

HAMZA SUGAR MILLS LTD
ENHANCEMENT OF CRUSHING CAPACITY

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan, one of the largest white refined sugar manufacturers in Pakistan, is already in operation since 1964. Now, management is intending to enhance crushing capacity of existing sugar mill upto 38000 TCD (Tons crushed daily). Management of Hamza Sugar Mills has obtained approval from Directorate General of Industries Prices, Weights and Measures Punjab and it is annexed.

The proposed extension will be done in already established sugar mills at Jetha Bhuta Khan pur, Rahim yar khan. The site was selected due to certain factors such as land availability which is in closer proximity to market at the surrounding location of industries and easily availability of transport at cheaper cost. The management will purchase high quality machinery / equipment for extension project.

ES.2 TITLE OF REPORT

HAMZA SUGAR MILLS LIMITED JETHA BHUTA, KHAN PUR, RAHIM YAR KHAN

ENHANCEMENT OF CRUSHING CAPACITY OF EXISTING SUGAR MILL
UPTO 38000 TCD (TONS CRUSHED DAILY).

Management of Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan intends to enhance crushing capacity. This is Environmental Impact Assessment (EIA) Report along with an Environmental, Social and Risk Management and Monitoring Plan (ESRMP).

ES.3 PROJECT'S LOCATION

The enhancement of crushing capacity of existing sugar mill upto 38000 TCD (Tons crushed daily) will be done in already established Hamza Sugar Mills Limited located at Jetha Bhuta, Khan pur, Rahim yar khan.

Sugar Mill was established in an economically and industrially backward area of Pakistan to endow with employment opportunities to local population.

Proposed Layout of extension project and Google imagery of the project is annexed at the end of the report.

ES.4 NAME OF THE PROPONENT

Sikandar Zulqernain Group General Manager

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6583807

Brief Activities

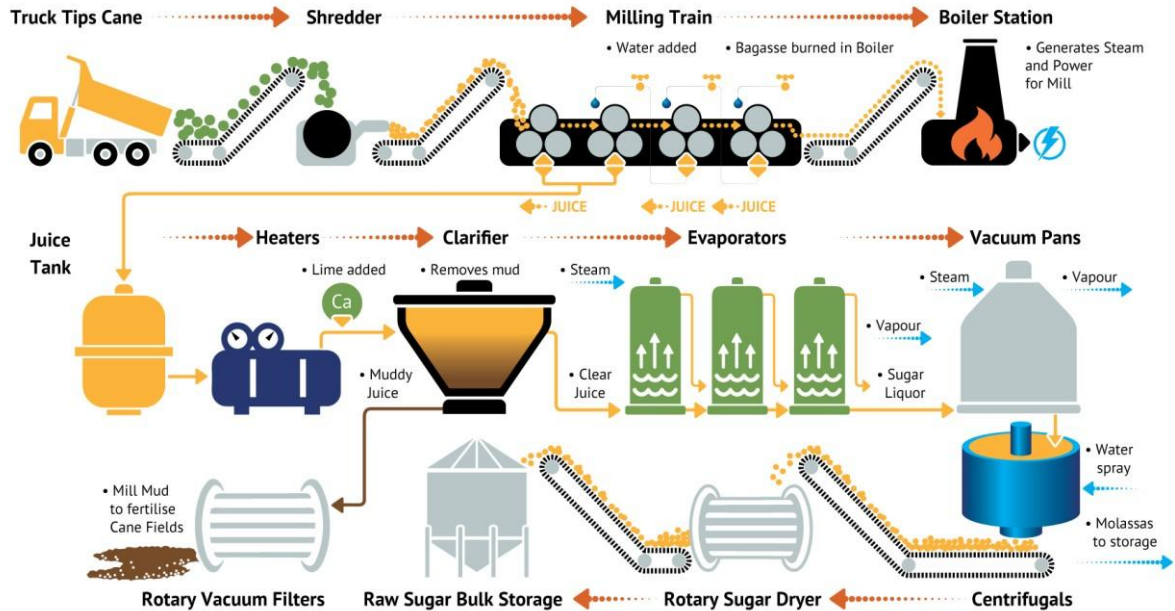
The management of Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan intends to enhance crushing capacity of existing sugar mill upto 38000 TCD (Tons crushed daily).

Management of Hamza Sugar Mills has obtained approval from Directorate General of Industries Prices, Weights and Measures Punjab.

The sugar manufacturing process will consist of following steps:

1. Extraction of juice (crushing)
2. Clarification of juice
3. Concentration of juice (juice to syrup) by evaporation
4. Boiling of syrup to grain (crystallization)

5. Separation of crystals from mother liquor (centrifuging)



The extension project is justified by the vision and mission of Hamza Group to improve and promote industrialization in the county. The total manpower required for the sugar mill is about 190 workers whose number will progressively increase as sugar mill gains momentum and extend its capacity. Eventually, the factory operations are expected to support the livelihoods of approximately more than 5000 people comprising of; farmers and their families, farm laborers, traders, tractor and vehicle operators which will then support the overall economic development vision of Country and the wider region.

ES.5 NAME OF THE ORGANIZATION PREPARING REPORT

In keeping view with the regulatory requirement of the country, management engaged **Environmental and Social Technical Services (ESTS)** to undertake an Environmental Impact Assessment (EIA) Report preparation.

ES.6 A BRIEF OUT LINE OF THE PROPOSAL

The extension project is designed to meet Punjab Environmental Quality Standards (PEQS) along with all other requirements as imposed by the Environmental laws and Regulations of local bodies.

Thus, the proposed project will operate in compliance with Punjab Environmental Quality Standards (PEQS). ○ All workers will be provided with Personal Protective Equipment's (PPEs) e.g. ear covering and wear glasses while working on plant.

- Medical checkup of all workers will be done after a specific time period (may be quarterly).
- Plantation will be carried out in the surrounding area as it can absorb noise and air pollution and improve environment.
- Noise pollution from machinery will be controlled or managed properly.
- Extensive plantation shall be done to improve/enhance the environmental scenario of sugar mill.

The proposed project enhancement of crushing capacity of existing sugar mill upto 38000 TCD (Tons crushed daily) within existing Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan to enhance economic growth of the country. It has no adverse impacts on the locality. It helps to enhance environment friendly atmosphere.

The fire-fighting system covers fire detection and protection system for the project.

The system will include the following:

- Fire-fighting water supply system ○ Indoor and Outdoor hydrants system ○ Fixed water spray system ○ Fire Extinguishers ○ Fire detection and alarm system

According to the Environment Protection Agency, Government of the Punjab, Lahore Review of IEE and EIA Regulations 2022 “List of Projects Requiring an EIA”, **Schedule II B (3) (Sugar Mills and distilleries)** said project under consideration falls in the category of the projects requiring Environmental Impact Assessment

(EIA). Further, the client is required to fulfill the legal requirements of the Section-12 of the Pakistan Environmental Protection Act 1997.

ES.7 THE MAJOR IMPACTS

The overall impacts of the proposed project can be considered positive. However, it may pose some minor and moderate negative social and environmental impacts which will require proper mitigation measures during mill operation.

Therefore, the intended measures are directed towards the mitigation of the identified adverse impacts. Some of the impacts are listed below:

- Likelihood of backend impacts relating to consumption of natural resources including water for various process and non-process operations.
- Likelihood of impacts relating to generation of sanitation wastewater from toilets and washrooms at the proposed project site if disposal will be improper.
- Likelihood of impacts relating to occupational health, worksite safety and noninsurance of the workers against the risks of job injury and resultant consequences.

There will be some generation of the ordinary food-based wastes and food residues resulting from consumption of food and eatables by the site workers taking their meals at the project site. Additionally, there will be generation of sanitation wastewater from the worksite toilets at the project premises.

A brief description of the various likely impacts follows hereunder:

- **Impacts of Land Use Change:** The proposed site for capacity enhancement is owned by Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan. Thus, no permanent impacts of land use change are expected, as the land surrounding the project site is not under any productive agricultural usage. Therefore, it would not involve any land use change. (*Activity devoid of any environmental or social impact*).
- **Impacts on Local Ecology, Biodiversity and the Habitat:** No Impacts as this aspect will be totally irrelevant to the proposed capacity enhancement and due

of its geophysical location; there will be no likelihood of damage to the local flora and fauna. (*Aspect/Activity devoid of any adverse environmental or social impact*).

- **Likelihood of Worksite Risks and Personal Injuries:** Non-observance of the standard procedures and non-compliance of the precautionary measures (like smoking on worksite, wearing loose cloths and avoiding the safety equipments) may render the workers prone to higher chances of emergency accidents. (*Aspect/Activity devoid of any adverse environmental or social impact*).
- **Loss of Livelihood and Structural Damages:** No impacts are related to loss of livelihoods of the neighboring residents, landowners or farmers or any structural damage. As capacity enhancement will be done within premises of Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan, therefore there is neither any human population nor any built-up sites upto considerable distance from the proposed project site. (*Activity devoid of any environmental or social impact*).
- **Impacts of Inadequate Disposal of the MSW:** No impacts related to generation and disposal of municipal solid wastes (MSW). The main solid pollutants within the waste water treatment plant (sludge) by HSM will be collected and disposed off properly. Therefore, there will not be any adverse environmental impact. (*Aspect/Activity devoid of any adverse environmental or social impact*).
- **Impacts on Groundwater:** Very minimal impacts relating to abstraction and consumption of groundwater. Additionally, small amount of freshwater will be required for drinking by the staff employed at the proposed project site premises or sanitation needs. (*Aspect/Activity devoid of any adverse environmental or social impact*).
- **Impacts on Surface Water:** No impacts on the nearby surface water as extension will be devoid of any interaction with the surface waters of the proposed area. (*Aspect/Activity devoid of any adverse environmental or social impact*).

- **Impacts of Inadequate Treatment and Disposal of Wastewaters:** No impacts are related to generation, inadequate disposal and treatment of the wastewater as the effluent obtained from sugar mill will be treated in DAF System and then it will be drained out in SCARP Drain – permission annexed. (*Aspect/Activity devoid of any adverse environmental or social impact*).
- **Cutting and Removal of Trees and Crops:** No impacts relating to cutting or removal of trees and crops. There are no standing crops or trees at the project site. However, the management will intend to plant large number of trees at the proposed area as a part of external development and landscaping of the surroundings of project area. (*Aspect / Activity devoid of any adverse environmental or social impact*).
- **Likelihood of Land Instability:** Capacity enhancement by already operational Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan will not cause any impact on soil instability from any of its activities, also this aspect is totally irrelevant to the project's geographical setting. (*Aspect/Activity devoid of any adverse environmental or social impact*).

A detailed account of the genesis of the above-referred adverse impacts, their potentiality to affect the ambient environment and the measures for their mitigations has been presented in this EIA Report. However, it would be suffice here to state that if the project activities at the site are carried out in a sustainable manner and in accordance with recommendations of the EMP and other relevant mitigation measures, as are given in this EIA study; then the majority of these adverse impacts would become insignificant and of no relevance at all.

The above-mentioned environmental impacts are of no significance and therefore not alarming in any way. Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan has already implemented all the suggested mitigation measures and directions of the EPA-Pb.

ES.8 RECOMMENDATIONS FOR MITIGATION MEASURES

The report details a set of comprehensive mitigation measures and strategies for avoiding and countering the adverse environmental and social impacts of the project. In addition to the preventive measures for warding off the adverse impacts, corrective measures have also been suggested for all and various project activities at the proposed project area to address the adverse impacts. The majority of the mitigation measures, as suggested in the EIA report. The report contains a set of comprehensive mitigation measures and the strategies for avoiding or addressing the adverse environmental impacts of the project's construction and subsequent operation phase. Unwanted water usage during construction can be avoided by relying on conservation practices of water use, such as curing the masonry and concrete structures with wet gunny wraps instead of direct showering of water streams on them. Impacts on surface-water and ground-water quality can be mitigated by avoiding direct discharge of the untreated sanitation effluents onto lands or into freshwater channels.

The mitigations relating to construction stage of the project at its former site included the following:

- Preparation of the tailored checklists for checking propriety of each and every activity in a systematic manner.
- Identification of alternate routes in case of temporary blockade of the approach road.
- Preferring to carrying out noisy activities at sugar mill during daytime hours, and
- Isolating the worksite with some dense material.
- Plantation will be taken up along the approach roads and vicinity of proposed project site.

The management will be taken appropriate measures for the worksite safety, and therefore, no impacts relating to construction of project and consequently no mitigations measures required.

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ES.9 ENVIRONMENTAL, SOCIAL & DISASTER MANAGEMENT PLAN (ESDMP)

The environmental management plan (EMP), as given in this report, provides a mechanism for implementing the preventive and the corrective mitigation measures along with list of the authorities and the focal persons responsible for their implementation. The mitigation guidelines are the result of lengthy deliberations over various issues made with the relevant stakeholders and the regulatory agencies. The primary objective of the EMP is to prevent and attenuate the adverse impacts to an acceptable level by adopting suitable administrative or technical options.

ES.10 PROPOSED MONITORING

The environmental monitoring is an essential tool for testing environmental performance of the proposed project and ascertaining whether environmental mitigation recommendations are meeting their goals. The prime objectives of the environmental monitoring are:

- To check whether mitigation and environmental enhancement measures are adequate, effective and are actually implemented.
- To ensure compliance with legal and community obligations including observance of safety procedures at the construction sites.
- To provide the means whereby impacts which were uncertain at the time of preparation of the report, or which could not be assessed, can be identified and steps taken to adopt appropriate corrective measures.
- To improve the approach for alike projects, i.e. to provide information on the actual nature and extent of the key impacts and effectiveness on mitigation and enhancement measures in order to improve the planning and execution of similar projects in the future.

The implementation and success of the EMMP will be verified through compliance monitoring of the various proposed project activities and the recommendations of the monitoring plan. The primary purpose of the environmental compliance monitoring or the post project auditing is to ensure that the process operations follow conditions of the Environmental Approval issued by the EPA-Pb.

ES.11 PROPOSED IMPACTS AND THEIR MITIGATION MEASURES

Environmental Aspects	Impacts and Mitigation Measures	
	Impacts	Mitigation Measures
Environmental Aspects	During construction Phase, through the use of locally available materials including cement, building blocks, metals, concrete, electrical cables, etc. The project continues towards the growth of economy by	☐ No mitigation measures required.
	contributing to the gross domestic product.	

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Employment Opportunities	• With the implementation of the project, there are employment opportunities for casual workers from the local community. The exact number of workers to be hired will depend on the magnitude of construction activities. • Unskilled workers also gain some skills that will help them in the future.	☐ No mitigation measures required.
Relocation of Utilities	The construction of the project will not relocate the existing public utilities. Hence, no rehabilitation or site restoration will be required.	☐ No mitigation measures required.
Noise Pollution	The construction works, delivering building materials by heavy trucks and the use of machines and equipment such as concrete mixers will contribute to high level of noise within the construction site and	☐ Proper encasement of noise generating sources will be done to control the noise levels within limits. The steam turbine generator will be provided with acoustic enclosures and

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	the surrounding area.	silencers in the exhaust. The steam turbine will be housed in a closed building which will considerably reduce the noise. In case of maintenance, the persons working near the steam turbine generator building will be provided with ear muffs. ☐ All the workers will be provided with PPEs
Solid waste generation		☐ Provide solid waste handling facilities such as waste bins and skips in all sections of the sugar factory ☐ Ensure that solid waste generated is regularly disposed off appropriately ☐ Re-use the bagasse which is the residual woody fiber of the cane as fuel for boilers. ☐ The filter mud will be used for the production of dry filter cake to be used as a fertilizer or cattle feed. ☐ Non-biodegradable and recyclable matter, such as containers, waste papers,

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		used materials, waste packaging materials, will be sold to local contractors for recycling or reuse purpose.
Waste water generation		□ Wastewater generated will be treated in DAF System. After treatment, wastewater will be discharged in SCARP Drain
Air pollution		□ Use of captive Bagasse from cane crushing as a fuel □ Complete combustion, wet scrubbers, ash collection system, and effective ash handling are the mitigation measures which will be adopted in said project for control of air emissions. □ Mixing of collected ash with press mud to sell to farmers/ brick producers (available near site) is another suggested mitigation measure to minimize the probable impacts of fuel handling & safe ash disposal. □ HSML needs to regularly carry out checks of all motor driven vehicles and carry out

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		regular servicing and maintenance of it in order to keep the environmental impact on account of their exhaust emissions to its minimum level. □ For reducing fugitive dust, regular water sprinkling on Kachha roads will be done. □ All trucks proposed to be used for transportation will be covered with tarpaulin, maintained and optimally loaded.
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ES.12 CONCLUSION

In conclusion, EIA of proposed project shows that with adoption of the proper environmental management and mitigation measures, the project will not have any adverse impact on any element of environment or the surrounding communities.

CHAPTER – 1

INTRODUCTION

1.1 INTRODUCTION

This report presents the Environmental Impact Assessment (EIA) Study titled as Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan, enhancement of crushing capacity - upto 38000 TCD (Tons crushed daily). Sugar mill is situated at Jetha Bhuta Khan pur, Rahim yar khan. This study has been carried out to estimate the likely environmental and social impacts during construction and operational phase and identify proper mitigation measures for reducing the adverse impacts on environment.

Management of Hamza Sugar Mills has obtained approval from Directorate General of Industries Prices, Weights and Measures Punjab.

1.2 HISTORY OF SUGAR PRODUCTION IN PAKISTAN

Sugar production in Pakistan for the outgoing season, 2004-5 season was 3.2 Million tons, which is 800,000 tons less than the preceding year. Each year production is expected to further decrease to 2.8 Million tons.

Currently there are more than 70 sugar mills in Pakistan, majority (38) of which are located in Punjab. While the installed capacity (5.5 million tons) of these sugar mills is much more than the domestic requirement (4million tons), this installed capacity is largely inefficient. This is mainly

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because majority of these mills are located in geographic areas which are not suited for sugar cane growing, resulting in low sucrose content; the single most important factor which determines profitability of the sugar mill. It is only a matter of time that the operating capacity is relocated to areas which are best suited for sugar cane growing as well as milling. This presents an opportunity to establish a sugar mill in a geographic location (Rahim Yar Khan) that is best suited for the purpose.

Raw material availability is not projected to become a problem in the upcoming crushing season.

Table – Key figures of Pakistan Sugar Industry

Sugar Year (Oct-Sep)	2001-2	2002-3	2003-4	2004-5	2005-6*
Sugarcane Area-Hectare	999,700	1,099,700	1,074,700	966,600	900,000
Sugarcane Produced-tons	48,041,000	52,049,000	53,800,000	43,533,000	40,000,000
Yield tones/ Hectare	48.06	47.33	50.00	45.04	45.00
Cane Utilized by Mills	36,708,638	41,786,689	43,661,377	32,101,739	30,000,000
% of Utilization	76.4%	80.3%	81.2%	73.7%	75.0%
Cane Support Price	43.00	43.00	41.00	43.00	60.00
Sucrose Recovery %	8.71%	8.74%	9.15%	9.10%	8.50%
Total Sugar Production	3,249,049	3,676,756	4,020,800	3,115,801	2,800,000
Consumption	3,252,165	3,483,854	3,850,241	3,941,513	4,000,000
Avg Domestic Retail Price/Kg	22.96	20.12	19.26	25.31	33.00
Int'l Sugar Price (USD/ton)	233.54	220.96	224.15	275.00	415.00

* estimate: source PSMA 2005 report

Pakistan's sugarcane yield averages around 45 tons per hectare, which is below the world average of around 60 tons/ hectare. Nonetheless, yields are increasing over time at a rate of approximately 1 ton/ hectare. This shows that there is potential for yield increase that would directly benefit the sugar industry. Sugarcane is one of the cash crops grown in the country, contributing over PKR 75 Billion to the agricultural economy. Harvesting period of sugarcane follows the pattern of many other northern hemisphere crops, beginning in October/ November and ending in April/ May. Planting can be done in autumn or spring with autumn planting (September-October) providing better results due to longer planting in the autumn, allowing for growth for up to 16 months.

