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ENVIRONMENTAL ASSESSMENT REPORT

Sicher Pharmaceutical

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LIST OF ABBREVIATIONS

CO_2	Carbon dioxide
dB(A)	A weighted decibel scale
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
EMP	Environmental Management Plan
Engr.	Engineer
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
EPO	Environmental Protection Ordinance
IEE	Initial Environmental Examination
Ltd.	Limited
LTI	Loss Time Injury
LWI	Loss Work Injury
m^3	Cubic meter
m^3/h	Cubic meter per hour
MW	Megawatt
M/S	Messrs
NEQS	National Environmental Quality Standards
No.	Number
NOC	No Objection Certificate
NO_x	Oxides of Nitrogen
PEPC	Pakistan Environmental Protection Council
PEPA, 1997	Pakistan Environmental Protection Act, 1997

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PEPA, 2012	Punjab Environmental Protection (Amendment) Act, 2012
PEPO, 1997	Punjab Environmental Protection Ordinance
PKR	Pakistani Rupees
PM	Particulate Matter
PPEs	Personal Protective Equipment
Pvt.	Private
SMART	Self-Monitoring and Reporting
SOPs	Standard Operating Procedures
SO_x	Oxides of Sulfur
WAPDA	Water and Power Development Authority

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EXECUTIVE SUMMARY

INTRODUCTION

The executive summary presents an overview of the main findings of Environmental Impact Assessment (EIA) report for the Establishment of pharmaceuticals manufacturing unit of M/S SICHER Pharma located at 4 KM Sua-e-Asal Road Off Ferozepur Road, Lahore

SICHER Pharma. is manufactures pharmaceutical finished products. It has a team of qualified & experienced professionals who are engaged with focused approach, to produce the quality products.

M/S **Exhodus Green.** has been engaged for conducting Environmental Impact Assessment (EIA) of Medicines Manufacturing unit of M/S SICHER Pharma.

The main objectives of this EIA are to establish baseline environmental conditions, identify potential impacts and suggest suitable mitigation measures for the execution of the said project. This study has been accomplished in line with the provisions – guidelines and directives of Punjab Environmental Protection Agency.

This executive summary presents an overview of the main findings of the EIA Report for the aforesaid project i-e Medicines Manufacturing Industry of M/s SICHER Pharma.

PROJECT OUTLINE (Details are given in Chapter 2)

This report is related to the Establishment of Pharmaceutical Manufacturing Unit. Total area of land is 8Kanals. The said site lies at Latitude 31.300808 and Longitude 74.20569. The production process for finished products begins with the collection of the right raw materials. When new raw materials arrive, they are first placed in quarantine until they are analyzed and clearedfor release. This is always carried out by a qualified person. M/s Exodus green

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SICHER PHARMACEUTICAL-EIA

Pharmaceuticals manufactures many pharmaceutical products of different categories. The raw materials are mixed in a mixer. When the mixture is ready in its finished form, it is packed into blisters or bottles. The product categories include Tablets, Capsules and Liquids mainly. After a product has been filled and packed, it is labelled and packed in final cartons or containers which is then placed in finished products storage area from where they are delivered to market for sale.

Salient features of project:

Proponent Name:	Munawer Ali Tariq CEO/ Director S/o Manzoor Ahmad
Project Title:	Establishment of Medicines Manufacturing unit of M/S SICHER Pharma.
Project Location:	**4 KM Sua-e-Asal Road Off Ferozepur Road, Lahore**
Name of organization preparing report	Exhodus Green.
Total Land Area	8Kanals
Cost	200 Million approximate
Products	Tablet, Capsule, Syrup, Cream & Ointment, Dry Powder Suspension & Sachet
Source of Water	Groundwater, Water Treatment Plant is provided to ensure quality of medicines
Nearest Industry	SPELL Pulse pharmaceutical Industries
Source of Power:	WAPDA Supply
Wastewater:	Wastewater will be Drain after proper treatment through activated sludge process for which treatment plant has already been installed.

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Solid Waste Management:	Rejected material will be delivered back to supplier. Domestic waste will be handed as per area practices.
Boiler Heating Surface	N/A

MAJOR IMPACTS AND RECOMMENDED MITIGATION MEASURES:

Beneficial/Positive Impacts:

- The establishment of the said project will contribute to enhancing Pakistan's domestic productivity, and help diversify Pakistan's economy
- Provision of employment and stimulation of local economy.
- Provision of local high quality medicine
- Potential of improvement for social and cultural values of local people's exchange of values and standards through positive social interactions. Positive changes in lifestyles will occur due to availability of income when the natives take up Company jobs.

Negative Impacts:

Impacts	Mitigation measures
Construction phase	
Dust emissions	Most of the dust generating activities during construction lasts for a brief period. Thereafter, vehicular movement generates most of the dusts. Dusts willbe suppressed using water bowser to spray exposed land surfaces and particularly areas likely to be disturbed by trucks and other vehicles during the construction of the factory premises. Vehicular speed limits of 20 km/h will be ensured in order to minimize dust generation. Further mitigation measures will be:

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	• Covering haulage vehicles transporting aggregate, soil and cement • Covering onsite stockpiles of aggregate, cement, soil, etc. • Providing workers with the necessary Personal Protective Equipment (PPE) e.g. dust masks and ensure that they are worn • Operating well maintained vehicles and equipment
Wastewater	• Portable toilets with septic tanks were provided to workers during construction phase
Impacts of accidental spillages	• The integrity of storage facilities will be ensured • Drip pans will be made available where necessary
Safety	• Safety signage will be put in relevant places within the construction site • Reckless driving by constructionworkers will be prohibited and monitored. • Workers will be given PPEs such as; helmets, mask, ear-plugs/muffs, safety boots, safety goggles, safety jackets, harnesses etc. and its use will be strictly enforced • Workers will be trained on regular basis regarding personal safety • Incidents will be reported directly to the concerned authority
Solid waste management	• Recycling or reuse of waste wherever possible. • Application of a good strategy to collect, remove and safely dispose of waste on daily basis to ensure a clean environment in the factory site • Integrated waste management system will be adopted for the proper

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	management of the waste at site • At the end of the construction phase, left-over waste will be removed as per practices of area • All the idle machinery and equipment will be immediately removed from the site • Scrap and the debris will be removed from the site at the end of the construction stage after appropriate segregation of the material
Operation Phase	
Particulate emissions and generator stack emissions	• No air emission is likely to be released during operation of the project; except the dust or PM to beproduced during floor cleaning and other such operations, which also will not be posing any environmental threat (will not breach the safe standards). Wet suppression is done to control dust emissions. Generator emissions will be controlled by providing proper enclosure, tuning and maintenance. Boiler emissionswill be controlled by using natural gas as fuel
Degradation of surface waters quality due to process water and sewage direct disposal	• Wastewater will be disposed off in Tehsil Council Drain after proper treatment through activated sludge process for which treatment plant has already been installed.
To minimize loss work injury/hazards/incidents/accidents	• Training regarding EHS should be given on the regular basis • Workers will be given PPEs such as: helmets, mask, ear-plugs/muffs, safety boots, etc. • It should be strictly enforced to wear PPEs while working • Workers will be trained on the

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	regular basis regarding personal safety and disaster management • Incidents should be reported directly to the concerned authority
To minimize disturbance of communities due to noise	• All the machinery will be installed and operated in a closed hall and from operation of machinery noise will notbe a problem for the residents in thearea nearby. Further Administration of the unit will take the precautionary measures to avoid the noiseemissions. There is no possibility of Noise pollution • A thick greenbelt will be developed all around the plant which will be acting as noise barrier. • Introduction of control and monitoring rooms having good sound insulation properties. • All the workers will be provided with ear plugs. • All the transporters will be advised to carry out regular maintenance of their vehicles.
Solid waste management	No process waste will be generated as the whole project will be carried out in closed tanks, while domestic waste will be handled as per area practices. For collection of solid waste dust bins are kept in the unit premises to manage the waste. Discarded/Rejected material will be sent back to supplier.

ENVIRONMENTAL MANAGEMENT & MONITORING PLANS:

During construction, ambient air quality for dust level in particular noise level

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(tests), solid waste management and soil contamination, and community andworkers' safety (visual) need to be monitored. During operation, stack emissions, noise level, air quality, wastewater quality and workers' safety need to be monitored. Plan has been included in **Chapter-6** of this EIA Report.

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1 *CHAPTER 1:* INTRODUCTION

1.1 GENERAL

The pharmaceutical industry in any country is considered as the mainstay of public health. Looking at the global scenario, the importance given by developing nations to the pharmaceutical sector can be clearly identified by including healthcare and pharmaceutical industry in their health and welfare strategy. The global pharmaceutical market is valued at no less than US$440 billion, with annual growth of 6%.

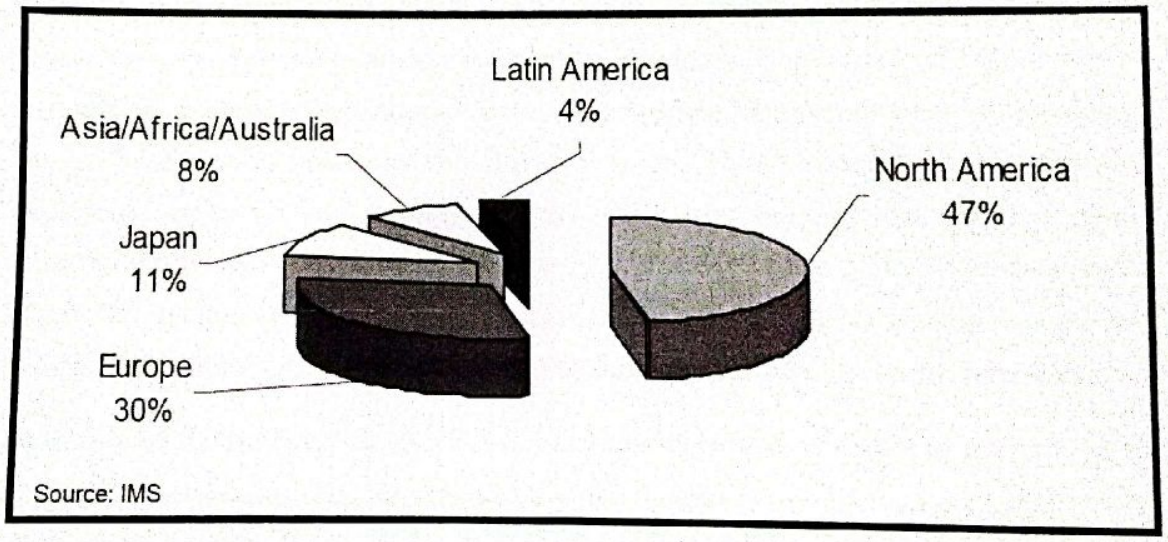


Figure 1-1: Global Sale-Pharmaceuticals (%)

The pharmaceutical industry is considered the backbone of public health services in Pakistan. This is strategically important both for the well being of the population in general and for the provision of good yet affordable healthcare in particular. The low cost of production and the huge potential of this sector has attracted major multinationals to establish their operations and production

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facilities in Pakistan.

Pakistan's Pharmaceutical industry started out slowly but gradually became an integral contributor to the developing economy of Pakistan. At the time of formation, there were only 10 members of Pakistan PharmaceuticalManufacturers Association (PPMA), as of 2015 there were around 235 companies holding membership. Pharmaceutical industry is one of the most organized industries in Pakistan, employing a large number of professionals inall areas of operations. Pakistan meets 80% of its domestic demand of medicines from local production and 20% through imports. The market for pharmaceuticals in Pakistan has been expanding at a rate of around 10 to 15% since last few years.

Pakistan is also exporting its surplus drugs to a large number of countries particularly to the Asian and African regions with an expanding trade in the newly emerged Central Asian States. Presently, the pharmaceutical industry in Pakistan is producing all the major pharmaceutical dosage forms. Similarly, there are some special products e.g. immunologicals, anti-cancer drugs, certain anti-diabetics, antidotes and products manufactured from biotechnology, which are still being imported, in the finished form. These specific areas provide excellent opportunities for investment. Only few bulk pharmaceutical raw materials are being manufactured locally and most of the pharmaceutical raw materials are being imported in large quantities fromdifferent countries of the world. This sector also gives challenge to explore andavail the opportunities.

Pakistan's Pharmaceutical market is very significant in the World market as it is the 10th largest in Asia Pacific and the 4th fastest growing market (2008/09) after China, India & Vietnam. The total worth of Pakistan's Pharmaceutical industry is measured at Rs. 191 Billion (USD 1.8 Billion) in September 2015 most of which is down to private sector investment. The private sector contributes to an overwhelming 82.5% of the total health expenditure. Figure below provided insight of growth trend for both MNC's and National pharmaceutical companies.

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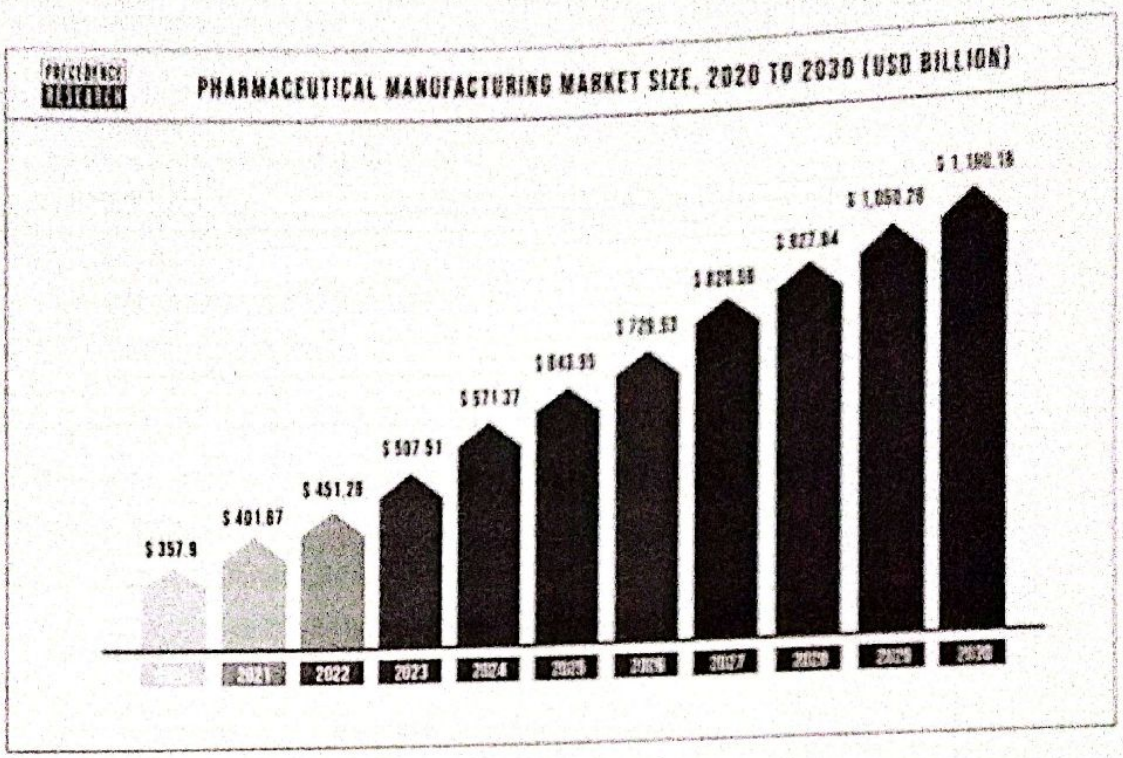


Figure 1-2: Growth trend of National and Multinational Pharmaceutical Companies

Some key statistics of Pakistan Pharmaceutical Market are as follows:

Table 1-1: Statistics of Pakistan Pharmaceutical Market

Enterprises / Companies active in the field	600
Number of Employees	Over 100,000
R&D Expenditure	1% of profit (by each company) goes to R&D Fund of the Ministry of Health
Registered Drugs	47000
Registered Molecules	1100

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Controlled Price Drugs	Almost All
Estimated Size of the Pharmaceutical Market	2.6 Billion US $ (IMS Q4, 2015)
Total Registered Pharmaceutical in Pakistan	Approx. 660
Multinational Pharmaceutical Company	18
National Pharmaceutical Company	641
Projected Growth of Market in 2016	13.06%

The pharmaceutical industry in Pakistan comprises of over 400 pharmaceutical manufacturing units including around 30 operated by multinationals present in Pakistan. Province wise break up of Pharmaceutical Manufacturing Units in Pakistan is given below:

Table 1-2: Province wise breakup of Pharmaceutical Manufacturing units inPakistan

Province	National	Multinational	Total
Punjab	205	4	209
Sindh	92	23	115
KPK	50	0	50
Balochistan	7	2	9
AJK	3	0	3
Total	356	30	386

The key to the success of Pakistani pharmaceutical companies is based on a simple formula, i.e. the production of high quality products at current Good Manufacturing Practices (cGMP)- compliant facilities and offering them at the most economical rates. Nearly all of Pakistan's leading pharmaceutical companies has maintained high standards to ensure compliance of all operations of production and quality control under the cGMP guidelines. As a result, they are now successfully exporting their products to various international territories.

