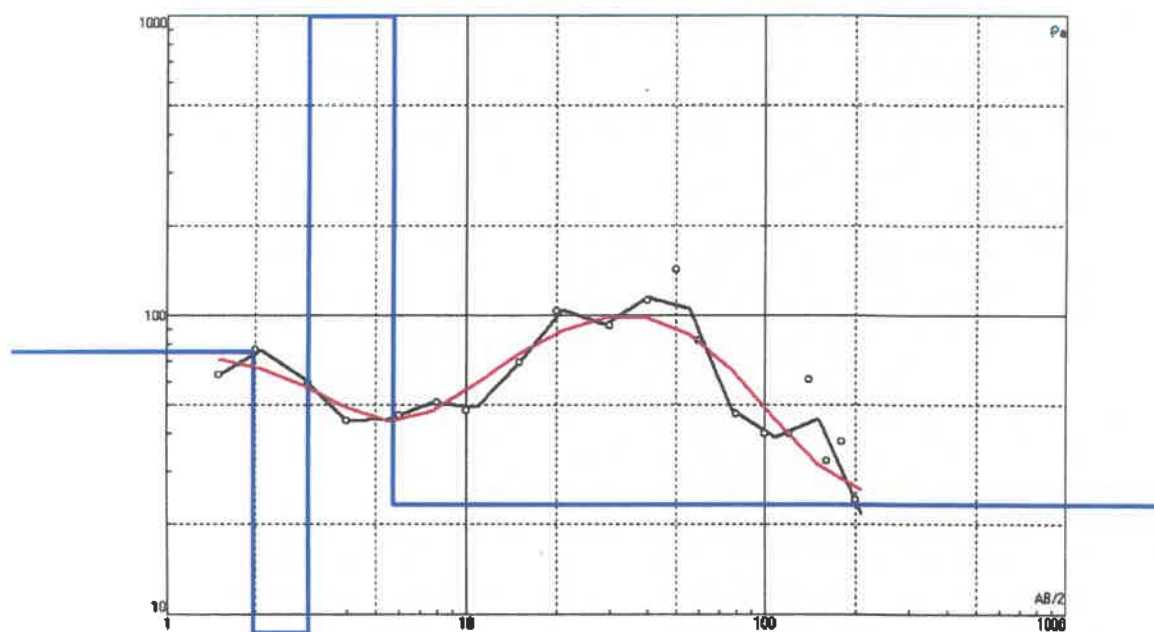
Electrical Resistivity Field Data, ER-06

AB/2(m)	MN/2(m)	constant	Resistance	Resistivity
1.50	1.00	6.28	29.08	182.73
2.00	1.00	11.78	17.81	209.84
3.00	1.00	27.49	3.53	97.08
4.00	1.00	49.48	0.50	24.58
6.00	2.00	23.56	1.35	31.78
8.00	2.00	54.98	0.89	49.09
10.00	2.00	98.96	0.59	58.07
15.00	2.00	155.51	0.31	47.66
20.00	4.00	173.57	0.16	28.37
30.00	4.00	311.02	0.14	44.47
40.00	10.00	117.81	0.40	47.66
50.00	10.00	274.89	0.15	42.12
60.00	10.00	494.80	0.11	55.82
80.00	10.00	777.54	0.11	83.71
100.00	20.00	376.99	0.24	91.49
120.00	20.00	549.78	0.14	78.89
140.00	20.00	989.60	0.06	61.01
160.00	20.00	1555.00	0.01	15.00
180.00	30.00	1484.00	0.01	20.17
200.00	30.00	2029.00	0.01	24.10



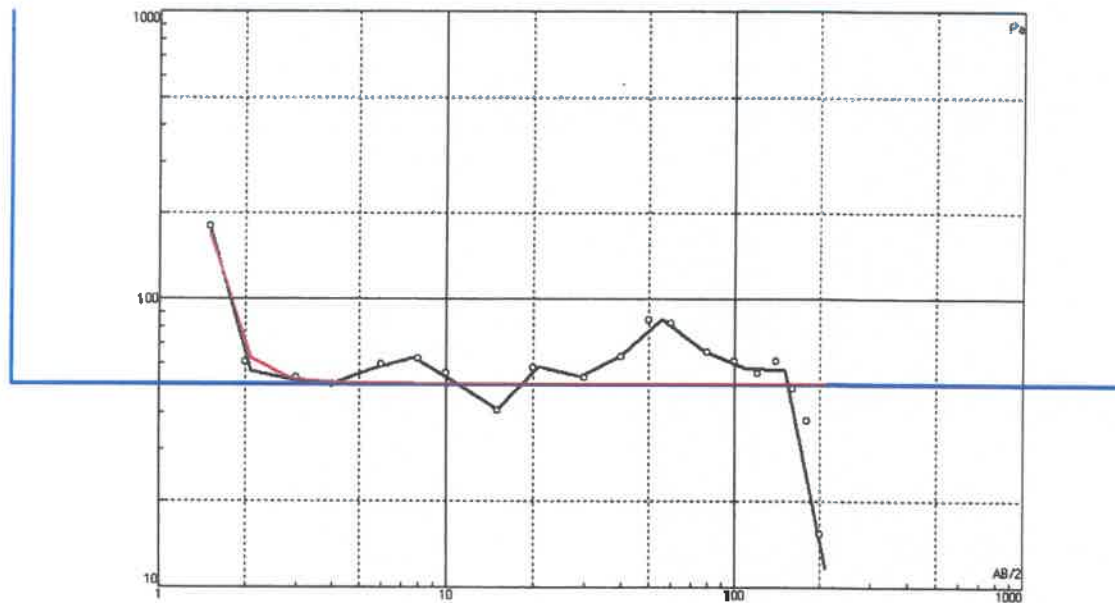
Electrical Resistivity Field Data, ER-07

AB/2(m)	MN/2(m)	constant	Resistance	Resistivity
1.50	1.00	6.28	10.00	62.85
2.00	1.00	11.78	6.50	76.58
3.00	1.00	27.49	2.15	59.06
4.00	1.00	49.48	0.90	44.39
6.00	2.00	23.56	1.97	46.42
8.00	2.00	54.98	0.93	51.20
10.00	2.00	98.96	0.49	48.13
15.00	2.00	155.51	0.45	69.38
20.00	4.00	173.57	0.60	104.03
30.00	4.00	311.02	0.30	92.40
40.00	10.00	117.81	0.96	112.59
50.00	10.00	274.89	0.52	142.13
60.00	10.00	494.80	0.17	82.07
80.00	10.00	777.54	0.06	46.72
100.00	20.00	376.99	0.11	40.29
120.00	20.00	549.78	0.07	40.29
140.00	20.00	989.60	0.06	61.01
160.00	20.00	1555.00	0.02	32.41
180.00	30.00	1484.00	0.03	37.59
200.00	30.00	2029.00	0.01	24.10



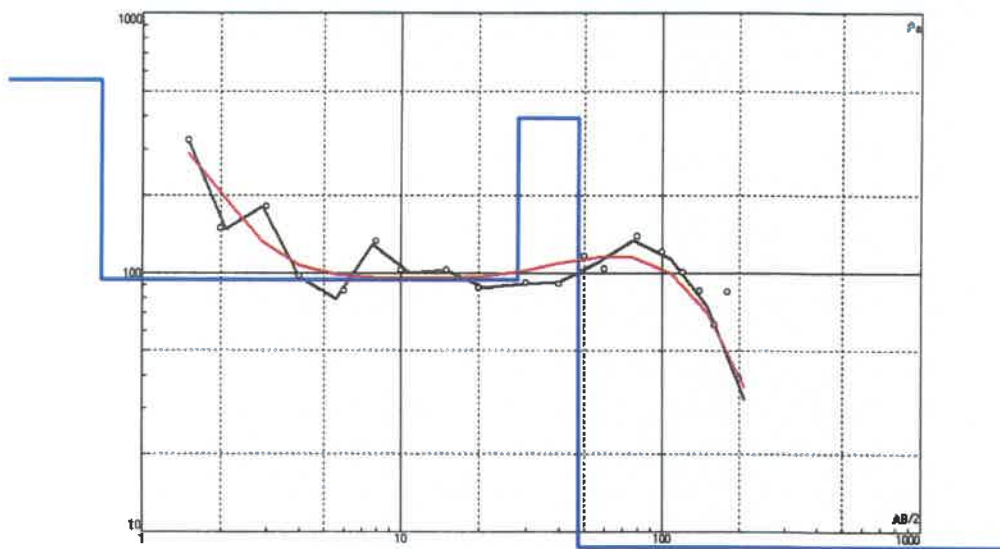
Electrical Resistivity Field Data, ER-08

