VET LINE PHARMA PRIVATE LIMITED

Plot No. 761, Sundar Industrial Estate Lahore

Environmental Impact Assessment (EIA) Report

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EXECUTIVE SUMMERY

According to the American Veterinary Medical Associate about 75% of the emerging human infectious diseases are directly or indirectly linked to animal e.g., zoonotic in nature. This phenomenon highlighted the importance of health scientists (veterinarians, physicians, etc.) working together as co-equal teams. Dealing with the implications of this information requires nothing less than a holistic, collaborative approach among all scientific disciplines involved.

Pharmaceutical companies are geographically spread all over Pakistan. Pharmaceutical production units in provinces tend to concentrate in major cities like Karachi, Lahore and Peshawar. Although the numbers reflect that majority of firms are in the province of Punjab, but in terms of production, capacity utilization, volume and size of business, Karachi leads the way as far as pharmaceutical firms are concerned. To show concern with animal health a project is designed to produce veterinary medicine with the aim to bring animal healthcare in the country at par with the best in the world, thus truly making a difference in the lives of farmers. For this purpose, the project is proposed by M/S Vet Line Pharma (PVT.) Ltd, will serves the same aim. The project is located at the Plot # 761, Sundar Industrial Estate, Lahore.

Title and Location of the Project

Vet Line Pharma (Pvt.) Ltd

Plot # 761, Sundar Industrial Estate, Lahore.

Name of the Proponent

Syed Zameer-ul-hassan (Proponent)

Address: House # 39, K-Block, Valencia Town, Lahore.

Detail of Consultant:

Integrated Environment Consultants

Office # 11, 2nd Floor, Anwar Tower, 99-Shadman Chowk, Lahore, Pakistan.

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A Brief outline of the Proposal

M/S **Vet Line Pharma** (PVT.) Ltd, are in process to manufacture animal health products at Plot # 761, Sundar Industrial Estate, Lahore. The unit will involve the manufacturing of Antibiotics, Anti-inflammatory, Anti-parasitic, De-wormers and nutraceuticals & growth promoters for cattle's as well as for sheep and goats. They will also produce Doxycyclines, Antibiotics, Anti-caccidials, Anti-parasitic, Immunity boosters, De-wormers, Flushers, nutraceuticals & growth promoters for poultry. The project in its vicinity has infrastructure like roads, transport, electricity, telephone, land and even the environment is of ideal condition for distribution center. There is no population within a radius of 2-Km from the project site.

To fulfill the legal requirements of the Punjab Environmental Protection Act (amended act 2012), section 12, this Environmental Impact Assessment (EIA) report is being submitted to the Environmental Protection Agency (EPA), Government of the Punjab to obtain the No Objection Certificate (NOC)/Environmental Approval (EA).

Product Description

They intend to produce veterinary medicines in different forms like, Powders, Liquids and Bolus/Tablets. Details of these products are as following:

- **Powders:** Range of water soluble powders, including Antibiotics, Anti-Coccidials, Nutritional Supplements, Immunity Boosters for poultry and livestock.
- **Liquids:** Antibiotics, Anti-Coccidials, Nutritional Supplements, Immunity Boosters and Electrolytes.
- **Bolus:** Antibiotics, Anthelmintics and Nutritional Supplements, for large and small animals.

Project Impacts and recommendations for their mitigation

Table given below shows the project impacts; related with construction and operation of the Project. Accordingly, mitigation measures have also been initiate to manage the environment and for sustainable development.

Table 1-1: Project Impacts and their Mitigations Measure

Impacts	Magnitude	Recommendation Measure	Responsible Authority
CONSTRUCTION/INSTALLATION PHASE			
Air Pollution Dust Generation, Gases emissions from vehicles	Minor	• Sprinkling of water on regular basis especially during dry climatic conditions • Periodic maintenance and management of all the construction machinery and vehicles	• Contractor • Proponent
Solid waste Construction waste and domestic waste from worker camps	Minor	• Conduct separate collection of construction and domestic waste to promote recycling and re-use • Dispose non-recyclable and hazardous waste material properly according to waste management rules	• Contractor • Proponent
Water Quality Run-off water from construction area Wastewater from camp site Leakage of oil and chemical materials from construction activity	Minor	• Use of spill prevention trays and impermeable sheets to avoid contamination of the groundwater/surface water. • Septic tanks will be constructed with cemented wall to prevent the groundwater contamination.	• Contractor • Proponent
Noise Noise caused by construction machinery Vehicles used for mobilization of construction equipment and workers	Minor	• Control noise through control of working hours and selection of less noisy equipment. • Proper maintenance of vehicles and construction equipment.	• Contractor • Proponent
OPERATIONAL PHASE			
Air Pollution	Minor	• Various types of pollution control devices including ventilation fans	• EHS officer

Impacts	Magnitude	Recommendation Measure	Responsible Authority
		(to went out the Hot air), Fumes condensers. • Vehicles and machinery will be regularly maintained and fitted with appropriate exhaust systems and devices.	• Plant Operators
Solid waste	Moderate	• Solid waste of empty drums (Fiber, Iron and Plastic) and paper waste will be disposed off through a third party contractor. • Kitchen waste of workers and other waste will be composed in backyard of the unit within the premises of the plant.	• EHS officer • Plant Operators
Water Quality (250 Liters/Hr for operation)	Moderate	• Installation of wastewater treatment plant so any wastewater produced will be treated and in compliance with wastewater standards of PQES and reused in the facility. All suspension and sludge will be removed through a third party contractor.	• EHS officer • Plant Operators
Noise Noise from Equipment/Machinery/Vehicles	Minor	• Proper maintenance of equipment and machinery. • Enhanced management to reduce machinery noise and exhaust and its impact on the surrounding environment. • Green belts around the project area, peripheral and internal areas.	• EHS officer • Plant Operators

Impacts	Magnitude	Recommendation Measure	Responsible Authority
Work Safety	Minor	• Prepare a manual for labor accident prevention including safety education and training • Provide workers with appropriate protective equipment • Installing fire extinguishers in fire handling places • Developing fire fighting organization and implementing fire drills	• EHS officer • Plant Operators
Quality Control	Minor	• pharmaceutical products will designed and developed in a way that takes account of the requirements of GMP • production and control operations will clearly specified in a written form and GMP requirements will adopted; • all necessary controls on starting materials, intermediate products, and bulk products and other in-process controls, calibrations, and validations will be carried out	• EHS officer • Plant Operators
Production Management	Minor	• An Air Handling Unit (AHU) will used to re-condition and circulate air as part of a heating, ventilating and air-conditioning system. • Air curtains will used to prevent air or contaminants from moving from one open space to another. • Manometers will used to measure both the pressures of an instrument and for the standard calibration of other instrument.	• EHS officer • Plant Operators

Proposed Monitoring

The monitoring program is designed to ensure that the requirements of the environmental approval awarded by the EPA are met. Monitoring Program (MP) provides important information that allows for more effective planning and an adaptive response based on the assessment of the effectiveness of mitigation measures. The monitoring of various parameters will help to determine the extent to which project construction/operation activities will cause environmental disturbance.

Table 1-2: Initial Monitoring Plan

Sr. No.	Monitoring Parameters	Monitoring Mechanism	Frequency	Responsibility
DURING INSTALLATION				
1.	Dust Emissions	Ambient Particulate Matter Monitoring System.	Will be carried out on quarterly basis.	• Proponent • Site Supervisor
2.	Noise Levels	Noise meter	On quarterly basis by a third party	• Proponent • Site Supervisor
3.	Gaseous Emissions	Emissions monitoring system. Monitoring of ambient air quality.	Will be carried out on quarterly basis.	• Proponent • Site Supervisor
4.	HSE Plan	Health, safety and Environmental will be monitored on daily basis	Daily	• Proponent • Site Supervisor
DURING OPERATION				
1.	Noise Levels	Noise meter	On quarterly basis by a third party	• Proponent • Project Manager
2.	Water Quality	Discrete grab sampling and laboratory testing of water samples.	As described by SMART	• Proponent • Project Manager
3.	Emissions	Emissions monitoring system. Monitoring of ambient air quality.	Will be carried out on quarterly basis.	• Proponent • Project Manager
4.	Security	Security arrangements will be	Daily	• Proponent

Sr. No.	Monitoring Parameters	Monitoring Mechanism	Frequency	Responsibility
		made		
5.	HSE Plan	Health, safety and Environmental will be monitored on daily basis	Daily	EHS officer of Project Proponent
6.	Production Management	Production unit will be monitored on daily basis to control bacterial contamination of products.	Daily	• Proponent • Project Manager

1 INTRODUCTION

Vet Line International is a well organized national corporation having roots in all parts of Pakistan in the field of Animal Health. The company operates its head office from the pearl city of the country "Lahore" which leads to an easy access of the market in the entire country. **Vet Line International** is the very well recognized Pharmaceutical Company that has its major roots in Animal Health products i.e. Antibiotics, Nutritional, Disinfectants, Feed additives and Biological.

Over many years **VET LINE International** itself has developed the name in the Pharmaceutical industry as the leading player through its innovative, progressive and environment friendly range of products and well equipped marketing team in the country. The success that the company enjoys today is the outgrowth of the constant struggle, effort and vision that was paved by the strong national and international binding in the field of Research and Development, technology, quality which is supported by the very well equipped team of visionary young professionals.

VET LINE International with its "Complete Range of Animal Health Products" plays a vital role in its capacity in development and progression of the economy of the country.

Veterinary science helps human health through the monitoring and control of zoonotic disease (infectious disease transmitted from non-human animals to humans), food safety, and indirectly through human applications from basic medical research. They also help to maintain food supply through livestock health monitoring, treatment, and mental health by keeping pets' healthy and long living. Keeping all this point in view M/S **Vet Line Pharma (Pvt.) Ltd**, are in process to formulate the blending of animal health care products at Plot # 761, Sundar industrial Estate, Lahore. The unit will involve the manufacturing of veterinary medicine.

To fulfill the legal requirements of the Punjab Environmental Protection Act (amended act 2012), section 12, this Environmental Impact Assessment (EIA) report is being submitted to the Environmental Protection Agency (EPA), Government of the Punjab to obtain the No Objection Certificate (NOC)/Environmental Approval (EA).

1.1. IDENTIFICATION OF PROJECT AND PROPONENT

Vet Line Pharma (Pvt.) Ltd

Plot # 761, Sundar Industrial Estate, Lahore.

Syed Zameer-ul-hassan (Proponent)

Address: House # 39, K-Block, Valencia Town, Lahore.

1.2. DETAIL OF CONSULTANT

The proponent has assigned the task of preparing EIA report to M/S Integrated Environment Consultants. The EIA study of the project has been conducted according to Environmental Assessment Procedures, 1997, Review of IEE and EIA Regulation 2000 and Rules of Power Delegation 2017 as prescribed by the Federal Environmental Protection Agency (Pak EPA), Government of Pakistan.

The study team of M/S Integrated Environment Consultants which completed the EIA report consists of following experts as mentioned in table 1.1.

Table 1-1: Members Completed EIA Process

Name	Qualification	Status in Project
Mr. Ahtesham Raza	∝ M.Phil (Env. Sciences) GC University, Lahore ∝ Ph.D Scholar, (Env. Sciences) University of the Punjab, Pakistan	Project Incharge
Mr. Adnan Sharif	∝ Diploma of Environmental Law Punjab university Lahore	Team Leader
Mehmood Amjad	∝ B.S (Hons.) Environmental Sciences NFC.IET. Multan	Monitoring Incharge
Mr. Tahir Sajjad	∝ B.S (Hons.) Environmental Engineering UET Taxila	Environmental Engineer

1.3. BRIEF DESCRIPTION OF NATURE, SIZE, AND LOCATION OF PROJECT

The proposed project site is located at Plot No 761, Sundar Industrial Estate, Lahore. The area of plot is 4.0 Kanals. The site is in vicinity has various industrial units. The area is industrial in nature and as declared by the competent authority. The land is already owned by the project proponent. As the project area is an industrial area so there is no population exists within a radius of 2-Km of the project site. M/S Vet line Pharma (Pvt.) has planned to establish Nutraceutical manufacturing unit. The total cost of the project is 120 Million PKR

This EIA report has been prepared according to the category defined in "Pakistan Environmental Protection Agency (review of IEE and EIA) Regulation 2000".

This report provides detailed basic specific information and facts; including environmental, economic, social, etc., enabling its assessment and justification that the project will meet the requirements of environmentally sustainable practices; during regular mining stage; as desired under the Punjab Environmental Protection Act, 1997 (amended 2012), the Punjab Environment Quality Standards and the rules and the regulations thereof.

This report is being prepared under the "Guidelines for the Preparation and Review of Environmental Reports October 1997/2000". Details are available in the individual and respective sections of this report.



Figure 1-1: Project Site Location (source Google Map)

2 SCREENING

According to the review of the Initial Environmental Examination (IEE) / Environmental Impact Assessment (EIA) Regulation 2000, this project falls in **Schedule-II (EIA) category B (2) "Chemical Project"** for which Environmental Impact Assessment (EIA) Report is required.

Therefore, to fulfill the legal requirements of Section–12 of the Punjab Environment Protection Act–1997 (PEPA Amended 2012), the proponent is required to submit the EIA Report in the Environmental Protection Agency, Government of the Punjab, to obtain the required Environmental Approval (EA).

3 SCOPING

3.1 SPATIAL AND TEMPORAL BOUNDARIES OF ENVIRONMENTAL ASSESSMENT

Spatial boundaries for project related to the environmental effects and cumulative effects for Valued Environmental Components. It depends on the Project Development Area and Local and Regional Assessment Area.

The proposed project has already located in the planned industrial estate where all facilities are available. The Google coordinates of the project are as followings:

31°16'30.5"N 74°11'00.8"E

Temporal boundaries based on timings and duration of project activity that will happen during construction and operational phase. Construction will be done in an environmental friendly manner that will not harm any existing boundaries and surroundings of project area. While during operational phase all the operation the activities will be done in order to meet the PEQS.



Figure 3-1: Project Site Location Map

3.2 IMPORTANT ISSUES AND CONCERNS RAISED DURING CONSULTATION

The regular survey and background studies were conducted to identify the stakeholders. People of surroundings were gathered which are likely to be affected, focus group meetings were conducted by the representatives. They were all briefed about the project whereabouts in the non-technical and understandable way. Certain issues and suggestion about the project that is included and raised by the locals were filed and recorded.

3.3 SIGNIFICANT IMPACTS AND FACTORS TO BE DETERMINED

Following impacts are considered to be significant and proper mitigation and maintenance plan of these are made

- Air pollution
- Noise Pollution
- Top Soil Removal
- Health and safety of workers
- Accidental spillages of chemicals to contaminate underground water during operation

4 CONSIDERATION OF ALTERNATIVES

4.1 NO PROJECT OPTION

The demands for animal healthcare products are continually rising due to livestock and poultry sector development. Although there are a number of local manufacturers producing good quality of medicine but still a huge demand exists for potential investment in this sector. This sort of project is quite flexible in a way that there is no processing of raw materials required and each machine is independent in its working. However, keeping in view the potential and industry norms, the project will be more feasible and economical. Due to the increase in demand and competition, there are chances that the market rates may reduce. However, this can be tackled by providing different value added services to customers. By keeping this view, no project option in not a good option.

4.2 SITE ALTERNATIVES THEIR SELECTION AND REJECTION CRITERIA

Proposed project is establishment of nutraceutical manufacturing unit by **M/S Vet Line Pharma Pvt. Ltd.** The site is considered suitable both in terms of environment and physical constraints. As the land use on the project site is industrial in nature. Current location of the project fulfills all the requirements which are needed for project. All facilities of infrastructure, electricity, roads, and communication facilities are present in current location. The current project is also facilitating people of the area with escalating the opportunity of employment and others related facilities. Hence, there is no need for alternative sites as the current project has all land facilities.

4.3 ENVIRONMENTAL ALTERNATIVES THEIR SELECTION AND REJECTION CRITERIA

4.3.1 Selection criteria and Rejection Criteria

The major aim of the proposed project is provide the farmers best animal healthcare products in an environment friendly way. Environmental Impacts of nutraceutical industries and its related products are lower in terms of relative discharge of pollution into the Environment. However, to tackle problems, the proponent ensures to follow the following actions.

- Cleaner Production and sustainability

- Reduction of waste and reduction of resource consumption
- Reuse/recycling
- Product modifications
- Implementation of EMP
- Life cycle analysis

4.4 ECONOMIC ALTERNATIVES THEIR SELECTION AND REJECTION CRITERIA

The economic Alternative in respect to the proposed project implies that the status quo is maintained i.e. no construction/development activity to take place. This option is most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. However, the need for such development is high and the anticipated insignificance environmental impacts resulting from construction have already been experienced.

4.4.1 Selection criteria

- Contributes to country GDP
- Direct Employment
- Increase in exports
- Foreign exchange and earnings
- Production of animal life saving drugs

4.4.2 Rejection criteria

- High operational, maintenance and transportation cost involve
- Increase in imports
- The economic benefits especially during constriction i.e. provision of jobs for skilled and non-skilled workers will not be realized.
- There will be no generation of income by the developer and the Government.