As per PEPA 2012 and the IEE/EIA Regulations, 2000 it is mandatory for the proponent of any development project to obtain Environmental Approval from EPA

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Punjab by filing an IEE or EIA as the case may be, before the Agency. This Report presents the Environmental Impact Assessment (EIA) for aforesaid medicines manufacturing unit. For this purpose, the proponent has engaged environmental consultants, **M/s Exodus Green**The purpose of this study is to identify the environmental baseline i.e. physical, biological and socio- economic/cultural conditions and assess all possible impacts arising during the construction and operation phase of the project with the aim to find outappropriate measures for their mitigation, to either eliminate those impacts orto bring them to acceptable level and formulate Environmental Management Plan (EMP) for implementation of the project in environment-friendly manner. The report provides relevant information, as required under the officially approved format, to facilitate the decision makers i.e. EPA Punjab for the issuance of Environmental Approval.

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1.2 THE PROPONENT(CEO/Director)

Name	Munawer Ali Tariq S/o Manzoor Ahmad
Address	House 351, Neelam Block allama Iqbal town Lahore
Contact Number	03008461857

1.3 THE PROJECT

1.3.1 Nature of Project

The Said Project is the Establishment of Pharmaceutical Manufacturing Unit of M/S SICHER Pharma. Its salient features have been described later in this Chapter, Chapter 2 and briefly in Executive Summary of this EIA Report.

1.3.2 Location of Project

Said Project is located at



Figure 1-3: Location Site

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1.3.3 Total area

Total area of land is approx. 8Kanals

1.4 DETAILS OF CONSULTANTS

For the preparation of the EIA Report of the said project, the proponent has hired the services of the environmental consultants; **M/S Exodus Green.** Team comprising of environmental engineers, chemical engineers, environmental experts and environmentalists has worked on this report. Exodus Greenis one of the pioneers Environmental Consultancy Companies in Pakistan with an unrivalled reputation for providing expert, tailored services and solutions. Exodus Greenprovides the environmental services, litigation and consultancy to clients both industry and government.

Exodus Greenis providing quality services in various environmental sectors i.e.

- Environmental Assessment Reports i.e. IEE/EIA
- Environment Management Plans (EMP)
- Designing of Emission Control Equipment
- Waste Water Treatment Plant (WWTP) Designing
- WWTP Construction Supervision, Commissioning and Operations
- Establishing Bottled Water Plant based on RO or UF
- Lab testing (Drinking Water & Waste Water Analysis , Soil Analysis, Sludge Testing, Petroleum/ Lube Oil Testing, Fertilizer Analysis, Pesticides in Water, Soil, Fertilizer, Coal, Coke Analysis)
- Monitoring and inspection
- Environmental modeling

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Contact Details:

Focal Person	Tariq Khalil
Address	House 189 B, Iqbal Avenue Phase 3, lahore
Contact No.	0304-8968536

1.5 PURPOSE OF REPORT

The development of any Project leads to positive and adverse changes in environmental and change in social settings of the Project Area. The intensity and level of change, however, depends upon the nature of the Project and the baseline environmental conditions of the area. The development and commencement of said project will cause minor to moderate adverse environmental and social impacts on the surrounding area. Thus, an environmental and social study is mandatory to establish the baseline conditions, evaluate the possible adverse impacts if any, and devise the mitigation measures.

Section 12 of Pakistan Environmental Protection Act, 1997 (PEPA, 1997) states "No proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an Initial Environmental Examination (IEE) and, where the project is likely to cause an adverse environmental effect, an Environmental Impact Assessment (EIA), and hasobtained approval from the Provincial Agency in respect thereof." Later on, Punjab Environmental Protection Agency (Review of IEE and EIA) Regulations, 2000 provided the guidelines for categorizing the Projects. The main objectivesof this EIA study were:

- To determine and document the state of the environment of the project area to establish a baseline in order to assess the suitability of the Said Project in that area.

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- To identify pre-construction, construction and operation activities and to assess their impacts on environment.
- Provide assistance to the proponent for planning, designing and implementing the project in a way that would strengthen environment, improve ecological resilience, eliminate or minimize the negative impact on the biophysical and socio-economic environment and maximizing the benefits to all parties in cost effective manner.

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- To present Mitigation and Monitoring Plan to smoothly implement the suggested mitigation measures and supervise their efficiency and effectiveness.
- To provide opportunity to the public for understanding the project and its impacts on the community and their environment in the context of sustainable development.
- Prepare an EIA Report for submittal to the Environmental Protection Agency, Punjab for according Environmental Approval.

1.6 Structure of Report

This EIA reviews information on existing environmental attributes of the Study Area. Geological, hydrological and ecological features, air quality, noise, water quality, soils, social and economic aspects and cultural resources are included. The report predicts the probable impacts on the environment due to the said project. This EIA also proposes various environmental management measures. Details of all background environmental quality, environmental impact/pollutant generating activities, pollution sources, predicted environmental quality and related aspects have been provided in this report. The structure of the assessment report will be as follow;

- Description of the Project
- Description of Environmental and Social Conditions
- Assessment of Environmental Impacts and Mitigation Measures
- Mitigation Measures for Identified Impacts
- Public Consultation
- Environmental Management and Monitoring Plan (EMMP)
- Recommendations and Conclusions

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Screening

As per Review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations, 2000 the Said Medicines Manufacturing Unit falls under B(2) Category of projects "**Manufacturing and processing**" mentioned in Schedule II requiring EIA

Scoping

Temporal and Spatial Boundaries:

Temporal Boundaries:

Construction period of said project is approx. 2 years. Operation Lifespan will be more than 25 years.

Spatial Boundaries:

Said project will have positive and negative impacts at local and national level. The establishment of the said project will contribute to enhancing Pakistan's domestic productivity, and help diversify Pakistan's economy. It will create potential of improvement for social and cultural values of local people's exchange of values and standards through positive social interactions. Positivechanges in lifestyles will occur due to availability of income when the nativestake up Company jobs.

Important issues and concerns raised during consultation

- Environmental enhancement measures such as; Tree plantation, monitoring and safety should be ensured
- HSE plan should be enforced strictly
- Preventive measures should be adopted to avoid any unfortunate incident
- Tree plantation must be ensured
- Local employment should be ensured
- Proponent shall work for betterment of community

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- All emissions and effluents shall be managed properly to avoid public nuisance.

Significant Impacts identified in scoping:

Construction Phase	Operation Phase
Dust emissions	Particulate emissions
Wastewater	Degradation of surface water quality due to process water and sewage direct disposal
Impacts of accidental spillages	Work injury/hazards/incidents/accidents
Safety	Disturbance of communities due to noise
Solid waste management	Solid waste management

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Site Alternatives

ALTERNATIVES

Said project is the Establishment of M/S Sicher Pharma (Pvt.) Ltd. Selected site is surrounded by other industries and no other alternative site is considered for Said Project. The site is well located in regard to the following:

- Within vicinity of existing unit
- Plot near other industries
- Easy road access to the market
- No settlements in close vicinity
- No watercourse within a safe distance
- No ecologically sensitive or declared protected area within safe radius of the selected site

In view of these facts, it can be concluded that the Selected Site is best suited for the project, and will not pose any adverse impact or threat on any component of the environment.

Distance of selected site from different receptors is as follows:

Sr. No	Receptors	Distance (Km)
1	SPELL	0.73
2	Pulse pharmaceutical	0.5
3	Lahore Kasur Road	4.09

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Considering the facts that said site is at a safe distance from sensitive receptors. The said site has advantage of not only to be environment friendly but also potentially sound to enhance sustainable development in the region. Therefore, given site is the most suitable for establishment of said project.

Process/Technology Alternative

Keeping in view all the environmental consideration the project site is located in an industrial area using the best suitable technology for air emission and for the treatment of wastewater. Best suited technology has been proposed forthe said project including no air emission. Water mitigation techniques also considered at their best including Activated Sludge Process for wastewater treatment.

Environmental Alternative

The unit site is located in an area which is devoid of any biodiversity including forestry, wildlife, migratory birds, game reserves (flora and fauna), or protected species of fauna & flora; fishery or aquatic biology; watershed. Thereis no cultural or any other heritage in the project area. Summarily, there is no environmental sensitivity in the project area. These factors are also strongly supportive of the proposed project site.

Economic Alternative

Selected land is under ownership of proponent and no cost is required to purchase other land so it is viable and economic option for proponent to construct frozen fries unit. The cumulative effect of this types project would result in noticeable economic growth. The project will also make a positive consideration to the industrial growth.

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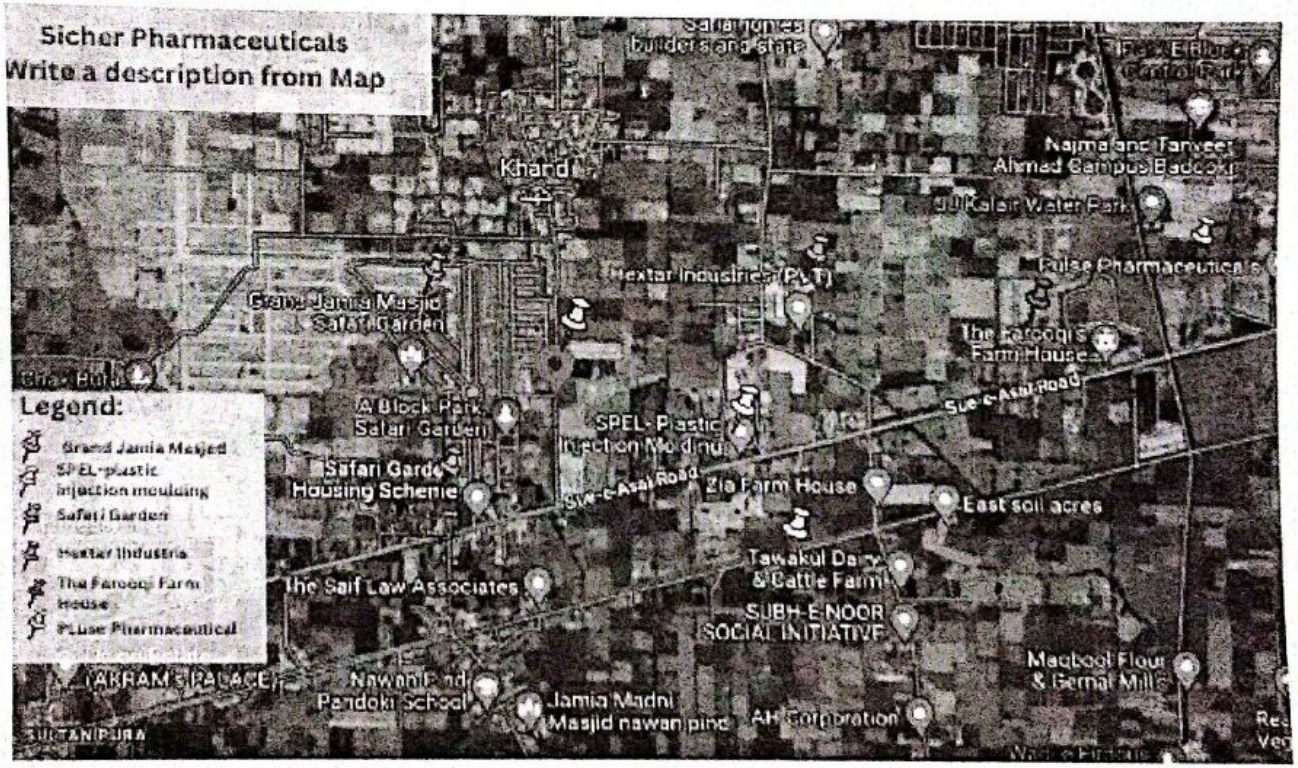


Figure 1-3: Distance of site from nearest receptors

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2: *CHAPTER 2:* DESCRIPTION OF PROJECT

2.1 GENERAL

This section of the study concentrates on details of the project and its salient features; such as location, site layout, objectives, selection of alternatives, cost and magnitude of operation and various phases. Inputs and discharges relevant to different phases of the project, such as electricity & materials, etc. have also been examined as a response to possible environmental concerns.

2.2 TYPE AND CATEGORY OF PROJECT

As per Review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations, 2000 the Said Medicines Manufacturing Unit falls under B(2) Category of projects "**Manufacturing and processing**" mentioned in Schedule II requiring EIA.

2.3 OBJECTIVES OF PROJECT

The main objective for the Establishment of Project is to carry out the competitive business of manufacturing high quality Pharmaceutical Finished products, also to meet market demand at affordable prices through dedication, sincerity, hard work and attitude. Also Proponent's intention is to become one of the most valued medicines manufacturing industry by continuously manufacturing good quality products that comply with the highest regulatory standards.

2.4 LOCATION AND LAYOUT OF PROJECT

2.4.1 Location of the Project

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No. AD(ELA)/EPA/F-287(EIA-I/2023/5418
GOVERNMENT OF THE PUNJAB
ENVIRONMENTAL PROTECTION AGENCY
LAHORE

aid Project site is located at 04Km sua asal road off feroz pur Road Lahore, The said site lies at Latitude 30.324431and Longitude 73.039667.



Figure 2-1: Location Map of the Site

2.5 GOVERNMENT APPROVALS

Approval for DRAP Approved Map Is attached.

2.6 LAND USE ON SITE

Land use on site for SICHER Pharma. is open land. The site will be used for the establishment of Pharmaceutical industry. There is no settlement, grassland or preserved area in the proximity of the project area that could be damaged or dismantled.

2.7 ROAD ACCESS

The site is approachable via Lahore-Kasue Road at 04 km.

