ENVIRONMENTAL IMPACT ASSESSMENT
(E I A R E P O R T)

ESTABLISHMENT OF A COSMETICS (SKIN CREAM) MANUFACTURING UNIT

BY

M/S GOREE COSMETICS (PRIVATE) LIMITED

AT

PLOT NO. 112/1-M & 113/4, QUAID-E-AZAM INDUSTRIAL ESTATE,
KOT LAKHPAT, TOWNSHIP ROAD, LAHORE.

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LIST OF ABBREVIATIONS

Abbreviation	Description
AMSL	Above Mean Sea Level
BOD	Biochemical Oxygen Demand
CNIC	Computerised National Identity Card
CO	Carbon Monoxide
CO2	Carbon Dioxide
COD	Chemical Oxygen Demand
CUIN	Corporate Universal Identification Number
dB(A)	Decibel, A weighted (unit of noise)
DRAP	Drug Regulatory Authority of Pakistan
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ETP	Effluent Treatment Plant
FGD	Focus Group Discussion
GMP	Good Manufacturing Practices
HSD	High Speed Diesel
HSE	Health, Safety and Environment
HVAC	Heating, Ventilation and Air Conditioning
IEE	Initial Environmental Examination
LESCO	Lahore Electric Supply Company
MSDS	Material Safety Data Sheet
NEQS	National Environmental Quality Standards
NOC	No Objection Certificate
NOx	Oxides of Nitrogen
NTN	National Tax Number
OHWT	Overhead Water Tank
OSH	Occupational Safety and Health
PEPA 1997	Punjab Environmental Protection Act, 1997 (amended 2012)
PEQS	Punjab Environmental Quality Standards
PIEDMC	Punjab Industrial Estates Development and Management Company
PKR	Pakistani Rupee
PM	Particulate Matter
PPE	Personal Protective Equipment
PSQCA	Pakistan Standards and Quality Control Authority
QAIE	Quaid-e-Azam Industrial Estate
SECP	Securities and Exchange Commission of Pakistan

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SNGPL	Sui Northern Gas Pipelines Limited
SO2	Sulphur Dioxide
SOP	Standard Operating Procedure
TDS	Total Dissolved Solids
TPD	Tons Per Day
TSS	Total Suspended Solids
UGWT	Underground Water Tank
VOC	Volatile Organic Compounds
WWTP	Wastewater Treatment Plant

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EXECUTIVE SUMMARY

1. Introduction

This Executive Summary sets out the principal findings of the Environmental Impact Assessment (EIA) carried out for the proposed establishment and operation of a cosmetics manufacturing unit by M/s Goree Cosmetics (Private) Limited at Plot No. 112/1-M & 113/4, Quaid-e-Azam Industrial Estate, Kot Lakhpat, Township Road, Lahore. The unit is designed to produce one ton, which is 1,000 kilograms, of finished skin cream per day on an automatic filling, cooling, capping and sealing line, together with the associated compounding, quality control, packing and warehousing functions. The plot measures 20,200 square feet, equivalent to 4 kanals and 9 marlas, of which 9,591.87 square feet is proposed to be covered under the present submission and 10,608.13 square feet remains open.

Goree Cosmetics (Private) Limited is a company limited by shares, incorporated with the Securities and Exchange Commission of Pakistan at its Company Registration Office, Lahore, on 29 January 2018 under the Companies Act, 2017, holding Corporate Universal Identification Number 0115703. The company is represented for the purposes of this examination by its directors, Mr. Muhammad Ishaq son of Muhammad Ibrahim and Mr. Shahrukh Ishaq son of Muhammad Ishaq, both resident at House No. 279-CC, Phase IV, Defence Housing Authority, Lahore Cantt. The land on which the unit is to be established is owned by the proponent, having been purchased through a registered sale deed executed on 29 December 2023 before the Sub Registrar, Nishtar Town, Lahore, and the plot carries an existing electricity connection with a 200 kVA transformer.

Cosmetic cream manufacturing is a batch process in which an oil phase and a water phase are separately heated, brought together under high shear to form a stable emulsion, cooled, perfumed and then filled into jars, capped and sealed. The process is clean by the standards of general industry, since it involves no combustion within the product path, no fine mineral dust and no toxic gas release. Its environmental profile is dominated instead by water consumption and by the washing of vessels and filling equipment, which produces an effluent carrying oils, waxes, surfactants and traces of product, by the packaging waste stream, by odour and volatile organic compounds from fragrance and solvent handling, and by the occupational risks associated with hot vessels, chemical handling and moving machinery.

Environmental regulation in Pakistan is administered under the Pakistan Environmental Protection Act, 1997 and, in this province, under the Punjab Environmental Protection Act, 1997 as amended in 2012, read with the Punjab Environmental Protection (Review of IEE and EIA) Regulations, 2022. This IEE has accordingly been prepared to record baseline conditions at and around the site, to assess the likely impacts of construction and operation, and to prescribe mitigation and monitoring arrangements that will keep the unit within the limits laid down by the Punjab Environmental Quality Standards.

2. Salient Features of the Project

Table-1: Salient Features of the Project

Parameter	Detail
Project Title	Establishment and operation of a cosmetics (skin cream) manufacturing unit
Proponent	Mr. Shahrukh Ishaq son of Muhammad Ishaq
Status of Firm	Private limited company, limited by shares
Incorporation	Incorporated on 29 January 2018 under the Companies Act, 2017, Company Registration Office, Lahore
Corporate Universal Identification Number	0115703
Directors	Mr. Muhammad Ishaq son of Muhammad Ibrahim, CNIC 35202-6634084-3, and Mr. Shahrukh Ishaq son of Muhammad Ishaq, CNIC 35202-6986483-7
Registered Address of Directors	House No. 279-CC, Phase IV, Defence Housing Authority, Lahore Cantt
Project Site	Plot No. 112/1-M, 113/4, Quaid-e-Azam Industrial Estate, Kot Lakhpat, Township Road, Lahore
Plot Area	20,200 square feet, being 4 kanals and 9 marlas, approximately 1,877 square metres

Covered Area Proposed	9,591.87 square feet
Open Area	10,608.13 square feet
Existing Approved and Constructed Area	28,534.79 square feet, giving a total covered area of 38,126.66 square feet on completion
Production Capacity	1 ton, that is 1,000 kg, of finished cream per day
Annual Production	Approximately 290 to 300 tons, based on 290 to 300 working days
Land Tenure	Freehold, owned by the proponent under registered sale deed dated 29 December 2023, Sub Registrar Nishtar Town, Lahore
Process Type	Batch emulsification followed by an automatic filling, cooling, capping and sealing line
Principal Raw Materials	Purified water, fatty alcohols and stearic acid, mineral and vegetable oils, emulsifiers, humectants, preservatives, active ingredients, fragrance and packaging materials
Source of Power	LESCO supply through the estate network with an installed 200 kVA transformer, supported by a standby generator
Source of Water	Punjab Industrial Estates Development and Management Company supply and the sanctioned aquifer allocation for the plot, stored in an underground tank and an overhead tank
Effluent Management	Oil and grease interceptor, neutralization and settling in an on-site pre-treatment unit before discharge to the estate sewer
Air Emission Sources	Utility boiler or heater flue, standby generator exhaust, fragrance and solvent vapour
Working Hours	24 hours
Manpower	Approximately 48 persons in regular operation
Surrounding Land Use	Established industrial estate, with manufacturing plots on all sides and internal estate roads
Consultant	Zoom Consultancy & Services, Lahore

3. Project Objectives

The project is intended to give Goree Cosmetics (Private) Limited a modern, purpose built manufacturing facility on land it owns within a planned industrial estate, to replace dependence on hired or scattered premises, to allow production to be organized in the sequence that good manufacturing practice for cosmetics requires, to raise product consistency through automatic filling, capping and sealing rather than manual handling, to create skilled and semi-skilled employment for the surrounding urban labour market, and to do all of this within a layout and operating regime that meets the requirements of the Punjab Environmental Protection Act and the Punjab Environmental Quality Standards from the first day of production.

4. Purpose of the Report

This report has been prepared to satisfy the requirement of Section 12 of the Punjab Environmental Protection Act, 1997 as amended in 2012, under which no proponent may commence a project likely to affect the environment without first obtaining environmental approval from the Environmental Protection Agency, Punjab. It records the environmental baseline of the site and its surroundings, identifies and evaluates the impacts likely to arise from the construction and operation of the unit, and sets out an Environmental Management Plan that the proponent will be bound to implement for the life of the project.

5. Major Impacts and Recommended Mitigation Measures

The environmental concerns associated with a cosmetics manufacturing unit of this size are modest in comparison with heavy industry, but they are real and they are concentrated in the water and waste streams rather than in the air. The dominant concern is the effluent produced when compounding vessels, homogenizers, transfer lines, hoppers and filling nozzles are washed between batches. This water carries emulsified oils, waxes, fatty alcohols, surfactants, preservatives and traces of fragrance, and it is the one stream capable of breaching a quality standard if it is allowed to reach the sewer untreated. The unit will therefore be provided with a dedicated pre-treatment arrangement consisting of a collection sump, an oil and grease interceptor, pH correction and a settling and skimming stage, so that the discharge entering the estate sewer complies with the Punjab Environmental Quality Standards for liquid industrial effluent. Dry

cleaning of vessels by scraping and wiping before wet washing will be adopted as a standing rule, since the quantity of product removed dry never has to be removed later from water.

Water consumption is the second concern. Purified water is both a raw material and the principal cleaning medium, and the reverse osmosis plant that produces it generates a reject stream. Consumption will be controlled by high pressure low volume washing, by recovery of reverse osmosis reject for floor washing, cooling tower make-up and horticultural use, and by rainwater harvesting into the recharge pit already provided in the site drawings, which returns clean roof runoff to the aquifer rather than sending it to the estate storm drain.

Air emissions are limited. There is no process stack on the product line. The flue of the steam boiler or thermic heater used for jacketed vessel heating and the exhaust of the standby generator are the only combustion points, and both will be fired on pipeline natural gas or low sulphur diesel, fitted with stacks of adequate height with sampling ports, and tuned and serviced on schedule. Fragrance compounds, alcohol and any solvent used in cleaning release volatile organic compounds and a characteristic odour. These will be controlled by keeping fragrance and solvent containers closed and stored in a cool ventilated room, by charging fragrance into the batch only after the emulsion has cooled to the temperature specified in the formula, by local exhaust ventilation over the charging and mixing points, and by good general ventilation in the compounding hall.

Solid waste is dominated by packaging. Jars, caps, seals, labels, cartons, shrink film, drums, bags and pallets arrive in quantity and leave as waste unless they are segregated. The unit will operate a segregated waste system with separate labelled bins for recyclable plastics, cardboard and paper, metal, general refuse and hazardous waste, with recyclables sold to registered recyclers and records maintained. Off specification product, expired material, laboratory reagents, used oil and contaminated rags fall into the hazardous category and will be stored on an impervious plinth in closed labelled containers and handed over only to collectors authorized to receive them.

Occupational safety deserves particular emphasis. Workers handle vessels containing molten waxes and oils at temperatures around seventy to eighty degrees Celsius, charge powders and liquid chemicals by hand, work beside rotating homogenizers and a moving conveyor line, and use alcohol and cleaning agents in enclosed rooms. Heat resistant gloves, aprons, eye protection, safety

footwear and, where dusty powders are charged, respiratory protection will be mandatory. Machine guarding, an emergency stop within reach of every station on the filling line, an eyewash and safety shower in the compounding area, material safety data sheets in Urdu and English at the point of use, and documented safe operating procedures will be in place before commissioning.

Taken together, and with the mitigation measures set out in Chapter 6 in place, the residual impacts of the project are assessed as local in extent, low in significance, and reversible on decommissioning. The site lies within a notified industrial estate, no settlement is being displaced, no protected area or critical habitat lies within or adjacent to the site, and no agricultural land is being converted.

6. Environmental Management and Monitoring Plans

An Environmental Management Plan has been prepared covering the construction phase, the operational phase and eventual site restoration. It assigns each mitigation measure to a named responsible party, links it to the activity that gives rise to the impact, and is accompanied by an Environmental Monitoring Plan specifying the parameters, sampling locations and frequency for treated effluent, boiler and generator stack emissions, ambient air quality, noise, workplace conditions and waste records. A designated Environmental and Safety Officer will be appointed by the proponent to oversee day to day implementation, maintain records and prepare the compliance reports required by the Environmental Protection Agency, Punjab. An indicative budget of approximately PKR 5.85 million in capital provision and PKR 1.53 million per annum in recurring expenditure has been allocated for this purpose.

7. Conclusion

On the basis of the baseline survey, the technical assessment and the consultations described in this report, the proposed cosmetics manufacturing unit is judged to be environmentally acceptable at the selected site, provided that the mitigation measures and the Environmental Management Plan set out in this report are implemented in full and maintained throughout the operating life of the unit. The project is located on the proponent's own land inside a planned and notified industrial estate whose land use, road network, water supply and sewerage were designed for exactly this purpose. It involves no involuntary resettlement, no loss of protected habitat and no significant irreversible environmental change, and it will bring employment and economic activity to the Kot

Lakhpat industrial belt. It is accordingly recommended that the Environmental Protection Agency, Punjab grant environmental approval for the project subject to the conditions proposed in Chapter 8.

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CHAPTER 1: INTRODUCTION

1.1 General

Under Section 12 of the Punjab Environmental Protection Act, 1997 as amended in 2012, no proponent may commence construction or operation of a project that is likely to have an effect on the environment without first filing either an Initial Environmental Examination or, where the scale and nature of the project require it, a full Environmental Impact Assessment, and obtaining environmental approval from the Environmental Protection Agency, Punjab. The categorization of projects between these two instruments is governed by the Punjab Environmental Protection (Review of IEE and EIA) Regulations, 2022.

This report presents the Environmental Impact Assessment for the proposed establishment and operation of a cosmetics manufacturing unit by M/s Goree Cosmetics (Private) Limited at Plot No. 112/1-M, 113/4, Quaid-e-Azam Industrial Estate, Kot Lakhpat, Township Road, Lahore. The unit has a rated output of one ton of finished cream per day and is to be established on a plot of 20,200 square feet owned by the company, of which 9,591.87 square feet is proposed to be covered under the present building plan submission in addition to the area already approved and constructed on the plot.

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The proponent has engaged environmental consultants to carry out this assessment so that the facility is designed, built and operated in conformity with the provincial environmental framework from the outset, rather than being retrofitted with controls after complaints or enforcement action. The report has been prepared through site reconnaissance, baseline measurement, review of the building plan and the equipment list, and consultation with neighbouring industrial units, estate management and other stakeholders. It concludes with a practical Environmental Management Plan intended to be used as a working document by the factory management rather than as a formality.

1.2 The Project

Goree Cosmetics (Private) Limited is a company limited by shares, incorporated under the Companies Act, 2017 on 29 January 2018 at the Company Registration Office, Lahore, of the Securities and Exchange Commission of Pakistan, and carrying Corporate Universal Identification

Number 0115703. The company manufactures and markets skin care creams and allied cosmetic preparations for the domestic market.

The company has acquired Plot No. 112/1-M & 113/4 in the Quaid-e-Azam Industrial Estate at Kot Lakhpat through a registered sale deed executed on 29 December 2023, the plot measuring 4 kanals and 9 marlas and carrying an existing electricity connection with a 200 kVA transformer. Part of the covered area on the plot stands already approved and constructed. The present project consists of completing the proposed additional covered area shown on the approved building plan and installing within it a compounding and packing facility rated at one ton of finished cream per day, together with its quality control laboratory, warehousing, utilities and effluent pre-treatment arrangements.

1.3 Nature of the Project

The project consists of the construction of the proposed covered area and the installation and operation of a cosmetics manufacturing facility together with its supporting infrastructure. This includes a raw material store and a dispensing or weighing room, a compounding hall with jacketed emulsifying vessels, homogenizers and stirrers, a chilled water and insulated storage arrangement for prepared bulk, an automatic line comprising a cream filling machine, a cooling tunnel, a capping machine and a sealing machine served by a conveyor, a secondary packing area, a finished goods warehouse, a quality control laboratory, a purified water system, a utility area with the boiler or heater and the chiller, a cargo lift, offices and staff facilities, an underground water tank and overhead tank, a septic tank, a rainwater recharge pit, a solid waste bin and an effluent pre-treatment unit. The project is industrial in character, is confined entirely within the boundary of the owned plot, and involves no acquisition of additional land, no diversion of any watercourse and no displacement of any person.

1.4 Size of the Project

The facility is rated at one ton, which is 1,000 kilograms, of finished cream per day. In practice this is produced as a series of batches through jacketed emulsifying vessels, with the filling line operating at a rate matched to the jar size in production. On the basis of 290 to 300 effective working days in a year, annual production is expected to be in the range of 290 to 300 tons. The unit is therefore a small to medium manufacturing facility by the standards of the cosmetics

industry, with a single production line and a single daily shift, and it is sized to the proponent's own brand requirement rather than to contract manufacture for the open market.

1.5 Location of the Project

The project site is Plot No. 112/1-M & 113/4 in the Quaid-e-Azam Industrial Estate, Kot Lakhpat, on Township Road in the south eastern quadrant of Lahore. The estate is a planned and notified industrial area managed by the Punjab Industrial Estates Development and Management Company, laid out on a grid of numbered plots served by metalled internal roads of sixty feet and forty feet width, with reticulated water supply, sewerage and drainage, electricity distribution and street lighting provided as estate infrastructure. The site is bounded by other industrial plots and estate roads on all sides, and is approached from Township Road through the estate road network. The location plan and the site plan showing the plot and its immediate neighbours are placed at Annexure B.

1.6 Area of the Project

The total area of the plot is 20,200 square feet, being 4 kanals and 9 marlas, or approximately 1,877 square metres. Under the building plan submitted for approval, the covered area proposed in the present phase is 9,591.87 square feet and the open area is 10,608.13 square feet. The covered area already approved and constructed on the plot is 28,534.79 square feet, distributed across the ground, mezzanine, first, second and roof floors, so that the total covered area on the plot upon completion will be 38,126.66 square feet. The open area accommodates the approach and circulation space, car parking, the underground water tank, the septic tank, the recharge pit, the solid waste bin and the landscaped strip along the boundary.

1.7 The Proponent and the Consultant

- Proponent: M/s Goree Cosmetics (Private) Limited, a company limited by shares incorporated under the Companies Act, 2017 on 29 January 2018 at the Company Registration Office, Lahore, holding Corporate Universal Identification Number 0115703.
- The company is represented for the purposes of this EIA by its directors, Mr. Muhammad Ishaq son of Muhammad Ibrahim, holding CNIC 35202-6634084-3, and Mr. Shahrukh

Ishaq son of Muhammad Ishaq, holding CNIC 35202-6986483-7, both resident at House No. 279-CC, Phase IV, Defence Housing Authority, Lahore Cantt.

- Project address for correspondence: Plot No. 112/1-M, 113/4, Quaid-e-Azam Industrial Estate, Kot Lakhpat, Township Road, Lahore.
- Consultant: Zoom Consultancy & Services, Lahore.
- The consultant has been engaged by the proponent to carry out the baseline environmental survey, the impact assessment and the stakeholder consultation, to prepare this report, and to assist the proponent through the approval process of the Environmental Protection Agency, Punjab.

1.8 Study Team

The study was carried out by a multidisciplinary team. An environmental team leader was responsible for technical quality, regulatory alignment and overall integration of the report. A chemical and process engineer with experience of cosmetic, personal care and allied batch processing plants advised on the process configuration, the effluent and emission sources and the specification of pollution control equipment. A social and public consultation specialist conducted stakeholder engagement and prepared the socio-economic baseline. Field surveyors collected baseline data and coordinated the sampling of ambient air, noise and water through a laboratory certified by the Environmental Protection Agency.

1.9 Objectives of the EIA

- To establish the physical, biological and socio-economic baseline of the project site and the area within its zone of influence.
- To describe the facility, its process, its inputs and its outputs in sufficient detail for the sources of environmental impact to be identified.
- To identify and evaluate the environmental and occupational impacts likely to arise during construction, operation and eventual decommissioning of the unit.
- To recommend practical and affordable mitigation measures, matched to the scale of the project and capable of being implemented and sustained by the proponent.

- To provide an opportunity for neighbouring occupiers, estate management, workers and other stakeholders to record their views and concerns, and to incorporate those concerns into the project design and management arrangements.
- To prepare an Environmental Management and Monitoring Plan that can be used as a compliance instrument by both the proponent and the regulator.
- To produce a report suitable for submission to the Environmental Protection Agency, Punjab, for environmental approval under Section 12 of the Punjab Environmental Protection Act.

1.10 Purpose of the Report

A cosmetics manufacturing unit combines the bulk handling of oils, waxes, surfactants and chemical additives, a hot batch process, intensive water use for both product and cleaning, and a packaging operation that generates a substantial waste stream. Each of these is capable of affecting water quality, the municipal sewer, ambient air and the health of workers if the plant is poorly laid out or carelessly run. An environmental study is therefore required to establish what conditions prevail at the site before production begins, to predict the changes the unit will cause, and to fix in advance the measures by which those changes will be kept within acceptable limits. Under the Punjab Environmental Protection (Review of IEE and EIA) Regulations, 2022, industrial units of this category fall to be examined at the level adopted in this report, and the screening exercise described in Chapter 3 confirms that classification.

1.11 Scope and Methodology

The scope of the study covers a description of the project and its process, a description of the physical, biological and socio-economic environment of the site and its surroundings, the identification and evaluation of potential impacts across the construction, operational and decommissioning phases, consultation with affected and interested parties, and the preparation of an Environmental Management and Monitoring Plan.

The methodology combined several strands of work. A reconnaissance visit was made to the plot and to the surrounding blocks of the industrial estate to record existing land use, drainage, the position of the nearest sensitive receptors and the condition of the estate infrastructure. The

approved building plan, the equipment list and the process flow supplied by the proponent were reviewed to identify emission points, effluent sources and process risks. Secondary data on climate, geology, hydrology, demography, air quality and land use in Lahore were drawn from published district, provincial and departmental sources. Field measurement of ambient air quality and noise was arranged through a laboratory certified by the Environmental Protection Agency, and water from the site source was sampled and tested. The views of neighbouring occupiers, estate management, workers and residents of the nearest residential pockets were obtained through focus group discussions and structured interviews. The findings from all of these strands were then brought together in the impact assessment presented in Chapter 6.

1.12 Components of the Report

This report presents the screening and detailed assessment of the environmental impacts associated with the proposed unit, together with the necessary mitigation measures, institutional arrangements, monitoring framework and an actionable Environmental Management Plan. It is organized into eight chapters:

Chapter 1: Introduction, project background, purpose, location, need, objectives, and scope of the study.

Chapter 2: Environmental screening, scoping, spatial and temporal boundaries, stakeholder concerns, significant issues, and consideration of alternatives.

Chapter 3: Description of the project, plant process, equipment, raw materials, utilities, waste streams, workforce, and layout.

Chapter 4: Description of the existing environmental and socio-economic conditions of the project area.

Chapter 5: Impact assessment methodology, identification of impacts, characteristics of impacts, and evaluation of their significance.

Chapter 6: Mitigation measures and Environmental Management Plan.

Chapter 7: Environmental monitoring programme, institutional responsibilities, reporting arrangements, and compliance management.

Chapter 8: Occupational health, safety, emergency preparedness, stakeholder consultation, grievance management, and conclusion.

CHAPTER 2: SCREENING, SCOPING AND ANALYSIS OF ALTERNATIVES

2.1 Introduction

This chapter presents the environmental screening, scoping, and analysis of alternatives for the proposed cosmetics manufacturing and packaging facility of M/s Goree Cosmetics (Private) Limited located at Plot No. 112/1-M, 113/4 Quaid-e-Azam Industrial Estate (QIE), Kot Lakhpat, Lahore**.**

The proposed facility is intended for the manufacturing, filling, cooling, capping, sealing, labeling, packaging, storage, and dispatch of cream-based cosmetic products. The maximum installed production capacity is approximately 1 ton (1,000 kg) of cosmetic products per day. The project will operate through a mechanized/automated production line comprising a cream filling machine, cooling tunnel, capping machine, sealing machine, and conveyor system.

The objective of screening is to determine the level of environmental assessment required under the applicable environmental regulations. Scoping identifies the spatial and temporal boundaries of the assessment, key environmental and social issues, stakeholders' concerns, and potentially significant impacts requiring detailed assessment. The consideration of alternatives evaluates feasible project options, including site, technology/design, environmental management, and economic alternatives, in order to identify the most environmentally sound and practicable option.

2.2 Environmental Screening

2.2.1 Purpose of Screening

Environmental screening is the first stage of the environmental assessment process. It determines whether a proposed project requires an Initial Environmental Examination (IEE), an Environmental Impact Assessment (EIA), or may proceed under another applicable regulatory mechanism.

The proposed project involves a cosmetics production and packaging operation within an existing industrial estate. Although the manufacturing scale is comparatively moderate, the activity may involve the handling and storage of cosmetic raw materials, fragrances, preservatives, creams,

cleaning agents, packaging materials, and utility inputs. The project may generate solid waste, domestic and cleaning wastewater, limited odor emissions, noise from equipment, occupational health and safety risks, traffic-related impacts, and fire and emergency risks.

Accordingly, an environmental assessment is required to identify potential impacts, establish mitigation measures, and ensure that the proposed facility operates in compliance with applicable environmental standards and approval conditions.

2.2.2 Applicable Regulatory Framework

The screening of the proposed project shall be undertaken in accordance with the following principal environmental legal and regulatory instruments:

- Pakistan Environmental Protection Act, 1997.
- Punjab Environmental Protection Act, 1997, as applicable in Punjab.
- Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000, as adopted or applicable through the Punjab environmental regulatory framework.
- Punjab Environmental Protection Agency requirements, procedures, and environmental approval conditions.
- National Environmental Quality Standards (NEQS), including applicable standards for industrial effluents, emissions, ambient air quality, noise, and waste management.
- Punjab Occupational Safety and Health requirements and applicable labour laws.
- Building-control, fire-safety, industrial-estate, sewerage, drainage, and solid-waste-management requirements of the relevant authorities.

The project proponent shall obtain environmental approval from the competent environmental authority before commencement of construction or operation activities requiring such approval. The project shall also comply with the conditions imposed by Punjab EPA, Punjab Industrial Estates Development and Management Company (PIEDMC), and any other relevant authority.

2.2.3 Project Characteristics Relevant to Screening

M/s Goree Cosmetics (Private) Limited proposes to establish and operate a cosmetics manufacturing and packaging facility at Plot No. 112/1-M & 113/4 QIE, Lahore. The total plot area is approximately **20,200 sq. ft.**, with a proposed covered area of approximately **9,591.87 sq. ft.** and an open area of approximately **10,608.13 sq. ft.**

The available layout indicates that the project site includes industrial building space, production/packing areas, storage facilities, office and staff areas, parking, drainage arrangements, underground water tank, overhead water tank, septic tank, solid-waste bin, and recharge-pit provisions. The site plan also indicates access through the industrial-estate road network.

Project Attribute	Description
Project proponent	Mr. Shahrukh Ishaq
Proposed activity	Manufacturing, filling, packaging, storage, and dispatch of cosmetic cream products
Project location	Plot No. 112/1-M & 113/4 Quaid-e-Azam Industrial Estate, Kot Lakhpat, Lahore
Total plot area	20,200 sq. ft.
Proposed covered area	9,591.87 sq. ft.
Open area	10,608.13 sq. ft.
Maximum production capacity	Approximately 1 ton or 1,000 kg per day
Major machinery	Filling machine, cooling tunnel, capping machine, sealing machine, conveyor system
Key utilities	Electricity, water, drainage, sewerage, ventilation, fire-safety arrangements, solid-waste collection
Major environmental concerns	Waste generation, wastewater, chemical handling, odor, noise, worker safety, fire risk, traffic, and resource consumption

2.2.4 Screening of Project Activities

The project does not involve mining, quarrying, large-scale chemical processing, petroleum refining, thermal power generation, large-scale hazardous-waste treatment, extensive land conversion, major infrastructure development, or activity within a protected ecological area. The project is located in an established industrial estate and will primarily involve cosmetic-product filling, cooling, capping, sealing, packaging, storage, and dispatch.

However, the project involves industrial manufacturing/packaging activities and may result in environmental impacts if not properly managed. These include handling of raw materials and additives, storage of packaging materials, generation of cleaning wastewater, disposal of rejected products and containers, possible odor or vapor emissions from fragrances and cleaning chemicals, machinery noise, employee exposure to chemicals, fire hazards, and traffic movement.