AB/2(m)	MN/2(m)	constant	Resistance	Resistivity
1.50	1.00	6.28	28.43	178.63
2.00	1.00	11.78	5.13	60.41
3.00	1.00	27.49	1.93	53.13
4.00	1.00	49.48	1.02	50.57
6.00	2.00	23.56	2.51	59.23
8.00	2.00	54.98	1.13	62.23
10.00	2.00	98.96	0.56	55.27
15.00	2.00	155.51	0.26	40.96
20.00	4.00	173.57	0.33	57.50
30.00	4.00	311.02	0.17	53.13
40.00	10.00	117.81	0.53	62.85
50.00	10.00	274.89	0.31	84.54
60.00	10.00	494.80	0.17	82.07
80.00	10.00	777.54	0.08	65.16
100.00	20.00	376.99	0.16	60.67
120.00	20.00	549.78	0.10	55.49
140.00	20.00	989.60	0.06	61.01
160.00	20.00	1555.00	0.03	48.97
180.00	30.00	1484.00	0.03	37.59
200.00	30.00	2029.00	0.01	15.35



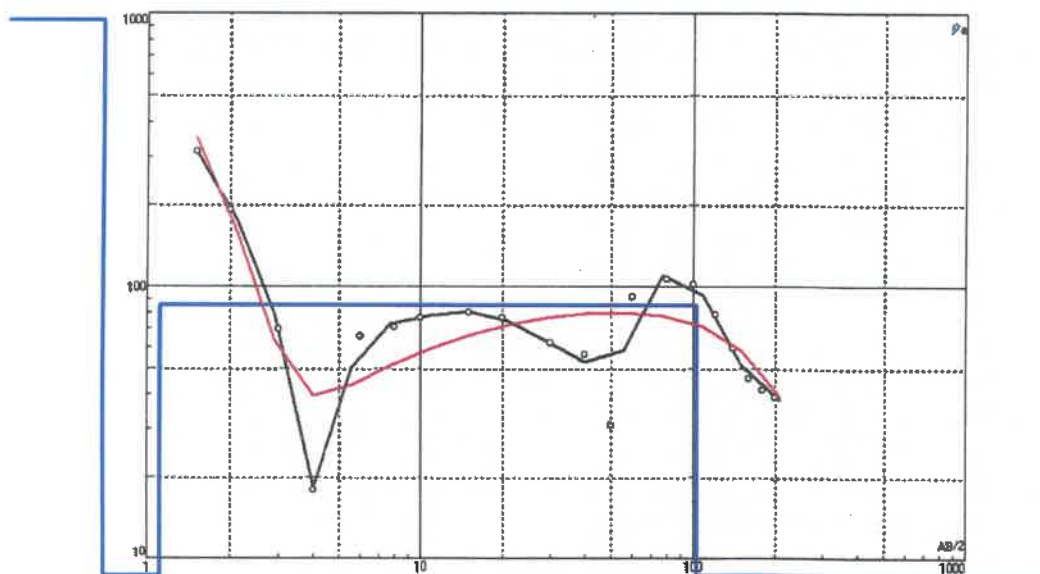
Electrical Resistivity Field Data, ER-09

AB/2(m)	MN/2(m)	constant	Resistance	Resistivity
1.50	1.00	6.28	51.59	324.15
2.00	1.00	11.78	12.60	148.48
3.00	1.00	27.49	6.58	180.93
4.00	1.00	49.48	1.96	97.08
6.00	2.00	23.56	3.62	85.38
8.00	2.00	54.98	2.42	133.19
10.00	2.00	98.96	1.04	103.01
15.00	2.00	155.51	0.66	103.01
20.00	4.00	173.57	0.51	87.95
30.00	4.00	311.02	0.29	91.49
40.00	10.00	117.81	0.77	90.59
50.00	10.00	274.89	0.42	116.55
60.00	10.00	494.80	0.21	104.03
80.00	10.00	777.54	0.18	138.56
100.00	20.00	376.99	0.32	120.66
120.00	20.00	549.78	0.18	100.99
140.00	20.00	989.60	0.09	85.38
160.00	20.00	1555.00	0.04	62.85
180.00	30.00	1484.00	0.06	84.54
200.00	30.00	2029.00	0.02	39.11



Electrical Resistivity Field Data, ER-10

AB/2(m)	MN/2(m)	constant	Resistance	Resistivity
1.50	1.00	6.28	29.08	182.73
2.00	1.00	11.78	17.81	209.84
3.00	1.00	27.49	3.53	97.08
4.00	1.00	49.48	0.50	24.58
6.00	2.00	23.56	1.35	31.78
8.00	2.00	54.98	0.89	49.09
10.00	2.00	98.96	0.59	58.07
15.00	2.00	155.51	0.31	47.66
20.00	4.00	173.57	0.16	28.37
30.00	4.00	311.02	0.14	44.47
40.00	10.00	117.81	0.40	47.66
50.00	10.00	274.89	0.15	42.12
60.00	10.00	494.80	0.11	55.82
80.00	10.00	777.54	0.11	83.71
100.00	20.00	376.99	0.24	91.49
120.00	20.00	549.78	0.14	78.89
140.00	20.00	989.60	0.06	61.01
160.00	20.00	1555.00	0.01	15.00
180.00	30.00	1484.00	0.01	20.17
200.00	30.00	2029.00	0.01	24.10



REFERENCES

Ahmed. A., Shuja, T.A., Kazmi, A.H., 1985,

"Final interpretation on groundwater resources of Thano Bula, Kalu Khuhar, Upper Malir and Gadap Basins; Dadu, Thatta and Karachi District, Sindh, Pakistan: GSP Mem.Vol.XV-Part-1"

Zaigham, N. A., 1985,

"Earth Resistivity measurements to explore groundwater potential in Kalu Khuhar and Upper Malir Basin, Dadu-Karachi-Thatta Districts, Sindh, Pakistan, GSP Mem.Vol.XV-Part-3"

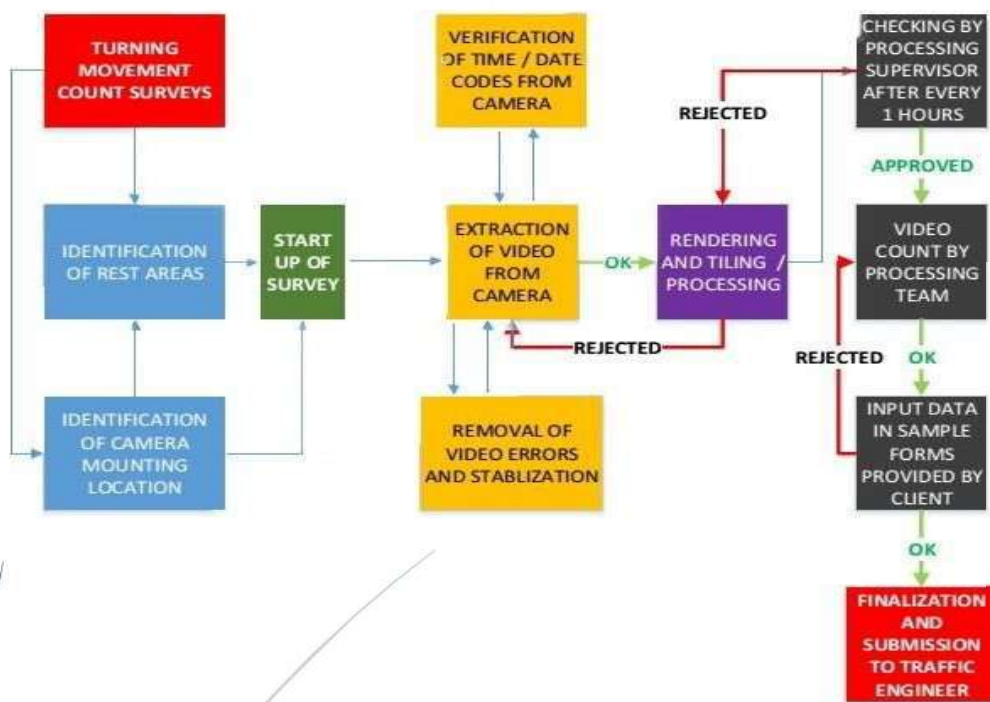
Zaigham, N. A., and Naqvi, S.W.H., 1993

"Electrical Resistivity Survey for exploration of groundwater potential in Orangi Area and Reconnaissance Electric Soundings in Band Murad Khan Valley, Karachi District, Pakistan: GSP IR No 293"