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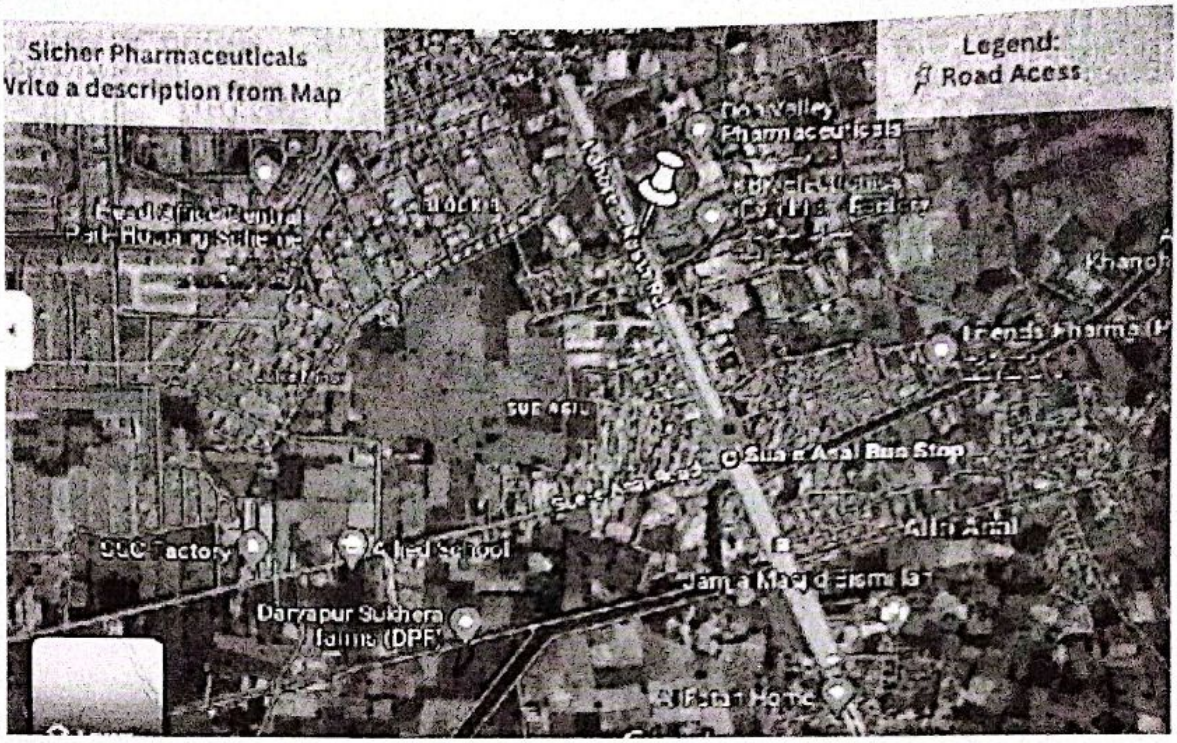


Figure 2-2: Road Access

2.8 VEGETATION FEATURES OF SITE

Various local plants are grown at the project site in the open areas, and along the boundary.

2.9 RESTORATION AND REHABILITATION PLANS

The main areas to be considered for site restoration include the construction area, temporary tracks; land used for vehicle and material stores, material excavation pitsetc. These areas should be restored to its original condition with the maximum possible effort. The restoration work comprises the removal of temporary construction works and removal of any fence installed, leveling of areas (wherever required), etc.The following procedures will be adopted for the restoration of the site:

- All temporary construction built for the site development will be removed.
- ite for construction camps should be restored to its previous conditions as much as possible.

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- Any debris from construction activities should be removed properly from the site.
- All fencing and gates will be removed and pits will be backfilled.
- Whole of the site will be covered with the original soil to the original levels andgrades and re-vegetation will be done, where required.

There exists no human settlement within safe radius of the selected project site to be displaced owing to the commencement of the said Project. No structure of any significance stands at the site to be relocated

Residence	Distance
Safari Garden	600m

dismantled. Nearest residence fromproject

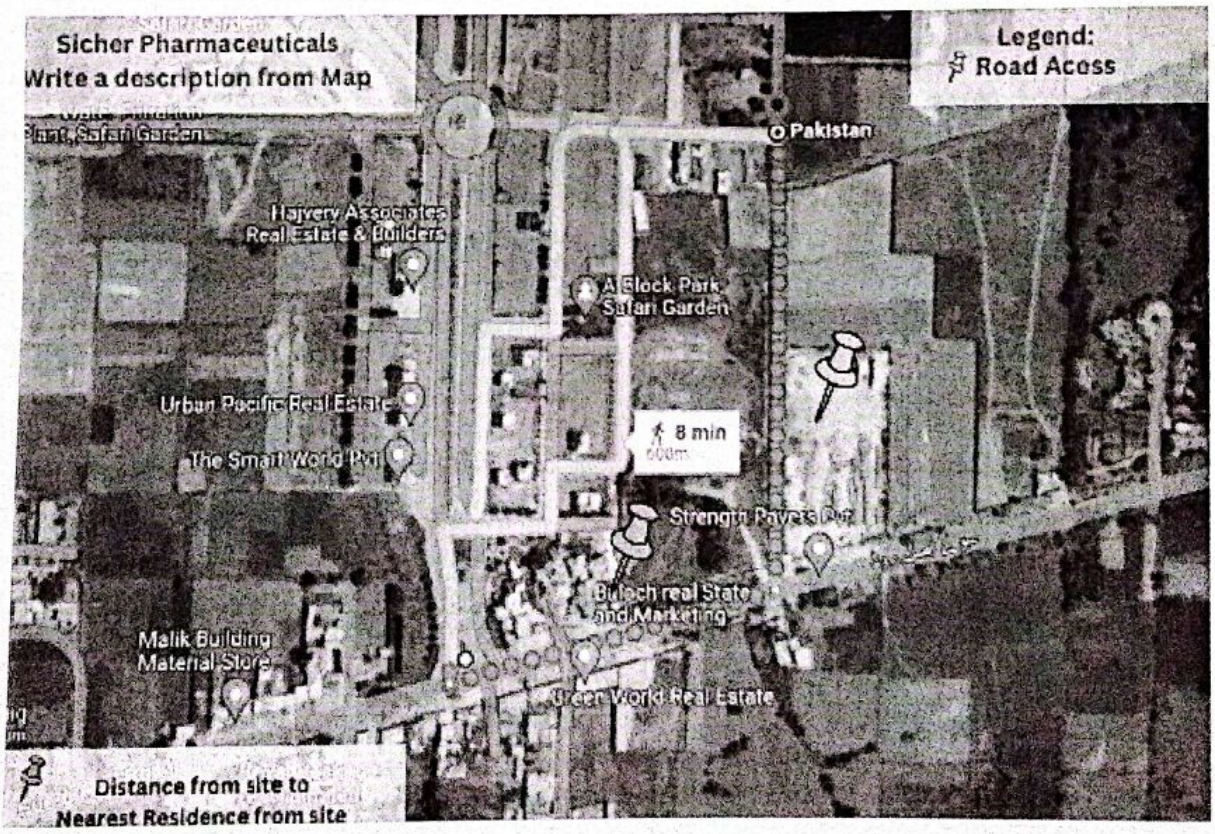


Figure 2-3: Distance of site from nearest residence

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2.10 DESCRIPTION OF PROJECT

2.10.1 Raw Material and products

List is attached as annexure.

2.10.2 General Process

SICHER Pharma. is involved in manufacturing of many Finished Pharmaceutical Products, the list of which is attached in Annexure. Generalized procedure for manufacturing of pharmaceutical finished products is given below:

RECEIVING BAY AND DEDUSTING AREA

The raw material, both active and inactive is received in receiving bay and dusting is done to remove any dust from packs to avoid any contamination.

QUARANTINE AREA

Quarantine area is classified into three sections via three different color boundaries including yellow, red and green lines. Yellow boundary line area is for the raw material which is under quality control testing, while green line area is for the raw materials which have been released by quality control department for manufacturing. Red boundary line area is for those raw materials which have been rejected by quality control department and should not be used in manufacturing, which will be sent back to company from where purchased. The raw materials, in their final containers are transferred to quarantine area of yellow boundary 1st until they are under testing by quality control department. Once it gets released by qualitycontrol department, it is shifted to green colored line boundary area for use in manufacturing process of syrups. The temperature and humidity is controlled properly and maintained at a temperature of 25±5^{0}C and humidity of 55±5%. Separate rooms are provided for storage of active ingredients and inactive ingredients. Regular temperature and humidity testing is conducted in these storage rooms. Relative Humidity of 45 and Temp of 25^{0}C is being maintained.

SAMPLING AREA

Sampling area is the specified area with proper air circulation via HVAC system. In this area, the raw materials are selected by random sampling under the supervision of

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qualified pharmacist. Samples are taken from upper, medium and bottom layer of

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containers and are supplied to quality control department for testing of raw material. Once the raw material has been approved and released by quality control department for manufacturing, it is transferred to dispensing area.

DISPENSING AREA

The released raw materials, both active and inactive ingredients by quality control department are dispensed in this section using digital weighing balances under supervision of pharmacist. These are dispensed and are transferred to manufacturing areas.

MANUFACTURING AREA

Manufacturing area contains machinery according to the product to be manufactured. The active and inactive raw materials are transferred tomanufacturing tank and RO water is stored in RO water tank from where it is supplied to manufacturing tanks via some pipes. Automatic Mixing is done to prepare homogeneous solutions. In process samples are taken and supplied to quality control department. Once released the manufactured product is transferred to storage tank until filled, labeled and packed.

WASHING AND DRYING AREA

In washing area the vials are washed along with caps using RO water. These washed bottles are then sterilized and oven dried at 250 ^{0}C to remove any dust or any particulate matter.

FILLING AREA

Filling area contains syrup/suspension filling machines. While for tablets and capsules, they are packed in blisters or strips. Once the samples get approved by quality control department, they are transferred for labeling and packaging.

LABELLING AREA

In labeling section, the various manufacturing details are printed onto the primary pack like batch number, date of manufacturing, maximum retail price of the therapeutic, etc. as required by Drugs Act.

PACKAGING AREA

Pharmaceutical manufacturers have to pack their medicines before they can be sent out for distribution. The type of packaging will depend on the formulation of the

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medicine. 'Blister packs' are a common form of packaging used for a wide variety of products. They are safe and easy to use and they allow the consumer to see the contents without opening the pack.

Primary packaging is the material that first envelops the product and holds it. This usually is the smallest unit of distribution or use and is the package which is in direct contact with the contents. Secondary packaging is outside the primary packaging – perhaps used to group primary packages together. Tertiary packaging is used for bulk handling, warehouse storage and transport shipping. The most common form is a palletized unit load that packs tightly into containers. Some of the primary packed bottles/ blisters are supplied to quality control department for in process quality control testing to check label and its specifications. Once approved these bottles/blisters are then packed into secondary packaging materials i.e. cartons and are stored in finished goods are till they are dispatched in market.

2.10.2.1 SUSPENSION MANUFACTURING

Suspensions are an important class of pharmaceutical dosage forms. The manufacturing of pharmaceutical suspensions involves several steps. The first step is to obtain particles of the proper size typically in the micrometer range. Pharmaceutical suspensions are usually prepared either by direct incorporation/ dispersion method or by precipitation method.

Direct Incorporation method involves following steps:

- Dissolution of the soluble components in the appropriate volume of diluent (vehicle).
- Dispersion of the solid therapeutic agent into the vehicle with the aid of mixing, prior to correction for volume.

The preparation of suspensions by precipitation method is as follows:

- The drug is dissolved in the vehicle (or a portion of the available volume), prior to precipitation following the addition of a counterion; the salt formed is insoluble (such systems are frequently deflocculated and are therefore mixed atlow shear rates).
- The excipients are then dissolved in the vehicle, or dissolved in a portion of the vehicle, which is then added to the suspension of drug.

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homogeneity.

- The volume of the formulation is then corrected by adding the required mass of diluent.

Receiving of Raw materials in dedusting area

Weighing of Raw material in dispensing area

Manufacturing of suspension by using RO water, Active and inactive ingredients in manufacturing tanks

In process QC testing of suspension

QC testing of glass bottles for any particulate matter

Air drying of bottles by blower machine

Washing of glass bottles and caps

Storage of manufactured suspension in storage tanks untill filled in bottles

Carrying of bottles to suspension filling machines using Conveyer belts

Filling of suspension in each bottle via specified nozzles in syrup filling machine

Capping on bottles

QC testing of finished product

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packed into immediate packs and then into cartons

Moved to packing area via conveyer belts for final packing and labelling by automatic labelling machine

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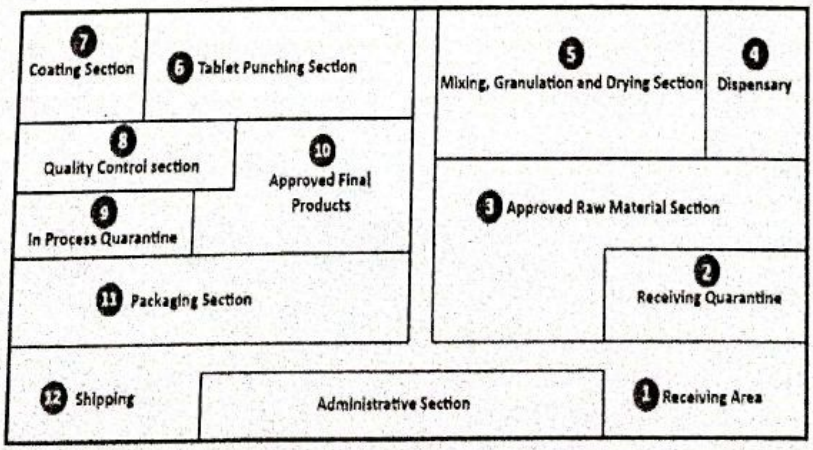
2.10.2.1 TABLET MANUFACTURING

Since decades among all the pharmaceutical products available, oral drug delivery has gained a higher scope and popularity and has been widely employed for the systemic delivery of drugs. The positive aspect regarding the oral dosage form which created its high level of acceptance was its ease of administration, patient compliance and stability of formulation.

The design and manufacture of pharmaceutical tablets is a complex multi- stage process whereby formulation scientists ensure that the correct amountof drug substance in the right form is delivered at the appropriate time, at the proper rate and in the desired location with its chemical integrity protected to that point. Most drug substances do not possess the required properties which give satisfactory flow from the hopper to the die cavity of tablet presses.As a result, they are subjected to pre-treatment either alone or in combination with suitable excipients to form free-flowing granules that lend themselves to tabletting.

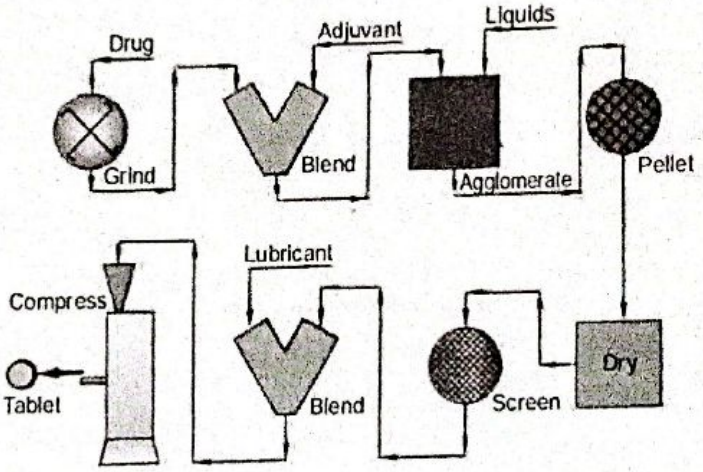
Tablets are commonly manufactured by **wet granulation, drygranulation or direct compression.** Regardless of the method used the unit processes – weighing, milling and mixing, are the same; subsequent steps differ.