5 DESCRIPTION OF THE PROJECT

This section deals with project components, which are the part of the construction of pharmaceuticals unit for manufacture, processing, and packaging of chemical materials is to be used as medications for animal health care. It also describes the category of the project, availability of construction materials, construction time and cost of the project, construction and operation equipments etc. The information presented in this section is based on project site survey, preliminary design report, and construction drawings provided by the client.

5.1 LOCATION & SITE LAYOUT THE PROJECT

The project is located at Plot # 761 Sundar Industrial Estate, Lahore. The project in its vicinity has infrastructure like roads, transport, electricity, telephone, land and even the environment is of ideal condition for distribution center.

The physical coordinates of the project are as following:

- Front Side = Open Plot
- Back Side = Godown
- Left Side = Nice Chain Factory

5.2 LAND USE ON THE SITE

The land used for the project is located on the vicinity of the industrial area and zone. The proposed project site is located in industrial zone. There are number of industries in the surroundings of the project. Most of them industries are textile and marbel. Other industries are related to food and rubber.

5.3 VEGETATION FEATURES ON THE SITE

The land for the project is located on the vicinity of the industrial zone. The proposed project site is industrial plot having no vegetation features. No vegetation is seen at the project site.

5.4 Road Access

The project site is accessible from the Gate No. 3 of Sundar Industrial Estate, Public transport is available on these roads but not on the link roads leading to the site. The labor will commute from different areas within the city of Lahore and other areas outside Lahore.

5.5 CONSTRUCTION PERIOD AND COST

The project cost has been estimated as 120 Million Pak rupees. The quantities have been worked out from the design drawings and project feasibility. The rates for cost estimates are based on construction work, contractor cost, and cost of the raw materials with 10% escalation for the year 2022.

It is planned that the following schedule of project implementation will be adhered to. This is subject to the conditions that everything goes according to planning and no serious bottlenecks are encountered.

The implementation stages of the project activity include:

1st Stage

The stage–1 comprises the onsite contouring studies and soil investigations.

2nd Stage

The stage –2 comprises Finalization of the following task:

i- Laying of foundations excavation and commencement of erection work.

ii- Start of civil, electrical and mechanical work.

iii- Development of basic infrastructure.

iv- Fitting of instrumentation.

3rd Stage

The stage –3 comprises the following task:

v- Plant Equipment erection completion.

vi- Completion of the basic infrastructures water supply system, electricity supply etc

4th Stage

The stage –4 comprises the Tests & Commissioning.

5th Stage

The Last stage will be commencement of regular processes.

5.6 PROJECT WATER REQUIREMENT AND SUPPLY

Water requirement of the project is to be met from the underground water table through pumps. However, it is anticipated that during construction about 200-250 gallons of water per day will be required while for regular operation of the project no water is required as proposed project process does not involve any usage of water.

5.7 OPERATIONAL ARRANGEMENTS

At operation stage, the project proponent will be involved for operation and maintenance of the proposed Facility.

5.8 CONSTRUCTION ASPECTS

Comparatively normal quantities of building and other facility construction materials will be required for construction of the proposed facility. The materials mainly required are listed below:

- Coarse and fine aggregate for concrete works
- Sandy gravel for backfilling, embankment raising, etc.
- Cement
- Steel
- Bitumen
- Electric Equipments
- Lights
- Other materials etc.

➢ Construction Camps

The establishment of the construction camp will be done within the facility. Location of the camp will be selected in a way that there will not be any disturbance to the surrounding community etc, and it is also close to the site of work or within the project site. Camp will be properly fenced and guarded. This site camp will be constructed mainly for construction staff and to accommodate Contractor's machinery. The area of the camp will be kept sufficiently large to accommodate parking areas for machinery, construction materials and workshops. For the drinking water and other domestic uses of the camp, ground water is being used.

➢ Work Force and Work Machinery

The details of the construction staff has been shown below in Table 5.1. The labor will work in one shift of eight (8) hours. The construction machinery which will be utilized for construction is shown in Table 5.2

Table 5-1: List of Construction Staff

Sr. No.	Category of Staff	Tentative Number

Sr. No.	Category of Staff	Tentative Number
1	Engineer	2
2	Construction Manager	1
3	Planning Engineer	1
4	Material Engineer	1
5	Site Engineer	1
6	Supervisor	1
7	Foreman	2
8	Skilled Worker	20
9	Semi Skilled Worker	40
10	Machinery Operator	8
11	Admin.	2

Table 5-2: List of Construction Machinery to be used

Sr. No.	Type of Machinery	Quantity
1	Excavator	1
2	Dumper & Loader	3
3	Tractor & Trolley	6
4	Water Bowser	2
5	Lift/Crane	1
6	Generator	1
7	Concrete Pump	3
8	Water Pump	3
9	Welding Plant	1

Sr. No.	Type of Machinery	Quantity
10	Concrete Mixing Plant	1

5.9 PROJECT DESCRIPTION

Designed project is planned to produce extensive range of quality medicine for animal health care including suspensions, powder, liquids, and bolus.

5.10 RAW MATERIAL

Raw materials from the vendors will received at receiving bay and identification label will pasted over it which includes QC no., SRV no. and other valuable details. Then material will transferred to the QC lab for analyzation purpose after passing, material receive Released label from the QC, if not then Rejected label and material sent back to the vendor.

After the passing of materials it will be stored in different sections based on its use like active ingredient stored in active section while excipient will stored in separate section. Likewise during manufacturing at each step product will sent to QC for evaluation.

5.11 PRODUCTION FACILITY

For every operational activity standard operating procedures shall follow to ensure the consistency of the process and reproducibility of the products. Equipment in industry will capable to produce the required quantity of the dosage forms and comply with the requirements of Current Good Manufacturing Practices (CGMP) In-house engineering department and a workshop will establish to keep the equipment well maintained and in good working condition.

The Production section has manufacturing plants for:

- Powder
- Bolos
- Liquids

.

- **Liquids**

Process Control: - This system consists of a closed circuit manufacturing facility from feeding of Sugar / Water Phase to loading the Volumetric Liquid Filling Machine. The Sugar Syrup Vessel is supplied with high speed stirrer & electrical heating. The sugar syrup is prepared at required temperature and transferred to Manufacturing Vessel by vacuum or by transfer pump. The product during emulsion formation is re-circulated through In-Line Homogenizer or Liquid Transfer Pump. The Pump also discharges the product in the Storage Vessel. The Storage Vessel is then taken to the filling area (if it is small capacity) and is connected to again Liquid Transfer Pump. Or Storage Vessel remains fixed and pump transfer the Liquids in the float tank which is connected with filling machine.

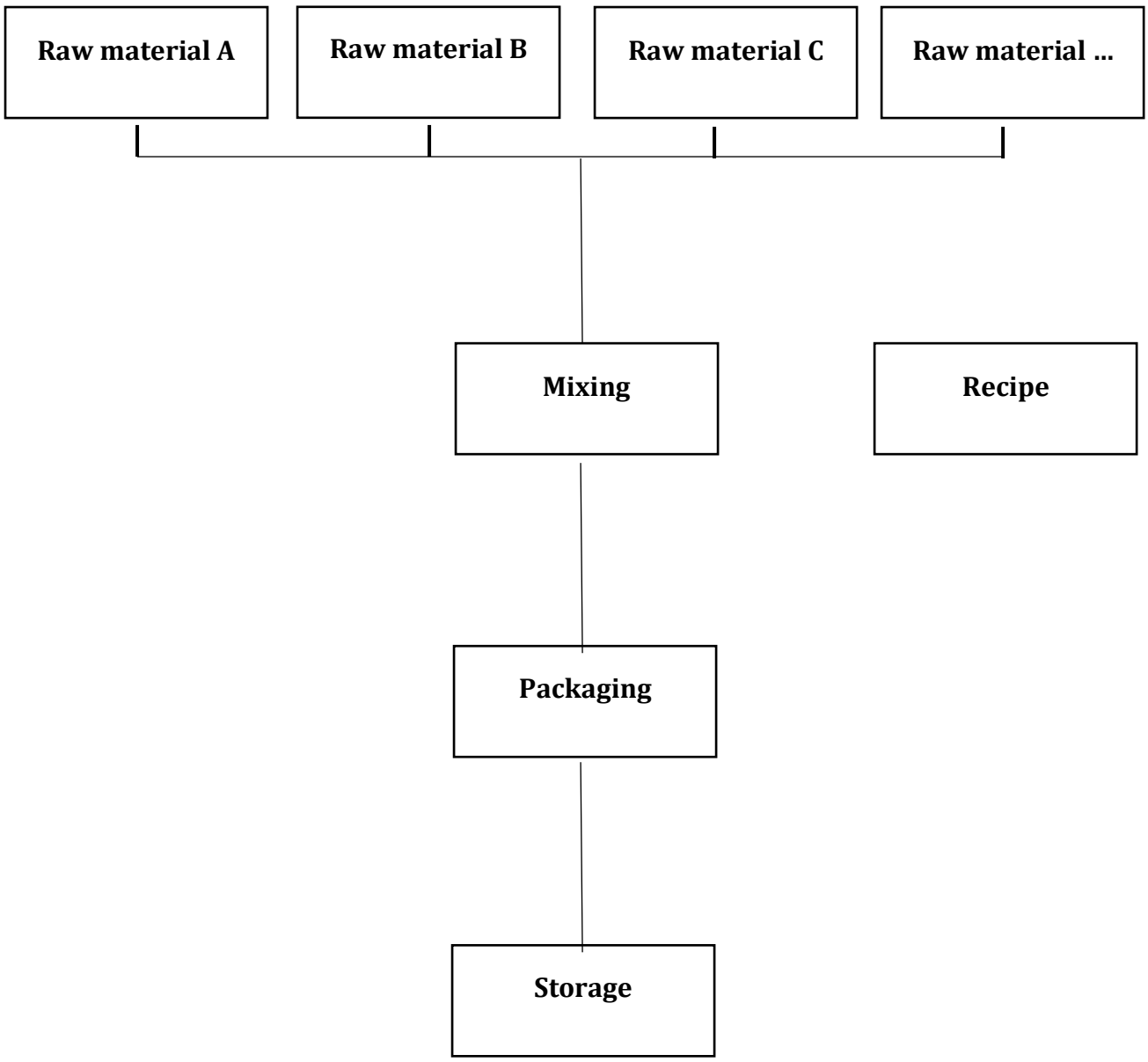


Table 5-3: Liquid Manufacturing Tanks

Following products will be manufacture in the form of liquids:

- Antibiotics
- Anti-coccidials
- Immunity booster
- Electrolytes
- Nutritional supplements

NUTRACEUTICAL LIQUID SECTION PROCESS FLOW



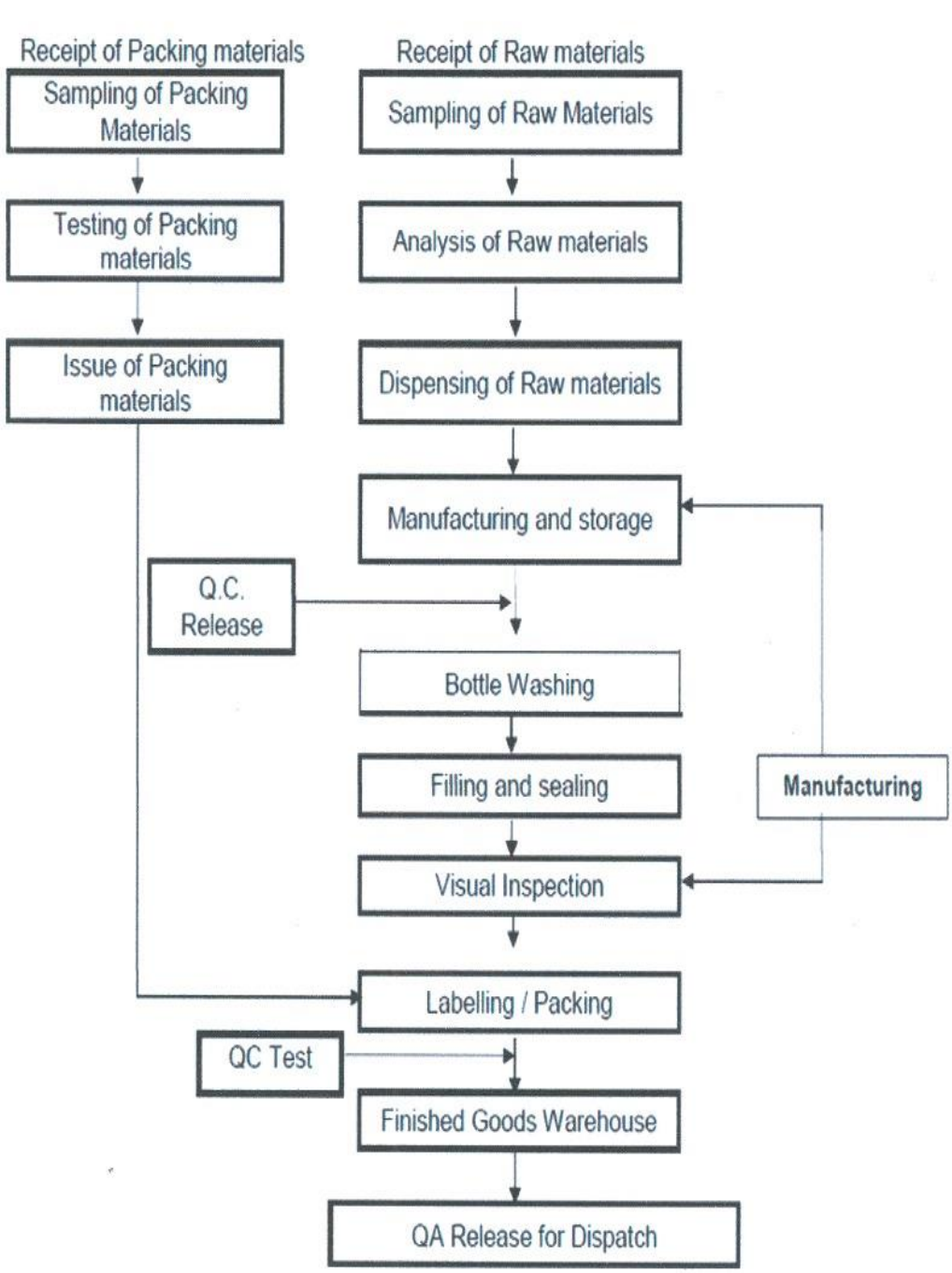


Figure 5-1: Liquid Section Process Flow

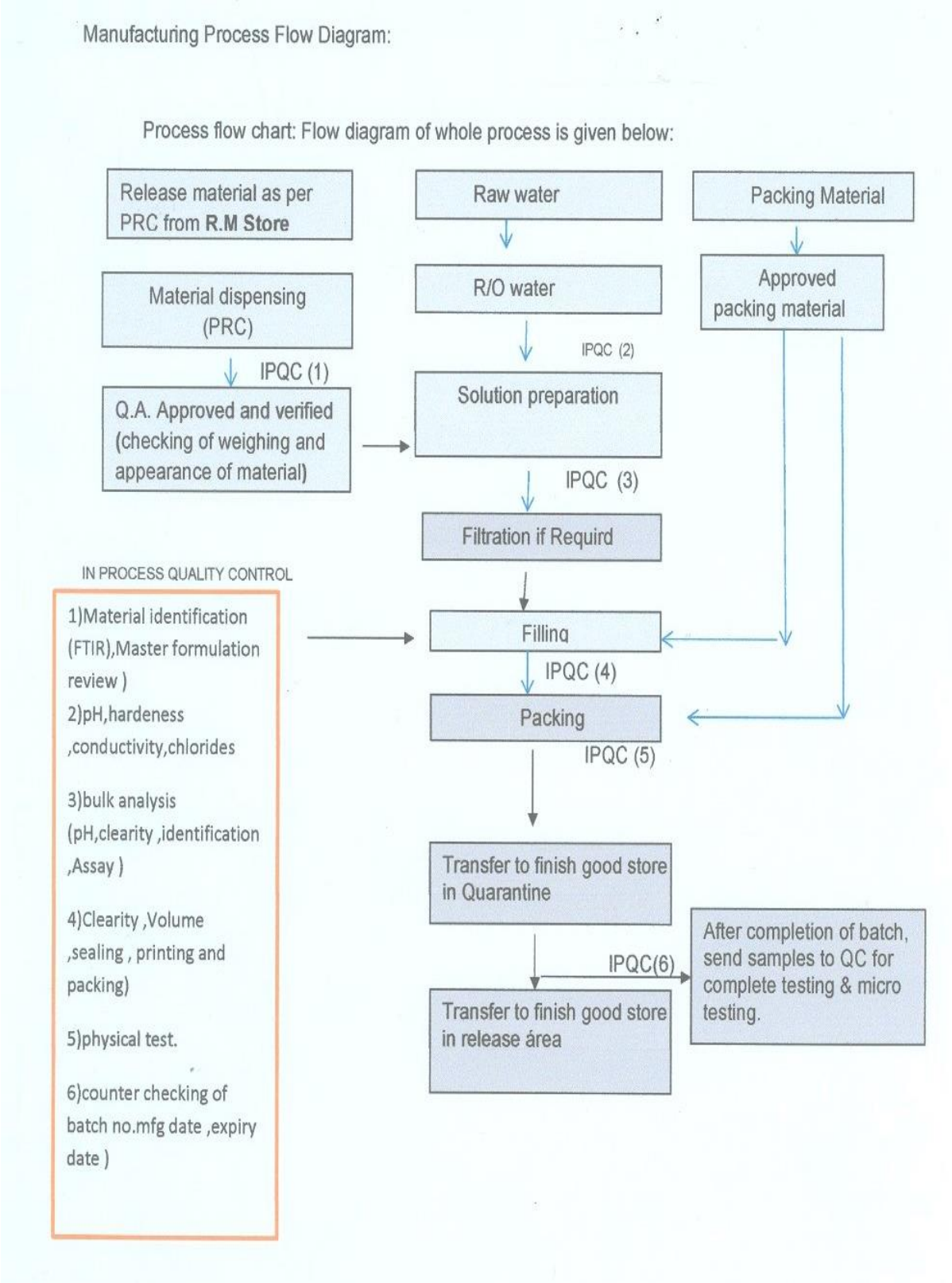


Figure 5-2: Oral Liquid Section Process Flow

ORAL LIQUID SECTION PROCESS FLOW

Manufacturing Process Flow Diagram:

Process flow chart: Flow Diagram of whole process is given below:

Table 5-4: Raw Material & Final Products

Veterinary Use Only

Sr. No	Oral Liquid / Suspensions General	Oral Powder General	Injectibles General	Drench	Bolus	Nutraceuticals Liquids and Powder
1	Neomycin	Tylvalosin	Sulfadoxine + Trimethoprim	Albendazole, Triclabendazole, Ivermectin	Closantel anthelmintic	Vitamins, Nutritional supplements etc
2	Colistin	Sulfadiazine + Trimethoprim	Gentamicin	Ivermectin	Oxyclozanide Ievamiole	
3	Doxycycline	Sulfadoxin + Trimethoprim	Ivermectin	Albendazole	Oxyclozanide (antiparasitic)	
4	CTC	Sulfaclozine	Amikacin	Albendazole, cobalt sulphate, sodium	Niclosamide	
5	Tylosin	Sulfadimidin	Sulfadimidine	Triclabendazole, cobalt sulphate , sodium	Niclosamide, oxybendazole	
6	Oxytetracycline	Sulfadimethoxin + trimethoprim	Oxytetracycline	Levamisole, closantel		
7	Amprolium	Sulfaquinoxalin	Ketoprefen NSAID	Closantel		
8		Colistin	Flunixin meglumine	Oxyclozanide (antiparasitic).		
9	Paractamol	Tetracycline	Meloxicam	Triclabendazole, Levamisole, cobalt		
10	Bromohexine	Doxycycline	Ivermectin, clorsulon	Oxyclozanide, levamisole		
11	Toltrazuril	CTC	Ivermentin, Vitamin A, D, E	Ievamisole, oxyclozanide cobalt sulphate		
12	Ricobendazole	Qunolone	Ivermectin	Ievamisole		
13	Thiabendazole	Flubendazole	Doramectin	Oxyfendazole, Cobalt sulphate, selenium		
14	Florfenicol, colistin sulphate	Tylosin	Ivermectic, closantel	Oxfendazole		
15	Enrofloxacin, colistin	Tylosinphosphate	Riconbendzole	Oxyclozanide, Oxfendazole, cobalt		
16	Flumequine, colistin	Lincomycin	Nitroxynil	Rafoxanide, cobalt, sodium selenite		

Sr. No	Oral Liquid / Suspensions General	Oral Powder General	Injectibles General	Drench	Bolus	Nutraceuticals Liquids and Powder
17	Enrofloxacin	Neomycin	Ivermectin, Vitamin A, Sodium selenite, Vitamin E	Rafoxonide, Ievamsole, cobalt, sodium, selenite		
18	florfericol	Piperazine	Tylosin, colistin, strentomycin	Ricobendzole, cobalt		
19		Lincomycin + Spectinomycin Lincosamide	Amoxicillin, Clavulanic acid	Oxyclozanide, Ievamisole, cobalt sulphate		
20		Bromohexine mucolytic	Colistin	Triclabendazole. Ivermectin, Fenbendazole		
21		Albendazole	Danofloxacin	Gentamicin, Tylosin, Colistin		
22		Niclosamide, Levamisole, Vitamin A	Oxytetracycline, flunixine meglumine	Flumequine		
23		Colistin	Enrofloxacin	Flumequine, Colistin sulphate		

- **Bolus**

Bolus improves food nutrients rate use (proteins, lipids, cellulose), promotes young animals growth and development. Appropriate in the fertile period, lactating and fattening with the purpose to reduce stress and as a supportive therapy in diverse infectious and parasitic diseases.

Following products will be manufacture in the form of bolus

- Antibiotics
- Anthelmintics
- Nutritional supplements

These products will be manufacture for large and small animals. Figure 2.4 shows the process floss of bolus section.

Bolus production capacity per day will be 25000.

Manufacturing Process Flow Diagram:

Process Flow chart: Flow diagram of whole process is given below:

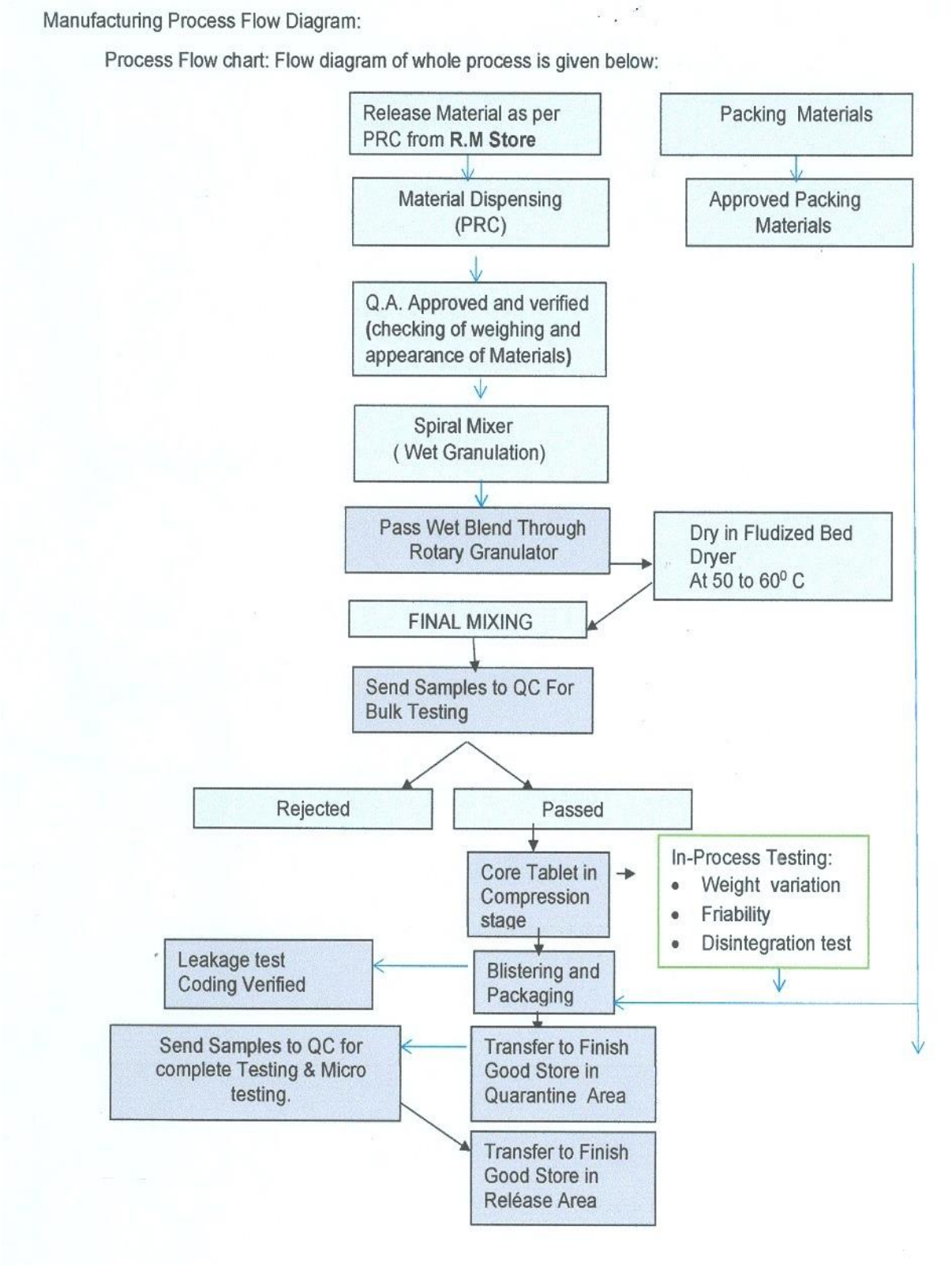


Figure 5-3: Process Flow Chart of Tablet/Bolus Section

- **Powder**

Range of water soluble powders will be manufacture in this unit. It includes

- ❖ Antibiotics
- ❖ Anti- coccidials
- ❖ Nutritional supplements
- ❖ Immunity boosters

All above mentioned products will be manufactured for poultry and livestock sector. Powder production capacity per day will be 500kg.

5.12 PACKAGING MATERIAL STORE

Packaging may be defined as the collection of different components (e.g. bottle, vial, closure, cap, ampoule, and blister) which surround the product from the time of production until its use. Packaging materials include printed material employed in the packaging of a product. The choice of primary and/or secondary packaging materials will depend on the degree of protection required, compatibility with the contents, the filling method and cost.

Table 5-5: Packaging material & uses

Types of materials	Uses
Cardboard	Boxes Display units
Paper	Labels leaflets
Glass	Ampoules Bottles Cartridges
Plastic	Bottles Bags

5.13 RESTORATION/REHABILITATION AT THE END OF PROJECT LIFE

There will be no any matter of rehabilitation as the site is already owned by the project proponent. There will not be any let regarding safety factors as applicable from time to time for such buildings on all accounts. However, at the end of the life of the building, it will be duly dismantled with special precautions to avoid/minimize

pollution and at the same time taking all safety precautions to protect human life and property around the project site.

Debris or any other wastes resulting from demolishing will be disposed off in environmentally sustainable fashion. The materials capable of recycling/reuse will be either sold in the market or to be reused for other suitable purposes. While dismantling all Government rules and regulations as applicable to such activities will be strictly adhered to. During entire construction period, necessary precautions will be taken to ensure that no damage is done to the basic infrastructures like sewer system, power transmission lines roads, private or public property and daily human life as well. Safety measures as desired under the code of demolition will be adopted to avoid any harm to humans, property around, or the environment in the project area. Dust to be generated will be minimized by constant sprinkling of water. After completion; all construction matrix, debris and garbage will be removed off immediately from the site within the minimum possible time under safe conditions. Any minor spill over of these materials will be cleared adequately. The land, if and where pitted will be adequately leveled. On the whole, the project site and the area in its near vicinity will be made neat and clean.

6 DESCRIPTION OF ENVIRONMENT

This chapter describes the baseline conditions, which cover the existing physical, ecological, and socio-economic environment of the Study Area. Information on these aspects has been derived from the desk study of available data, field visits to the project area as well as information obtained through visits to the Government departments and other agencies namely Irrigation Department, Meteorological Department, Forest offices and prevailing environmental laws and environmental quality standards etc.

6.1 GENERAL

An environmental baseline study is intended to establish a database against which potential project impacts can be predicted and managed later. This section covers a comprehensive description of the project area, including environmental attributes which are expected to be affected by the project, as well as, those which are not expected to be directly affected by the construction and operation of the project. The existing environmental conditions around the project have been considered with respect to physical, biological and socio-economic aspects. A site visit was conducted to survey the field area and to collect environmental data on physical, biological and socio-economic parameters. Further, consultations were held with the general public and stakeholders of the project area in order to seek the public opinion on the implementation of the project.

6.2 PHYSICAL ENVIRONMENT

6.2.1 Topography

The topography of the project area is flat. The General height of the area is approximately 220 meters above the Mean Sea Level (MSL). The district Lahore is divided into two parts. The low lying alluvial soil is along the Ravi River and the upland in the east. Upland is a plain slope from north-east to south-west. The lowlands are generally inundated during the monsoon season by Ravi River, flowing in the west of district along its boundary with district Sheikhupura. Figure 3.1 represents the topography of the area

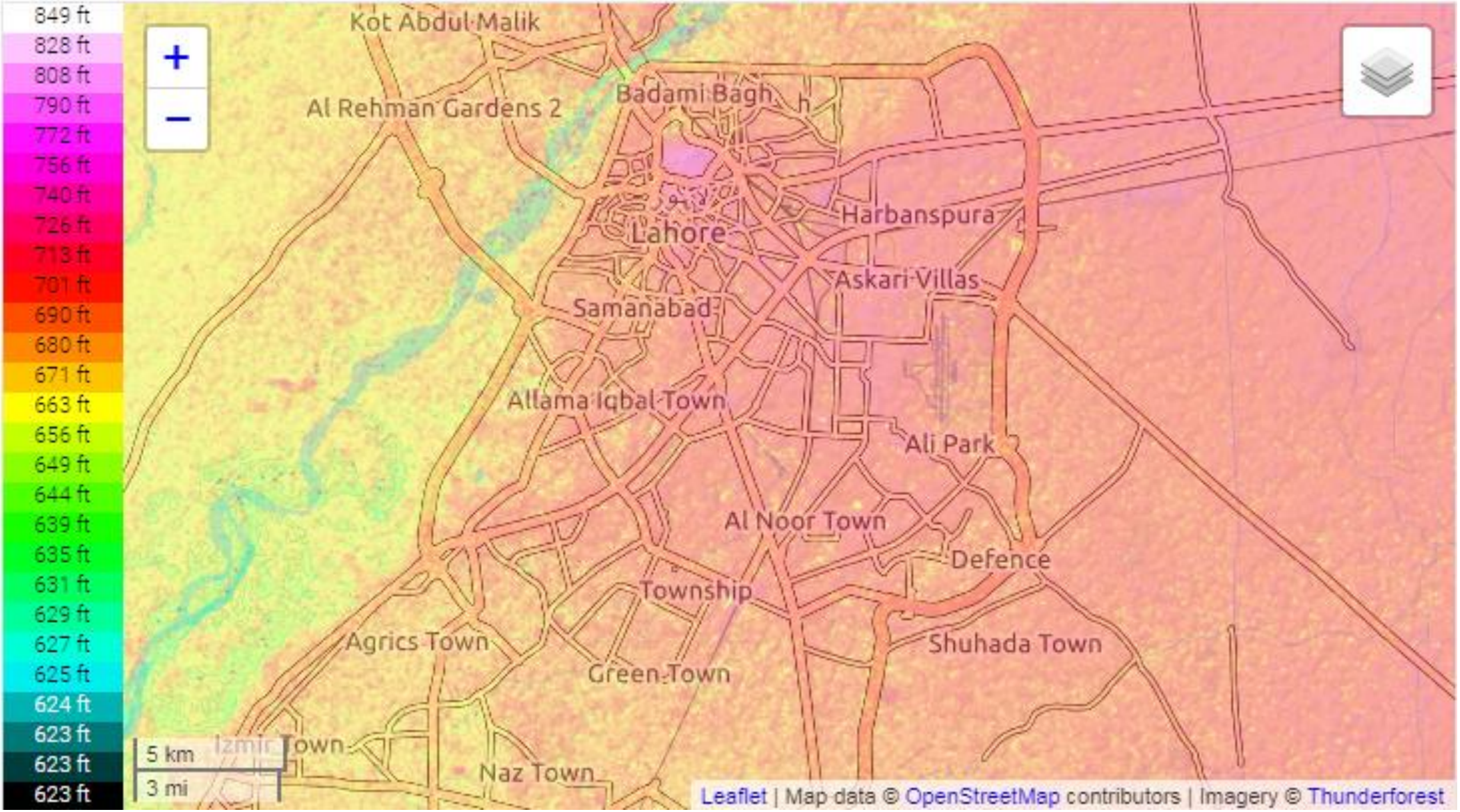


Figure 6-1: Topography of Project Area

6.2.2 Soils

The soil is different in character and generally inclined to be dry. However, it is rich in potential plant nutrients. Rainfall is low and groundwater is saline and brackish at the shallow depth and irrigation is largely dependent on the canals. Tube wells have also been sunk to the greater depths in the Project Area where fresh water is available.

The chemical quality of groundwater in the district varies with depth. However, the sweet potable water is available in a belt five to twenty miles wide paralleling the Ravi River.