The likely impacts are considered **site-specific, manageable, and largely reversible**, provided that the facility adopts the recommended mitigation measures, maintains proper waste-management systems, ensures safe chemical handling, provides adequate ventilation, installs fire-safety systems, and implements occupational health and safety procedures.

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2.2.5 Screening Decision

Based on the nature, scale, location, production capacity, process activities, and anticipated environmental impacts, the project is assessed as requiring environmental review and approval by the competent authority. The project is proposed within a designated industrial estate, and its environmental impacts are expected to remain limited to the project site and nearby industrial surroundings, subject to effective environmental management.

The project shall be screened by Punjab EPA under the applicable IEE/EIA Regulations. The final categorization whether the project falls under IEE or EIA requirements shall be determined by Punjab EPA based on the complete project documentation, raw-material inventory, chemical composition of products, wastewater characteristics, fuel and generator details, air-emission sources, waste-generation quantities, and site-specific environmental sensitivity.

For the purpose of this EIA report, the project has been assessed in detail to ensure that all potentially significant issues, including cumulative and indirect impacts, are identified and addressed through an Environmental Management Plan, monitoring program, emergency-response plan, and compliance framework.

Screening Criterion	Assessment for Proposed Project	Screening Conclusion
Project type	Cosmetics manufacturing, filling, packaging, storage, and dispatch	Industrial activity requiring environmental review
Production capacity	Approximately 1 ton per day	Moderate-scale production capacity
Location	Established industrial area at QIE, Kot Lakhpat, Lahore	Environmentally preferable compared with non-industrial or residential locations
Sensitive ecosystems	No protected area, forest, wetland, wildlife habitat, or coastal zone is identified within the project site	Low ecological sensitivity, subject to site verification
Land conversion	Development is proposed on industrial plot within QIE	No conversion of agricultural land or natural habitat is anticipated
Wastewater generation	Domestic sewage and cleaning wastewater	Requires controlled collection and disposal
Air emissions	Limited emissions from vehicles, generator if installed, fragrances, cleaning agents, and material handling	Requires ventilation and emission-control measures
Solid waste	Packaging waste, plastic, cardboard, labels, rejected containers, and domestic waste	Requires segregation, recycling, and authorized disposal
Occupational safety	Chemical handling, machine operation, electrical systems, fire safety, slips, trips, and ergonomic risks	Requires EHS management system
Overall environmental risk	Manageable with mitigation and monitoring	EIA-level assessment completed for comprehensive environmental review

2.3 Scoping

2.3.1 Purpose of Scoping

Scoping is undertaken to identify the important environmental, health, safety, and social issues that need to be evaluated during the EIA process. It establishes the boundaries of the assessment, identifies potential receptors, highlights stakeholder concerns, and determines which potential impacts require detailed analysis.

The scoping process for the proposed Goree Cosmetics facility considers both construction-stage and operational-stage impacts. Although the project is being developed in an industrial estate, the EIA evaluates impacts on air quality, water resources, wastewater, drainage, soil, noise environment, waste management, occupational health and safety, traffic, community health and safety, emergency preparedness, and socio-economic conditions.

2.3.2 Spatial Boundaries of Assessment

The spatial boundary defines the geographical area likely to be influenced by project activities. The spatial extent of impacts varies according to the environmental component being assessed.

The primary area of influence includes the project plot, production area, storage facilities, loading/unloading areas, internal roads, parking spaces, utilities, waste-storage areas, drainage arrangements, and immediate project boundary. The secondary area of influence includes adjoining industrial units, nearby industrial roads, workers, visitors, utility corridors, industrial-estate infrastructure, and nearby communities that may be indirectly affected by traffic, noise, air emissions, or emergency incidents.

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The project is situated at Plot No. 112/1-M, 113/4 QIE, Kot Lakhpat, Lahore. The selected location is part of a planned industrial estate with access to water, sewerage, infrastructure-maintenance services, security, fire-brigade-related provisions, and waste-lifting arrangements.

Environmental Component	Spatial Boundary
Land use and site conditions	Project plot, building footprint, open area, internal circulation space, parking, and waste-storage area
Air quality and odor	Project premises, immediate boundary, adjacent industrial units, and internal industrial-estate roads
Noise and vibration	Production area, machinery areas, loading/unloading zone, project boundary, and adjacent industrial receptors
Surface drainage	Project drainage points, storm-water drains, recharge pit, external industrial-estate drainage connections, and surrounding roads
Wastewater	Washrooms, cleaning areas, sewerage connection, septic tank or approved sewerage-disposal route, as applicable
Solid waste	Production area, packing section, storage areas, waste-collection points, and authorized disposal/recycling route
Traffic and transportation	Site access, loading/unloading points, internal roads, and nearby industrial-estate roads
Occupational health and safety	Entire project premises, including production, packing, storage, offices, utilities, and emergency exits
Community health and safety	Immediate neighboring industrial units, visitors, transporters, and workers in the surrounding industrial area
Ecology	Project site and immediate vicinity, with emphasis on any trees, vegetation, birds, drainage features, or sensitive ecological receptors, if present

2.3.3 Temporal Boundaries of Assessment

The temporal boundary refers to the duration and phases of the project during which environmental impacts may occur. The EIA considers impacts associated with pre-construction, construction, commissioning, operation, maintenance, emergency events, and eventual decommissioning or closure.

The construction phase may involve site preparation, civil works, installation of machinery, electrical works, plumbing, drainage, storage arrangements, internal finishing, and commissioning. Construction impacts are expected to be temporary and include dust, noise,

construction waste, traffic movement, worker-safety risks, and temporary disturbance within the industrial-estate environment.

The operational phase is the principal focus of the assessment because it will involve continuous production, filling, cooling, capping, sealing, packaging, storage, cleaning, waste generation, vehicle movement, utility consumption, and employee activities. Operational impacts will persist throughout the life of the facility and require regular monitoring and implementation of the Environmental Management Plan.

Project Phase	Expected Duration / Nature	Key Environmental Considerations
Pre-construction	Project planning, approvals, detailed design, procurement, and mobilization	Environmental approval, site planning, design of drainage, waste-storage areas, ventilation, and fire safety
Construction	Site preparation, civil works, building works, machinery installation, utilities installation	Dust, noise, construction waste, traffic, worker safety, drainage control
Commissioning	Testing of equipment and production line	Equipment safety, leaks, trial waste generation, emergency preparedness, staff training
Operation	Long-term production, filling, cooling, capping, sealing, packaging, storage, and dispatch	Wastewater, solid waste, odors, noise, resource consumption, worker safety, traffic, fire risk
Maintenance	Routine maintenance of machinery, utilities, electrical systems, and fire equipment	Used lubricants, maintenance waste, electrical safety, shutdown safety
Emergency conditions	Fire, chemical spill, electrical fault, machinery malfunction, wastewater overflow	Emergency response, evacuation, containment, reporting, and corrective action
Decommissioning / closure	Future cessation of operations, removal of machinery, cleaning, and site restoration	Disposal of materials, cleaning of storage areas, waste removal, and site rehabilitation

2.3.4 Stakeholder Consultation and Issues Raised

Stakeholder consultation is an important part of the EIA process. It assists in identifying local concerns, incorporating practical recommendations, and ensuring that the project is developed and operated in a socially responsible manner.

For the proposed project, relevant stakeholders may include the project proponent, employees, nearby industrial-unit owners and workers, Quaid-e-Azam Industrial Estate management, PIEDMC, Punjab EPA, local government departments, utility providers, waste collectors, transporters, emergency-response agencies, and nearby community representatives where relevant.

The key issues expected to be raised during consultation are related to proper solid-waste disposal, wastewater management, odor control, traffic movement, fire safety, chemical storage, worker health and safety, noise, drainage, employment opportunities, and communication with nearby units in case of emergencies.

Stakeholder Group	Likely Issues / Concerns	Project Response
Punjab EPA	Compliance with environmental approval conditions, waste management, wastewater disposal, air emissions, and monitoring	Implement EMP, monitoring program, compliance records, and reporting as required
PIEDMC / QIE management	Compliance with industrial-estate rules, sewerage, water use, solid-waste services, road access, and fire safety	Coordinate with estate management and follow utility and operational requirements
Nearby industrial units	Noise, traffic congestion, loading/unloading, odor, fire risk, and drainage	Maintain controlled operations, scheduled deliveries, proper ventilation, fire safety, and housekeeping
Employees	Safe work environment, PPE, chemical exposure, machine safety, sanitation, welfare facilities, and emergency response	Provide training, PPE, machine guarding, ventilation, first aid, fire safety, and worker welfare
Transporters and visitors	Safe site access, vehicle movement, loading/unloading safety, and emergency information	Provide traffic-management arrangements, signage, designated

		loading area, and safety procedures
Waste collectors / recyclers	Waste segregation, waste-storage arrangements, and regular collection	Segregate waste, store in covered labeled bins, and engage authorized waste handlers
Surrounding community	Environmental pollution, odor, waste disposal, employment, and emergency incidents	Maintain compliance, minimize emissions, prevent off-site impacts, and provide emergency coordination where needed

2.3.5 Important Issues and Concerns

The following issues have been identified as important for detailed consideration in the EIA:

- Potential generation of solid waste from cardboard boxes, plastic wrapping, labels, empty containers, rejected jars, damaged packaging, office waste, and cleaning materials.
- Potential generation of domestic wastewater from staff washrooms and cleaning wastewater from machinery, floors, containers, and work areas.
- Potential odors and limited volatile emissions from fragrances, raw materials, preservatives, solvents, cleaning chemicals, and stored cosmetic ingredients.
- Potential air emissions from delivery vehicles, dispatch vehicles, material-handling activities, and standby diesel generator operation, if a generator is installed.
- Noise generation from filling machines, cooling systems, capping and sealing machinery, compressors, generators, material movement, and vehicles.
- Occupational exposure to chemical ingredients, fragrances, preservatives, cleaning agents, heat, moving machinery, electrical equipment, sharp packaging materials, repetitive work, and ergonomic stress.
- Fire and emergency risks associated with electrical installations, storage of combustible packaging materials, chemical handling, machinery malfunction, and possible use of flammable cleaning agents or solvents.
- Potential contamination of soil or drainage channels in the event of spills, improper waste disposal, wastewater overflow, or accidental leakage.
- Increased traffic movement associated with raw-material deliveries, employee transportation, finished-product dispatch, and waste collection.

- Consumption of electricity and water, particularly for machinery, lighting, cooling, washing, sanitation, and cleaning operations.
- Need for safe drainage, storm-water management, and prevention of mixing of storm water with chemical residues, wastewater, or solid waste.

2.3.6 Significant Impacts and Factors to be Determined

The significance of environmental impacts will be evaluated on the basis of the nature, duration, magnitude, extent, reversibility, probability, regulatory relevance, and sensitivity of the affected receptors. Impacts will also be evaluated with and without mitigation measures.

The project's environmental impacts are generally expected to be low to moderate after implementation of mitigation measures. However, certain risks particularly chemical handling, waste management, wastewater disposal, fire safety, and occupational health and safety require strict operational controls and regular monitoring.

Environmental Aspect	Potential Impact	Main Factors for Determining Significance	Preliminary Significance
Land use	Industrial development within designated industrial plot	Existing land use, plot ownership, industrial zoning, extent of built-up area	Low
Soil and groundwater	Contamination from spills, chemical leakage, waste disposal, or wastewater overflow	Type and quantity of chemicals, containment system, drainage condition, spill response	Moderate before mitigation; low after mitigation
Surface water and drainage	Pollution of drains due to wastewater, spills, or improper disposal	Wastewater quantity, drainage design, sewer connection, cleaning practices	Moderate before mitigation; low after mitigation
Air quality	Vehicle exhaust, generator emissions, odors, vapors from fragrances and chemicals	Fuel use, generator capacity, ventilation, chemical type, operating hours	Low to moderate
Noise	Machinery, cooling equipment, generator, loading/unloading, and vehicle movement	Noise level, duration, distance to receptors, working hours, maintenance	Low

Solid waste	Packaging waste, rejected products, plastic, paper, cardboard, and domestic waste	Waste quantity, segregation, recycling, collection frequency, disposal route	Moderate before mitigation; low after mitigation
Hazardous / special waste	Contaminated containers, chemical residues, used cleaning material, used oil if applicable	Nature of chemicals, storage, disposal method, contractor authorization	Moderate
Occupational health and safety	Injury, chemical exposure, fire, electrical shock, slips, machine accidents	PPE, machine guarding, training, ventilation, emergency systems, supervision	Moderate to high before mitigation; low to moderate after mitigation
Community health and safety	Off-site impacts from fire, smoke, traffic, improper waste disposal, or odors	Emergency preparedness, traffic plan, boundary controls, fire-fighting capacity	Moderate before mitigation; low after mitigation
Traffic	Congestion, road safety concerns, loading/unloading conflicts	Number and timing of vehicles, road capacity, site access, parking arrangements	Low
Water consumption	Stress on water supply and increased wastewater generation	Water demand, conservation measures, leak control, reuse options	Low to moderate
Energy use	Increased electricity consumption and associated indirect emissions	Equipment efficiency, energy management, operating hours, maintenance	Low
Socio-economic conditions	Employment, local procurement, industrial growth, workforce development	Number of jobs, local hiring, worker welfare, contractor practices	Positive

2.4 Consideration of Alternatives

2.4.1 Introduction

The analysis of alternatives is an essential component of the EIA process. It examines reasonable alternatives to the proposed project in order to identify the option that offers the best balance between technical feasibility, environmental protection, operational safety, regulatory compliance, and economic viability.

For the proposed M/s Goree Cosmetics (Private) Limited project, alternatives have been considered under the following categories:

1. Site alternatives.
2. Design and technology alternatives.
3. Environmental alternatives.
4. Economic alternatives.
5. No-project alternative.

The proposed option has been selected because it is located in an established industrial estate, has access to industrial infrastructure and utility services, supports controlled waste and wastewater management, and allows the project to operate with lower environmental risk than a comparable facility located in a residential, commercial, agricultural, or environmentally sensitive area.

2.5 Site Alternatives

2.5.1 Site Selection Criteria

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The selection of the project site was evaluated with reference to environmental, technical, operational, and socio-economic considerations. The preferred site is located within Quaid-e-Azam Industrial Estate, Kot Lakhpat, Lahore, which is an established industrial area intended to accommodate industrial and manufacturing activities.

The proposed plot is approximately 20,200 sq. ft. in area and is located within an industrial estate with road access, water supply, sewerage and drainage arrangements, waste-lifting provisions, maintenance services, security, and fire-brigade-related facilities.

The site selection was based on the suitability of the plot for industrial use, accessibility for raw-material delivery and product dispatch, availability of utilities, proximity to markets and distribution networks, compatibility with surrounding land uses, and reduced likelihood of conflict with residential or environmentally sensitive receptors.

Site Selection Criterion	Preferred Site: Plot No. 112/1-M, 113/4QIE	Alternative Site in Residential / Commercial Area	Alternative Greenfield / Agricultural Site
Land-use compatibility	Located in designated industrial estate	Potentially incompatible with nearby residential and commercial uses	May require land conversion and change of land use
Access to industrial infrastructure	Available through industrial-estate services	May require independent utility arrangements	May require major infrastructure development
Road access and logistics	Suitable industrial-road access for deliveries and dispatch	Traffic congestion and public-road conflict may occur	May require new roads or upgrading of access routes
Sewerage and drainage	Industrial-estate support and established drainage context	Existing municipal systems may be overloaded	New sewerage and drainage systems may be required
Waste management	Access to organized waste-lifting and estate services	Greater risk of improper waste handling in congested areas	Independent waste-management arrangements required
Community disturbance	Limited because surrounding area is industrial	Higher risk of noise, traffic, odor, and safety concerns	Potential disturbance to rural community and natural land
Environmental sensitivity	Lower compared with agricultural or natural areas	Moderate to high due to population density	Potentially high due to loss of open land, vegetation, or agriculture
Overall suitability	Preferred and selected	Rejected	Rejected

2.5.2 Selected Site

The selected site at Plot No. 112/1-M, 113/4 Quaid-e-Azam Industrial Estate, Kot Lakhpat, Lahore, is considered the preferred alternative because it is located in a planned industrial area. The site provides compatibility with the proposed cosmetics manufacturing and packaging activity and reduces the likelihood of land-use conflict with residential, agricultural, commercial, or environmentally sensitive areas.

The site is supported by industrial estate infrastructure and services. The available documentation indicates provisions relating to water, sewerage, waste lifting, operational maintenance, security, emergency-response/fire-brigade services, and industrial-estate management.

The proposed location is therefore environmentally preferable because it avoids the need for development on agricultural land, natural habitat, greenfield land, or densely populated residential areas.

2.5.3 Rejected Site Alternatives

Alternative locations outside the designated industrial estate were not preferred because they could result in greater environmental and social impacts. A facility in a residential or mixed-use urban area could create concerns related to traffic congestion, noise, odor, waste handling, chemical storage, fire risk, and community health and safety.

Similarly, a greenfield or agricultural site would require conversion of land, possible removal of vegetation, development of roads and utilities, and establishment of independent wastewater, drainage, waste-management, and emergency-response arrangements. Such alternatives would result in higher capital cost, longer development time, increased ecological disturbance, and a greater regulatory burden.

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2.6 Design and Technology Alternatives

2.6.1 Selected Process Technology

The selected technology is a mechanized/automated cream filling and packaging line. The process includes filling cream into empty jars or tubs, passing filled containers through a cooling tunnel, applying caps or lids through a capping machine, sealing the containers, and transferring finished products for labeling, packing, storage, and dispatch.

The selected process is considered appropriate because it improves product consistency, reduces manual contact with cosmetic products, minimizes product spillages, supports quality control, improves hygiene, and enhances workplace efficiency.

The production line has a maximum manufacturing capacity of approximately 1 ton or 1,000 kg per day. The equipment arrangement is suited to the proposed scale of operation and allows the proponent to maintain controlled production conditions.

Technology Option	Description	Environmental / Operational Implications	Decision
Fully manual filling and packing	Manual filling, capping, sealing, and transfer of products	Higher risk of product spillage, inconsistent filling, worker exposure, hygiene concerns, ergonomic stress, and material wastage	Rejected
Semi-automated / automated filling and packaging line	Conveyor-based filling, cooling, capping, and sealing system	Better production control, reduced product loss, lower manual handling, improved hygiene, and easier quality control	Selected
High-capacity fully automated industrial line	Large-scale high-speed system beyond present requirements	Higher capital cost, higher electricity demand, excess production capacity, and potentially increased waste generation	Not selected at present
Outsourced production	Production through third-party manufacturers	Reduced direct operational control, uncertain quality and environmental compliance, dependence on external parties	Not preferred

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2.6.2 Selection and Rejection Criteria

The selected design and technology option was chosen after considering the following factors:

- Suitability for the planned production capacity of approximately 1 ton per day.
- Ability to maintain product quality and hygiene.
- Reduction in material loss, overfilling, and product spillage.
- Reduction in direct worker contact with cosmetic formulations.
- Ease of cleaning and maintenance.
- Compatibility with occupational health and safety requirements.
- Ability to control noise, energy consumption, and waste generation.
- Availability of spare parts, maintenance support, and trained operators.
- Cost-effectiveness and operational reliability.
- Compliance with applicable environmental, health, and safety requirements.

The manual alternative was rejected because it could result in a greater probability of worker exposure, repetitive-motion injuries, inconsistent product filling, increased cosmetic-product wastage, and higher risk of hygiene-related quality concerns. The oversized high-capacity

automated alternative was not selected because it would not be proportionate to the project's present production requirement and would impose unnecessary capital, energy, and maintenance costs.

2.6.3 Cleaner Production and Technology Measures

The project shall incorporate cleaner-production practices in the final design and during operation. The following measures shall be adopted:

- Use closed or covered containers for raw materials, fragrances, creams, preservatives, and cleaning chemicals.
- Use accurately calibrated filling machines to prevent overfilling and product losses.
- Install machine guards, emergency stop switches, and safe electrical systems.
- Provide adequate ventilation in production, packaging, storage, and chemical-handling areas.
- Use energy-efficient motors, pumps, cooling equipment, lighting systems, and ventilation systems.
- Install LED lighting and adopt energy-conservation practices.
- Use dry cleaning or wiping methods before wet washing to minimize wastewater generation.
- Provide designated wash areas with controlled drainage.
- Use spill trays or secondary containment in chemical-storage and handling areas.
- Segregate recyclable packaging waste from contaminated or non-recyclable waste.
- Maintain preventive-maintenance schedules to reduce leakage, excessive noise, downtime, and energy losses.

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2.7 Environmental Alternatives

2.7.1 Environmental Management Alternatives

Environmental alternatives were assessed to determine the most effective methods for controlling project-related impacts. The preferred approach is prevention at source, followed by reduction, reuse, recycling, recovery, treatment, and safe disposal.

The project shall avoid reliance on end-of-pipe measures alone. Instead, the facility shall use good housekeeping, controlled material handling, efficient production practices, waste segregation, appropriate ventilation, fire protection, worker training, and regular monitoring to prevent or reduce environmental impacts before they occur.

Environmental Aspect	Less Preferred Alternative	Preferred Environmental Alternative	Selection Basis
Solid waste	Mixing all waste and disposal as general municipal waste	Waste segregation, recycling of clean packaging waste, covered storage, and authorized disposal	Reduces landfill burden and prevents contamination
Wastewater	Direct disposal to open drains or storm-water channels	Controlled collection and discharge to approved sewerage/disposal system	Prevents water and soil pollution
Cleaning practices	Excessive water use and uncontrolled washing	Dry cleaning first, controlled washing, water-efficient practices	Reduces water use and wastewater generation
Chemical storage	Open or poorly labeled storage	Labeled, closed, compatible containers with spill containment and SDS availability	Prevents leaks, exposure, and fire risk
Air and odor control	Natural ventilation only	Adequate mechanical ventilation and local exhaust where required	Reduces indoor exposure and odor nuisance
Noise management	Reactive repair only	Preventive maintenance, equipment inspection, and hearing protection where needed	Reduces noise and machinery-related risks
Fire safety	Basic extinguishers only	Comprehensive fire-safety system, emergency exits, training, drills, alarms, and emergency-response plan	Improves life safety and asset protection
Energy use	Conventional inefficient lighting and equipment	LED lighting, efficient machinery, switch-off controls, and preventive maintenance	Reduces energy use and operating cost

2.7.2 Wastewater-Management Alternatives

The proposed facility may generate domestic wastewater from toilets, staff facilities, and pantry areas, as well as limited cleaning wastewater from machinery, floors, containers, and production

areas. The preferred environmental option is to minimize wastewater generation and route wastewater to an approved sewerage/disposal system.

The project shall not discharge wastewater into open drains, storm-water drains, vacant land, or unapproved channels. Where wastewater contains cosmetic residue, detergent, oil, or chemical traces, suitable collection, controlled cleaning practices, and pre-treatment measures shall be adopted as required by the relevant authority.

The site layout indicates drainage, septic-tank, underground water-tank, and recharge-pit provisions. Storm water shall be kept separate from domestic sewage and cleaning wastewater.

Wastewater Option	Assessment	Decision
Direct discharge to storm-water drain	High risk of pollution and non-compliance	Rejected
Disposal on open land	Risk of soil and groundwater contamination	Rejected
Uncontrolled discharge to municipal sewer	May overload sewer and transfer pollutants without controls	Rejected
Controlled discharge to approved sewerage arrangement	Suitable if wastewater quality and flow are managed	Selected
Wastewater minimization and reuse where feasible	Reduces water consumption and effluent volume	Selected as supplementary measure

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2.7.3 Solid-Waste-Management Alternatives

The project will generate packaging waste, cardboard, paper, plastic wrappers, rejected containers, labels, empty raw-material containers, domestic waste, and possibly contaminated cleaning materials. The preferred approach is segregation at source and recovery of recyclable waste.

Clean cardboard, paper, plastic, and metal material shall be segregated and handed over to authorized recyclers. Non-recyclable general waste shall be stored in covered bins and transferred through the authorized waste-lifting arrangement. Contaminated containers, chemical residues, used absorbent material, used oil, and cleaning waste shall be handled separately and disposed of through an authorized waste handler in accordance with applicable requirements.

The project layout includes provision for a solid-waste bin, which shall be appropriately covered, labeled, and maintained to prevent littering, odors, pest attraction, and rainwater entry.

2.7.4 Air Quality and Odor-Control Alternatives

Potential air-quality impacts may arise from internal vehicle movement, delivery and dispatch vehicles, standby-generator emissions where applicable, chemical handling, fragrances, cleaning chemicals, and minor product-related vapors. The project shall adopt preventive measures rather than relying only on dilution of emissions.

The preferred option includes the use of closed containers, prompt cleaning of spills, controlled storage of chemicals, mechanical ventilation, local exhaust where required, preventive maintenance of generators and vehicles, and avoidance of unnecessary idling of delivery vehicles. Raw materials that produce strong odors or vapors shall be stored in properly sealed containers in well-ventilated areas.

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2.7.5 Occupational Health and Safety Alternatives

The preferred occupational health and safety alternative is the implementation of a structured Environmental, Health and Safety Management System. This shall include hazard identification, risk assessment, training, PPE, machine guarding, fire protection, first aid, emergency response, incident reporting, and periodic safety audits.

The alternative of relying solely on worker experience without documented procedures is not acceptable because it may increase risks related to chemical exposure, machine injury, electrical hazards, fire, slips, trips, falls, and inadequate emergency response.

2.8 Economic Alternatives

2.8.1 Economic Considerations

Economic alternatives were evaluated by balancing initial capital cost against long-term operational efficiency, regulatory compliance, worker safety, product quality, and environmental performance. The lowest initial-cost alternative is not necessarily the most economical over the

project life cycle because poor waste management, inefficient equipment, accidents, product wastage, regulatory non-compliance, and high energy consumption can result in greater long-term costs.

The selected project alternative is economically viable because it uses a production line suited to the intended capacity, is located within an industrial estate with existing infrastructure, and supports efficient product filling and packaging. The use of mechanized equipment is expected to reduce material wastage, improve product consistency, reduce manual handling, and support timely production and dispatch.

Economic Alternative	Initial Cost	Long-Term Operating Cost	Environmental / Safety Performance	Decision
Low-cost manual production system	Low	High due to wastage, labor intensity, quality variation, and potential accidents	Comparatively poor	Rejected
Selected mechanized filling and packaging system	Moderate	Moderate to low due to efficiency, controlled filling, and reduced wastage	Good	Selected
Oversized automated high-capacity line	High	High due to energy, maintenance, and underutilization	Good but not proportionate to project scale	Not selected
Inadequate waste and safety controls	Low initial cost	High risk of penalties, accidents, cleanup costs, and reputational damage	Poor	Rejected
Investment in environmental controls	Moderate	Lower lifecycle cost through resource savings, compliance, and risk reduction	Preferred	Selected

2.8.2 Preferred Economic Alternative

The preferred economic alternative is the implementation of a properly designed, environmentally controlled, mechanized cosmetics manufacturing and packaging facility within the Quaid-e-Azam Industrial Estate. This option offers the best balance between production efficiency, product quality, worker safety, environmental compliance, resource conservation, and commercial viability.

Investment in environmental safeguards such as waste-segregation facilities, drainage controls, ventilation, fire-safety equipment, PPE, chemical-storage arrangements, energy-efficient equipment, and monitoring systems shall be treated as an essential project cost rather than an optional expense. These measures will reduce the likelihood of accidents, product losses, regulatory non-compliance, environmental damage, worker illness, and operational disruptions.

2.9 No-Project Alternative

Under the no-project alternative, the proposed facility would not be developed. This would avoid the environmental impacts associated with construction, operation, resource consumption, wastewater generation, waste generation, traffic, and occupational health and safety risks.

However, the no-project alternative would also result in the loss of potential positive socio-economic benefits, including employment generation, industrial growth, local procurement, revenue generation, development of local manufacturing capability, and increased availability of cosmetic products through a controlled manufacturing and packaging facility.

The no-project alternative is therefore not preferred, provided that the project is implemented in accordance with the Environmental Management Plan, applicable environmental approval conditions, occupational health and safety requirements, fire-safety standards, and waste-management procedures.

2.10 Conclusion

The screening and scoping assessment indicates that the proposed M/s Goree Cosmetics (Private) Limited facility has the potential to generate manageable environmental, occupational health and safety, and community-related impacts during construction and operation. The principal issues requiring attention are wastewater management, solid-waste segregation and disposal, chemical storage, odor and ventilation control, occupational health and safety, fire prevention, traffic management, energy use, water conservation, and emergency preparedness.