Generalized steps involved in this process are:



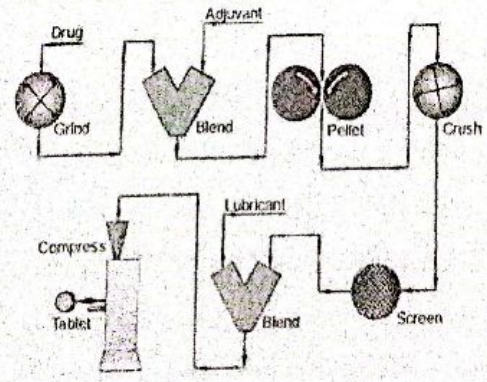
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The formation of granules by compacting powder mixtures into large pieces or compacts which are subsequently broken down or sized into granules (often referred to as dry granulation, double compression or pre-compression) is a possible granulation method which, however, is not widely used in the



Manufacturing of tablets by direct compression method

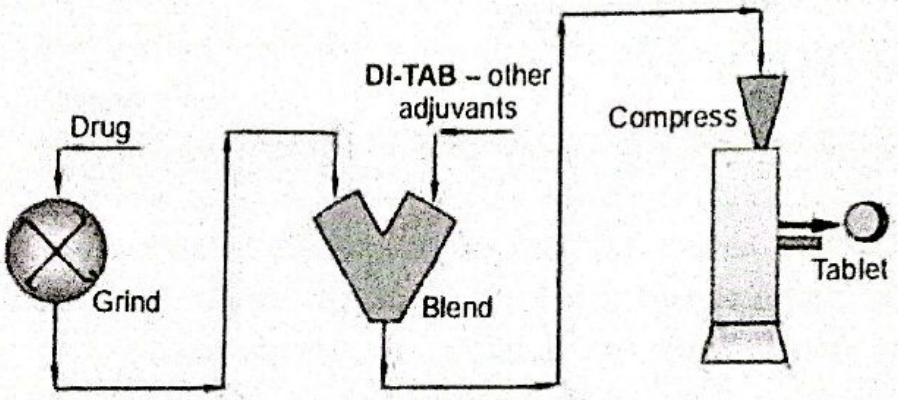
As its name implies, direct compression involves direct compression of powdered materials into tablets without modifying the physical nature of the materials itself. The technology involved in this method assumes great importance in the tablet formulations, because it is often the cheapest particularly in the production of generics that the active substance permits. Direct compression avoids many of the problems associated with wet and dry granulations.



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Manufacturing of tablets by direct compression method

As its name implies, direct compression involves direct compression of powdered materials into tablets without modifying the physical nature of the materials itself. The technology involved in this method assumes great importance in the tablet formulations, because it is often the cheapest means,



2.10.2.1 *CAPSULE MANUFACTURING*

Capsules are solid dosage forms in which one or more drug substance and/or inert materials are enclosed within a small shell. They are composed largely of gelatin and consist of two parts: the body designed to contain the drug and the diluent, and the cap that is approximately half as long as the body.Most capsule products manufactured today are of the hard gelatin type. It is estimated that the utilization of hard gelatin capsules to prepare solid dosage forms exceeds that of soft gelatin capsules by about 10-fold. The method formanufacturing hard gelatin capsules is as below:

Step 1: Preparation of the gelatin solution (dipping solution)

A concentrated solution of gelatin is prepared by dissolving the gelatin in demineralized water which has been heated to 60–70°C in jacketed pressure vessels. This solution contains 30 – 40% w/w of gelatin. The gelatin solution is then transferred to temperature-controlled tanks on the dipping machine where it is fed continuously into the dipping dishes.

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Step 2: Dip-coating the gelatin solution on to metal pins (moulds)

Capsule shells are manufactured under strict climatic conditions by dipping pairs (body and cap) of standardized steel pins arranged in rows on metal bars into an aqueous gelatin solution (25 – 30% w/w) maintained at about 50 ° C in a jacketed heating pan. Because the moulds are below the gelling temperature, the gelatin begins to form a thin gelatin layer or film on the moulds. The rows of pins are arranged so that caps are formed on one side of the machine while bodies are simultaneously formed on the opposite side of the machine.

Step 3: Rotation of the dip-coated pins

Following adsorption of the gelatin solution on to the surface of the pins, the bar containing the pins is removed and rotated several times to evenly distribute the solution around the pins, correct gelatin distribution being critical to uniform and precise capsule wall thickness and dome strength.

Step 4: Drying of the gelatin-coated pins

Once the gelatin is evenly distributed on the mould, a blast of cool air is usedto set the gelatin on the mould. At this point, the gelatin is dried, and the pins are then passed through several drying stages to achieve the target moisture content.

Step 5: Stripping and trimming

After the gelatin is dried, the capsule is stripped off the mould and trimmed to the proper length.

Step 6: Joining of the trimmed capsule shell

Once trimmed, the two halves (the cap and body) are joined to the pre-closed position using a pre lock mechanism. At this point, printing is done if needed before packing in cartons for shipping.

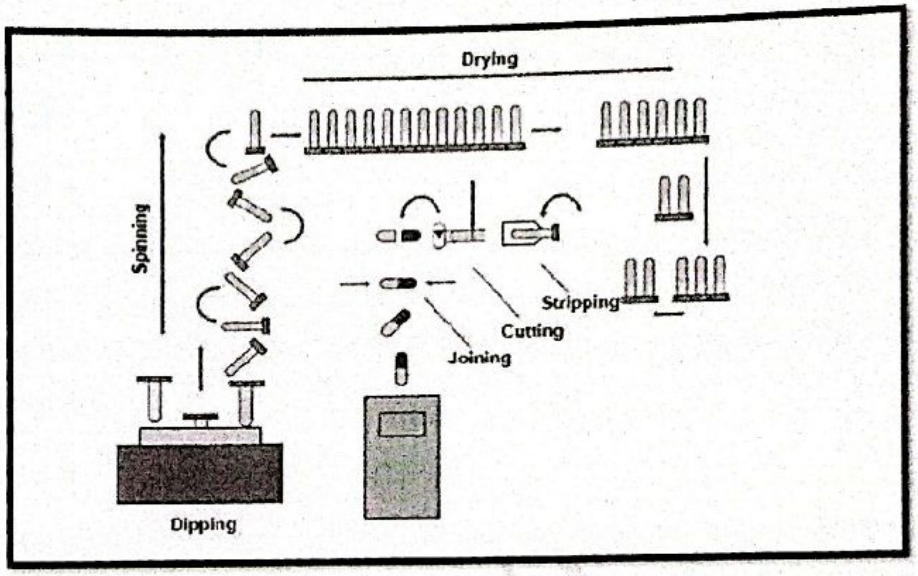
Step 7: Printing

After formation, the capsule shells can be printed to improve identification. Printing can be achieved using one or two colours, containing information such

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as product name or code number, manufacturer's name or logo and dosage details.

Printing reduces the risk of product confusion by the numerous handlers and users of the product including manufacturers, pharmacists, nurses, doctors, caregivers, and patients.



2.1.1 List of machinery

List of machinery provided in SICHER Pharma. is attached asannexure.

2.1.2 Manpower (Direct & Indirect)

The Project requires manpower during both the construction and operational phases. During construction phase 60-70 workers were involved. During the operation phase of the project, the total manpower requirement is estimated to be 80-100 people (Both Direct & Indirect) comprising administrative, technical, and non-technical persons. These include pharmacists, chemists, computer operators, accountants, administrative assistances, secretaries, etc. All recruited staff will be given appropriate training in order to educate them on the specific job tasks to be performed.

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2.10.3 Firefighting, evacuation plan, Health & Safety and HVAC plan

The fire-fighting system includes water and gas devices / extinguishers. Plant has established a proper fire-fighting system. Indoor and outdoor fire hydrants are installed according to the codes and standards.

A proper evacuation plan is formulated to cope with any emergency situation. Assembly points are set and marked. Fire frightening and emergency plan is annexed.

2.10.4 Electricity

WAPDA will be the main source of electricity for this pharmaceutical unit. Stand-by generator will provide electricity for this Unit in load-shedding conditions. One standby diesel fired generator of capacity 200kva, are also provided in unit.

2.10.5 Water supply

The water requirement for the project includes drinking water, Process water and water for fire hydrants. Ground water supply is used to fulfill thisdemand. Water treatment plant is provided for quality medicines (design is annexed).

2.10.6 WASTEWATER

Wastewater will be disposed off in Tehsil Council Drain after proper treatment through activated sludge process for which treatment plant. Municipal wastewater coming from various municipal works, such as cleaning will be generated, which will be treated via a Septic Tank. Process flow diagram of WWTP is attached as annexure.

2.10.7 AIR EMISSIONS

No air emission is likely to be released during operation of the project; except the dust or PM to be produced during floor cleaning and other such operations, which also will not be posing any environmental threat (will not

breach the safe standards). Wet suppression is done to control dust emissions. Generator emissions will be controlled by providing proper enclosure, tuning and maintenance. Boiler is natural gas fired.

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2.1.1 NOISE

All the machinery will be installed and operated in a closed hall and from operation of machinery noise will not be a problem for the residents in the area nearby. Further Administration of the unit will take the precautionary measures to avoid the noise emissions. There is no possibility of Noise pollution.

2.1.2 SOLID WASTE

No process waste is generated as the whole project will be carried out in closed tanks, while domestic waste is handled as per area practices. Forcollection of solid waste dust bins are kept in the unit premises to manage the waste. Discarded/Rejected material will be sent back to supplier.

2.1.3 AREA

Total area of plot is 8kanals

Table 2-1: Building Areas Distribution

Sr. No	Section	Area (Sq Ft)
1.	Total Area Of Plot	8 kanals
2.	Total Covered Area Of Plot	25381
Covered Building Area		
1.	Ground floor area	11657
2.	Admin area	1185
3.	Visitors /officer's change room	512
4.	General oral liq section	992
5.	Packing hall	341
6.	Change rooms	745
7.	Semi solid section	750
8.	General Tab capsule sec	2750
9.	Granulation +coating +compression sec	1090
10.	Packing Hall	1000

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11.	Oral dry powder section	1213
12.	other	1146
13.	QC	2000

2.1.1 COST AND MAGNITUDE OF OPERATION

Raw Material, Operation and maintenance of the Production machinery are the costly activities involved in the operation phase of the project. Equipment safety will be assured if these operations are carefully managed. No separatefund allocation is required. However, budget will be allocated for purchase and maintenance of standardized PPEs for workers and for waste management and environmental enhancement. Despite these costs, this project was found to be financially feasible in the feasibility report. Magnitude of operations includes:

1. Applying for and getting all necessary approvals and contracts
2. Construction of boundary wall and other structures
3. Installation of machinery
4. Installation of firefighting equipments
5. Marking of emergency exits, assembly points
6. Tree plantation and land-scapping

2.10.8 SCHEDULE OF IMPLEMENTATION

The project construction intends to take 6 months from start to completion.

Sr. #	Activities	6 Months			6 Months			6 Months			6 Months		
		2M	2M	2M	2M	2M	2M	2M	2M	2M	2M	2M	2M
1	Detailed Designing												
2	Mobilization of Contractors												

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3	Lean Construction Period												
4	Peak Construction Period												
6	Installation of machinery												
7	Installation of firefighting equipments & emergency exits												

M=Month

3 CHAPTER 3: DESCRIPTION OF THE ENVIRONMENT

3.1 GENERAL

This Section of the report covers a comprehensive description of the baseline conditions of the project and its related influential area with respect to the physical, biological and social aspects. In addition to the secondary data, the field survey was carried out and the environmental baseline conditions were established based on socioeconomic interviews, impact location profiles; environmental profile questionnaires and public consultations. A social survey was carried out through consultation with various communities. Interviews were conducted from the locals near the project area. The main intention of these interviews were to acquire feedback associated with the project as well as its impacts on their daily life on short term as well as long term basis.

3.2 PHYSICAL ENVIRONMENT

This part examines the physical resources such as topography, soil, climate, surface and ground water resources and quality, ambient air quality and geology of not only the Project site but also the city as a whole to assess whether the project under assessment can or does have any impacts on any of these parameters. The description of physical environment of city and the project area is present in the following sub sections.

3.2.1 Soil Types

The said Project area forms a part of the vast Indus plain, which is a part of the IndoGangetic depression. This depression is of a synclinal nature. Synclinorium depression is a fore deep downward of the Himalayan foreland of variable depth,

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converted into flat plains by the simple process of alluviation. The alluvial deposits are underlain by rocks of Precambrian age. The soil of the level area is generally medium to coarse texture. Bar and levees have mediumto coarse material. In sub-recent flood plain the soils of the bar and levees are relatively coarser while those of channels / basin are predominantly clayey

3.2.2 Seismicity Data

Earthquake in non-cohesive soil may cause serious problems. In extreme cases liquefaction can occur if Relative density is low Initial confining pressure (overburden) is low Earthquake intensity is high Duration of ground shaking is long National Seismic Monitoring Centre of Pakistan issued the seismic zone map for Pakistan, as shown in Figure below. Said Project area falls in low hazard area and low risk associated with the infrastructure found in this area.

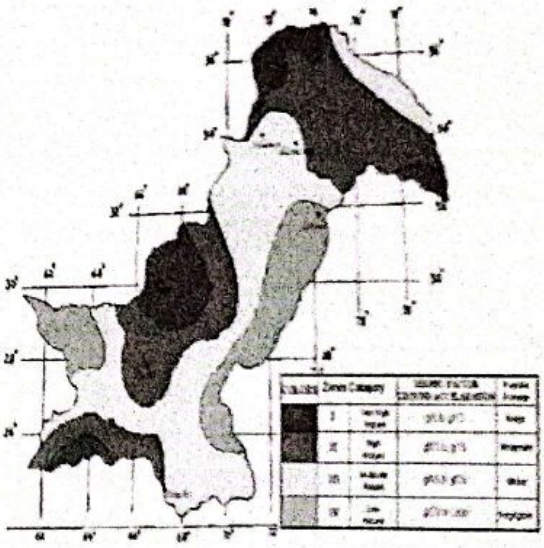
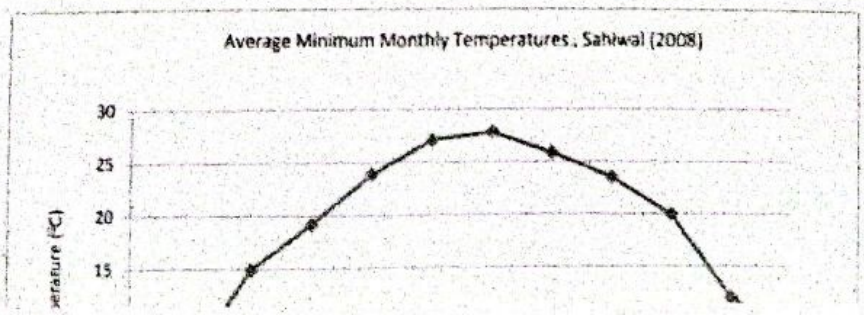