Alluvium is soil or sediments deposited by a river or other running water. Alluvium is typically made up of a variety of materials, including fine particles of silt and clay and larger particles of sand and gravel. A river is continually picking up and dropping solid particles of rock and soil from its bed throughout its length. Where the river flow is fast, more particles are picked up than dropped. Where the river flow is slow, more particles are dropped than picked up. Areas, where more particles are dropped, are called alluvial or floodplains and the dropped particles are called alluvium

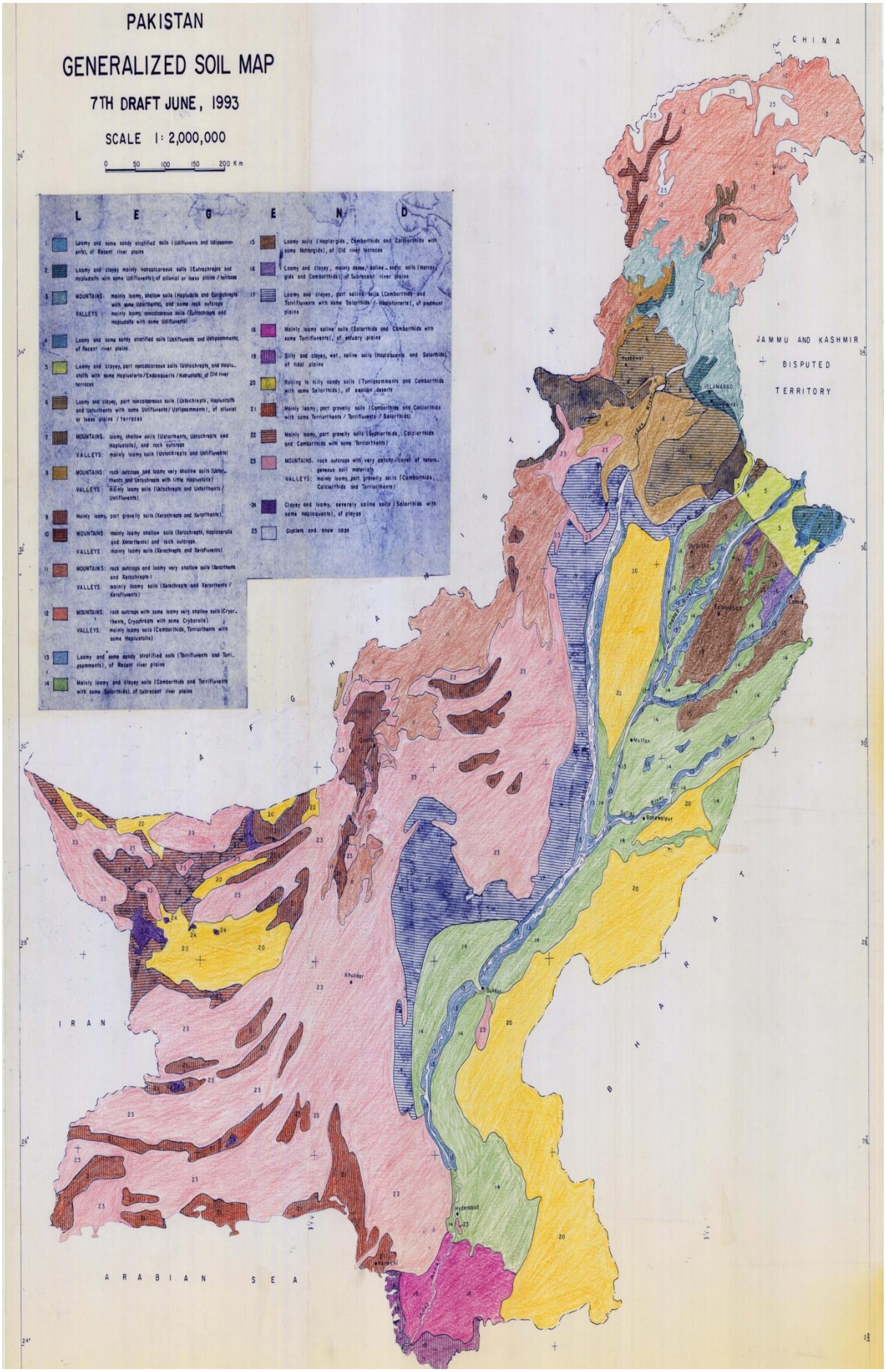


Figure 6-2: Soil Map of Punjab

6.3 CLIMATE AND METEOROLOGY

Seasonal climatic conditions must be considered for the design and execution of Project. The climate including air, temperature, precipitation, humidity, and evaporation is an influencing factor, affecting the construction of the plant and other engineering structures. However, to determine the overall effect of the climatic stresses, daily and seasonal temperature changes, site altitude, direct solar radiation, and precipitation must be considered. The Project Area has extreme climate: it has hot summer and cold winters. The summer starts from April and lasts till September. May, June, and July are the hottest months. The mean maximum and minimum temperature ranges from 40.4 ºC and 27.3 ºC respectively for these months.

The winter seasons lasts from November to March. December, January, and February are the coldest months. The mean maximum and mean minimum temperature ranges from 19.8ºC to 5.9ºC in January. Temperatures in the Project Area vary from 5.9 ºC to 40.4 ºC.

Table 6-1: Meteorological and Climatic Features

Classification of Climate	Tropical (hot/humid)
Predominant Wind Direction	East/Northeast
Wind intensity	Weak to moderate
Average annual precipitation	>650 mm
Rainy season	July to September
Dry season	October to June
Average annual temperature	19-20 °C
Average summer temperature	36-38 °C
Average winter temperature	6.5-10.5 °C

Table 6-2: Average Monthly Temperature, Precipitation and Relative Humidity (2017)

Month	**Mean Temperature**		**Precipitation (mm)**	**Average Relative Humidity (%)**
	Maximum	**Minimum**		
January	18	8	100	72
February	24	11	31	60
March	28	15	39	54
April	37	22	62	40
May	39	26	50	37

June	37	26	176	54
July	36	27	200	68
August	35	27	184	69
September	35	25	50	63
October	34	22	0	56
November	24	13	19	72
December	22	9	31	63
Annual	30.8	17.8	666	70.34

Table 6-3: Rainfall Data of the Area

Month	Precipitation (Millimeters)
January	23
February	28.6
March	41.2
April	19.7
May	22.4
June	36.3
July	202.1
August	163.9
September	61.1
October	12.4
November	4.2
December	13.9
Annual	628.7

Based on climatic elements, five seasons are recognized

6.3.1 Pre-Monsoon Season

Pre-monsoon refers to the period from April to June prior to the setting in of the monsoon. This is the hottest and the driest season, with persistent dry and hot winds. Daytime temperature rises to 40.40 C. The flows in the river begin to rise simultaneously due to snow-melt water in the high mountains. The water table falls to the maximum depth

6.3.2 Monsoon Season

Monsoon is the main rainy period, which starts at the beginning of July, reaches its climax in August and gradually, subsides in September. High-intensity Rainfall causes soil erosion which is a function of erosivity and erodibility. The cool monsoon winds followed by heavy showers lower the temperature to great extent. The part of rain percolates into the soil and is conserved in the subsoil and part adds to the groundwater. The conserved moisture in the soils is generally sufficient to rejuvenate the vegetation. All plants grow rapidly and mature towards the end of the season.

With the start of monsoon season, the rivers flow at their peak level. The groundwater level is improved toward the end of the season in September and October.

6.3.3 Post-Monsoon Season

Post monsoon season refers to autumn (October-November). The temperature starts falling but the extreme aridity prevents plants to flower early and sets seed toward mid-seasons. Groundwater level rises as a result of infiltration from rainfall.

6.3.4 Winter Season

Winter refers to the period from December to January. The lowest temperatures (< 20°C) and cold winds characterize this season. The plants become dormant and most of them dry out. Most of the trees shed their leaves and few remain green or partly green. Sometimes this season becomes severe due to cold Siberian winds. Groundwater level declines in this season due to low flows in the rivers and no or little rains which usually fall in light showers causing little soil erosion.

6.3.5 Spring Season

Spring refers to the period from February to March. Temperatures become pleasant. The mean maximum temperature is 27°C with the highest precipitation of 41.2 mm and relative humidity of 57.6 percent. Some light showers of rain may also fall without generating runoff. The vegetation sprouts again because of conserved moisture from winter and spring rains, if any. The water table starts falling

6.4 SURFACE WATER & GROUND WATER

6.4.1 Surface Water

No rivers exist in the vicinity; however, storm water drains cross the route for disposal into the Ravi River. Water from River Ravi, flowing on the northwestern side of the city of Lahore, is being used for other purposes other than drinking purposes. River Ravi receives almost all the municipal/ industrial wastes from the city of Lahore. The potential value as a recreational water body and breeding place for fish is threatened by the municipal and industrial pollution.

6.4.2 Groundwater

Groundwater quality is fresh (defined as acceptable in terms of its salinity). Raw water abstracted from the deep tube wells is believed to be essentially bacteria free. The status of quality of groundwater both in the country and Punjab Province is shown in fig. The water quality in the upper 50 meters zone of the subsoil is generally

brackish. For city's drinking purposes water is abstracted from groundwater aquifer by means of tube wells located throughout the city. The quality of water is generally adequate for direct consumption. About 83% of the city population is consuming groundwater for drinking purposes. Groundwater is available at a depth ranging between 15 to 23m below the natural surface level.

Water consumption varies significantly and its variation as of industrial units. Usual water consumption pattern for industrial units and data collected from the prospective industrialist will form the basis for total water demand.

According to Master Plan-2030 for the city of Lahore, the mean average decline in groundwater is about 2.03 feet per year. The water table contour map for the Year-2000 is exhibited in Exhibit-4.14. It is noted from the exhibit that groundwater is at a greater depths in the central part of the city where abstraction is more than the re-charge and close to surface waters i.e. Ravi River and Canal, the situation is in the reverse order.

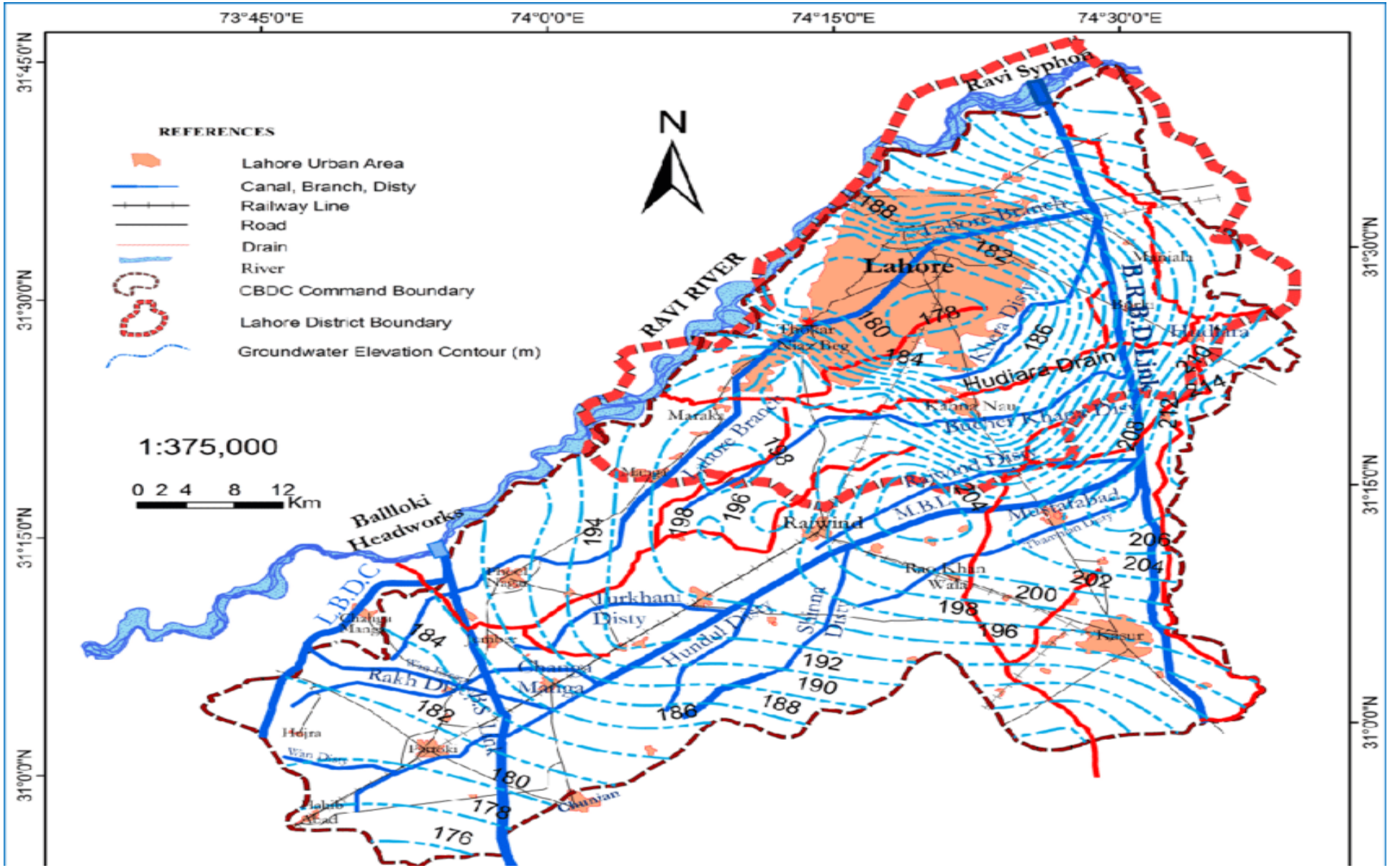
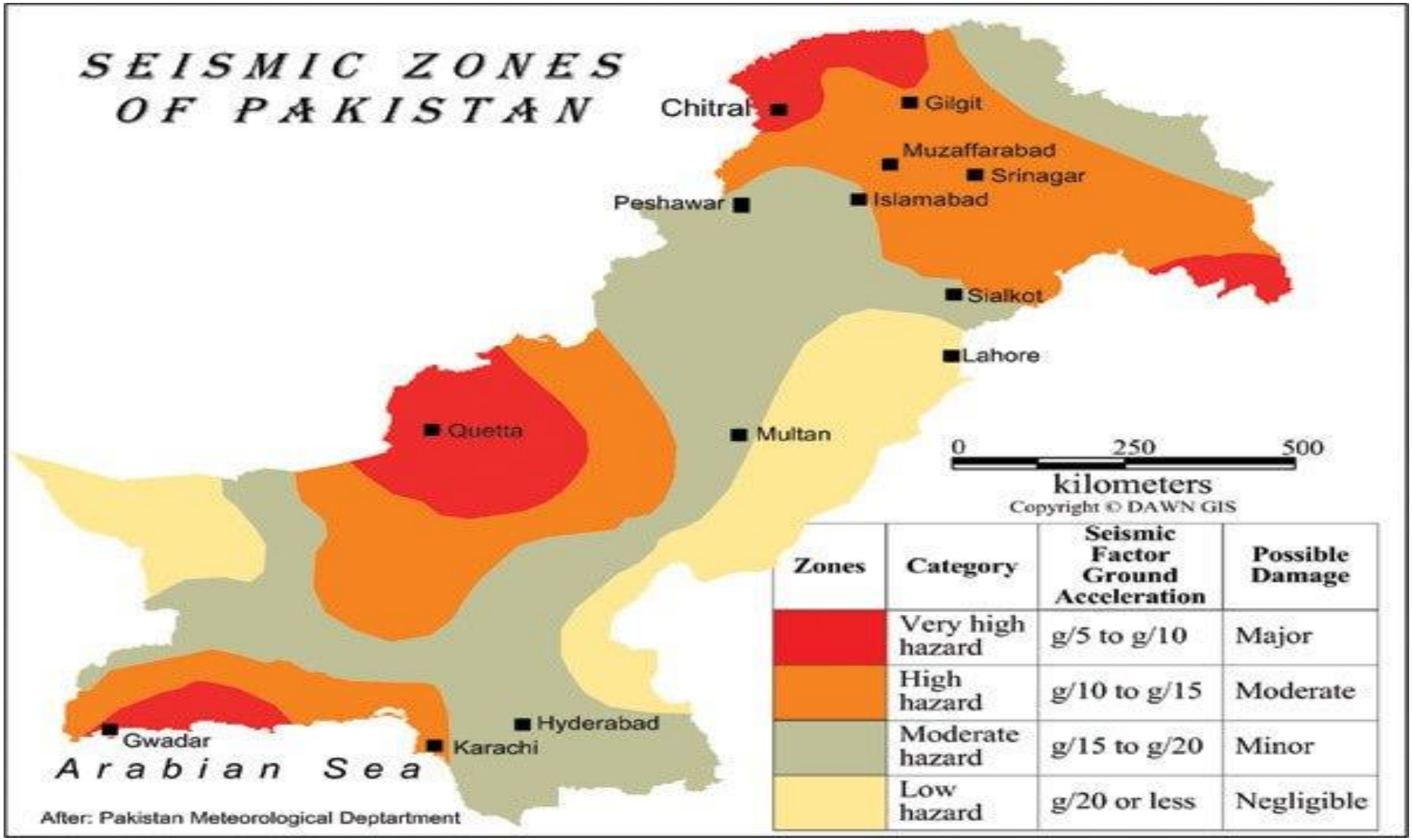


Figure 6-3: Groundwater Contours of Lahore

6.5 SEISMOLOGY

Pakistan Building Code distributes the country into 4-zones, fig. The project site falls in Moderate damage Zone, as such structural design of buildings and others will follow the applicable criteria for the zone.

Seismic details are a very important consideration for any planning activity. As it directly lays impact on the construction of the site.