A.A.R Zohdy, G.P Eaton,

Application of Surface Geophysics to Ground Water Investigation





TRAFFIC MANAGEMENT PLAN

SAIMA CENTER POINT

Phase I & Phase II



EHS Services

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Traffic Management Plan

SAIMA CENTER POINT
Phase I & Phase II

Inception Report
December 2025



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Traffic Management Plan

***SAIMA CENTER POINT
Phase I & Phase II***

Draft Report

Date:
December 2025

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Executive Summary

This Traffic Management Plan (TMP) provides a detailed assessment of the trip generation, parking adequacy, circulation design, and access operations for a two-phase mixed-use project Saima Center Point located on Main M.A. Jinnah Road, a primary arterial corridor. The combined project integrates 3,888 residential units, 478,978.72 sq.ft of retail and showroom area, and extensive multi-level parking infrastructure.

The PM peak hour is identified as the critical analysis period due to high residential inbound flows and strong retail activity. Combined PM peak trips reach 5,325 vehicles/hour, which required high level of mitigations in order to run traffic smoothly.

All parking requirements for both phases are not only met but exceeded, ensuring no external parking spillover. The development's internal circulation, ramp configurations, and access design support efficient flow during peak and non-peak periods.

The TMP concludes that with the recommended lane provisions, queue storage, signage, and operational controls, both phases can function efficiently without adverse impacts on the surrounding road network.

1. Introduction

1.1 Project Background and Significance

The development is positioned along Main M.A. Jinnah Road, a major arterial supporting diverse traffic including private cars, motorcycles, public transport, and commercial vehicles. The corridor is known for consistent daytime congestion, high retail activity, and dense mixed-use development.

Given the scale of this project—thousands of residential units and nearly half a million square feet of commercial space—traffic planning is essential to ensure safe and efficient movement throughout construction and operation.



While these developments bring economic benefits and improve accessibility for residents, they also have significant implications for traffic and parking. These developments generally generate trips in morning and evening peak, including private vehicles, motorcycles, taxis, delivery vans, and pedestrians. The concentration of these trips during peak hours can create congestion on surrounding roads, increase parking demand, and influence the overall circulation of the area.

Traffic Management Plan (TMP) plays a vital role in assessing these effects. It provides decision makers, developers, and local authorities with a structured analysis of how a new development will influence existing transportation systems. By identifying potential issues such as traffic circulation, parking shortages, and safety concerns, the study ensures that necessary measures, such as improved access, or traffic management strategies, can be incorporated into the project design.

The significance of this study lies in its ability to balance residential and commercial growth with urban mobility. Development must remain accessible to their users while ensuring that the surrounding community is not negatively impacted by excessive traffic or unsafe conditions. A well-prepared TMP not only supports sustainable urban development but also promotes a safer and more efficient travel environment for all road users.

1.2 Objectives and Scope of Study

1.2.1 Objective

The primary objective of this study is to evaluate the capacity of the facility to bear the impact generated and attracted by the proposed development Saima Center Point, with particular focus on its effect on the operational performance of the surrounding roadway network. The study is intended to provide a clear understanding of how the development will influence existing traffic conditions and to recommend measures that ensure safe and efficient movement of people and vehicles.

Specifically, the study seeks to:

- Assess the additional trip generation and attraction.
- Analyze the distribution of trips within the surrounding road network, reflecting realistic traffic circulation patterns.
- Ensure efficient vehicular circulation within the project boundaries.
- Establish safe and seamless access and egress arrangements between the development and the adjacent roadway system.
- Identify necessary improvements and mitigation measures to adequately accommodate the anticipated traffic demand without causing undue strain on the surrounding urban environment.

1.2.2 Scope of the Study

To achieve these objectives, the study has been structured around the following major components:

1.2.2.1 Trip Generation and Attraction

- Estimation of trips generated and attracted by the proposed development, supported by similar traffic studies.
- Trip distribution analysis based on observed circulation patterns in the vicinity.
- PM peak analysis

1.2.2.2 Entry and Exit Analysis

- Evaluation of the existing roadway and intersection circulation patterns surrounding the project site, with specific attention to M.A. Jinnah Road and connecting links.
- Assessment of the project's proposed access and egress points, considering traffic demand, turning movements, and safety requirements.
- Identification of potential bottlenecks, conflicts, and spillover parking risks associated with the project's operation.

- Development of traffic management and mitigation measures, including recommendations for circulation improvements, parking supply adequacy, and demand-control strategies within the project's influence area.

1.2.2.3 Parking and On-Site Circulation

- Assessment of the adequacy of on-site parking within the Development.
- Review of internal circulation patterns to ensure smooth vehicle flow, minimize conflicts, and maintain safe pedestrian movement.

2. Project Understanding

2.1 Site Location

The proposed development is located on main M.A. Jinnah Road, adjacent to Numaish Chowranghi underpass in Karachi. The site lies in dense urban district with strong institutional, commercial, and residential significance. Its placement provides excellent accessibility for a wide commuter base, but it also situates the project in an area that is already characterized by high traffic volumes and mixed land-use activity.

The site benefits from frontage on M.A. Jinnah Road, which serves as a key urban link connecting various residential and commercial hubs. The surrounding road network consists of multiple approach roads that converge near the site, creating a complex traffic circulation environment. The project's central position enhances its potential but simultaneously introduces challenges related to traffic congestion, parking demand, and circulation efficiency.