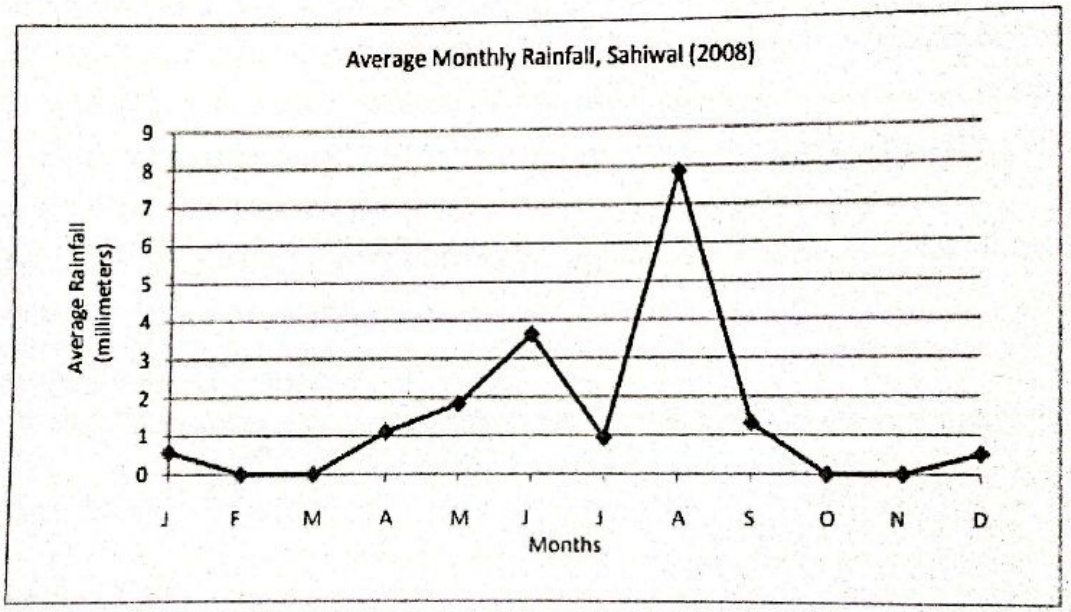
Figure 3-1: Seismic Zoning of Pakistan

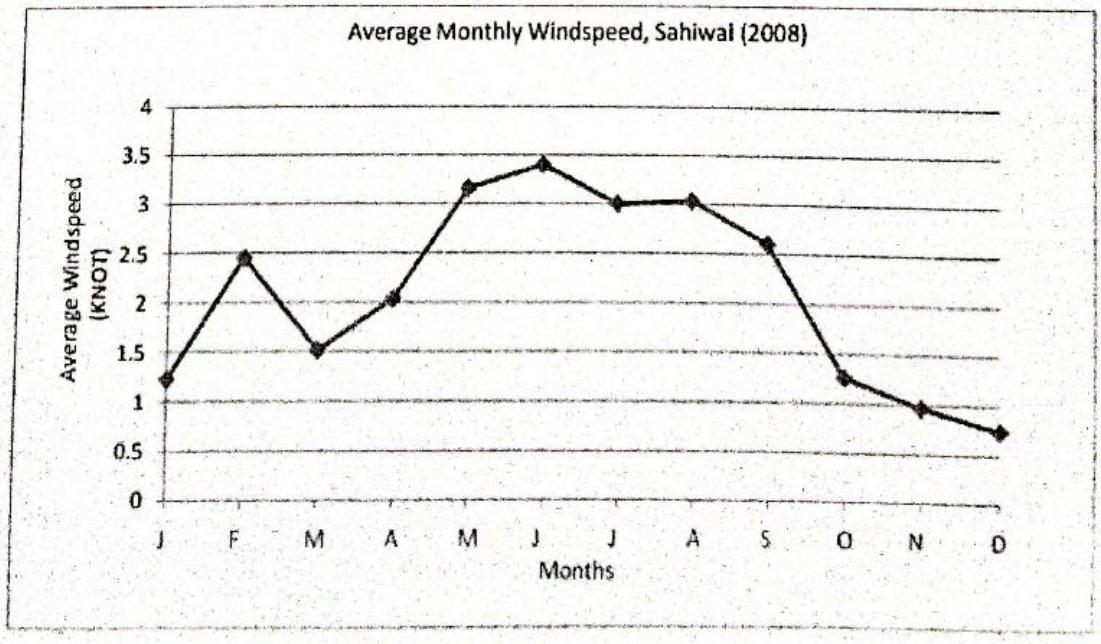
3.2.3 CLIMATE

The climate of the area is arid and characterized by a long hot summer and short mild winter. The data collected from the nearest meteorological station ofthe project, at Sahiwal is presented in the following graphs.



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3.2.4 Hydrology

Pakpattan canal system is the main source of the surface water within the project area. There are some seasonal nallahs which run during the monsoon period but due to lack of any collection and storage infrastructure, it is too scant and unreliable to be of any agricultural or other use. Pakpattan canal isa perennial canal and closes only for cleaning purpose. The main canal is divided into two parts; Upper Pakpattan and Lower Pakpattan canal. The Upper canal off-takes from river Sutlej at Suleimanki Barrage and Lower canal feed through SMB Link canal. M.P Link canal is another source of upper Pakpattan canal and brings about 1000 cusecs of water from L.B.D.C. Pakpattan-Islam Link canal off-take from upper Pakpattan at RD 406 and takes about 1000 cusecs of Upper Pakpattan canal water to Islam Barrage to accommodate the discharge of Upper Bahawal and Qaim Canal. The discharge capacity of the Upper Pakpattan canal at the head regulator (Suleimanki Barrage) is 6,594 cusecs.

Groundwater Quality report of the said project site has been attached in the Annexure V of this report.

3.2.5 AMBIENT AIR QUALITY

Ambient air quality was monitored at site by HSE Services lab and results are

annexed as annexure V

3.2.6 NOISE

Noise level observed at project site was within PEQs limits. Results are annexed

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3.3 BIOLOGICAL ENVIRONMENT

3.3.1.1 Flora

Prior to canal irrigation in the Pakpattan area, wild trees such as Jand (Prosopis spicigera) and Van (Salvadora abeoides) were prominent in the region. After 1930 trees such as Shesham (Dalbergia sisoo) and Kikar (Acacia nilotica) were planted whereas in recent years, Sufaida (Eucalyptus) has also been planted in the area.

Reference: IEE of Punjab Irrigated Agriculture Investment Program, Tranche 3 — Pakpattan Canal and Suleimanki Barrage Improvement Project, August 2012

3.3.1.2 Fauna

About a century ago, wildlife species of the area included neel gai (blue bull), Chankara deer, Hog deer, wolves, wild cat, hyenas and leopards. But due to the development of irrigation system during 1920s and construction of new cities including Vehari, Burawala, Arifwala etc the habitats of some of these animals were distracted and they become extinct in this area. Also vigorous hunting and killing during last three to four decades eradicated some of the above species from this part of the world.

Reference: IEE of Punjab Irrigated Agriculture Investment Program, Tranche 3 — Pakpattan Canal and Suleimanki Barrage Improvement Project, August 2012

3.3.1.3 Protected areas / National Sanctuaries

There is no wildlife sanctuary or game reserve or any other protected area within the project area.

3.4 SOCIOECONOMIC ENVIRONMENT

This section provides collective information about the existing socio-economicand environmental condition of the project area within the AOI. The differenttypes of socio-economic aspects were covered such as demographic profile, occupation, education and health facilities. This data helped in identifyingmajor interventions for the development of Environmental Management and Monitoring Plan (EMMP). The study also helped to assess the positive or adverse impacts on local community.

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3.4.1 Socio-Economic Environment

3.4.2 Industries

Industries nearby site are:



Figure 3-2: Industries nearby site

3.4.3 Educational facilities

Educational facilities nearby project site are:

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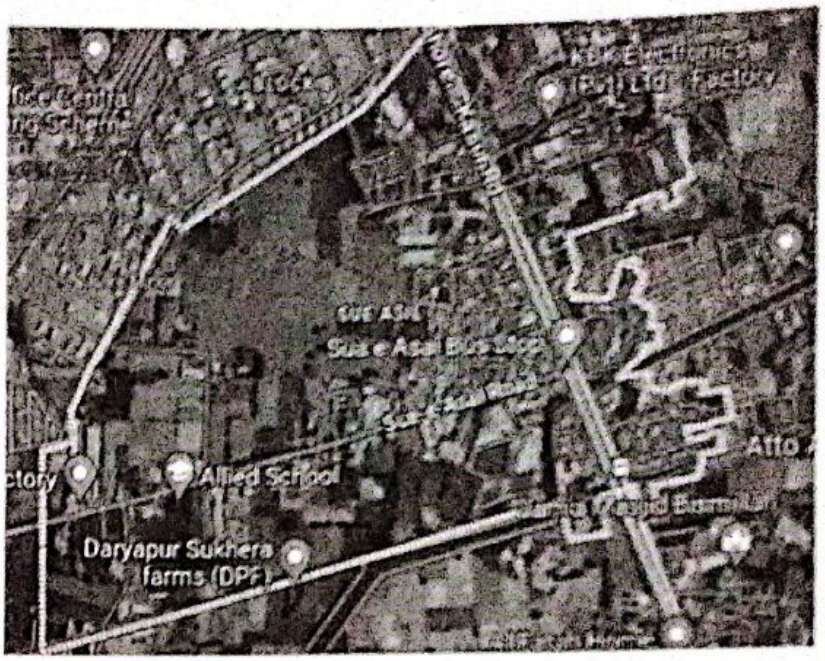


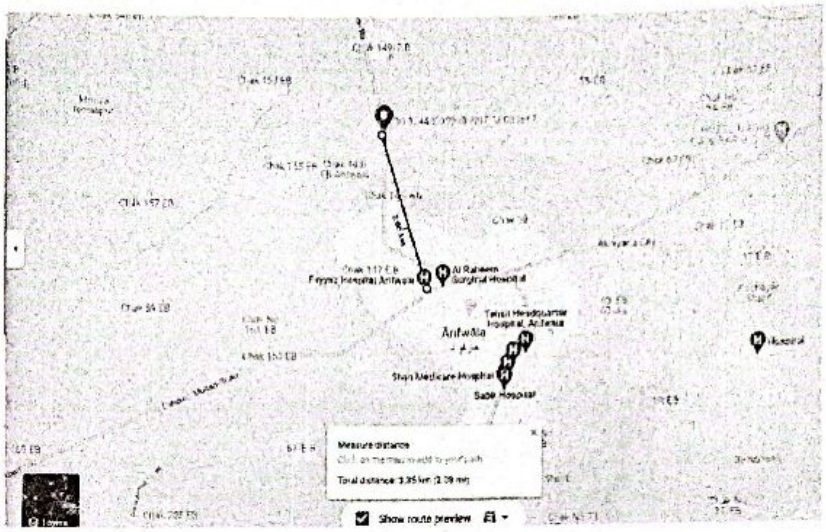
Figure 3-3: Schools nearby site

3.4.4 Health facilities

Nearest hospital from the project site



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Socio-Economic Questionnaire and Environmental Checklist were used as survey tools by the Exodus Greento collect desired information. Graphical representation of results of Socio-Economic Survey is given below:

3.1.1 Occupation of Respondents

Majority of the respondents (70%) are attached with jobs, 15% shopkeepers and remaining 15% are labors. During survey, efforts were made to interact with people representing all walks of life. The detailed graphic representation of occupational status is given below:

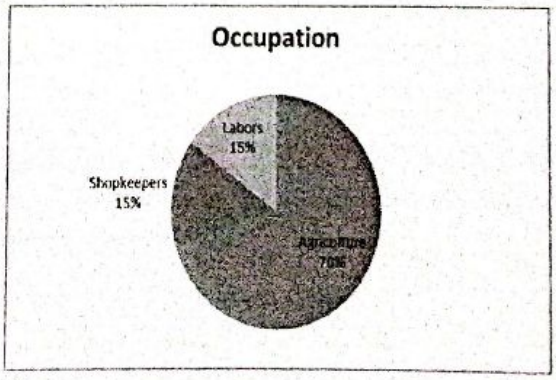


Figure 3-5: Occupation of Respondents

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35.2 Literacy Rate

From survey results, it was found that 75 % of the studied population was illiterate, 15% was up to primary level, 10% studied up to middle level.

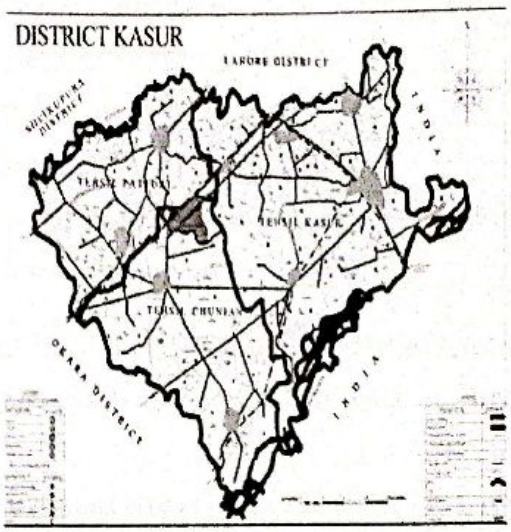


Figure 3-7: Literacy Rate

3.5.3 Common Diseases

According to the survey the common diseases recorded in the project area were, Diabetes, Fever, Hepatitis, Hypertension, stomach problems, Malaria, Typhoid, Nephritis and Diarrhea.

3.5.4 Livestock

People in the study area have common livestock which include; Cows, Buffalos, Sheep, Goats and Hens. However, there is no proper cattle or poultry farm observed within the study area.

3.6 LAB REPORTS OF ENVIRONMENTAL ANALYSIS

Testing of different parameters was done by HSE Services laboratory to check the quality of different environmental parameters. The copy of the lab reports of these parameters (ambient air analysis, water quality analysis and noise) is given in annexure V.

3.7 SUITIBILITY OF SITE

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Said project is the Establishment of M/S Sicher Pharma (Pvt.) Ltd. Selected site is surrounded by other industries and no other alternative site is considered for Said Project. The site is well located in regard to the following:

- Within vicinity of existing unit
- Plot near other industries
- Easy road access to the market
- No settlements in close vicinity
- No watercourse within a safe distance
- No ecologically sensitive or declared protected area within safe radius of the selected site

In view of these facts, it can be concluded that the Selected Site is best suited for the project, and will not pose any adverse impact or threat on any component of the environment.

Considering the facts that said site is at a safe distance from sensitive receptors. The said site has advantage of not only to be environment friendly but also potentially sound to enhance sustainable development in the region. Therefore, given site is the most suitable for establishment of said project.

4 CHAPTER 4: STAKEHOLDER CONSULTATION

4.1 GENERAL

Public consultation refers to the process by which the concerns of local affected persons and others who have plausible stake in the environmental impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate. According tothe IEE and EIA Review Regulations, public consultation is mandatory for any socio-environmental study.

Impact assessment survey and public consultation sessions held with different stakeholder groups that may be impacted by the said project development. The consultation process was carried out in accordance with the guidelines laid by EPA. The objectives of this process were to:

- Share information with stakeholders on said project installation and

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operation

- To access the impacts on the physical, biological, and socio-economic environment
- Understand stakeholder concerns regarding various aspects of the project
- Understand the perceptions, assessment of social impacts and concerns of the communities of the project area
- Find out the awareness level and situation of acceptability to identify any issues for the implementation of the said project
- To invite people to express their views about the positive/negative impacts on their life styles and environment

This report includes all the comments, which were taken into account in preparing the definitive development concept for the establishment of said project. Public consultation performa is attached as Annex-VIII of this EIA Report.

4.2 OBJECTIVES OF CONSULTATION

Public consultation plays a vital role in studying the impacts said project on stakeholders in its successful implementation and execution. It provides an opportunity to exchange knowledge with theall stakeholders. Referring particularly to a project related to environmental assessment, involvement of public is all the more essential, as it leads to better and more acceptable decision-making. The overall objective of the consultation with the stakeholdersis to help verify the environmental and social issues, besides technical ones, that have been presumed to arise and to identify those which are not known or are specific to the project. In fact, discourse with many who have thoroughly observed the site conditions in the pre-developmental phase, goes a long way in updating the knowledge and understanding.

4.3 IDENTIFICATION OF STAKEHOLDERS

All the people who are directly or indirectly affected or concerned with the project are the stakeholder. Besides the living population of the surrounding areas, some

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other stakeholders were identified and contacted. They are the key players including; shops owners, vendors, public offices, school, university, hospitals,. Not only published material (Both brief and comprehensive literature were obtained on request) but also noted their views and the concerns. Following stakeholders are identified for this project:

Project stakeholders include the settled families, either property owners or the tenants, businessmen (land owners, traders, shopkeepers, vandors, transporters, restuarent owners etc.), employees of the commerical entities. PAPs are of two types, for instance:

4.3.1 Direct

In this case, the PAPs are those who will be benefited directly by project. No disturbance on the local community is being foreseen due to the installation of the said plant.

4.3.2 Indirect

Indirect impact will occur on those who are living or doing business within

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roject area of influence. Indirect respondents include;

- ✓ Government agencies responsible to deal with the project related activities
- ✓ Government Agencies directly, indirectly or widely involved in the execution and monitoring of the said project
- ✓ Workers of political, cultural, religious or social scientific bodies, directly or indirectly related

4.4 PUBLIC DISCLOSURE

Public disclosure is the outcome of all such activities where public is involved at least in the information sharing process. This is an integral part of that process so before the proponent applies for NOC to the EPA, this disclosure will be distributed properly among all stakeholder. It is the responsibility of the proponent and the consultants to display public disclosure document at prominent places where community has easy access.