Harvesting begins in October in Sind, November in Punjab and NWFP and continues until April/ May. The Government sets sugarcane support prices, with an objective to play a supporting role to the sugarcane growers.

Pakistan's installed sugarcane crushing capacity of 5.5 million tons per annum representing 71 mills on the face of it looks more than sufficient to meet the domestic demand; in fact this installed capacity is inefficient. The above is based on 160 days crushing season and 9.15% recovery rate whereas practically speaking the average crushing season is 130 days and recovery less than

8.75%. The need for additional and efficient capacity also stems from the fact industry is facing a crisis like situation in Punjab where few of the mills are in the process of shutting down and many are interested shifting the location to areas of Sindh that have high recovery rates and longer crushing seasons. New sugar capacity would not result in any irrational capacity increase; it would simply replace the capacity, which is in the process of shutting down in Punjab.

Simultaneously the area under sugarcane cultivation in Punjab would convert to cotton production. A similar situation is developing in North Punjab. Due to intense competition amongst mills, the raw material availability is becoming an issue and the price for sugarcane being paid by the mill in North Punjab makes it uneconomical for the mills to remain profitable. Additionally the sucrose recovery rate of 8.0% in North Punjab is not economically viable.

One of the reasons, which make the domestic sugar industry an efficient producer, is because majority of it is located in geographic regions, which are not suitable for sugar cane milling. For example, in Northern Punjab the sugar recovery rate (the single most important factor which determines profitability) averages 8.8% which is not only lower than the world average it is also lower than the national average of 9.10% based on previous season. Similarly, while the sugar recovery rate in Punjab is at an acceptable level of above 9%, the crushing season is shorter compared to the rest of Pakistan. This translates into higher fixed cost (interest, depreciation, salaries) per ton. Due to these factors the local industry is not an efficient producer and the industry is undergoing restructuring whereby weaker and inefficient players are in the process of exiting the sector and new and efficient entrants are entering this segment. A step towards this industry rationalization by the market itself is relocation of the industry to geographic locations that are well suited for sugar cane cropping (high yielding crop-better sugar recover rate) and longer crushing season. South Punjab is an area that offers both these advantages within Pakistan for sugarcane growing.

1.3 PURPOSE OF REPORT

The main objectives of this Environmental Impact Assessment (EIA) Report are to identify the baseline environmental, biophysical and socio-economic conditions, to examine project alternatives including alternate sites, and to study the potential impacts along with formulation of suitable mitigation measures for an environment friendly implementation of the proposed project

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and around the project area. The purpose of the EIA study is to identify the possible beneficial and adverse environmental impacts as presently envisaged and propose practical mitigation measures to be implemented during installation of the project to minimize the negative impacts of sugar mill. The specific stages and purpose of EIA are:

- Review of available documents; ○ Collection of baseline data related to physical, ecological and social domains of environment;
- Overview of different Project Alternatives; ○ Evaluation of project impacts on environment and social settings; Suggesting mitigation measures for adverse impacts;
- Preparation of Environmental Management Plan (EMP); and preparation of Environmental Impact Assessment (EIA) Report. ○ Guidelines for public participation.

The report provides relevant information, as required under the officially approved format, to help the decision makers i.e. EPA Punjab before issuing the Environmental Approval.

1.4 IDENTIFICATION OF PROJECT AND PROPONENT

a. CONTACT PERSON Sikandar Zulqernain Group General Manager CNIC No. 35201-9032578-3

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Askri-11-B, Lahore

0331-6583807

b. DETAILS OF CONSULTANT

Name of Organization **Environmental and Social Technical Services (ESTS)**

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Address 215, B-Block, Faisal Town, Lahore Pakistan List of team

is annexed.

1.5 PROJECT LOCATION

Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan is already working since 1963. Now, the management intends to enhance crushing capacity upto 38000 TCD (Tons crushed

daily) of existing sugar mill at Jetha Bhuta Khan pur, Rahim yar khan . Sugar mill is well-connected to Shahi Road, District Rahim yar Khan.

Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan is surrounded by many industries of national importance.

1.6 BRIEF DESCRIPTION OF NATURE, SIZE AND LOCATION OF PROJECT

The management of Hamza Sugar Mills Limited located at Jetha Bhuta Khan pur, Rahim yar khan intends to set up a new integrated state of the art technology.

Management of Hamza Sugar Mills has obtained approval from Directorate General of Industries Prices, Weights and Measures Punjab.

The sugar manufacturing process will consist of following steps:

1. Crushing
2. Clarification
3. Concentration of juice (juice to syrup) by evaporation
4. Crystallization
5. Separation of crystals from mother liquor (centrifuging)

NATURE OF PROJECT

This project is the extension in crushing capacity of already established Sugar Mill.

SIZE OF PROJECT

Proposed project is the establishment of 34000 TCD (tonnes sugar cane crushed per day) capacity sugar mill.

1.7 NEED FOR ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Pakistan Environmental Protection Act 1997 (PEPA-97) Clause 12, stipulates that the “Proponent of any development Project will have to submit Environmental Assessment Report (EIA or IEE, whichever is applicable) to the concerned Environmental Protection Agency to obtain its approval prior to start of construction and operation of the Project”.

Construction of this project has been judged to fall under Schedule II of IEE/EIA Regulations 2002 and requires submission of EIA report prior to construction. To ensure compliance with the lawful provisions of section 12 of PEPA 1997, rules and regulations made there under, this EIA report has been prepared for obtaining environmental approval under section 12 of PEPA 1997 from EPA Punjab.

1.8 OBJECTIVES AND SCOPE OF WORK

The main objectives of the study are to identify the environmental impacts due to the construction of the project and to suggest appropriate measures to mitigate the adverse impacts of this proposed project. The primary objective of this environmental and social impact study relating to enhancement of crushing capacity upto 38000 TCD (Tons crushed daily) of existing sugar mill is to examine, compare, review and analyze the parameters. Another objective is to review the mitigation measures with respect to their relevance, efficacy and adequacy in addressing the identified impacts of the project and to suggest appropriate modifications therein, if so warranted.

Another objective is to carry out a comprehensive and all-encompassing review of the Mitigation Guidelines and the Environmental and Social Management and Monitoring Plan (ESMMP).

The scope of the work for the EIA study can be summarized as under: Identification of the existing physical, biological and socio-economic aspects. Identification of probable impacts of the project:

- Determination of the significant impacts during construction. ○ Recommendations for the implementation of mitigation measures.
- Development of a detailed Environmental Management Plan (EMP)

It is hoped that findings of the instant study will help in avoiding and averting the negative impacts of the project to render it an environment friendly and environmentally compliant facility.

1.9 APPROACH AND METHODOLOGY OF EIA STUDY

Environmental Impact Assessment (EIA) is conducted under the legal framework of Pakistan Environmental Protection Agency (PEPA). As per legal requirements, the project will be reviewed in the light of the provisions of Pakistan Environmental Protection Act, 1997 and

Pakistan Environmental Assessment Procedures, issued by Pakistan Environmental Protection Agency (Pak-EPA).

Secondary information for this EIA Study was collected from relevant departments/personals and literature to establish physical, socio-economic and environmental profile of the project area. Relevant secondary information available with the proponent on the physical, technical and institutional aspects of the proposed project was also utilized. Architect and Engineers of the project were also consulted for obtaining information about various features of the project. Interviews and direct consultations with the stakeholders were held. The secondary sources of data and information included the office record of the proponent, information on the project as available with the EPA-Pb, relevant websites and a few other similar sources of information.

1.10 ENVIRONMENTAL, SOCIAL & DISASTER MANAGEMENT & MONITORING PLAN (ESDMP)

The Environmental, Social & Disaster Management & Monitoring Plan (ESDMP) provides a mechanism for implementing the preventive and mitigatory measures in the form of suitable environmental guidelines. The main objectives of the ESDMP are firstly to prevent and wherever it is not possible, to attenuate the adverse impacts to an acceptable level by adopting suitable administrative and technical options. The key components of the ESDMP include the environmental and social guidelines to be implemented by the project authorities, the construction contractor and all other concerned. The ESDMP also outlines the institutional setup for implementing the mitigation guidelines i.e., designating a focal person by the proponent (usually the project's Environmental Manager) for managing environmental and social impacts of the various project activities at the appropriate managerial levels.

1.11 ESDMP'S IMPLEMENTATION COSTS

Costs involved in implementing the ESDMP will pertain mainly to expenses on training and external monitoring of the project's environmental and social performance. Because of involvement of number of variables, it is not possible at this stage to work out the exact financial outlay of these activities. However, as a tentative estimate, it is expected that holding of workshops will cost about Rs. 0.5 million.

CHAPTER – 2

POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1 GENERAL

This section provides an overview of the policy framework and national legislation that applies to the project. The project is expected to comply with all national legislation relating to environment in Pakistan, and to obtain all the regulatory clearances required.

2.2 NATIONAL POLICY AND ADMINISTRATIVE FRAMEWORK

The Pakistan National Conservation Strategy (NCS) that was approved by the federal cabinet in March 1992 is the principal policy document on environmental issues in the country (EUAD/IUCN, 1992). The NCS outlines the country's primary approach towards encouraging sustainable development, conserving natural resources, and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment.

The core areas that are relevant in the context of the project are pollution control, prevention and abatement, increasing energy efficiency, conserving biodiversity, supporting forestry and plantations, and the preservation of cultural heritage.

Two organizations, the Pakistan Environmental Protection Council (PEPC) and the Pakistan Environmental Protection Agency (Pak-EPA), are primarily responsible for administering the provisions of the Pakistan Environmental Protection Act, promulgated by the Government of

Pakistan in 1997. The PEPC oversees the functioning of the Pak-EPA. Its members include representatives of the government, industry, non-governmental organizations, and the private sector. The Pak-EPA is required to ensure compliance with the PEQS and establish monitoring and evaluation systems. As the primary implementing agency in the hierarchy, it is responsible for identifying the need for, as well as initiating legislation whenever necessary. The PakEPA is also authorized to delegate powers to its provincial counterparts, the provincial EPAs (Environmental Protection Agencies). One of the functions delegated by the PakEPA to provincial EPAs is the review and approval of environmental assessment reports of projects undertaken in their respective jurisdictions.

2.2.1 Pakistan Environmental Protection Act, 1997

The Pakistan Environmental Protection Act, 1997 (1997 Act) empowers the Pak-EPA to:

- Delegate powers, including those of environmental assessment, to the provincial EPAs.
- Identify categories of projects to which the IEE/EIA provision will apply.
- Develop guidelines for conducting initial environmental examinations (IEE) and EIAs and procedures for the submission, review and approval of the same.
- Develop environmental emission standards for parameters such as air, water and noise.
- Enforce the provisions of the Act through environmental protection orders and environmental tribunals headed by magistrates with wide-ranging powers, including the right to fine violators of the Act.

Under the provisions of the 1997 Act, the Pak-EPA has empowered four provincial EPAs to manage the environmental concerns of their respective provinces. The provincial EPAs can frame environmental regulations tailored to the requirements of their province, provided these regulations meet or exceed the minimum standards set by the Pak-EPA. Provincial EPAs are required to review and approve EIAs of all development projects undertaken in their respective provinces, including those projects implemented by federal agencies.

2.2.2 Regulations for Environmental Assessment

Under Section 12 (and subsequent amendment) of the 1997 Act, a project falling under any category specified in Schedule I (SRO 339 (10/2000)), requires the proponent to file an EIA with the federal agency concerned (the Pak-EPA). Projects falling under any category specified in

Schedule II require the proponent to file an EIA with the federal agency. Within ten working days of the IEE or EIA having been deposited, the federal agency will confirm that the document submitted is complete for the purpose of review. During this time, should the federal agency require the proponent to submit any additional information, it will return the IEE or EIA to the proponent for revision, clearly listing those aspects that need further discussion. Subsequently, the federal agency shall make every effort to complete an IEE review within 45 days and an EIA review within 90 days of filing.

Recognizing that the Pak-EPA has delegated powers to the provincial EPAs to enforce the provisions of the 1997 Act, an EIA must be submitted to one of the relevant Provincial EPA based on the location of the project.

At the time of application, the project proponent is also required to pay a specified fee to the EPAs concerned.

2.2.3 Guidelines for Environmental Assessment

The Pak-EPA has published a set of environmental guidelines for conducting environmental assessments and the environmental management of different types of development projects. The guidelines that are relevant to the project are listed below, followed by comments on their relevance to the project:

Guidelines for the Preparation and Review of Environmental Reports, Pakistan Environmental Protection Agency, 1997

The guidelines on the preparation and review of environmental reports target the project proponents, and specify:

- ✓ The nature of the information to be included in environmental reports
- ✓ The minimum qualifications of the IEE/EIA conductors appointed
- ✓ The need to incorporate suitable mitigation measures at every stage of project implementation
- ✓ The need to specify monitoring procedures.

The terms of reference for the reports are to be prepared by the project proponents themselves. The report must contain baseline data on the project area, a detailed assessment thereof, and mitigation measures.

These guidelines deal with possible approaches to public consultation and techniques for designing an effective program of consultation that reaches out to all major stakeholders and ensures that their concerns are incorporated in any impact assessment study.

Sectoral Guidelines Pakistan Environmental Assessment Procedures, Pakistan Environmental Protection Agency, October 1997

The guidelines for 'Major Chemical and Manufacturing plants' are structured to assist in identifying key environmental issues related to various Chemical and Manufacturing Plant, as well as the various mitigation measures and alternatives that should be considered and applied accordingly.

2.2.4 Punjab Environmental Quality Standards

The Punjab Environmental Quality Standards (PEQS), specify the following standards:

- Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged into inland waters, sewage treatment facilities, and the sea (three separate sets of numbers)
- Maximum allowable noise levels from vehicles.
- Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources
- Maximum allowable concentration of pollutants (two parameters) in gaseous emissions from vehicle exhaust and noise emission from vehicles.

These standards also apply to the gaseous emissions and liquid effluents generated by generator, process waste etc. The standards for vehicles will apply during the construction as well as operation phase of the project. Standards for air quality have not been prescribed as yet.

2.2.5 National Resettlement Policy and Ordinance

There is no such kind of land acquisition. Therefore, no further details have been discussed.

2.3 INTERACTION WITH OTHER AGENCIES

The client is responsible for ensuring that the project complies with the laws and regulations controlling the environmental concerns. This chapter describes the nature of the relationship between the client and line departments concerned.

2.3.1 Federal and Provincial EPAs

The client will be responsible for providing the complete environmental documentation required by the Pak-EPA, and Punjab Environmental Protection Department (EPD) and remain committed to the approved project design. No deviation is permitted during project implementation without the prior and explicit permission of the EPAs concerned.

2.3.2 Provincial Revenue and Other Departments

Since the issue of land acquisition and contacts with Agriculture, Horticulture and Forestry Department are not involved in this project, hence they are not elaborated.

2.3.3 Provincial Governments

The client must ensure that the project meets the criteria of the Punjab provincial government as related to the safe disposal of wastewater, solid waste, and toxic materials. The client will coordinate and monitor environment-related issues.

2.3.4 Local Government and Municipalities

The client will work with local government/administration and municipalities on the resettlement of squatters and removal of encroachments or sources of congestion if any. In such cases, the Client will frame an agreement with the municipality, local government, or other service provider concerned on the resettlement of displaced squatters.

2.4 OTHER ENVIRONMENT-RELATED STATUTES

This section outlines statutes apart from the Pakistan Environmental Protection Act, 1997, which are relevant to the project.

2.4.1 Antiquities Act, 1975

The Antiquities Act relates to the protection, preservation and conservation of archaeological/historical sites and monuments. It prohibits construction (or any other damaging) activity within 200 m of such sites unless prior permission is obtained from the Federal Department of Archaeology and Museums. The Antiquities Act also binds the project proponent to notify the department should anything of archaeological value be excavated during project construction.

2.4.2 Provincial Local Government Ordinances, 2001

These ordinances, issued following the devolution process, establish regulations for land use, the conservation of natural vegetation, air, water, and land pollution, the disposal of solid waste and wastewater effluents, as well as matters related to public health and safety.

2.4.3 Pakistan Penal Code, 1860

The Pakistan Penal Code deals with offences where public or private property and/or human lives are affected due to the intentional or accidental misconduct of an individual or body of people. In the context of environment, the Penal Code empowers the local authorities to control noise, noxious emissions and disposal of effluents. The PEQS enforced by the EPAs supersede the application of this legislation on industries and municipalities. The Penal Code, however, can provide a basis for the client to coordinate its activities with the local authorities to ensure that its construction activities do not become a cause of public nuisance or inconvenience.

2.4.4 The Cutting of Trees (Prohibition Act), 1975

Section 3 of this Act states “No person shall, without the prior written approval of the local formation commander or an officer authorized by him in this behalf, cut fell or damage or cause to cut, fell or damage any tree.”

2.4.5 The Protection of Trees and Bush wood Act, 1949

This Act prohibits cutting or chopping of trees and bush wood without permission of the Forest Department.

2.4.6 Labour Laws

The Constitution of Pakistan contains a range of provisions with regards to labour rights found in Part II: Fundamental Rights and Principles of Policy.

Article 11 of the Constitution prohibits all forms of slavery, forced labour and child labour;

Article 17 provides for a fundamental right to exercise the freedom of association and the right to form unions;

Article 25 lays down the right to equality before the law and prohibition of discrimination on the grounds of sex alone;

Article 37(e) makes provision for securing just and humane conditions of work, ensuring that children and women are not employed in vocations unsuited to their age or sex, and for maternity benefits for women in employment.

Under the Factories Act, 1934 no adult employee, defined as a worker who has completed his or her 18th year of age, can be required or permitted to work in any establishment in excess of nine hours a day and 48 hours a week. Similarly, no young person, under the age of 18, can be required or permitted to work in excess of seven hours a day and 42 hours a week.

2.4.7 The Punjab Plantation and Maintenance of Trees Act, 1974

The proponent shall be responsible for protecting and maintaining the plants and trees present in the land owned by him.

2.5 INTERACTION WITH OTHER DEPARTMENTS

The Proponent is responsible for ensuring that the project complies with the laws and regulations controlling the environmental concerns of the construction and operation stages. This section describes the nature of the relationship between the Proponent and the concerned line departments.

2.5.1 Environmental Protection Department (EPD), Punjab

The Proponent will be responsible for providing the complete environmental documentation required by EPD, Punjab and remain committed to the approved project design. No deviation is

permitted during the project implementation without the prior and explicit permission of the EPD, Punjab.