Zones	Category	Seismic Factor Ground Acceleration	Possible Damage
	Very high hazard	g/5 to g/10	Major
	High hazard	g/10 to g/15	Moderate
	Moderate hazard	g/15 to g/20	Minor
	Low hazard	g/20 or less	Negligible

Figure 6-4: Seismic Zoning Map of Pakistan

6.6 FLOODING

No surface drainage problems are foreseen as surface water can be disposed of in the existing primary and secondary drainage network including partly moving into the sewerage.

6.7 WATER LOGGING AND SALINITY

There are no signs of water logging in the project site

6.8 ECOLOGICAL RESOURCES

6.8.1 Marine and Aquatic Ecology

This is not applicable to the Project area.

6.8.2 Flora

The diversity and distribution of plant species within the Lahore District depend upon the availability of water and the underlying geology. There are significant numbers of trees in Green Belts en-route.

6.8.3 Fauna

Common birds found in the area are crows and sparrows. Chirping birds are having their nests at the well-grown trees that are providing a natural habitat for the birds. Some squirrels, parrot, rats, weaver, sparrows are also found in the area.

Different species of reptile and amphibians such as lizards and frogs are also found. Various bird species known to occur in the area include myna, bulbul, crow and sparrow.

6.8.4 Endangered Species

The endangered plant in Pakistan is the Elm i.e., Ulmus wallichiana which is not found here. No endangered species exist in the project area.

6.9 SOCIOECONOMIC ENVIRONMENT

Lying between 31°15′—31°45′ N and 74°01′—74°39′ E, Lahore is bounded on the north and west by the Sheikhupura District, on the east by Wagah, and on the south by Kasur District. The Ravi River flows on the northern side of Lahore. Lahore city covers a total land area of 404 square kilometers (156 sq mi) and is still growing. With a rich history dating back over a millennium, Lahore is a main cultural center of Punjab and one of the most densely populated cities in the world. The city of Lahore remains an

economic, political, transportation, entertainment, and educational hub. It is referred to as the "Mughal City of Gardens" due to the historic presence of gardens in and around the city dating back to the Mughal period.

6.9.1 Political and Administrative Setup

The project area falls in Lahore City of the Lahore District. District Co-ordination Officer is the highest ranked administrator of the district. For the collection of revenue and administration, the districts are subdivided into Tehsils. Local governments also administer the area through Union Councils and Tehsils. The total area of the district Lahore is 2,300 square kilometers.

6.9.2 Economy and Industrial Activities

As of 2008, the city's gross domestic product (GDP) by purchasing power parity (PPP) was estimated at $40 billion with a projected average growth rate of 5.6 percent. This is at par with Pakistan's economic hub, Karachi, with Lahore (having half the population) fostering an economy that is 51% of the size of Karachi's ($78 billion in 2008).

The contribution of Lahore to the national economy is supposed to be around 13.2%. As a whole, Punjab has $115 billion economy making it first and to date only Pakistani Subdivision of economy more than $100 billion at the rank 144.

Lahore's GDP is projected to be 102 billion$ by the year 2025, with a slightly higher growth rate of 5.6% per annum, as compared to Karachi's 5.5%. Central to Lahore's economy is the Lahore Stock Exchange (LSE), Pakistan's second largest stock exchange.

Lahore has offices of several Pakistani government corporations including the Water and Power Development Authority (WAPDA) and Water and Sewage Authority (WASA). Food and restaurant businesses remain open all night. Lahore is the second largest financial hub of Pakistan and has industrial areas including Kot Lakhpat and the new Sundar Industrial Estate (near Raiwand). Lahore's economic base is broad and varied.

Major industries include the manufacture of automobiles and motorcycles, Heavy machinery, railway coaches, home appliances, steel, telecommunications, information technology, chemicals, pharmaceuticals, computers, engineering, and construction material. A major industrial agglomeration with about 9,000 industrial units, Lahore has shifted in recent decades from manufacturing to service industries. Some 42% of its

workforce is employed in finance, banking, real estate, community, cultural, and social services. The city is Pakistan's largest software producing Centre and hosts a growing computer-assembly industry. Arfa Software Technology Park in Lahore is the biggest and most advanced IT park in the country.



6.10 QUALITY OF LIFE VALUES

6.10.1 Demographic Characteristics of the Project Area

The total population of Lahore District was 6,318,745 as enumerated in March 1998 with an intercensal percentage increase of 78.3 since March 1981 when it was 3,544,942 souls. The average annual growth rate of population in the district during intercensal period 1981-1998 was 3.5 percent. The total area of the district is 1772 square kilometers, which gives population density of 3,566 persons per square kilometer as against 2000 persons observed in 1981 indicating a fast growth rate of the district. The table gives population, its intercensal increase and average annual growth rate since 1951 of Lahore district.

Table 6-4: Intercensal Demographic Survey

Description	1951	1961	1972	1981	1998
Population (in 000's)	1,135	1,626	2,588	3,545	6,319
Intercensal Increase (%)	43.3	59.2	37.0	78.3	-
Average Annual Growth Rate (%)	3.7	4.1	3.8	3.5	-

6.10.2 Rural and Urban Distributions

The urban population was 5,209,088 or 82.4 percent of the total population of the Lahore district, which grew at an average rate of 3.3 percent during 1981-98. The

growth decreased from 3.7 percent, which was observed during 1972-81. There are one Metropolitan Corporation, two Town Committees and one Cantonment in the District.

There were 261 Mauzas (the smallest revenue unit) in 1998. Of these 61 had a population over 5 thousand, another 61 had 2 to 5 thousand, 64 had one to two thousand, and 74 had under one thousand persons while one was uninhibited.

6.10.3 Religion

The population of the district is predominantly Muslims i.e. 93.9 percent. The next higher percentage is of Christians with 5.8 points followed by Ahmadis 0.2 percent. While other minorities like Hindu etc. are very small in number.

6.10.4 Ethnic Structure

The main castes and groups of the Lahore district are Arain, Jat, Rajput, Malik, Pathan, Mughal, Sheikh, Komboh and Gujjar. Besides, there are also village artisans, which include Lohars (blacksmiths), Tarkhan (carpenter), Kumhars (potters), Mochis (cobblers), Machhis (water-carrier), barbers and weavers etc.

6.10.5 Mother Tongue

The mother tongue refers to the language used for communication between parents and their children in any household. Punjabi is the predominant language being spoken by the majority (86.2 percent) of the population of the district followed by Urdu, Pushto, and Siraiki being spoken by 10.2, 1.9, and 0.4 percent. Sindhi is spoken by 0.1 percent.

6.10.6 Institutions

Lahore is the metropolitan city and a hub of various educational, academic and flourishing government institutes. In the vicinity of the project, there are many educational institutions like Government College University, University of Veterinary and Animal Sciences, University of the Punjab, College for Women University, Forman Christian Collage, National College of Arts, King Edward Medical University, Kinnaird College for women, Shadbagh Girls College and many more renowned institutions.



Figure 6-5 : Educational Institutes in Lahore

6.10.7 Transportation

The city of Lahore is one of the most accessible cities of the Punjab Province. In addition to the historic Grand Trunk Road (G.T. Road), a motorway (M- 2) was completed in 1997 from Lahore to Islamabad. The government has built underpasses to ease congestion and prevent traffic jams, and according to official figures, Lahore transportation services have improved to accommodate the growing number of visitors to the city. It is well connected by air to other countries as well as all major cities of Pakistan. Buses, trains, taxis, and rickshaws are the other means of transport available in Lahore.



6.10.8 Health Facilities

Ample medical and health facilities are available in the Lahore Metropolitan Corporation area and its suburbs. Shaukat Khanam Hospital is the latest addition to the medical care facilities in Lahore for the most dangerous disease in the country i.e. Cancer. There are also other hospitals of voluntary organizations which provide health coverage to the general public. Among the prominent hospitals are General Hospital, Lady Willington Hospital, Mayo Hospital, Fatima Jinnah Hospital, The Children Hospital, Services Hospital, and Ganga Ram Hospital etc. Besides, a number of private medical practitioners, Hakims, and homeopathic doctors are also practicing in the city. Services Hospital is the nearest health care facility that is present in the vicinity of the project.



Figure 6-6; Hospitals in Lahore

6.10.9 Architecture Style

Lahore, Pakistan architecture refers to the various structures built during different time periods. Walled city is famous for its gates and architecture. Mostly there are three types of old buildings in Lahore. Victorian Architecture: When British conquered sub continent they made these buildings during the period 1857 -1947 keeping in mind the climate conditions. Mughal Architecture: By an architectural point of view, therefore, Lahore is essentially a Mughal city, Made by Mughal emperors during the period of

1504 -1857. Minarets are attached to buildings. Cylindrical construction with internal staircases and balconies leading to the conical roof. All buildings are symmetrical creating a mirror-like effect. British Architecture: Under British rule (1849–1947), colonial architecture in Lahore combined Mughal, Gothic and Victorian styles. Under British rule, Sir Ganga Ram(sometimes referred to as the father of modern Lahore) designed and built the General Post Office, Lahore Museum, Aitchison College, Mayo School of Arts (now the NCA), Ganga Ram Hospital, Lady Mclagan Girls High School, the chemistry department of the Government College University, the Albert Victor wing of Mayo Hospital, Sir Ganga Ram High School (now Lahore College for Women) the Hailey College of Commerce etc. In modern Lahore, Pakistan; the traditions of architecture have been changing. The dome, minaret, the arch, the intricate mirror work and the extravagant use of ornaments which were features of the Mughal style, have now gone out of fashion. Changing patterns of economy, industrialization and increase in population have contributed a great deal in revolutionizing the entire basis of architectural forms.

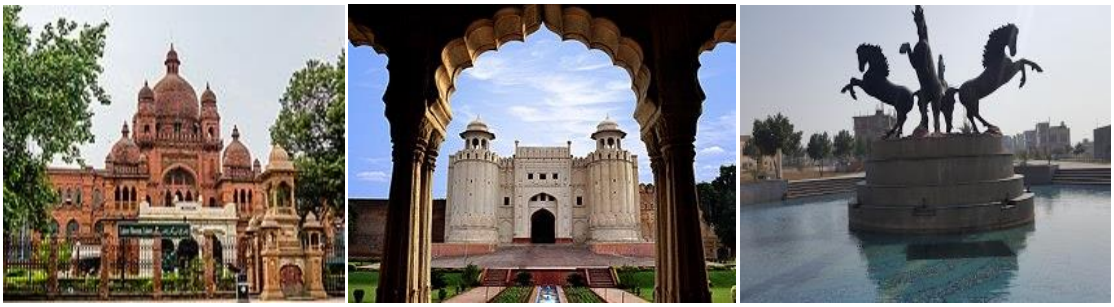


Figure 6-7: Architecture Style of Lahore

6.11 ENVIRONMENTAL MONITORING DATA

6.11.1 Air Quality

Motor vehicle emissions are composed of the by-products that come out of the exhaust systems or other emissions such as gasoline evaporation. These emissions contribute to air pollution and are a major ingredient in the creation of smog in some large cities. A study by MIT indicates that 53,000 early deaths occur per year in the United States alone because of vehicle emissions

The main source of air pollution in the Project area is traffic congestion that occurs off and on in the Project Area. Traffic load has increased manifold due to the rapid growth of the City. Ambient air is being polluted due to the emission of fuel gases like Carbon Monoxide (CO), Nitrogen Oxide (NO_X) and Sulphur Oxide (SO_X) due to the vehicle

exhaust. Untreated fuel from rickshaws also contains trace amount of Lead (Pb) in it.

Table 6-5: Ambient Air Monitoring Data

Reference Point	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	CO (mg/m^3)
Main Road	54	51	1.01
North Side of the Project	59	55	1.09
South Side of the Project	53	49	1.13
East Side of the Project	58	52	1.06
NEQS Limiting Values	**120.0**	**80.0**	**10.00**

Level of Emission is increasing over the period, implies with without project, the vehicles' speed is reducing and these are producing more emissions; and

Cars and Pick-ups are more producers of carbon monoxide whereas Rickshaws and Motorcycles produce more hydrocarbons and heavier traffic produces more nitrogen oxides.

6.11.2 Noise

The project area falls under an urban environment and presently, the noise level is within the permissible limits of 85 db.

6.11.3 Water Quality

Water quality refers to the chemical, physical, biological, and radiological characteristics of water. It is a measure of the condition of water relative to the requirements of one or more biotic species and or to any human need or purpose. It is commonly compared with a set of standards against which compliance can be assessed. The water resource in the study area includes groundwater. The secondary data and the information collected during the field survey, the groundwater table depth varied from site to site. The groundwater is extracted by means of wells, hand pumps, and electric motors.

6.12 CULTURAL VALUES

There is blend of poor and elite class among the residents of the project site. One can see a mixture of modern and old cultural values. Younger generation is fastly adopting modern cultural values of the affluent society. Elderly people are well respected and they even now play a decisive role in decision making in family matters. The liberal independence is also dominating now a day.

7 IMPACT ASSESSMENT AND MITIGATION

7.1 PROBLEM AND ITS OCCURRENCE

On the basis of the findings of the EIA, it is concluded that the project will not pose any adverse impact on the local population and the environment. A proper management plan shall be prepared in case of an accident like;

- Any health hazard to workers/other persons during construction or operation phase.
- Gaseous emissions to the environment.
- Inappropriate waste handling.

As mention above that, the project will not pose any adverse impacts to the environment. An assessment of impact during construction and operation phase is given in **Table 7.1** - which indicates the impact and their magnitude.

Table 7-1: Anticipated Impacts and their magnitude of the Project

Environmental Components / Components/ Activities	Physical Environment												Biological Environment							Social Environment					
	Agricultural Lands	Soil (Erosion/Stability)	Housing	Cultural/Religious Properties	Infrastructure	Mineral Resources	Downstream River Flows	Flooding	Surface water quality	Groundwater quality	Air quality	Noise	Aquatic Ecosystem	Wetland Ecosystem	Terrestrial Ecosystem	Endangered Species	Natural Flora	Wildlife	Disease Vectors	Public Health/Safety	Land Use	Communication System	Employment	Community Stability	Cultural and Religious Value
Construction Phase (Further Construction)																									
Construction Camp site	NA	LA	O	O	O	O	NA	NA	O	LA	LA	LA	O	O	O	O	O	O	LA	O	LA	O	LB	O	O
Digging and excavation activities	NA	LA	O	O	O	O	NA	NA	O	O	LA	LA	O	O	O	O	O	O	O	O	O	O	LB	O	O
E&M of Equipments	NA	LA	O	O	O	O	NA	NA	O	O	LA	LA	O	O	O	O	O	O	O	LA	O	O	MB	O	O

Environmental Components / Components/ Activities	Physical Environment												Biological Environment							Social Environment					
	Agricultural Lands	Soil (Erosion/Stability)	Housing	Cultural/Religious Properties	Infrastructure	Mineral Resources	Downstream River Flows	Flooding	Surface water quality	Groundwater quality	Air quality	Noise	Aquatic Ecosystem	Wetland Ecosystem	Terrestrial Ecosystem	Endangered Species	Natural Flora	Wildlife	Disease Vectors	Public Health/Safety	Land Use	Communication System	Employment	Community Stability	Cultural and Religious Value
Vehicular Movement	NA	LA	O	O	O	O	NA	NA	O	LA	LA	MA	O	O	O	O	O	O	O	LA	LA	O	O	LA	O
Machinery and Equipments work	NA	LA	O	O	O	NA	NA	NA	O	O	LA	MA	O	O	O	O	O	O	O	LA	LA	O	LB LA		O
Operation Phase																									
Solid Waste	NA	LA	O	O	O	NA	NA	NA	O	LA	O	O	O	O	O	O	O	O	O	LA	O	O	O	O	O
Fire Fighting Arrangement	NA	O	O	O	O	NA	NA	NA	O	O	O	O	O	O	O	O	O	O	O	HB	O	LB	LB	MB	O

Environmental Components / Components/ Activities	Physical Environment												Biological Environment							Social Environment					
	Agricultural Lands	Soil (Erosion/Stability)	Housing	Cultural/Religious Properties	Infrastructure	Mineral Resources	Downstream River Flows	Flooding	Surface water quality	Groundwater quality	Air quality	Noise	Aquatic Ecosystem	Wetland Ecosystem	Terrestrial Ecosystem	Endangered Species	Natural Flora	Wildlife	Disease Vectors	Public Health/Safety	Land Use	Communication System	Employment	Community Stability	Cultural and Religious Value
Health and safety	NA	O	O	O	O	NA	NA	NA	O	O	O	O	O	O	O	O	O	O	O	HB	O	LB	LB	MB	O
Waste water	NA	LA	O	O	O	NA	NA	NA	O	LA	O	O	O	O	O	O	O	O	O	LA	O	O	O	O	O

LA: Low Adverse MA: Medium Adverse HA: High Adverse NA: Not Applicable O: None or Insignificant

LB: Low Beneficial MB: Medium Beneficial HB: High Beneficial ND: Not Determinable

7.2 WAYS OF ACHIEVING MITIGATION MEASURES

7.2.1 Changing In Planning and Design

No such change is required in the planning and design of the project as it does not have any significant impact.

7.2.2 Improved Monitoring and Management Practices

There shall be a suitable program of monitoring and maintenance. There will be proper firefighting and health and safety plan. Any improvement in monitoring and management practices shall be addressed to concerned authorities.

7.2.3 Compensation in Money Terms

There is no compensation in money terms as the land is already owned by the Project Proponent. Land documents are submitted for the same.