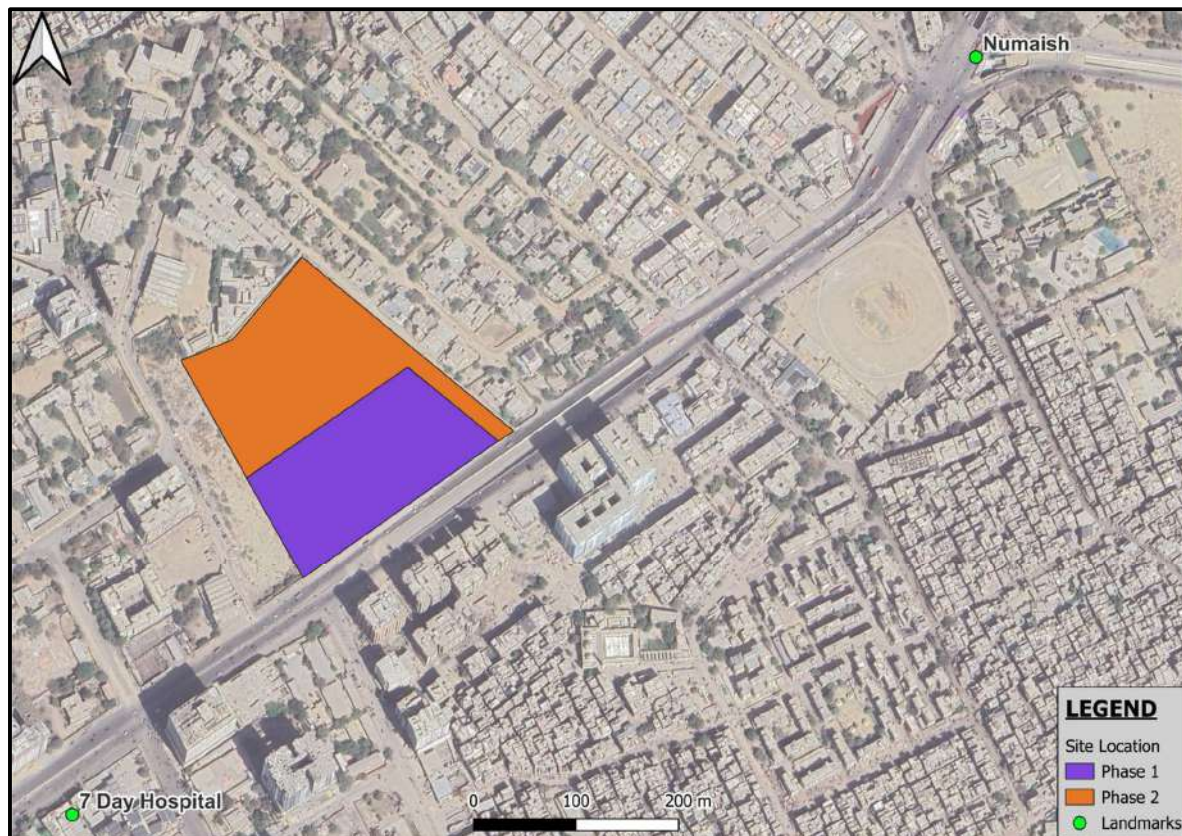


Figure 1 : Site Location

2.1.1 Accessibility

The project site is accessible via multiple approach roads feeding into M.A. Jinnah Road, making it reachable from different directions of the city. However, this also means that traffic flows are highly interwoven with existing congestion points, particularly during peak hours. In addition, the site's central location near Numaish Chowrangi underpass intensifies the importance of carefully designed access and egress provisions to avoid conflicts with background traffic.

In summary, while the site's location provides a strategic advantage for both residential and commercial viability, it also makes traffic management and parking provision critical considerations. A detailed understanding of the existing road network, circulation patterns, and adjacent land uses is therefore essential to accurately evaluate the project's impact and to propose suitable mitigation measures.

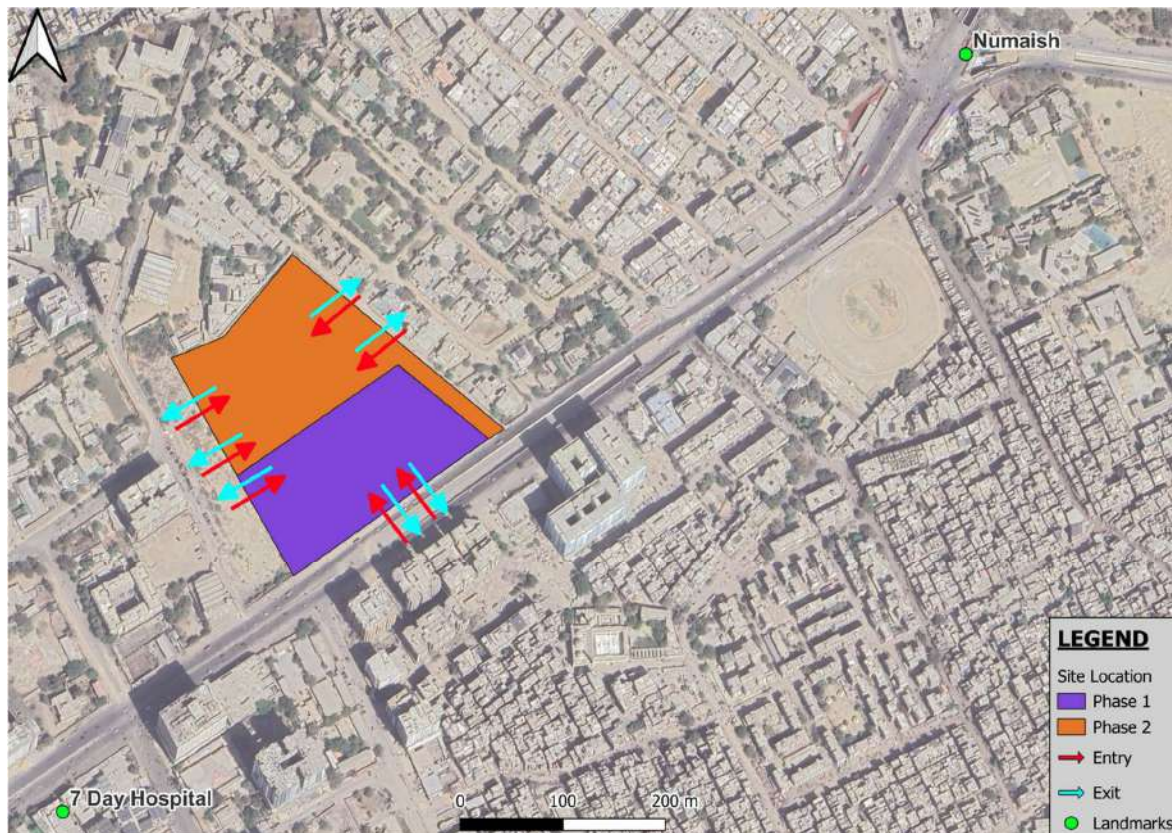


Figure 2 : Entry and Exit

2.1.2 Existing Road Network

The project site is situated within a complex urban traffic environment. The surrounding road network comprises a mix of arterial and collector roads, each

serving distinct functions while also accommodating high daily traffic volumes. Main M.A. Jinnah Road carries substantial two-way traffic with commercial frontage on both sides.

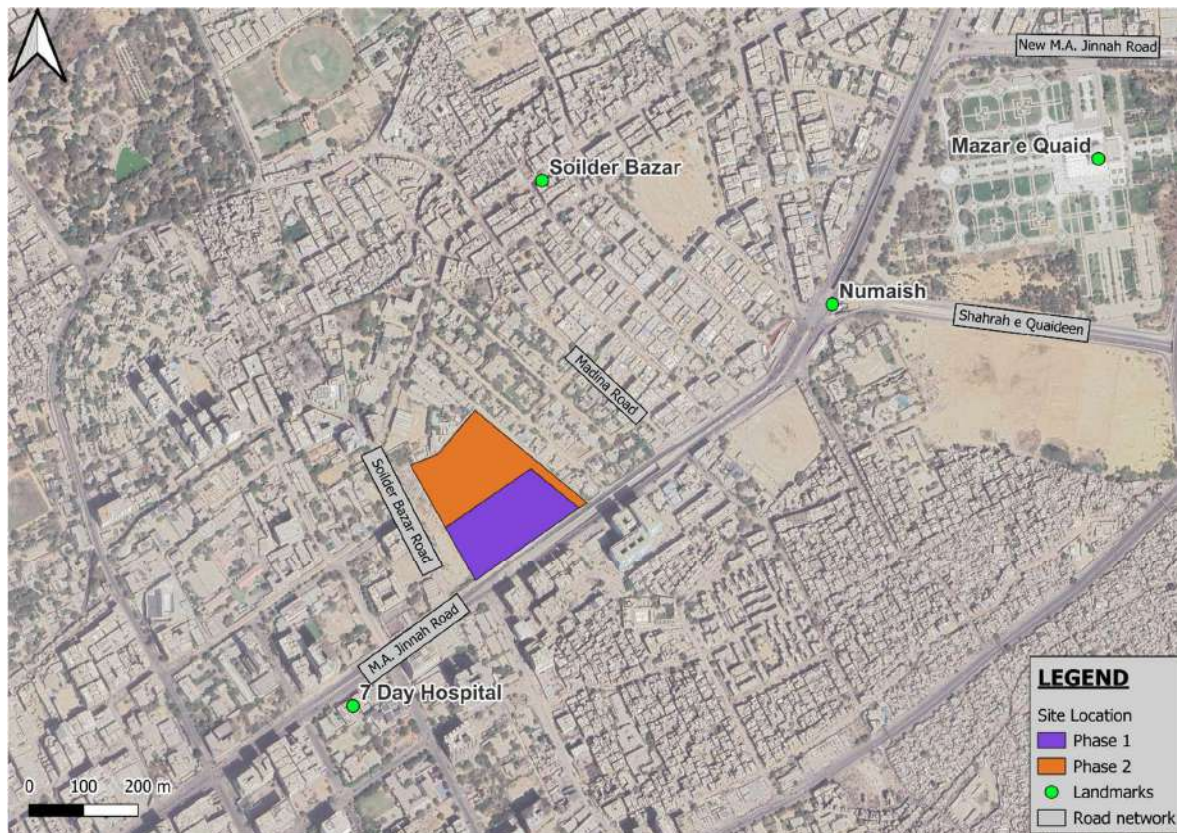


Figure 3 : Road Network

2.1.3 Traffic Characteristics

- **Peak Periods:**
 - Evening (6:00–7:00 PM) peak is more critical in this scenario.
- **Modal Composition:** All types of modes consist of cars and motorcycles public transport, and taxis/rideshare services will be intersecting the location with a smaller proportion of heavy traffic.
- **Operational Constraints:** limited lane availability, and other ongoing mega projects will contribute to recurring bottlenecks.