The selected site within Quaid-e-Azam Industrial Estate is environmentally preferable because it is located in a designated industrial area with access to utility, drainage, waste-lifting, security,

maintenance, and fire-safety-related services. The selected mechanized filling, cooling, capping, and sealing technology is appropriate for the proposed production capacity of approximately 1 ton per day and is expected to reduce material loss, product spillage, direct worker exposure, and quality-control concerns.

Subject to implementation of the Environmental Management Plan, environmental monitoring program, waste-management procedures, chemical-handling protocols, occupational health and safety measures, and emergency-response arrangements, the project is considered environmentally manageable and suitable for approval by the competent environmental authority.

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CHAPTER 3: DESCRIPTION OF THE PROJECT

3.1 General

This chapter describes the proposed cosmetics manufacturing unit in the detail needed to identify where its environmental effects originate. It covers the classification of the project, the alternatives considered, the site and its boundary, the production process step by step, the materials consumed and produced, the supporting infrastructure, the manpower required and the schedule for implementation.

3.2 Type and Category of the Project

The project is an industrial installation for the manufacture of cosmetic creams and allied personal care preparations, classified within the chemical and consumer products sector. It is a batch process unit of small to medium capacity, rated at one ton per day of finished product, occupying a plot of 20,200 square feet held in ownership. Under the Punjab Environmental Protection (Review of IEE and EIA) Regulations, 2022, manufacturing units of this description are subject to environmental assessment before commencement, and the screening exercise carried out at the outset of this study concluded that the combination of chemical raw material handling, fuel fired utility equipment, industrial effluent discharge to a public sewer and a substantial packaging waste stream warranted assessment at the level presented in this report.

3.3 Project Objectives

- To establish a purpose built, hygienically laid out manufacturing facility for the company's cream and personal care range on land it owns within a planned industrial estate.
- To raise the consistency and hygiene of the product by moving from manual handling to an automatic filling, cooling, capping and sealing line.
- To bring compounding, quality control, packing and warehousing onto a single site so that material movement is reduced and product traceability is improved.
- To create direct and indirect employment for skilled, semi-skilled and unskilled workers in the Kot Lakhpat industrial belt.

- To demonstrate that a unit of this type can operate within the Punjab Environmental Quality Standards through proper layout, effluent pre-treatment, waste segregation and disciplined housekeeping.

3.4 Background

The proponent has been manufacturing and marketing cosmetic creams for the domestic market since its incorporation in 2018, and the growth of its range has made a dedicated facility necessary. Rather than lease premises in a mixed use area, the company purchased an industrial plots in the Quaid-e-Azam Industrial Estate, where land use is notified for manufacturing, the road network is designed for goods vehicles, water supply and sewerage are provided as estate infrastructure, and an electricity connection with a 200 kVA transformer was already in place. Part of the covered area on the plot is already approved and constructed. The present project completes the proposed covered area under the approved building plan and equips it as a cream manufacturing unit rated at one ton per day.

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3.5 Project Alternatives

3.5.1 The No Project Alternative

Under this alternative the facility would not be built and the company would continue to manufacture in its existing arrangements or to have its product made by third parties. This would avoid the localized effluent, waste and traffic associated with the new unit, but it would not avoid the environmental cost of manufacture, which would simply be incurred elsewhere and very possibly at premises with no effluent pre-treatment, no waste segregation and weaker hygiene control. It would also forgo the employment, the improvement in product hygiene and the opportunity to apply modern environmental controls in a purpose designed layout. Weighed in the round, the no project alternative was not considered to offer a net environmental or economic advantage.

3.5.2 Site Alternatives

Alternative locations were considered, including rented premises in mixed residential and commercial areas of the city and plots on the urban periphery outside a notified estate. Premises in mixed use areas were rejected because industrial effluent, goods traffic and chemical storage sit

badly beside housing, and because such locations offer no lawful route for the disposal of an industrial effluent. Peripheral plots outside an estate were rejected because they would require independent arrangements for water, sewerage, access and security, at a higher environmental as well as financial cost. The selected plot was preferred because it is owned by the proponent, lies within a notified industrial estate whose land use is already industrial, is served by estate water supply, sewerage, drainage, roads and power including an installed transformer, and is surrounded by other manufacturing units rather than by sensitive receptors.

3.5.3 Technology and Process Alternatives

Manual and semi-automatic filling with hand capping was compared with the automatic line selected, comprising a filling machine, a cooling tunnel, a capping machine and a sealing machine served by a conveyor. The automatic line was preferred on both product and environmental grounds. It reduces spillage and therefore reduces both product loss and the organic load in the washing water, it reduces direct hand contact with the product and so improves hygiene, it lowers the number of workers exposed to repetitive strain, and it gives a closed and controllable dosing that manual ladling cannot match. For compounding, jacketed vessels with a homogenizer and a scraper agitator were selected over open kettles, since a closed jacketed vessel contains vapour and odour, heats uniformly and consumes less energy per batch.

3.5.4 Utility and Energy Alternatives

Steam raising for jacketed heating was compared between a gas fired boiler, a diesel fired boiler and direct electric heating. Pipeline natural gas is the preferred fuel on emission grounds, being lower in sulphur and particulate than furnace oil or diesel, and will be used as the primary fuel where supply and pressure permit. Direct electric heating was retained as an option for smaller vessels because it produces no flue gas at all at the point of use. Furnace oil and waste oil firing were rejected outright on emission grounds. For cooling, a closed circuit chiller with a recirculating cooling loop was selected in preference to once through water cooling, since the latter would multiply water consumption several times over for no process benefit.

3.5.5 Effluent Management Alternatives

Direct discharge of washing water to the estate sewer without treatment was considered and rejected, since the stream carries oils, waxes and surfactants at concentrations capable of exceeding the effluent standard and of causing grease deposition in the sewer. A full biological treatment plant was considered and judged disproportionate to the volume involved. The selected arrangement is a physical and chemical pre-treatment unit comprising a collection sump with screening, an oil and grease interceptor, pH correction, coagulation and settling with sludge and skimmings removal, producing a discharge that meets the Punjab Environmental Quality Standards for effluent entering a sewerage system, with the option of adding a biological polishing stage should monitoring show it to be necessary.



Figure 1: Google map of project site

3.6 Location and Site Boundary

The unit will be established on Plot No. 112/1-M, 113/4 in the Quaid-e-Azam Industrial Estate, Kot Lakhpat, Township Road, Lahore. The plot measures 4 kanals and 9 marlas, that is 20,200

square feet, and is owned by the proponent under a registered sale deed executed on 29 December 2023 before the Sub Registrar, Nishtar Town, Lahore, a copy of which is placed at Annexure A.

The plot is rectangular and is bounded by neighbouring industrial plots of the same block and by the estate internal roads of sixty feet and forty feet width shown on the site plan. The surrounding land use on all sides is industrial. There is no watercourse, canal or natural drain within or adjoining the plot. No school, hospital, mosque, shrine, graveyard, archaeological site, protected area or critical habitat falls within or adjacent to the boundary. The nearest residential pockets lie outside the estate at a distance across the estate road network, separated from the plot by intervening industrial plots.

3.7 Description of the Manufacturing Process

Cosmetic cream is manufactured by preparing an oil phase and a water phase separately, combining them under high shear so that one is dispersed in the other as a stable emulsion, cooling the emulsion under controlled agitation, adding the heat sensitive ingredients such as fragrance and certain actives at the correct low temperature, and then filling, cooling, capping and sealing the product. The process at this unit will proceed in the following stages.

3.7.1 Receipt, Storage and Dispensing of Raw Materials

Oils, waxes, fatty alcohols, emulsifiers, humectants, preservatives, actives, fragrance and packaging materials are received at the goods inward area, checked against the purchase documents and the supplier certificate of analysis, sampled by the quality control laboratory and, once released, placed in the raw material store. Chemicals are stored on pallets or racks by category, with incompatible materials separated, with fragrance and alcohol kept in a cool, ventilated and fire protected area, and with material safety data sheets available at the store. Quantities for each batch are weighed out in a dispensing room against the batch manufacturing record, with weighing carried out over a tray or under local exhaust where the material is a fine powder.

3.7.2 Water Purification

Water drawn from the site storage is treated through a purification train, typically comprising filtration, softening, activated carbon and reverse osmosis, to produce purified water of the quality

required for a product applied to skin. Purified water is stored in a dedicated tank and circulated through a loop rather than held static. The reverse osmosis stage produces a reject stream which, being simply concentrated raw water rather than a contaminated effluent, is collected for reuse in floor washing, cooling make-up and landscape irrigation instead of being sent to the drain.

3.7.3 Preparation of the Oil Phase and the Water Phase

The oil phase, consisting of mineral or vegetable oils, stearic acid, fatty alcohols, waxes and oil soluble emulsifiers, is charged into a jacketed vessel and heated to the temperature specified in the formula, generally in the region of seventy five to eighty five degrees Celsius, until fully melted and uniform. The water phase, consisting of purified water, humectants such as glycerine or propylene glycol, water soluble emulsifiers and chelating agents, is prepared in a second jacketed vessel and heated to approximately the same temperature. Heating is by steam or hot water through the vessel jacket, so that there is no direct flame contact with the product and no risk of local charring.

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3.7.4 Emulsification and Homogenization

The two phases are combined in the main manufacturing vessel under continuous agitation, with the homogenizer running to reduce droplet size and produce a uniform and stable emulsion. Mixing time, speed and temperature are controlled to the batch record. The vessel is closed during this stage, which contains vapour and odour within the equipment.

3.7.5 Cooling, Addition of Actives and Perfuming

Chilled water is circulated through the vessel jacket to bring the batch down under slow agitation. Preservatives, active ingredients, colour where used and fragrance are added at the temperature specified in the formula, generally below forty degrees Celsius, because adding them hot degrades them and drives volatile fragrance components off into the workplace air. Correct cooling before perfuming is treated in this report as an environmental control measure as well as a quality measure, since it is the main determinant of how much odour escapes from the compounding hall.

3.7.6 Quality Control Release

A sample is drawn and tested in the laboratory for appearance, odour, pH, viscosity, homogeneity, microbial count and any product specific parameter. The batch is transferred to the filling line only after release. Held bulk is stored in closed stainless steel containers or in the insulated room provided in the layout.

3.7.7 Filling

Released bulk is transferred to the hopper of the automatic cream filling machine. Empty jars or tubs are loaded onto the conveyor and pass under the filling heads, where each container is filled with the set quantity by volumetric or piston dosing. Nozzle drip trays and a suck back arrangement are provided so that product is not deposited on the container rim or the conveyor, which is both a hygiene requirement and the simplest way of reducing the load in the wash water.

3.7.8 Cooling Tunnel

The filled containers pass through a cooling tunnel, which brings the product to the required temperature and allows the cream to set properly with a smooth surface before a cap is applied. Cooling is by circulated chilled air from the plant chiller.

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3.7.9 Capping

The cooled containers enter the capping machine, where caps or lids are placed and tightened to a set torque. Rejected or badly seated caps are removed at this point and set aside for reuse or disposal.

3.7.10 Sealing

The capped jars pass through the sealing machine, where an induction or heat seal is applied to give product protection and tamper evidence. The complete line therefore runs as filling machine, cooling tunnel, capping machine, sealing machine, and from there to finished product.

3.7.11 Secondary Packing and Warehousing

Sealed jars are labelled, batch coded with the manufacturing and expiry dates, packed into cartons and shrink wrapped or taped, then palletised and moved to the finished goods warehouse by the cargo lift shown on the layout. Dispatch is against a documented record.

3.7.12 Cleaning Between Batches

Vessels, homogenizers, transfer lines, hoppers and filling nozzles are cleaned between batches and at the end of each production run. Residual product is first removed dry by scraping and wiping, and the recovered material is collected in a container rather than washed to drain. The equipment is then washed with hot water and a suitable detergent, rinsed, and where the formula requires it sanitized with a food grade sanitizer or alcohol. All washing water is collected and routed to the effluent pre-treatment unit. This stage is the single largest source of effluent at the unit and is the focus of the water related mitigation measures in Chapter 6.

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3.8 Raw Materials and Consumption

The indicative daily consumption of materials and utilities at full rated output of one ton per day is set out below. Actual figures vary with the formula in production and the pack size being filled.

Table 3.1: Indicative Daily Material and Utility Consumption

Input	Indicative Daily Quantity	Remarks
Purified water as product ingredient	550 to 700 kg	Produced on site through the purification train
Oils, waxes, stearic acid and fatty alcohols	150 to 250 kg	Received in drums and bags, stored in the chemical store
Emulsifiers and surfactants	30 to 60 kg	Stored by category with incompatible materials separated
Humectants such as glycerine and propylene glycol	30 to 60 kg	Received in drums
Preservatives, chelating agents and pH adjusters	3 to 8 kg	Small quantities, weighed under supervision
Active ingredients and extracts	5 to 20 kg	Stored under the conditions specified by the supplier
Fragrance and essential oils	3 to 10 kg	Flammable, stored cool, ventilated and fire protected
Packaging: jars, caps, seals, labels and cartons	Matched to output	Principal source of the solid waste stream
Water for cleaning, utilities and domestic use	12 to 18 m³	Estate supply and sanctioned aquifer allocation
Electricity	Approximately 900 to 1,300 units	Machinery, chiller, purification plant, lighting, lift and offices
Fuel for steam raising	Pipeline natural gas, or diesel where gas is unavailable	Jacketed vessel heating and hot water

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3.9 Product and Market

The product is finished cosmetic cream packed in jars or tubs of the sizes carried in the company's range, together with such allied personal care preparations as the company may add within the same process capability. The entire output is manufactured for the company's own brand and is distributed through its established domestic sales network. No finished product is stored on site beyond the normal warehousing period between production and dispatch, and finished goods are

held in a dedicated warehouse area under controlled temperature and away from the compounding hall.

3.10 Plant and Machinery

Table 3.2: Indicative Plant and Machinery

Item	Indicative Specification
Jacketed emulsifying vessel with homogenizer	Stainless steel, steam and chilled water jacket, scraper agitator, capacity matched to the batch size
Oil phase and water phase vessels	Stainless steel jacketed vessels with agitators
Transfer pumps and product lines	Sanitary lobe or gear pumps with stainless steel or food grade hose
Water purification plant	Filtration, softening, activated carbon and reverse osmosis with purified water storage and loop
Automatic cream filling machine	Multi head volumetric or piston filler with drip trays and suck back
Cooling tunnel	Chilled air tunnel conveyor serving the filling line
Capping machine	Automatic cap placement and torque controlled tightening
Sealing machine	Induction or heat sealing for tamper evidence
Conveyor and labelling and coding unit	Line conveyor with labeller and batch coder
Chiller and chilled water circulation	Closed circuit chiller for vessel jackets and the cooling tunnel
Steam boiler or thermic heater	Gas fired unit with stack, safety fittings and registration under the boiler legislation
Air compressor and receiver	For pneumatic operation of the line, with receiver registered as a pressure vessel
Standby generator	Housed in an acoustic enclosure with exhaust stack

Cargo lift	For movement of material between floors as shown on the building plan
Effluent pre-treatment unit	Collection sump, screening, oil and grease interceptor, pH correction, coagulation, settling and sludge removal
Quality control laboratory equipment	pH meter, viscometer, balance, microbiological incubator and glassware
Firefighting equipment	Dry chemical, carbon dioxide and foam extinguishers, hose reels, sand buckets and a water reserve

3.11 Basic Infrastructure and Facilities

The site will be developed in accordance with the approved building plan. The facilities include a boundary wall with a controlled main gate and a separate gate for goods, paved circulation and car parking in the open area, a security room and reception at the entrance, offices and a conference room, a raw material store and dispensing room, a compounding hall with the jacketed vessels and homogenizers, an insulated room and chiller area for prepared bulk, the filling, cooling, capping and sealing line, a secondary packing hall, a finished goods warehouse, a quality control laboratory, a machine shop and utility area, an overhead water tank and an underground water tank of twelve feet by eight feet, a septic tank, a rainwater recharge pit of twelve feet by eight feet, a covered solid waste bin of six feet by six feet, open drains for rainwater, a sewerage connection in unplasticised polyvinyl chloride pipe to the estate main sewer line, a water supply distribution in sixty three millimeter polypropylene random copolymer pipe, electrical earthing pits, a cargo lift, washrooms, a staff dining area and a first aid post.

3.12 Energy

Electrical power will be drawn from the estate distribution network of the Lahore Electric Supply Company through the existing connection with its 200 kVA transformer. The electrical load comprises the vessel agitators and homogenizers, the filling line and conveyor, the chiller, the water purification plant, the air compressor, the cargo lift, the ventilation system, lighting and the office load. A standby generator will be installed to cover outages, since an interruption during a batch leaves the emulsion without agitation and can spoil it. The generator will be housed in an

acoustic enclosure, will exhaust through a stack carried above the enclosure roof, and will be operated only when grid supply fails. Thermal energy for the jacketed vessels and for hot water will come from a gas fired steam boiler or thermic heater, with direct electric heating retained as an option for small vessels. Energy conservation measures include insulation of steam and chilled water lines, recovery of condensate to the boiler feed, use of light emitting diode lighting throughout, power factor correction and scheduled servicing of the chiller and the compressor.

3.13 Availability of Water

Water will be drawn from the supply provided by the Punjab Industrial Estates Development and Management Company for the plot, together with the aquifer allocation sanctioned for the plot and recorded in the estate water and operation and maintenance billing. Water is stored in the underground tank and pumped to the overhead tank for distribution through the internal network. The daily requirement is estimated at twelve to eighteen cubic metres, made up of purified water for the product, cleaning of vessels and the filling line, boiler feed and chiller make-up, floor and utensil washing, and domestic use by the workforce. Abstraction will be metered, recorded and kept within the sanctioned allocation. Reverse osmosis reject will be recovered for floor washing and irrigation, and clean roof rainwater will be directed to the recharge pit provided on the site drawings rather than to the storm drain.

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3.14 Wastewater Management

The unit generates three wastewater streams. The first and most significant is the washing water from vessels, homogenizers, transfer lines, hoppers, filling nozzles and containers, which carries emulsified oils, waxes, fatty alcohols, surfactants, preservatives and traces of fragrance and colour. The second is utility water, consisting of boiler blowdown, chiller and cooling make-up overflow and reverse osmosis reject, which is clean but saline in the case of the reject and hot in the case of the blowdown. The third is domestic sewage from the washrooms, kitchen and dining area.

Washing water will be collected through floor channels into a dedicated sump and passed through the pre-treatment unit, comprising screening to remove solids, an oil and grease interceptor with skimming, pH correction, coagulation and flocculation where required, and settling, with the sludge and skimmings drawn off and handed over as waste. Boiler blowdown will be cooled before it joins the line. Reverse osmosis reject will be recovered for non-product use to the extent

practicable. Domestic sewage will go to the septic tank shown on the layout and thence to the estate sewer. Treated effluent will be discharged to the estate sewer only, at a metered and sampled point, and will meet the Punjab Environmental Quality Standards for effluent entering a sewerage system. No effluent of any kind will be discharged to a storm drain, a watercourse or the ground. Dry cleaning of equipment before wet washing is adopted as a standing rule, since product recovered dry never has to be removed later from water.

3.15 Air Emissions and Control

The unit has no process stack on the product line. Air emissions arise from three sources. The first is the flue of the gas fired steam boiler or thermic heater, which releases carbon dioxide, oxides of nitrogen, a small quantity of carbon monoxide and, where diesel is used as a fallback fuel, sulphur dioxide and particulate. The second is the exhaust of the standby generator, which operates intermittently. The third is fugitive emission within the building, consisting of volatile organic compounds and odour from fragrance, alcohol and cleaning agents, water vapour from hot vessels, and a small quantity of airborne powder during the charging of fine raw materials.

Combustion sources will be controlled by firing on pipeline natural gas as the primary fuel, correct burner tuning and air to fuel ratio setting, scheduled servicing, stacks of adequate height fitted with sampling ports and safe access, and periodic stack monitoring against the Punjab Environmental Quality Standards. Fugitive emissions will be controlled by keeping fragrance, alcohol and solvent containers closed and stored in a cool ventilated store, by adding fragrance only after the batch has cooled to the specified temperature, by providing local exhaust ventilation at the charging, dispensing and mixing points and over the powder weighing bench, by maintaining general mechanical ventilation and air changes in the compounding hall, and by fitting the vessel vents with condensers or filters where the formula makes that useful. Housekeeping, prompt cleaning of spills and closed containers for waste complete the arrangement.

3.16 Noise

The significant noise sources are the homogenizer, the agitators, the air compressor, the chiller and its condenser fans, the filling and capping machines, the conveyor and the standby generator. Noise from these is moderate and is largely contained within the building. All rotating equipment will be mounted on properly designed foundations with vibration isolation where the manufacturer

specifies it, will be kept in good repair and lubricated on schedule, since worn bearings and loose guards are a common and avoidable cause of elevated noise. The compressor and the generator will be housed in enclosed and acoustically treated rooms. Production will be confined to daytime hours, so that night time noise levels at the boundary are unaffected. The site lies within an industrial estate where the applicable standard is 75 dB(A) by day and 65 dB(A) by night.

3.17 Solid and Hazardous Waste

The solid waste stream is dominated by packaging. It consists of cartons, shrink film, plastic and glass jar rejects, damaged caps and seals, label backing paper, empty drums, bags and containers of raw materials, wooden pallets, and domestic refuse from the offices, kitchen and dining area. The process itself generates off specification or expired product, sludge and skimmings from the effluent pre-treatment unit, spent filter cartridges and activated carbon, used lubricating oil from the compressor and the generator, laboratory reagents and used microbiological media, and contaminated rags and gloves.

Waste will be segregated at source into labelled bins for recyclable plastic, cardboard and paper, metal and glass, general refuse, and hazardous waste. Recyclable packaging will be sold to registered recyclers against records. Empty chemical drums will be triple rinsed, with the rinsate routed to the effluent pre-treatment unit, and returned to the supplier or sold to authorized reconditions, and under no circumstances released for the storage of water or food. Off specification product, sludge, spent filter media, used oil, laboratory waste and contaminated rags are hazardous waste and will be stored in closed and labelled containers on an impervious plinth under cover, recorded in a waste register, and handed over only to collectors authorized to receive them against documented receipts. Domestic refuse will be collected in the covered bin shown on the layout and lifted through the arrangement operated by the estate management. Open burning of any waste on the site is prohibited without exception.

3.18 Firefighting and Emergency Plans

Fire is the most serious credible emergency at the unit, because oils, waxes, alcohol, fragrance concentrates and large quantities of cardboard and plastic packaging are held under one roof. Dry chemical, carbon dioxide and foam extinguishers of appropriate rating will be mounted at the chemical store, the compounding hall, the filling line, the packing hall, the finished goods

warehouse, the utility and boiler area, the generator room, the laboratory and the offices, and will be inspected and recharged on schedule. Hose reels and a water reserve with a pump will be provided, with the underground tank available as the fire water source. Flammable liquids will be stored in a separate, cool and ventilated store away from heat sources, in quantities within the limits permitted, with bunding and drip containment. Electrical installations in the flammable store will be of the appropriate protected type, and earthing and bonding will be provided as shown on the earthing detail in the approved drawings. Smoking will be prohibited throughout the production and storage areas, with signage in Urdu and English. Exits will be marked, kept clear and provided with emergency lighting. A written emergency response plan covering fire, chemical spillage, scald or burn injury, chemical splash to the eye, gas leakage and electrical incident will be prepared before commissioning, and drills will be held at least twice a year with attendance recorded.

3.19 Operational Arrangements

The unit will operate a single shift of eight hours by day on approximately 290 to 300 days in the year, with the option of a second shift during peak demand. Production will follow an approved batch manufacturing record for each formula, with in process checks on temperature, mixing time, pH, viscosity and appearance, and a laboratory release before filling. A daily log will record production, batch numbers, water and energy consumption, effluent volume, waste handed over and any abnormal event such as a spill, a machine stoppage or a failed batch. Good manufacturing practice disciplines, including gowning, hand hygiene, restricted access to the compounding and filling areas, pest control and periodic cleaning validation, will be applied as a matter of routine, and they carry an environmental benefit as well as a product one, since a clean plant loses less product to the drain.

3.20 Land Ownership

The land is industrial land owned by the proponent, purchased through a registered sale deed executed on 29 December 2023 and registered with the Sub Registrar, Nishtar Town, Lahore, in respect of Plot No. 112/1-M, 113/4 of the Quaid-e-Azam Industrial Estate, Kot Lakhpat, measuring 4 kanals and 9 marlas. No government land, common land or agricultural land is involved, no acquisition under the Land Acquisition Act has been required, and no person is being displaced

from residence or from possession as a consequence of this project. There are no encroachers or tenants in occupation of the plot.

3.21 Land Use on Site

Table 3.3: Indicative Land Use on Site

Component	Indicative Area (square feet)	Share of Plot
Covered area proposed under the present building plan	9,591.87	47.5 percent
Paved circulation, loading and unloading area	4,500.00	22.3 percent
Car parking	2,200.00	10.9 percent
Underground water tank, septic tank, recharge pit and solid waste bin	1,100.00	5.4 percent
Effluent pre-treatment unit and utility yard	800.00	4.0 percent
Landscaped strip, greenbelt and boundary setback	2,008.13	9.9 percent
Total plot area	20,200.00	100 percent

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The covered area already approved and constructed on the plot amounts to 28,534.79 square feet distributed over the ground, mezzanine, first, second and roof floors, so that the total covered area on the plot on completion will be 38,126.66 square feet. The open area of 10,608.13 square feet accommodates the components listed above.

3.22 Manpower

The unit will employ approximately forty eight persons in regular operation, with a larger workforce during the construction and installation phase. The figure is indicative and will be confirmed at the time of commissioning. Preference in recruitment for unskilled and semi-skilled positions will be given to residents of the surrounding localities.

Table 3.4: Indicative Manpower Requirement

Category	**Number**
Factory manager	1
Production officer and shift supervisor	3
Quality control and assurance officers and analysts	4
Environmental and Safety Officer	1

Compounding operators	6
Filling, capping and sealing line operators	8
Packing and labelling staff	10
Store and warehouse staff	4
Utility, boiler and maintenance technicians	4
Electrician and mechanic	2
Housekeeping and cleaning staff	3
Security and support staff	2
Total	48

3.23 Vegetation Feature of the Project Site

The plot lies within a developed industrial estate and carries no natural vegetation. Part of the plot is already built upon, and the remaining open area is levelled ground with a few ornamental or self sown plants and scattered grass. There is no natural forest, no plantation of any protected species and no tree of exceptional age or size on the plot. No tree is expected to be removed for the proposed construction. Where removal of any tree is unavoidable, the proponent will obtain the permission required and will plant replacement stock at a ratio of not less than five saplings for each tree removed, in addition to the landscaping and greenbelt described in Chapter 7.

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3.24 Project Cost

The total capital cost of the project is estimated at **PKR 150 Million**, which encompasses land acquisition, civil construction, manufacturing machinery, utility setup, water treatment, and environmental protection works.

Table 3.5: Project Cost

Head of Cost	**Indicative Amount (PKR)**
Land, as per registered sale deed dated 29 December 2023	94,375,000
Construction of the proposed covered area, finishes, and services	25,940,000
Process plant and machinery, including vessels, homogenisers, and the filling, cooling, capping, and sealing line	13,534,000
Water purification plant, storage tanks, and distribution network	2,538,000
Utilities: boiler or heater, chiller, compressor, generator, and electrical works	6,767,000
Effluent pre-treatment unit (ETP) and drainage works	1,410,000

Quality control laboratory equipment	1,692,000
Firefighting, safety equipment, signage, and landscaping	1,240,000
Contingency and pre-operating expenses	2,504,000
Total Indicative Project Cost	**150,000,000**

3.25 Implementation Schedule

Table 3.6: Indicative Implementation Schedule

Activity	Indicative Duration
Environmental approval and statutory clearances	Month 1 to Month 3
Construction of the proposed covered area and finishes	Month 2 to Month 7
Internal services: electrical, plumbing, ventilation and drainage	Month 5 to Month 8
Installation of process plant, filling line and utilities	Month 7 to Month 9
Installation of the water purification plant and effluent pre-treatment unit	Month 8 to Month 9
Landscaping and greenbelt planting	Month 9, in the planting season
Trial batches, validation, stack and effluent testing	Month 10
Commencement of regular production	Month 10 onward

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CHAPTER 4: DESCRIPTION OF THE ENVIRONMENT

4.1 General

This chapter records the condition of the environment at the site and in the area around it before the unit begins production. The baseline serves two purposes. It allows the significance of the predicted impacts to be judged against what is actually present rather than against an assumed condition, and it provides the reference point against which the monitoring results obtained during operation will later be compared. The study area for the physical and biological baseline was taken as a radius of approximately two kilometres from the site, which covers the Quaid-e-Azam Industrial Estate, the adjoining industrial blocks of Kot Lakhpat and the residential and commercial pockets on the surrounding roads.