2.5.2 Forest and Wildlife Departments, Punjab

As the implementation of the project does not involve the clearing of vegetation and trees within the project area, and no wild life sanctuary exist in the project area, so no clearance from forest and wildlife departments is envisaged. However, for evaluation of trees owned by private owners may require the involvement of Forest Department.

2.5.3 Revenue Department, Punjab

Under the national law, matters relating to land use and ownership are provincial subjects, and the revenue department of the concerned province is empowered to carry out the acquisition of private land or built-up property for public purposes, including on behalf of another provincial or federal agency. For this purpose, the lead department must lodge an application with the concerned provincial government to depute a land acquisition collector (LAC) and other revenue staff, who will be responsible for handling matters related to the acquisition and disbursement of compensation.

2.5.4 District Government

The Proponent and its contractors must ensure that the project meets the criteria of district government as related to the establishment of construction camps and plants, and the safe disposal of wastewater, solid waste, and toxic materials.

2.5.5 Water and Power Development Authority (WAPDA)

In case of relocation of any EHV or HV transmission lines, distribution lines, the proponent have to apply to the WAPDA for NOC and relocation of transmission lines as per WAPDA regulations. Similarly, to get new connections for the Project to meet the electricity requirements, Proponent may also have to coordinate with WAPDA.

2.5.6 Pakistan Telecommunication Company Ltd. (PTCL)

If relocation of telephone poles, optic fiber cable, co-axial cable, etc. will be involved in the project, or election of facilities will be required, Proponent have to coordinate with PTCL and fulfill the regulatory requirements.

2.5.7 Sui Northern

In case of relocation of existing gas pipelines or to get new connection, Proponent has to coordinate with Sui Northern Department.

2.5.8 Pakistan Railway

In case project crosses the existing railway track, Proponent has to coordinate with Pakistan Railway and get NOC.

2.5.9 Public Health Department, Punjab

For proper disposal of storm as well as sewage water, the Proponent will have to coordinate with Public Health Department, Punjab.

CHAPTER – 3

DESCRIPTION OF PROJECT

3.1 TYPE AND CATEGORY OF PROJECT

“Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan” proposed to enhance crushing capacity upto 38000 TCD (Tons crushed daily) of existing sugar mill. Project falls under the category of Review of EIA / IEE Regulations 2022, **Schedule II B (3) (Sugar Mills and distilleries)** projects requiring an EIA Report for its Environmental Approval under section 12 of the Act.

The project falls under Schedule-II of the IEE/EIA Regulations, 2022 notified by Government of Pakistan. Thus PAKISTAN ENVIRONMENTAL PROTECTION AGENCY (REVIEW OF IEE AND EIA) REGULATIONS, 2022, projects requiring an EIA the Regulations governing the functioning of the EPA’s with respect to the IEE and EIA reports.

Management of Hamza Sugar Mills has obtained approval from Directorate General of Industries Prices, Weights and Measures Punjab and it is annexed.

3.2 OBJECTIVES OF PROJECT

Hamza Sugar Mills Limited is proposing to enhance its crushing capacity upto 38000 TCD (Tons crushed daily) for the purpose of processing sugar cane and producing milled sugar and other related byproducts. The overall purpose of enhancement of crushing capacity upto 38000TCD (Tons crushed daily) of sugar mill is to increase the Pakistan’s competitiveness in the sugar sector and to meet domestic sugar demand using local resources.

Company is endeavoring to be the leading Industry in Sugar Sector by building the Company’s image through quality improvement, customers’ satisfaction and by maintaining a high level of Ethical and Professional Standards through the Optimum use of resources. Another goal for the establishment of the factory is to create employment for locals and support out-growers to grow and supply sugar cane by providing them with assistance in terms of land preparation extension services, seeds and fertilizers.

3.3 ALTERNATIVES CONSIDERED REALISTICALLY AND REASONS FOR THEIR REJECTION

The consideration of alternatives to any project is one of the key aspects of an environmental study. Consideration of the alternatives provides for the examination of different options to achieve a stated objective and assist the decision makers in the choice of the best option, which has the least adverse and the greatest beneficial environmental, social and economic consequences. Different alternative sites were considered for Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan.

Keep the following points in mind while selection of project site.

- Free land availability as site is owned by Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan.
- Minimum environmental adverse impacts ○ No resettlement and land acquisition.
- No issue regarding this project to all adjacent land owners ○ Cost effective solution ○ Easily approachable for prospective ○ Low cost of material handling, due to straight and short route and absence of back tracking. ○ Continuous flow of work

Reasons of Rejection

Such a large piece of land is not available for its project in the vicinity.

- Such land is very costly but this land is owned by management of Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan.
- The access to road is not easy available. ○ Area falls within the residential sector. ○ Area was too congested. ○ Involved rehabilitation and relocation of the locals.
- Traffic jam issues during peak and rush hours. ○ Suitability of land

Basis of Selection of Site

Enhancement of crushing capacity of existing sugar mill upto 38000 TCD (Tons crushed daily) within the premises of already existing Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan is the best option for proposed project. A critical analysis based on accessibility of available site, accessibility of site, availability of water resources, less damage to existing environment and other minimum environmental problem was made. Finally selected site of project is more practicable with respect to economic, social and environmental perspective and future development. Some of the factors that were kept in mind during site selection for the project:

Sources Vulnerability ○ Land availability with no cost as site is owned by the management.

- Access to an ample supply of suitable water ○ Access to power supply mainline. ○ Accessable all-weather roads.
- Suitability of soils and topography for construction. ○ Access to main cities of the country.

There are no nearby settlements nor any issue of land compensation. Therefore, proposed to enhance crushing capacity upto 38000 TCD (Tons crushed daily) of existing Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan has been selected.

The selected proposed site for the project will be located along Shahi Road, RYK so it is well-connected to main road. Therefore, the land selected is best suitable for the development of project.

Technology alternatives

Juice extraction technology:

Juice from cane can be extracted by milling or diffusion methods.

Juice extraction by milling is the process of squeezing the juice from the cane under a set mills using high pressure between heavy iron rollers. Those mills can have from 3 up to 6 rolls; every set of mills are called tandem mill or mill train. For improve the milling

extraction efficiency, imbibition water is added at each mill. Hot water is poured over the cane just before it enters the last mill in the milling train and is recirculated up to the reach the first mill.

Sugarcane diffusion is the process of extracting the sucrose from the cane with the use of imbibition but without the squeezing by mills. Shredded cane is introduced into the diffuser at the feed end, Hot water is poured over the shredded cane just before the discharge end of the diffuser.

With milling process, the bagasse obtained does not require subsequent drying; however the diffusion process leaves the fibre completely saturated with water and to extract this water, a powerful mill is required in addition to the diffusion apparatus. By diffusion process, the crushed cane become powdery, and their fuel-value is very inferior to that of the bagasse obtained by direct milling, so that supplementary fuel (wood or coal) becomes necessary.

The diffusion process is a continuous one hence should be carried out day and night. The quantity of cane treated by diffusion in 24 hours is strictly limited by the number and capacity of the diffusers. The milling process is more adaptable, because the rollers can be adjusted to admit more cane per day. Diffusion gives a lower starch with reduced purity and about 25% more colour. Diffusion is more sensitive to trash and gives around 6% more bagasse since all bagacillo is retained in the extraction unit.

Juice heating is fundamental for diffusion in order to eliminate microorganisms and to promote rate of extraction; for this reason there is a slight overall increase in the process steam demand for diffusion.

Considering above advantages of milling over diffusion process for juice extraction, milling technology alternative is adopted.

Granular sugar manufacturing technology alternative

White granular sugars can be undertaken using either the open pan (OP) or vacuum pan (VP) processes. The major difference between the VP and OPS technology is the method of evaporating or boiling the juice. In open pan process, the boiling operation uses cascade type furnaces of various configurations. The massecuite is removed from the final boiling pan at about 84°Brix, at a temperature of around 112°C. Whereas in vacuum pan process, the juice is

HAMZA SUGAR MILLS LTD ENHANCEMENT OF CRUSHING CAPACITY

boiled under vacuum, to about 70° Brix, inside closed vessels or 'effects'. Low pressure steam is used to boil the juice which circulates through tubes within a closed vessel. The vapor driven off passes into a second similar vessel and it is used to heat more juice. In order to maintain suitable temperature differentials for heat transfer to occur, a partial vacuum is applied to each vessel, effectively lowering the boiling temperature of the juice. This system is capital- intensive but is highly energy efficient and more importantly boils the juice at progressively lower temperatures from 103 to 50°C, reducing the effects of inversion, minimizing discoloration and enhancing the formation of sugar crystals. In

OP technology, juice is boiled in open pan furnaces with little control over sugar losses due to inversion caused by boiling the juice at higher temperatures and for longer periods. The VP technology is energy self sufficient while OP needs additional fuel.

In VP Technology of insoluble materials and some undesirable dissolved substances from the juice is done with liming, sulphitation or carbonation in continuous clarifiers. In OP, usually batch clarification is done in open pans with vegetable bark extracts and manual skimming of the scum. Better clarification is achieved with VP than OP as purer juice is obtained with VP.

Considering above advantages of VP over OP process for sugar manufacturing, VP technology alternative is adopted.

3.4 LOCATION AND SITE LAYOUT OF THE PROJECT

Hamza Sugar Mills Limited is located at Jetha Bhuta Khan pur, Rahim yar khan,

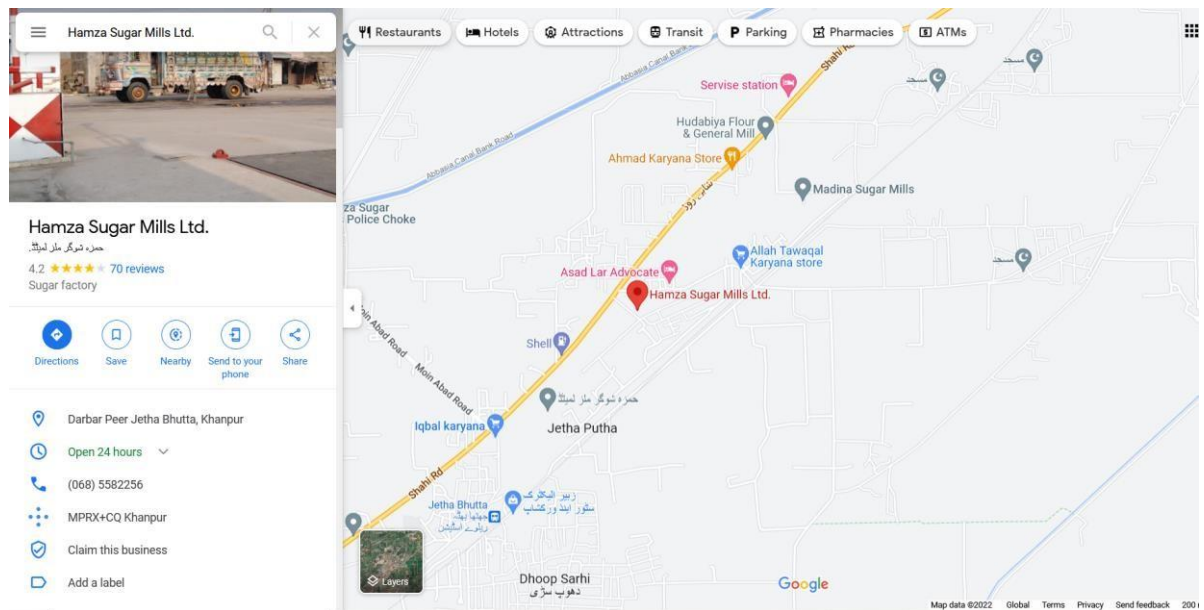


3.5 LAND USE ON THE SITE

The site is open land / industrial within the existing facility of M/s Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan.

3.6 ROAD ACCESS OF PROJECT SITE

The site for Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan is well-connected to Shahi Road. The road access for the proposed project is given below:



3.7 VEGETATION FEATURES OF THE SITE

Once rich in natural vegetation the land use pattern of the Indus Basin and other areas has greatly been modified for want of land for cultivation. This has changed the pattern of flora wherever irrigation was possible.

After clearing the Tropical Thorn Forests, using canal water irrigation, better areas were cultivated.

The district's flora consist of jand (*Prosopis spicigera*), karir (*Capparis aphylla*), beri (*Zizyphus jujuba*), van (*Salvadora oleoides*), kikar (*Acacia nilotica*), shisham (*Dalbergia sissoo*) and aak (*Calotropis* spp). Various herbs are also found, including harmal, akrey and bathoo.

Main tree species grown are Shisham (*Dalbergia sissoo*), *Morus alba* (Mulberry), *Populus Spp.* (Poplar), and *Eucalyptus camaldulensis* (sufaida).

Indigenous flora includes *Prosopis cineraria*, *Tamarix aphylla*, *Capparis aphylla* and *Salvadora oleoides* with undergrowth of *Chenopodium album*, and *Cannabis sativum*.

3.8 COST AND MAGNITUDE OF OPERATION

Extent of operation will be enhancement of crushing capacity of existing sugar mill upto 38000 TCD (Tons crushed daily). However, the cost affidavit is annexed at the end of the report.

The magnitude of operation is to manufacture sugar.

3.9 SCHEDULE OF IMPLEMENTATION

The implementation stage of proposed project activity is described below:

1st Stage comprises (Completed): ○ The onsite contouring studies and soil investigations.

2nd Stage comprises the following tasks: (2 years) ○ Laying of foundations excavation and commencement of erection work.

- Start of civil, electrical and mechanical work.
- Electrical engineering tasks ○ Development of basic infrastructure ○ Refurbishing and erection of mechanical parts. ○ Fitting of instrumentation etc.

3rd Stage comprises the following tasks: (1 year) ○ Plant equipment erection completion ○ Completion of basic infrastructures; electricity supply etc.

4th Stage will be the commencement of regular operation. (1 year)

3.10 DESCRIPTION OF PROJECT / FLOW CHART OF PROJECT

Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan (The Company) was established in 1963 before promulgation of Pakistan Environmental Protection Act, 1997, keeping in view the requirements as well as burning demand of peasants. It is located at Jetha Bhuta Khan pur, Rahim yar khan, absolutely in conformity with the feasibility of this plant. The primary objective of the proposed project is that Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan is going to set up a new integrated state of the crushing facility. The management is conscious of its obligations for protecting the environment and has taken various measures for this purpose.

Proposed project (enhancement of crushing capacity of Hamza Sugar Mills) is the production of refined sugar (white) through sugarcane using Defecation-Remeltphosphatation process. Monthly raw material of sugar cane is approx. 400000MTons per month. Main steps involved in sugar manufacturing are:

1. Extraction of juice (crushing)
2. Clarification of juice
3. Concentration of juice (juice to syrup) by evaporation
4. Boiling of Syrup to grain (crystallization)
5. Separation of crystals from mother liquor (centrifuging) **Cane receiving:**

The sugar cane in the field is examined for its quality before harvesting and harvesting permits are given after its quality and maturity is found satisfactory. The sugar cane is then manually harvested and transported to factory by tractor trailers, trucks and bullock carts. The vehicles bringing sugar cane are received at the factory cane yard. Sugar cane in said project will be purchased locally.

Sugarcane Weighing:

The vehicles carrying the sugar cane are weighed on the platform type electronic weighbridges and released for unloading. The gross weight is recorded and printed. After unloading the

vehicles are once again weighed for the tare weight. These weights are printed on the weighment slips, which also carry the details of the farmer, cane etc.

Sugarcane Unloading:

The cart cane is manually unloaded directly to the cane carrier. The cane from the trucks and tractor- trailers are unloaded with the help of cane un-loader crane. The cane is unloaded on to the feeder table of 100ton each.

Sugarcane Conveying:

The cane from the feeder table is then dumped to the main cane carrier, which conveys the cane to the cane preparatory devices. Electronic devices, depending on the cane-crushing rate control the speed of the cane carrier, and level in the cane carrier etc.

Sugarcane preparation:

The sugar cane is passed through the cane preparatory devices called leveler, cutter and shredder where in the cane is cut into small pieces to expose the juice cells for extraction

Milling:

The prepared cane then passes through the milling tandem having 3 roller mills necessary feeding device. The milling train continues to extract the maximum sucrose from the prepared cane with addition of hot water spray in last two mill which is called compound imbibition system. The cane is conveyed between mills with the help of mechanical conveyors. Screens then filter the extracted juice and filtered juice is pumped for further processing. The fibrous residue after juice extraction known as bagasse is withdrawn and conveyed through bagasse conveyors to boiler for steam generation. Surplus bagasse is withdrawn from the conveyor and stored for reuse when necessary. This bagasse may be used as substrate of chip board plant and number of other industrial purposes. The bagasse conveyor also has return conveyor to feed the stored bagasse.

Juice clarification:

The mixed juice received from milling after filtration is weighed in a juice weighing scale or by a mass flow meter to know the quantity of juice flowing. The juice contains certain undesirable impurities, which are removed before it is taken for concentration in evaporators. The juice is first heated to a temperature of 65-70°C. The hot juice is then mixed with lime to increase pH upto 7.5-8.0. The treated juice is again heated to a temperature of 104-105°C .The heated juice

is then sent to a gravity settler known as clarifier wherein it stays for 45min so that mud agglomerate to form flocs and settles.

The mud settled at bottom of clarifier is withdrawn continuously and is mixed with fine baggasalo. Then it is filtered in a rotary vacuum filter. The filtered mud after removing residual juice in the filter is scraped from the filter drum and sent out. The filtrate juice is returned to the raw juice tank and re-circulated. The mud is used as bio-fertilizer and cattle feed.

Evaporation:

The clear juice will then be concentrated into syrup by boiling using steam in a process called evaporation. The main aim of this is water removal by multiple effect evaporation. Multiple effect evaporation is the scheme where the juice is boiled in series 4 or 5 vessels, with the steam being fed to vessel 1 only. The vapour from vessel 1 will boil the juice in vessel 2 and the vapour from 2 will boil the juice in 3, and so on until vapour from the final vessel goes to waste and the sugar is crystallized in vacuum pans. The clear juice gets concentrated from a brix of 15 to 65 after passing through multiple effect evaporators.