3. Study Methodology

This chapter describes the methodological framework adopted for the preparation of this Traffic Management Plan. The methodology is structured around internationally recognized traffic engineering standards and local practice and is applied consistently across all analytical components of the study.

Reference	Application in This Study
JICA Karachi Transportation Improvement Project (KTIP), Final Report, 2012	Base year (2010) traffic volumes, travel demand forecasts, traffic growth rate derivation
ITE Trip Generation Manual, 11 th Edition (Institute of Transportation Engineers)	Trip generation rates for residential and retail land uses
Highway Capacity Manual (HCM), 7 th Edition (Transportation Research Board)	Level of Service definitions, capacity values, intersection analysis methodology
Pakistan Bureau of Statistics — Census 2023	Population growth rates for Karachi; upper bound for traffic demand growth
Karachi Building & Town Planning Regulations	Parking demand standards and access design requirements
AASHTO Policy on Geometric Design of Highways and Streets (Green Book)	Driveway geometry, sight distance, taper lengths
Sindh Building Control Authority (SBCA) Regulations	Local access and parking compliance requirements

3.1 Traffic Survey Methodology

Traffic data forms the foundation of this TMP. The following survey types were conducted or referenced:

3.1.1 Base Year Traffic Data (2010)

The base year traffic data for the M.A. Jinnah Road / Numaish Chowrangi corridor is sourced from the JICA KTIP (2012), which conducted comprehensive classified traffic counts on all major Karachi arterials using 2010 as the base year. The KTIP survey recorded a PM peak hour volume of 34,171 vehicles/hour at Numaish, of which 21,340 vehicles/hour constituted bus traffic. This data provides a robust, independently verified baseline for growth projection analysis.

3.1.2 Traffic Classification

Traffic volumes are classified into the following categories consistent with the JICA KTIP methodology:

- Private cars and light vehicles

- Motorcycles and three-wheelers
- Public buses (conventional and BRT)
- Taxis and ride-hailing vehicles
- Heavy goods vehicles (HGV) and commercial vehicles
- Non-motorized transport (NMT) and pedestrians

3.1.3 Peak Hour Identification

The PM peak hour (19:00–20:00) is identified as the critical analysis period based on:

- Consistent PM peaking observed in the 2010 KTIP survey data for this corridor
- Residential home-arrival trip peak, generating maximum inbound flows to the development
- Retail activity surge in the evening period, coinciding with residential peak
- Combined peak is therefore the most conservative and appropriate design scenario

The AM peak hour (08:00–09:00) represents a secondary period with predominantly outbound residential flows and lower retail activity and is assessed qualitatively.

3.2 Traffic Growth Rate Methodology

A compound annual growth rate (CAGR) is applied to project base year traffic volumes to the study horizon year. The growth rate is derived as follows:

3.2.1 Derivation from JICA KTIP

The JICA KTIP (2012) demand forecast projects total person trips in Karachi to increase from approximately 19.5 million trips/day in 2010 to 33 million trips/day by 2030, representing 1.7 times increase over the 20-year horizon. The implied CAGR is:

$$\text{CAGR} = (33,000,000 / 19,500,000)^{(1/20)} - 1 = (1.692)^{(0.05)} - 1 = 2.69\% \text{ per annum}$$

A conservative value of 2.5% per annum is adopted, rounding down from the KTIP-implied 2.69% to account for infrastructure capacity constraints on the M.A. Jinnah Road corridor.

3.2.2 Cross-Check Against Population Growth

As a secondary validation, Karachi's population growth rate from the Pakistan Bureau of Statistics Census 2023 is 3.62% per year (2017–2023). The adopted 2.5% traffic growth rate is deliberately set below this ceiling, consistent with the

standard practice that trip generation growth is moderated by road network saturation effects in dense urban corridors.

3.2.3 Projection Formula

$$V(t) = V(0) \times (1 + r)^n$$

Where: $V(0)$ = base year volume, $r = 0.025$ (2.5% annual growth rate), n = number of years

Applied to 2010 base over 15 years to 2025:

$$V(2025) = 34,171 \times (1.025)^{15} = 34,171 \times 1.4483 = 49,490 \text{ vehicles/hour (PM peak)}$$

3.3 Trip Generation Methodology

Trip generation for the proposed development is estimated using local PM peak hour rates calibrated to comparable mixed-use developments in Karachi, cross-referenced with ITE Trip Generation Manual (11th Edition) rates for equivalent land uses:

Land Use	Rate	Source	Direction Split
Residential (apartments)	1.0 trip / unit	Local calibration / ITE LUC 220	45% in / 55% out
Retail / showroom	3.0 trips / 1,000 sq.ft	Local calibration / ITE LUC 820	85% in / 15% out

The PM peak is selected as the critical period because the directional split for residential use (45% in / 55% out) combined with the high retail inbound proportion (85% in) produces the maximum inbound gate loading, which governs queue length and access design.

3.4 Queue Length Analysis Methodology

Queue length at inbound security gates is assessed using deterministic queuing theory, appropriate for situations where arrival rates and service rates are relatively stable (as in the PM peak hour). The methodology follows four steps:

Step 1 — Lane Capacity

$$C = 3,600 / t_s$$

Where: C = lane capacity (vehicles/hour), t_s = service time per vehicle (seconds)

Step 2 — Flow per Gate

$$q = Q_{in} / G$$

Where: q = flow per gate (veh/hr), Q_{in} = total inbound trips (veh/hr), G = number of gate lanes

Step 3 — Volume-to-Capacity (v/c) Ratio

$$v/c = q / C$$

If $v/c \geq 1.0$: queue grows continuously (unstable — unacceptable). If $v/c < 1.0$: stable queue, length can be estimated.

Step 4 — Queue Length

$$\text{Overflow} = q - C \quad (\text{if } q > C, \text{ else } 0)$$

$$\text{Queue Length (m)} = \text{Overflow} \times L_v$$

Where: L_v = average vehicle length including spacing = 6.0 m

3.5 Level of Service (LOS) Methodology

Level of Service for the surrounding road network is assessed per HCM 7th Edition criteria for urban arterials. LOS is defined by average control delay per vehicle (seconds/vehicle) at intersections:

LOS	Delay (sec/veh)	Description
A	≤ 10	Free flow, minimal delay
B	10 – 20	Stable flow, minor delays
C	20 – 35	Stable flow, acceptable delays
D	35 – 55	Approaching unstable, tolerable delays
E	55 – 80	Unstable flow, long delays
F	> 80	Forced flow, excessive delays, breakdown

3.6 Parking Demand Methodology

Parking demand is estimated using area-based rates calibrated to local standards and SBCA requirements:

- Residential: 1 car space per 1,000 sq.ft of residential floor area
- Retail/showroom: 1 car space per 800 sq.ft of retail floor area
- Motorcycle allocation: 16% of total car demand (based on Karachi modal share data from JICA KTIP HIS 2010)
- Disabled parking: 1 space per 50 car spaces (minimum)

4. Existing Traffic & Data Collection

4.1 Existing Traffic Conditions

The traffic survey available previously conducted in 2010 at Numaish recorded (JICA KTIP):

- Total PM peak hour volume: 34,171 vehicles/hour
- Of this, 21,340 vehicles/hour were bus traffic

With the commissioning of the Green Line BRT system, the historic bus volume is expected to decline significantly due to fleet restructuring and modal shift to high-capacity buses. This change improves operational efficiency and reduces the share of mixed traffic on M.A. Jinnah Road.