4.2 Physical Environment

4.2.1 Geological Formation and Seismicity

Lahore lies on the flood plain of the River Ravi in the Bari Doab, part of the Upper Indus Plain. The subsurface consists of thick Quaternary alluvium deposited by the rivers of the Punjab, made up of interbedded fine to medium sand, silt and clay with occasional gravel lenses, extending to great depth with no exposed bedrock. The ground is level and stable and presents no landslide, subsidence or slope stability concern. In terms of seismic exposure, Lahore falls within a zone of low to moderate seismic hazard under the Building Code of Pakistan, well removed from the active thrust belt of the north. The structure, the vessel supports and the elevated water tank will nevertheless be designed to the seismic provisions applicable to the zone.

4.2.2 Topography and Physiography

The terrain is flat, with the general fall of the land toward the south west, consistent with the regional slope. Elevation in this part of the city is of the order of 205 to 215 metres above mean sea level. There are no hills, ridges, escarpments or natural depressions within the study area. The landscape is fully urbanized, consisting of industrial plots and sheds within the estate, commercial frontage along the main roads, and residential neighbourhoods beyond, with drainage entirely through the constructed storm water and sewerage network.

4.2.3 Soil

The natural soils of the area are alluvial, deep and of loam to silt loam texture, calcareous, low in organic matter and slightly alkaline in reaction. Within the estate, however, the natural soil profile has largely been replaced by made ground, compacted fill and paving, and the plot itself is partly built upon. No soil of agricultural significance and no soil carrying a conservation designation is present on or adjacent to the site.

4.2.4 Temperature and Rainfall

The climate of Lahore is semi-arid subtropical with five recognizable seasons: a short spring in February and March, a hot dry summer from April to June, the monsoon from July to September, a mild autumn in October and November, and a cool foggy winter from December to January. Summer daytime temperatures commonly exceed forty degrees Celsius in May and June, while January nights fall to around five degrees. Mean annual rainfall is in the range of six hundred to seven hundred millimetres, the greater part falling in July and August, when short intense storms regularly exceed the capacity of the urban drainage system. The seasonal pattern is directly relevant to plant operation, since summer heat raises the load on the chiller and the risk of heat stress among workers, and monsoon storms determine the design of the site drainage and the recharge pit.

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Table 4.1: Indicative Monthly Climate Profile of the Study Area

Month	Average Maximum Temperature (°C)	Average Minimum Temperature (°C)	Mean Rainfall (mm)	Seasonal Character
January	20.0	5.5	23	Cool and foggy, poor dispersion
February	22.5	8.5	30	Mild, occasional western disturbance
March	28.5	13.5	35	Pleasant, spring transition
April	35.0	19.0	20	Dry and warming rapidly
May	40.0	24.0	20	Hot, high thermal stress
June	41.0	27.0	50	Peak summer heat, pre-monsoon dust

July	37.0	27.0	180	Hot and humid, monsoon onset
August	35.5	26.5	170	Humid, heaviest rainfall
September	35.0	24.0	65	Post-monsoon, clearing
October	33.0	17.5	12	Mild and clear
November	27.5	11.0	5	Cool and dry, smog onset
December	21.5	6.5	15	Cool and dry, fog and smog spells

4.2.5 Wind and Meteorological Dynamics

Winds during the summer and monsoon months are predominantly from the east and south east, shifting to a north westerly to westerly pattern during winter. Average wind speeds are modest, generally in the range of five to fifteen kilometres per hour, rising during pre-monsoon squalls. Calm conditions with a shallow inversion are common on winter nights and mornings, which is when the dispersion of emissions and of vehicle exhaust across the city is poorest and when the seasonal smog episodes of central Punjab occur. The layout of the unit takes the prevailing direction into account in the positioning of the boiler and generator stacks and of the ventilation discharges, so that they do not blow directly onto the working areas of the adjoining plots.

4.2.6 Hydrology and Water Resources

There is no natural river, stream or canal within the study area. The River Ravi lies well to the north west of the site and has no hydraulic connection with the estate. Surface drainage within the estate is entirely constructed, with road side and internal drains carrying rainwater to the estate storm water system, and a separate reticulated sewer carrying wastewater to the municipal system. The site drawings provide open drains for rainwater on the plot, a sewerage connection in unplasticised polyvinyl chloride pipe to the estate main sewer line, and a recharge pit that returns clean roof runoff to the ground rather than loading the storm drain.

Groundwater in Lahore occurs in the thick alluvial aquifer and has been the principal source of supply for the city and its industry for decades. Abstraction has consistently exceeded recharge, and the water table beneath the city has fallen steadily over the past several decades, with the depth to water in the built up area now typically in the range of thirty five to fifty metres and locally

deeper around heavily pumped wells. This decline is the single most serious environmental issue in the district so far as this project is concerned. Groundwater quality in the industrial belt is generally suitable for industrial use after treatment, but the aquifer is vulnerable to downward migration of contaminants where spillage, leaking drains or unlined disposal pits are present. Protection of this resource is the reason for the requirement in this report that all chemical storage be bunded, that no effluent be discharged to the ground, and that the recharge pit receive clean roof rainwater only.

4.2.7 Ambient Air Quality

The baseline air quality of the area is that of a dense urban and industrial district. The existing sources are heavy vehicle and passenger traffic on Township Road, Ferozepur Road and the estate internal roads, boiler and generator stacks of the manufacturing units in the estate, construction activity, road dust, and the regional contribution of crop residue burning and brick kilns during the winter months. Lahore experiences pronounced seasonal smog episodes from late October through January, during which particulate concentrations across the city rise well above the ambient standards regardless of local sources. Baseline measurement carried out for this study reflects that pattern: gaseous pollutants are generally within the ambient standards, while particulate matter is the parameter of concern, being close to or above the standard during the dry and smog affected months. The results of the baseline survey are summarized below.

Table 4.2: Summary of Baseline Ambient Air Quality

Parameter	Observed Baseline Range	PEQS Limit (24 hour)	Status
PM10	Within the limit during the general period, exceeding it during winter smog episodes	150 µg/m³	Seasonally sensitive, regional in origin
PM2.5	Elevated during winter smog episodes in common with the city as a whole	35 µg/m³	Regionally sensitive parameter
Sulphur Dioxide (SO2)	Low to moderate, attributable to boilers and traffic	120 µg/m³	Compliant
Nitrogen Dioxide (NO2)	Moderate, attributable to traffic and combustion sources	80 µg/m³	Compliant
Carbon Monoxide (CO)	Low, attributable to road traffic	5 mg/m³ (8 hour)	Compliant

4.2.8 Ambient Noise Levels

Noise in the study area is characteristic of an industrial estate on a busy urban corridor. It arises from goods vehicles and passenger traffic, from the machinery, compressors and generators of neighbouring units, and from loading and unloading activity. Measurements taken at the plot boundary and along the estate road indicate daytime levels within the standard applicable to industrial areas, with lower levels at night when most units are closed, subject to peaks when generators run during load shedding. The nearest residential pockets lie outside the estate and are separated from the plot by intervening industrial plots and roads, so that the noise reaching them from this unit will be indistinguishable from the general estate background.

Table 4.3: Summary of Baseline Noise Levels

Location	Day Time Observed	Night Time Observed	PEQS Limit, Industrial
Project plot boundary	Within the industrial day limit	Well below the night limit	75 dB(A) day / 65 dB(A) night
Estate internal road frontage	Within the industrial day limit, with peaks during vehicle movement	Low, occasional generator noise	75 dB(A) day / 65 dB(A) night
Nearest residential pocket outside the estate	Within the residential day limit	Within the residential night limit	55 dB(A) day / 45 dB(A) night

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4.2.9 Water Quality

Water samples were drawn from the source serving the plot and from the estate supply and were tested by a certified laboratory for physical, chemical and bacteriological parameters. The results indicate water of the quality generally found in the Lahore aquifer. The pH lies within the neutral to slightly alkaline range. Total dissolved solids and hardness are moderate to high, which is normal for the calcareous alluvium of the doab and is the reason a softening stage precedes the reverse osmosis unit in the purification train. Iron and manganese are present in traces at levels that filtration removes. No oil, grease or hydrocarbon was detected. These results establish the reference against which any future allegation of contamination from the unit can be tested, which is precisely why the baseline was taken before production began. The condition of the estate sewer at the point of connection was also noted, so that the quality of the effluent leaving the plot can be assessed against it during operation.

4.3 Biological Environment

The study area lies within a fully urbanized industrial district and retains no natural habitat. Its biological interest is limited to planted roadside and boundary trees, ornamental landscaping within factory plots, and the birds, small mammals and insects that persist in built up areas.

4.3.1 Flora

Vegetation within the study area consists of planted species along estate roads, within factory compounds and in the green strips maintained by the estate management. The species commonly encountered are sufeda or eucalyptus, kikar, shisham, neem, sukhchain, amaltas, alstonia, ficus, bottle brush and ornamental palms, together with hedges of duranta and bougainvillea and the usual ruderal weeds of disturbed urban ground. No species listed as threatened or protected, and no species of restricted distribution, was recorded on the plot or in its immediate surroundings. The plot itself carries no natural vegetation of any value.

4.3.2 Fauna

The fauna of the area is that of an urban industrial district. Mammals are limited to commensal species, including house rats, mice, house shrews, bats roosting in older structures and stray cats and dogs. Bird life is the most visible component and includes the house crow, common myna, bank myna, house sparrow, rock pigeon, collared and laughing doves, red-vented bulbul, black kite, common tailorbird, purple sunbird and ring-necked parakeet. Reptiles are limited to the common house gecko and the garden lizard. No critical habitat, breeding colony, wetland of importance or migratory bird concentration was recorded within the study area.

4.3.3 Protected Areas and Critical Habitats

No national park, wildlife sanctuary, game reserve, Ramsar site, protected forest or other area carrying a conservation designation lies within or adjacent to the project site, and none falls within the study area. The project will therefore not affect any protected area, and no clearance from the Wildlife Department is required on that account.

4.4 Socio-Economic Environment

4.4.1 Demography and Settlement Patterns

Lahore is the provincial capital and the second largest city of Pakistan, with a population of well over eleven million in the district and a high rate of growth driven by both natural increase and migration from other districts. Kot Lakhpat is one of its established industrial and commercial areas, lying in the south of the city along the Ferozepur Road and Township corridors and surrounded by planned residential schemes including Township, Green Town, Model Town and the Defence Housing Authority. The population is urban, mixed in origin, Punjabi and Urdu speaking, with literacy and access to services well above the provincial average. The immediate neighbours of the project site are factories rather than households, and the nearest residential neighbourhoods lie outside the estate boundary.

4.4.2 Economic Infrastructure and Local Land Use

The economy of the area is industrial, commercial and service based. The Quaid-e-Azam Industrial Estate accommodates a wide range of manufacturing, including engineering, textiles, plastics, chemicals, pharmaceuticals, food processing and packaging, supported by warehousing, transport and trading businesses along the main roads. Land use within the study area is dominated by industrial plots and sheds, with commercial frontage on the arterial roads and residential schemes beyond. Agricultural land use is absent. The presence of the project in an area zoned and developed for industry is the single most favourable feature of its location, since the activity is entirely compatible with what surrounds it.

4.4.3 Transportation and Public Utilities

The area is served by Township Road, Ferozepur Road and the estate internal road network of sixty feet and forty feet width, with access to the Lahore ring road and the motorway network from the south of the city. Public transport includes the Metro Bus and Orange Line corridors on Ferozepur Road, wagons, rickshaws and ride hailing services. Electricity is supplied by the Lahore Electric Supply Company, and the plot carries an installed 200 kVA transformer. Piped natural gas is supplied by Sui Northern Gas Pipelines Limited. Water supply, sewerage, drainage, road maintenance, street lighting, security and solid waste handling within the estate are provided by

the Punjab Industrial Estates Development and Management Company against the water, operation and maintenance charges billed to plot holders. Telecommunication and broadband coverage is comprehensive.

4.4.4 Health, Education and Quality of Life

Healthcare is available through a dense network of public and private hospitals and clinics in the southern part of the city, with major tertiary facilities within a short distance of the estate. The prevailing health concerns are those of urban Lahore generally: respiratory illness that worsens sharply during the winter smog season, cardiovascular disease, diabetes and hypertension, waterborne illness where supply is contaminated, and road traffic injury. Education is provided through a wide range of public and private schools, colleges and universities. Quality of life in the neighbourhoods around the estate is closely tied to air quality, traffic congestion and the reliability of water and power. Local expectations of a new manufacturing unit centre on employment, on whether it will add to the traffic and noise of the area, and on whether its effluent and waste will be handled properly. Those expectations are recorded in Chapter 5 and have shaped the commitments made in Chapter 7.

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CHAPTER 5: IMPACT ASSESSMENT METHODOLOGY AND CHARACTERISTICS OF IMPACTS

5.1 Introduction

This chapter presents the methodology adopted for identification, prediction, evaluation, and characterization of the potential environmental and social impacts associated with the proposed cosmetics manufacturing and packaging facility of M/s Goree Cosmetics (Private) Limited**,** located at Plot No. 112/1-M, 113/4 Quaid-e-Azam Industrial Estate (QIE), Kot Lakhpat, Lahore**.**

The proposed facility will undertake filling, cooling, capping, sealing, packaging, storage, and dispatch of cream-based cosmetic products. The production line consists of a filling machine, cooling tunnel, capping machine, sealing machine, and conveyor-based product-transfer system. The maximum production capacity is approximately 1 ton (1,000 kg) per day. The project plot comprises approximately 20,200 sq. ft.**,** of which approximately 9,591.87 sq. ft. is proposed covered area and approximately 10,608.13 sq. ft. remains as open area.

The impact assessment has been undertaken for all relevant phases of the project, including pre-construction, construction, commissioning, operation, maintenance, accidental/emergency conditions, and future decommissioning. The assessment considers the direct, indirect, cumulative, temporary, permanent, positive, negative, reversible, and residual impacts of the project.

The principal environmental receptors considered in this assessment include land and soil, groundwater, drainage, wastewater system, air quality, noise environment, occupational health and safety, workers, neighboring industrial units, traffic, waste-management systems, public health and safety, and the local socio-economic environment.

5.2 Objectives of Impact Assessment

The main objectives of the impact assessment are to:

- Identify project activities that may result in environmental, occupational health and safety, or social impacts.
- Identify environmental and social receptors that may be affected by project activities.

- Determine the nature, magnitude, extent, duration, reversibility, probability, and significance of potential impacts.
- Distinguish between impacts during construction, operation, maintenance, emergency, and closure phases.
- Identify positive and negative impacts of the proposed project.
- Determine the level of risk associated with chemical handling, waste generation, wastewater discharge, machinery operation, electrical systems, traffic movement, and fire hazards.
- Develop practical mitigation measures to avoid, minimize, control, or compensate for adverse impacts.
- Identify residual impacts that may remain after implementation of mitigation measures.
- Provide the basis for the Environmental Management Plan, environmental monitoring plan, emergency-response procedures, and occupational health and safety arrangements.

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5.3 Project Activities Considered

The environmental impact assessment has considered the following project components and activities:

Project Phase	Activities Considered for Impact Assessment
Pre-construction phase	Detailed design, environmental approval, procurement, contractor mobilization, preparation of site-management procedures, selection of machinery, planning of drainage and utilities
Construction phase	Site preparation, civil works, building construction, internal finishing, installation of plumbing and drainage, electrical works, machinery installation, painting, storage of construction materials, worker movement, waste generation
Commissioning phase	Testing of filling, cooling, capping, sealing, conveyor, electrical, ventilation, water, drainage, fire-safety, and emergency-response systems
Operational phase	Receipt of raw materials, storage of cream ingredients and packaging materials, filling, cooling, capping, sealing, labeling, packing, storage, loading, dispatch, cleaning, use of water and electricity, staff activities
Maintenance phase	Equipment inspection, servicing, lubrication, replacement of machine parts, electrical maintenance, maintenance of drainage, cleaning of storage areas, fire-equipment inspection
Emergency phase	Chemical spill, accidental release, fire, electrical short circuit, machinery failure, generator malfunction, wastewater overflow, drainage blockage, injury, and evacuation
Decommissioning phase	Future removal of machinery, dismantling, disposal of residual materials, waste clearance, cleaning of chemical-storage areas, and restoration of the premises

The operational phase is the principal focus of the assessment because it involves regular production and packaging activity. The process flow comprises filling of cream into empty jars/tubs, cooling of filled jars through the cooling tunnel, placement and tightening of caps/lids, sealing of containers, and transfer of finished products for packing and dispatch.

Raw Material / Cream→Filling→Cooling→Capping→Sealing→Labelling / Packing→Storage →Dispatch

5.4 Methodology for Impact Identification

5.4.1 Overview

A combination of qualitative and semi-quantitative methodologies has been used to identify and assess the potential impacts of the proposed project. The assessment approach has been selected to suit the scale and nature of the cosmetics filling and packaging operation, its location in an established industrial estate, its production capacity, and the likely environmental issues associated with the project.

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The following methods have been used:

1. Review of project documents and layout plans.
2. Site and process-based checklists.
3. Environmental interaction matrices.
4. Cause-and-effect networks.
5. Spatial overlay and receptor analysis.
6. GIS and computer-based systems, where required.
7. Professional judgment and applicable regulatory standards.
8. Risk-based assessment for health, safety, chemical handling, and emergency impacts.

The combined use of these methods ensures that both routine and accidental impacts are identified. It also helps distinguish between direct impacts, indirect impacts, cumulative impacts, and residual impacts after mitigation.

5.5 Review of Project Documents

The impact assessment was initiated through a review of available project information, including the project description, production process, site layout, plot area, building plan, utility-related information, drainage features, and production capacity.

The available project documentation indicates that the proposed facility is located at Plot No. 112/1-M, 113/4 QIE, Lahore, with a total plot area of approximately 20,200 sq. ft. The project has a proposed covered area of approximately 9,591.87 sq. ft. and an open area of approximately 10,608.13 sq. ft.

The available layout also indicates provisions for water supply, underground water tank, overhead water tank, septic tank, drainage, recharge pit, open rainwater drain, staff facilities, office areas, storage spaces, parking, cargo lift, and solid-waste-bin arrangement. These components have been considered in the assessment of water demand, wastewater management, drainage, storm-water control, solid-waste handling, traffic movement, and occupational safety.

The project documentation further identifies a conveyor-based cosmetic cream filling and packaging system involving a filling machine, cooling tunnel, capping machine, and sealing machine. This process information has been used to identify potential impacts associated with product spillage, material handling, machinery noise, worker exposure, energy demand, cleaning wastewater, packaging waste, and occupational health and safety.

5.6 Checklist Method

5.6.1 Purpose of Checklist Method

The checklist method has been used as the primary tool for systematic identification of project-related impacts. A checklist enables the EIA team to review each project activity against each environmental and social receptor and determine whether an interaction is likely to occur.

The checklist approach is particularly suitable for this project because the facility has defined activities, predictable process stages, limited land area, controlled production operations, and

identifiable environmental aspects. The method ensures that important issues such as wastewater, waste, odor, noise, worker safety, fire safety, traffic, drainage, and resource use are not overlooked.

The checklist has been prepared for construction, operational, maintenance, and emergency phases. Each issue has been screened as having a potentially positive, negative, negligible, temporary, permanent, direct, indirect, or cumulative effect.

5.6.2 Environmental Impact Identification Checklist

Environmental and Social Component	Construction Phase	Operational Phase	Maintenance / Emergency Phase	Preliminary Impact Status
Land use	Minor alteration within industrial plot	Compatible industrial use	No significant additional impact	Low negative / compatible
Topography and soil	Excavation, material storage, minor soil disturbance	Potential contamination from leaks, spills, or improper waste disposal	Potential spill impact during maintenance or emergency	Low to moderate negative
Groundwater	Risk from construction-material spills	Risk from chemical leakage, wastewater seepage, or poor drainage	Spill-related risk	Low to moderate negative
Surface drainage	Temporary obstruction due to construction materials	Risk of blockage, wastewater mixing, or poor storm-water control	Overflow or drainage blockage	Moderate negative if unmanaged
Water demand	Water use for curing, cleaning, and workers	Water use for sanitation, cleaning, and limited process requirements	Water use for maintenance and fire response	Low to moderate negative
Wastewater	Domestic wastewater from workers	Domestic sewage and cleaning wastewater	Possible wastewater overflow or contaminated wash water	Moderate negative if unmanaged
Ambient air quality	Dust, vehicle emissions, paint fumes	Vehicle exhaust, generator emissions if any, odor/vapor from chemicals	Maintenance-related emissions or accidental release	Low to moderate negative
Noise and vibration	Construction equipment and vehicle movement	Filling, cooling, capping, sealing equipment, compressor/generator if any, vehicle movement	Machinery maintenance and emergency alarms	Low negative
Solid waste	Construction debris, packaging, scrap material	Cardboard, plastic, labels, rejected jars, domestic waste, cleaning materials	Used parts, used oil, contaminated absorbent material	Moderate negative if unmanaged

Hazardous / special waste	Paint containers, chemical residue, used rags	Contaminated containers, chemical residue, expired material, used cleaning materials	Used lubricants, used filters, spill-cleanup waste	Moderate negative
Ecology	No major impact anticipated due to industrial location	Limited disturbance to urban/industrial flora and fauna	No significant impact	Negligible to low
Traffic	Construction-material vehicles and worker movement	Raw-material deliveries, staff transport, dispatch vehicles, waste collection	Emergency vehicle movement	Low negative
Occupational health and safety	Falls, electrocution, construction injuries, dust exposure	Chemical exposure, burns, machine injury, electrical hazards, slips, fire, ergonomic stress	Maintenance hazards, emergency response risks	Moderate to high without controls
Community health and safety	Temporary dust, traffic, and construction risks	Fire, smoke, odor, vehicle movement, waste handling, accidental release	Emergency impacts beyond site boundary	Low to moderate negative
Visual environment	Temporary construction materials and debris	Industrial building and signage compatible with industrial area	No significant impact	Low
Socio-economic environment	Temporary construction employment	Permanent employment, local procurement, industrial activity	Skills development and indirect benefits	Positive
Energy consumption	Construction machinery and temporary electricity use	Electricity use for cooling, filling, sealing, lighting, ventilation, and offices	Maintenance energy use	Low to moderate negative
Climate-change contribution	Minor emissions from construction vehicles	Indirect emissions from electricity, generator fuel, and transport	Emergency generator use	Low negative

5.7 Matrix Method

5.7.1 Purpose of Matrix Method

The matrix method has been used to identify the interaction between project activities and environmental receptors. A matrix allows the assessment team to evaluate which activities are likely to affect which environmental components and whether the interaction is positive or negative.

For this project, the matrix method has been used to assess the relationship between major project activities such as construction, material handling, filling, cooling, capping, sealing, packaging, storage, cleaning, wastewater generation, vehicle movement, maintenance, and emergency situations and environmental receptors.

The matrix provides a preliminary indication of impact importance. The final significance of an impact depends on its magnitude, duration, extent, reversibility, probability, sensitivity of receptors, and effectiveness of mitigation measures.

5.7.2 Environmental Interaction Matrix

Key:

+ = Positive impact

- = Negative impact

0 = No significant impact anticipated

L = Low significance

M = Moderate significance

H = High significance

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Project Activity	Soil / Groundwater	Drainage / Water	Air Quality / Odor	Noise	Solid Waste	Worker Safety	Community Safety	Traffic	Socio-Economic
Site preparation and civil works	-L	-L	-M	-M	-M	-M	-L	-L	+L
Machinery installation	-L	0	-L	-L	-L	-M	-L	-L	+L
Raw-material receiving and storage	-M	-M	-L	-L	-M	-M	-L	-L	+L
Cream filling	-L	-L	-L	-L	-M	-M	-L	0	+M
Cooling operation	0	0	-L	-L	-L	-L	0	0	+M
Capping and sealing	0	0	-L	-L	-M	-M	0	0	+M
Labeling and packaging	0	0	0	-L	-M	-L	0	0	+M
Cleaning and washing	-M	-M	-L	0	-M	-M	-L	0	0
Waste storage and disposal	-M	-M	-L	0	-M	-L	-L	-L	+L
Vehicle movement and dispatch	0	0	-L	-L	0	-L	-L	-M	+M
Generator operation, if applicable	0	0	-M	-M	-L	-L	-L	0	+L
Maintenance activities	-M	-L	-L	-L	-M	-M	-L	0	+L
Fire, spill, or emergency event	-H	-H	-H	-M	-H	-H	-H	-M	-M

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The matrix indicates that the most important potentially adverse interactions are associated with wastewater and drainage management, chemical/raw-material storage, solid-waste handling, cleaning activities, occupational health and safety, fire protection, and emergency situations. These issues require detailed mitigation and monitoring measures.

5.8 Network Method

5.8.1 Purpose of Network Analysis

The network method has been used to identify cause-and-effect relationships between project activities, primary impacts, secondary impacts, and potential final environmental consequences. This method is useful for identifying indirect and cumulative impacts that may not be immediately apparent through a checklist or matrix.

For example, improper storage of chemical ingredients may result in a spill. The spill may contaminate the floor, enter the drainage system, affect wastewater quality, contaminate soil or groundwater if uncontrolled, create odor, increase worker exposure, and potentially create a fire or slip hazard. The network method therefore helps identify the full sequence of possible impacts and the points at which preventive controls should be introduced.

5.8.2 Impact Network

The impact network analysis demonstrates the cause-and-effect relationships across key operational activities of the cosmetics manufacturing unit, highlighting how primary activities can escalate into environmental, health, and safety risks if unmitigated. In chemical storage and handling, improper containment or accidental spills can lead to floor contamination, drainage entry, and subsequent wastewater degradation, posing risks to soil and groundwater. Concurrently, direct worker contact with spilled chemicals creates occupational health risks such as skin irritation, eye damage, or inhalation hazards, while leaks involving flammable raw materials present significant fire threats that generate smoke pollution and compromise community safety. Similarly, cleaning and production line washing generate effluent laden with cosmetic residues and detergents; discharging this uncontrolled into stormwater drains increases sewer loads and risks broader soil and groundwater contamination. In packaging operations, generated solid waste such as cardboard, rejected plastic containers, and labels can lead to drain blockages, littering, and pest infestation if improperly stored, whereas systematic waste segregation and recycling ensure resource conservation and waste volume reduction. Furthermore, emergency threats arising from electrical faults, chemical leaks, or combustible packaging can result in severe fire incidents causing property damage, worker injury, and off-site safety risks, which can be effectively mitigated through early detection systems, employee training, and routine drills. Ultimately, this

network analysis confirms that preventive containment and process controls are far more effective than post-incident corrective measures. Therefore, the project shall prioritize robust chemical storage controls, spill containment, waste segregation, drainage protection, preventive machine maintenance, integrated fire protection systems, and ongoing occupational health and safety training for all workforce personnel.

5.9 Overlay Method

5.9.1 Purpose of Overlay Analysis

The overlay method is used to assess the relationship between project facilities and environmental receptors by superimposing site-layout information over environmental and social features. This approach assists in identifying whether potentially polluting activities, waste-storage points, chemical-storage areas, drainage lines, loading/unloading zones, and utility systems are appropriately located.

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For the proposed project, the overlay assessment considers the site layout, building footprint, production area, storage areas, staff facilities, parking, internal circulation, drainage arrangements, solid-waste-bin area, underground and overhead water storage, septic tank, and recharge pit.

The available site plan identifies a solid-waste-bin provision, septic tank, recharge pit, underground water tank, overhead water tank, rainwater drainage arrangements, parking area, and internal access routes. These features have been considered in the environmental assessment.

5.9.2 Overlay Considerations

The following principles shall be adopted in the layout and operational arrangement:

- The chemical and raw-material storage area shall be located away from storm-water drains, sewer manholes, recharge pits, and open drainage channels.
- The solid-waste storage area shall be covered, accessible to waste-collection vehicles, and located away from food, staff dining, washrooms, and production areas.
- Wastewater-generating cleaning areas shall be connected to the approved wastewater-collection and disposal system.

- Storm-water drainage shall remain separate from domestic sewage and cleaning wastewater.
- The recharge pit shall receive only clean storm water and shall not receive wastewater, wash water, chemical spills, oil-contaminated runoff, or solid waste.
- Loading and unloading activities shall be conducted within designated areas to prevent obstruction of internal roads and minimize conflict with pedestrian movement.
- Fire extinguishers, hydrants where applicable, emergency exits, alarm systems, first-aid boxes, and assembly points shall be clearly marked and accessible.
- The production line shall maintain adequate access around machinery for operation, cleaning, maintenance, and emergency evacuation.
- Chemical-storage and waste-storage areas shall have impervious flooring and suitable secondary containment, where necessary.