4.5 CONSULTATION PROCESS

Information disclosure, public consultation and discussion regarding the various aspects of the project with the people of the area are necessary. This process is intensified during the EIA Studies, and separate rounds of public consultations were held. Surveys were carried out in order to investigate physical, biological and socio-economic resources falling within the immediate area of influence of the project. Primary data collection included:

- Data collection regarding the socio-economic condition of the study area
- Pretesting of socio-economic survey tools in the field
- To consult the locals for collection of information on biological environment

Various meeting with the stakeholders were held the following objectives:

- Share information with stakeholders on the said project and expected impacts on community in the vicinity of the project

Understand stakeholders' concerns regarding various aspects of

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project, including the existing condition of the upgrading requirements, and the likely impact of construction and operation activities

- Provide an opportunity to the public to influence the project design in a positive manner
- Obtain local and traditional knowledge, before decision making
- Increase public confidence about the proponent, reviewers and decision makers
- Reduce conflict through the early identification of controversial issues, and work through them to find acceptable solutions
- Dissemination of information through discussions, education and liaison
- Documentation of information narrated by the stakeholders and mitigation measures proposed by the stakeholders
- Incorporation of public concerns and their address in the EIA; and eliciting their comments and feedback

4.5.1 Consultation Methodology

The methodology adopted for consultations is summarized below.

4.5.1.1 Consultation Material

The main document for distribution to stakeholders during the consultations was Social Impact Assessment Interview.

4.5.1.2 Consultation Mechanism

Primary stakeholders were consulted during informal and formal meetings heldin the project area. The consultation process was carried out in the Urdu language. During these meetings a simple, non-technical, description of the project was given, with an overview of the project's likely human and environmental impact. This was followed by an open discussion allowing participants to voice their concerns and opinions. In addition to providing communities with information on the said project, their feedback was documented during the primary stakeholder consultation. The issues and suggestions raised were recorded in field notes for analysis, and interpretation.

By reaching out to a wider segment of the population and using various

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communication tools such as participatory needs assessment, community consultation meetings, focus group discussions, in-depth interviews, and participatory rural appraisal EIA involved the community in active decision-making. This process will continue even after this EIA has been submitted, as well as during future EIA in which similar tools will be used to create consensus among stakeholders on specific environmental and social issues.

Secondary stakeholder consultations were more formal as they involved government representatives and local organizations, consulted during face-to- face meetings. They were briefed on the EIA process, the project design, and the potential negative and positive impact of the project on the area's environment and communities. It was important not to raise community expectations unnecessarily or unrealistically during the stakeholder consultation meetings in order to avoid undue conflict with community's leaders or local administrators. The issues recorded in the consultation process were examined, validated, and addressed in the EIA report.

4.5.2 Primary Stakeholders Consultation

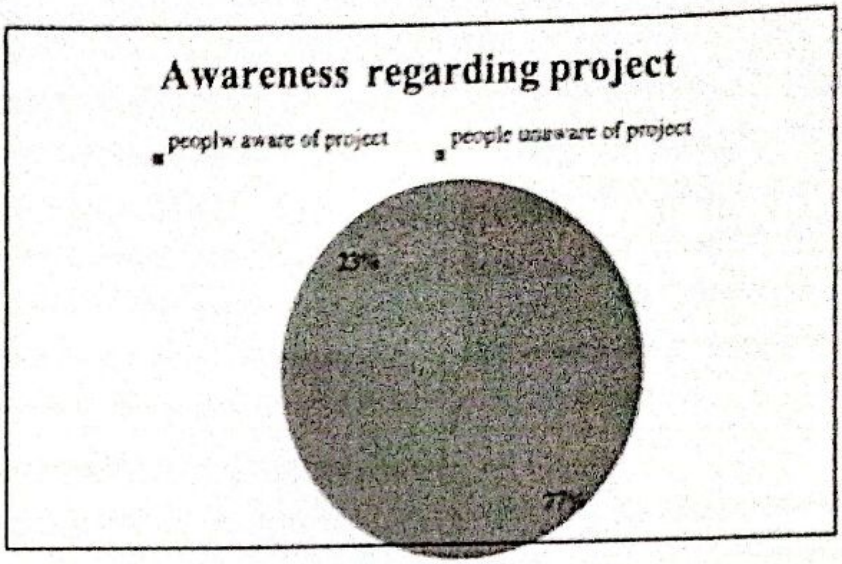
The community consultations were conducted with the community members outside their settlements to encourage and facilitate their participation. Consultation was done for 1 day.

4.5.2.1 *STAKEHOLDER CONCERNS AND RECOMMENDATIONS*

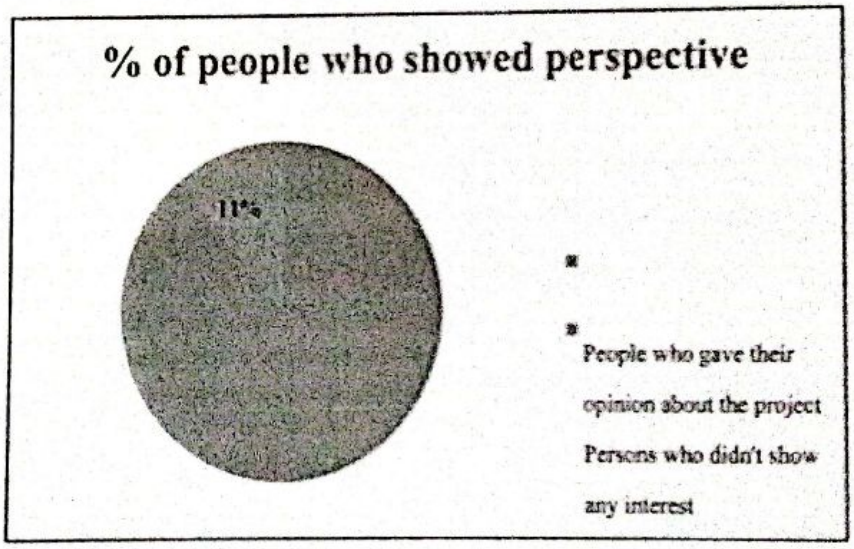
The finding of the community consultation has been addressed in various sections of EIA. Mitigation plan has been incorporated into EMP. The summary of consultation with various stakeholders is given below

Out of total respondents of, 77% knew about the project whereas 23% were not aware of the project planning and implementation. All people were then briefed about the project.

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89% commented their views about the project and 11% didn't respond.



Out of 89%, majority of the people (about 94%) favored the construction of the project keeping in view its importance and 6% people showed pessimistic views in general but mitigation measures and solutions to their concernswere provided.

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Majority of people were in favor of project. They said that project will result not only in direct jobs opportunities for locals but also will enhance subsidiary business, trade, education, and community development. The people were of the view that industry might also elevate education standards, struggle for career enhancement besides improvement in standard and quality of living in area. People were also of the view that industry may also be instrumental in connecting the local people with major cities and will result in increase in GDP.

4.6 ENVIRONMENT MANAGEMENT TEAM

The Proponent will utilize the following arrangements in the implementation of theEMMP during planning and design, construction, and operation phase. The Proponent is accountable for ensuring that resources are made available to effectively implement the EMMP and necessary environmental management measures arising from the project

Position	Responsibility
Project Manager	• Supervising construction works. • Schedule preparation and resource forecasting for engineering andother technical activities relating to the project. • Effective implementation of the EMMP • Regular performance reviews • Corrective and/or remedial action where this may be required.
Contractor	• Undertake development of facility in accordance with contract signed with the Proponent. • Adhere to Proponent HSE policies, procedures and otherrequirements while undertaking the Project. • Implement aspects of EMMP assigned to them.

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HSE Executive	• Preparation of environmental monitoring, reporting and any permitapplications (if any) • Overseeing of construction process and ensuring the implementation of avoidance and mitigation measures • Conducting monitoring and review of EMMP implementation bycontractor • Inspect the constructed facility after completion.

4.7.1 Secondary Stakeholders Consultation

The consultations were carried out with the local government officials and officials of the following departments:

1. District Office Environment, Kasur
2. Livestock Department

Comments and recommendations of all government representatives are presented in table below:

CHAPTER5: POTENTIAL ENVIRONMENTAL IMPACTSAND MITIGATION MEASURES

5.1 GENERAL

This chapter describes the potential environmental and social impacts of the proposed activities, predicts the magnitude of the impact and assesses the significance. The main intention of this section is to provide the mitigation measures that need to be adopted wherever necessary, to reduce, minimize, or compensate for the negative impacts.

5.2 IDENTIFICATION OF POTENTIAL IMPACTS

In the first step, potential impacts of the project are identified by desktop screening exercise, using checklists during field visits for collection of baseline data, professional judgment, published literature on environmental impacts of similar projects and standard environmental guidelines. Potential impacts are also identified through discussion with project proponent, consultation with stakeholder

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and community to identify their concerns. The main aspects associated with potential impacts are as follows:

- Water resources
- Ambient Air Quality
- Waste discharges
- Noise pollution
- Ecology of the area, including flora and fauna
- Vehicle movement
- Socio-economic conditions
- Archaeology

5.3 CLASSIFICATION OF IMPACTS

According to the type of potential receptors, the potential impacts are classified. The following receptor categories were used.

Category of Receptor	Description
Community	People their social and cultural values, aspirations and archaeological sensitivity
Land and Soil	Land resources, soil resources
Air Quality	Ambient air quality
Water Resources	Ground and surface water resources
Ecosystem	Vegetation, wildlife and biodiversity

5.4 SCOPING CRITERIA FOR IMPACTS

The identified potential impacts of the project are evaluated on the basis of following criteria;

- The present baseline condition, the change in environmental parameters likely to be affected by the project related activities;
- Is there any impact that environmental standards or environmental guidelines applicable to the project will be breached?
- Is there a high risk of permanent, irreversible, and significant change to environmental condition due to particular project activity?
- Did the community express any concern about this aspect?

5.5 METHODOLOGY FOR IMPACT ASSESSMENT

The impact assessment methodology defines three levels of consequences (or severity)

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and likelihood (chance of occurrence) i.e. Low, Moderate/Medium or High. The significance of an impact is determined on the basis of the level of consequence and likelihood of the impact.

Table 5-1: Definitions of severity and likelihood of impacts

Level	Severity of Impact (Consequence)	Likelihood
High	Serious / catastrophic damage to local and regional environment Serious threat to corporate reputation/ profitability / ability to do business	High likelihood of occurrence during lifetime of operation Regular / continuous part of operations
Moderate	Measurable damage to the environment Potential to affect reputation / cost Reduced efficiency	Moderate possibility of occurrence during lifetime of operation Periodic / occasional part of operations
Low	Negligible damage to the environment No risk to business	Unlikely to occur during lifetime of operation

Table 5-2: Impact Significance Matrix

		Likelihood (Probability of occurrence)		
		High	**Medium**	**Low**
Impact (Consequence)	**High**	High	High	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Low

The prediction of impacts also includes the duration of impacts in terms of short-term or long-term, nature of impact, geographical location of the impact, reversibility of the impact. The criterion for impact assessment is illustrated in the Table

Table 5-3: Impact Assessment Criteria

Impact Characteristics	Categories

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Nature of the Impact	Direct: The environmental parameter is directly changed by the project. Indirect: The environmental parameter is changed as a result of alteration in another parameter.
Duration of the Impact	Short term: Lasting only till the duration of the project Medium term: Lasting from a few months to a year Long term: Lasting for a period much greater than medium term impacts
Geographical Location of the impact	Local: Within the area of project i.e. operation site and access roads Regional: Within the boundaries of the project area National: Within the boundaries of the country
Reversibility of the impact	Reversible: When a receptor resumes its pre-project condition Irreversible: When a receptor cannot resume its pre-project condition

5.5.1 What is the problem?

The project is about pharmaceutical industry, namely "SICHER Pharma.". The major impact associated with the construction and operation of pharmaceutical industry includes solid waste management, wastewater management, noise emissions, tree plantation and fire-fighting arrangements.

5.5.2 When problem will occur and when it should be addressed?

The impacts from the pharmaceutical industry mainly occur during the construction and operational phase of the project. These issues include; noise generation, fugitive dust emissions, solid waste management, wastewater disposal, top-soil removal, Health and Safety issues and change in the geographic features of the area. These all problems should be addressed on-site where they are being generated, to avoid the residualor adverse impacts.

5.5.3 Where problem should be addressed?

The problem will be generated from site development and operation of the industry. So, it should be addressed on source, i.e. at site within the same timeframe.

5.5.4 How the problem should be addressed?

Proper mitigation measures will be provided according to the nature of the impacts/problems.

5.5.5 Ways of Achieving Mitigation Measures:

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Following ways will be adopted to reduce the impacts of the proposed development:

5.5.5.1 *Changing in Planning Design*

The design of pharma industry is developed considering environmental risk and hazards. Moreover, there is no endangered and threatened species present in the project area. Any human settlement or infrastructure was not dislocated or dismantled due to the project development. Hence, there is no need to change the design of the project.

5.5.5.2 *Improved Management and Monitoring Practices*

The anticipated impacts will be reduced significantly by adopting better management activities, as it will be carried out for the

betterment of the society. While environmental monitoring will be conducted on the regular basis to keep the sources of the air pollution, wastewater generation, noise and public nuisances in-check. Following practices that need to be adopted to reduce the impact significantly:

5.5.5.3 *Compensation in Money Terms*

Due to the development of the project, no tree cutting is involved, however, there is no protected or environmentally sensitive area present within 5.0 km vicinity of the project that could be impacted. Hence, no compensationin the monetary terms is required.

5.5.5.4 *Replacement/Relocation/Rehabilitation*

The project site is owned by the proponent and reserved for the said pharma industry. No replacement, relocation and rehabilitation is required for the commencement of the aforesaid project.

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5.6 IMPACT ASSESSMENT

Evaluation of impacts signifies the potential impacts in terms of its likelihoodnature as per the following criteria:

- The impacts are further classified based on their spatial distribution, i.e. *local,* when impacting an area of approximately 1 km radius from the project area, *moderate spread,* when impacting an area of 1 to 2 km radius and *regional* beyond 2 km.
- The impacts are classified as *short term, moderate term* and *long term* in terms of their existence in temporal scale. Impacts less than 1 year existence as *short term,* while those with 1 to 3 years as *moderate term* and more than 3 years as *long term.*
- The negative impacts are termed as *adverse impacts* while positive impacts as *beneficial.*

The significance of environmental impacts of various involved activities has been evaluated based on the criteria outlined in Table 9.

Table 5-4: Impact Significance Criteria

Impact Significance	Criteria
Long term	When the impact is of high intensity with high spread and high duration
Moderate term	When the impact is of moderate intensity with high-moderate spread and high-moderate duration
Short term	When the impact is of low intensity but with moderate spread and moderate duration or of
Insignificant	When the impact is of low intensity, low spread and low duration
Beneficial	When the impacts are positive

Based on the above-specified criteria, Matrix method has been used to describe potential environmental impacts due to project as shown in Table below. It is

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important to note that one activity may have varying impacts on different receptors i.e. different components of the environment. To avoid repetitions, this section describes various activities, which may have wide impacts on many receptors.

For example, waste generation and disposal will have impacts on land, water bodies, odour nuisance etc, therefore, the impacts of waste generation and disposal have been considered as one of the key areas of impacts. Similarly, gaseous emissions may be adverse to air quality; which on exposure may impact upon health of individuals and ecology in the surroundings.