7.2.4 Replacement, Relocation, and Rehabilitation

There will be no any matter of replacement, relocation, and rehabilitation as the site is already owned by the project proponent. There will not be any let regarding safety factors as applicable from time to time for such buildings on all accounts.

8 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The potential impacts of the proposed project on the area's geomorphology, surface and groundwater resources, air quality, biological resources, and socio-cultural environment have been discussed in the following sections. Where appropriate, mitigation measures have also been included to reduce the unacceptable impacts. Likely impacts that trigger the Environmental Management Plan (EMP) and accompanied mitigation measures have been identified in this EIA. The organizational structure and responsibilities of various functionaries towards EMP also have been highlighted, indicated generic environmental control measures that need to be applied during the possible implementation of EMP when required. The primary objectives are to:

Facilitate the implementation of the mitigation measures required by EPA.

- Identify monitoring parameters to ensure the effectiveness of the mitigation measures.
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
- Identify training requirements at various levels
- Accordingly, mitigation measures have also been prepared to manage the environment and for sustainable development.

8.1 ENVIRONMENTAL PROBLEM DUE TO INSTALLATION AT PRESENT LOCATION OF PROJECT

Environmental problems related to location of the project are mostly in the areas of physical setting, socioeconomic setting, ecological setting and special areas. The impacts of the project due to its location are mostly insignificant in nature.

8.2 PROJECT DESIGN RELATED ENVIRONMENTAL PROBLEMS

Environmental problems related to location of the project are mostly in the areas of physical setting, socioeconomic setting, ecological setting, and special areas. Field survey revealed that the impacts of the project due to its location are mostly insignificant in nature. There is no disturbance in physical and socioeconomic and ecological settings as the land is barren and no specific crops are grown there. The project is located away from residential setting so there will no resettlement and relocation problems.

8.3 PROJECT DESIGN RELATED ENVIRONMENTAL PROBLEMS

The design unit has sought to minimize any environmental potential impacts by ensuring that the project should be in according to the environmental standards. Local aesthetic value is another issue to be considered during project design.

8.4 ENVIRONMENTAL IMPACTS DURING CONSTRUCTION PHASE

The activities during construction phase generally comprise site preparedness, civil works, mechanical installations, electrical work etc. Environmental problems relating to construction activities are insignificant, which are given below.

8.4.1 Air quality

Construction activities such as foundations, flooring and grinding of the project may generate emission of fugitive dust caused by movement of earth materials, contact of construction machinery with ground.

Mitigation measures

Adoption of following mitigation measures to mitigate dust emissions will result in further reduction / prevention:

- The Contractor will be required to have a dust abatement program that includes installing enclosures and covers around the boundary walls, spraying water on sand piles.
- PPE, such as dusk masks, will be used where dust generation occurred.
- Avoiding open burning of solid.
- Care will be taken to keep all material storages adequately covered and contained so that they are not exposed to situations where winds on site could lead to dust / particulate emissions.
- Fabrics and plastics for covering piles of soils and debris is an effective means to reduce fugitive dust.
- Regular and periodic sprinkling of water on all exposed surfaces to suppress emission of dust

8.4.2 Soil Contamination

During the construction stage, the contamination of land occurs due to unchecked chemicals or fuel spillage through their improper handling, transportation and storage. The sources of spills are:

- During refueling, the transfer of fuel from one container to the other;
- By the maintenance of vehicle and machinery;
- Leakage from the container or equipment;
- Traffic Accident

Mitigation Measures

- Fuel oils, lubricants, and chemicals will be stored in covered areas
- Construction machinery will be kept in good condition in order to prevent soil contamination.
- Vehicles and equipment maintenance will be taken place at specified site.
- Washing of vehicles will be carried out in the designated areas.
- Construction vehicles and machinery will be examined on a regular basis for leakage prevention.
- Removal of oil and contaminated soil around the fuel and oil storage areas will be made possible by the availability of appropriate implements i.e. shovels, plastic bags and absorbent materials.
- Contaminated media will be managed with the objective of protecting the safety and health of laborer at the site, the surrounding residents, and the environment.
- Spill kit should be available at site and drip trays are to be provided.

8.4.3 Construction waste

The construction waste will mainly include excavation waste, metal cuttings, rejected materials, surplus materials, surplus oil, excavated materials, paper bags, empty cartons, empty paints and solvent containers, broken glass, steel, wooden scaffolding, cement bags, excavated soil, wood remains etc. This waste generated may pose a threat to the drainage and dumping sites, chocking of water bodies as well as to the labors working in the facility. Some of the waste materials including metal cuttings and plastic containers are non-biodegradable and can have long-term and cumulative effects on the environment.

Mitigation measures

The mitigation measures laid down as under will help to mitigate the impacts posed due to the constructional phase of the proposed project:

- The construction waste which will be sent for recycling like damage pipes left over steel, wooden and plastic pieces. While, the rest of the left over waste will then be taken away to the dumping sites for disposal.
- The construction material will be kept in a cover place, especially during the precipitation season.
- The excavated soil will be re-used by adopting different methods, which will be used as a filling material for the construction of the industry.
- Various waste containers for different types of waste will be deployed, in order to treat the waste in accordance with its nature.
- The waste bins will be properly marked for each type of waste produced during the constructional activities.
- The project area will contain the sewage and litter facility to overcome the problem of unchecked dumping of waste.
- Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste.
- Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time

8.4.4 Wastewater generation

During the construction phase, the wastewater is generated from the project site is mainly due to the municipal activities, run-off from the project site during the season of precipitation, washing and leakage of fuel from the construction vehicles etc. Construction activities of the project may include the generation of sanitary wastewater discharges in varying quantities depending on the number of workers involved. The untreated wastewater disposal may deteriorate the water quality of the surface and groundwater resources near the project site.

Mitigation measures

The following are the recommendations to reduce and control the wastewater generated during the constructional activities:

- Septic tanks with appropriate design and capacity shall be constructed at each work and campsite for the disposal of domestic liquid waste
- Maintenance of vehicles and other equipment will be allowed only in designated areas underlain with concrete slabs and a system to catch runoff
- Washing of vehicles and construction machinery will be restricted to a designated area.

- Wastewater will not be disposed of directly into the water bodies, but first be treated and then the effluent will be disposed of in a proper manner.
- Wastewater generation will be minimized by controlling the pollutant at the source.
- The oily waste will be contained before disposing the wastewater into the sewer.
- Regular monitoring of the wastewater generation will be taken into consideration.
- Adequate portable or permanent sanitation facilities serving all workers will be provided at all construction sites.
- Sanitary wastewater in construction and other sites will be managed

8.4.5 Noise and vibration

The construction work, delivery of building materials through heavy trucks and by the use of machinery/equipment including bulldozers and metal grinders will contribute high levels of noise and vibration within the construction site and the surrounding areas. Elevated noise levels within the site can affect project workers and passer-by and other persons within the vicinity of the project site. The operation of this equipment will likely generate noise ranging between 70-80 dB (A). All the machinery will comply with the relevant local and international noise protection standards. As far as necessary, times and conditions of operation will be fixed in detail in co-operation with the competent authorities. The noise and vibration during the construction phase will be of short span of time. During the construction phase, noise and vibration is likely to be generated by the following activities:

- Construction and excavation work such as heavy earth moving equipment, piling works, welding, cuttings, drilling, grinding etc.
- Diesel generators used for power supply during the construction works.
- Material loading/ unloading vehicles and other transport used by employees within the site.
- Use of pressure horns

Mitigation measures

The following measures will be adopted

- Construction machinery will be kept in good condition to reduce noise generation.
- All generators and heavy-duty equipment’s will be installed and placed in enclosures to minimize ambient noise levels.

- The Contractor will need to ensure that machinery is adequately silenced
- Noise control devices will be used such as temporary noise barriers and deflectors for impact activities.
- Mange specific daytime working hours for earth moving equipment and other machinery for construction.
- Develop schedule for the movement of dump trucks that will be initially used for hauling of excavated soil

8.4.6 Impact on biological environment

The survey of the project area has revealed that there is no significant flora and fauna of biological importance present within the project area as the project site is in a designated industrial area. Similarly, wildlife in the area is almost non-existent due to extensive human activities. Therefore, there are no major threats imposed upon the flora and fauna of the proposed project area.

8.5 ENVIRONMENTAL IMPACTS DURING OPERATION PHASE

Environmental problems relating to operation activities are insignificant, which are given below

8.5.1 Air quality

- During operation phase of the project air emissions mainly come from process and process related activities. Air Emissions will be generated from standby generator.

Mitigation measures

Following mitigation measures will be adopted

- To prevent generation of fugitive emissions, all plant and machinery piping and insulation will be maintained on regular basis.
- All equipment, machinery and vehicles should be regularly tuned maintained and monitored.
- Installation of air pollution control technology wet scrubber and filter bags.
- Air emission should comply the PEQS limits.
- The air emissions will be monitored for the specified parameters on regular basis and results reported to EPA as per the SMART Rules.
- Regularly carry out ambient air quality monitoring at various points on the access road and immediately outside the proposed project premises

- Capturing and recovering the off-gases from the processes (e.g. installation of heat recovery systems);
- Maintaining good ventilation at work areas.
- Designing products that do not require volatile chemicals. Avoid specifying solvent-based (e.g., water-repellent) finishes unless absolutely necessary.

8.5.2 Noise

There are several high noise machinery and processing sections during the processes of mixing, blending, and packing etc. Other noise sources include utility and generator area.

Mitigation Measures

Controls should be applied to minimize the in-house noise and following steps would be taken to reduce the noise at source level.

- Regular maintenance of all machinery and equipment
- PPEs should be worn all the time.
- Mufflers – Similar concept as duct silencers, but applied to motors or compressed air piping to reduce equipment exhaust noise. Typically applied generators.
- Sound Barrier Walls– Open top enclosures used to effectively block noise by surrounding noisy equipment while not restricting airflow.
- Proper covering of standby generator, to reduce the noise
- Use of insulations and proper maintenance of the equipments/ machineries
- Noise reduction measures like buffering of noise through trees should be adopted where deemed necessary to reduce the noise level at the project boundary

8.6 POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES

Wastes specific to the nutraceutical industry include rejected material, cardboard, packing material. Other waste includes empty drums and plastic packing materials, sludge from wastewater Septic tank, expire chemicals, spills, electrical and electronics waste, metals, woods etc.

8.6.1 Solid waste and effluent management

- Rainwater disposal will be done through the adequate system to be provided at all levels of the project building.
- Sewage will be discharged to the main sewerage system as mentioned earlier no effluent will be generated from the operation of project.

- Sale of recyclables and reusable materials to minimize waste for disposal.
- Establishing a waste generation and collection register for tracking the disposal of waste.
- All hazardous chemicals will be stored in original containers for ease of identification and handling.
- Appropriate PPE will be provided, and usage at all times ensured, to the workers handling hazardous substance
- Waste water will be treated in septic tank. The treated wastewater will be discharged in the drains of industrial Estate. It will meet the PEQS after treatment

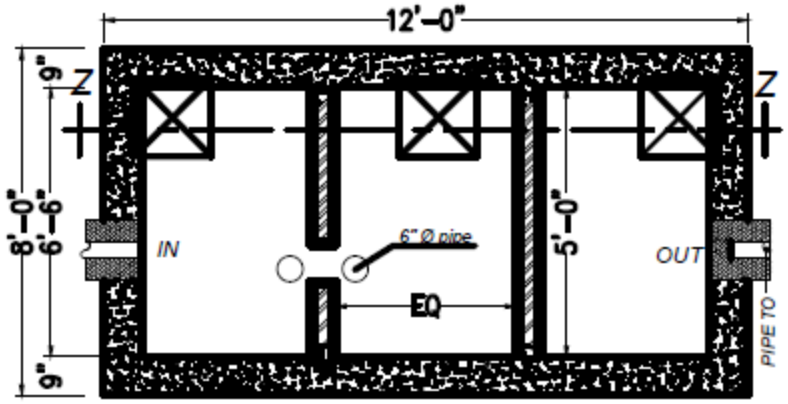


Figure 8-1: Design of Septic Tank

9 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

9.1 DESCRIPTION OF PROPOSED MITIGATION ACTIONS ALONG WITH

This document provides an overall approach for managing and monitoring environment and social related issues and describes the institutional framework and resource allocations proposed by Vet Line Pharma (Pvt.) Ltd. to implement the Environmental Management Plan (EMP).

During the EIA process mitigation measures have been identified to minimize the adverse environmental impacts of the project and to keep it within acceptable limits. The Environmental Management Plan (EMP) has been developed to effectively implement the monitoring and mitigation measures identified in the EIA. PEPA 1997 (Amended 2012) places strong emphasis on the preparation of EMP during project processing and on setting out conditions and targets to be met during project implementation.

9.2 OBJECTIVE OF ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Plan provides a mechanism to address the adverse impact of a project during its construction, to enhance project benefits, and to introduce standards of good practice to be adopted for all project works. The objectives of the EMP are to:

- To outline functions and responsibilities of responsible persons.
- To state standards and guidelines, which are required to be achieved in term of environmental legislation.
- To outline mitigation measures and environmental specifications which are required to be implementation for all phase of the project in order to minimize the extant of environmental impacts and to manage environmental impact associated with the project.
- To prevent long term or permanent environmental degradation
- To identify training requirement at various levels.

9.3 INSTITUTIONAL CAPACITY

Project Proponent will be responsible for Monitoring and Evaluation, but Environment consultant (of the proponent) will responsible to monitor EMP implementation in the field and reporting to the Project Proponent. The Project Proponent will integrate monitoring reports in the main monthly reports of the project. The Environment Specialist of proponent will carry out a final evaluation at the end of the Project. In addition, for external monitoring, proponent is to engage an independent agency (an NGO, an academic institute or an individual consultant) to conduct 3rd party validation of EMP implementation. District Office of the EPA at the project area will monitor the overall activity at the site.

9.4 TRAINING SCHEDULE

In order to effectively operate the EMP all the staff to be engaged in this activity should be trained extensively.

The person to monitor gaseous emissions, PM and noise levels should be extensively trained to handle his job capably. Training program should include use of monitoring instruments, data generation, processing, interpretation, recording and presentation. Training of the workers should be done on quarterly basis.

9.5 SCOPE OF ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides mitigation and management measures for the following phases of the project:

9.5.1 Construction Phase

This section of EMP provides management principles for the construction phase of the project. Environmental actions, procedures and responsibilities as required within the construction phase are specified. These specifications will form part of the contract documentation and therefore, the contractor will be required to comply with the specifications to the satisfaction of the project Manager and Environmental Control Officer, in terms of the construction contract.

9.5.2 Operation and Mitigation Phase

This section of EMP provides management principles for the operation and maintenance phase of the project. Environmental actions, procedure and

responsibilities are required from proponent within the operation and maintenance phase are satisfied.

9.5.3 Decommissioning Phase

This section includes principles for the decommissioning phase of the project. This section of the EMP will be required to be revised and updated at the time of decommissioning.

The EMP is a dynamic document which will be updated as required on a continuous basis. Any amendments made, must be submitted to both the Environmental Officer and Project/Plant Manager for approval prior to implementation.