Crystallization:

Crystallization of sugar is one of the most vital steps in sugar milling which involves the formation of solid crystals. In the crystallization stage, the syrup will be boiled at low temperatures under partial vacuum and some sugar seeds added which will cause the development and growth of sugar crystals and the outcome is called massecuite. This will involve the feeding of pulverized sugar into the pan as the liquid evaporates, causing the formation of a thick mass of crystals. The crystals will then be spun dry in a centrifuge to produce crystal sugar. Crystallization is not only a means to convert the sucrose to a more usable form, but also an important refining step since pure sucrose tends to crystallize out of the solution, leaving most of the impurities in the associated syrup. The process will be undertaken under reduced pressure of 75-90kPa to allow a reduced boiling temperature (60- 72°C) in order to avoid the formation of colored compounds. Crystals thus obtained will have a size of 1.5-4mm. The sugar is then sent to sugar storage bins with the help of bucket elevators. The storage capacity of these storage bins is enough to store 24 hours production. The sugar is discharged

from bins to fill 50kg bags and weighed automatically by electronic type automatic weighing machines. The sugar bags are transported to warehouse through belt conveyors. The quantity of sugar produced by a 10000 TCD plant shall be 33000 MT per month at 11% recovery on cane

List of machinery involved for this process is;

1. Juice Clarifier
2. Vacuum filters
3. Falling film evaporators (FFE)
4. Vapor Cells
5. Continuous Centrifugal Machine
6. Refine Centrifugal Machine
7. Juice Heaters
8. Tallo Clarifier
9. Fibrizor 52"x104"
10. 52"x104" Mill
11. Motor 2000KW
12. Gear Box 2200 KW
13. New motor at Mill#4 1200KW
14. New motor at Mill#S 1200KW
15. 170 TPH High pressure boiler
16. 60 TPH High pressure boiler
17. 10 MW High Pressure Turbine
18. 6 MW High Pressure Turbine
19. 3 MW Low Pressure Turbine
20. Mechanical Dust Collector
21. Wet Scrubber
22. Dry Ash to Wet Ash System

3.11 POWER & STEAM REQUIREMENT

Power required is annexed at the end of the report. Annexure 11

3.12 WATER REQUIREMENT & WASTEWATER GENERATION

The mill will require significant volumes of water in order to sustain various factory processes. This water will be required for process, boiler and domestic purpose. During initial startup of milling, in the absence of hot condensate from cane, the maximum water intake shall be around 3000-4000 m³/day after which the volume will reduce significantly. When the factory is finally in full operation, almost 50 % of water in the closed circuit will be re-circulated which will mean limited water abstraction. Water will be extracted from ground.

Estimated waste water quantity around 700 T/Hr. Waste water is sent to waste water collection pits through oil skimmers and DAF System, finally send to Mills Scrap drain and for the usage of neighboring farmers for irrigation.

3.13 SOLID WASTE GENERATION

The key solid wastes and by-products expected from the proposed project will include baggase, and filter or press mud. Baggase is cane milling waste fibre matter whose content will be about 30.98 % of the cane.

Hamza Sugar Mills re-use the bagasse which is the residual woody fiber of the cane as fuel for boilers for steam generation.

One Type of Solid waste is vacuum filter mud. It will be 50-60 T/Hr. It is directly sold to the open market and used in place of fertilizer and very small quantity if any will be dumped outside the Mills.

The baggase is stored in a well-designed holding area before reuse at the power plant.

The disposal of non-biodegradable and recyclable matter, such as containers, waste papers, used materials, waste packaging materials, will be sold to local contractors for recycling or reuse purposes on competitive rates.

3.14 AIR AND NOISE POLLUTION CONTROL DEVICES

Standardized Air and Noise Pollution control devices are installed at Hamza Sugar Mills Limited, Khan Pur Rahim Yar Khan.

Gases Cleaning System, Dust Collector, Vent Silencers etc. are installed to control

Air and Noise Pollution whose details with drawing and Pictures are annexed. Annexure 18

3.15 LIST OF PERSONAL PROTECTIVE EQUIPEMENT

All construction workers will be equipped with Personal Protective Equipment's (PPEs) safety boots, helmets, gloves and protective masks and will also monitor their proper and sustained usage.

In operational phase, workers will be provided with suitable Personal Protective Equipment's. For head protection, helmets will be given, for hands protection, suitable gloves and for feet protection, safety boots will be provided. Masks and ear plugs will also be provided. Workers will be provided PPEs whenever necessary.

The detailed Personal Protective Equipment's (PPEs) are annexed at the end of the report.

3.16 INVOLVEMENT OF LABORS DURING CONSTRUCTION PHASE

About 350 workers will be required which includes 100 skilled workers and 250 unskilled workers.

3.17 JOB OPPORTUNITY

After completion of the project, 190 skilled and unskilled labor will be employed for extension project.

3.18 RESTORATION AND REHABILITATION PLAN

There will be no matter of rehabilitation as the site is already owned by the management of Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan (land ownership attached). During entire construction period, necessary precautions will be taken to ensure that no damage is done to the basic infrastructures cleaning and restoration will be carried out during and immediately after each phase of construction and it will be the responsibility of each team in their respective area. After completion; all construction matrix, debris and garbage will be removed off immediately from the site within the minimum possible time under safe conditions. Any minor spill ever from the project site will be cleared adequately. The land, if and where will be made neat and clean. In the event that the management becomes redundant rehabilitation

plan will be produced and will be provided to the Director General, Environment Protection Agency at least three months prior to decommissioning.

3.19 GOVERNMENT APPROVALS

Certificate of Incorporation for Commencement of Business was obtained and annexed at the end of the report. Approval from Directorate General of Industries Prices, Weights and Measures Punjab is obtained and it is annexed.

CHAPTER – 4

DESCRIPTION OF ENVIRONMENT

4.1 GENERAL

An environmental baseline study is intended to establish a data base against which potential impacts can be predicted and managed later. The existing environmental conditions around the proposed project have been considered with respect to physical, biological and socio-economic aspects. A site visit was conducted to survey the field area and to collect environmental data on physical, biological and socioeconomic parameters. Further, interviews were held with the general public and stakeholders of the areas adjacent to the project area in order to seek the public opinion on the implementation of the proposed action.

4.2 COLLECTION OF BASELINE DATA

A comprehensive field survey was carried out in the vicinity of the Project area to collect the detailed baseline data primarily for the key issues identified.

The details of the baseline data for site and the access road are described in the following sections of this chapter. The photographs of the important features and

overall environmental setting of the study area are also presented in the relevant sections of this chapter.

4.3 PHYSICAL ENVIRONMENT

The areas covered under physical resources are; climate, water resources, topography, seismology, geology and soil conditions. The objective of the study was to establish;

- Baseline conditions of surface and groundwater resources
- Assess the surface and groundwater quality
- Soil and geology baseline of the area

- Impact assessment of the project activities on the physical environment The detailed description of physical resources is discussed as under:

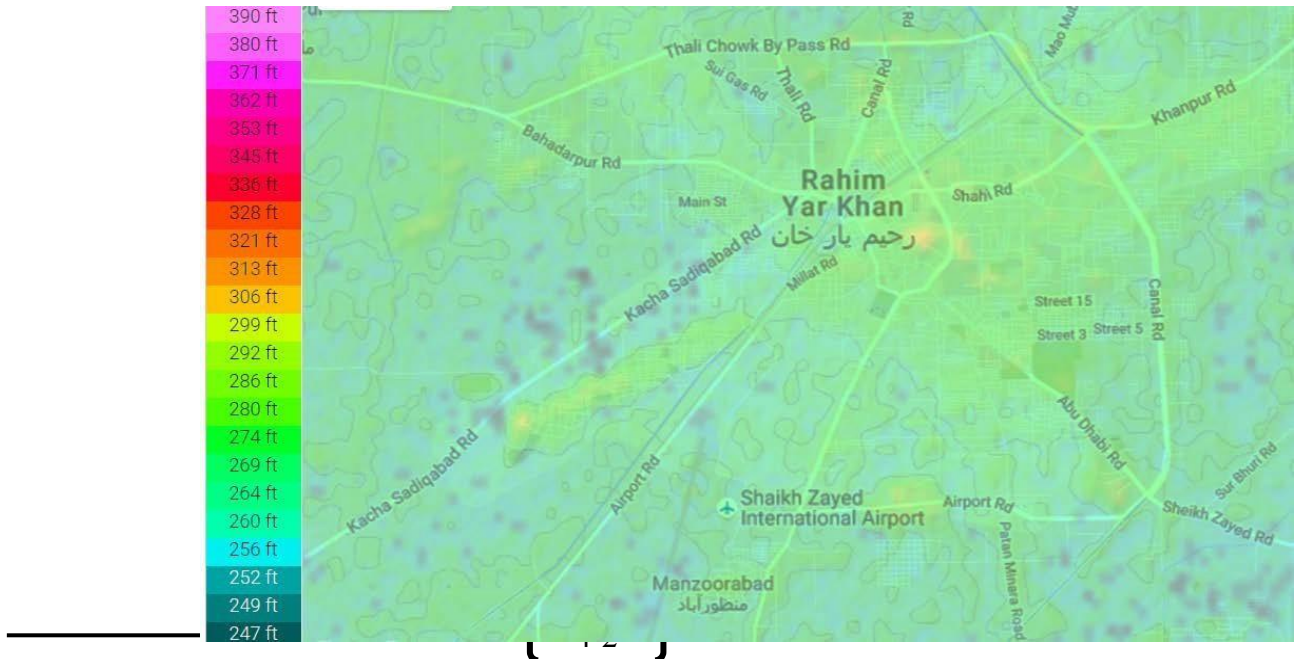
4.3.1 Topography

Rahim Yar Khan is divided into three main physical features i.e. (a) Riverine area; (b) Canal irrigated area and (c) Desert area which is called Cholistan. The Riverine area of the district lies close on the southern side of the Indus River mainly falling in the river bed. The Canal irrigated area lies on the south and is separated by main Minchan Bund.

Topographically, the project area is plain and quite uniform. The approximate height of the irrigated area of the Rahim Yar Khan District is 150 to 200 meters above the sea level. The third part of the area called Cholistan lies in the south of the irrigated tract Upto the Indo-Pak border. The surface of the desert consists of a succession of sand dunes rising at places to a height of 150 meters and covered with the vegetation peculiar to sandy tracts.

4.3.2 Geology

Punjab Province mostly comprises of plain areas lying in Indus Basin



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formation. Rahim Yar Khan District lies between Indus basin and Cholistan Desert formation. The project site is located in Punjab, which is a plain of Alluvial material and scattered rocks at very deeper depth.

Major portion of the Punjab Province falls in the Indus Plain, which geologically originated in Late Pleistocene period by deposition of sediments from the Himalayas into abyssal sea. In early days the sediments were carried by two river systems, viz., Indus and Ganges. Later in the geological history, the Ganges River changed its course from westward to eastward. Later, the Indus River and its five major tributaries, viz., Jhelum, Chenab, Ravi, Bias and Sutlej, carved the deposits of the early river systems.

¹ <http://en-in.topographic-map.com/places/Rahim-Yar-Khan-8153923/>

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Fig. 4.2 Geological Map of Rahim Yar Khan Area

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4.3.3 Geography

Rahim Yar Khan is situated in the alluvium plain between Indus River in the West and Cholistan in the East. The district lies between 27°40'-29°16' north latitudes and 60°45'-70°01' east longitudes. Rahim Yar Khan town is located on the main Karachi – Peshawar railway line. It is at distance of 634 km from Karachi and 566 km from Lahore. Rahim Yar Khan is situated at a distance of 176km from Bahawalpur, Headquarter of Division. The National highway

“Grand Trunk Road” by passes the town in western side at a distance of about 11km.

The district Rahim Yar Khan is bounded in the north by Muzaffargarh district, in the east by Bahawalpur district, in the south by Jasilmir (India) and Ghotki district of Sindh province and in the west by Rajanpur district².

4.3.4 Climate

Sugar is located in Khan pur, Rahim Yar Khan, Punjab. The climate of the district is hot and dry in the summer and cold and dry in the winter. The summer season is comparatively longer. It starts in April and continues until October. The winter season goes from November to March. However, the month of March and November are pleasant. Dust storms are frequent during the summer season. The average rain fall is about 100 millimetres (3.9 in).

Average annual temperature, relative humidity and average annual precipitation are given in the **Table 4.1, 4.2, 4.3** and while graphical presentation of average annual temperature and average annual precipitation is given in **Fig. 4.3 (a,b & c) & 4.4** respectively.

Table 4.1: Temperature Fluctuations Observed

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Month	Mean Temperature(°C)	
	Avg. High	Avg. Low
Jan	21.8	4.4
Feb	24.4	7.3
Mar	30.2	12.8
Apr	37	18.5
May	41.7	23.6
Jun	42.4	27.2
Jul	30.9	27.3
Aug	38.4	26.3
Sep	37	23.1
Oct	34.8	16.3
Nov	20.4	10.1
Dec	23.5	5.3
Annual	33.5	17

² <http://uu.urbanunit.gov.pk/Documents/Publications/0/114.pdf>

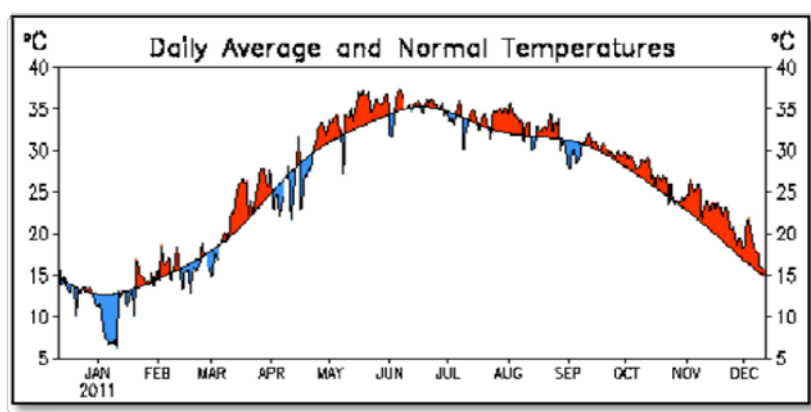


Fig. 4.3 (a): Month wise Average and Normal Temperature

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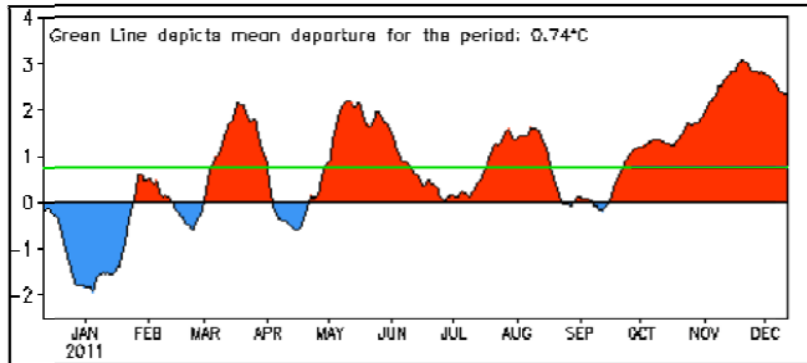


Fig. 4.3 (b): Daily Mean Temperature

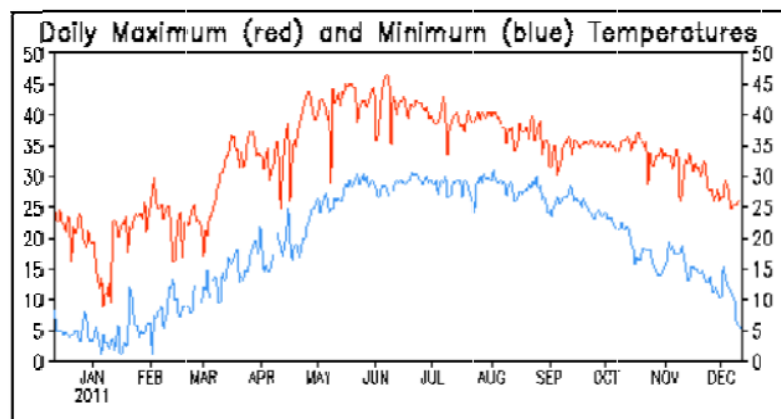


Fig. 4.3 (c): Maximum and Minimum Mean Temperature

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Table 4.2: Monthly Average of Relative Humidity

Month	Relative Humidity (%)
Jan	57.5
Feb	52.0
Mar	46.4
Apr	35.2
May	33.4
Jun	41.7
Jul	53.4
Aug	57.7
Sep	56.9
Oct	50.0
Nov	53.7
Dec	59.5
Annual Average	49.8

Total Annual Rainfall are given in Table 4.3

Table 4.3: Annual Rainfall

Month	Annual Rainfall (mm)
Jan	5
Feb	5
Mar	7
Apr	5
May	7
Jun	5
Jul	26
Aug	27
Sep	9

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Oct	1
Nov	1
Dec	3
Total	101

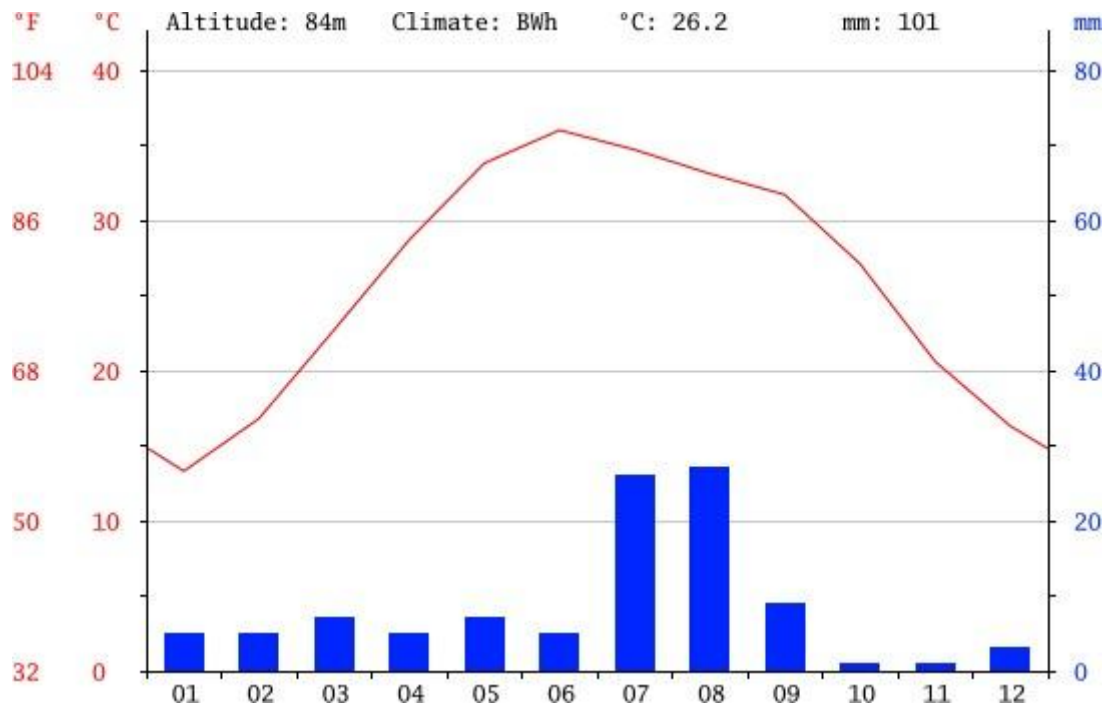
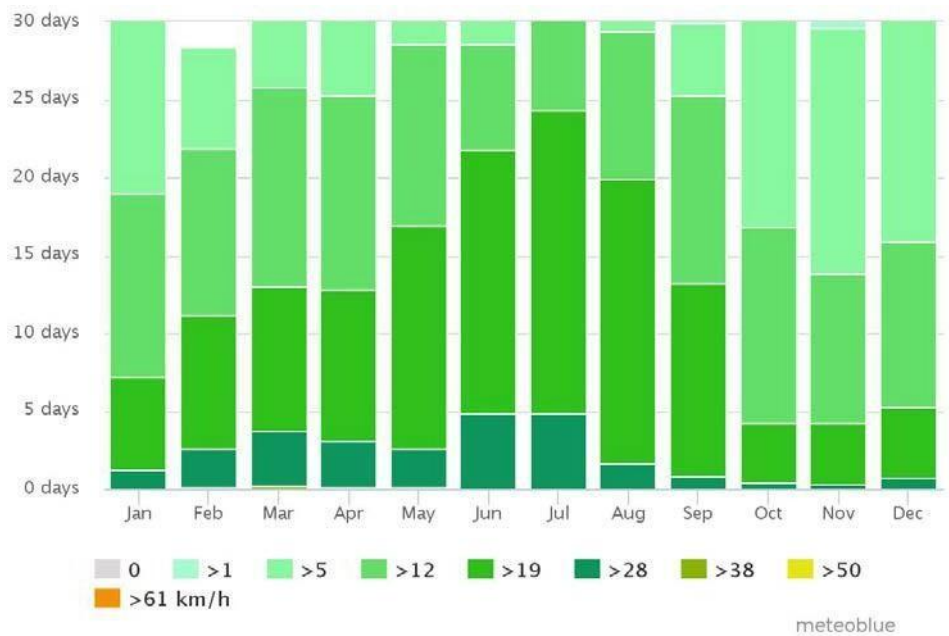


Fig. 4.4: Total Annual Rainfall in Rahim Yar Khan³

4.3.5 Wind

The Fig. 4.5 for Rahim Yar Khan shows how many days within one month can be expected to reach certain wind speeds. Monsoons create steady strong

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winds on the Tibetan Plateau from December to April, but calm winds from June to October.