4.2 Projected Traffic Volume for Year 2025

A standard annual growth rate of 2.5% was applied to the 2010 base volumes over 15 years.

4.2.1 Traffic Growth Calculation

$$\text{Projected Volume} = 34,171 \times (1.025)^{15}$$

$$\text{Projected 2025 PM Peak Volume} \approx 49,490 \text{ vehicles/hour}$$

4.2.2 2025 Traffic Summary

Year	PM Peak Traffic (vph)
2010 (Base)	34,171
2025 (Projected)	49,490

This represents the background traffic before adding development trips.

4.2.3 Data

The Required data for the development is extracted from:

- Architectural plans
- Parking schedules
- F.A.R and area summaries
- Unit distribution

- Shop and showroom areas

4.2.4 Peak Trip Generation Analysis

PM peak hour from 19:00 to 20:00 was selected because of:

- Previous study has peak in similar time duration
- Residential home-arrival peak
- Retail activity surge
- Significant mixed-mode traffic externally

5. Trip Generation and Distribution

5.1 Trip Generation

Trip generation analysis establishes the expected number of trips that will be produced and attracted by the proposed development. These estimates are fundamental to assessing the project's impact on the surrounding transportation network.

5.1.1 Methodology

Trip generation follows local PM peak rates:

- **Residential:** 1.0 trip/unit
 - 45% inbound
 - 55% outbound
- **Retail/Showroom:** 3.0 trips/1,000 sq.ft
 - 85% inbound
 - 15% outbound

Phase-1 Trip Generation (Detailed Table)

Phase-1 Land Use Inputs

- Residential: 1,680 units
- Retail/Showroom GFA: 472,208.10 sq. ft

Phase-1 Trip Generation Table					
Category	Units/Area	Trip Rate	Total Trips	Inbound	Outbound
Residential	1,680 units	1.0 / unit	1,680	756	924
Retail/Showroom	472,208.10 sq.ft	3 / 1,000 sq.ft	1,417	1,204	213
TOTAL PHASE-1			3,097	1,960	1,137

Phase-1 generates 3,097 PM peak trips, most of which originate from retail/showroom activity (1,417 trips). Residential trips contribute 1,680 trips. Inbound retail trips dominate due to an 85% arrival pattern during evening hours. Total Phase-1 inbound traffic reaches 1,960 vph, while outbound is 1,137 vph.

Phase-2 Trip Generation (Detailed Table)

Phase-2 Land Use Inputs

- Residential: 2,208 units
- Shops/Showroom: 6,770.62 sq.ft

Phase-2 Trip Generation Table					
Category	Units/Area	Trip Rate	Total Trips	Inbound	Outbound
Residential	2,208 units	1.0 / unit	2,208	994	1,214
Shops/Showroom	6,770.62 sq.ft	3 / 1,000 sq.ft	20	17	3
TOTAL PHASE-2			2,228	1,011	1,217

Phase-2 generates 2,228 PM peak trips, predominantly from residential units. Retail activity produces only 20 trips due to small floor area. Total inbound Phase-2 trips are 1,011 vph and outbound trips are 1,217 vph.

COMBINED TRIP GENERATION TABLE			
Phase	Total Trips	Inbound	Outbound
Phase-1	3,097	1,960	1,137
Phase-2	2,228	1,011	1,217
COMBINED	5,325	2,971	2,354

Combined project traffic equals 5,325 PM peak trips, with inbound demand at 2,971 vph and outbound at 2,354 vph. This magnitude demands well-designed access points, multiple lanes, and queue management solutions to prevent bottlenecks on M.A. Jinnah Road.

5.1.2 Trip Distribution

Trip distribution analysis determines the directional allocation of generated trips across the adjacent roadway network. The distribution was based on:

- Observed traffic circulation patterns in the study area.
- Accessibility and connectivity of the project site to major arterials.
- Surrounding land-use

The combined effect of **background traffic (2025)** and **development-generated traffic** produces the following PM peak hour demand:

Network Traffic With Development	
Component	PM Peak Volume (vph)
2025 Background Traffic	49,490
Development Trips	5,325
Total Traffic Demand	54,815

This level must be evaluated against the available capacity on M.A. Jinnah Road and adjacent access points.

- M.A. Jinnah Road is already a high-demand arterial corridor.
- Projected background traffic reaches ~49,500 vph, approaching saturation.
- Addition of 5,325 vph from the project represents:
- $\frac{5325}{49490} \approx 10.7\%$ increase
- Without improvements, localized congestion will increase near project accesses.

5.1.3 Impact on Project Access Points

The PM-peak inbound traffic (2,971 vph) directly affects gate performance due to mandatory security checks.

- At 15 sec processing time, queueing was severe.
- At 10 sec, conditions improve but remain critical for Phase-1.
- Outbound traffic (2,354 vph) distributes over longer periods and is less queue-sensitive but requires channelized exit lanes.

5.1.4 Impact on Local Intersections

The intersections surrounding Numaish, Soldier Bazaar, Teen Hatti, and Gurumandir are expected to experience notable traffic impacts due to the proposed development. These intersections will see higher turning volumes as vehicles navigate the increased demand, along with a rise in pedestrian activity in the area. Additionally, the increased right-turn movements will place greater demand on existing right-turn storage lengths, potentially affecting the efficiency of traffic flow at these key junctions.

6. Access and Egress Analysis

6.1 Queue Length Analysis

This chapter presents the queue length analysis for all inbound security gate configurations at the proposed Saima Center Point development. The analysis evaluates gate operational performance during the PM peak hour, which constitutes the critical design period. Two scenarios are assessed: (a) manual security check at 15 seconds per vehicle, and (b) RFID/ANPR automated processing at 3 seconds per vehicle. Mitigation measures and gate specifications are provided to ensure queue-free operation on M.A. Jinnah Road.

6.2 Methodology

Queue length at inbound security gates is assessed using deterministic queuing theory, which is appropriate for the PM peak hour where arrival rates and service rates are relatively stable. The analysis follows four sequential steps:

Step 1 — Lane Capacity

Each lane's processing capacity is a direct function of the time taken to service one vehicle:

$$C = 3,600 / t_s \text{ (vehicles/hour per lane)}$$

Where: C = lane capacity (veh/hr), t_s = service time per vehicle (seconds)

Step 2 — Flow per Gate

The arrival demand at each gate lane is the total inbound peak hour volume divided by the number of operational gate lanes:

$$q = Q_{in} / G \text{ (vehicles/hour per lane)}$$

Where: q = flow per gate lane (veh/hr), Q_{in} = total inbound trips (veh/hr), G = number of gate lanes

Step 3 — Volume-to-Capacity (v/c) Ratio

$$v/c = q / C$$

If $v/c \geq 1.0$: the gate is over-saturated and queue grows continuously (unacceptable condition).

If $v/c < 1.0$: the gate operates below capacity, and queue length can be estimated.

Step 4 — Queue Length Estimation

For over-saturated conditions ($v/c \geq 1.0$), the overflow accumulates over the analysis period. For the purpose of this study, an overflow rate (vehicles failing to clear per hour) is used to estimate the queue that would form at the end of the peak hour:

$$\text{Overflow} = q - C \text{ (veh/hr, if } q > C; \text{ otherwise } 0)$$

$$\text{Queue Length (m)} = \text{Overflow} \times L_v$$

Where: L_v = average vehicle length including bumper-to-bumper spacing = 6.0 m

6.3 Inbound Peak Hour Demand

The PM peak hour inbound trip demand is derived from the trip generation analysis in Chapter 4. Inbound flows dominate residential developments during the evening peak and are the governing condition for gate design.