9.5.4 Mitigation Plan for Construction Phase

The mitigation measures for plant construction are presented in table 6.1. The measures are organized under the following environmental aspects of the project activities during construction phase:

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9.5.5 Oraganogram for implementation Environmental Management Plan (EMP)

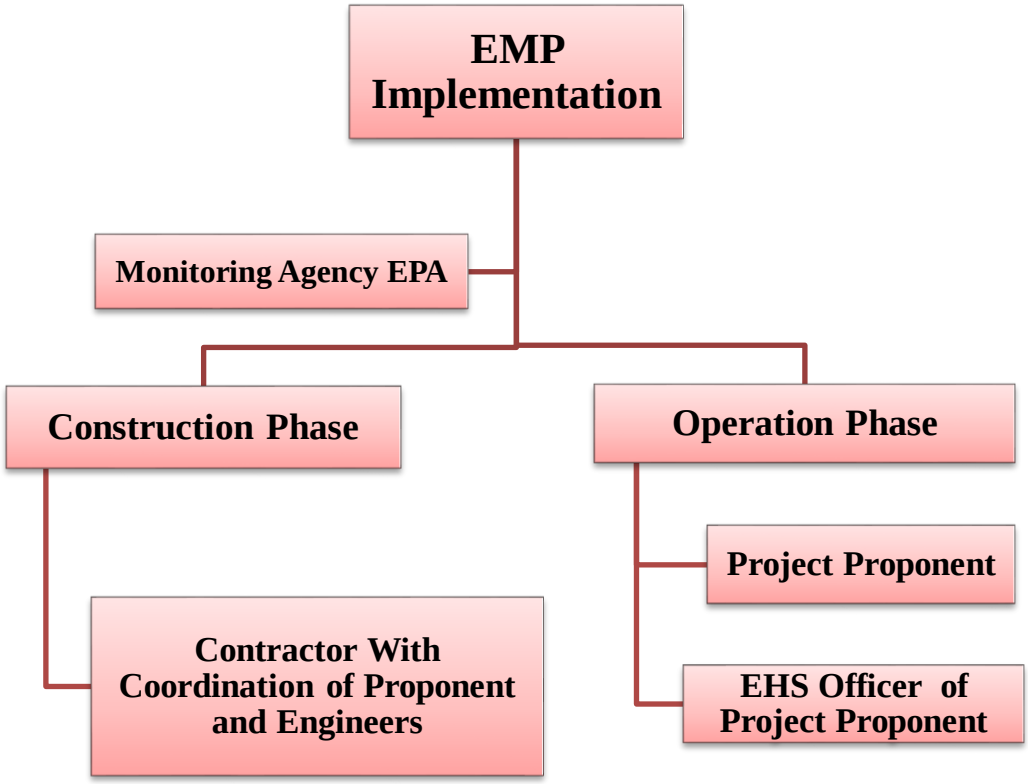


Table 9-1: ENVIRONMENTAL MANAGEMENT PLAN

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
1.	Legislation, permits and agreements	• Full compliance with all relevant National & Local Legislation	• In all instances, Proponent, service providers, contractors and consultants require to remain in compliance with relevant local and national legislation.	Once at Design Stage and prior to moving onto site by proponent.	Project Proponent
2.	Land Acquisition, Loss of private land, agriculture field, trees, residential/ commercial structures	• Site preparation/ clearance and proper landscaping without any kind of grievance for construction	• Develop an appropriate "land acquisition & Resettlement Action Plan" • Land acquisition must be conducted in compliance with relevant laws and legislation • The cost related to relocation will be given	Prior to start construction by Proponent.	Project Proponent

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			to the relocated residents • Ensure maximum possible employment to local residents		
3.	Planning & Design	• High degree of structural competence, reliability, safety and ease	• The design specification will be followed to withstand local standards regarding noise and vibration and use of familiar and culturally relevant materials wherever consistent with functional needs • Project performance must be enhanced by incorporating innovative and sustainable design strategies.	• At Design Stage by proponent with coordination of Design Engineers	Project Proponent

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
4.	Local Conflicts of interest among residents, workers, government officers & local politician	• Settle down each of conflict arise to best possible extent	• Ensure consideration of affected people's emotions • Provide maximum project benefits to local affected person (e.g. employment)	Prior to start construction by contractor with coordination of proponent	Project Proponent
5.	Access to Site may result in damage to existing roads due to heavy machinery/ equipments mobilization	• Ascertain existing conditions of road for safe access to site for transportation of construction equipments and materials	• Access to site will be via existing roads. The Contractor will need to ascertain the existing condition of the roads and repair major damage to avoid delays in transporting construction materials • All roads for construction access must be planned and approved by the	Contractor with coordination of Engineer and Consultant	Project Proponent

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			Engineer and Consultant • No trees, shrubs or groundcover may be removed or vegetation stripped without the prior permission of Engineer/ Consultant • The Local Traffic Police Department shall be involved in the planning stages of the road closure and detour and shall be available on site for the monitoring of traffic in the early stages of the operations during road closure		
6.	Setting up of	• Availability of	• Choice of site for the Contractor‘s camp	Contractor with	Project Proponent

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	Construction Camps	environmentally sound construction camp facilities	requires the Engineer's permission and must take into account location of local residents, businesses and existing land uses, if any. • If the Contractor chooses to locate the camp site on private land, he must get prior permission from both the Engineer and the landowner • Cut and fill must be avoided where possible during the set up of the construction camp • Camp must be properly fenced and secured • The Contractor shall	coordination of proponent	

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			make adequate provision for temporary toilets for the use of their employees. Such facilities, which shall comply with local authority regulations, shall be maintained in a clean and hygienic condition. Their use shall be strictly enforced • Bins and/ or skips shall be provided at convenient intervals for disposal of waste within the construction camp • Bins shall have liner bags for efficient control and safe disposal of waste		

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			• Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged.		
CONSTRUCTION PHASE					
1.	**Air Quality** • Dust resulting from construction work • Use of heavy machinery can generate exhaust and dust emissions – Smoke from burning of waste materials or burning of firewood in the	– Compliance with prescribed PEQs to control air pollution	– Necessary measures like sprinkling of water on regular basis especially during dry climatic conditions should be taken to limit pollution from dust and other windblown materials. – Periodic maintenance and management of all the construction machinery and vehicles	During Construction Phase by Contractor with coordination of Proponent staff	• Proponent • Site Supervisor

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	labor camp		– Cutting and burning shrubs for fuel will be prohibited. Instead gas cylinders should be used in the labor camp for cooking purposes. Similarly waste burning will not be allowed.		
2.	**Water Quality** • Run-off water from construction area – Drainage of wastewater on ground can contaminate the soil and groundwater. – Inappropriate	– Control of groundwater or surface water pollution from construction activities	– Use of spill prevention trays and impermeable sheets to avoid contamination of the groundwater/surface water – Furthermore, septic tanks will need to be constructed which will be cemented to prevent the groundwater	During Construction Phase by Contractor with coordination of Proponent staff	• Proponent • Site Supervisor

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	disposal of waste. – Open sewerage water disposal on land can contaminate ground water and cause generation of mosquitoes and various other insects in the area. • Leakage of oil and chemical materials from construction activity		contamination – Proper disposal of waste material on dumping sites to avoid leachate generation and contamination of groundwater/surface water – Prohibit illegal dumping of waste – The contractor will repair / replace / compensate for any damages caused by the Construction activities to the drinking water source/s.		
3.	**Waste**	– Proper & safe handling and disposal	– Ensure prevention of inappropriate disposal	During Construction Phase by Contractor	• Proponent

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	• Construction waste from construction activities • Domestic waste from workers camp • Hazardous waste such as dry batteries, chemicals etc.	of construction related waste – Compliance with applicable waste management rules for hazardous and non-hazardous waste disposal – Implementation of waste management plan	of waste material – Conduct separate collection of construction and domestic waste to promote recycling and re-use – Dispose non-recyclable and hazardous waste material properly according to waste management rules – Proper disposal of waste on agreed site as per agreed method. The area to be leveled and contoured after disposing excess material. No waste or	with coordination of Proponent staff	• Site Supervisor

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			debris will be thrown in the nearest canal water or other water bodies – Contractor will prepare waste management plan related to construction activities; get its approval from site engineer and ensure its full implementation		
4.	**Noise** • Noise caused by construction machinery and vehicles used for mobilization of construction equipment and	– Compliance with prescribed PEQs to control Noise pollution	– The contractor will strictly follow the PEQS for ambient noise – Control noise through c ontrol of working hours and selection of less noisy equipment. – Prohibit use of pressure horns	During Construction Phase by Contractor with coordination of Proponent staff	• Proponent • Site Supervisor

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	workers		– Provision of acoustic enclosures (hood and shrouds) on generator – Proper maintenance of vehicles and construction equipment. – Minimize/avoid unnecessary use of pneumatic drills and other noisy machinery – The personal protective equipment (PPE) will be provided to the construction workers and its usage will be made mandatory		
5.	Materials	– Safe and secure environment for	– Stockpiles shall not be situated such that they	Contractor with coordination of	• Proponent

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	Management	construction workers	obstruct natural water pathways – Stockpiles shall not exceed 2m in height unless permitted by Concerned Engineer on site – If stockpiles are exposed to windy conditions or heavy rain, they shall be covered either depending on the duration of the project. Stockpiles may further be protected by the construction of low brick walls around their bases	proponent and Engineer	• Site Supervisor

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			– All substances required for vehicle/ machinery maintenance and repair must be stored in sealed containers until they can be disposed of / removed from the site – Hazardous substances / materials are to be transported in sealed containers or bags – Spraying of insecticide shall not take place under windy conditions		
6.	**Biological Resources** – Removal of vegetation covers by cutting of trees,	– Obligation to respect wildlife, Forest and Fisheries Laws. – Conserve biodiversity and its terrestrial as	– Re-plantation of maximum number of trees. – Staff and workers should be instructed not	Contractor with coordination of proponent staff	• Proponent • Site Supervisor

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	crops, herbs and shrubs – Fauna including birds and animals will be affected during excavation, movement of labor and carriage of goods and machinery	well as aquatic habitat	to damage nearby vegetation of the surrounding area. – Open fires should be prohibited in the area to avoid the hazard of fire and impact on nearby flora and fauna. – Contractor staff should be given clear instructions that they should not hunt any birds/ animal in the project area/ site – Barriers/ fencing/ or boundary wall should be installed at project site to protect movement of animals at		

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			the project site during constructions. – Proper disposal of organic waste (if any) generated during the construction stage to avoid rodents and other insects' generation.		
7.	Staff Conduct	– Timely completion of project activities	– The Contractor must monitor the performance of construction workers to ensure that point relayed during their induction have been properly understood and being followed	Contractor	• Proponent • Site Supervisor
8.	Leakages/ spills/	– Compliance with standards set forth by	– Contractor will apply strict rules on his		• Proponent

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
	Paints/ Used oil	"Guide Lines for Oil Spill Waste Minimization and Management" issued by International Petroleum Industry Environmental Conservation Associate	workers and labor to ensure that no spill or leakages are caused – All fuels, oils and bitumen will be stored appropriately, with concrete padding and bunding for containment in case of leakage – Proper maintenance of vehicles and machinery – Chemical waste will be disposed off in approved disposal site. – All fuel tanks, chemicals including paints, pesticides or other hazardous		• Site Supervisor

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			substances will be properly marked to highlight their content – PPE will be enforced to use during the handling and application of chemicals – Used oil/ oil rags will be disposed through approved recyclable waste vendors – The contractor will employ the general criteria for oil and leakage at construction sites, as per standards		
9.	Workers Health & Safety	– Prevention of any possibility of work site accident /impact	– Provision of Personal Protective Equipment to the workers	Contractor	• Proponent • Site Supervisor

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
		on worker's health	– Provision of first aid box at work site to cope with emergency situation – Safety training to the workers – Safe driving training to the drivers – Adequate safety signs on site – Provide training regarding proper handling and use of chemicals/ paints – Install fire extinguishers at fire handling places – Inspect and ensure that any lifting devices, such as cranes, are		

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			appropriate for expected loads – Any loss of public/ private property will be compensated by the contractor – Regular checks should be carried out to ensure a contractor's is following safe working procedures and practices.		
10.	Socio-economic Impacts	– Prevention of conflicts among locals and make the project socially acceptable – Empowerment of locals to possible	– Contractor's activities and movement of staff to be restricted to designated construction areas – The conduct of the construction staff when	Contractor with coordination of proponent staff	• Proponent • Site Supervisor

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
		extent – Increase in employment and business opportunities for locals	dealing with the public or other stakeholders shall be in a manner that is polite and courteous all the time – Lighting on the construction site shall be pointed downwards and away from oncoming traffic. – The site must be kept clean to minimize the visual impact of site – Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors		

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			– Noisy activities must be restricted to the times given in the Project Specification or General Conditions of contract – The Contractor are responsible for ongoing communication with those people that are interested in / affected by the projects – Employ local residents as much as possible – Promote communication between external workers and local people (e.g. join local events).		

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
11.	Clearance of site from extra / surplus material and construction equipment	– Restoration of site to a similar condition prior to the commencement of the work or to a condition agreed with the project management and landscaping of the site	– Timely removal of waste from the site to avoid congestion at work place. – Construction waste should be collected and disposed separately from other waste. – Care will be taken during handling and disposal of waste. – Contaminated soil (if generated) due to accidental spills will be removed and transported to suitable site for disposal. – Avoid mixing of hazardous waste with	Contractor	• Proponent • Site Supervisor

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			non-hazardous waste. – Safe transportation of construction equipment from the site. – The contractor must ensures that all structure, equipment, materials and facilities used or created on site for/or during construction activities are removed. – Empty/available space will be covered with grassy lawns. – Use of native vegetation as a part of landscape. Ornamental plant species like roses,		

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			jasmine, and seasonal flowers can be used in proposed landscaping, which is a common practice in this part.		
OPERATIONAL PHASE					
1.	**Air Quality** – Vehicular emissions – Exhaust gas from stacks	– Compliance With Emission gas standards, Ambient air quality (PEQs) standards, Prevention of air pollution in surrounding area;	– Use of clean raw materials. – Raw Materials handling procedures and management. – Quality controls on charging of furnaces – Installation of abatement system included in the design of the facility. – Vacuum systems for clean-up of facility	EHS officer of Project Proponent	• Proponent • Manager

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			– Use of low emission vehicles – Use of battery operated/gas operated systems where feasible – For stack design, height will be 90 m – Periodic maintenance and management of vehicles		
2.	**Water Quality** – Industrial process/Cooling water – Rainwater drainage	– Compliance with Wastewater standards of PEQS	– Preventative Maintenance and Monitoring Program – Installation of water conservation interventions – Construction of	EHS officer of Project Proponent	• Proponent • Manager

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			Septic tank so any wastewater produced complies with wastewater standards of PQES – Runoff water is collected in the pond and discharged after appropriate treatment – Storage of Generator oil and chemical material in appropriate tank with retaining wall and method to prevent permeation into ground – Awareness training		

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			to be provided to all personnel regarding responsibilities to the environment		
3.	**Waste** – Sludge from wastewater treatment and waste oil from equipment etc. – Sewage and garbage from workers	– Compliance with waste management rules – Management of waste, especially hazardous waste – Prevention of inappropriate waste disposal	– Implementation of waste management program consisting of reduce, reuse and re-cycling of materials – Systematic collection and protected storage of waste – Waste disposal at appropriate and designated site – Inspection and preventative maintenance of	EHS officer of Project Proponent	• Proponent • Manager

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			operational equipment and waste handling infrastructure – Hazardous waste must be treated under related regulation		
4.	**Noise & Vibration** – Noise and vibration from equipments, generators etc. – Noise from vehicles used for mobilization of equipment	– Compliance with prescribed PEQs to control Noise pollution	– Installation of low noise/ low vibration type equipment – Proper maintenance of equipments – Adequate enclosure of equipment to reduce noise – Provision of PPEs to workers like ear muffles – Ensure use of PPEs by	EHS officer of Project Proponent	• Proponent • Manager

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			workers		
5.	**Access to social services** – Social facilities like road, school etc. – Employment opportunities	– Improved social infrastructure and living standards of local residents	❖ Increased access to social services – Construction of access road, community road, and road around the project boundary – Service facilities such as school and medical centre are made available to the local residents as required – Electrification of surrounding area must be examined – Provision of employment to every	Project Proponent	• Proponent • Manager

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			affected person on fair basis		
6.	**Work environment (including work safety)** – Labor accidents due to handling heavy loads; working – Diseases caused by air pollutants, water pollutants, and noise from the operation – Fire Hazards	– Prevention measures against labor accidents and health problems	❖ **Labor accidents** – Prepare a manual for labor accident prevention including safety education and training – Provide workers with appropriate protective equipment – Inspect and ensure that any lifting devices, such as cranes, are appropriate for expected loads – Keep lifting devices well maintained and	EHS officer of Project Proponent	• Proponent • Manager

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			perform maintenance checks as appropriate – Use equipment that protects against electric shock ❖ **Environment Pollution** – Observe related standards and provide workers with appropriate facilities. ❖ **Fire Hazards** – Installing fire extinguishers in fire handling places – Installing fire fighting system – Developing fire		

Sr. No.	Project Component/ Impact	Targets to be Achieved	Mitigation/ Preventive Action	Responsibility	
				Implementation	Monitoring
			fighting organization and implementing fire drills		

9.6 ENVIRONMENTAL MONITORING PROGRAM

It will be in the fitness of the things to operate this project under the Environmental Management Plan (EMP). The EMP will ensure that even all type of pollutants from project is within the prescribed limiting values of the PEQS. Thus, the environment and human health around the project will be safeguarded.

Regular monitoring of all the significant environmental issues is essential to check the compliance status of EMP.

The main objective of the monitoring will be;

- To verify the results of the environmental study with respects to the project.
- To estimate the trends of concentrated values of the issues, which have been identified as critical and then planning the mitigating measures.
- To assess the efficiency of pollution control mechanism.
- To ensure that any additional parameters, other than those identified in the EIA report, do not turn critical after the commissioning of project

Table 9-2: Recommended Activities of Environmental Monitoring

Parameter/ Receptor	Location	Monitoring Mechanism	Monitoring and Reporting Frequency
Water Quality	▪ Ground Water ▪ Surface Water ▪ Final storm water outlet of the facility ▪ Foundry and Mill House, Change rooms.	Discrete grab sampling and laboratory testing of water samples.	▪ Sampling and laboratory testing should be done on monthly basis during the construction and annually during the operational stage. ▪ Discharges from the construction sites should be tested for temperature, pH and turbidity. ▪ Treated effluent discharges from the worker's camp to be tested for pH, TSS and BOD_5.

