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Disclaimer

The data was based on the originality of project site shown by the project proponent/ stakeholders/ promoters, provided maps, verbal communications and all other related documents. The authenticity of supra-mentioned relies with the proponent/ stakeholders/ promoters, not with the environmental consultant. The IEE report can't be negotiated in any court of law.

Author: _____

Consultant:

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LIST OF ABBREVIATIONS

EPA Punjab	Environmental Protection Agency, Punjab
EIA	Environmental Impact Assessment
IEE	Initial Environmental Examination
PEQS	Punjab Environmental Quality Standards
PEPA	Punjab Environmental Protection Act
ToRs	Term of references
WAPDA	Water And Power Development Authority
LESCO	Lahore Electric Supply Company

Executive Summary

Title & Location of the project

Subject project for which this Environmental Impact Assessment Study has been conducted is the establishment of Refrigerator Assembling Unit under the name of M/S DWP Engineering Industries Private Limited at 60-KM Multan Road, Khanky Morr, District Kasur. The current study has been conducted for the development of the Refrigerator Assembling Unit.

The proposed project falls under Schedule-II of Review of IEE and EIA Regulations, 2000. TORs of the study under clause 5 (f) of policy and procedure for the filing, review and approval of environmental assessment are annexed as ***Annexure – A.***

Location

Project site is located at 60-KM Multan Road, Khanky Morr, District Kasur.

Front: Access road is present

Back: Open land is present.

Left: Open Land

Right: Diamond Product Pvt Limited

For further details layout and Google earth map of the project site indicating its distances from nearby residential, commercial and industrial areas on A3 page is attached.


M/S DWP Engineering Industries Private Limited
Map of Project Site
Legend
31 10'12.3" N 73 54'56.2"E
Al Rehmat
Arif Autos AbidRaza
Haji Usman
31 10'12.3" N 73 54'56.2"E
Diamond Products (Pvt) Ltd
Haji Usman
Wardah foods industry
Arif Autos AbidRaza
Google Earth
Image © 2022 Maxar Technologies
Khanke Morr
N
1000 ft

Name of the proponent

Proponent: Muhammad Farooq Naseem

Postal Address: P.o same Barqi Sangat Pur, Tehsil Lahore, District Lahore

For further details CNIC of the proponent and other relevant documents are attached.

Name of organization preparing the report

Eco focal Environmental Solutions Pvt. Ltd is an independent company, who conducts IEE, EIA, EMP and other environmental investigations through its panel of environmental consultants, public participation practitioners and experienced environmental managers.

Contact numbers: 0324-4902836

Email: ecofocalenviro.solutions@gmail.com

For detail company profile see the *Chapter # 1 "Introduction"*

Authority letter in the favor of the consultant has been attached with the initial documents.

A brief outline of the proposal

Name of the proposed project	M/S DWP Engineering Industries Private Limited
Land Requirement	
Total Area allocated for proposed project	79 kanal 5 Marla and 10 SFT
Status and location	
Location of the proposed site	60-KM Multan Road, Khanky Morr District Kasur
Description of project	Subject project is the proposed establishment of Refrigerator Assembling Unit.
Water Requirement	
Water consumption for the project	700-800 Gallon/ day during construction phase
Ways of extraction	Motor pump

Boring Depth	Approx. 600-800 feet
Source of Water consumption	Underground.
Amount of waste water	60-70% of total used water
Source of waste water	Constructional and Domestic Waste
Mode of treatment	During land development site camp septic tanks will be installed for the treatment of domestic and constructional wastewater. During the operational phase of the project, each industry would install its own wastewater treatment facility for wastewater treatment as per requirement.
Mode of Disposal	Drain out into nearby Drain. NOC from Irrigation Department, Obtained by the Proponent
Distance of drain from subject project	Present nearby the project site
Solid Waste	
Source of solid waste generation	Constructional and Domestic
Mode of disposal	Will be handed over to contractor
Manpower	
Labor Force	About 40 person during construction

The major impacts

The following major impacts associated with the project during constructional and operational phase of the project have been identified and mitigation measures suggested:

Summary of Environmental and social impacts of the project during the construction phase and mitigation measures suggested:

Potential Impact	Criteria for determining	Key Mitigation Measures

	Significance	
Dust Emissions— Dust and PM may be generated during road construction and excavation activities. Gaseous emissions from site generators and transportation vehicles may affect ambient air quality in the vicinity of the project site.	An increase in visible dust beyond the boundaries of the construction site; or Concentration of PM_{10} in excess of 150 $\mu g/m^3$ PEQS for Ambient Air	Sprinkling of water on dusty roads, tracts and surfaces is recommended; During excavation works drop heights will be minimized to control the fall of materials reducing dust escape; Use of wind shield around stockpiles is recommended; Vehicle speed restrictions should be applied in the project area; Raw materials should be transported in covered trucks;
Construction Noise- Noise may be generated during landscaping activities and from generators and transportation vehicles at the project site; which may be a nuisance for the workers.	OSHA standards	Activities generating high levels of noise should be minimized at the project site. If the noise level will exceed the permissible limits with reference to national and OSHA standards, following recommendations are suggested to take action against the high noise levels: • Proper tuning of construction machinery and vehicles is recommended. • Ear muffs and ear plugs are recommended in case of high noise levels.
Solid waste Management— If solid waste will not be managed properly, it may cause negative impacts	Generation of excessive waste; Recyclable waste and reusable waste is discarded; Littering; Improper disposal.	Constructional waste should be utilized for road filling and maintenance purposes; Domestic waste should be disposed off properly, handed over to contractors, placed in bins; Proper solid waste management plan should be devised and implemented.
Vegetation Loss/ Soil erosion— Minor negative impact may arise as only some weeds and grasses are present at the project site which will be cleared for the purpose of construction.	Unnecessary or excessive removal of trees and shrubs	No tree cutting/ vegetation loss issue will be involved in the subject project as project site is free of any dense vegetation and trees. Preparation of a Reinstatement Plan to restore the land after the constructional activities is recommended.

Water Resources— The extraction of water for the project constructional activities may affect the groundwater availability for other users.	Water extracted for the project has directly affected the ability of the community to meet their water needs.	No impact on the community groundwater needs is envisaged as a result of the project.
Soil Contamination— Oil and chemical spills can contaminate the soil	Presence of visible amount of hydrocarbon in soil	Provision of spill prevention and control kits; Use of impermeable surfaces in workshops, and storage areas; Contaminated soil will be collected and incinerated.
Traffic issues- Traffic issues may arise due to the constructional activities at the project site if traffic will not be managed properly.	TEPA rules	Traffic impact assessment study should be conducted at the project site; Speed limit of 10 km/h should be maintained on the access road; Ample parking area must be allocated at the project site. Guards should be hired to manage the traffic at the project site.
Socioeconomic impacts—Inter-cultural differences between the project staff from other areas and the local community may arise due to the subject project. Positive socioeconomic impacts due to increased infrastructure, employment opportunities and economic growth.	No community complaints. Increased employment facilities in the area; Increased infrastructure	Training of the non-local project staff on local culture and norms; Avoidance of unnecessary interaction of local population with the non-local project staff. Employment opportunities should be provided to the local people.

Summary of Environmental impacts of the project during the operation phase and their mitigation measures:

Potential Impact	Criteria for determining Significance	Key Mitigation Measures

Gaseous Emissions- During the construction phase of the project, gaseous emissions from different activities and vehicles may affect the air quality of the project area.	PEQS for Ambient Air	Sprinkling of water must be done to control the dust or PM. Vehicle emissions inspection should be done on regular basis. Sprinkling should be done on the unpaved area to avoid dust pollution/ particulate matter. Vehicles/ trucks should be serviced regularly. All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke.
Noise- Noise due to different activities, machinery can be a nuisance for the workers in the working area.	OSHA Standards	Activities generating high levels of noise should be minimized at the project site. Personal Protective Equipment PPEs including Ear muffs, Ear plugs and other noise abating equipment will be provided to the workers and other staff in case of noise at the project site. Proper maintenance and tuning of the vehicles should be done. Speed restriction of 40 km/h should be imposed on all construction vehicles.
Discharge of wastewater- The discharge of untreated effluents or municipal wastewater may be a negative impact of the subject project.	PEQS for Municipal and Liquid Industrial Effluents (mg/l, unless otherwise defined)	Domestic and industrial waste water will be drained out in nearby local drain after treatment in wastewater treatment facilities. Oils, lubricants, chemicals, and other listed hazardous materials should be stored safely at their designated spots, enclosures or store rooms, which should be safe from rainfall. Monitoring should be conducted as per PEQS and reports should be submitted to EPA.
Health & Safety Issues- different constructional and operational activities at the project site may cause health	OSHA Standards	Proper training of workers and staff should be conducted to avoid the accidents. Use of PPEs should be implemented at workplace.

and safety issues for workers if precautionary measures will not be adopted.		First aid measures/medical facility should be provided at the project site. Safe drinking water must be provided to workers, staff, and poor people of the area. Water consumption records should be maintained. Safety signs & boards should be placed during constructional activities. Construction site should be fenced properly to avoid any damage to nearby settlements. Smoking or any drugs should be prohibited during working hours or performing work. At the time of earthwork, fencing will be ensured for the area under the exploration.
Solid waste management- If solid waste will not be managed properly, it may cause negative impacts	Exposure to potentially hazardous waste; Generation of excessive waste; Recyclable waste and reusable waste is discarded; Littering; Improper disposal.	A solid waste management division should be formulated to deal with the proper disposal of solid waste, supervised by HSE Manager, SW Manager, and other related personnel. Solid waste generated from the construction activity as sand, stones residues etc. that should be utilized in restoration of the quarry area whereas solid waste from the domestic sources should be disposed off properly Proper solid waste management system is recommended for each individual industrial unit. Industrial ecology practices will be adopted wherever possible. 7 R's of sustainability are recommended to achieve. Sludge should be removed and dispose off in scientific way.
Groundwater—The increased withdrawal of groundwater for the industries may affect the groundwater resources of the project area.	Water extracted for the project has directly affected the ability of the community to meet their water needs	No impact on the community groundwater needs is envisaged as a result of the project.

Proposed Environmental Monitoring

To oversee the environmental performance of the project through its lifecycle enforcing the PEQS an Environmental Monitoring Program should be formulated which ensures effective surveillance of the environmental parameters at various stages of the project development and compliances with PEQS and legal obligations. Monitoring for following Environmental Parameters is recommended:

- **Ambient Air**

  Monitoring for ambient air should be conducted on monthly basis during constructional phase of the project and report should be submitted to EPA Punjab.
- **Noise**

  Monitoring for noise level should be conducted on monthly basis during constructional and operational phase of the project and report should be submitted to EPA Punjab.
- **Drinking water quality**

  Monitoring of drinking water quality should be conducted on monthly basis during constructional and operational phases of the project and report should be submitted to EPA Punjab. Record should be maintained regarding the underground water pump and consumption.
- **Wastewater**

  Monitoring of wastewater should be conducted on monthly basis during the operational phase of the project and report should be submitted to EPA Punjab.

Recommended Schedules of Proposed Monitoring

During Constructional phase:

Sr. No.	Parameters	Monitoring Schedules
1.	Ambient Air	Monthly
2.	Noise Level	Monthly
3.	Water quality	Monthly

During Operational phase:

Sr. No.	Parameters	Monitoring Schedules
1.	Noise Level	Monthly
2.	Water quality	Monthly
3.	Wastewater	Monthly

Recommendation: *Environmental Monitoring data log book should be maintained by the project proponent.*

1 CHAPTER # 1

Introduction

This Section of the report provides an overview of the rational of the Project, objective of project, requirement of the project, purpose of the report and approach adopted to conduct the Environmental Impact Assessment Study.