5.9.3 Limitations of Overlay Assessment

This assessment is based on the available site-layout information and project drawings. Before final construction and operation, the proponent shall verify the exact location of machinery, raw-material storage, chemical-storage area, waste-storage area, drainage points, emergency exits, fire equipment, electrical panels, and loading/unloading zones through a detailed site implementation plan.

5.10 GIS and Computer-Based Assessment

5.10.1 Use of GIS

Geographic Information System (GIS) tools may be used, where required by Punjab EPA or other approving authorities, to confirm the geographical context of the project. GIS-based analysis can support identification of nearby land uses, roads, drainage features, industrial units, educational institutions, health facilities, residential areas, water bodies, ecological receptors, and sensitive locations.

For the present project, GIS-based assessment is not expected to be the primary impact-identification tool because the facility is located within an established industrial estate and the

anticipated impacts are predominantly site-specific. However, GIS may be used to prepare or verify the following:

- Project location map.
- Site-coordinates map.
- Land-use map within the surrounding study area.
- Buffer map showing adjacent industrial units and nearby receptors.
- Road-access and traffic-route map.
- Drainage and storm-water flow map.
- Sensitive-receptor map, if any sensitive receptors are identified during the field survey.

5.10.2 Computer Expert Systems and Modelling

Computer-based expert systems and mathematical models may be used for detailed assessment if project-specific data justify their use. Possible applications include air-dispersion modeling for generator emissions, noise modeling for machinery or standby-generator operation, wastewater load calculations, traffic assessment, and fire-risk analysis.

At the present project scale, detailed dispersion or noise modeling may not be required unless required by Punjab EPA, the industrial-estate management, or project-specific monitoring data. The project's likely emissions are expected to remain localized, subject to proper ventilation, machine maintenance, controlled chemical storage, and compliance with applicable standards.

If a diesel generator is installed or if a significant emission source is introduced in future, the proponent shall conduct stack-emission monitoring and, where necessary, air-dispersion assessment. Similarly, if noise measurements indicate elevated levels near the project boundary or at worker locations, noise monitoring and corrective measures shall be implemented.

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5.11 Impact Evaluation Criteria

5.11.1 General Approach

The significance of an impact has been determined by considering:

- Nature of the impact.
- Type of impact.
- Magnitude or intensity.
- Spatial extent and location.
- Timing and frequency.
- Duration.
- Reversibility.
- Probability of occurrence.
- Sensitivity of the affected receptor.
- Regulatory standards and compliance requirements.
- Availability and effectiveness of mitigation measures.
- Residual impact after mitigation.

The overall impact significance is determined through professional judgment, supported by the checklist, matrix, network analysis, site-layout review, and risk evaluation.

5.11.2 Impact Significance Categories

Significance Category	Description
Negligible	Impact is not measurable or is too small to cause noticeable environmental change
Low	Limited, localized, short-term, and reversible impact that can be managed through routine controls
Moderate	Noticeable impact requiring specific mitigation measures, monitoring, and management procedures
High	Significant impact with potential for serious environmental, health, safety, or community consequences; requires strong controls and management
Positive	Beneficial impact that improves employment, local economy, infrastructure, skills, or environmental performance

5.11.3 Impact Magnitude Categories

Magnitude	Description
Negligible	No measurable change from baseline conditions
Minor	Small change that remains within normal environmental variation or applicable standards
Moderate	Noticeable change requiring mitigation, monitoring, or operational control
Major	Large change that may exceed standards, affect sensitive receptors, or require major mitigation
Severe	Serious or potentially irreversible change with broad environmental or community consequences

5.12 Characteristics of Impacts

5.12.1 Nature of Impacts

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The nature of an impact describes whether it is beneficial or adverse and whether it is direct, indirect, cumulative, induced, or residual.

The proposed project is expected to generate both positive and negative impacts. Positive impacts include employment generation, industrial development, local procurement, economic activity, improved product availability, and development of worker skills. Negative impacts may include waste generation, wastewater discharge, odor, machinery noise, chemical-handling risks, fire hazards, vehicle emissions, traffic movement, and resource consumption.

Impact Type	Description for Proposed Project
Direct impact	Wastewater generation from cleaning, waste generation from packaging, noise from machinery, chemical exposure, and electricity consumption
Indirect impact	Increased demand for waste collection, recycling, transport services, utilities, and maintenance services
Cumulative impact	Combined contribution of project traffic, emissions, wastewater, and waste with other industrial units operating in QIE
Temporary impact	Construction dust, temporary construction noise, installation waste, and commissioning-related disturbances
Long-term impact	Resource consumption, routine waste generation, wastewater generation, traffic movement, and occupational exposure during operation

Positive impact	Employment, industrial activity, local procurement, skill development, and economic contribution
Negative impact	Potential air, water, soil, waste, noise, health, and safety impacts if not managed
Residual impact	Low-level impacts remaining after mitigation, such as routine vehicle emissions, limited noise, and non-recyclable waste generation

5.12.2 Magnitude of Impacts

Magnitude refers to the degree or intensity of change caused by a project activity. For this project, impact magnitude has been assessed with reference to the scale of the activity, volume of materials handled, production capacity, quantity of waste generated, duration of activity, emission potential, proximity of receptors, and ability of the environment to absorb the impact.

The proposed facility has a maximum production capacity of approximately 1,000 kg/day. The production is based on filling, cooling, capping, and sealing operations rather than large-scale chemical synthesis or highly polluting processing. Therefore, routine operational impacts are expected to be low to moderate in magnitude if the project adopts the recommended environmental controls.

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Environmental Aspect	**Likely Magnitude Before Mitigation**	**Likely Magnitude After Mitigation**
Construction dust	Minor to moderate	Minor
Construction noise	Minor to moderate	Minor
Construction waste	Moderate	Low
Domestic wastewater	Moderate	Low
Cleaning wastewater	Moderate	Low
Solid packaging waste	Moderate	Low
Contaminated waste / chemical residues	Moderate	Low to moderate
Odor and indoor vapor exposure	Moderate	Low
Vehicle emissions	Minor	Minor

Machinery noise	Minor	Negligible to minor
Fire risk	Major in an uncontrolled situation	Low to moderate with fire-safety system
Chemical spill risk	Moderate to major in uncontrolled situation	Low with containment and response procedures
Worker injury risk	Moderate to high without safety controls	Low to moderate with EHS measures
Traffic impact	Minor	Negligible to minor
Employment and economic benefit	Moderate positive	Moderate positive

5.12.3 Extent and Location of Impacts

The extent of an impact refers to the geographical area over which an impact may occur. The proposed project is located in an established industrial estate; therefore, most routine impacts are expected to remain confined to the project premises or the immediate industrial surroundings.

The primary impact zone includes the production area, raw-material storage area, packaging section, finished-product storage, waste-storage points, internal roads, loading/unloading area, drainage channels, staff areas, and utility locations.

The secondary impact zone includes the immediate boundary of the facility, adjoining industrial units, nearby estate roads, waste-collection routes, utility connections, and drainage infrastructure. Under routine conditions, no significant impact is anticipated beyond the industrial-estate surroundings.

Impact	Primary Location	Possible Area of Influence
Product spillage	Filling, capping, sealing, and packing areas	Production floor and nearby drainage point if uncontrolled
Chemical leakage	Raw-material and cleaning-chemical storage areas	Storage floor, drainage system, and soil if spill escapes containment
Wastewater generation	Washrooms, cleaning areas, floor-wash points	Internal drainage and approved sewerage/disposal system
Solid waste	Packaging, storage, office, and waste-bin area	On-site waste-storage point and authorized disposal/recycling route
Noise	Machinery, cooling tunnel, loading/unloading, generator if any	Production floor, boundary, and adjacent industrial units
Odor / vapors	Raw-material storage, production, cleaning areas	Indoor work environment and immediate site boundary
Traffic	Main gate, internal roads, loading/unloading point	Nearby QIE industrial roads
Fire / emergency	Chemical store, packaging store, electrical panels, machinery areas	Entire premises and potentially adjoining industrial units in a severe event

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5.12.4 Timing of Impacts

Timing refers to when an impact may occur during the project life cycle, including whether the impact is continuous, intermittent, seasonal, occasional, or accidental.

Construction-related impacts will occur during site development, civil work, installation of machinery, utility connection, and commissioning. These impacts will generally be temporary and will cease after construction and commissioning.

Operational impacts will occur during daily manufacturing and packaging activities. Waste generation, wastewater production, use of electricity and water, internal noise, worker exposure, vehicle movement, and product handling will occur regularly during working hours.

Emergency impacts are not routine but may occur unexpectedly due to electrical faults, chemical spills, machinery malfunction, fire, drainage blockage, or improper handling of materials.

Impact Source	Timing / Frequency
Construction dust and noise	Temporary; during civil works and machinery installation
Wastewater generation	Daily during staff use, cleaning, and operational activities
Solid-waste generation	Daily; increases with production and packaging volume
Odor / vapor release	Intermittent; during material handling, filling, cleaning, and storage
Machinery noise	Intermittent to continuous during production shifts
Vehicle emissions and traffic	Intermittent; during deliveries, dispatch, and waste collection
Energy consumption	Continuous during operating hours
Fire or chemical spill	Accidental and low frequency, but potentially high consequence
Maintenance waste	Periodic; during servicing and repair activities
Employment benefits	Long-term during project operation

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5.12.5 Duration of Impacts

Duration refers to the period for which an impact persists. The duration may be short-term, medium-term, long-term, permanent, or intermittent.

Impact	Expected Duration
Construction dust	Short-term and temporary
Construction noise	Short-term and temporary
Construction waste	Temporary until properly removed
Operation-related solid waste	Long-term and recurring throughout facility operation
Domestic and cleaning wastewater	Long-term and recurring throughout operation
Machinery noise	Long-term but intermittent during operating hours
Vehicle-related emissions	Short-term and intermittent

Odor from chemicals or fragrances	Short-term and intermittent, depending on material handling
Energy and water consumption	Long-term and continuous during operation
Employment generation	Long-term positive impact
Soil contamination from spill	Potentially medium- to long-term if not promptly remediated
Fire or emergency incident	Short-duration event, but may have long-term consequences if severe

5.12.6 Reversibility of Impacts

Reversibility refers to the extent to which an affected environmental component can return to its original condition after cessation of the activity or implementation of mitigation measures.

Most impacts associated with the proposed cosmetics facility are expected to be reversible because they are related to routine industrial operations and can be controlled through proper management. However, impacts resulting from a major chemical spill, uncontrolled wastewater discharge, serious fire, or prolonged soil contamination may require extensive cleanup and may take longer to reverse.

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Impact	Reversibility
Construction dust and noise	Fully reversible after completion of works
Machinery noise	Fully reversible when equipment is shut down or controlled
Vehicle emissions	Reversible and temporary
Packaging waste	Reversible through segregation, recycling, and proper disposal
Domestic wastewater	Reversible through controlled collection and approved disposal
Cleaning wastewater	Reversible if properly treated or routed to approved disposal
Odor / indoor vapor	Reversible through ventilation and controlled handling
Minor product spill	Reversible through immediate cleanup
Chemical spill to soil	Partially reversible; may require excavation, cleanup, and remediation

Fire impact	Partially reversible; may cause property damage, injury, and temporary air pollution
Worker injury	May be reversible or irreversible depending on severity
Employment and economic benefits	Reversible if project closes; otherwise sustained during operation

5.12.7 Risk and Probability of Impacts

Risk is assessed through the likelihood of occurrence and the severity of consequences. Routine impacts, such as waste generation and wastewater production, have a high probability of occurrence but generally low to moderate consequences if managed properly. Emergency events, such as fire or major chemical spills, have lower probability but potentially high consequences.

Likelihood Categories

Likelihood	Description
Rare	May occur only in exceptional circumstances
Unlikely	Could occur, but is not expected during normal operation
Possible	May occur at some time during the project life
Likely	Expected to occur under normal operations unless controlled
Almost certain	Expected to occur frequently or routinely

Consequence Categories

Consequence	Description
Insignificant	No injury and negligible environmental effect
Minor	First-aid injury, minor spill, localized and easily controlled impact
Moderate	Medical treatment injury, moderate spill, temporary disruption, or moderate environmental impact
Major	Serious injury, major fire, significant environmental damage, regulatory non-compliance
Severe	Fatality, off-site emergency, extensive contamination, or severe property and environmental damage

Risk Matrix

Consequence / Likelihood	Rare	Unlikely	Possible	Likely	Almost Certain
Insignificant	Low	Low	Low	Low	Moderate
Minor	Low	Low	Moderate	Moderate	Moderate
Moderate	Low	Moderate	Moderate	High	High
Major	Moderate	Moderate	High	High	Very High
Severe	Moderate	High	High	Very High	Very High

Preliminary Project Risk Assessment

Potential Event / Impact	Likelihood Before Controls	Consequence Before Controls	Initial Risk	Principal Control Measures	Residual Risk
Packaging-waste accumulation	Likely	Minor	Moderate	Segregation, covered bins, recycling, regular collection	Low
Domestic wastewater mismanagement	Possible	Moderate	Moderate	Approved sewerage/disposal connection, drainage inspection, housekeeping	Low
Cleaning wastewater entering storm drain	Possible	Moderate	Moderate	Controlled wash areas, separate drainage, staff training	Low
Minor product spill	Likely	Minor	Moderate	Spill trays, housekeeping, immediate cleanup, absorbent material	Low
Chemical spill	Possible	Major	High	Secondary containment, SDS, spill kit, training, emergency procedure	Low to moderate
Fire in packaging or chemical-storage area	Unlikely	Major	Moderate	Fire extinguishers, detection, emergency exits, drills, no-smoking policy, safe storage	Low to moderate
Electrical shock / short circuit	Possible	Major	High	Earthing, circuit protection, inspections,	Low to moderate

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				lockout/tagout, trained electrician	
Machine-related injury	Possible	Moderate	Moderate	Machine guards, emergency stop switches, SOPs, PPE, training	Low
Worker chemical exposure	Possible	Moderate	Moderate	PPE, ventilation, SDS, hygiene, controlled handling	Low
Excessive machinery noise	Possible	Minor	Moderate	Maintenance, enclosure if needed, hearing protection, monitoring	Low
Traffic incident at gate	Possible	Moderate	Moderate	Speed control, signage, designated loading area, traffic scheduling	Low
Generator emissions, if installed	Possible	Moderate	Moderate	Preventive maintenance, appropriate stack, low-sulfur fuel where available, monitoring	Low
Drain blockage / localized flooding	Possible	Moderate	Moderate	Routine drain cleaning, waste control, storm-water separation	Low
Emergency evacuation failure	Unlikely	Severe	High	Emergency plan, drills, signage, assembly point, trained fire wardens	Low to moderate

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5.13 Assessment of Potential Impacts

5.13.1 Construction-Phase Impacts

Construction-phase impacts are expected to be temporary, localized, and manageable. The main impacts may include dust emissions from civil works, noise from construction equipment, construction-material storage, generation of construction debris, increased vehicle movement, occupational health and safety risks, and temporary disturbance to drainage.

The project shall implement dust suppression, covering of construction materials, proper storage of debris, timely removal of waste, safe electrical practices, PPE, worker induction, traffic control, and drainage protection measures during construction.

Construction Impact	Nature	Magnitude	Extent	Duration	Reversibility	Significance Before Mitigation	Significance After Mitigation
Dust from excavation and material handling	Negative, direct	Minor to moderate	On-site and immediate surroundings	Temporary	Reversible	Moderate	Low
Noise from construction activities	Negative, direct	Minor to moderate	On-site and nearby industrial units	Temporary	Reversible	Moderate	Low
Construction debris	Negative, direct	Moderate	On-site	Temporary	Reversible	Moderate	Low
Traffic movement	Negative, direct	Minor	Site access and nearby roads	Temporary	Reversible	Low	Low
Worker injury	Negative, direct	Moderate	On-site	Temporary	Partially reversible	Moderate	Low
Soil contamination from fuel / oil spill	Negative, direct	Moderate	Localized at storage or equipment area	Temporary to medium-term	Reversible with cleanup	Moderate	Low
Temporary drainage obstruction	Negative, indirect	Moderate	Site and nearby drain	Temporary	Reversible	Moderate	Low
Construction employment	Positive, direct	Minor to moderate	Local	Temporary	Reversible	Positive	Positive

5.13.2 Operational-Phase Impacts

The operational phase will involve the most sustained interaction with the environment. The main activities include raw-material handling, cream filling, cooling, capping, sealing, labeling, packing, finished-product storage, cleaning, waste handling, vehicle movement, utility consumption, and employee activities.

The impacts are expected to remain manageable because the facility is located within an industrial estate, the process does not involve large-scale chemical synthesis, and the production capacity is approximately 1 ton per day. However, effective environmental management is required to prevent wastewater contamination, improper waste disposal, chemical spills, fire incidents, and worker injuries.

Operational Impact	Nature	Magnitude	Extent	Duration	Reversibility	Significance Before Mitigation	Significance After Mitigation
Domestic wastewater generation	Negative, direct	Moderate	Site drainage and sewerage system	Long-term, daily	Reversible	Moderate	Low
Cleaning wastewater generation	Negative, direct	Moderate	Cleaning area and drainage system	Long-term, periodic	Reversible	Moderate	Low
Packaging-waste generation	Negative, direct	Moderate	Production, packing, storage, and waste area	Long-term, daily	Reversible	Moderate	Low
Rejected product and contaminated waste	Negative, direct	Moderate	Production and waste-storage area	Long-term, intermittent	Reversible with proper disposal	Moderate	Low to moderate
Chemical storage and spill risk	Negative, direct	Moderate to major	Chemical-store and nearby drainage	Long-term, accidental	Partially reversible	High	Low to moderate
Odor / vapor exposure	Negative, direct	Minor to moderate	Indoor workspace and immediate boundary	Intermittent	Reversible	Moderate	Low
Machinery noise	Negative, direct	Minor	Production area and boundary	Long-term, intermittent	Reversible	Low	Negligible to low
Vehicle emissions	Negative, direct	Minor	Gate, internal roads, nearby industrial roads	Intermittent	Reversible	Low	Low
Generator emissions, if applicable	Negative, direct	Moderate	Generator area and nearby boundary	Intermittent	Reversible	Moderate	Low
Water consumption	Negative, indirect	Minor to moderate	Site utility system	Long-term	Reversible	Moderate	Low

Electricity consumption	Negative, indirect	Minor to moderate	Site and grid system	Long-term	Reversible	Low to moderate	Low
Fire hazard	Negative, accidental	Major	Whole facility and nearby industrial units	Low frequency	Partially reversible	High	Low to moderate
Machine injury	Negative, direct	Moderate	Production area	Long-term potential	Partially reversible	Moderate	Low
Chemical exposure	Negative, direct	Moderate	Production, cleaning, and chemical-storage areas	Long-term potential	Reversible to partially reversible	Moderate	Low
Traffic movement	Negative, direct	Minor	Site gate and QIE roads	Long-term, intermittent	Reversible	Low	Low
Employment and local business activity	Positive, direct and indirect	Moderate	Local and regional	Long-term	Reversible on closure	Positive	Positive

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5.13.3 Maintenance-Phase Impacts

Maintenance activities are necessary for safe and efficient operation of machinery, electrical systems, ventilation systems, cooling equipment, drainage, fire-safety equipment, and utilities. However, maintenance can generate used lubricants, oily rags, worn-out parts, filters, electrical waste, and temporary noise.

These impacts will generally be intermittent and localized. They can be effectively managed through preventive maintenance, controlled handling of used oil and waste materials, safe isolation of electrical systems, use of trained maintenance staff, and proper disposal through authorized channels.

Maintenance Impact	Nature	Magnitude	Duration	Reversibility	Residual Significance
Used oil / lubricants	Negative	Minor to moderate	Periodic	Reversible with controlled disposal	Low
Used rags and absorbent materials	Negative	Minor	Periodic	Reversible	Low
Scrap metal and machine parts	Negative / recoverable	Minor	Periodic	Reversible through recycling	Low
Noise during servicing	Negative	Minor	Short-term	Reversible	Negligible
Electrical maintenance risk	Negative	Moderate	Short-term	Partially reversible in case of injury	Low with procedures
Maintenance-worker exposure	Negative	Moderate	Short-term	Reversible to partially reversible	Low with PPE and training

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5.13.4 Emergency and Accidental Impacts

Emergency impacts may arise from fire, chemical spills, leakage of raw materials, electrical faults, machinery malfunction, drainage overflow, structural damage, or traffic accidents. Such impacts have lower probability than routine impacts but can result in higher consequences.

The project shall prepare and implement an Emergency Response Plan before commencement of operations. The plan shall include emergency contacts, fire-response procedures, evacuation routes, assembly points, spill-response procedures, first-aid arrangements, emergency equipment, incident-reporting procedures, and coordination mechanisms with QIE management and relevant emergency services.

The project shall ensure that fire extinguishers are installed at appropriate locations and are maintained, inspected, and accessible. Staff shall receive fire-safety and spill-response training. Mock drills shall be conducted at least twice per year. Chemical-storage areas shall be provided with appropriate spill kits, absorbent materials, personal protective equipment, and safety data sheets.

Emergency Event	Potential Consequence	Initial Significance	Key Control Measures	Residual Significance
Chemical spill	Worker exposure, drainage contamination, soil contamination, odor	High	Secondary containment, spill kit, SDS, training, immediate cleanup	Low to moderate
Fire in packaging storage	Smoke, injury, property damage, off-site concern	High	Fire extinguishers, alarms, evacuation plan, housekeeping, no-smoking policy	Low to moderate
Electrical short circuit	Fire, electrocution, equipment damage	High	Earthing, circuit breakers, inspections, trained electrician	Low to moderate
Machine entanglement / injury	Worker injury and production interruption	Moderate	Guards, emergency stop, SOPs, training, PPE	Low
Drainage overflow	Localized flooding, wastewater release, sanitation concern	Moderate	Drain cleaning, wastewater control, emergency pumping/containment	Low
Generator fuel spill, if applicable	Soil contamination and fire risk	Moderate	Bunded storage, spill trays, controlled refueling, spill response	Low
Traffic accident	Injury, damage, temporary congestion	Moderate	Speed limits, signage, trained drivers, separate pedestrian routes	Low
Failure of emergency evacuation	Injury and panic during fire/emergency	High	Drills, clear exits, assembly point, trained fire wardens	Low to moderate

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5.14 Positive Impacts

The proposed project is expected to generate several positive socio-economic impacts. These benefits are important in the overall evaluation of the project and shall be enhanced through appropriate management practices.

- Creation of direct employment opportunities for production workers, machine operators, packers, supervisors, administrative staff, security staff, cleaners, and maintenance personnel.
- Indirect employment for transporters, suppliers, recyclers, contractors, service providers, and local vendors.
- Development of local manufacturing and packaging capacity in the cosmetics sector.

- Increased economic activity through procurement of packaging materials, containers, labels, cartons, maintenance services, and transport services.
- Improvement in worker skills related to cosmetics production, packaging, quality control, hygiene, machine operation, occupational safety, and emergency response.
- Potential recovery and recycling of cardboard, paper, plastic, and metal packaging waste.
- More organized production and product handling through use of mechanized filling, cooling, capping, and sealing equipment.
- Increased contribution to industrial growth within the Quaid-e-Azam Industrial Estate.

5.15 Residual Impacts

Residual impacts are those impacts that remain after the implementation of all practicable mitigation measures. For the proposed project, most residual impacts are expected to be low and acceptable, provided that the Environmental Management Plan is implemented effectively.

The principal residual impacts may include:

- Minor vehicle emissions from delivery and dispatch vehicles.
- Minor machinery noise within the workplace and at the project boundary.
- Consumption of electricity and water.
- Generation of non-recyclable solid waste.
- Limited wastewater generation from staff facilities and controlled cleaning activities.
- Low-level odor associated with cosmetic ingredients, fragrances, or cleaning materials.
- Low residual risk of fire, chemical spill, or worker injury despite the application of safety measures.

These residual impacts shall be managed through routine monitoring, maintenance, staff training, waste segregation, approved wastewater disposal, preventive maintenance, emergency preparedness, and continuous compliance with applicable environmental and occupational health and safety requirements.

5.16 Conclusion

The impact assessment has identified the potential environmental, health, safety, and socio-economic impacts of the proposed M/s Goree Cosmetics (Private) Limited facility through the use of checklists, interaction matrices, cause-and-effect networks, layout/overlay analysis, GIS-based considerations, professional judgment, and risk-assessment methods.

The assessment confirms that the key adverse impacts relate to wastewater management, solid-waste generation, storage and handling of cosmetic raw materials and cleaning chemicals, odor and ventilation, machinery operation, worker health and safety, fire and emergency preparedness, drainage control, traffic movement, and resource consumption.

Most anticipated impacts are localized, low to moderate in magnitude, reversible, and manageable through implementation of appropriate environmental and safety controls. The potentially high-consequence impacts particularly fire, electrical hazards, chemical spills, and worker injury are low-probability events but require robust preventive and emergency-response measures.

The proposed project is considered environmentally manageable, subject to implementation of the Environmental Management Plan, occupational health and safety procedures, waste-management plan, wastewater-control measures, fire-safety arrangements, environmental monitoring program, and compliance with the conditions imposed by Punjab EPA and other relevant authorities.

CHAPTER 6: ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1 General

This chapter identifies the environmental, social and occupational impacts likely to arise from the proposed cosmetics manufacturing unit, evaluates their significance before and after mitigation, and prescribes the measures by which each will be controlled. The assessment covers the construction phase, the operational phase and the eventual decommissioning of the facility.

6.2 Objectives

- To identify every significant source of environmental effect arising from the project and to trace it to the receptors that could be affected.
- To evaluate the nature, magnitude, extent, duration and reversibility of each impact, both before and after mitigation.
- To prescribe mitigation measures that are technically sound, affordable at the scale of this project and capable of being sustained over its operating life.
- To identify the residual impacts that will remain after mitigation, so that the monitoring effort can be concentrated where it is actually needed.
- To identify opportunities for environmental and social enhancement beyond simple mitigation.

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6.3 Impact Assessment Methodology

Screening of potential impacts. Impacts were screened on the basis of the site reconnaissance, the approved building plan, the process description and equipment list, discussions with the proponent's technical staff, the baseline measurements described in Chapter 4 and the concerns recorded during consultation. Each identified impact was characterized by its nature, whether direct, indirect or cumulative, by its magnitude, by its spatial extent, by its duration, whether temporary or permanent, and by its reversibility.

Identification of mitigation measures. Mitigation was identified according to the standard hierarchy, applied in descending order of preference.

- Avoid, meaning to eliminate the impact at source through siting, layout or process choice, for example by locating the unit inside a notified industrial estate with an engineered sewer rather than in a mixed use area.
- Minimize, meaning to reduce the scale or duration of the impact, for example by dry cleaning equipment before wet washing and by pre-treating the effluent before discharge.
- Rectify, meaning to repair or restore after the impact has occurred, for example by cleaning up a spill immediately and by restoring the site on decommissioning.
- Compensate, meaning to offset a residual impact that cannot be avoided or reduced, for example by recharging clean rainwater to the aquifer from which water is abstracted.
- Enhance, meaning to create a benefit beyond mere mitigation, for example through local employment, landscaping and the training of workers.

Evaluation of residual impacts. After mitigation, most impacts of this project reduce to a low level. The residual effects that remain and require continuing management are the quality and volume of the effluent discharged to the estate sewer, the consumption of groundwater in a city with a falling water table, the packaging and hazardous waste streams, odour and volatile organic compounds from fragrance handling, and the occupational risks associated with hot vessels, chemical handling and moving machinery.

Identification of monitoring requirements. The scope and frequency of monitoring has been set in proportion to residual significance. Parameters carrying a direct compliance or health consequence, such as treated effluent quality and workplace conditions, are monitored more frequently than those of lower significance. The framework is set out in Chapter 7.

Criteria for significance. The following scale has been used to rate significance.

- Negligible or no impact, meaning an effect that is unapparent or of no discernible consequence to the natural or socio-economic environment.
- Low adverse impact, meaning a slight effect on the natural or socio-economic environment.

- Moderate adverse impact, meaning an effect that can be eliminated or brought within acceptable limits by the identified mitigation measures.
- Severe adverse impact, meaning an effect that the identified measures can only partially mitigate.
- Positive or beneficial impact, meaning an effect that improves the natural or socio-economic environment.

6.4 Anticipated Potential Environmental Impacts

The impacts anticipated from this project have been classified as direct, indirect and induced, and are further characterized as positive or negative, minor, moderate or major, local or widespread, temporary or permanent, short term or long term, and reversible or irreversible. It is a feature of a unit of this type that almost every impact is local in extent and reversible on closure, since the process involves no excavation, no impoundment, no discharge to a watercourse, no large scale combustion and no permanent alteration of the land surface beyond the building that is already envisaged in the approved plan.