Table 5-5: Impact Screening Checklist (Construction Phase)

Environmental Sensitivitie	Nature of Likely Impacts						Impact Significance				
	Low Intensity	Moderate Intensity	High Intensity	Local	Moderate Spread	Regional	Beneficial	Insignificant	Short Term	Moderate	Long Term
Air Quality		✓		✓							
Noise	✓			✓							
Water Quality		✓			✓						
Land Environment			✓		✓						
Flora		✓		✓							

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Fauna	✓			✓							
Local Economy			✓		✓						
Social Impacts			✓	✓							
Health & Safety		✓		✓							

Table 5-6: Impact Screening Checklist (Operational Phase)

Environmental Sensitivitie	Nature of Likely Impacts						Impact Significance				
	Low Intensity	Moderate Intensity	High Intensity	Local	Moderate Spread	Regional	Beneficial	insignificant	Short Term	Moderate	Long Term
Air Quality		✓			✓						
Noise		✓		✓							
Water Quality			✓		✓						
Land Environment	✓										
Flora	✓			✓							
Fauna	✓			✓							
Local Economy			✓		✓						
Social Impacts			✓	✓							
Health & Safety		✓		✓							

5.1 IMPACTS DUE TO PROJECT LOCATION

The said project site is located in area surrounded by other industries. The project site is devoid of any forest; hence the site clearance from Forest Department is not involved. Further, the project site is devoid of any human habitation hence evacuation of the project-affected persons is not involved inthis project. Thus, no resettlement and rehabilitation issues are involved in the said project. This project will be developed while undertaking minimum cutting for making terraces for construction while making minimum modifications in the terrain conditions and implementing environmental

The topsoil removed from the site will be restored in dumps during construction period and in the post construction phase. The top soil will be spread on the unbuilt area of the plot and tree plantations and green belt development will be

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taken up. As the top soil removed from the site will be reused for the growth of plants, no adverse impact will be envisaged due to removal of topsoil from the site.

5.7 DESIGN PHASE

In general, the design of the said project optimized the use of best available technology in order to prevent or minimize potentially significant environmental impacts associated with the project as well as to ensure high level business and environmental performances. In pre-construction / design phase, a management system will be provided at design level for the reduction of impacts. Design of the said project will be adhered to all standard technical requirements in order to avoid adverse impacts on the environment and human health. Efficient infrastructure will be developed. Procurement of construction materials from approved dealers will be ensured.

5.8 IMPACTS ASSOCIATED WITH CONSTRUCTION PHASE

This section explains how said project affected different environmental aspects and its mitigation measures to manage the impact. The impacts during construction phase will be temporary and localized. Even though, the proper mitigation measures will be followed to minimize such impacts.

Sr. No	Aspect	Impacts	Mitigation Measures
1	Economy Improvement	During construction phase, employment opportunitiesfor local people will be generated.	No mitigation measure are required.

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2	Air Quality	During construction phase, suspended particulate matter will be the main pollutants Fugitive emissions will be observed due to vehicular movement. But it will be negligible or temporary phenomenon.	Dust emissions will be minimized through strict enforcement of onsite speed controls. The routes will be sprinkled with water regularly to reduce the amount of dust generated by construction vehicles. All vehicles and construction machinery will be properly tuned, serviced and monitored on regular basis.
3	Water Quality	During construction phase, water will be required for sprinkling on roads for dust suppression, domestic uses of construction workers	During this phase, water conservation practices willbe given proper consideration.
4	Relocation of Utilities	The project site is already near other industries. The construction will not relocate the existing public utilities.	No mitigation measure will be required.
5	Solid Waste Generation	During excavation of the site for foundation works and landscaping, solid waste will be generated. The waste consisted of metal cuttings, rejected materials, surplus material, paper bags, cement bags, empty cartons and broken glass pieces.	Recyclable material will be separated at source. The cement bags and other such items will be handed over to approved contractors on weekly basis.

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6	Noise Pollution	During construction phase, the major sources of noise are due to operation of construction equipment. The anticipated noise will be mostly confined to the facility itself.	Several mitigation measures will be considered. For this purpose, most of the extension works will be done in day time.
7	Ecology	The project site is located in industrial- agricultural zone. It is devoid of thick forest and vegetation.	Tree plantation will be done to act as pollution barrier as well as to enhance the aesthetic beauty of the area.
8	Worker's Health, Safety and Environment	The construction activities have the potential to pose negative impact on the health and safety of workers in case of unfavorable working conditions.	The contractor will ensure that the workers and labors will be trained in safety procedures for all relevant aspects of the construction. Workers will be provided with proper safety equipment which will be required on the basis of nature of the work. First aid kits will be kept available on the site to ensure safe working environment for the labors and workers. As per the requirement warning signs will be displayed in local language. Proper fencing will be done around the site.

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5.9 IMPACTS ASSOCIATED WITH OPERATION PHASE

In this section, the environmental and socio-economic impacts associated with the said project operation activities are discussed. The impacts that are discussed are as follows:

1. Environmental Impacts
- Air emissions
- Noise
- Traffic
- Solid waste and by-products
- Wastewater
- Resource Consumption
- Abnormal conditions
- Occupational Health and Safety
2. Socioeconomic Impacts
- Employment Opportunity
- Community Development

5.10 ENVIRONMENTAL IMPACTS

5.10.1 AIR EMISSIONS

POTENTIAL IMPACTS

Air emissions from the project are relatively small. Particulate emissions are typically not significant. Fugitive dusts and emissions may result during raw material handling and storage which is relatively less likely to occur. Other potential sources for air emissions are combustion products (nitrogen oxides, sulfur dioxide, particulate matter, carbon monoxide) from standby diesel generators and combustion products from vehicles used for project activities. The emissions from standby generators will be less in concentration. The emission levels depend on the type and quality of fuel and the manner in which it is burnt.

MITIGATION MEASURES

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The following mitigation measures will be implemented. The proposedmitigation measures to reduce the impacts on air quality during the proposed operation activities are:

- Clean and maintain a sufficient level of temperature and humidity in every section.
- Proper handling of raw material to minimize the likelihood of fugitive dust and emissions during storage.
- Monitoring of Ambient air parameters (Particulate matter, SOx, NOx) emissions should be carried out on regular basis to ensure compliance withthe PEQS.
- Plantation of indigenous trees within the premises and along the boundary.

RESIDUAL IMPACT

If proper mitigation measures are effectively implemented, the residual impact of the proposed activities on the area's air quality is expected to be low in terms of significance.

5.10.2 NOISE

POTENTIAL IMPACTS

The main sources of pollution from noise are during raw material and finished good loading and unloading, vehicle movements, operation of machines. The increased noise may be a source of disturbance to workers, working near to the machines. Noise level during operation phase of pharmaceutical unit will be limited to operational site. Workers could be exposed to high noise levels, however only concerned staff will be working in the area with required personal protective equipment (PPE) to minimize or reduce the noise exposure. The residential area is located at a distance of more than 1.5 km away from the project site and there will be no significant impact on the community.

MITIGATION MEASURES

The following mitigation measures will be undertaken in order to further reduce the noise levels:

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- Effective noise suppression design and plan will be made for all noise producing equipment i.e. high noise generating machines will be kept in isolation from other machines to minimize the overall cumulative noise.
- It will be ensured that generators, vehicles and other potentially noisy equipment are in good condition. Noise from generators, vehicles, other equipment and machinery will be kept to the minimum through regular maintenance.
- Noise monitoring will be carried out periodically.

RESIDUAL IMPACTS

Implementation of the mitigation measures proposed above will result in negligible to no residual impact due to pharmaceutical unit noise on the surrounding environment.

5.10.3 TRAFFIC

The operational phase of the pharmaceutical unit will result in increasedtraffic. However, the impact will be minimal. Vehicles will be well maintained to prevent unnecessary exhaust emissions and drivers will be appropriately trained.

MITIGATION MEASURES

The following mitigation measure will be implemented.

- Nighttime driving of project vehicles will be limited where possible.
- Vehicles will remain confined to defined access.
- Speed limits will be maintained.
- Road signage relevant to the project traffic will be placed, where necessary.
- Community complaint register and other means will be adopted for the community to complain about non-adherence of traffic to speed limits, safe driving and other safety related concerns.
- All vehicle drivers will be trained in community safety aspects. Drivers will be trained in responsible and safe driving practices; safe speed limits for vehicles will be followed.

5.10.4 SOLID WASTE

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Solid waste generated from a pharmaceutical unit comprises of raw materials packaging waste like cartons, material bags, finished goods packaging waste etc. Most of the generated waste will be recyclable. The rejected raw materialwill be handed back to the supplier. The generated domestic solid waste willbe handled as per area practices. If the waste management is not carried out properly, it can affect health of workers, pollution of soil, surface or ground water. All waste generated from the project will be managed by proposed controls. The environmental impacts will be minimized after the implementation of the proposed mitigations.

MITIGATION MEASURES

The following mitigation measures will be implemented:

GENERAL WASTE MANAGEMENT PRACTICES

During operational phase of the project, a proper waste management plan will be devised and implemented. Key elements of the waste management systemwill include the following:

ON-SITE HANDLING

- Proper waste collection system will be ensured. For this purpose, waste bins will be placed inside the boundary.
- The recyclable waste will be sent to waste contractors.
- Records of generated waste should be maintained.
- All non-hazardous waste that can be recycled or reused will be handed over to the contractors.

OTHER MANAGEMENT MEASURES

- Training will be provided to personnel for identification, segregation and management of waste.
- All containers of waste will be labeled properly.
- In-house audits of the waste management will be undertaken on regular

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basis.

RESIDUAL IMPACTS

Proper implementation of the mitigation measures will minimize the residual impact from waste. Monitoring and inspection will be undertaken to ensurethe implementation of mitigation measures.

5.10.5 WASTEWATER

Wastewater will be disposed off in Tehsil Council Drain after proper treatment through activated sludge process for which treatment plant has already been installed. Municipal wastewater coming from various municipalworks, such as cleaning will be generated, which will be treated via a Septic Tank. Process flow diagram of wwtp is attached as annexure.

RESIDUAL IMPACTS

Implementation of the proposed mitigation measures and regular monitoring is not likely to leave any significant impact of the waste water from the pharmaceutical unit.

5.10.6 ABNORMAL CONDITIONS

Abnormal events might include loss of power and fire outbreak. The pharmaceutical unit will have its own backup power supply using diesel generator to protect against a loss of power. The facility will be equipped with a proper fire-fighting and emergency evacuation plan to tackle in case of any fire outbreak.

5.10.7 OCCUPATIONAL HEALTH AND SAFETY

This section discusses the occupational health and safety impacts of the operation of pharmaceutical unit. Physical hazards may include exposure to same-level fall hazards due to slippery conditions especially during cleaning of syrup tanks. In a variety of situations, a worker can be exposed to lifting, carrying, and repetitive work and work posture injuries.

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MITIGATION MEASURES

In order to reduce the physical hazards and other health and safety issues that may be encountered at workplace, following will be followed.

- Proper training will be provided for the proper usage of machineries and personal protective equipment (PPE) will be provided. It will be ensured that the individual who has received the correct training is operating a particular machine.
- Regular housekeeping practices will be ensured by keeping the floor dry and during washing; proper protective equipment are being used. Restricted entry should be ensured during washing.
- Training of staff in the handling of lifting materials.
- Timely maintenance and repair of electrical equipment will be conducted.
- Implementation of work rotations, provision of regular work breaks.
- At workplace, first aid facilities will be maintained at readily accessible places.

5.11 SOCIOECONOMIC IMPACTS

A summary of potential socio-economic impacts of the project is presented in Table below.

Table 5-7: Potential Socioeconomic impacts of the project

Impact	Beneficial	Adverse
Economic	Employment generation Procurement of equipment and services Local authority business tax / rates revenue Increase in property value	Negative economic Impacts are not anticipated

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Social	Indirect beneficial community impacts from employment Provision of training to employees and workers	Risks of occupational and environmental health issues.

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By implementing the following mitigation measures, impact to community can be minimized.

- All vehicle drivers will be trained in community safety aspects.
- The company will maintain a social complaint register at the site to document all complaints received from local communities. The register will also record the measures taken to mitigate these concerns.
- It will be ensured that generators, vehicles, and other potentially noisy equipment used are in good condition. Noise from generators, vehiclesand other equipment will be kept to the minimum through regular maintenance.
- Maximum number of unskilled and semi-skilled jobs will be reserved for the local communities.

EMPLOYMENT OPPORTUNITIES

The project is expected to have positive impact on economic condition of locals. Employment opportunities will be generated due to said project activities. The project will generate approximately 80-100 jobs during operation phase of the project.

Similarly, the operation of the project will create far greater number of indirect income resources for example income resource for transporters for the transportation of the raw materials, procurement of required goods from local market etc.

Overall the project will have a positive impact on the employment opportunities of Pakistan.

5.12 POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES

GREENBELT DEVELOPMENT

Apart from functioning as a pollutant sink, green belts provide other benefits like:

Green belt helps in noise abatement for the surrounding area

Thus, it is recommended as noise barriers.

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- Green belt helps in achieving bio diversity by providing possible habitats for birds and animals.
- Green belts increase the aesthetic value of the site.

Adequate number of small plants and trees are planted along the periphery of the unit and available open spaces.

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6 CHAPTER 6: ENVIRONMENTAL MANGEMENT AND MONITORING PLANS

6.1 GENERAL

This EIA provides the Environmental Management Plan (EMP) of the project to keep it environment benign as well as the monitoring plan to ensure the compliance of the established EMP.

Outline and key features of the EMP for construction and operations phase is presented in sub-sections below. As per the environmental legislation in Pakistan, the EMP for the operations phase, along with other documents, is to be submitted to the environmental protection agency to obtain confirmation for compliance and Environmental Approval for project operation. Even after implementation of the suggested mitigation measures, the impact may remain significant, and require regular monitoring. This section also underlies the monitoring framework for both construction and operation phases to check compliance of the EMP and to take timely actions for correction in case any accidence of significant criteria, requirements or goals are found.

6.2 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The primary objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified
- Define the responsibilities of the project proponent and contractor and provide a means of effective communication of environmental issues between them.
- Identify monitoring parameters in order 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.

6.3 MANAGEMENT APPROACH

The organizational roles and responsibilities of the key players are summarized

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below:

Proponent: The project proponent will undertake overall responsibility for compliance with the EMP. Concerned Departments will carry out verification checks to ensure that the contractors are effectively implementing their environmental and social requirements.

Contractors: The contractors will implement the majority of environmental and social mitigation measures. The contractors will carry out field activities as part of the project. The contractors are subject to certain liabilities under theenvironmental laws of the country, and under its contract with proponent.

6.4 COMPONENTS OF THE EMP

THE EMP CONSISTS OF THE FOLLOWING:

- Management plan
- Monitoring Plan
- Communication and documentation
- Institutional capacity
- Environmental training

6.5 ENVIRONMENT MANAGEMENT PLAN(Project Specific)

It lists all the mitigation measures identified in the EIA and the associated environmental or social aspect in line during operational phase with the administrative framework involving all the responsible implementing authorities who are required to take the planned actions/measures. It enhances project benefits by reducing its impacts and making it environmentalfriendly.

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Table 6-1: Environmental Management Plan/Proposed Mitigation Actions

Objective	Management Action	Responsibility	Time framework	Residual impact
Construction phase				
Employment Opportunities				
To promote the employment of local persons	Recruitment of local workers will be undertaken without discrimination and in accordance with company recruitment policy by contractors involved in construction	Contractor	On commencement of constructionactivities	Unemployed people of area will get job opportunities and their standard of living improved
To promote the useof local service providers	Local procurement of goods and services will be undertaken wherever possible and cost effectiveand where practicable to the project	Contractor	On commencement of construction activities	Indirect job opportunities
Safety during construction				
To ensure safety onconstruction site	• Safety signage will be put inrelevant places within the construction site • Construction drivers are subjected to public safetyawareness • Reckless driving by constructionworkers will be prohibited and monitored	Contractor/ Environmental manager/EHS manager	On commencementof construction activities	Safety of workers will be ensured by implementing proposedmitigation measures

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	• Workers will be given PPEs suchas; helmets, mask, ear-plugs/muffs, safety boots, etc.			