Phase	Total PM Peak Trips (vph)	Directional Split	Inbound Trips (vph)	Gate Lanes Provided
Phase-1	3,560	55% in / 45% out	1,960	3 RFID/ANPR lanes
Phase-2	1,765	57% in / 43% out	1,011	4 RFID/ANPR lanes
Combined	5,325	—	2,971	7 RFID/ANPR lanes (total)

6.4 Scenario A — Manual Security Check (15-Second Service Time)

This scenario reflects conventional manual security checking where a guard verifies credentials, logs visitor details, and operates the barrier manually. A service time of 15 seconds per vehicle is adopted as representative of this process.

$$\text{Lane Capacity (15s)} = 3,600 / 15 = 240 \text{ vehicles/hour per lane}$$

Phase-1 — Scenario A

$$\text{Flow per gate} = 1,960 / 3 = 653 \text{ veh/hr}$$

$$v/c = 653 / 240 = 2.72 \rightarrow \text{OVER-SATURATED}$$

$$\text{Overflow} = 653 - 240 = 413 \text{ veh/hr}$$



Queue Length = $413 \times 6 = 2,480$ m per gate lane

Phase-1 (Scenario A): FAILED — Queue Unacceptable

v/c ratio: 2.72 (far exceeds capacity threshold of 1.0)

Overflow: 413 vehicles/hour continuously accumulating per lane

Queue length: approximately 2,480 m per gate lane

Implication: Queues extend well onto M.A. Jinnah Road, causing severe disruption to background traffic and blocking emergency vehicle access

Phase-2 — Scenario A

Flow per gate = $1,011 / 4 = 253$ veh/hr

v/c = $253 / 240 = 1.053$ → MARGINALLY OVER-SATURATED

Overflow = $253 - 240 = 13$ veh/hr

Queue Length = $13 \times 6 = 77$ m per gate lane

⚠ Phase-2 (Scenario A): MARGINAL — Queue Present

v/c ratio: 1.053 (slightly above capacity threshold)

Overflow: 13 vehicles/hour accumulating per lane

Queue length: approximately 77 m per gate lane

Implication: Queue approaches the site boundary and may occasionally spill onto the public footpath. Unacceptable for long-term operation.

6.5 Scenario B — RFID/ANPR Automated Processing (3-Second Service Time)

This scenario reflects automated gate processing using RFID (Radio Frequency Identification) tags for registered residents and ANPR (Automatic Number Plate Recognition) cameras for pre-registered visitors. A service time of 3 seconds per vehicle is adopted as the design value for this technology, consistent with published industry performance benchmarks for UHF RFID barrier systems.

Lane Capacity (3s) = 3,600 / 3 = 1,200 vehicles/hour per lane

This represents a five-fold increase in processing capacity compared to the manual scenario (from 240 to 1,200 veh/hr/lane), fundamentally changing the operational outcome at both phases.

Phase-1 — Scenario B

Flow per gate = 1,960 / 3 = 653 veh/hr

v/c = 653 / 1,200 = 0.544 → STABLE, WELL BELOW CAPACITY

Overflow = 0 → No queue forms

Phase-1 (Scenario B): PASS — Queue Eliminated

v/c ratio: 0.544 (45.6% reserve capacity available)

Overflow: zero

Queue length: 0 m

3 RFID/ANPR lanes are sufficient to handle Phase-1 inbound demand with significant reserve

Phase-2 — Scenario B

Flow per gate = 1,011 / 4 = 253 veh/hr

v/c = 253 / 1,200 = 0.211 → STABLE, HIGHLY UNDER-SATURATED

Overflow = 0 → No queue forms

✓ Phase-2 (Scenario B): PASS — Queue Eliminated

v/c ratio: 0.211 (78.9% reserve capacity available)

Overflow: zero

Queue length: 0 m

4 RFID/ANPR lanes comfortably serve Phase-2 inbound demand with large reserve for future growth

6.6 Scenario Comparison Summary

Parameter	Phase-1 15-sec (A)	Phase-1 3-sec (B)	Phase-2 15-sec (A)	Phase-2 3-sec (B)
Service Time (sec/veh)	15	3	15	3
Lane Capacity (veh/hr)	240	1,200	240	1,200
Gate Lanes	3	3	4	4
Flow per Gate (veh/hr)	653	653	253	253
v/c Ratio	2.72	0.544	1.053	0.211
Overflow (veh/hr)	413	0	13	0
Queue Length (m)	2,480	0	77	0
Verdict	FAIL	PASS	MARGINAL	PASS

6.7 Sensitivity — Minimum Gate Lanes Required

The following table demonstrates the minimum number of RFID/ANPR lanes technically required to achieve $v/c < 1.0$, and confirms the recommended lane count provides an adequate operational buffer

Phase	Inbound (vph)	Min Lanes @ 3s to Avoid Queue	v/c @ Min Lanes	Recommended Lanes	v/c @ Recommended	Reserve Capacity
Phase-1	1,960	2 lanes	0.817	3 lanes	0.544	45.6%
Phase-2	1,011	1 lane	0.843	4 lanes	0.211	78.9%

NOTE:

Two RFID/ANPR lanes are technically sufficient for Phase-1 ($v/c = 0.817$, queue = 0). The third lane is recommended to provide a 20% reserve capacity buffer against peak variation and year-on-year traffic growth. For Phase-2, four lanes are specified for operational reasons (dedicated access lanes serving separate residential towers) rather than strict capacity requirements.

6.8 Gate System Technical Specifications

The following specifications shall be incorporated into the gate system design and procurement to achieve the 3-second service time assumed in Scenario B:

Component	Specification
RFID Technology	UHF RFID (860–960 MHz); read range 5–10 m; automatic barrier trigger on valid resident tag; no driver interaction required

ANPR Camera	HD camera with IR illumination; plate recognition in < 1 second; integrated with access management software; pre-registered visitor database
Barrier Type	High-speed boom barrier with 1.5–2.0 sec open/close cycle; fail-safe open mode on power failure or fire alarm
Lane Width	Minimum 3.5 m per RFID/ANPR lane; 4.0 m for manual/visitor lane
Queue Storage	Minimum 10 m of on-site queue storage per lane, measured from the barrier within the site boundary (no overspill onto M.A. Jinnah Road ROW)
Visitor / Manual Lane	One dedicated manual lane per gate cluster (separate from RFID lanes) for unregistered visitors; 10–15 sec service time; managed by security staff
Emergency Override	Manual override accessible to security staff; all barriers default open on activation of fire alarm or emergency signal; dedicated emergency access lane to remain clear at all times
App Integration	Visitor pre-registration via mobile app or web portal recommended to minimize manual processing at gate
Power Backup	UPS backup for all gate electronics; minimum 4-hour autonomy during power outage

6.9 Emergency Vehicle Access

The elimination of queuing under Scenario B (RFID/ANPR, 3-second service time) removes the primary emergency access risk identified in this study. Under Scenario A, a 2,480 m queue on M.A. Jinnah Road would prevent ambulances and fire tenders from reaching the site. The following additional provisions shall be made:

- Emergency vehicles shall be granted instant access via a manual override switch operated by the security supervisor on duty, or automatically via a coded transponder fitted to emergency vehicles.
- All boom barriers shall default to the open position upon activation of the building fire alarm system.
- Gate design shall accommodate a minimum swept path for a 10.5 m rigid fire tender (turning radius per local fire authority requirements).
- Security staff shall be trained in emergency access protocols, including clearing queue vehicles to the side to create an access corridor in degraded operating conditions.

6.10 Swept Path Analysis

Swept path analysis was carried out for all proposed vehicular access and egress points at Saima Center Point to verify that the driveway geometry, turning radii, and internal circulation layout can accommodate the full range of design vehicles expected to use the development. The analysis was conducted using AutoCAD vehicle turning templates in accordance with AASHTO geometric design standards.

The swept path analysis confirmed that all proposed access points, internal ramp connections, and gate lane configurations provide sufficient horizontal clearance and turning geometry to accommodate vehicles without encroachment onto opposing lanes, footpaths, or structural elements.

- On the basis of this analysis, the access and egress arrangements at Saima Center Point are confirmed to be geometrically adequate for the safe and efficient maneuvering of all anticipated vehicle types, including emergency appliances, under both normal operational and construction phase conditions. No geometric modifications to the proposed access design are required.
- Swept path drawings are provided in Annex of this report.