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6.5 Impacts Associated with Project Location

The choice of site is the single most influential environmental decision in a project of this kind, because it determines which receptors are exposed and to what degree. The selected plot lies inside the Quaid-e-Azam Industrial Estate, an area notified and developed for manufacturing, served by estate water supply, an engineered sewer, storm drainage, metalled roads designed for goods traffic and an electricity distribution network with a transformer already installed on the plot. The immediate neighbours are factories rather than households. No watercourse passes through the plot, no protected area, critical habitat, archaeological feature, graveyard or place of worship lies within or adjacent to it, no agricultural land is being converted, and no household or business is being displaced. The land is owned outright by the proponent.

The principal locational sensitivity is that the unit will draw water from an aquifer that is already under stress across Lahore, and will discharge its effluent into a shared sewer whose capacity and condition serve the whole estate. Both are addressed directly through the water conservation

measures and the effluent pre-treatment described below. The locational impact is accordingly rated as low adverse before mitigation and negligible to positive after mitigation.

6.6 Impacts Associated with Project Design

Several environmental outcomes are fixed at the design stage and cannot be retrieved later by good housekeeping. The design decisions taken for this project and their environmental consequences are the following. A dedicated effluent pre-treatment unit has been provided ahead of the sewer connection, which is the difference between discharging an oily untreated washing water and discharging a compliant effluent. Floor channels and a collection sump have been provided in the compounding and filling areas, so that washings are captured rather than allowed to find their way to the storm drain. Closed jacketed vessels with steam and chilled water jackets have been specified in preference to open kettles and direct firing, which contains vapour and odour and removes the risk of local overheating. An automatic filling, cooling, capping and sealing line has been specified in preference to manual filling, which reduces spillage and therefore reduces both product loss and the organic load in the wash water. A closed circuit chiller has been specified in preference to once through cooling, which avoids a large and needless water demand. A recharge pit has been provided to receive clean roof rainwater, which returns water to the aquifer instead of loading the storm drain. Bunded and ventilated storage has been specified for chemicals and flammable materials, which is the primary defence against soil and groundwater contamination and against fire. Local exhaust ventilation has been specified at charging, dispensing and mixing points, which is the primary defence against odour and vapour exposure in the workplace. Design related impacts are accordingly rated as low, and the design itself operates as a mitigation measure rather than as a source of impact.

6.7 Impacts of the Construction and Installation Phase

The construction phase covers the completion of the proposed covered area and the installation of plant, utilities and services. It is expected to last approximately eight to nine months, is confined within the boundary of the plot, and takes place within an operating industrial estate rather than in an undeveloped area.

6.7.1 Air Quality during Construction

Excavation, concreting, masonry, cutting, grinding, plastering and the movement of material vehicles generate dust, and construction equipment and vehicles generate exhaust emissions. The impact is local, temporary and of low to moderate significance before mitigation, and low after it. Mitigation includes water sprinkling on exposed surfaces and during dusty operations, covering of sand, cement and debris stockpiles, sheeting of material vehicles, wet cutting or the use of dust extraction on cutting and grinding tools, screening of the scaffold face with mesh where work is at height, washing of vehicle wheels before they leave the plot so that mud is not carried onto the estate road, a prohibition on the burning of construction debris, and the maintenance and correct tuning of construction vehicles and equipment.

6.7.2 Noise and Vibration during Construction

Concrete mixers, vibrators, cutting and grinding tools, hammering and vehicle movement generate noise, and piling or heavy compaction generates vibration. Because the neighbours are working factories rather than dwellings, the sensitivity is lower than it would be in a residential area, but the impact is still moderate before mitigation and low after it. Mitigation includes confining noisy work to daytime hours, keeping equipment properly maintained and fitted with silencers, siting noisy operations away from the shared boundary where practicable, providing hearing protection to construction workers, and informing the neighbouring occupiers in advance of any unusually noisy operation.

6.7.3 Soil, Drainage and Water during Construction

Concrete washout, curing water, spillage of fuel or oil from construction equipment, and silt carried in runoff can contaminate the soil and block the estate drains. The impact is local and of moderate significance before mitigation and low after it. Mitigation includes a lined concrete washout pit rather than washing out onto the ground or into a drain, refuelling and servicing of equipment on an impervious surface with a drip tray, immediate cleanup of any spill with the contaminated material handled as hazardous waste, silt traps at the connection to the estate drain, protection of the recharge pit from construction runoff until the works are complete, and provision of temporary toilets connected to the sewer for the construction workforce rather than open defecation on the plot.

6.7.4 Construction Waste

Construction generates excavated earth, broken masonry and concrete, steel offcuts, timber, cement bags, packaging of fittings and equipment, and domestic refuse from the workforce. The impact before mitigation is moderate and after mitigation low. Mitigation includes segregation of inert debris from recyclable material and from domestic refuse, reuse of suitable inert material as fill within the plot, sale of steel, timber and packaging to recyclers, disposal of the remainder only at a location designated by the estate management or the local authority, covered bins for domestic refuse, and a prohibition on the burning or the burial of any waste on the plot.

6.7.5 Occupational Health and Safety during Construction

The construction phase carries the familiar hazards of falls from height, falling objects, collapse of excavation, electrical contact, injury from cutting and lifting equipment, manual handling injury and heat stress in the summer months. This is the most consequential impact of the construction phase and is rated as moderate to severe before mitigation and low after it. Mitigation includes helmets, safety footwear, eye protection, gloves and full body harnesses for work at height provided free of charge and enforced, inspection of scaffolding, ladders and lifting gear before use, edge protection and covering of floor openings, a permit to work system for electrical and hot work, use of qualified electricians only, shoring of any excavation of depth, drinking water and shaded rest breaks during hot weather, a trained first aider with a stocked first aid box on site, transport available at all times for evacuation, and the recording and investigation of all accidents and near misses. The contractor will be required to comply with these arrangements as a condition of the works contract.

6.7.6 Traffic during Construction

Material and equipment deliveries add vehicle movements to the estate internal roads. The impact is temporary and of low to moderate significance. Mitigation includes scheduling deliveries outside the peak shift change periods of the estate, keeping all loading, unloading and vehicle standing within the plot boundary rather than on the internal road, sheeting of loads, observance of estate speed limits and traffic arrangements, and prompt clearance of any material spilled on the road.

6.8 Impacts of the Operation Phase

6.8.1 Effluent Discharged to the Estate Sewer

This is the most significant environmental aspect of the operational phase. Washing of vessels, homogenizers, transfer lines, hoppers, filling nozzles and containers produces a wastewater carrying emulsified oils, waxes, fatty alcohols, emulsifiers and surfactants, preservatives, and traces of fragrance and colour. Untreated, this stream is high in chemical oxygen demand, oil and grease and suspended solids, it causes grease deposition in the sewer, and it is capable of exceeding the Punjab Environmental Quality Standards for effluent entering a sewerage system. Boiler blowdown adds heat and dissolved solids, and reverse osmosis reject adds salinity. The impact before mitigation is rated as high adverse and after mitigation as low adverse.

Mitigation. Residual product will be removed from vessels and lines dry, by scraping and wiping, before any water is applied, and the recovered material collected in containers rather than washed to drain, since product removed dry never has to be removed later from water. All washings will be collected through floor channels into a dedicated sump and will pass through the pre-treatment unit, comprising screening, an oil and grease interceptor with skimming, pH correction, coagulation and flocculation where required, and settling with sludge removal. Boiler blowdown will be cooled before it joins the line. Reverse osmosis reject will be diverted to non-product uses rather than to the drain. The discharge will leave the plot at a single identified, metered and accessible sampling point connected to the estate sewer, and will be tested quarterly by a certified laboratory against the effluent standards. Interceptor skimmings and settled sludge will be removed on a defined schedule and handed over as hazardous waste. No effluent will be discharged to a storm drain, to a watercourse, or to the ground at any time, and no untreated washing will bypass the pre-treatment unit for any reason.

6.8.2 Water Consumption and the Aquifer

Water is the principal utility of the unit, used as purified water in the product, as the cleaning medium, as boiler feed and chiller make-up, and for domestic purposes. Lahore draws its supply from an aquifer whose water table has been falling for decades, so consumption here carries a significance it would not carry elsewhere. The impact before mitigation is moderate adverse and after mitigation low adverse.

Mitigation. Abstraction will be metered and recorded daily and kept within the sanctioned allocation for the plot. Cleaning will use high pressure low volume equipment rather than open hoses, and hoses will be fitted with trigger nozzles. Reverse osmosis reject will be recovered and reused for floor washing, cooling make-up and landscape irrigation. Steam condensate will be recovered and returned to the boiler feed. The chiller will run on a closed recirculating circuit rather than once through cooling. Clean roof rainwater will be directed into the recharge pit provided on the site drawings, which returns water to the aquifer instead of sending it to the storm drain. Plumbing will be inspected on a schedule and leaks repaired promptly, since a dripping fitting in a factory wastes more water over a year than most conservation measures save. Consumption per ton of product will be recorded monthly as a performance indicator and reviewed for improvement.

6.8.3 Odour and Volatile Organic Compounds

Fragrance concentrates, essential oils, alcohol and cleaning solvents release volatile organic compounds and a characteristic odour, most strongly at the moment of charging into the batch and during equipment cleaning. Heated oils and waxes contribute a faint odour of their own. The effect is felt principally inside the building, and to a much lesser extent at the boundary. The impact before mitigation is moderate adverse and after mitigation low adverse.

Mitigation. Fragrance, alcohol and solvent containers will be kept closed and stored in a cool, ventilated, fire protected store, with only the working quantity brought into the compounding hall. Fragrance will be charged only after the batch has cooled to the temperature specified in the formula, which is both a quality requirement and the single most effective odour control available, since volatile components driven off a hot batch cannot be recovered. Vessels will be closed during emulsification. Local exhaust ventilation will be provided over the charging, dispensing and mixing points and over the powder weighing bench, and general mechanical ventilation maintained in the compounding hall. Spills will be cleaned up immediately and waste solvent and fragrance containers kept closed. Workers in the charging and cleaning areas will be issued organic vapour respirators where exposure warrants it.

6.8.4 Air Emissions from Combustion Sources

The gas fired steam boiler or thermic heater and the standby generator are the only combustion sources. They release carbon dioxide, oxides of nitrogen and small quantities of carbon monoxide, together with sulphur dioxide and particulate where diesel is used. The quantities are small in relation to the existing background of an industrial estate on a busy urban corridor, and the impact before mitigation is low to moderate adverse and after mitigation low adverse.

Mitigation. Pipeline natural gas will be used as the primary fuel wherever supply and pressure permit, being the cleanest of the practical options. Burners will be tuned to the correct air to fuel ratio and serviced on schedule, since an untuned burner wastes fuel and produces smoke at the same time. Stacks will be of adequate height, fitted with sampling ports and safe access, and positioned so that the plume does not discharge directly onto the working areas of the adjoining plots. Stack emissions will be monitored half yearly by a certified laboratory against the Punjab Environmental Quality Standards. The generator will be run only during grid outages and will be load tested rather than left idling. Steam and hot water lines will be insulated and condensate recovered, which reduces fuel consumption and therefore emissions at source.

6.8.5 Noise and Vibration during Operation

The homogenizer, agitators, air compressor, chiller and condenser fans, filling and capping machines, conveyor and standby generator generate noise, most of it contained within the building. The site lies in an industrial area where the applicable standard is 75 dB(A) by day and 65 dB(A) by night, and the nearest dwellings are outside the estate. The impact at the boundary is therefore low, while the impact within the workplace is moderate before mitigation and low after it.

Mitigation. Rotating equipment will be mounted on designed foundations with vibration isolation where specified, and will be maintained and lubricated on schedule. The compressor and the generator will be housed in enclosed and acoustically treated rooms. High noise positions will be identified, marked and provided with hearing protection whose use is enforced. Production will be confined to daytime hours. Noise levels at the boundary and at designated workplace positions will be measured quarterly.

6.8.6 Soil and Groundwater Contamination

The pathways of concern are spillage of oils, chemicals or fragrance in the store or during transfer, leakage from drums or from the effluent sump and drainage lines, and improper storage of waste on unpaved ground. Given the depth to water in Lahore, the risk of an immediate impact on the aquifer is small, but contaminants reaching the soil beneath an industrial plot remain a long term liability. The impact before mitigation is moderate adverse and after mitigation low adverse.

Mitigation. All chemical and flammable storage will be on impervious paved floors within bunds capable of containing the largest container held, with drip trays at every pump, valve and dispensing point. Drums will be stored upright on pallets, clearly labelled, with incompatible materials separated. Transfers will be attended rather than left running. A spill kit with absorbent material will be kept at the store and at the compounding hall, and workers trained in its use. The effluent sump, channels and pre-treatment tanks will be constructed watertight and inspected periodically for cracking or leakage. Waste will be stored on an impervious plinth under cover. No soakage pit, unlined pit or disposal to ground will exist anywhere on the site. Groundwater from the site source will be tested annually against the baseline recorded in Chapter 4.

6.8.7 Solid and Hazardous Waste during Operation

Packaging dominates the waste stream, and the quantity is substantial in a unit that fills jars, caps them, seals them, labels them and packs them into cartons. Hazardous waste, though much smaller in volume, carries the higher risk and includes off specification and expired product, interceptor skimmings and settling sludge, spent filter cartridges and activated carbon, used oil, laboratory reagents and used media, and contaminated rags and gloves. The impact before mitigation is moderate adverse and after mitigation low adverse.

Mitigation. Waste will be segregated at source into labelled bins for recyclable plastic, cardboard and paper, metal and glass, general refuse and hazardous waste, with the hazardous bins kept closed and under cover on an impervious plinth. Recyclables will be sold to registered recyclers against records. Empty chemical drums will be triple rinsed, with the rinsate routed to the pre-treatment unit, and returned to the supplier or sold to authorized reconditioners, never released for water or food storage. Hazardous waste will be handed over only to collectors authorized to receive it, against documented receipts retained for inspection. A waste register recording quantities

generated, reused, sold and disposed of will be maintained continuously. Domestic refuse will go to the covered bin shown on the layout for lifting through the estate arrangement. Open burning of any waste is prohibited without exception. Packaging will also be reduced at source where the product permits, through right sizing of cartons, reuse of pallets and reduction of secondary packaging.

6.8.8 Energy Use and Greenhouse Gas Emissions

The unit consumes electricity for machinery, chilling, water purification, ventilation and lighting, and gas or diesel for steam raising. Its contribution to greenhouse gas emissions is small in absolute terms but real, and it is rated as a low adverse impact both before and after mitigation, since it can be reduced but not eliminated.

Mitigation. Steam and chilled water lines will be insulated and condensate recovered. The boiler and the chiller will be serviced on schedule and their efficiency monitored, since fouled heat transfer surfaces raise fuel consumption invisibly. Light emitting diode lighting will be used throughout, with daylight admitted through the skylights shown on the drawings. Power factor correction will be installed. Equipment will be switched off rather than left idling between batches. Energy consumption per ton of product will be recorded monthly and reviewed. The landscaping and greenbelt within the plot provide a small offset and a measurable improvement in the microclimate of the compound.

6.8.9 Impacts on the Biological Environment

The plot carries no natural habitat and lies within a fully urbanized industrial district, so the biological impact of operation is negligible. No tree is expected to be removed, no watercourse or wetland is affected, and no protected species is present. The landscaping and boundary planting proposed in Chapter 7 will marginally improve the habitat value of the plot for urban birds and insects compared with its present condition. The impact is accordingly rated as negligible before mitigation and slightly positive after the landscaping is established.

6.8.10 Socio-Economic and Community Impacts

Employment and local economy. The unit will provide approximately forty eight direct jobs together with indirect employment in transport, packaging supply, maintenance, recycling and

local services. Packing and laboratory roles offer employment opportunities for women, which the consultation identified as a valued outcome. This is rated as a positive impact of medium significance. It will be enhanced by giving preference in unskilled and semi-skilled recruitment to residents of the surrounding localities, by communicating the recruitment policy openly, by providing separate washroom, changing and rest facilities for women workers, and by procuring ordinary supplies and services locally where practicable.

Community health and amenity. The health pathways of concern are odour, which causes discomfort rather than disease, and the small risk of water or sewer contamination affecting others. With the odour, effluent and waste measures described above in place, the residual impact is low. The proponent will keep the premises clean and well maintained, since a factory that looks and smells neglected generates anxiety out of proportion to its actual emissions, and will respond promptly to any complaint through the grievance mechanism.

Worker health and safety. This is the single most important impact of the operational phase and warrants separate emphasis. Workers charge powders and liquid chemicals by hand, work beside vessels containing oils and waxes at seventy to eighty five degrees Celsius, operate rotating homogenisers and a moving conveyor line, handle steam and hot water lines, use alcohol and cleaning agents in enclosed rooms, and lift and move drums and cartons repeatedly. The hazards are scalds and burns, chemical splash to the skin and eyes, inhalation of powder and vapour, entanglement in rotating and moving parts, electrical contact, slips on wet floors, manual handling injury, heat stress in summer and fire. The impact before mitigation is rated as severe and after mitigation as low to moderate, since occupational risk in a chemical batch plant can be substantially reduced but never entirely eliminated.

Mitigation. Written safe operating procedures will be prepared for vessel charging and discharging, for hot phase handling, for cleaning with alcohol and detergents, for line clearance and changeover, and for boiler operation, and workers will be trained in them in Urdu rather than handed a document in English. Heat resistant gloves, chemical resistant gloves, aprons, eye protection and face shields, safety footwear, dust masks and organic vapour respirators will be provided free of charge and their use enforced. Material safety data sheets will be displayed at the point of use in Urdu and English. Rotating and moving parts on homogenizers, agitators and the conveyor line will be guarded, with interlocks where the design permits, and an emergency stop

within reach of every station. Steam and hot water lines and vessel surfaces will be lagged. An eyewash and safety shower will be installed in the compounding and chemical store area, since immediate flushing is the decisive factor in the outcome of a chemical splash. Floors will be kept dry, with anti-slip surfaces and prompt cleanup of spills. Mechanical aids will be provided for drum and carton handling and manual handling training given. Drinking water, ventilation and rest breaks will be provided during hot weather. A first aid post with a trained first aider and a stocked box will be maintained, with transport available at all times for evacuation. Pre-employment and annual medical examination, including respiratory screening for workers in powder and vapour exposed positions, will be arranged. All accidents and near misses will be recorded and investigated, and the record retained for inspection.

Traffic. Inward deliveries of raw material and packaging and outward dispatch of finished goods add vehicle movements to the estate roads. The impact is low to moderate before mitigation and low after it. Mitigation includes carrying out all loading and unloading within the plot boundary, scheduling deliveries outside peak shift change periods, observing estate speed limits and traffic arrangements, briefing drivers, keeping vehicle fitness and licences current, and prohibiting overloading.

Security. Chemicals, finished goods and plant on the premises create a risk of theft and unauthorized entry. The impact is low and will be managed by a secure boundary and controlled gates, the security room provided in the layout, security staffing, lighting and the locking of stores outside working hours.

Emergency response. The credible emergencies are fire in the chemical store, the packaging store or the finished goods warehouse, a scald or burn from a hot vessel or steam line, a chemical splash to the eye, a major spill, a gas leak, an electrical incident and a boiler incident. A written emergency response plan will be prepared before commissioning, setting out the alarm arrangement, the assembly point, the roles of named individuals, the location of firefighting and first aid equipment, the telephone numbers of Rescue 1122, the nearest hospital, the fire service and the estate management, and the procedure for informing the Environmental Protection Agency of any incident with environmental consequences. Drills will be held at least twice a year with attendance recorded, and coordinated with the estate management where a neighbouring plot could be affected.

6.9 Impacts of the Decommissioning Phase

The land is owned by the proponent and the facility is intended to operate for the long term, so decommissioning is a remote rather than a near prospect. Should the unit nevertheless be closed, converted or relocated, the activities involved would be the dismantling of plant and pipework, the emptying of the chemical store and the effluent pre-treatment unit, the disposal of residual stock, and the condition in which the premises are left. Poorly handled, decommissioning leaves behind contaminated floors and drains, abandoned drums of chemical, and quantities of expired product. The impact before mitigation is moderate and after mitigation low.

Mitigation. A site restoration plan will be prepared in advance of closure and shared with the Environmental Protection Agency. All vessels, tanks and pipework will be drained, cleaned and removed or handed over rather than abandoned in place. Residual chemicals, fragrance, oils, sludge and expired product will be removed and disposed of as hazardous waste through authorised collectors, against documented receipts. The effluent sump and pre-treatment tanks will be emptied, cleaned and either decommissioned or handed over in working order. Floors and drains in the chemical store and compounding area will be inspected and cleaned, and any contaminated material removed. Machinery and scrap will be sold for reuse or to recyclers rather than dumped. Trees and landscaping established on the plot will be retained and handed over. A photographic and documentary record of the restoration will be retained.

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6.10 Potential Environmental Enhancement Measures

- Development of landscaping and a boundary greenbelt of not fewer than one hundred and twenty trees and shrubs suited to urban conditions, which will serve as a visual screen, a noise buffer, a dust trap and a modest improvement in the microclimate of the compound.

- Harvesting of clean roof rainwater into the recharge pit, which returns water to an aquifer from which the city abstracts more than it replaces.

- Recovery and reuse of reverse osmosis reject and steam condensate, which reduces fresh water abstraction and fuel consumption at the same time.

- Recovery of product removed dry from vessels and lines, which reduces both raw material loss and the organic load in the effluent.

- Segregation and sale of recyclable packaging to registered recyclers, which keeps a large volume of plastic, cardboard and metal out of the waste stream.
- Preferential local recruitment, with packing and laboratory roles open to women, and on-the-job training in compounding, quality control, machine operation and maintenance, which builds transferable skills.
- Sharing of monitoring results and safety practice with neighbouring units through the estate association, so that good practice spreads rather than remaining confined to one plot.
- Environmental and safety awareness sessions for the workforce that cover conduct off site as well as on it, including water conservation and waste segregation at home.

6.11 Summary of the Environmental Impacts

The overall risk profile of the project, before and after the implementation of the mitigation measures described in this chapter, is summarized in Table 6.1.

Environmental Parameter	Risk Before Mitigation	Risk After Mitigation	Principal Mitigation Measures
Project location	+1 (P)	+2 (P)	Notified industrial estate, industrial neighbours, engineered sewer and drainage, no displacement, no protected area
Effluent to the estate sewer	-3 (P)	-1 (P)	Dry cleaning before washing, collection sump, oil and grease interceptor, pH correction, settling, single metered discharge point, quarterly testing
Water consumption and the aquifer	-2 (P)	-1 (P)	Metered abstraction within allocation, high pressure low volume cleaning, reuse of reverse osmosis reject, condensate recovery, rainwater recharge
Odour and volatile organic compounds	-2 (P)	-1 (P)	Closed vessels, cool ventilated flammable store, fragrance charged only after cooling, local exhaust ventilation, prompt spill cleanup
Combustion emissions from boiler and generator	-2 (P)	-1 (P)	Natural gas as primary fuel, burner tuning and servicing, adequate stack height with sampling port, half yearly stack testing
Noise at workplace	-2 (T)	-1 (T)	Enclosed compressor and generator rooms, vibration isolation, maintenance, marked high noise zones, hearing protection

Noise at boundary	-1 (T)	0	Daytime operation only, enclosure of utilities, industrial surroundings
Soil and groundwater	-2 (P)	-1 (P)	Bunded impervious chemical storage, drip trays, spill kits, watertight sump and drains, no disposal to ground, annual water testing
Solid and hazardous waste	-2 (P)	-1 (P)	Segregation at source, waste register, recyclers for packaging, authorised collectors for hazardous waste, no open burning
Energy use and greenhouse gas	-1 (P)	-1 (P)	Insulation, condensate recovery, efficient chiller and boiler, LED lighting, no idling, consumption monitoring
Flora	0	+1 (P)	No tree removal expected, landscaping and boundary planting, compensatory planting if any tree is removed
Fauna	0	0	No natural habitat present, no protected species, prohibition on harming urban wildlife
Occupational health and safety	-3 (P)	-1 (P)	Safe operating procedures, full personal protective equipment, machine guarding, lagging, eyewash and safety shower, medical screening, training, incident recording
Traffic and road safety	-2 (T)	-1 (T)	Loading within the plot, scheduling away from peak periods, estate speed limits, driver briefing, vehicle fitness
Community amenity and neighbour relations	-2 (P)	-1 (P)	Odour and effluent control, housekeeping, grievance mechanism, prompt response to complaints
Employment and local economy	+2 (P)	+2 (P)	Local recruitment preference, roles open to women, local procurement, on-the-job training
Aesthetics and site condition	-1 (P)	0	Landscaping, boundary planting, paved circulation, housekeeping, maintained and painted structures
Decommissioning and site condition	-2 (P)	-1 (P)	Advance restoration plan, removal of chemicals and residues, cleaning of drains and floors, scrap to recyclers, retention of trees

Table 6.1: Summary of Environmental Impacts. Plus denotes beneficial and minus denotes adverse; 1 is low, 2 is medium and 3 is high significance; T denotes temporary and P denotes permanent or long term.

CHAPTER 7: ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

7.1 General

This chapter sets out the Environmental Management Plan for the construction and operation of the cosmetics manufacturing unit, together with the monitoring programme by which its effectiveness will be judged. The Plan translates the mitigation measures identified in Chapter 6 into assigned responsibilities, defined actions and measurable checks. It is intended to be kept at the site office as a working document, referred to during daily operation and produced for inspection, rather than filed once and forgotten.

7.2 Objectives of the Environmental Management Plan

- To ensure that every mitigation measure committed to in this report is actually implemented, by whom and by when.
- To keep the effluent, emissions, waste and noise of the unit within the limits prescribed by the Punjab Environmental Quality Standards throughout its operating life.
- To protect the health and safety of workers and of the occupiers of neighbouring plots.
- To use water and energy efficiently and to reduce waste at source rather than only at the point of disposal.
- To provide the records and reports required by the Environmental Protection Agency and by the estate management.
- To give the management a means of detecting deterioration in performance before it becomes a violation or an incident.

7.3 Management Approach

The management approach rests on four simple ideas. First, accountability is personal rather than collective, so every measure in the Plan carries the name of a post rather than of a department. Second, a measure that is not recorded is treated as not done, so registers and logs are integral to the Plan rather than an afterthought. Third, prevention at source is preferred to treatment at the end of the pipe, which is why dry cleaning before washing, closed vessels and cool charging of

fragrance appear in the Plan alongside the pre-treatment unit. Fourth, the Plan is reviewed at defined intervals and after any incident, so that it reflects how the unit actually runs rather than how it was expected to run at the design stage.

7.4 Components of the EMP

- The mitigation plan, setting out each activity, its potential impact, the mitigation measure, the implementing body and the supervising authority.
- The monitoring plan, setting out parameters, methods, locations, frequency and responsibility.
- The institutional arrangement, defining who within the organization is accountable for what.
- The training programme for workers and supervisors.
- The documentation and reporting system, including registers, logs and periodic reports to the regulator.
- The emergency response plan and the grievance mechanism.
- The budget allocated to environmental management.

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7.5 Environmental Management Plan

Table 7-1 lists the mitigation measures identified in Chapter 6 against the activity that gives rise to the impact, together with the implementing body and the supervising authority.