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	and its use will be strictly enforced • Workers will be trained on the regular basis regarding personal safety • Incidents will be reported directly to the concerned authority			
Construction waste management				

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To prevent the contamination of soils and water resources due to inappropriate management and disposal of waste	• The construction site has litter bins for waste collection • Recycling or reuse of waste wherever possible. • Application of a good strategy to collect, remove and safelydispose of waste on daily basis to ensure a clean environment in the factory site • Integrated waste management system will be adopted for the proper management of the waste at site • At the end of the construction phase, left-over waste will be removed by using the standard waste management procedures • All the idle machinery and equipment will be immediately removed from the site • Scrap and the debris will be removed from the site at the	Contractor	Throughout construction stage	Waste will be disposed of/reused/ recycle or resale as per practices of area

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	end of the construction stage after appropriate segregation of the material			
Pollution control management				
To contain spillages	• Proper maintenance of construction vehicles and equipment will be undertaken • Appropriate environmental security measures including shovels and plastic bags etc will be provided to prevent accidental release to ground. • Appropriate procedures and protocols will be establishedand monitored for materials transport and handling whilst on the site.	Contractor	On-site establishment	Potential for accidental release of materials during transport and handling on the site will be minimized.
To manage sewage	Portable toilets will be used	Contractor	On commencement of construction	
Protection of biodiversity				
To avoid unnecessary disturbance of and quick recovery of biodiversity in the plant site	• Avoid destruction of biodiversity outside the designated factory construction site • Minimize clearing of vegetation during construction • Surface soil excavated during construction to be placed back on the sub-soil to fast	Contactor	Throughout construction phase	Vegetation loss cannot be avoided, but successful restoration, improvement and long-term management of the surrounding areas and maintenance of planted trees will be provided

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	vegetation recovery • Prepare and implement an appropriate landscaping programme to help in re-vegetation of affected project areas after construction • The flora of the site will be restored at the end of the construction phase by landscaping and planting native vegetation			
Air quality & dust management				
To minimize the dust entrainment during construction	• Regular surface wetting will be implemented on dusty sections in the factory construction site • Strict on-site speed controls will be enforced for construction vehicles • All trucks hauling soil, sand and other loose materials will be covered • No excavation activity will be carried out during windy days • Fuel-efficient and well-maintained haulage trucks will be employed to minimize exhaust emissions • Construction workers will be sensitized on measures to reduce air pollution	Contractor	On commencement of construction activities	Dust propagation was limited to construction area and did not influence local community. However workers will be supplied with dust masks especially on dry days.

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To minimize disturbance due to noise	• Loading and unloading of materials will be done carefully to reduce noise disturbances to surrounding households • Residences are at a safe distance from site so no disturbance is envisaged. • Drivers will be instructed to avoid unnecessary gunning of vehicles, hooting and buzzing. • Regular maintenance of the machinery will be done to reduce the noise • Vehicles will be tuned on regular basis	Contractor	On commencement of construction activities	Noise level will be within PEQs
Occupational health & safety				

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To ensure healthy and Secure/safe environment in the construction site for all workers	• Management will ensure that fire extinguishers are located in strategic and visible places • All vehicles and construction equipment will be under control of competent personnel • Inspection of material and harmonization to the occupational health and safety standards. • Adequate security for workers will be be provided during construction • Sensitize workers to operate in teams	Contractor	Throughout construction phase	Record of all incidents will be maintained and reported to EHS manager.
Operation phase				
Wastewater management				

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Degradation of surface waters quality due toprocess water and sewage direct disposal	Wastewater will be disposed off in Tehsil Council Drain after proper treatment through activatedsludge process for whichtreatment plant has already been installed. Municipal wastewater coming from various municipal works, such as cleaning will be generated, which will be treated via a Septic Tank. Process flow diagram of wwtp is attached as annexure.	SICHER Pharma.	Throughout project life cycle	None
Air quality management				
Particulate emissions and generator stack emissions	• No air emission is likely to be released during operation of the project; except the dust or PM to be produced during floor cleaning and other such operations, which also will not be posing any environmental threat (will not breach the safe standards). Wet suppression is done to control dust emissions.	SICHER Pharma.	Throughout operation phase	Local air quality will be virtually unaffected and will be based on PEQs

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	Generator emissions will be controlled by providing proper enclosure, tuning and maintenance.			
Noise & vibration				
To minimize disturbance of communities due to noise	• All the machinery will be installed and operated in a closed hall and from operation of machinery noise will not be a problem for the residents in the area nearby. Further Administration of the unit will take the precautionary measures to avoid the noise emissions. There is no possibility of Noise pollution • A thick greenbelt will be developed all around the plant which will be acting as noise barrier. • Introduction of control and monitoring rooms having good sound insulation properties. • All the workers will be provided with ear plugs. • All the transporters will be advised to carry out regular maintenance of their vehicles.	SICHER Pharma.	Throughout project life cycle	Noise level will be based on PEQs
Traffic & transport				
Increased heavy	• Restricting delivery hours to	Management	Throughout	The traffic has the

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vehicles traffic both locally and nationally.	reduce noise nuisance; avoid heavy truck movements in the night hours will be considered whether deliveries should be scheduled to avoid peak times to reduce congestion	of SICHER Pharma.	project operation	potential to contribute to congestion and lead to complaints due to noise/vibration nuisance on a local basis. However, the study indicates that there will not be a significant impact.
EHS				
To minimize loss work injury/hazards/incidents/accidents	• Training regarding EHS should be given on the regular basis • Workers will be given PPEs such as; helmets, mask, ear-plugs/muffs, safety boots, etc. • It should be strictly enforced to wear PPEs while working • Workers will be trained on the regular basis regarding personal safety and disaster management • Incidents should be reported directly to the concerned authority	Environmental manager/EHS	Throughout life cycle of project	Potential of injuries will be minimized
First aid				
To ensure safety and health	• First aid box will be available at the site • First aid training will be givento the employees on the regular basis	Environmental manager/EHS	Throughout life cycle of project	None

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	• Numbers of all the concerned/authorized persons that will be contacted in the case of emergency will be displayed on-site			
Fire hazard				
To prevent any disaster	• Firefighting equipment including DCP type fire extinguisher, CO2 Type extinguisher, sand buckets, sand drums with spade and hose pipe cabinet will be installed inside the plant • All the equipment will be placed at strategic locations where the risk of out-burst of the fire is high. List of fire posts is annexed. • Smoking will not be permittedin the vicinity of the plant • Regular site inspection will be done to eliminate all the chances of the hazards • Checking and maintenance ofthe fire-fighting equipment will be carried out on the regular basis • Emergency evacuation plan is annexed.	Environmental manager/EHS	Throughout life cycle of project	Potential of disaster will be minimized by suggested mitigation measures implementation
Employment				
To provide job	• During this phase, skilled and	Sicher pharma	During	Direct and indirect jobs

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opportunities and helping in improving living standard of people	unskilled labour will be required. • Employment opportunities for the un-skilled workers will therefore increase which will enhance the positive benefits for the local people who are in dire need of income for sustenance. • Indirect opportunities for employment will arise from the provision of services to the construction teams, such as sale of raw-material such as cement, bricks, sand etc., as well as food and beverages forthe labour and after completion of construction phase serve as a permanent business opportunity.	(Pvt.) Ltd.	construction and operation phase	

6.1 ENVIRONMENTAL MONITORING PROGRAMME

Environmental monitoring is a vital component of the Environmental Management Plan. It is the mechanism through which the effectiveness of the environmental management Plan in protecting the environment is measured. The feedback provided by the environmental monitoring is instrumental in identifying any problem or lapse in the system under implementation and planning corrective actions.

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Table 6-2: Environmental Monitoring Programme

Env. Components	Project Stage	Parameters	Instrument	Standards	Monitoring			Institutional Responsibility
					Location	Frequency	Duration	
Air	Construction	PM_{10}, SO_2, NO_2, CO, SPM, O_3	Air Quality Monitors/Gadgets	PEQS	Project site	Twice during construction	As per approved testing method	Contractor through approved monitoring lab
	Operation	Stack emissions	Air Quality Monitors/Gadgets	PEQs	stack	Monthly	As per approved testing method	Through approved third party/monitoring lab

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Noise Levels	Construction	Noise levelson dB(A) scale	Digital Sound Meter	PEQs	Project site	Twice during construction	Reading to be takenat 15 seconds interval for 15 minutes every hourand then averaged	Contractor through approved monitoring lab
	Operation	Noise levelson dB(A) scale	Digital Sound Meter	PEQs	Project site	Annually	Reading to be takenat 15 seconds interval for 15 minutes every hourand then averaged	Through approved third party/monitoring lab

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Waste water	Operation	BOD, COD, TSS etc	Through approved equipments	PEQs	ETP	Monthly	As per approved testing method	Through approved third party/monitoring lab

6.1 ROLES & RESPONSIBILITIES OF ENVIRONMENT MANAGEMENT TEAM

The Proponent will utilize the following arrangements in the implementation of theEMMP during planning and design, construction, and operation phase. The Proponent is accountable for ensuring thatresources are made available to effectively implement the EMMP and necessary environmental management measures arising from the project

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Position	Responsibility
Project Manager	• Supervising construction works. • Schedule preparation and resource forecasting for engineering and other technical activities relating to the project. • Effective implementation of the EMMP • Regular performance reviews • Corrective and/or remedial action where this may be required.
Contractor	• Undertake development of facility in accordance with contract signed with the Proponent. • Adhere to Proponent HSE policies, procedures and otherrequirements while undertaking the Project. • Implement aspects of EMMP assigned to them.
HSE Executive	• Preparation of environmental monitoring, reporting and any permitapplications (if any) • Overseeing of construction process and ensuring the implementation of avoidance and mitigation measures • Conducting monitoring and review of EMMP implementation bycontractor

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	• Inspect the constructed facility after completion.

6.7.1 Primary Responsibilities

The primary responsibility for implementing EMP lies with the owner ofproject.

6.7.2 Operation Management & Control

Conducting the operational activities in environmentally sound manner willbe the responsibility of the concerned Manager; for which he will be trained.

6.7.3 Supervision & Monitoring

Senior Supervisor will be responsible for all environmental issues and for theimplementation of EMP.

6.2 REPORTING & REVIEWING PROCEDURES

An effective mechanism to store and communicate environmental informationduring the project is an essential requirement of an EMP.

6.8.1 MEETINGS

Two kinds of environmental meetings will take place during the project:

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- Kick-off meetings
- Weekly meetings

The purpose of the kick-off meeting will be to present the EMP to project staff and discuss its implementation and to discuss any event of environmental significance that has happened in the under-discussion industry or a similar

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industrial unit to investigate its route causes and develop its solutions.

The purpose of the weekly meetings will be to discuss the conduct of the operation and environmental issues and their management. The proceedings of the meeting will be recorded in the form of a weekly environmental report.

6.8.2 CHANGES-RECORD REGISTER

A change-record register will be maintained at the site, in order to document any changes in project design. These changes will be handled through the change management mechanism.

6.3 ENVIRONMENTAL TRAINING

Environmental training will help to ensure that the requirements of the EIA and EMP are clearly understood and followed by all project personnel in the course of the project.

Table 6-3: Training Program

Target audience	Trainers	Contents	Schedule
Selected management staff	Contractors	Key finding of mitigation measure	After every five months
All personnel	EHS Officer	Mitigation measures	Monthly
Technical Staff	EHS Officer	Waste disposal or sale out status, vehicle movement restriction and other mitigation measures	After every three month
Other staff	EHS Officer	Waste disposal, resource conservation and other mitigation workers	Monthly

6.1 EQUIPMENT MAINTENANCE DETAILS

The project is about pharmaceutical unit namely "SICHER Pharma.". Machines in pharmaceutical unit will be maintained on the regular basis. The fire-

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fighting equipment that would be installed in the halls/buildings will also be checked and maintained or regular basis. Onlyfire safety equipment such as; portable fire extinguishers will be installed which will need regular maintenance and check in order to eliminate hazards of associated the fire risks. Following is the maintenance details for the machines and equipments:

Task	Weekly	Monthly	Semi-Annually	Annually
Visual Inspection	✓			
Testing and Inspection			✓	
Maintenance of Machines		✓		
Fire Mains and Nozzles		✓		
Containers/Cylinders			✓	
Control and Section Valves			✓	

6.2 ENVIRONMENTAL BUDGET

Approximately PKR 1.2 Million budget will be reserved for tree plantation, solid waste management, wastewater management and environmental monitoring. Monitoring tests for ambient air quality, noise and groundwater quality will also be conducted.

Table 6-4: Schedule for Implementation & Environmental budget

Amenities	Frequency	Cost in PKR (Million)	
Ambient air monitoring	Construction: Biannualy	20,000/-	0.2 Million

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	Operation: quarterly	
Noise monitoring	Construction: Biannualy Operation: quarterly	10,000/-
Water quality monitoring	Construction: Biannualy Operation: quarterly	20,000/-
Health & safety	Daily	30,000/-
Tree Plantation/Green Belts Development	Monthly	60,000/-
Solid Waste Management	Monthly	60,000/-
Wastewater Treatment	Monthly	1 Million
Total Cost		**PKR 1.2 Million**

Sr. #	Activities	6 Months			6 Months			6 Months			6 Months		
		2M	2M	2M	2M	2M	2M	2M	2M	2M	2M	2M	2M
1	Detailed Designing												
2	Mobilization of Contractors												
3	Lean Construction Period												
4	Peak Construction Period												
6	Installation of machinery												
7	Installation of firefighting equipments & emergency exits												

M=Month

7 *CHAPTER 7:* CONCLUSION AND RECOMMENDATIONS

7.1 CONCLUSION

The report presents Environmental Impact Assessment (EIA) of the said pharmaceutical unit.

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EIA of Said Project is performed according to guidelines of EPA. It includes description of the project, description of the environmental baselines, potential environmental impacts and suggested mitigation measures. An implementation mechanism for mitigation measures in the form of an Environmental Management Plan is included in the study.

The performed EIA showed all anticipated impacts (both positive and negative), associated with the project. Appropriate mitigation measures as explained in the environmental study will strengthened the environment andpromote sustainable development.

Based on overall assessment of the environmental impact of the project, it is concluded that the economic benefit from the project is not at the cost of environment. From the historical records and vast experience in sustainable development keeping environment as integral part of manufacturing system, SICHER Pharma. is worthy of Environmental approval. Further the project is not likely to cause any significant adverse impact on the physical and biological environment but positive impact on social development and economic prosperity of the area, provided that suitable mitigation measures as identified in this study are implemented.

It is accordingly recommended that Environmental Approval for the project may be issued by the Punjab Environmental Protection Agency, subject to payment of the requisite scrutiny fee by the proponent of the project.

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7.2 RECOMMENDATIONS

The Environmental Impact Assessment study and survey results are finallyevaluated to recommend the following:

- Implementation of EMP must be given top priority.
- Proper PPEs including ear plugs, ear muffs, mufflers, goggles, glovesand shoes etc. should be provided to workers
- Train workers to use PPEs
- Advise workers to follow SOPs.
- Equipment maintenance and efficiency must be checked.
- No compromise on public health and environment should beallowed.
- Waste minimization practices should be employed and workersshould be encouraged to adopt such methods.
- Wages should be distributed on time.
- Proper tree plantation plan should also be developed in order tomake the unit environment friendly.
- Small waste storage bins should be installed at different corner forproper waste collection and discharge.
- Proper dispensary and first aid box should be provided for workers
- Smoking should be avoided within premises of project site and nearfuel storage areas.
- The Security Guards shall also be trained to act in case of all possible emergency

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situations. The fire alarms can be activated to signal evacuation. At the same time, communication shall be made with hospitals, emergency services and police for urgent support.

- The proposed Environmental Management & Monitoring Plan shouldbe implemented.

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