Fig. 4.5: Wind Speed in Rahim Yar Khan⁴

³ <http://en.climate-data.org/location/3016/>

⁴ https://www.meteoblue.com/en/weather/forecast/modelclimate/rahim-yarkhan_pakistan_1167460

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The wind rose for Rahim Yar Khan shows how many hours per year the wind blows from the indicated direction. Example SW: Wind is blowing from SouthWest (SW) to North-East (NE).

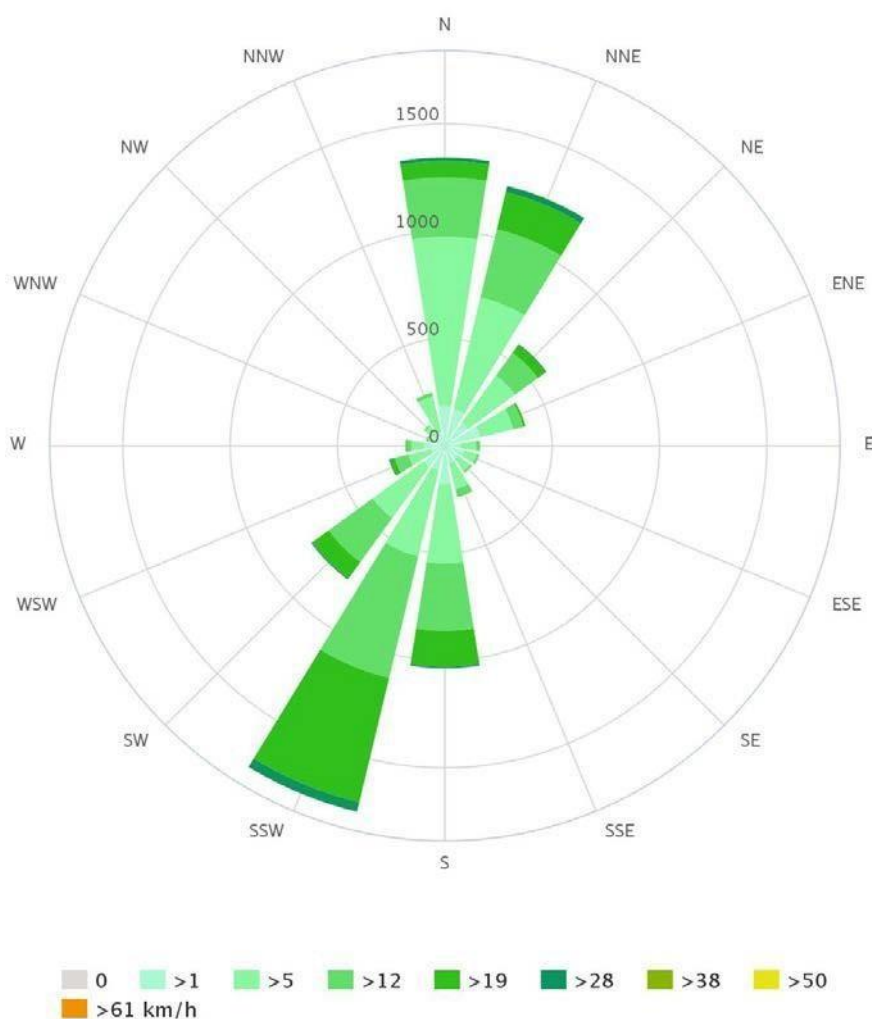


Fig. 4.6: Wind Rose for Rahim Yar Khan⁵

4.3.6 Air Quality

The ambient air quality was monitored in the Project Area. The ambient air quality was monitored for priority pollutants such as CO, NO₂, SO₂ and PM₁₀.

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The monitoring period was 24 hours at sampling point. Sampling locations for air, water, and noise monitoring are presented in **Annexure**.

The result of ambient air monitoring at project site shows that the values of CO, NO_x, SO₂ and PM₁₀ are well within the PEQS Limit.

⁵ https://www.meteoblue.com/en/weather/forecast/modelclimate/rahim-yarkhan_pakistan_1167460

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4.3.7 Noise

Noise levels monitoring was carried out at the Project site and are well within prescribed permissible limits of PEQS.

4.3.8 Surface Water and Groundwater

Groundwater is being used for domestic purpose whereas surface water is used for agriculture requirements. The main source of drinking water in the Project area is tubewells. Table 4.6 presents the analysis results of groundwater near the project area.

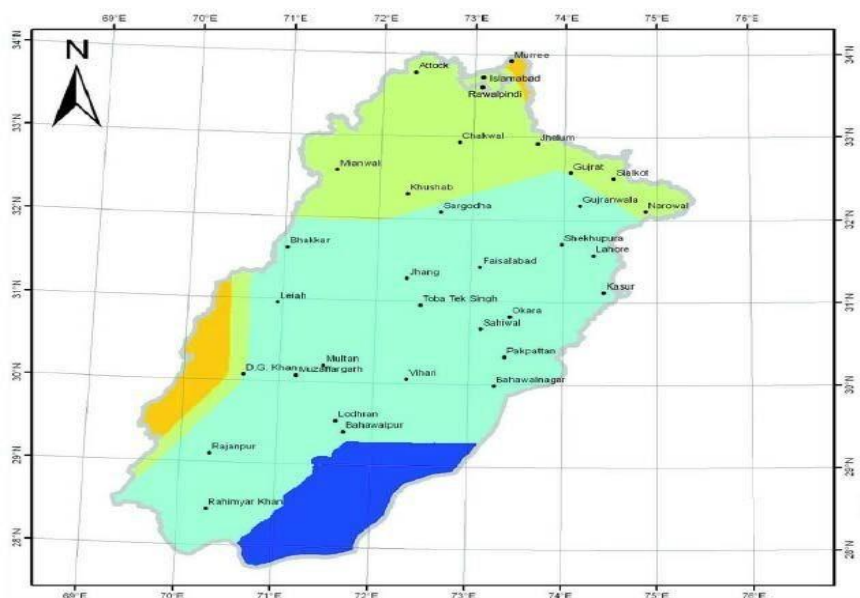
Groundwater sample taken is suitable for drinking purpose as all of its parameters have values within the limits of PEQs Guidelines. The detail of sampling locations is given in **Table 4.8**.

4.3.9 Seismicity

Probabilistic Seismic Hazard Assessment (PSHA) carried out for revision of seismic provisions of the Building Code of Pakistan, shows that the site area falls in Zone 2A. It is therefore, recommended that the project structures should be designed to cater for the requirements of Zone 2A of Building Code of Pakistan (2007).

A plan showing various zones of Pakistan as per Latest Seismic Microzonation as given in the Building code of Pakistan is shown in Fig. 4.7.

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4.3.10 Land use Pattern

The land use in the vicinity of the project area is agricultural cum commercial. The educational institutions in the surroundings are Govt. Higher School. Moreover graveyards and a number of mosques also exist in the vicinity of the project area of influence. **Fig.4.15** shows the land use pattern of the project area.

Industrial and Commercial Activities

There are many industrial activities in the vicinity of Project area. However some commercial shops are situated in the vicinity of Project area

Agriculture and Crop Pattern

Major portion of the tract on the one side of the project area, nearly eighty percent (80%) is under agriculture. The lands which are irrigated by canal water or through tubewells are fertile and productive. A majority of population is linked with agriculture sector, being the most significant economic parameter for their livelihood. The land in the vicinity of the project area is mostly fertile and suitable for the growth of crops, vegetables and fruits.



Fig. 4.8: A General View of the Crop Pattern in the vicinity of Project Area

4.4 BIODIVERSITY AND NATURAL RESOURCES

Once rich in natural vegetation the land use pattern of the Indus Basin and other areas has greatly been modified for want of land for cultivation. This has changed the pattern of flora wherever irrigation was possible.

4.4.1 Flora

The flora of the district characteristics are two major ecological divisions, northern, southern. The botanical life found in the northern half identifies itself with that of the rest of the irrigated tracts at central Punjab. The human interference in the form of irrigation network has virtually wiped out the old plantation without much revolutionization of the phytophysiology in the area. Due to factors such as waterlogging and salinity, only the salt resistant plants can survive in most of the area. The southern half is characterized by sand dunes, more or less barren of vegetation except in the rainy season when multitudes of ephemeral or short lived plants come up and transform the bare land into a lush green carpet. In general, the vegetation in this part of the arid region is sparse. The bulk of the vegetation consists of stunted, thorny or prickly shrubs and perennial herbs capable of withstanding drought with grown in open clump formation with plenty of vacant spaces between them. Distinctly scattered trees of stunted growth are found along the depression technically known as desert scrub.

Plants found in Cholistan are as under:

1. Phatokar: Cholistan aborigines use its puddings for (halva) the removal of worms from the alimentary tract.
2. Katran: A shrub with aromatic leaves (fragrance). Its ark is used for asthma and the Sharbat is given to patients suffering from prolonged fever.
3. Chapri: Cholistanis consider it as a Soghat. It is used in rheumatic pain and as diuretic. It is believed to increase sexual potency.
4. Baren Dandi: it is a medicinal plant, particularly useful in liver trouble.
5. Gor gopan: it is considered as a Thandi Booti. It is used in liver trouble. Some take it as substitute of tea.
6. Bo Phali: Cholistanis take it for the cure of urinary tract troubles.

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7. Rat Sat: It is believed that this weed contains ingredients of certain minerals. Chemists are generally found interested in this plant, perhaps due to some minerals of medicinal significance.
8. Phali: Indian bustard's favorite food (seeds), also eaten by camels.
9. Olatee: Seeds eaten by desert partridges.
10. Phag: The flower is cooked as pot herb (sag) and tastes like eggs.
11. Khip: it is being tried as a substitute of jute: its seeds are considered to be a rich source of fat.
12. Pelu: The fat from Pelu seeds is being studied for its utilization in soap making.
13. Boara: Gum is extracted from this plant.
14. Pepoon: It is a fungus which grows on decaying roots of capperis and is eaten as a vegetable. Chatni is also prepared from it.
15. Agaricus: (Khumbi) This fungus is also cooked and taken as food.
16. Monyan: Serves as fodder for animals.

4.4.2 Fauna

An unblemished geographical feature of a vast arid land, popularly known as Cholistan desert provides an ideal opportunity for a variety of wildlife. A wild cat still exists in the area which as the desert traditions say, is very fond of ripping apart the newly born young goes of Chinkara deer. Pig known as Hirhoon, Jitama, Bhoondin or Soor in this area is found in a fairly large number in government plantation near the desert. Jackals (Geeder), fox (Loomeri), badger (Bijjoo) also exist in the desert. Wolfe locally known as Mahr is negligible now. Porcupile (Seh), squirrel (Golhari Fubhri) and jerbils musk rat (Chhachhoondar), wild rat (Choocha) of brownish color mongoose (Neola), are generally visible. Mongoose has half a dozen of varieties in this area. Though small, it readily attacks much larger animals. It kills large number of poisonous

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snakes and rodents. A duel between mongoose and cobra used to be a familiar attraction in village festivities generating enthusiasm of no less than a bull fighting.

Some of the animals such as hog deer (Parha), blue bull (neel Ghaee) and ravine deer (Heron) are more or less non-existent now and are rarely witnessed across the Indian borders. Black buck, once a beauty of the desert has been totally eliminated. Chinkara is a fine specimen of antelopes, though not as original as the black buck, commonly known as Ghazaal.

Black crow, sparrow and dove are numerically common as in other parts of Punjab, Green parrots are also found and generally damage the crops. Myna is however a useful bird for cultivators. Lark is another bird which charmingly charts in the early morning hours. Owl has also established its existence in the specific types such as Chibri and Ghug. Falcons here are of various species known as Baz, Shikra and Shaheen etc. Tanny eagle, spotted eagle, bonelli's eagle, laggar eagle, white and black vultures, mash harrier and kestrel are generally spotted in the area. Falcon used for hunting the bustard is especially trained for this purpose. It is caught hold of at tender age, through interesting indigenous methods which are otherwise banned under the law protecting the wild life.

Wild lizards are witnessed here in a number of species including Goh, Kirli and Kirla. Another species is locally called gohira and yet another Sanda. A very deadly poisonous snake Padam is also found in the district as the local saying goes "Jen Ko dangia Padam, Chalan Noa Ditha Qadam", (he whom Padam has bitten, will not go another step). White egrets, little egrets and black wing stilts are common and feed on insects and fish. Amphibians generally include on y frogs and toads.

Over 40 varieties of fishes are found in the district. Rahu, Thaila, Mori, Mullee, Khagga and Sanghara are however found in abundance in river, canals and ponds. **4.4.3**

Endangered Fauna

No endanger species have been reported in the Project area.

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4.4.4 Critical Habitats

No wild life sanctuary or game reserve (Critical Habitats) exists around proposed project site.

CHAPTER – 5

SOCIAL BASELINE

5.1 SOCIAL BASELINE CONDITIONS

5.1.1 Administrative Setting

Rahim Yar Khan comprises of 4 Tehsils, 3 Municipal Administration and Town Committee and 136 union councils. Project site is located in Rahim Yar Khan Tehsil. Its area is 1715 sq. km. and population was 985655 in the year 1998. Total (male and female) population consists of more than 90% Muslims and Majority is Punjabi. Total population of Tehsil is 274666, literacy ratio is 60.4, and education primary (Male + Female) is 46000, Matric & above is 39000. Housing pattern mostly pacca, potable water for 11774, and electricity, 32503 & latrine facility for 21919 persons. Average household size is 7.4.

5.2 SOCIAL INFRASTRUCTURE & ITS IMPACTS

5.2.1 Social Impacts

- a) Impacts which result in a change in the community's demographic structure
- b) Environmental impact that may cause substantial change or disruption to the community behavior (loss of neighbor cohesion, access to facilities, links to other communities, community identity or cultural character)
- c) Impacts which result in some individuals or communities being significantly being disadvantaged
- d) Impacts on the health, safety, security, privacy or welfare of individuals or communities because of factors such as:
 - (i) Air pollution, odor and noise
 - (ii) Vibration, blasting, electromagnetic fields or radiation

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- (iii) Release of disease or genetically modified organisms (iv) Disease causes due to dust problem.

- e) Impacts that result in a change in the level of demand for community resources (e.g. facilities, services and labor force)
- f) Any other social impacts.

5.2.2 Heritage, Aesthetic, Cultural Impacts

- a) Impacts on a locality, place, project or natural landmark having aesthetic, anthropological, architectural, cultural, historical, scientific, recreational, scenic or social significance or other special value for present or future generations
- b) Any other heritage, aesthetic, cultural impacts

5.2.3 Land Use Impacts

- a) Any major changes in land use
- b) Any curtailment of other beneficial uses
- c) Any property value impacts with land use implications
- d) Any other land use impacts

5.2.4 Transportation Impacts

- a) Substantial impacts on existing transportation systems (road, pedestrian-both public and private), altering present patterns of circulation, modal split or movement of people and/or goods
- b) Directly or indirectly encouraging additional traffic
- during construction
 - during operation

- c) Any other impacts on transport or traffic.

5.2.5 Temporary Land Acquisition

- a) Impacts due to change of site or access of land during construction/ operation/ study.
- b) Negotiations and related delays associated with land acquisition issues.

5.3 DEMOGRAPHIC CHARACTERISTICS OF THE POPULATION IN AREA OF INFLUENCE

Due to the social and Jagirdari set-up in the project area, it was difficult to collect the relevant information on this socially sensitive part of the questionnaire; however, an effort was made to get the desired information relating to the demographic features of the population resided along the project corridor. The demographic features include the information on ethnicity/tribes, size of households, gender composition, and literacy status of the population in the project area.

5.3.1 Family Size

In the project corridor, the population is living in an extended, joint and nuclear family system. An extended family system refers to the households where parents and grandparents are living together in a household, while joint family system includes the households where, parents, brothers, sisters, sons, daughters are living together. The nuclear family includes only a single family, i.e. husband, wife & kids.

In the visit, it was observed that in the project corridor; mostly the population is living in a joint family system.

5.3.2 Gender Composition

The gender composition, on the whole, includes the proportion of male and female population in the ratio of 52 percent and 48 percent males and females respectively residing along the project corridor

Table 5.1: Demographic Analysis of Sample Population

Area	Gender Composition		Literacy Rate (%)		
	Male (%)	Female (%)	Overall	Male	Female
Project Area	52	48	60	65	35

5.3.3 Education Status

Literacy is not just attaining the skills of reading and writing but providing people with the skills to learn, protect and empower themselves in society and effectively contribute in decision making at various levels. The general disparity in education exists in low-income communities.

5.3.4 Nature of Occupation

In the project area, the major occupations include business (shops, stores, kiosks, medical stores etc.), service (government, private, drivers), labour (skilled & unskilled), farming and others (i.e. abroad, artisans etc.). The socioeconomic baseline survey results summarized that on overall basis in the project area, 5 percent of population settled along the project corridor operated business (general stores, shops etc); 10 percent are labourers/tenants, 3 percent are engaged in farming, while 11 percent are in service sector.

Table 5.2: Major Occupations of Sample Population

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Area	Main Occupation (%)			
	Service	Business	Labour	Farming
Project Area	11	5	10	3

5.4 AGRICULTURE

5.4.1 Land Use Pattern along the Project Corridor

The optimum cropping pattern refers to the allocation of cultivated area under different crops during the year in order to attain maximum output within the existing resources. There are only three main crops being grown along the project corridor. In Rabi season, wheat is the main crop, in Kharif season the main crop is cotton, sugarcane and in few cases rice.

5.4.2 Cropping Intensity

The extent of cultivated area due to its less developed irrigation system is less due to terrain of most of the area being sandy desert. The average cropping intensity is estimated as below as compared to other Districts of Punjab.

5.4.3 Crop Yield

Crop yield is one of the key performance indicators to assess the productivity of land. As discussed above, there are the main species grown in the area like as wheat, rice, maize, cotton and fodder crops. The average yield of wheat crop is 1600kgs per acre, rice (paddy) is estimated as 1400kgs per acre and sugarcane is estimated as 2500kgs per acre along the project corridor.

Cotton crop yield is about 4000 Kgs per acre.