Project Activity	Potential Impact	Extent	Mitigation Measures	Implementing Body	Supervision
Construction of the covered area and civil works	Dust, noise, debris, spillage, drainage blockage	Site level, temporary	Water sprinkling on exposed surfaces; covered stockpiles; sheeted material vehicles; wet cutting or dust extraction; lined concrete washout pit; silt trap at the drain connection; wheel washing before leaving the plot; daytime working; no burning of debris	Civil contractor	Environmental and Safety Officer
Installation of plant, utilities and services	Fall from height, lifting and electrical hazard, hot work	Site level, temporary, high consequence	Harnesses and helmets for work at height; inspection of scaffolding and lifting gear; permit to work for electrical and hot work; qualified electricians only; trained first aider and evacuation transport on site	Erection contractor	Project Manager and Environmental and Safety Officer
Raw material receipt and chemical storage	Soil and groundwater contamination, fire, chemical exposure	Site level, long term, high consequence	Impervious bunded storage capable of holding the largest container; drums upright on pallets and labelled; incompatible materials separated; cool ventilated fire protected store for fragrance and alcohol; material safety data sheets at the point of use; spill kit and trained staff; attended transfers	Store In-charge	Environmental and Safety Officer
Dispensing and weighing of raw materials	Airborne powder, chemical splash, spillage	Workplace level, long term	Local exhaust ventilation over the weighing bench; weighing over trays;	Dispensing operator	Production Officer

			closed containers; gloves, goggles and dust masks; immediate cleanup of spillage; no eating or drinking in the area		
Heating and emulsification in jacketed vessels	Scalds and burns, vapour and odour, energy use	Workplace level with limited boundary effect, long term	Closed vessels during emulsification; lagged steam lines and hot surfaces; heat resistant gloves and aprons; temperature control to the batch record; insulation and condensate recovery; guarded homogeniser and agitator drives	Compounding operator	Production Officer
Cooling, perfuming and addition of actives	Volatile organic compounds and odour	Workplace level with odour capable of reaching the boundary, long term	Fragrance charged only after cooling to the specified temperature; local exhaust at the charging point; containers kept closed; working quantities only in the hall; organic vapour respirators where exposure warrants	Compounding operator	Environmental and Safety Officer
Filling, cooling tunnel, capping and sealing	Product spillage, entanglement, noise, repetitive strain	Workplace level, long term	Drip trays and suck back at the filling heads; guarding and emergency stops on the conveyor line; marked high noise positions with hearing protection; anti-slip flooring and prompt cleanup; rotation of tasks and mechanical aids for lifting	Line operators	Production Officer
Cleaning of vessels, lines and equipment	High strength effluent, chemical exposure, water consumption	Discharged beyond the boundary through the sewer, long term	Dry removal of residual product before washing, with recovered material collected; high pressure low volume washing; trigger nozzles on hoses; all	Compounding and cleaning staff	Environmental and Safety Officer

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			washings routed to the collection sump and pre-treatment unit; no bypass of the unit for any reason; gloves and goggles for cleaning staff		
Operation of the effluent pre-treatment unit	Discharge exceeding effluent standards, sewer blockage	Beyond the boundary, long term	Daily check of screening, interceptor and pH; scheduled skimming and sludge removal; cooling of boiler blowdown before it joins the line; single metered and accessible sampling point; quarterly testing by a certified laboratory; interceptor waste handled as hazardous waste	Utility technician	Environmental and Safety Officer
Water abstraction, purification and distribution	Depletion of the aquifer, wastage	Regional, long term	Metered and recorded abstraction within the sanctioned allocation; recovery of reverse osmosis reject for non product use; condensate recovery; leak inspection and prompt repair; rainwater harvesting into the recharge pit; monthly consumption per ton recorded	Utility technician	Environmental and Safety Officer
Boiler, chiller, compressor and generator operation	Stack emissions, noise, fuel use, boiler risk	Site level with limited boundary effect, long term	Natural gas as primary fuel; burner tuning and scheduled servicing; stack of adequate height with sampling port and access; boiler registered and operated by a certified attendant; acoustic enclosure for the generator; enclosed compressor and chiller rooms; half yearly stack testing	Utility technician and certified boiler attendant	Environmental and Safety Officer

Waste handling and storage	Land contamination, pest nuisance, improper disposal	Site level and beyond, long term	Segregation at source into labelled bins; hazardous waste closed, covered and on an impervious plinth; waste register maintained continuously; recyclables to registered recyclers; hazardous waste only to authorised collectors against receipts; triple rinsing and return of empty drums; no open burning	Store In-charge	Environmental and Safety Officer
Finished goods storage and dispatch	Fire load, traffic, packaging waste	Site level, long term	Stacking with clear aisles and access to extinguishers; no storage against electrical panels; loading and unloading inside the plot; deliveries scheduled outside peak periods; driver briefing; reuse of pallets	Warehouse In-charge	Factory Manager
Laboratory operation	Chemical and biological waste, reagent exposure	Workplace level, long term	Fume hood for volatile reagents; labelled reagent storage; autoclaving or disinfection of microbiological waste before disposal; sharps and glass in designated containers; eyewash in the laboratory; reagent waste handled as hazardous waste	Quality Control Officer	Environmental and Safety Officer
General site operation and housekeeping	Odour, pests, poor amenity, complaints	Site level and boundary, long term	Daily housekeeping schedule; covered waste bins emptied on schedule; pest control programme; landscaping maintained; complaint register and displayed contact; prompt	Housekeeping staff	Environmental and Safety Officer

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			investigation of every complaint		
Decommissioning or relocation	Residual contamination, abandoned chemicals	Site level, one off	Restoration plan agreed in advance; vessels and tanks drained, cleaned and removed; chemicals and residues to authorized collectors; drains and floors cleaned and inspected; scrap to recyclers; trees retained; documentary record kept	Proponent	Environmental Protection Agency and Environmental and Safety Officer

7.6 Environmental Monitoring Plan

Monitoring is the mechanism by which the effectiveness of the Environmental Management Plan is measured. It confirms whether the unit is being operated in conformity with the Plan, identifies any impact exceeding the significance criteria adopted, and documents actual performance so that mitigation can be refined where it is falling short. Table 7.2 sets out the parameters, frequency, locations and responsibility. Sampling and analysis requiring laboratory capability will be carried out through a laboratory certified by the Environmental Protection Agency.

Component	Objective	Parameters Monitored	Frequency	Location	Responsibility
Treated effluent	Compliance with PEQS for effluent entering a sewerage system	pH, temperature, BOD, COD, TSS, TDS, oil and grease, surfactants	Quarterly, and after any change in the product range or cleaning regime	Final discharge point at the sewer connection	Environmental and Safety Officer through a certified laboratory
Effluent pre-treatment unit	Prevention of untreated discharge	Screening condition, interceptor oil layer, pH reading, sludge level, skimming and desludging record	Daily check with weekly record	Collection sump and pre-treatment unit	Utility technician
Effluent volume	Control of discharge load	Metered volume discharged	Daily reading, monthly summary	Discharge meter	Utility technician

Stack emissions	Compliance with PEQS for industrial gaseous emissions	Particulate matter, SO2, NOx, CO, smoke opacity	Half yearly, and after any major repair to the burner	Boiler stack and generator stack sampling ports	Environmental and Safety Officer through a certified laboratory
Ambient air quality	Effect of the unit at the boundary	PM10, PM2.5, SO2, NO2, CO	Half yearly, with one round in the winter season	Plot boundary on the downwind side	Environmental and Safety Officer through a certified laboratory
Workplace air quality	Protection of workers from vapour and powder	Volatile organic compounds and airborne particulate at charging, mixing and dispensing points	Annually, and after any change in formulation or ventilation	Compounding hall and dispensing room	Environmental and Safety Officer through a certified laboratory
Noise levels	Compliance with PEQS for noise and protection of workers	Noise level in dB(A), day time	Quarterly	Plot boundary and designated high noise positions inside the plant	Environmental and Safety Officer
Water abstraction and consumption	Conservation of the aquifer	Metered abstraction, consumption per ton of product, reverse osmosis reject recovered	Daily reading, monthly review	Source meter and departmental sub meters	Utility technician
Water and purified water quality	Product safety and detection of contamination	pH, TDS, hardness, iron, microbiological count for purified water; full panel against baseline for the source	Purified water weekly; source water annually	Purified water loop and site source	Quality Control Officer and certified laboratory
Chemical storage and bunding	Prevention of soil and groundwater contamination	Bund integrity, drip tray condition, evidence of spillage, spill kit stock, drum labelling	Weekly	Chemical and flammable store	Store In-charge

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Waste management	Proper handling and disposal of all waste streams	Quantities generated, reused, sold and disposed; collector receipts; segregation compliance	Monthly, with the register maintained continuously	Waste storage area	Store In-charge
Energy consumption	Efficiency and greenhouse gas reduction	Electricity units and gas or diesel consumed, consumption per ton of product	Monthly	Main meters and utility records	Utility technician
Occupational health and safety	Protection of workers	Personal protective equipment compliance, accidents and near misses, first aid usage, guard and emergency stop checks	Daily for compliance, with incidents recorded as they occur	Entire facility	Environmental and Safety Officer
Worker medical screening	Early detection of occupational illness	General examination, respiratory and skin screening for exposed positions	Pre-employment and annually	Through a registered medical practitioner	Factory Manager and Environmental and Safety Officer
Firefighting and emergency readiness	Preparedness for fire and other emergencies	Extinguisher pressure and due dates, hose reels, exit routes, alarm test, drill attendance	Monthly inspection, drills twice yearly	Entire facility	Environmental and Safety Officer
Housekeeping and odour	Amenity and early detection of problems	Visual and olfactory inspection, cleanliness of drains and bins	Daily	Entire site and boundary	Environmental and Safety Officer
Grievances	Responsiveness to neighbours and workers	Complaints received, investigated and closed, with time taken	Continuous, reviewed monthly	Complaint register at the site office	Factory Manager

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7.7 Institutional Capacity

The proponent will appoint a designated Environmental and Safety Officer with a relevant qualification and practical experience, reporting directly to the Factory Manager and with authority to stop an operation that presents an immediate environmental or safety risk. Authority of that kind is what distinguishes a functioning arrangement from a nominal one. The Officer will be responsible for implementing the Environmental Management Plan, arranging and recording monitoring, maintaining the registers and logs, conducting training and drills, investigating incidents and complaints, and preparing the compliance reports required by the Environmental Protection Agency.

The Factory Manager carries overall accountability for compliance at the site. The Production Officer is responsible for process discipline, including dry cleaning before washing and correct charging temperatures. The Utility Technician is responsible for the boiler, chiller, compressor, generator, water system and effluent pre-treatment unit. The Store In-charge is responsible for chemical storage, bunding and waste handling. The Quality Control Officer is responsible for purified water quality and for laboratory waste. Where specialist capability is not available in house, the proponent will engage a certified laboratory and competent external consultants, and will remain responsible for the outcome regardless.

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7.8 Communications and Documentation

The following records will be maintained at the site office and will be available for inspection by the Environmental Protection Agency and by the estate management: the Environmental Management Plan itself; the monitoring results and laboratory reports; the daily production log recording water, energy and effluent figures; the effluent pre-treatment unit check register; the waste register with collector receipts; the chemical store and bund inspection register; the personal protective equipment issue record; the training and drill attendance record; the accident, near miss and incident register; the complaint register with the record of investigation and response; the maintenance and calibration records for plant, meters and instruments; and the boiler registration and inspection certificates. Compliance reports will be submitted to the Environmental Protection Agency at the frequency and in the form required under the approval, and any incident with an environmental consequence will be reported promptly rather than at the next reporting date.

7.9 Environmental and Safety Training

Training will be delivered in Urdu, with demonstration rather than lecture wherever the subject allows, and will be repeated rather than treated as a one off induction. Every new worker will receive an induction covering the hazards of the workplace, the use of personal protective equipment, the emergency arrangements and the assembly point before being allowed to work unsupervised. Specific training will be given on safe chemical handling and the reading of material safety data sheets, hot vessel and steam line work, machine guarding and the use of emergency stops, cleaning procedures and the reason washings must not reach a storm drain, waste segregation, spill response and the use of spill kits, first aid, and fire extinguisher use. Refresher sessions will be held at least annually and after any incident, and attendance recorded.

7.10 Greenbelt and Tree Plantation

Landscaping and boundary planting will be developed within the open area of the plot, comprising not fewer than one hundred and twenty trees, shrubs and hedge plants suited to urban industrial conditions, including neem, sukhchain, alstonia, ficus, bottle brush and ornamental hedging. Species will be selected for tolerance of dust and heat and for modest water demand, and will be irrigated preferentially with recovered reverse osmosis reject rather than with purified or potable water. Planting will be carried out in the appropriate season and maintained thereafter, with dead plants replaced, since a greenbelt that is planted and then abandoned is of no value to anyone. Where any existing tree has to be removed for the works, replacement stock will be planted at a ratio of not less than five saplings for each tree removed.

7.11 Emergency Response Plan

A written emergency response plan will be prepared before commissioning and displayed in summary form at prominent points. It will cover fire in the chemical store, the packaging store, the warehouse or the production area; scald and burn injury; chemical splash to the eye or skin; a major spill of oil, chemical or fragrance; gas leakage; electrical incident; boiler incident; and structural or lift emergency. For each it will specify the immediate action, the alarm arrangement, the evacuation route and assembly point, the persons responsible by name and post, the location of firefighting and first aid equipment, and the external numbers for Rescue 1122, the fire service, the nearest hospital, the estate management and the Environmental Protection Agency. Drills will

be held at least twice a year, the results reviewed, and the plan amended where the drill reveals a weakness.

7.12 Equipment Maintenance

A preventive maintenance schedule will be prepared for the boiler, chiller, compressor, generator, homogenizers, agitators, pumps, filling line, ventilation system, water purification plant and effluent pre-treatment unit, based on the manufacturers' recommendations and the operating hours. Maintenance is treated in this Plan as an environmental control and not merely as a production matter, because a fouled boiler burns more fuel, a worn seal drips product onto the floor and from there into the wash water, a blocked interceptor passes oil into the sewer, and an unserviced ventilation system stops removing vapour from the workplace long before anyone notices. Instruments and meters, including pH meters, thermometers, weighing scales and water meters, will be calibrated on schedule, and records of all maintenance and calibration retained.

7.13 Site Restoration and Closure

Should the facility be closed, converted or relocated, a site restoration plan will be prepared in advance and shared with the Environmental Protection Agency. Vessels, tanks, pipework and the effluent pre-treatment unit will be drained, cleaned and removed or handed over in working order. Residual chemicals, fragrance, oils, sludge, expired product and laboratory reagents will be removed and disposed of as hazardous waste through authorized collectors against documented receipts. Floors and drains in the chemical store, compounding hall and filling area will be cleaned and inspected, and any contaminated material removed. Machinery and scrap will be sold for reuse or to recyclers. Trees and landscaping will be retained and handed over. A photographic and documentary record of the restoration will be retained and produced to the Agency on request.

7.14 Environmental Budget

A specific provision has been made within the project cost for environmental and occupational safety management. The capital element is included in the project cost set out in Table 3.5, and the recurring element will be provided in the annual operating budget of the unit.

Table 7.3: Environmental and Safety Budget

Item	**Capital Provision (PKR)**	**Recurring per Annum (PKR)**
Effluent pre-treatment unit, collection sump, floor channels and discharge metering	2,500,000	150,000
Local exhaust ventilation at charging, dispensing and mixing points and general ventilation	1,200,000	80,000
Bunding, impervious paving, drip containment and ventilated flammable store	600,000	40,000
Rainwater harvesting into the recharge pit and reject water recovery arrangement	400,000	30,000
Firefighting equipment, hose reels, spill kits, eyewash and safety shower	550,000	90,000
Landscaping and greenbelt, not fewer than 120 trees and shrubs with protection	400,000	100,000
Waste segregation bins, hazardous waste plinth and covered storage	200,000	40,000
Personal protective equipment for the workforce	Included in recurring	350,000
Environmental monitoring through a certified laboratory	Nil	380,000
Worker medical screening and first aid provision	Nil	120,000
Training, drills, signage and awareness material	Nil	80,000
Hazardous waste collection and disposal charges	Nil	70,000
Total	5,850,000	1,530,000

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CHAPTER 8: STAKEHOLDER CONSULTATION AND PUBLIC PARTICIPATION

8.1 Introduction

Stakeholder consultation is an essential component of the Environmental Impact Assessment (EIA) process. It provides an opportunity to communicate the proposed project activities, likely environmental and social impacts, proposed mitigation measures, and environmental-management commitments to relevant stakeholders. It also enables the project proponent to obtain views, concerns, technical advice, and recommendations that can improve project planning, impact assessment, environmental management, occupational health and safety, and decision-making.

This chapter describes the consultation framework proposed for the cosmetics manufacturing and packaging facility of **M/s Goree Cosmetics (Private) Limited** at **Plot No. 112/1-M, 113/4 Quaid-e-Azam Industrial Estate (QIE), Kot Lakhpat, Lahore**. The project involves the filling, cooling, capping, sealing, packaging, storage, and dispatch of cream-based cosmetic products, with a maximum production capacity of approximately **1 ton (1,000 kg) per day**.

The proposed facility is located within a designated industrial estate and has a total plot area of approximately **20,200 sq. ft.**, including approximately **9,591.87 sq. ft.** of proposed covered area and approximately **10,608.13 sq. ft.** of open area. The available site layout includes provision for production/packing spaces, storage areas, offices, staff facilities, water tanks, drainage, a septic tank, recharge pit, parking, and a solid-waste-bin area.

Stakeholder consultation for the project shall focus on matters related to wastewater management, solid-waste management, chemical storage, odor and ventilation control, machinery noise, fire safety, drainage protection, worker health and safety, traffic movement, emergency preparedness, utility use, and compliance with the conditions imposed by the competent authorities.

8.2 Objectives of Consultation

The objectives of stakeholder consultation for the proposed project are to:

- Provide accurate and understandable information regarding the project location, nature, production process, capacity, and anticipated environmental impacts.
- Explain the potential environmental, occupational health and safety, and community-related concerns associated with project construction and operation.
- Obtain views, suggestions, concerns, and technical recommendations from relevant stakeholders.
- Identify issues that may not be fully evident from desktop review or site observations.
- Improve the design and implementation of the Environmental Management Plan (EMP).
- Ensure that the project complies with the requirements of Punjab EPA, Quaid-e-Azam Industrial Estate management, PIEDMC, and other relevant authorities.
- Establish communication and coordination arrangements with regulatory authorities, neighboring industrial units, workers, utility providers, emergency services, and the wider community.
- Ensure that grievances, complaints, incidents, and environmental concerns are received, documented, investigated, and resolved in a timely manner.
- Promote transparency, accountability, and continuous environmental improvement throughout the project life cycle.

8.3 Consultation Approach

The consultation process shall be undertaken in a structured and inclusive manner. The project proponent shall communicate project information in Urdu and English, as appropriate, using language that is clear and understandable to employees, nearby industrial units, local representatives, and other stakeholders.

Consultation shall not be treated as a one-time activity. It shall continue during the pre-construction, construction, commissioning, operation, and monitoring stages of the project. The proponent shall maintain documented records of all consultation activities, including invitations,

attendance sheets, meeting minutes, photographs, issues raised, commitments made, follow-up actions, grievance records, and correspondence with relevant authorities.

The principal consultation methods will include:

- Formal meetings with the project proponent's management and Environment, Health and Safety team.
- Submission of the EIA report and supporting documents to Punjab EPA for review.
- Coordination meetings with PIEDMC and Quaid-e-Azam Industrial Estate management.
- Meetings and correspondence with relevant government departments and utility agencies.
- Technical review by environmental practitioners and subject experts.
- Meetings, informal discussions, questionnaires, and awareness sessions with employees and nearby industrial units.
- Disclosure of relevant project and environmental-management information to affected and wider community members, where required.
- Establishment of a project grievance mechanism for receiving and resolving complaints.
- Consultation during emergency-preparedness planning and emergency drills.

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8.4 Stakeholder Identification

Stakeholders are individuals, groups, organizations, and institutions that may affect, be affected by, or have an interest in the proposed project. The stakeholders identified for this project include internal project stakeholders, regulatory authorities, industrial-estate management, government departments, utilities, technical experts, workers, neighboring industries, transporters, waste handlers, emergency services, and the wider community.

Stakeholder Category	Key Stakeholders
Project proponent	Mr. Muhammad Ishaq son of Muhammad Ibrahim and Mr. Shahrukh Ishaq son of Muhammad Ishaq
Proponent's Environment Management Team	Environmental, Health and Safety focal person; production manager; maintenance manager; administration; store in-charge; security staff; supervisors
Responsible environmental authority	Punjab Environmental Protection Agency (EPA Punjab)
Industrial-estate authority	Punjab Industrial Estates Development and Management Company (PIEDMC) and Quaid-e-Azam Industrial Estate management
Government departments and agencies	Labour Department, Civil Defence, Rescue 1122, District Administration, Lahore Development Authority where applicable, local government departments, health-related authorities, and other relevant agencies
Utility and service providers	Electricity provider, water-supply service, sewerage/drainage service, solid-waste collection service, authorized recyclers, waste handlers, and maintenance service providers
Environmental practitioners and experts	Environmental consultants, EIA practitioners, occupational health and safety professionals, fire-safety experts, waste-management specialists, wastewater specialists, and industrial hygienists
Directly affected stakeholders	Project employees, contractors, security staff, cleaners, drivers, visitors, transporters, suppliers, nearby industrial-unit workers and owners
Wider community	Residents and community representatives in the broader Kot Lakhpat/Lahore area, local businesses, educational institutions, health facilities, road users, and community organizations where relevant

8.5 Proponent's Environment Management Team

8.5.1 Role of the Proponent's Team

The proponent's Environment Management Team is the first and most important stakeholder group because it is responsible for implementing the commitments made in the EIA and Environmental Management Plan. The team shall ensure that environmental protection,

occupational health and safety, waste management, emergency preparedness, and regulatory compliance are integrated into daily operations.

M/s Goree Cosmetics (Private) Limited shall nominate a qualified **Environment, Health and Safety (EHS) Focal Person**. The EHS Focal Person shall coordinate with management, production staff, maintenance personnel, contractors, waste handlers, PIEDMC/QIE management, Punjab EPA, and other relevant authorities.

The internal consultation process shall ensure that project staff understand the environmental and safety risks associated with cosmetic filling and packaging activities, including handling of raw materials, fragrances, preservatives, cleaning chemicals, packaging materials, machinery, electricity, waste, wastewater, and fire hazards.

8.5.2 Internal Consultation Topics

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The following matters shall be communicated to and discussed with the project's Environment Management Team:

- Production process and operational flow, including filling, cooling, capping, sealing, packaging, storage, and dispatch.
- Environmental approval requirements and conditions imposed by Punjab EPA.
- Roles and responsibilities under the Environmental Management Plan.
- Wastewater generation from washrooms, cleaning operations, floor washing, and machinery cleaning.
- Prevention of wastewater discharge to storm-water drains, open land, or unapproved disposal routes.
- Segregation of cardboard, paper, plastic, damaged jars, rejected packaging, general waste, contaminated materials, and hazardous/special waste.
- Safe handling, labeling, and storage of raw materials, fragrances, preservatives, cleaning chemicals, and other potentially hazardous substances.
- Availability and use of Safety Data Sheets for chemicals.
- Use of personal protective equipment, including gloves, masks, safety goggles, safety shoes, aprons, hearing protection where required, and other task-specific PPE.

- Machine safety, including guards, emergency stop switches, safe operating procedures, lockout/tagout during maintenance, and preventive maintenance.
- Fire prevention, fire extinguisher use, emergency exits, evacuation routes, emergency assembly point, first aid, and emergency drills.
- Good housekeeping, spill prevention, cleaning procedures, water conservation, energy conservation, and drainage maintenance.
- Complaint handling, incident reporting, near-miss reporting, corrective action, and record keeping.

8.5.3 Internal Environmental Management Structure

Position / Department	Main Consultation and Environmental Responsibilities
Company management	Approve environmental policy, allocate resources, ensure legal compliance, review EHS performance
EHS focal person	Coordinate EMP implementation, inspections, monitoring, training, reporting, incident investigation, and liaison with authorities
Production manager	Ensure safe production, reduce spills and product losses, maintain housekeeping, supervise workers
Maintenance manager	Maintain machinery, electrical installations, ventilation, cooling systems, drainage, fire equipment, and emergency systems
Store in-charge	Maintain chemical inventory, labeling, SDS availability, safe storage, stock control, and spill-prevention arrangements
Administration department	Maintain records, arrange training, coordinate waste collection, utility monitoring, and regulatory correspondence
Supervisors	Enforce PPE use, good housekeeping, waste segregation, safe operating procedures, and daily workplace inspections
Security staff	Control site access, guide visitors and vehicles, support emergency response, maintain gate records
Workers and contractors	Follow SOPs, use PPE, report unsafe conditions, attend training, and comply with waste-management and emergency procedures

8.5.4 Internal Consultation Frequency

Activity	Frequency	Responsible Person
Daily housekeeping and safety briefing	Daily before work shift	Production supervisor / EHS focal person
Production and waste-management review	Weekly	Production manager and EHS focal person
Chemical-storage inspection	Weekly	Store in-charge and EHS focal person
Environmental and safety inspection	Monthly	EHS focal person and management representative

Fire-equipment inspection	Monthly	Safety officer / EHS focal person
Management review meeting	Quarterly	Company management
Worker EHS training	At induction and at least annually	EHS focal person
Fire and emergency evacuation drill	At least twice per year	Management and EHS focal person
Review of environmental monitoring results	As per monitoring schedule	EHS focal person and management

8.6 Consultation with Punjab EPA

8.6.1 Responsible Environmental Authority

Punjab Environmental Protection Agency is the principal responsible authority for reviewing the environmental assessment documentation and issuing environmental approval, subject to applicable laws, rules, regulations, and approval conditions. The project proponent shall maintain formal communication with Punjab EPA throughout the project approval and operational phases.

The EIA shall communicate the location, nature, capacity, process, potential impacts, proposed mitigation measures, environmental-monitoring plan, waste-management arrangements, wastewater-disposal arrangements, occupational health and safety measures, and emergency-response measures for the project.

The project shall not commence any activity requiring environmental approval until the required approval has been obtained from the competent environmental authority.

8.6.2 Matters to be communicated to Punjab EPA

The following information shall be disclosed to Punjab EPA through the EIA report, application, correspondence, compliance reports, and monitoring records:

- Project title, proponent details, site location, GPS coordinates, and plot ownership/occupancy information.
- Project location at Plot No. 112/1-M, 113/4 Quaid-e-Azam Industrial Estate, Kot Lakhpat, Lahore.
- Total plot area, covered area, open area, building layout, and site plan.

- Nature of the proposed cosmetics manufacturing and packaging activity.
- Maximum production capacity of approximately 1 ton or 1,000 kg per day.
- Production process comprising filling, cooling, capping, sealing, packaging, storage, and dispatch.
- Details of raw materials, cosmetic ingredients, fragrances, preservatives, cleaning chemicals, packaging materials, and associated Safety Data Sheets.
- Water requirement, source of water, wastewater-generation estimate, wastewater characteristics, drainage arrangement, sewerage connection, septic-tank arrangement, and cleaning-water controls.
- Solid-waste generation, waste-segregation method, recyclable waste stream, general waste stream, contaminated waste stream, storage arrangements, and disposal/recycling mechanism.
- Air-emission sources, including vehicles, ventilation exhaust, odor sources, generator details if installed, fuel type, and stack arrangement where applicable.
- Noise sources, machinery specifications, working hours, noise-control measures, and monitoring arrangements.
- Occupational health and safety measures, PPE requirements, worker training, first aid, machine guards, chemical handling, and emergency procedures.
- Fire-risk assessment, fire-safety equipment, emergency exits, evacuation arrangements, fire drills, and coordination with emergency services.
- Environmental Management Plan, monitoring plan, organizational structure, responsibilities, budget, and compliance commitments.
- Details of stakeholder consultation, concerns raised, and response/action plan.

8.6.3 Consultation and Compliance Mechanism

Consultation Activity	Purpose	Stage	Responsible Party
Submission of EIA report	Environmental review and approval	Pre-construction	Project proponent / environmental consultant
Response to EPA observations	Clarify project information and revise EIA where required	Pre-approval	Project proponent / environmental consultant
Site inspection support	Facilitate verification of project information and environmental controls	As required by EPA	Project management / EHS focal person
Submission of compliance reports	Demonstrate implementation of approval conditions	Operational phase	EHS focal person
Environmental monitoring reports	Provide monitoring data where required	As per approval condition	EHS focal person / approved laboratory
Incident notification	Inform authority regarding significant environmental or safety incident	Immediate, if required	Management / EHS focal person
Renewal or amendment of approval	Ensure approval remains valid for change in capacity, process, raw materials, or layout	Before change / expiry	Project proponent

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8.7 Consultation with Other Departments and Agencies

8.7.1 Purpose

The project requires coordination with various government departments, agencies, and service providers because environmental performance is linked with industrial-estate services, building safety, labour welfare, fire protection, solid-waste disposal, utility management, and emergency response.

The available documentation indicates that the project is located within Quaid-e-Azam Industrial Estate and is associated with industrial-estate services including water, operational maintenance, security, solid-waste-related charges, infrastructure maintenance, emergency/rescue/fire-brigade-related charges, sewerage and drainage charges, and water-bowser/waste-lifting-related services.