6.11 Key Findings and Recommendations

Finding	Detail
Manual processing is unacceptable	At 15-second service time, Phase-1 generates a 2,480 m queue per lane and Phase-2 generates a 77 m queue. Both phases fail under manual operation.
RFID/ANPR eliminates all queuing	At 3-second service time, Phase-1 v/c = 0.544 and Phase-2 v/c = 0.211. Queue length is zero in both phases under the recommended gate configuration.
Gate count is adequate	3 RFID/ANPR lanes for Phase-1 and 4 lanes for Phase-2 are sufficient, with meaningful reserve capacity (46% and 79% respectively).
RFID/ANPR is a prerequisite	Implementation of the automated gate system is a mandatory condition prior to occupation of Phase-1. Manual processing shall not be used as the primary access control mechanism.
Emergency access is safeguarded	With zero queuing on M.A. Jinnah Road, emergency vehicle access to the site is unobstructed at all times under normal operation.
Future growth absorbed	The reserve capacity at both phases absorbs the 2.5% annual traffic growth rate for a minimum of 15 additional years before gate reconfiguration is required.

7. Parking Analysis

7.1 Parking Analysis

7.1.1 Parking Demand

7.1.1.1 Phase-1 Required Parking

For Retail:

$$\text{Area (sq.ft)}/800 = 472208.10/800 = 590.26 \text{ Cars}$$

For Flats:

$$\text{Area (sq.ft)}/1000 = 1491623.00/1000 = 1491.62 \text{ Cars}$$

$$\text{Cars} = 590.26 + 1491.62 = 2082$$

16% Motorcycles (M.C)

$$0.16 * 2082 = 333.12$$

$$\text{Total Car Parking Required} = 2082 - 333 = 1,749 \text{ (1714+35)}$$

$$\text{Disabled parking} = 1749/50 = 35$$

$$\text{Total M.C Parking Required} = 333 * 6 = 1,998$$

7.1.1.2 Phase-2 Required Parking

For Retail:

$$\text{Area (sq.ft)}/800 = 6770.62/800 = 8.46 \text{ Cars}$$

For Flats:

$$\text{Area (sq.ft)}/1000 = 2085953.20/1000 = 2085.95 \text{ Cars}$$

$$\text{Cars} = 8.46 + 2085.95 = 2095$$

16% Motorcycles (M.C)

$$0.16 * 2095 = 335.20$$

$$\text{Total Car Parking Required} = 2095 - 335 = 1,760 \text{ (1725+35)}$$

Category	Required
Cars	1,714
Motorcycles	1,998
Disabled	35

Category	Required
Cars	1,725
Motorcycles	2,010
Disabled	35



Disabled parking = $1760/50 = 35$

Total M.C Parking Required = $335 \times 6 = 2,010$

Both phases require **over 3,500 car spaces** and **approximately 4,000 motorcycle spaces**.

7.1.2 Provided Parking (Actual)

7.1.2.1 Phase-1 Provided Parking

Level	Cars	MC
B2	516	627
B1	237	684
3 rd	393	500
4 th	393	500
5 th	393	500
6 th	393	500
7 th	393	500
Total	2,718	3,811

7.1.2.2 Phase-2 Provided Parking

Level	Cars	MC
B2	508	434
B1	552	434
GF	336	—
1F	493	841
2F	508	872
Total	2,397	2,581

Phase-1 exceeds car parking requirements by **969 spaces**, while Phase-2 exceeds by **637 spaces**. Motorcycle supply is also adequate, especially in Phase-1 where 3,811 MC spaces exceed the requirement by 1,813 spaces.

8. Conclusion and Recommendations

8.1 Conclusion

The combined development generates 5,325 PM peak trips. Required infrastructure includes:

- Adequate queue storage
- Strong access controls
- Signage and traffic marshals

This TMP ensures operational safety and regulatory compliance.

8.2 Limitations of the Traffic Impact Assessment and Recommendations for Future

The Traffic Impact Assessment (TIA) presented in this report has been carried out for the proposed Saima Center Point development in accordance with standard traffic engineering practice and to the extent practicable given the prevailing conditions of the surrounding road network. However, the following important limitations and recommendations are noted for the record and for the consideration of the reviewing authority.

Limitations of the Current TIA

The development is situated on M.A. Jinnah Road, which forms part of a designated mass transit corridor currently under active construction as part of the Green Line BRT Project. This circumstance imposes fundamental constraints on the representativeness and reliability of a conventional Traffic Impact Assessment at this time, for the following reasons:

- The corridor is in an active construction phase, and prevailing traffic conditions, including lane configurations, signal timings, pedestrian routes, and background traffic volumes are materially different from the conditions that will exist upon completion of the mass transit infrastructure.
- The Right-of-Way (ROW) along M.A. Jinnah Road has already been planned, designed, and partly acquired under the Green Line BRT Project. The future cross-section of the corridor, including lane allocations, BRT lanes, station footprints, and service roads, is therefore predetermined and is not subject to modification on the basis of this TIA.
- Under these circumstances, conducting a full traffic impact assessment against the existing road geometry is neither fully representative of future conditions nor capable of informing meaningful geometric or capacity interventions on the public road network, since those interventions are already determined by the mass transit project design.

Recommendation 1: Repeat TIA Under Stable Future Conditions

It is strongly recommended that a comprehensive Traffic Impact Assessment be carried out once the Green Line BRT corridor construction is complete and traffic dynamics on M.A. Jinnah Road have stabilised under future operating conditions.

Recommendation 2 : Emergency Traffic Management Plan

The Traffic Management Plan prepared as part of this report addresses the operation of the development under normal peak traffic conditions. Given the scale of the development with an anticipated population of approximately 15,000–20,000 persons, in addition to retail visitors the normal operational TMP alone is insufficient to cover all traffic management scenarios. It is accordingly recommended that a dedicated Emergency Traffic Management Plan (ETMP) be prepared as a separate document, addressing the following scenarios:

Mass evacuation: Coordinated evacuation of the residential population in the event of fire, structural emergency, structural failure, or civil emergency, including staged departure sequencing, assembly area designation, and gate operating protocols to maximise outbound throughput

Fire and rescue access: Detailed routing for fire tenders, ambulances, and rescue vehicles under congested and partially blocked road conditions, including alternative access routes if the M.A. Jinnah Road frontage is obstructed

8.3 Mitigation Measures

To maintain acceptable operational performance, the following mitigation measures are recommended.

8.3.1 Access & Gate Improvements

1. Increase the number of inbound lanes at security checkpoints based on queue length analysis.
2. Implement 3-second optimized processing with multiple screening booths.
3. Provide dedicated lanes for:
 - Residents with RFID access
 - Visitors
 - Deliveries / logistics vehicles
4. Use ANPR, RFID, and fast-scan systems to reduce delays.

8.3.2 Internal Circulation Enhancements

1. Channelized entry and exit points with proper merging lengths.
2. Segregation of residential and commercial movements.
3. Provide clear wayfinding to reduce internal conflicts.

8.3.3 Improvements on M.A. Jinnah Road

1. Add a deceleration lane for inbound traffic entering the site.
2. Add an acceleration lane for outbound traffic merging with fast traffic stream.
3. Improve lane markings and signage to guide traffic.

8.3.4 Public Transport Integration

1. Maximize connectivity with Green Line BRT stations, reducing private vehicle dependency.
2. Provide pedestrian access to promote modal shift.
3. Encourage use of ride-hailing pick-up points inside the site.

8.3.5 Parking & Drop-off Management

1. Separate parking for residential, retail, and visitors.
2. Internal holding areas to prevent spillback onto M.A. Jinnah Road.
3. Dedicated ride-hailing bays to avoid curbside parking.

The comprehensive traffic impact assessment demonstrates that the proposed development cannot be successfully integrated into the existing transportation network without the implementation of appropriate mitigation measures, as it would otherwise result in significant adverse impacts on existing traffic circulation. While internal circulation and on-site parking are adequate, the proposed trips are expected to generate queues at the site entrance, which in turn lead to inadequate levels of service and operational delays on the surrounding road network. Therefore, targeted mitigation measures are required to improve overall traffic performance and ensure safe and efficient access.

Annexures



**Traffic Management Plan
(TMP)**

**SAIMA CENTER POINT
Phase I & Phase II**

Annexures