5.4.4 Household Expenditure

The annual expenditure and pattern of expenditure provides an indication for assessing the standard of living of a household. The expenditure on food items includes cereals, pulses, flour,

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sugar, cooking oil/ghee, milk etc., while the non-food items consist of expenditure on education, medical treatment (if any), clothes, shoes, cosmetics etc.

Table 5.3: Average Monthly Expenditure

Area	Food Expenditure (Rs)	Non-Food Expenditure (Rs)	Occasional Expenditure (Rs)	Total Expenditure per Month (Rs)
Project Area	3711	1594	1600	7482

5.4.5 Extent of Credit Utilization

Generally, the credit is obtained to supplement the income to meet routine and some occasional expenditure of the household including investment, social needs and other unforeseen situations. Credit is obtained from formal (banks/institutions) and informal sources (friends, relatives, land owners etc.). Mostly people do not like to get credits from the government saying that the mark up rate is very high.

5.4.6 Access to Social Amenities

Generally, in the project area, drinking water is available to the population. In the survey it was noted that along the project corridor, the major sources of drinking water were “hand pumps, wells/electric motor, tube wells, electric wells (motor) etc.

Table 5.4: Access to Social Amenities along the Project Corridor (Percentage)

Social Amenities	Available	Satisfactory	Non Satisfactory	No Access
Electricity	100	20	77	1
Sui Gas	75	36	37	23
Water Supply	0	0	0	100

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Telephone	65	12	24	64
Sewerage/Drainage	47	7	33	49
Health Unit	99	13	87	1
School	99	43	56	0

5.5 SOCIO ECONOMIC SURVEY

The categories of stakeholders which are not directly located inside the project area have also been interviewed. They include farmers, tenants, labourers, vendors, drivers, students, shop keepers and females etc.

5.6 CULTURAL AND RELIGIOUS STRUCTURES

No such site is located near project area.

5.7 INDIGENOUS AND WOMEN HEADED HOUSEHOLDS

During the field visit of the project, efforts were made to identify the indigenous and women headed households along the Project boundary. But no indigenous group of people was identified which comes under the definition of “Indigenous People”

CHAPTER – 6

SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1 SCREENING

Section 12 of Punjab Environmental Protection Act (PEPA), 1997 (Amended 2012) states: “*No proponent of a project shall commence construction or operation unless he has filed with the Government Agency designated by Federal Environmental Protection Agency or Provincial Environmental Protection Agencies, as the case may be, or, where the project is likely to cause an adverse environmental effects an Environmental Impact Assessment (EIA), and has obtained from the Government Agency approval in respect thereof.*”

As per Review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations, 2022 under Section 12 of Punjab Environmental Protection Act, 1997 (Amended 2012), the said project Sugar mills falls in the projects mentioned in Schedule II.

6.2 SPATIAL AND TEMPORAL BOUNDARIES OF ENVIRONMENTAL ASSESSMENT

The said project is the enhancement of crushing capacity upto 38000 TCD (Tons crushed daily) of M/s Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan and the selected land is under the ownership of company. By the implementation of said project, the wastewater generated from the various sections like; washing of sugarcane, crushing, washing of vessel, etc. will be treated before its final disposal. By implementation of said project the sanitary condition of selected area will be improved as the pollution load will be reduced significantly, water quality

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will be improved, pollutants & toxicants will be eliminated that enable the generated wastewater to be reused for various domestic & horticultural activities. The wastewater treatment may cause nuisance for general public as odor will be generated while treating the wastewater & during sludge drying, it will be mitigated by maintaining the treatment plant on regularly and through thick tree planation. Moreover, the residential area is at the safe distance from project site.

The wastewater of sugar mills can be a source of nuisance, if not properly disposed off. It can cause serious health issues among the people using the water directly or indirectly after the discharge of the wastewater in the channel. Similarly, site can also have negative impacts if not properly managed. The spatial and temporal analyses associated with the site are discussed in this section. This site is carefully selected, as it is in the premises of the Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan and is in vicinity of water body (channel). Therefore, after rigorous treatment through DAF System, the wastewater will be discharge directly into the channel that will be safer to ecosystem. It can be seen from the above map that there are fewer residential houses and more agricultural area within the 01 km radius, which makes it a suitable site.

Significant Impacts and Factors to be Determined

Main impacts and factors to be determined are

- Occupational Health and safety
- Site Security
- Traffic Management
- Hygiene management
- Job opportunities for locals
- Resource conservation

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- Avoid excessive water consumption
- Tree plantation at designated green areas
- Emergency preparedness

6.3 ENVIRONMENTAL PARAMETERS

This section identifies the potential impacts related to construction and operation of the proposed project on the physical, ecological and socioeconomic domains of the environment. Accordingly mitigation measures have also been reported to manage the environment and for sustainable development. The project activities will neither adversely affect the population nor the environment around the project site.

6.3.1 ENVIRONMENTAL PARAMETERS ASSOCIATED WITH PROJECT LOCATION

The project is the enhancement of crushing capacity, having current capacity 24000 TCD at Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan up to 35000 TCD. There is no human settlement, heritage building, social structure, grassland or preserved area in the project vicinity that could be damaged, dislocated or dismantled due to the project activity in the proposed extension.

The proposed extension is undisputed open land located within existing facility of M/S Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan. So, no other site alternative has been considered in this regard. Wastewater generated from the operation of sugar mill will be treated in DAF System.

Nature of Impact

The nature of the proposed impact will be direct, low, short-term and hence insignificant.

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Mitigation Measures

No mitigation measure will be adopted as the selected site is in close proximity of existing unit and is already under the ownership of Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan.

6.3.2 Design

At the design phase, no considerable impact will occur on land, soil, topography, ground water, and people residing in the nearby area.

However, in pre-construction phase a management system should be provided so anticipated impacts can be reduced. Design of the proposed plant will adhere to all standard technical requirements in order to avoid adverse impacts on socioenvironmental aspect.

The design, if maintained and operated in sustainable manner, is expected to cast positive impact on the social environment and will impose adverse impact on the environment which can be mitigated or reduced upto acceptable level by adopting best management practices.

Nature of Impact

The nature of the proposed impact will be direct, low, short-term and hence insignificant.

Mitigation Measures

The Proponent intends to extend the unit on modern lines with incorporation of latest technology which will not cause any significant impact on environment. Wastage of water will be avoided. All the waste material will be tried to use as raw material i-e baggase as fuel of boiler, wastewater in sugarcane fields etc. Moreover, the buildings will be designed by keeping in consideration all the technical standards to avoid adverse impacts on the environment and society

6.3.3 Impacts and Mitigation Measures during Construction Phase

The main contractor for the construction of aforementioned project will be expert in similar construction developments. It is expected that a maximum of 15-20 workers will be hired and it is planned that they will use existing building for domestic activities. The construction activities will include

- Site leveling
- Utilities and services connections to site
- Foundation excavations and installation of concrete footings
- Erection of plant
- Installation of machinery
- Commissioning

Project construction phase will be of two year whose activities will surely show effects on land environment, water, air, noise level, soil quality, socio-economic trend, etc. This activity will have a positive impact in case of socio-economic culture for the people in the nearby villages of Jetha Bhutta.

They will have a chance for local employment in foundation, fabrication, brick masonry, painting and machinery erection works. Along with that tree plantation will be one of the activities. As local workers are involved in construction phase, impact at site will be negligible. The construction phase of extension of sugar plant will include activities associated with the site leveling, construction of civil structures, architectural works and building services. The construction phase would bring in immediate but short term changes on various components of environment near the project site.

Impact on Topography

The area of the proposed plant is more or less flat terrain. It is predominantly covered with fine to medium grained clay loam as top soil with underlying compacted dense sand. During the

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construction phase leveling would be required. Apart from the localized construction impacts confined to the plant site, no significant long term adverse impact on topography is envisaged.

Soil Contamination

The following practices will be adopted to minimize the risk of soil contamination:

- The proponent will be required to instruct and train their workforce in the storage and handling of materials that can potentially cause soil contamination.
- Solid waste generated during construction will be properly and safely disposed of as per practices of area.

Impact on Air Environment

The main source of air emission during the construction phase is dust. It will be generated due to movement of equipment at the site and during site leveling, earthwork, foundation work and other constructional activities. Dust emissions are expected to result in increased particulate matter thus affecting base line air quality, primarily in working area for a short duration.

Following mitigation measures will be adopted:

- In order to reduce concentration of suspended dust particles, transport roads will be sprinkled with water on the regular basis
- Construction activities causing dust should not be carried out on excessively windy days
- Construction workers will be provided with masks for protection against the inhalation of dust and they should be trained for its use
- Vehicle speed should be controlled within the limit

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- Emission of exhaust gases from vehicles used for construction should be controlled

Impact on Water Environment

The construction activities will be associated with mechanical fabrication, assembly and erection. These activities associated do not consume large quantities of water. Make shift sanitation facility shall be provided by contractors for disposal of sanitary sewage generated by the work force. There shall be no disposal of construction waste outlet. The overall impact on water environment during construction phase due to the proposed project is considered short term and insignificant.

Impact on Flora & Fauna

Project site is clear and no vegetation is present on-site. Since, no flora removal is involved; therefore no effect due to the project implementation is being envisaged. There will be no effect on fauna of the area, animals will not be allowed at project execution area. Proper fencing will be done during construction period to protect any damage to fauna (if any).

Impact on Noise Environment

The noise produced during construction phase may not have significant impact on the existing ambient noise levels. The activities like construction of foundation, infrastructure and plant are considered as the main source of noise generation. The major construction work will be carried out during the daytime. The construction equipment may generate high noise which can affect the personnel operating the machines. Use of proper personnel protective equipment will mitigate any adverse impact of noise on the working population. Noise from the site is expected to be reduced significantly before reaching nearby habitation.

Following mitigation measures will be adopted:

- Selection of up to date and well maintained plant or equipment with reduced noise levels ensured by suitable in built damping techniques or with appropriate muffling devices

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- Confining noisy work to normal working hours in the day, wherever possible
- Providing the construction workers with suitable hearing protection like ear cap, or earmuffs and training them in its use
- Restricting construction vehicle movements during nighttime
- Use of low noise machinery, or machinery with noise shielding and absorption are the mitigation measures suggested for said project

Occupational Safety

During the construction there are chances of minor or major accidents at the site.

Mitigation:

All the workers will be provided with PEPs such as; helmets, goggles and safety instructions in the form of manuals and also first-aid will be made available. List of PPEs is given below:

- Safety shoes 16 No's
- Gloves 24 No's
- Helmets 12 No's
- Safety belts 06 No's
- Ear plugs 12 No's
- Safety Goggles 12 No's

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IMPACTS DURING OPERATION PHASE

The plant operational activities will have impact on physical environment (air & water quality, noise level) and on socio-economic environment. No land/topography alteration is envisaged due to the operation of sugar plant.

Impact on Air Environment

Sources of air emissions in Sugar Mill (extension) are boilers and steam generators. The air environment gets polluted due to emission of suspended particulate matter.

Due to existing Pucca roads & reduced distances for bullock carts, tractors & trucks to reach the mill site suspended particulate matter generation will be comparatively lesser. Use of captive Bagasse from cane crushing as a fuel will be a solution for its safe disposal. Complete combustion, wet scrubbers, ash collection system and effective ash handlings are the mitigation measures which will be adopted in said project. Mixing of collected ash with press mud to sell to farmers/brick producers (located near site) is another suggested mitigation measure to minimize the probable impacts of fuel handling & safe ash disposal. Ash will be generated at less than 1% of baggase used as fuel in boiler.

Vehicles used for transportation of sugar cane as well as finished product would be bullock cart, tractors and trucks and the utility vehicles used would be buses, jeeps, cars and ambulances. HSML needs to regularly carry out checks of all motor driven vehicles and carry out regular servicing and maintenance of it in order to keep the environmental impact on account of their exhaust emissions to its minimum level. For reducing fugitive dust, regular water sprinkling on Kachha roads will be done. All trucks proposed to be used for transportation will be covered with tarpaulin, maintained and optimally loaded. Moreover, the garden development and tree plantation activities of HSM during operational phase would ensure minimal impact of fugitive dust emissions.

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Impact on Noise Environment

Noise, an unwanted sound, affects human being. Excessive exposure to noise produces varying degree of damage to hearing system. It leads to headache, fatigue etc. Road traffic will also result in rise in noise levels. Continuous exposure of increased level of noise will have an adverse impact on the health of workers as well as the people residing in surrounding area.

In the operation of Sugar mill following equipment shall be the sources of noise.

- Centrifugal Machine - 86-87 dB (A)
- Vacuum Release - 102-104 dB (A)
- Sugar dry units - 91-92 dB (A)
- Compressor for air supply - 90-92 dB (A)
- Milling - 88-91 dB(A)
- Mill Turbine - 92-94 dB(A)
- Juice clarification station - 88-89 dB(A)
- Juice evaporation station - 82-93 dB(A)
- Boilers - 83-109 dB(A)
- FD fans - 94-96 dB(A)
- Delivery pumps for sugar & molasses supply - 89-90.5 dB(A)

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As the nearest residence is at a distance of 7.6km from site so no disturbance due to noise will be there on residents.

Proper encasement of noise generating sources will be done to control the noise levels within limits. The steam turbine generator will be provided with acoustic enclosures and silencers in the exhaust. The steam turbine will be housed in a closed building which will considerably reducing the noise. In case of maintenance, the persons working near the steam turbine generator building will be provided with ear muffs.

A thick greenbelt will be developed all around the plant which will be acting as noise barrier.

In general the following methods will be adopted to control the noise pollution from the proposed units;

- The use of concrete and masonry walls & barriers keeping in view the benefits of stiffness weight & cavity construction & the need to provide well sealed sound attenuating doors & windows.
- The use of complete or partial enclosures.
- Attenuation by use of sound absorbents on walls and fixed or suspended ceilings
- Introduction of control and monitoring rooms having good sound insulation properties.
- The use of mufflers, sound attenuation and acoustic louvers in air flow paths, taking particular care to direct inlet and discharge an opening away from critical areas wherever possible, so as to take advantage of direct effects.
- All the workers will be provided with ear plugs, proper maintenance of blowers and pumps. All the transporters will be advised to carry out regular maintenance of their vehicles.

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Solid waste management

The solid waste generated from the sugar unit is mainly ash, press mud and Bagasse. The ash will be generated from boiler. This solid waste in case dump on land will create soil degradation or underground water pollution.

Mitigation:

Press mud will be sold to farmers to use as biofertilizer or cow feed. Bagasse is the raw material in boilers. Ash generated during combustion in boiler will be sold to brick manufacturers or will be mixed with mud cakes and used in fields.

Impact on water environment

Wastewater generated will be treated in lagoons in DAF System. After treatment, wastewater will be discharged in SCARP Drain.

Impact on Socioeconomic Environment

Like other sugar factories HSML is also located in an isolated area. HSML management thought that it would be advantageous to improve the living conditions of people in and around the plant site. It also proposes to employ local skilled and unskilled workers in the proposed project. It will therefore generate employment in the local area.

In turn local people can avoid uncertainty of jobs, raise their living standards, do supplementary jobs of cane & other farming, cattle, poultry, brick making unit etc. thus to stabilize & prosper in life. This will surely make a positive impact.

6.4 POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES

i. Enhancement in opportunities for employment

During proposed construction, the employment opportunity will be enhanced. Workers will be hired from local community, include; skilled and un-skilled workers. During construction phase 20 - 25 workers will be hired and in operational phase only 10 workers will be employed as the process employed will be fully automated. It will include technical staff only. Locals will also have the opportunity to diversify their income by being employed during various project phases. Hence, there will be an increased employment opportunity for the local people which will have a positive impact on the socio-economic status of the area.

ii. Environment Friendly

Project will have positive environmental impacts and is expected to significantly reduce a source of chronic water pollution.

iii. Recycling/Reuse of Treated Wastewater

Wastewater treatment plant (DAF System) will contribute in saving water resources as effluent water from the treatment plant will be used for various purposes i.e. agricultural use, fire services use, washing of vehicles and many others.

iv. Tree Plantation

At the end of the installation phase, landscape of the area will be enhanced by planting native and ornamental plants at the designated green areas. This will enhance the aesthetic look of the area.

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6.5 ENVIRONMENTAL AND SAFETY COMPONENTS AND THEIR IMPACT MATRIX

6.5.1 Environmental Matrix for Pre-Project Activity

S.N.	Activity	Positive Impact		Negative Impact		No Impact
		Short	Long Term Term	Short	Long Term Term	
Pre-Project Activity						
1	Displacement and Resettlement of local people					√
2	Change in Land Use					√
3	Loss of Trees/Vegetation				√	
4	Shifting of equipment, machinery and material					√
5	Employment for local people		√			

6.5.2 Environmental Matrix for Construction Phase

S.N.	Activity	Positive Impact		Negative Impact		No Impact
		Short Term	Long Term	Short Term	Long Term	

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Construction Phase						
1	Pressure on infrastructure and transportation system			√		
2	Impact on air quality including dust generation			√		
3	Noise Pollution			√		
4	Traffic					√
5	Impact on the land/soil Environment			√		
6	Impact on groundwater					√
7	Stacking and disposal of construction material			√		
8	Impact on water quality			√		
9	Health and Safety conditions of people			√		
10	Social Impact		√			
11	Economic Impact		√			

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6.5.3 Environmental Matrix for Operational Phase

S.N.	Activity	Positive Impact		Negative Impact		No Impact
		Short Term	Long Term	Short Term	Long Term	
Operational Phase						
1	Increase in air pollution and noise levels				√	
2	Water Usage		√			
3	Disposal of solid waste		√			
4	Infrastructure development		√			
5	Quality of life		√			
6	Handling operations for transfer, charging of raw materials, final product				√	

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CHAPTER – 7

**ENVIRONMENTAL MANAGEMENT AND MONITORING
PROGRAMME**

7.1 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (EMP) is the integral part of environmental assessment report. The primary objectives of the EMP are to:

- Define the responsibilities of project proponent, contractors and other role players, and effectively communicate environmental issues among them;
- Facilitate the implementation of the mitigation measures identified in the EIA by providing the technical details of each project impact, and providing an implementation schedule;
- Define a monitoring mechanism and identify monitoring parameters to ensure that all mitigation measures are completely and effectively implemented;
- All environmental safeguards are carried out correctly.
- The project is monitored for environmental impacts. Therefore, adverse impacts on environment are minimized.
- All relevant legislation is complied with.

7.2 STRUCTURE OF EMP

The structure of EMP should:

- Identify the resources required to implement the Environmental Management Plan (EMP) and outline relevant expenses arrangements.
- Identify key monitoring parameters and schedule of monitoring of these parameters identify training requirements at various stages of the development of the project.

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- Environmental control methods to be used to minimize environmental impacts.
- Assign responsibility for each control measures to specific staff member.

7.3 INSTITUTIONAL CAPACITY

The following organizations would be involved in the implementation of the suggested EMP;

- Proponent of the project
- Project Contractor, as the executor of the EMP during construction stage of the proposed project Environmental Manager / Supervisor to monitor and execute the EMP during construction and operation stage.
- EPA Punjab, as Government Department to review and monitor the implementation of remedial and mitigation measures as given in EIA Report.