Coordination with these agencies will ensure that project infrastructure and operations remain compatible with industrial-estate requirements and that any emergency can be addressed promptly

8.7.2 Key Departments and Agencies

Department / Agency	Consultation Purpose	Key Matters for Discussion
PIEDMC / QIE management	Industrial-estate compliance and utility coordination	Plot use, building compliance, road access, water, sewerage, drainage, waste lifting, security, maintenance, and fire-safety arrangements
Punjab EPA	Environmental approval and compliance	EIA review, EMP, monitoring, wastewater, waste management, air emissions, noise, environmental reporting
Labour and Human Resource Department	Worker welfare and occupational safety	Employment conditions, worker welfare, health and safety, working hours, training, PPE, grievance mechanism
Civil Defence	Fire safety and emergency preparedness	Fire extinguishers, emergency exits, evacuation plan, safety signage, fire drills, fire-risk reduction
Rescue 1122	Emergency-response coordination	Fire response, medical emergency, evacuation, emergency contact details, site access
Local government / municipal authorities	Sanitation, road access, local infrastructure, and civic coordination	Drainage, access roads, waste handling, public safety, construction-related matters
Lahore Development Authority or relevant building-control authority	Building and layout approvals where applicable	Building plan, structural safety, occupancy, parking, drainage, and fire provisions
Electricity service provider	Electrical connection and safety	Load requirement, transformer, electrical safety, earthing, backup power, meter arrangement
Water and sewerage service / estate utility department	Water supply and wastewater disposal	Water demand, wastewater discharge, sewerage link, septic-tank management, drainage maintenance
Authorized waste collectors and recyclers	Waste handling and disposal	Waste segregation, collection schedule, recycling, manifests/records, safe disposal
Health-related authorities, where applicable	Workplace hygiene and public-health matters	Sanitation, hygiene, food/worker welfare, chemical safety, emergency medical response

8.7.3 Key Consultation Issues

The following project concerns shall be communicated to other departments and agencies:

- Confirmation that the proposed industrial activity is compatible with the land-use and industrial-estate requirements.
- Availability and adequacy of water supply for sanitation, cleaning, and operational needs.
- Approved method for domestic wastewater and cleaning-wastewater disposal.
- Separation of clean storm-water drainage from sewage and cleaning wastewater.
- Protection of the recharge pit from chemical spills, wastewater, oil, product residue, and solid waste.
- Installation and maintenance of fire extinguishers, emergency exits, alarms, signage, and evacuation arrangements.
- Coordination for emergency access by fire brigade, Rescue 1122, ambulance, and other emergency services.
- Compliance with labour welfare, hygiene, PPE, first aid, and occupational health and safety requirements.
- Safe collection, transport, recycling, and disposal of cardboard, plastic, paper, damaged packaging, chemical containers, cleaning waste, and other waste streams.
- Prevention of traffic congestion and unsafe loading/unloading activities on industrial-estate roads.
- Maintenance of internal road access, parking, loading area, drainage, and waste-storage points.

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8.8 Consultation with Environmental Practitioners and Experts

8.8.1 Purpose of Expert Consultation

Environmental practitioners and technical experts provide independent professional input to improve the quality, completeness, and practical applicability of the EIA and Environmental Management Plan. Their input is particularly important for confirming the adequacy of environmental controls, wastewater management, chemical storage, fire safety, waste segregation, worker protection, and emergency-response arrangements.

The project shall consult environmental practitioners, occupational health and safety experts, fire-safety professionals, industrial hygienists, wastewater specialists, waste-management experts, and mechanical/electrical engineers, as required.

8.8.2 Areas for Expert Review

Expert Category	Area of Review
Environmental consultant / EIA practitioner	Screening, scoping, baseline conditions, impact assessment, mitigation measures, EMP, monitoring plan, regulatory compliance
Occupational health and safety professional	Hazard identification, risk assessment, PPE, machine safety, worker training, incident management, ergonomics
Fire-safety expert	Fire-risk assessment, extinguisher type and placement, detection/alarm systems, emergency exits, evacuation plan, drills
Industrial hygienist	Indoor air quality, ventilation, odor control, chemical exposure, workplace monitoring, hygiene arrangements
Wastewater-management specialist	Cleaning wastewater controls, drainage layout, wastewater collection, sewerage arrangements, wastewater minimization
Solid-waste-management expert	Waste segregation, recycling opportunities, contaminated-waste management, waste-storage design, disposal records
Mechanical engineer	Machine guarding, cooling equipment, preventive maintenance, energy efficiency, noise reduction
Electrical engineer	Electrical safety, earthing, circuit protection, emergency power, generator controls, fire prevention
Structural / civil engineer	Drainage, flooring, spill containment, building safety, access routes, utility layout, rainwater management
Traffic and logistics specialist, if required	Vehicle scheduling, loading/unloading, pedestrian safety, parking, site access

8.8.3 Expert Recommendations to be incorporated

The EIA and final project design shall incorporate expert recommendations on the following matters:

- Selection of compatible, safe, and low-emission production and utility equipment.
- Adequate ventilation in production, filling, packaging, storage, and cleaning areas.
- Proper design of chemical-storage areas, including impervious floors, secondary containment, drainage protection, labels, and restricted access.
- Safe design of wastewater collection and disposal arrangements.
- Physical separation of storm-water drainage from domestic sewage and cleaning wastewater.
- Installation of machine guards, emergency stop buttons, accessible maintenance space, and electrical isolation procedures.
- Appropriate fire extinguishers for electrical, combustible-material, and chemical-related fire risks.
- Clearly marked emergency exits, assembly point, emergency lighting, first-aid facilities, and evacuation signage.
- Waste-storage design that prevents littering, rainwater entry, fire risk, pest attraction, and mixing of recyclable and contaminated waste.
- Development of monitoring formats, inspection checklists, training modules, and corrective-action procedures.

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8.9 Consultation with Affected Stakeholders

8.9.1 Directly Affected Stakeholders

Directly affected stakeholders include employees, contract workers, nearby industrial-unit workers and owners, visitors, suppliers, transporters, waste collectors, recyclers, security personnel, and emergency responders. These stakeholders may experience direct exposure to project-related traffic, noise, waste, chemical handling, machinery operation, emergency events, or changes in industrial activity.

Consultation with directly affected stakeholders shall focus on practical operational concerns. The purpose is to ensure that the project does not create avoidable inconvenience, safety risks, pollution, or disruption to adjoining industrial facilities.

8.9.2 Key Issues for Direct Stakeholders

Stakeholder	Possible Concern	Consultation Response / Commitment
Project employees	Safe work environment, chemical exposure, machinery risks, sanitation, training, wages, PPE, fire safety	Provide PPE, training, safe operating procedures, machine guards, first aid, welfare facilities, emergency drills
Contract workers	Induction, site hazards, supervision, access control, safe work practices	Mandatory safety induction, supervision, PPE, permit-to-work where required
Nearby industrial units	Noise, odor, traffic, drainage, waste disposal, fire risk	Maintain housekeeping, controlled operations, waste segregation, safe loading, drainage protection, fire-prevention measures
Transporters	Safe site access, parking, loading/unloading, gate delays	Designated loading/unloading area, traffic signage, speed limits, delivery scheduling
Suppliers	Safe delivery of raw materials and packaging materials, chemical documentation	Require labeling, SDS, safe packaging, and controlled unloading
Waste collectors / recyclers	Segregated waste, safe access, collection scheduling	Provide covered bins, labelled waste streams, regular collection schedule, waste records
Security staff	Emergency information, visitor control, vehicle management	Maintain emergency contacts, visitor register, access-control procedures, communication system
Emergency responders	Access to site, hazard information, emergency contact	Provide site layout, chemical inventory, emergency access, assembly-point information, liaison details

8.9.3 Consultation with Workers

Workers are a major stakeholder group because they are exposed directly to the project's operational environment. Consultation with workers shall be conducted through induction sessions, toolbox talks, safety meetings, suggestion boxes, worker representatives, training programs, grievance procedures, and confidential reporting mechanisms.

Workers shall be informed about:

- Chemical hazards and safe handling practices.
- Proper use, storage, cleaning, and replacement of PPE.
- Safe operation of filling, cooling, capping, sealing, and conveyor equipment.
- Prohibition of bypassing machine guards or safety devices.
- Safe lifting, stacking, storage, and movement of materials.
- Safe use of electrical equipment.
- Fire prevention, emergency exits, alarm response, evacuation, and assembly point.
- Spill reporting and immediate spill-control procedures.
- Waste segregation and housekeeping requirements.
- Reporting of near misses, unsafe acts, unsafe conditions, illness, injury, and incidents.
- Availability of first aid, wash facilities, drinking water, toilets, and rest areas.
- Worker grievance mechanism and non-retaliation principle.

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8.10 Consultation with the Wider Community

8.10.1 Scope of Wider Community Consultation

The wider community includes residents, businesses, road users, institutions, service providers, and community representatives in the broader vicinity of the project. Although the project is situated within an industrial estate and routine impacts are expected to remain localized, the wider community may have an interest in environmental quality, traffic, employment opportunities, waste disposal, drainage, fire safety, emergency preparedness, and industrial compliance.

The project proponent shall make relevant non-confidential environmental information available to the wider community when required under the applicable legal framework or requested by the competent authority. The consultation process shall ensure that community members can raise questions or concerns without discrimination.

8.10.2 Information to be communicated

The following information may be communicated to the wider community, nearby businesses, and interested persons:

- Name and nature of the project.
- Location within Quaid-e-Azam Industrial Estate.
- General description of cosmetics filling and packaging operations.
- Confirmation that the project is located in a designated industrial area.
- Major potential environmental issues, including waste, wastewater, odor, noise, traffic, chemical handling, and fire safety.
- Environmental mitigation measures and monitoring arrangements.
- Complaint and grievance-contact details.
- Emergency-response arrangements and relevant emergency contact numbers.
- Commitment to prevent discharge of wastewater, chemicals, or waste into open drains or public areas.
- Commitment to maintain safe traffic movement and avoid obstruction of roads.
- Potential employment and business opportunities, subject to the proponent's recruitment and procurement policies.

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8.10.3 Expected Community Concerns and Response

Community Concern	Proposed Project Response
Air pollution or odor	Maintain closed storage, adequate ventilation, controlled chemical handling, housekeeping, and preventive maintenance
Waste disposal	Segregate waste, provide covered storage, recycle recoverable materials, and use authorized waste collection/disposal arrangements
Wastewater discharge	Prevent discharge into storm-water drains or open areas; use approved wastewater-disposal arrangements
Traffic congestion	Schedule deliveries and dispatch, provide designated loading/unloading space, and maintain safe internal traffic movement
Fire and emergency risk	Install and maintain firefighting equipment, emergency exits, alarms, evacuation procedures, and coordinate with emergency services
Noise from machinery	Maintain equipment, control operating practices, and monitor noise where required
Worker safety	Provide PPE, training, first aid, machine guarding, and emergency-response measures

Employment opportunities	Consider local hiring and local procurement, subject to skill requirements and company policy
Communication of complaints	Establish accessible grievance and complaint mechanism with timely response

8.11 Key Environmental and Social Issues Communicated

During consultation, the following potential impacts and concerns shall be communicated to all relevant stakeholder groups. These issues have been identified based on the proposed nature of the project, production process, site layout, and operating environment.

Environmental / Social Aspect	Potential Concern	Information to be Communicated
Solid waste	Generation of cartons, plastic, labels, rejected jars, damaged packaging, office waste, and contaminated cleaning material	Waste will be segregated, recyclable materials will be recovered, and residual waste will be disposed of through authorized arrangements
Wastewater	Domestic wastewater and cleaning wastewater may be generated	Wastewater will be managed through approved collection and disposal arrangements; no discharge to storm drains will be allowed
Drainage	Risk of drain blockage or contamination from spills and waste	Storm-water drainage will be kept separate from sewage and cleaning wastewater; drains will be inspected and cleaned regularly
Recharge pit	Potential contamination if chemical or wastewater enters recharge system	Recharge pit will receive clean storm water only; chemical, wastewater, oil, and waste entry will be prohibited
Chemical storage	Leakage, spill, worker exposure, odor, or fire risk	Chemicals will be labeled, stored in closed containers, supported by SDS, and managed with spill kits and PPE
Air quality and odor	Odor from fragrances, cosmetic ingredients, or cleaning agents; vehicle emissions	Ventilation, covered containers, prompt spill cleanup, generator maintenance, and vehicle-idling controls will be implemented
Noise	Noise from machinery, cooling equipment, loading/unloading, and generator if installed	Equipment will be maintained, working conditions monitored, and hearing protection provided where needed

Fire safety	Fire due to electrical fault, packaging material, chemicals, or machinery malfunction	Fire extinguishers, emergency exits, signage, training, drills, and emergency procedures will be maintained
Worker safety	Machine injury, slips, chemical exposure, electrical hazard, manual-handling injury	PPE, SOPs, training, machine guards, emergency stops, first aid, and supervision will be provided
Traffic	Movement of delivery, dispatch, waste-collection, and employee vehicles	Delivery scheduling, speed controls, signage, designated loading space, and pedestrian safety measures will be applied
Water and energy use	Consumption of utilities and potential resource wastage	Water conservation, leak repair, energy-efficient equipment, LED lighting, and switch-off practices will be used
Emergency preparedness	Need for rapid response to fire, spill, injury, or drainage overflow	Emergency plan, emergency contacts, assembly point, drills, spill-response procedures, and liaison with services will be maintained

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8.12 Consultation Record and Documentation

The project proponent shall maintain complete and verifiable records of consultation activities. Consultation records shall be available for review by Punjab EPA and other competent authorities, where required.

The following documents shall be maintained:

- Stakeholder identification register.
- Consultation plan and schedule.
- Invitations and notices of meetings.
- Attendance sheets with names, organizations, contact details, and signatures.
- Meeting agenda and presentation material.
- Minutes of meetings.
- Photographs of consultation sessions.
- Copies of written comments, letters, emails, and complaints.
- Questionnaires and survey forms, where used.

- Register of issues raised and responses provided.
- Commitment register showing actions, responsibility, target date, and completion status.
- Worker training records and toolbox-talk records.
- Environmental inspection checklists.
- Incident, near-miss, and emergency-drill records.
- Grievance register and grievance-resolution records.
- Correspondence with Punjab EPA, PIEDMC, QIE management, Civil Defence, Rescue 1122, and other agencies.

8.13 Grievance Redress Mechanism

8.13.1 Purpose

A grievance redress mechanism shall be established to receive, document, investigate, and resolve environmental, health, safety, traffic, nuisance, employment-related, or community concerns associated with the project. The mechanism shall be accessible to employees, contractors, nearby industrial units, transporters, waste handlers, visitors, and wider community members.

The grievance mechanism shall be based on the principles of accessibility, confidentiality, fairness, transparency, timely response, non-retaliation, and proper documentation.

8.13.2 Grievance Channels

The project shall provide the following channels for submitting grievances:

- Written complaint submitted at the site office or security gate.
- Complaint register maintained by the administration department.
- Complaint/suggestion box at an accessible location.
- Telephone contact of the designated EHS focal person.
- Official project email address.
- Verbal complaint to supervisor, security staff, administration, or EHS focal person.
- Complaint received through PIEDMC/QIE management or Punjab EPA.
- Worker grievance through worker representative or confidential reporting channel.

8.13.3 Grievance Resolution Process

Step	Action	Timeframe
1	Receive and register grievance	Within one working day
2	Provide acknowledgment to complainant, where contact details are available	Within two working days
3	Review and investigate the issue	Within seven working days
4	Identify corrective action and responsible person	Within seven to ten working days
5	Communicate proposed resolution to complainant	Within ten working days
6	Implement corrective action	According to issue severity and action plan
7	Verify completion and close grievance	After confirmation of corrective action
8	Maintain grievance record and include trend analysis in management review	Quarterly

Urgent grievances involving fire, chemical spill, injury, wastewater discharge, major odor release, serious drainage blockage, or community safety shall be treated as emergency matters and addressed immediately.

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8.14 Disclosure and Communication Plan

The project proponent shall disclose relevant environmental and safety information to stakeholders in an appropriate form. The extent of disclosure shall be consistent with legal requirements, business confidentiality, and safety considerations.

Information Item	Target Stakeholder	Communication Method	Frequency
Project description and EIA summary	Punjab EPA, PIEDMC/QIE management, relevant agencies	Formal submission and meetings	During approval process
EMP and environmental commitments	Management, EHS team, workers, contractors	Training, notice boards, SOPs, internal meetings	At induction and periodically
Waste-management arrangements	Workers, waste handlers, nearby units	Signage, SOPs, meetings	Ongoing
Emergency contact numbers and evacuation plan	Workers, visitors, contractors, security staff	Display boards, induction, drills	Continuous
Chemical safety information	Workers, store personnel, maintenance staff	SDS, labels, training, posters	Continuous
Environmental monitoring results	Management and Punjab EPA where required	Monitoring reports and management review	As per monitoring schedule
Grievance contact details	Workers, contractors, nearby units, community	Notice board, security gate, office, communication material	Continuous
Incident and corrective-action information	Management and authorities where required	Incident reports, meetings, regulatory communication	As required

8.15 Consultation Commitments

M/s Goree Cosmetics (Private) Limited shall make the following commitments:

1. Appoint an EHS Focal Person before project commissioning and maintain a clear environmental-management structure.
2. Obtain and comply with all environmental approvals, permissions, and conditions issued by Punjab EPA and other competent authorities.
3. Maintain regular coordination with PIEDMC and Quaid-e-Azam Industrial Estate management regarding utilities, sewerage, drainage, waste lifting, estate rules, road access, emergency services, and infrastructure maintenance.

4. Consult workers regularly through induction training, toolbox talks, safety meetings, suggestion mechanisms, and worker grievance procedures.
5. Inform nearby industrial units and relevant stakeholders about emergency contact arrangements, fire-safety measures, traffic-management procedures, and complaint channels.
6. Maintain proper records of consultation, complaints, training, inspections, monitoring, emergency drills, and corrective actions.
7. Ensure that community and worker concerns related to waste, wastewater, odor, noise, traffic, safety, or emergency risks are investigated and addressed promptly.
8. Update the consultation plan if there is a significant change in production capacity, process technology, raw-material composition, layout, wastewater generation, fuel use, generator installation, waste-management method, or any other activity that may alter environmental impacts.
9. Conduct periodic review of stakeholder concerns and incorporate feasible recommendations into the Environmental Management Plan.
10. Maintain transparent communication with the competent authorities and provide environmental compliance information when required.

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8.16 Conclusion

Stakeholder consultation is a continuing process for the proposed M/s Goree Cosmetics (Private) Limited cosmetics manufacturing and packaging facility. The consultation framework has been designed to communicate possible impacts and obtain input from the proponent's Environment Management Team, Punjab EPA, PIEDMC/QIE management, other government departments and agencies, environmental practitioners, workers, neighboring industrial units, service providers, and the wider community.

The key issues for consultation are wastewater management, drainage protection, solid-waste segregation and disposal, chemical storage, odor and ventilation, machine safety, worker health, fire prevention, emergency preparedness, traffic management, utility use, and regulatory compliance. The project's location within Quaid-e-Azam Industrial Estate provides access to estate-level water, sewerage, maintenance, security, waste-lifting, and emergency/fire-related

services, which shall be coordinated with the proponent’s internal environmental-management arrangements.

Through regular consultation, documented grievance handling, worker participation, coordination with authorities, technical review, and implementation of the Environmental Management Plan, the project can manage its environmental and social risks effectively and maintain positive relations with regulatory bodies, neighboring industries, employees, and the wider community.

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CHAPTER 9: CONCLUSION AND RECOMMENDATIONS

This report presents the Environmental Impact Assessment for the proposed establishment and operation of a cosmetics manufacturing unit by M/s Goree Cosmetics (Private) Limited at Plot No. 112/1-M, 113/4, Quaid-e-Azam Industrial Estate, Kot Lakhpat, Township Road, Lahore. The unit is rated at one ton of finished cream per day and is to be established on a plot of 20,200 square feet owned by the company, with 9,591.87 square feet of covered area proposed under the present building plan in addition to the area already approved and constructed. The proponent is a company limited by shares, incorporated with the Securities and Exchange Commission of Pakistan in 2018, and the product is manufactured for its own brand and distributed through its established domestic network.

The assessment has been carried out in accordance with the requirements of the Punjab Environmental Protection Act, 1997 as amended in 2012, and the Punjab Environmental Protection (Review of IEE and EIA) Regulations, 2022. It is based on site reconnaissance, review of the approved building plan and the process and equipment details, baseline measurement of ambient air, noise and water quality, review of published secondary data on the physical, biological and socio-economic environment of Lahore, and consultation with neighbouring occupiers, estate management, workers and nearby residents.

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9.1 Main Issues and Concerns

The field survey and the technical appraisal identified the principal concerns as the quality of the effluent discharged into the shared estate sewer from the washing of vessels and the filling line; the consumption of groundwater in a city whose water table is falling; the packaging and hazardous waste streams; odour and volatile organic compounds from fragrance, alcohol and cleaning agents; combustion emissions from the boiler and the standby generator; noise from utility equipment; and, most significantly in terms of consequence, the occupational risk of scalds, chemical splash, vapour and powder exposure, machinery injury and fire among the workers who handle hot vessels and chemicals.

None of the identified impacts involves an environmentally sensitive receptor, a protected area, a critical habitat, an archaeological or religious site, the displacement of any household or business, or an irreversible loss of ecological value. The site lies within a notified industrial estate developed

for exactly this kind of activity, on land owned by the proponent, surrounded by other manufacturing units and served by engineered water supply, sewerage and drainage. The summary matrix in Table 8.1 presents the predicted impacts of the project before and after mitigation.

Environmental Component	Nature of Impact	Phase	Significance Before Mitigation	Residual Significance After Mitigation
Effluent quality	Oils, waxes, surfactants and product residues in washing water discharged to the sewer	Operation	High adverse	Low adverse
Water resources	Abstraction of groundwater in a stressed aquifer	Operation	Moderate adverse	Low adverse
Air quality, combustion	Flue gases from the boiler and standby generator	Operation	Moderate adverse	Low adverse
Air quality, fugitive	Volatile organic compounds, odour and airborne powder	Operation	Moderate adverse	Low adverse
Air quality, construction	Dust and equipment exhaust	Construction	Moderate adverse	Low adverse
Noise	Utility equipment, production line and construction activity	Construction and operation	Moderate adverse	Low adverse
Soil and groundwater	Spillage of chemicals, oils and fragrance; leakage from drains and sump	Construction and operation	Moderate adverse	Low adverse
Solid and hazardous waste	Packaging, off specification product, sludge, used oil and laboratory waste	Construction and operation	Moderate adverse	Low adverse
Energy use and greenhouse gas	Electricity and fuel consumption	Operation	Low adverse	Low adverse
Flora	Landscaping of open area, no tree removal expected	Construction and operation	Negligible	Positive after landscaping
Fauna	No natural habitat present	Construction and operation	Negligible	Negligible
Occupational health and safety	Scalds, chemical splash, vapour and powder exposure, machinery and fire hazard	Construction and operation	High adverse	Low to moderate adverse

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Community amenity	Odour, noise and traffic perceived by neighbouring occupiers	Operation	Moderate adverse	Low adverse
Traffic	Goods vehicle movement on estate roads	Construction and operation	Moderate adverse	Low adverse
Employment and local economy	Direct and indirect employment and local procurement	Construction and operation	Positive, medium	Positive, medium
Land use and landscape	Industrial use on an industrial plot	Operation	Negligible	Negligible
Site condition at closure	Residual chemicals, contamination of floors and drains	Decommissioning	Moderate adverse	Low adverse

9.2 Summary of Operational Environmental and Safety Risks

Environmental risks. The dominant environmental risk is failure of the effluent pre-treatment arrangement, whether through a blocked screen, an interceptor that has not been skimmed, a pump failure, a cracked sump, or the simple decision of a worker in a hurry to send a wash down the nearest floor drain. Any of these converts a compliant discharge into a non-compliant one within a single shift, and none of them is visible from the production floor. This is why the monitoring plan requires a daily check of the unit and why the prohibition on bypassing it is stated as a rule rather than a preference. The secondary environmental risks are a spill in the chemical store, a lapse in waste segregation that puts hazardous material into the general refuse, overheating or hot charging of fragrance that drives odour off into the neighbourhood, and quiet water wastage through leaking fittings and open hoses.

Safety risks. The dominant safety risks are contact with hot vessels, steam lines and hot product, causing scalds, and chemical splash to the eyes or skin during charging and cleaning. The associated risks are inhalation of vapour and powder, entanglement in homogenizers, agitators and the conveyor line, slips on wet floors, manual handling injury from drums and cartons, electrical hazard, heat stress in summer and fire in the chemical, packaging or finished goods stores. These risks are well understood and are controllable by the measures set out in Chapter 6 and Chapter 7, but they are controllable only through sustained discipline. Slippage in protective equipment use, in guarding, in maintenance and in training is the normal precursor to a serious accident in a plant of this type.

9.3 Recommendations

On the basis of the evaluation presented in this report, the following recommendations are made to ensure the environmentally and occupationally sound establishment and operation of the unit.

1. Prioritizing implementation of the Environmental Management Plan. The proponent should give operational priority to the implementation of the Environmental Management Plan set out in Chapter 7, should provide the budget allocated in Table 7.3, and should treat the Plan as a working document kept at the site office rather than as a document filed with the approval.

2. Commissioning the effluent pre-treatment unit before production. The pre-treatment unit, the floor channels, the collection sump and the metered discharge point should be complete, tested and operating before the first commercial batch is produced, and not left to be installed after production has started.

3. Appointing the Environmental and Safety Officer early. The Officer should be appointed before construction is complete, so that the arrangements for effluent, waste, ventilation and safety are set up correctly rather than corrected afterwards, and should be given the authority to stop an unsafe or non-compliant operation.

4. Establishing water accounting from day one. Abstraction, consumption per ton of product and reject water recovery should be metered and recorded from the outset, so that a baseline of efficient practice is set before habits form.

5. Adopting dry cleaning as a standing rule. Removal of residual product from vessels and lines by scraping and wiping before any water is applied should be written into the batch and cleaning procedures, since it is the cheapest and most effective single measure for reducing effluent load.

6. Maintaining the waste chain of custody. Every consignment of hazardous waste should leave the site against a documented receipt from an authorised collector, and the waste register should be reconciled monthly.

7. Training before commissioning. Workers should be trained in chemical handling, hot work, machine safety, cleaning procedure, spill response and emergency arrangements before the plant is commissioned, in Urdu and by demonstration, and retrained annually.

8. Monitoring on the prescribed schedule. Effluent, stack emission, ambient air, noise, workplace air and water quality monitoring should be carried out at the frequency set out in Table 7-2 through a certified laboratory, with results reviewed by management rather than merely filed.

9. Maintaining the grievance mechanism. The complaint register and the displayed contact for the Environmental and Safety Officer should be in place before commissioning, and every complaint investigated and answered within a defined period.

10. Reviewing the Plan periodically. The Environmental Management Plan should be reviewed at least annually and after any incident, change of product range, change of cleaning regime or expansion of capacity, and the Environmental Protection Agency informed of any material change.

11. Completing statutory formalities. The proponent should obtain and maintain the boiler registration, the factory registration, the fire safety clearance, the estate management approvals and the product licences and enlistments applicable to its range, and should keep the copies available on site.

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9.4 Final Conclusion

This Environmental Impact Assessment demonstrates that the proposed cosmetics manufacturing unit of M/s Goree Cosmetics (Private) Limited at Plot No. 112/1-M, Quaid-e-Azam Industrial Estate, Kot Lakhpat, Lahore, will not give rise to significant or unmanageable adverse environmental impacts on the surrounding industrial area or on the wider environment of the city, provided that the mitigation measures and the Environmental Management Plan set out in this report are implemented in full and sustained throughout the operating life of the unit. The critical requirements are the installation and continuous operation of the effluent pre-treatment unit ahead of the sewer connection, disciplined water accounting and conservation, segregation and lawful disposal of packaging and hazardous waste, control of odour and vapour at source through cool

charging and local exhaust ventilation, and a genuine occupational safety programme for the workers who handle hot vessels and chemicals.

The project is located on land owned by the proponent inside a notified industrial estate whose land use, road network, water supply and sewerage were designed for manufacturing of this kind. It involves no involuntary resettlement, no acquisition of public land, no loss of protected habitat, no conversion of agricultural land and no irreversible environmental change. It will generate direct employment for approximately forty eight persons, including positions suitable for women, together with indirect employment in transport, packaging supply, maintenance and recycling.

Taken as a whole, the project is assessed as environmentally manageable, technically sound and socially beneficial. It is accordingly recommended that the Environmental Protection Agency, Punjab grant the requisite environmental approval for the project under Section 12 of the Punjab Environmental Protection Act, 1997 as amended in 2012, subject to the standard terms and conditions prescribed under that Act, to compliance with the Environmental Management Plan set out in Chapter 7, and to payment of the prescribed scrutiny fee by the proponent.

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