Dust Emissions	▪ Tracks along the roads during construction period.	Ambient Particulate Matter Monitoring.	▪ Sampling and laboratory testing should be done on monthly basis during the construction and annually during the operational stage.
Noise Levels	Fence line, materials handling, foundry, mill house, roadways	Noise meter	▪ Monthly during the construction and operational stage.
Air Emissions from stacks and Air Emissions from work environment (PM, CO, SOx, NOx, total heavy metals)	Foundry Furnace Stack, Reheating Furnace Fence line, materials handling, roadways	Emissions monitoring system. Monitoring of ambient air quality.	▪ Monthly monitoring of air pollution parameters including PM_{10}, NO_X, SO_X, CO, Hydrocarbons during the construction period, and quarterly monitoring of PM_{10}, NO_X, SO_X, CO, VOCs during the operation stage.
Housekeeping	Site	Observed Tasks, Site inspections, incident reporting, Corrective Action Notices	On-going
Ecological Environment			
Cutting of trees	In all Project Area during the construction stage and operation stage.	Periodic visits at site to ensure that only those trees should be cut, which are demarcated for cutting.	▪ Weekly during routine monitoring and reported on monthly basis during the construction period, and once in a year monitoring and reporting during the operation period.
Socio-Cultural Environment			
Inconvenience	All around the	Consultations with	• Monthly monitoring and

to community	Project Area	community to get feedback about inconvenience due to the construction activities to perform their daily routine chores.	reporting during the construction period.

9.7 ENVIRONMENT MANAGEMENT COST

The total cost for the environmental management is estimated as 3 million Pak Rupees.

Table 9-3: Environmental Management Cost

Environmental Component	Quantity	Amount PKR
(i) Tree Plantation	1400	700,000.0
(ii) Health and Safety Measures and Provision of PPEs	L.S.	1,000,000.0
(iii) Air and Water Quality & Noise Monitoring	L.S.	800,000.0
(iv) Environmental Trainings	L.S	500,000.0
Total Environmental Management and Monitoring Cost		**3,000,000.0**

10 STAKEHOLDER CONSULTATION

Stakeholder consultation is a mean of involving all primary and secondary stakeholders in the project's decision-making process in order to address their concerns, improve project design, and give the project legitimacy. Stakeholder consultation, if conducted in a participatory and objective manner, is a means of enhancing project sustainability. Community input (both of knowledge and values) on socioeconomic and environmental issues can greatly enhance the quality of decision-making. Stakeholder consultation was therefore conducted in the project area not only to satisfy the legal requirements of the EIA process in Pakistan but also to improve and enhance the social and environmental design of the project.

The following chapter includes the detailed information of the process and parties that depicts the involvement and consultation of the important stakeholders that is conducted by the Integrated Environment Consultants. The consultation is carried out to resolve any kind of issues that involved and can be potentially affected by the proposed project. The activity plays an important role in the decision making and the keeps in view the concerns of stakeholders. The parties that are involved in the process are as follows:

- Local government
- Local community
- Affected community (directly and indirectly)
- General public
- Service providers
- Proponents

10.1 PROPONENT'S ENVIRONMENT MANAGEMENT TEAM

All possible impacts and mitigation measure related to the project were discussed with the proponent and management. Proponent assured to take all suggested mitigation measures to control any discrepancy arose by the project and to make the protect environment friendly.

10.2 THE RESPONSIBILITY AUTHORITY

M/S Vet Line Pharma (Pvt.) Ltd management shall be the responsible authority to take all measures prior to start the project and during operation.

10.3 OTHER DEPARTMENTS AND AGENCIES

For the impact analysis detailed with the management, local community, educational institutes, industrial locals. All issues were discussed related to implementation of the project. Scoping sessions, focused group discussion and way side consultations were held with the relevant stakeholders in the area.

10.4 ENVIRONMENTAL PRACTITIONERS AND EXPERTS

During visit to the project site, discussion with stakeholders and consulted with the local people of nearby and other towns to evaluate the project socio-economic impacts. People of the area belong to different professions like mostly belong to employment, own businesses, doctors, some in abroad, teaching, in agriculture etc. women were also consulted for their point of view regarding the betterment of the area by this project, some of them communicated but according to social value of the area they mostly hesitate to communicate comfortably and get pictured. People provide the massive information about the project and have positive remarks regarding the project development.

10.5 AFFECTED AND WIDER COMMUNITY

There is no affected community present in the area of the proposed project as the project is located in industrial area. Team has consulted with the inhabitants or neighboring areas. The remarks of people are positive regarding the project and people foresee positive impacts like employment opportunities, business, development of the area etc.

10.6 PUBLIC CONSULTATION:

During the field work public consultation were carried out by the team members of Integrated Environment Consultant (IEC) to brief the people of nearby areas about the Project. The participants included residents, workers, students and other concerned. Majority people are having positive comments/concerns regarding the Project

11 CONCLUSION AND RECOMMENDATIONS

Based on the study conducted for Environmental Impact Assessment (EIA) of the project, the following recommendations are made:

- Plantation as far as permissible and within the scope of the project be carried out.
- Sustainable development approach through conservation of natural environment be followed.
- Environmental aspects of the project should be well taken care through implementation of the Environmental Management Plan as recommended in this report.
- The project management may adopt “cleaner and greener environment” as its motto and this will make the project more environment friendly.

On the basis of the findings of the EIA, it is concluded that the project will not pose any adverse impact on the local population and the environment. Therefore, it is recommended that the competent authority may please be issues Environmental Approval for the construction and operation of this project.

REFERENCES

Listed below are some of the documents, reports and other references consulted during the preparation of this report:

a. Information and data provided by project proponents;

b. Project Pre-feasibility Study Report;

c. Technical Design Data related to the project.

d. Information gathered through discussions with the project related persons of the project proponent;

e. Information collected from the Technical documents of various suppliers of machinery/equipment.

f. Punjab Environment Quality Standards for Ambient Air November 2010;

g. Punjab Environment Quality Standards Noise Levels November 2010;

h. Punjab Environment Quality Standards for Drinking Water November 2010:;

i. Pakistan Environmental Protection Act, 1997;

j. The Punjab Environmental Protection (Amendment) Act 2011 covers aspects related to:

   i. The protection, conservation, rehabilitation and improvement of the environment and the prevention, control of pollution and promotion of sustainable development;

   ii. Establishing complete regulatory and monitoring bodies, policies, rules, regulations and Punjab environmental quality standards; and

   iii. To ensure enforcement, the act establishes regulating bodies i.e. Punjab Environmental Protection Council (PEPC) and responsible bodies i.e. Punjab Environmental Protection Agency (Punjab EPA) at Provincial level.

k. Environment related Laws in Pakistan and the Province of Punjab;

l. Government of Pakistan, Pakistan Environmental Protection Agency, Policy and Procedures for Filing, Review and Approval of Environmental Assessment, 2000;

m. Google earth, maps.

n. Guidelines for Public Consultations - These guidelines cover:

- Consultation, involvement and participation of Stakeholders
- Techniques for public consultation (principles, levels of involvements, tools, building trust)
- Effective public consultation (planning, stages of IEE where consultation is appropriate)
- Consensus building and dispute resolution.

o. workplace safety and health act 2011

p. Land Acquisition Act (LAA) of 1894

q. The forest Act 1927

r. Pakistan Penal Code, 1860

s. Provincial Wildlife Act, 1974

t. Drugs Act 1976

TERM OF REFERENCES

1. The Consultant is required to carry out an Environment Assessment Study of the Project as required under section 12 of Pakistan Environmental Protection Act 1997/ Punjab Environmental Protection Act 2012.
2. The Study should be comprehensive and should cover all aspects which are envisaged under the relevant national and provincials laws & regulations including but not limited to:

- Identification and recommendation for suitable solution/treatment/mitigation measures of emissions and effluents such as waste water and sludge etc in accordance with Punjab Environmental Quality Standards (PEQS).
- Identification and recommendation for suitable solution/treatment/mitigation measures of solvents, oils (tar), hazardous waste, organic compounds, steam, flue gases, particulate matter and chemical compounds harmful for the environment and other substances leading to air, noise, water and soil pollution in accordance with PEQS.

The Study should be acceptable to the relevant national and/or provincial authorities (relevant authorities) in Punjab.

	Glossary
Air Quality	Measurement of the pollutants in the air; a description of healthiness and safety of the atmosphere.
Antibiotic	Antibiotic is a type of antimicrobial drug used in the treatment and prevention of bacterial infections.
Anti-inflammatory	Anti-inflammatory is the property of a substance or treatment that reduces inflammation or swelling.
Anti-parasitic	Anti-parasitic are a class of medications which are indicated for the treatment of parasitic diseases, such as those caused by helminths, amoeba, ectoparasites, parasitic fungi, and protozoa, among others.
Bolus	A bolus (from Latin bolus, ball) is the administration of a discrete amount of medication, drug, or other compound within a specific time, generally within 1 - 30 minutes, in order to raise its concentration in blood to an effective level.
Compensation	Includes cash payment, deferred payment, a bond, an insurance policy, stipend, payment in kind, rendition of services, grant of privileges and disturbance money, entitlement to special treatment by government and semi government entities, grant of alternative land, grant of import licenses and business, trade and commercial facilities in addition to the rehabilitation and resettlement of an affected person.
Contamination	The undesired introduction of impurities of a chemical or microbial nature, or of foreign matter, into or on to a starting material or intermediate, during production, sampling, packaging or repackaging, storage or transport.
Consultation	Consultation refers to two-way transfer of information or joint discussion between project staff and the affected population. Systematic consultation implies a sustained and rigorous sharing of ideas. Bank experience shows that consultation often yields the best

	resettlement alternatives, fruitful procedures for continued participation, and independent information on actual conditions for implementation.
Coordinates Contaminate	Each of a group of numbers used to indicate the position of a point, line, or plane to make impure, pollute
De-wormer	De-wormer is an anthelmintic drug to animal to rid them of helminthes parasites, such as roundworm, flukes and tapeworm
Disclosure	The action of making new or secret information known
Disruption	Disturbance or problems which interrupt an event, activity, or process.
Environmental Management	Attempt to control human impact on and interaction with the environment in order to preserve natural resources
Evaluation	The making of a judgment about the amount, number, or value of something; assessment.
Geology	A science that studies rocks, layers of soil, etc., in order to learn about the history of the Earth and its life
Good Laboratory Practice	GLP specifically refers to a quality system of management controls for research laboratories and organizations to try to ensure the uniformity, consistency, reliability, reproducibility, quality, and integrity of chemical (including pharmaceuticals) non- clinical safety tests; from physio-chemical properties through acute to chronic toxicity tests.
Good Manufacturing Practice	Good Manufacturing Practice (GMP) is a system for ensuring that products are consistently produced and controlled according to quality standards.
Ground Water	Aquifers currently being used as a source of drinking water or those capable of supplying a public water system. They have a total dissolved solid content of 10,000 milligrams per liter or less, and are

	not "exempted aquifers."
Hazardous	Substance or material, which could adversely affect the safety of the public, handlers or carriers during transportation
Household	People residing under one roof, using the same hearth and operating as a single economic unit.
Impact	Effect on someone or something
Injection	Injection is a technique for delivering drugs by parenteral administration, that is, administration via a route other than through the digestive tract.
Land Acquisition	The process whereby a person is compelled by a public agency to cede all or part of the land a person owns or possesses, to the ownership and possession of that agency, for public purpose in return for compensation.
Liquid	Liquid medicines include liquids, solutions, syrups and mixtures and are commonly used in patients that have difficulty swallowing medicines.
Medicines	Medicines are chemicals or compounds used to cure, halt, or prevent disease; ease symptoms; or help in the diagnosis of illnesses. Advances in medications have enabled doctors to cure many diseases and save lives.
Mitigation	The action of reducing the severity, seriousness, or painfulness of something
Nutraceutical	Nutraceutical product is a food or fortified food product that not only supplements the diet but also assists in treating or preventing disease (apart from anemia), so provides medical benefits.
Occupational Health	Maintenance of the highest degree of physical, mental and social well-being of workers in all occupations by preventing departures from

	health, controlling risks and the adaptation of work to people, and people to their jobs
Penicillins	Penicillins are beta-lactam antibiotics derived from 6-aminopenicillanic acid. The natural penicillins include sodium and potassium salts of benzyl penicillins. Semisynthetic penicillins possess properties that improve upon deficiencies of natural penicillins,
Powder	Pharmaceutical powder is a solid dosage form comprising of a large number of finely divided solid particles of drugs or mixture of drugs and recipients.
Project Area	The area specified by the funding and/or implementing agency according to the Official Gazette Notification and includes the areas within the administrative limits of the Federal or a Provincial Government.
Proponent	A person who advocates a theory, proposal, or course of action.
Rehabilitation	Include all compensatory measures to re-establish; at least lost incomes, livelihoods, living and social systems. It does not include the payment of compensation for required assets.
Resettlement	Means all measures taken to mitigate any and all adverse impacts, resulting due to execution of a project on the livelihood of the project affected persons, their property, and includes compensation, relocation and rehabilitation.
Social Environment	It includes the culture that the individual was educated or lives in, and the people and institutions with whom they interact.
Scope	The extent of the area or subject matter that something deals with or to which it is relevant
Stakeholders	Include affected persons and communities, proponents, private and

	public businesses, NGOs, host communities and EPA.
Topography	Details of the surface features of land. It includes the mountains, hills, creeks, and other bumps and lumps on a particular hunk of earth.
Vitamin	A vitamin is an organic molecule (or related set of molecules) which is an essential micronutrient, that an organism needs in small quantities for the proper functioning of its metabolism
Zoonatioc Disease	Zoonoses are infectious diseases that can be naturally transmitted between animals (usually vertebrates) and humans

Health & Safety Management Plan

Health and safety are an integral component of workforce sustainability and improved productivity in the pharmaceutical industry. The pharmacists are constantly being exposed to chemical and biological hazards which pose a serious threat to their health. Furthermore, lack of adequate safety standards and non-compliance may impact workforce productivity and have significant repercussions on business sustenance in the long run.

Therefore, it is important to have optimal health and safety practices while ensuring that all employees adhere to such regulations. Discussed here are the tips to maintain improved health and safety standards in the pharmaceutical industry.

A. Risk Evaluation

Effective risk evaluation is the cornerstone of assessing the potential hazards at workplace and ensuring safety of the employees. In the pharmaceutical industry, it is legally obligatory to conduct thorough health and safety risk estimation. It involves reviewing the workplace to identify the dangers and their sources. Typically, the following steps are involved in health and safety risk assessment:

- Walk around the facility to discover potential risks and evaluate the accident record sheets
- Once the dangers are identified, check which employees are most vulnerable to such threats
- Determine how the workplace hazards can be managed and control; set a definitive action plan – the objective must be to either minimise or remove the hazard to ensure improved health and safety of the employees
- Record the risks and action taken to demonstrate the issue has been identified and given attention
- Review the risk evaluation report annually to ensure effective implementation of health and safety measures in the workplace

B. Practice Primary Laboratory Safety

In the pharmaceutical industry, maintaining basic safety in the laboratory is mandatory. The Occupational Safety and Health Administration (OSHA) have

comprehensive guidelines regarding how to practice lab safety. Ensure all your employees are aware of the primary health and safety practices and take preventive measures when working in a hazard-prone environment.

Based on OSHA guidelines, the following key steps can be taken to maintain health and safety at the laboratory:

- Practice frequent cleaning, particularly when the employees are exposed to chemical hazards or particles
- Wash hands regularly and properly to inhibit the spread of bacteria, viruses or hazardous chemicals
- Never eat, drink or smoke inside the laboratory
- Make wearing suitable Personal Protective Equipment mandatory inside the laboratory – coveralls, eye gear, protective helmet, shoe covers, etc.
- Label the containers appropriately
- Regularly check that all equipment is working properly and safe to use
- Wear head cap to prevent contamination through hair
- Keep the corridors clean and sanitised
- Perform risk evaluations every day

C. Ensure Injury Free Work Environment

For any pharmaceutical company, employees are the biggest asset. To ensure their improved health and safety, it is important to implement and regulate an "injury free" environment. Set guidelines, take action and regulate implementation of safety measures that eliminate injuries and incidents. Some of the key steps here are:

- Visibly demonstrate and inspire through your commitment to inculcate an injury and incident free culture
- Educate employees that they are accountable for their own safety and also for the safety of those around them
- Implement effective management that helps identify, control and eliminate all types of hazards up to an acceptable limit
- Take appropriate action to prevent the reoccurrence of incidents and injuries through effective investigation and anticipatory strategy development

- Implement and regulate corporate safety standards across all your pharmaceutical buildings, offices and laboratories
- Conduct injury-free survey wherever appropriate to discover opportunities for improvements

D. Health & Safety Standards in Handling Chemicals

Transporting and handling hazardous chemicals can be dangerous. If done inappropriately by untrained staff, it can cause chemical releases, explosions and fire. To minimise the risk and ensure more safety, it should be done "so far as is reasonably practicable." Using the Classification of Chemicals can be an effective way of handling hazardous chemicals and mitigating the associated risks.

The Classification of Chemicals helps identify how the chemicals can have detrimental effects. It also states how the chemicals should be labelled correctly and handled in a legally-compliant manner to avoid disasters or health risks. High temperature, high pressure or oxidation often causes chemicals to explode or release. By lowering the oxidation work scale and understanding the right flammable limits, pharmaceutical companies can help reduce the risks.

Installing emergency showers is also an effective way of handling chemicals when they come directly into contact with the user. It can help wash away the chemical from the PPE and the skin to prevent health hazards. Consider installing eye wash stations inside the facility to minimise the risk of major damages.

Conclusion

Ensuring health and safety of the employees in the workplace is the responsibility of the employer. Having optimal practices in place and ensuring that all employees adhere to them can help improve health and safety standards in the workplace.