7.3.1 Specific Implementation Responsibilities

The implementation of the EMP will be the prime responsibility of the project proponent. He will designate responsibilities and obligations to its selected contractors and Environmental Manager / Supervisor. Specific responsibilities of key role players are illustrated hereunder:

7.3.2 Proponent

Proponent will be responsible for ensuring overall implementation of the EMP during construction as well as operational stages of the project. He will provide the requisite financial resources to the contractor and Environmental Manager / Supervisor to implement the EMP. Key responsibilities of proponent are:

- Communicate with local community and Regulatory Authorities in order to get time to time feedback of the stakeholders on various social and environmental concerns.
- Coordinate with regulatory agencies EPA or other departments.

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- Make sure liaison between the contractor / Environmental Manager / Supervisor and Environmental Consultant to check environmental compliance with EPA.

The contractor will be responsible for the implementation of all measures necessary to ensure that environmental impacts during construction phase should be minimized. In order to fulfill these requirements, contractor will carry out the following:

- Implement environmental good practice measures outlined in the mitigation measures.
- Provide, to extent practicable, environmental training to the work force and promote environmental awareness.
- Coordinate with local authorities as appropriate.
- Facilitate consultants during environmental monitoring.

7.3.3 Environmental Manager / Supervisor

The principle responsibilities included:

- To monitor on daily basis whether operational activities are carried out in an environmentally sound and sustainable manner.
- Coordination with provincial and local officials, community groups, government departments, etc. on environmental issues.
- Monitoring of the environmental aspects to ensure that the environmental impacts and the mitigation measures suggested in the EMP are implemented.
- Undertake critically important routine and visual monitoring of waste disposal and overall environmental management practices adopted.

7.3.4 Environment Protection Agency

The Role of EPA is on the apex and includes checking:

- The implementation of mitigation recommendations as given in EIA Approval for starting actual project operations is obtained from EPA and Orderly review of audit reports prepared internally or by a third party monitor.

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- Whether requirements of the Environment Approval awarded by the EPA against EIA report are met.
- Carry out environmental monitoring on quarterly basis and advise any changes in the structure or implementation method of the EMP.
- Suggest or order any appropriate solutions.

7.3.5 Auditing

The Audit will be carried out internally by the Proponent, Contractor and Environmental Manager / Supervisor. The primary aim of the auditing is to assess compliance and effectiveness of the EMP as well as the alternative environmental and social objectives and also to assess the effectiveness of corrective actions. Audit will also suggest remedial measures to overcome the environmental and social problems.

The external auditing will be carried out by the EPA, Punjab, in order to check compliance and implementation of EMP. The EPA will check various parameters with reference to various sections of Pakistan Environmental Protection Act PEPA- 1997 (amended 2012) and standards specified by PEQS there under.

7.4 TRAINING SCHEDULES

TRAINING SCHEDULE OF CONSTRUCTION PHASE				
Activity	Duration	Trainer	Venue	Addressee / Participants
Work at height	1 Day	Environmental Specialist of Contractor	Onsite	20 Workers of Construction phase.
Emergency drills	1 Day	Environmental Specialist of Contractor	Onsite	20 Workers of Construction phase.

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Health and Safety	1 Day	Environmental Specialist of Contractor	Onsite	20 Workers of Construction phase.
Water Sprinkling	1 Day	Environmental Specialist of Contractor	Onsite	20 Workers of Construction phase.
Briefing about EMP of construction phase	1 Day	Environmental Specialist of Contractor	Onsite	20 Workers of Construction phase.

7.5 EQUIPMENT MAINTENANCE DETAILS

Type of Equipment	Type of Inspection	Schedule
Maintenance of Vehicles (Cranes, Truck, Hydraulic, etc.)	Complete inspection and certification	Before put to work and annually
	Critical items, overall functioning	Daily
	Safety device, hooks, cables, electrical	Monthly
	Repair	When failure occurs
	Preventative maintenance	Manufacturer's recommendation
Heavy Equipment/ Machinery	Complete inspection	Before put to work
Maintenance of PPEs	Repair	When failure occurs
	Preventative maintenance	Manufacturer's Recommendation

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Maintenance of Fire Fighting Equipment's	Complete inspection	Weekly Basis
Miscellaneous	Complete inspection	Before put to work
Maintenance of Trees Plantation and Grassy Area	Complete inspection	Daily Basis

7.6 ENVIRONMENTAL BUDGET

Sr. No.	Activity	Budge (PRs)
1	Personal Protective Equipment's	10,00,000
2	Water Sprinkling	3,00,000
3	Tree Plantation and Grassy area	2,00,000
4	Fencing	1,00,000
5	Fire Fighting	3,00,000
6	Housekeeping	1,00,000
7	Training of Workers	1,00,000
8	Vehicle Maintenance	1,00,000
9	Maintenance of Equipment/ Machinery	8,00,000
	Total	30,00,000 (Thirty Lac Pak Rupees)

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7.6.1 Mitigation and Impact Assessment

What is the problem	When will problem occur and when it should be addressed	Where problem should be addressed	How the problem should be addressed
Dust Pollution	During construction phase, it should be addressed to reduce dust pollution	During construction activities	Water Sprinkling
Impacts on air quality	During construction phase, mitigation measures should be implemented	Construction vehicles during construction activities	Given in detail below
Impacts of solid waste generation	During construction phase, it should be addressed to reduce the solid waste generated from construction material.	During construction activities	Given in detail below

7.6.2 Proposed EMP reporting and reviewing procedures

- During construction, EMP reporting and reviewing will be done by the contractor/HSE department. Regular monitoring will be done and reports will be submitted in EPA as per condition of Environmental Approval of construction phase.

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- Monitoring reports will be reviewed by EMP team and HSE department of M/s Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan and then will be shared with EPA.
- Photographic records will also be maintained
- Recorded data will be reviewed by supervisory contractor/proponent so that it can be further improved if required.

7.6.3 Mitigation and Impact Assessment

Purpose of Mitigation Measures should include:

- What is the problem i.e. in terms of “major environmental impacts” which may arise by the subject project activity?
- When the problem will occur and when it should be addressed.
- Where the problem should be addressed.
- And how the problem should be addressed.

The major impacts may arise by the proposed project are, dust, noise, solid waste, and wastewater. Other impacts are of minor importance. These impacts can arise during operation but precautionary measures have been adopted prior to start the operational activity, during the activity and post activity.

Any impact that would arise due to the subject project activity will be addressed through proper channel and on site. Trainings will be conducted regarding HSE, firefighting, best work practices etc. while other precautionary measures are also adopted to make the project safe and environmental friendly.

Whys of achieving Mitigation Measures by adopting proper mitigation measures, any anticipated major or minor environmental impacts could be controlled or mitigated. The detail of impacts and mitigation measures has been discussed in previous chapters.

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And how the problem should be addressed

The major impacts may arise by the project are dust, noise, solid waste, and waste water. Other impacts are of minor importance. These impacts can arise during operation but precautionary measures have been adopted prior to start of operational activity, during the activity and post activity. Any impact that would arise due to the proposed project activity will be addressed through proper channel. Trainings will be conducted regarding HSE, firefighting, best work practices etc. while other precautionary measures are also adopted to make the project safe and environmental friendly.

Project proponent will be responsible for the implementation of EMP and he has appointed as Project Manager/ Environmental Manager along with site manager to assess any impact that could be arisen during operation of the project. He is responsible to address the problem and to mitigate it.

Ways of Achieving Mitigation Measures

Adopting proper mitigation measures any anticipated major or minor environmental impact could be controlled or mitigated. The detail of impacts and mitigation measures has been discussed in previous chapters. Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan has been taking appropriate measures to provide pollution free and safe environment during the proposed project by implementing improved management. Practices and monitoring techniques suggested in EMP. Management will further take necessary actions to mitigate any residual impacts. The management will adopt such plan that will assure the minimum impact on the environment and health by implementing proper mitigation measures. Design of the building assures the structure stability in a long run. There was no dispute arose at the time of purchase of land and it is the property of Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan and if in future, there would arise any issue regarding environment degradation, they will compensate in terms of money as assured to achieve PEQS and compliance to other regulations made under PEPA 1997 (Amended 2012).

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Plantation will be done within the project site and for this area is reserved. The management will further develop Restoration / Reclamation or Tree Plantation Plan to restore the proposed project area. Plantation will be enhanced with native species within site, along the boundary wall and along the road side as per direction by EPA Punjab.

Improved Monitoring and Management Practices

The aim of improving monitoring is to enhance the environmental performance of the project through its enforcing the Punjab Environmental Quality Standards (PEQs) at all stages of activities as well as dealing with an emergency as and when it may occur. The objective of exercising by the management of the sugar mill is to ensure prevention of occurrence of any situation of emergency and incase of development of such situation, steps required to be taken to manage the situation. The section also contains a set of environmental guidelines for avoiding and preventing the adverse environmental impacts of the project. The monitoring will be carried out in accordance with Punjab Environmental Quality Standards (PEQs). The management will undertake monitoring of the Safety, Health and Environmental aspect, it will be the best tool for achieving mitigation measures.

Compensation in Money Terms

There is no affecting of the proposed capacity enhancement project because the land of project is owned by Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan. The construction and operational activities at the proposed project site will not damage inflict to any of the private properties, of the neighboring communities. Hence, no need of any sort of compensation. Not applicable in case of current project.

Replacement, Relocation and Rehabilitation

The management carrying all responsibility for cleaning and restoration will be carried out immediately after each phase of construction and will be the responsibility of each team in their respective area of operation, if relocation of any public utility or facility

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will involve, it should be carried out well ahead the start of construction to avoid disruption of service to the user-community. Once the phase will be over, efforts for restoring normalcy and rehabilitation should be initiated under instructions of the appropriate authorities or the project management committee, if any existing. Cleaning and restoration will be carried out during and immediately after each phase of construction and will be the responsibility of each team in their respective area of operation.

The following measures will be taken in this regard.

- All pin flags, stakes, signs and refuse will be removed.
- All concrete slabs will be broken and shipped to an appropriate site outside the Project.
- Area for proper disposal.
- Site will be cleaned so that no refuse or wastes are left behind; the waste will be properly disposed off.
- All ditches and sumps will be backfilled.
- Contaminated soil will be removed and be properly disposed off.

7.7 SUMMARY OF IMPACTS AND MITIGATION MEASURES

Summary of impacts and their mitigation measures are presented below in Environmental Management Plan (EMP) of construction and operation phase.

IMPACTS	MITIGATION MEASURES
Noise from construction machinery and vehicles	Use of Personal protective Equipment's (PPEs)
Noise generated by machinery during processing or during construction phase	Regular maintenance and vehicular monitoring.

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IMPACTS	MITIGATION MEASURES
from transport vehicles.	De-dusting System with Bag House
Wastewater generated during construction and operation phase.	Wastewater from domestic sources will be treated in septic tank prior to its use and drained out during construction. During operation, wastewater from treatment plant will be treated and then reused for other purposes. Monitoring.
Gaseous emissions / particulate matter during construction and operation phase by processing machinery or vehicles for transportation.	Covering of construction material to avoid dust. Installation of canopy or other equipments in case of any emission. Use of Personal Protective Equipment's (PPEs) while working. Maintenance and inspection of vehicles and processing machinery.
Construction, domestic or project related solid waste	Utilize the construction waste for road filling and maintenance. Solid waste bins will be placed at all suitable places. Moreover, disposal facility and proper management system should be provided.
Land or Soil Erosion	Removal of less vegetation.

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IMPACTS	MITIGATION MEASURES
	Restoration of land by plantation and maximum plantation will be done.
Health and Safety Issues	Use of PPEs. Training regarding Health & Safety, firefighting, and medical first aid. Never left machinery unattended. Well management practices will be adopted
Socioeconomic	Provide employment opportunities. Prefer local people for jobs.

7.8 PROPOSED EMP REPORTING AND REVIEWING PROCEDURES

- During construction, EMP reporting and reviewing will be done by the contractor/HSE department. Regular monitoring will be done and reports will be submitted in EPA as per condition of Environmental Approval of construction phase.
- Monitoring reports will be reviewed by EMP team and HSE department of M/s Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan and then will be shared with EPA.
- Photographic records will also be maintained
- Recorded data will be reviewed by supervisory contractor/proponent so that it can be further improved if required.

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7.9 ENVIRONMENTAL MANAGEMENT PLAN

Objective	Management Action	Responsibility	Time framework
CONSTRUCTION PHASE			
Employment Opportunities			
To promote the employment of local persons	Recruitment of local workers will be undertaken without discrimination and in accordance with HSML recruitment policy by contractors involved in construction	Hamza Sugar Mills Limited /Contractor	On commencement of construction activities
To promote the use of local service providers	Local procurement of goods and services will be undertaken wherever possible and cost effective and where practicable to the project (enhancement of capacity)	Hamza Sugar Mills Limited /Contractor	On commencement of construction activities
Construction traffic management & safety			
To ensure safety in factory construction	• Safety signage will be put in relevant	Contractor	On commencement of construction

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site	places within the construction site • Construction drivers to be subjected to public safety awareness • Reckless driving by construction workers will be prohibited and monitored and prohibited		activities
Soil management			
To ensure the conservation of soil	• Topsoil is to be stripped from the footprint area for the plant, and plant related infrastructure • All excavation works must be properly backfilled and compacted to avoid soil erosion • Rip compacted areas to reduce runoff and improve re-	Contractor	Continued from planning phase

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	vegetation where required		
Waste management (Construction Phase)			
To prevent the contamination of soils and water resources due to inappropriate management and disposal of waste	• The Hamza Sugar Mills Limited construction site will have litter bins for waste collection • 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 mill site	Contractor	Throughout construction stage
Pollution control management			
To contain spillages	Proper maintenance of construction vehicles and equipment will be	Contractor	On-site establishment

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	undertaken		
To manage sewage	Portable toilets will be provided at site offices. The portable toilets are to be cleaned on a regular basis	Contractor	On commencement of construction
Protection of biodiversity			
To avoid unnecessary disturbance of and quick recovery of biodiversity in the Hamza Sugar Mills Limited 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 vegetation recovery • Prepare and implement an appropriate landscaping	Contractor	Throughout construction phase

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	programme to help in re-vegetation of affected project areas after construction		
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 are to be enforced for construction vehicles • All trucks hauling soil, sand and other loose materials shall be covered	Contractor	On commencement of construction activities
Noise & Vibration			
To minimize disturbance due to noise & vibration	• Loading and unloading of materials must be done carefully to reduce noise		

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	disturbances to surrounding households • Residences are at a safe distance from site so no disturbance will be envisaged.		
Occupational health & safety			
To ensure healthy and secure environment in the mill construction site for all workers	• Management must ensure that fire extinguishers are located in strategic and visible places • All vehicles and construction equipment are under control of competent personnel • Employees need will be informed on the necessary safety procedures and be competent in the work they are employed to do.	Contractor	Throughout construction phase

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	• Inspection of material and harmonization to the occupational health and safety standards. • Adequate security for workers will be provided during construction		
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7.10 ENVIRONMENTAL MANAGEMENT PLAN (OPERATION PHASE)

Fire management (Cane)			
To ensure prevention of cane fires	• Sensitization of farmers on the environmental impacts of cane harvesting using the burning method • Ensure that all the farmers avoid the use of cane harvesting using the burning method	Hamza Sugar Mills Limited	Throughout project operation (enhancement of capacity)

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Farm soil compaction			
Ensure cane loading outside the farm	To alleviate the deterioration of farm soil quality due to compaction by heavy tractors during cane harvesting and delivery to the factory	Hamza Sugar Mills Limited	Hamza Sugar Mills Limited
To avoid environmental pollution through improper solid waste management (SWM) in the sugar factory	• Provide solid waste handling facilities such as waste bins and skips in all sections of the sugar mill • Ensure that solid waste generated is regularly disposed off scientifically • Hamza Sugar Mills Limited re-use the bagasse which is the residual woody fiber of the cane as fuel for boilers for steam generation.	Hamza Sugar Mills Limited	Throughout project life cycle (enhancement of capacity)

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	• One Type of Solid waste is vacuum filter mud. It will be 50-60 T/Hr. It is directly sold to the open market and used in place of fertilizer and very small quantity if any will be dumped out side the Mills. • Non-biodegradable and recyclable matter, such as containers, waste papers, used materials, waste packaging materials, will be sold to local contractors for recycling or reuse purpose.		
Wastewater	• Estimated waste water quantity around 700 T/Hr. Waste water is sent to waste water collection pits through oil skimmers and DAF System, finally send to Mills	Hamza Sugar Mills Limited	Throughout project life cycle

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	Scrap drain and for the usage of neighboring farmers for irrigation.		
Air quality and Noise management			
To minimize air and Noise pollution due to said project (enhancement of capacity)	- Standardized Air and Noise Pollution control devices are installed at Hamza Sugar Mills Limited, Khan Pur Rahim Yar Khan. - Gases Cleaning System, Dust Collector, Vent Silencers etc. are installed to control Air and Noise Pollution whose details with drawing and Pictures are annexed. Annexure 18 - For reducing fugitive dust, regular water sprinkling on	Hamza Sugar Mills Limited	Throughout project life cycle

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	Kachha roads will be done. • All trucks proposed to be used for transportation will be covered with tarpaulin, maintained and optimally loaded. • Moreover, the grassy lawns development and tree plantation activities of HSM during operational phase would ensure minimal impact of fugitive dust emissions.		
To minimize disturbance of communities due to noise and vibrations	• Proper encasement of noise generating sources is done to control the noise levels within limits. • A thick greenbelt is maintained all around the plant which will be acting as noise	Hamza Sugar Mills Limited	Throughout project life cycle

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	barrier. • The use of complete or partial enclosures. • Attenuation by use of sound absorbents on walls and fixed or suspended ceilings • Introduction of control and monitoring rooms having good sound insulation properties. • The use of mufflers, sound attenuation and acoustic louvers in air flow paths, taking particular care to direct inlet and discharge an opening away from critical areas wherever possible, so as to take advantage of direct effects. • All the workers are provided with ear		
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	plugs, proper maintenance of blowers and pumps. • All the transporters are advised to carry out regular maintenance of their vehicles.		
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7.11 ENVIRONMENTAL MONITORING PROGRAM

Env. Components	Project Stage	Parameters	Instrument	Standards	Monitoring			Institutional Responsibility
					Location	Frequency	Duration	
Air	Construction	PM10, SO2, NO2, CO, SPM, O3	Air Quality Monitors/ Gadgets	PEQs	Project site	Twice during construction	As per approved testing method	Contractor through approved monitoring lab
	Operation	Stack emission	Air Quality Monitors/ Gadgets	Category B of SMART rules	Boiler stack	Quarterly	As per approved testing method	HSML through approved monitoring lab
Noise Levels	Construction	Noise levels on dB(A) scale	Digital Sound Meter	PEQs	Project site	Twice during construction	Reading to be taken at 15 seconds interval for 15 minutes every hour and then averaged	Contractor through approved monitoring lab
	Operation	Noise levels on dB(A) scale	Digital Sound Meter	PEQs	Project site	Quarterly	Reading to be taken at 15 seconds interval for 15 minutes	HSML through approved monitoring lab

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							every hour and then Avera ged.	
Waste water	Operatio n	Effluent flow, Tempera ture, COD, BOD, pH, pH, TSS, Oil & grease	Lab equipm ents	Catego ry B of SMAR T rules	Wastew ater dischar ge point	Quarterl y	As per approv ed standa rds metho d	HSML through approved monitorin g lab

**7.12 ENVIRONMENTAL TECHNICAL ASSISTANCE AND TRAINING
PLAN**

In order to raise the level of professional and managerial staff, there is need to upgrade their knowledge in the related areas. HSE/Project Manager should play a key-Roll in this respect and arrange the training program. Project Manager will provide training to staff and workers about the best EPA management practices at the project site and effective implementation of EMP.

CHAPTER – 8

CONSIDERATION OF THE PROJECT ALTERNATIVES

8.1 SIGNIFICANCE OF THE ALTERNATIVES

The consideration of alternatives to a proposed project is one of the key aspects of an Environmental Impact Assessment (EIA). Consideration of alternatives assists the decision makers in the choice of an alternative, which has the least adverse and greatest beneficial environmental, social and economic consequences.

The most pertinent question to assess feasibility and propriety of a developmental project, from environmental impacts perspective, is to ask whether an alternative option would be better than the project proposal. The comparative analysis of the environmental and economic impacts of all the possible alternative question has been objectively and analytically examined in this EIA in the light of the impacts on the physical, biological, ecological, health, and economic environment as well as views and reservations of the stakeholders (proponent and the likely beneficiaries / losers).

8.2 NO PROJECT POSSIBLE ALTERNATIVES TO THE PROJECT REASONS

In the light of the views of the stakeholders and other objective evidence:

- The site Abandonment of the project on financial and technical grounds and maintenance of the existing position (i.e., status quo or no project option).
- Changing the size and operational scope of the proposed project site (Reducing & downsizing; or enhancing & upsizing).
- Shifting the project area to some other locations (site shifting).
- Construction of alternative network of smaller independent units at different locations in a much wider coverage area.

The above-mentioned possible alternatives are discussed below briefly:

8.2.1 Abandonment of the Project (No Project Option)

The first alternative option could be to abandon the project altogether and continue with the existing situation. This option is not supported by objective conditions & population size of the district.

8.2.2 Changing the Scope

The second alternative could be change in the scope of the proposed project, i.e., either reduction and downsizing the size of the projector, the scope of the services or enhancing and upgrading the same. The downsizing or upsizing would include both the area of the project. The physical constraint in upsizing the project is nonavailability of additional clear land at the site. On the other hand, downsizing is likely to jeopardize economic viability of the project.

According to the proponent, both these factors have been taken into account while designing the project. As such, the object evidence does not support downsizing. Since additional land is not available at the proposed site, the upsizing option automatically becomes irrelevant, at least for the time being. Therefore, the option of change in the scope of the project is found not feasible.

8.2.3 Relocating the Project

The third possible option could be shifting, either a part or the entire project, to some other location. As mentioned in earlier, due to space constraints the project is being undertaken at this site primarily because land is available with all the facilities at this proposed site.

Therefore, shifting of the project to some other place in or around the city is not possible because it will be firstly non-feasible and secondly, it will not serve objectives of the projects.

8.3 SUMMARY OF THE PROJECT ALTERNATIVE OPTIONS

Based on the objective analysis, views, and opinions of the stakeholders, as detailed above, various alternative options are found not feasible. Furthermore, the net socio-environmental

impacts of the project are positive. Therefore, consideration of the above-discussed alternative option is not relevant to the instant project.

8.4 FINAL SELECTION OF SITE

A critical analysis was made based on the available accessibility with Reference to land availability, accessibility of site, availability of water resources, less damage to existing environment and other environmental problem. Finally selected present site of proposed project is more practicable with respect to economic, social and environmental perspective and future development for proposed steel division.

8.4.1 Design/technology alternatives, their selection and rejection criteria Juice extraction technology:

Juice from cane can be extracted by milling or diffusion methods.

Juice extraction by milling is the process of squeezing the juice from the cane under a set mills using high pressure between heavy iron rollers. Those mills can have from 3 up to 6 rolls; every set of mills are called tandem mill or mill train. For improve the milling extraction efficiency, imbibition water is added at each mill. Hot water is poured over the cane just before it enters the last mill in the milling train and is recirculated up to the reach the first mill.

Sugarcane diffusion is the process of extracting the sucrose from the cane with the use of imbibition but without the squeezing by mills. Shredded cane is introduced into the diffuser at the feed end, Hot water is poured over the shredded cane just before the discharge end of the diffuser.

With milling process, the bagasse obtained does not require subsequent drying; however the diffusion process leaves the fibre completely saturated with water and to extract this water, a powerful mill is required in addition to the diffusion apparatus. By diffusion process, the crushed cane become powdery, and their fuel-value is very inferior to that of

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the bagasse obtained by direct milling, so that supplementary fuel (wood or coal) becomes necessary.

The diffusion process is a continuous one hence should be carried out day and night. The quantity of cane treated by diffusion in 24 hours is strictly limited by the number and capacity of the diffusers. The milling process is more adaptable, because the rollers can be adjusted to admit more cane per day.

Diffusion gives a lower starch with reduced purity and about 25% more colour. Diffusion is more sensitive to trash and gives around 6% more bagasse since all bagacillo is retained in the extraction unit.

Juice heating is fundamental for diffusion in order to eliminate microorganisms and to promote rate of extraction; for this reason there is a slight overall increase in the process steam demand for diffusion.

Considering above advantages of milling over diffusion process for juice extraction, milling technology alternative is adopted.

Granular sugar manufacturing technology alternative

White granular sugars can be undertaken using either the open pan (OP) or vacuum pan (VP) processes. The major difference between the VP and OPS technology is the method of evaporating or boiling the juice. In open pan process, the boiling operation uses cascade type furnaces of various configurations. The massecuite is removed from the final boiling pan at about 84°Brix, at a temperature of around 112°C. Whereas in vacuum pan process, the juice is boiled under vacuum, to about 70° Brix, inside closed vessels or 'effects'. Low pressure steam is used to boil the juice which circulates through tubes within a closed vessel. The vapor driven off passes into a second similar vessel and it is used to heat more juice. In order to maintain suitable temperature differentials for heat transfer to occur, a partial vacuum is applied to each vessel, effectively lowering the boiling temperature of the juice. This system is capital- intensive but is highly energy efficient and more importantly boils the juice at progressively lower temperatures

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from 103 to 50°C, reducing the effects of inversion, minimizing discoloration and enhancing the formation of sugar crystals. In OP technology, juice is boiled in open pan furnaces with little control over sugar losses due to inversion caused by boiling the juice at higher temperatures and for longer periods. The VP technology is energy self sufficient while OP needs additional fuel.

In VP Technology of insoluble materials and some undesirable dissolved substances from the juice is done with liming, sulphitation or carbonation in continuous clarifiers. In OP, usually batch clarification is done in open pans with vegetable bark extracts and manual skimming of the scum. Better clarification is achieved with VP than OP as purer juice is obtained with VP.

Considering above advantages of VP over OP process for sugar manufacturing, VP technology alternative is adopted.

CHAPTER – 9

STAKEHOLDER’S CONSULTATIONS

9.1 GENERAL

This chapter describes the process and outcome of the consultations held with the relevant stakeholders and the neighboring community over environmental aspects of the proposed project.

Public discussions were held with the inhabitants of the surrounding area. Public consultation was conducted at site to know the point of view of the people. Majority of the people observes strong positive impacts regarding employment, business and structural development due to this proposed project. Audit report findings depict that people perceive overall positive social and economic impacts by the proposed project. Majority of the people are convinced for development in the area and they correlate this progress with the pace of their social mobility. Moreover, management of Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan admitted to adopt all the measures to control any impacts resulting from the subject project.

9.2 WAYS OF PUBLIC CONSULTATION

Public Consultation was done by Scoping sessions, focused group discussion, small group meetings and way side consultations with the relevant stakeholders. Multiple fieldstrips and site visits were arranged. These visits were arranged by the environmental consultant for the collection of baseline data and public consultations to know the point of views of different stakeholders regarding the proposed project. There is no affected community present in the radius of the study area. Team visited the proposed site, had discussions with stakeholders and consulted with the local people to evaluate the project socio-economic impacts.

People provide the massive information about the project and have positive remarks regarding the project development.

9.3 OBJECTIVES AND RATIONALE OF CONSULTATIONS

The primary objective of the stakeholders' consultations was to learn and know the apprehensions, concerns and opinions of the key stakeholders over environmental implications of the project. The consultations sessions also served as a source of first-hand information about expectations of the community and beneficiaries of the project. Dialogue with the stakeholders and recording their concerns at appropriate stages of the project can help to tailor the project in line with stakeholders' aspirations and therefore likely to promote public acceptance of the project and its sub-components.

9.3.1 Summary of Issues Raised by Stakeholders

A summary of the key issues raised by stakeholders and how these are being addressed by project proponent is provided in Table below:

During consultation it was observed that majority of the respondents were in favor of proposed project as the wastewater is disposed off into channel and by reducing the pollution load in wastewater it will be reusable by consumers. The other related issues and concerns raised by general public are discussed. However, during the social survey following concerns of the local community, Government Departments and Environmental Practitioners and experts were noted:

- Nuisance must be controlled at source.
- Latest/State of the art technology must be adopted.
- Locals should be preferred for the job opportunities.
- Wastewater monitoring should be done regularly to comply with PEQS.
- Solid waste should be managed effectively by adopting the standard practices of the area.
- Cleanliness of the area should be ensured.

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- An effective EMMP should be designed and enforced with true spirit.
- Health and safety of the workers should be ensured.
- Plantation of indigenous species must be carried out at extensive scale to control odor.
- Proper disposal of sludge should be adopted.

Table 1: Summary of Issues and Commitments by Proponent

Issue	Aspect/Concern raised by Stakeholders	Project Proponent Commitments
Employment Opportunities	Expectations of employment are very high. Job opportunities are less for locals as they generally have less skills and training.	Employment is the main priority of the proposed extension. Mostly, local skilled and unskilled labor will be prioritized and also there will be job in executive level. Maximum persons according to the requirement will be employed by Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan

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Training Opportunities	People are keen to consult with subject industry if the project offers training and upgrading opportunities to enhance their trade or professional skills.	Development of the Training Strategy, including commitment of allocation of budget investment for design, training infrastructure, and delivery.
Health & Safety	Truck traffic is a main concern because the road used by the project passes through a number of small communities and different industries and there will be a high volume of trucks transporting raw material or final products.	Development of Transport Management Plan including traffic safety training. Traffic advisory signs will be installed along proposed project site and all nearby specific areas.
Local Economy and Business Development	Local service providers are keen to participate in providing services to transport raw material and expect in order to adjust their businesses to meet specific needs.	The management has main focus that all the material regarding construction and operation will preferred to buy from the local market.

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Environ mental Issues	Dust and noise impacts, from the construction activities and in operation of mechanically un-fit machines are of concern to other residents.	Implementation of control under the Environmental Management Plan, including on and off site dust and noise monitoring.
	Loss and change of vegetation due to soil degradation.	Thus, the rehabilitation plan has been established.
Water Quality and Quantity	Water quality and quantity and impacts from the wastewater disposal are all key concerns for nearby residents.	Implementation of consultation in relation to water use and development of Environmental Monitoring Program.

9.3.2 Stakeholder's Feedback

In consultation process, the stakeholders were briefed during scoping sessions about the objectives of the project. At the consultation meetings, the stakeholders and village representatives were informed about the project and project requirements. During the consultation meetings, all the stakeholders appreciated the project and expressed full support to the sugar mill management.

A detailed consultative process was carried in the form of official meetings, letters, and/or telephonic discussions, to consult the stakeholders for the extension of Hamza Sugar Mills Limited Jetha Bhuta Khan pur, Rahim yar khan.

Remarks given by stakeholders during the field survey are listed at the end of the report.

9.3.3 *Concerns raised by the public*

The positive concerns raised were:

- The project (enhancement of capacity) would encourage sugar cane farming in the region
- Sugar cane farmers will have a reliable outlet: they will grow and sell their cane through contract farming with Hamza Sugar Mills Limited. They will also earn income and raise their standard of living.
- There will be both direct and indirect employment for the people: the former will apply to workers who will be employed by Hamza Sugar Mills Limited and the later will apply to sugar cane farmers and those who will be employed in business that will spring up due to the presence of Hamza Sugar Mills Limited.
- New businesses will spring up and old ones will grow as a result of migration of people in the area.
- The local economy is likely to grow through backward and forward linkages and income and employment multiplier effects resulting from the project (enhancement of capacity).
- Some by products from sugar processing will be used locally. Such by products will include ash which can be used to fertilize the soil.
- The establishment of sugar mill in the region will contribute to industrial development

The project (enhancement of capacity) will provide raw materials for other industrial Plants e.g., those manufacturing industrial spirits.

- The project (enhancement of capacity) will produce sugar for domestic use hence saving the foreign exchange that could be used for its importation.
- On many occasions children are employed on sugar cane farms. This is not only against the law but also denies children to attend school.

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- The widespread use of fertilizers and herbicides on the sugar farms, there will be water pollution in the streams and rivers.
- Youth unemployment is high in the area.
- The cost of transporting sugar cane is borne by the farmer.
- Poor management of sugar factories. This leads to delayed and low payments to the farmers which may lower their morale.

9.3.4 *Recommendations made by the participants*

- Early maturing cane varieties should be introduced in the area. This will enable farmers to earn money early enough from sugar cane than presently is the case.
- Use of child labor on sugar cane farms should be banned.
- Farmers should be encouraged to use organic manure instead of industrial fertilizers on the farms.
- Hamza Sugar Mills Limited should give preference to the local unemployed youths when employing workers for the project (enhancement of capacity).
- The cost of transporting cane to the factory should either be borne by both the farmer and Hamza Sugar Mills Limited or be charged at a flat rate irrespective of the distance from the farm to the factory.

9.4 IDENTIFICATION OF THE RELEVANT STAKEHOLDERS

The consultation process began with identification of the most pertinent stakeholders. Efforts were made to identify the relevant stakeholders through systematic process based on the nature and degree of their actual and perceived stake in the project.

9.5 CONSULTATION METHODOLOGY

Onsite consultations were held with representatives of the various categories of the stakeholders as were available during field visits of the proposed site for extension. Additionally, wherever found feasible, general public visit in the vicinity were also conducted to know their views and concerns over the project activities. The majority of these consultations were either one to one meetings or small and focused group discussions.

9.5.1 Outcome of the Consultations

The neighborhood communities did not express any specific or significant concerns. Interestingly, different stakeholders had different perceptions and different concerns about the proposed project. Some of the concerns and apprehensions relating to various aspects of the project are reproduced below:

9.5.2 Design Aspects

The design aspects need to take into account the relevant building codes, byelaws, and the applicable governmental policies.

9.6 CONSTRUCTION ASPECTS

- Delays in construction and completion of the proposed project are likely to result into escalation of construction costs.
- Construction related noise could be troublesome for the community.
- Delays in payments to the contractors, sub-contractors, suppliers and the labour can cause delays in the project implementation.
- Interference by the local regulatory agencies and the municipal authorities are also likely to cause delays in completions.

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- Delays in handing over the sites and later changes in the drawings and scope of work result into slow progress of the construction under the proposed project.
- Generations of dust and its deposition on exposed surfaces would require frequent dusting.

9.7 OPERATIONAL ASPECTS

- There could be blackish air emissions laden with harmful particles.
- There could be disruptions and discontinuations in the supply of the machinery / equipment and raw materials for timely completions of project.

9.8 PROPONENT

Possible impacts and mitigation measures related to the proposed project were discussed with the project proponent and management. They assured to take all suggested mitigation measures to control any discrepancy arose by the project and to make the project environmental friendly.

9.9 OTHER DEPARTMENTS AND AGENCIES

For the impact analysis detailed meeting were held with the management of project and local community. Issues were discuss that may affect the environment and also the implementation of the proposed project. All possible mitigation measures were considered and incorporated in the Environmental Management Plan (EMP). Scoping sessions, focused group discussion and way side consultations were held with the relevant stakeholders in the area. The purpose of such consultations is to obtain the feedback from the relevant persons.

9.10 AFFECTED & WIDER COMMUNITY

There is no affected community present in the radius of the study area. Team has consulted with the inhabitants of different villages. They provided positive remarks regarding the subject project and in the favor of the proposed extension.

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Stakeholders participation Performa's and socioeconomic questionnaire were get filed by the locals to evaluate the project socio-economic impacts.

CHAPTER – 10

CONCLUSIONS AND RECOMMENDATIONS

10.1 CONCLUSIONS

Based on the preliminary design, environmental and social field surveys and impacts assessment of the proposed project, it may be concluded that although there are some significant negative impacts but would be of short term during the construction stage. However, there are a few negative impacts that would be expected during the operational stage but their intensity can be reduced by taking appropriate measures.

The environmental issues related with the project activities are summarized as under:

Environmental Impacts

During operation stage, disposal of waste will become a problem. Therefore, proper mitigation measures may be adopted in the preliminary design including safe and environmental friendly disposal of solid waste.

Physical Impacts

Physical impacts like soil contamination, water contamination, air pollution, high noise level, etc. are of temporary nature during the construction stage. However, during operational stage by adopting abatement technologies such as de-dusting system with bag filters and development of buffer zones and green areas intensity of negative impacts can be minimized.

Biological Impacts

No forest area or wildlife sanctuary exists within the vicinity of the proposed project area, which may be affected by the project. Few reptiles like lizards and snakes and few birds like Mynah and house sparrows will be disturbed by the project activities and may have to move into nearby areas. This will be a temporary insignificant impact.

Social Impacts

The other social issues like safety of general public and workers, security problems, community accessibility issue, etc. will be of temporary nature.

10.2 RECOMMENDATIONS

Although comprehensive mitigation measures have been suggested in the report to minimize the negative impacts and to enhance the positive impacts of the proposed project, however, major recommended mitigation measures are summarized as under:

1. Dust suppression system should be available on project site for wetting of all the materials to avoid effects of dust such as respiratory diseases.
2. All appropriate environmental management measures detailed in this report, together with any other environment management commitments should be implemented throughout the entire life of the project.
3. Water contamination, air pollution and high noise levels will be controlled with the use of good engineering practices.
4. Environmental Management Plan (EMP) recommended will be implemented in the true spirit.
5. Machinery will be well-maintained for good efficiency.
6. Installed Air Pollution Control Equipment (APC) system which will be equipped with Bag Filter or any other air pollution controlled equipment.
7. First Aid measures, Health & Safety Equipment (PPEs) will be provided to the workers.
8. Safety signs or boards will be placed wherever needed within the premises of the proposed project.

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9. Personal Protective Equipment's (PPEs) will be provided and ensured that they are used by the workers during working hours.
10. Proper measures will be taken to control the air emission or high noise levels such de-dusting system will be used by the management to control air emissions.
11. High temperature zones will be highlighted.
12. Transportation vehicles will be maintained and tuned well.
13. No parameters above Punjab Environmental Quality Standards (PEQS) will be allowed in any case.
14. The parameters of the effluent will be within the permissible limits defined in the PEQS.
15. Any seepage and leakage will be controlled through proper mitigation measures.
16. Regular monitoring and auditing will be taken by the management to ensure the compliance of all the mitigation measures.
17. Proper solid waste management system must be adopted.
18. Safety signs, safety board's etc. must be placed on the project site for safety purpose of workers.
19. Plantation campaign will be initiated.