1.1 Purpose of the report

Environmental Impact Assessment (EIA) report is being submitted to the Environmental Protection Agency (EPA), Government of the Punjab, Lahore for the compliance of Section 12 of Punjab Environment Protection Act-1997 (Amended 2012) for obtaining No Objection Certificate (NOC) before starting the construction activity at the project site. The other relevant regulations and guidelines considered while preparing this EIA report include:

- Policy and procedures for filing, review and approval of environmental assessments.
- Guidelines for the preparation and review of environmental reports.
- Guidelines for public participation.
- Guidelines for sensitive and critical areas.
- Detailed sectoral guidelines

Various aspects like environmental, social, physical and other aspects of the project both during construction and its regular occupancy are highlighted in this EIA report. Measures necessary to be adopted to mitigate any environmental impacts on any part of the environment around are also described. All the important information is also provided as described under the format used to help decision makers, EPA Punjab in the present case, before issuing the desired Environmental Approval.

1.2 Identification of the project and proponent

The proposed project falls under Schedule-II of Review of IEE and EIA Regulations, 2000.

1.2.1 Proponent:

Proponent: Muhammad Farooq Naseem

Postal Address: P.o same Barqi Sangat Pur, Tehsil Lahore, District Lahore

For further details CNIC of the proponent and other relevant documents are attached.

1.3 Details of Consultant

Eco focal Environmental Solutions Pvt. Ltd is an independent company, who conducts IEE, EIA, EMP and other environmental investigations through its panel of environmental consultants, public participation practitioners and experienced environmental managers.

Contact numbers: 0324-4902836

Address: Office No.1, 4th Floor, Sindhu Plaza, Moon Market, Allama Iqbal Town, Lahore.

Email: ecofocalenviro.solutions@gmail.com , hassan.ecofocal@gmail.com

The current study was carried out by the following professionals:

Name of the EIA/IEE Team	Qualification and Brief Experience	Position in the IEE Team
Hassan Ali Irshad	**Environmental Professional |(Author)** Four Years' Experience as Professional Environmentalist.	Environmentalist/ Director
Alghaya Asghar	**Environmental Professional** **M.Phill (Environmental Sciences)** Six Years' Experience as Professional Environmentalist.	Chief Environmentalist
Anila hayat	**Environmental Professional** Six Years' Experience as Professional Environmentalist. **M. Phill** (Urban Planning)	Chief Coordinator Urban Planner/Environmentralist
Hamza Afzal	**Environmental Professional** Five Years' Experience as Professional Environmentalist.	Environmental Engineer
Salaha Saeed	**Environmental Professional** Five Years' Experience as Professional Environmentalist.	Environmental Engineer

1.4 Brief description of Nature, Size and Location of Project

The subject project is the proposed establishment of Refrigerator Assembling Unit under the name of M/S DWP Engineering Industries Private Limited (Refrigerator Assembling Unit). Project site is located at 60-KM Multan Road, Khanky Morr District Kasur. The project is the development of land for Refrigerator Assembling Unit and construction of offices.

The total area of the proposed project is 79 kanal 5 Marla and 10 SFT Total cost of the project will be Approx. 200 Million rupees which will include the cost of development works including construction of roads, sewerage, water supply, boundary walls, landscaping, provision of electricity and sui gas and establishment charges. There are no other associated activities with regard to the subject project.

1.4.1 Location

Project site is located at 60-KM Multan Road, Khanky Morr, District Kasur.

Front: Access road is present.

Back: Open land is present.

Left: Open Land

Right: Diamond Product Pvt Limited

For further details layout map and Google earth map of the project site indicating its distances from nearby residential, commercial and industrial areas on A3 size page is attached

Description of the Project

1.5 Type and Category of the Project:

The subject project is the proposed establishment of Refrigerator Assembling Unit under the name of M/S DWP Engineering Industries Private Limited at 60-KM Multan Road, Khanky Morr, District Kasur. The current Environmental Impact Assessment study has been conducted for the development of the Refrigerator Assembling Unit.

The proposed project falls under Schedule-II of Review of IEE and EIA Regulations, 2000. TORs of the study under clause 5 (f) of policy and procedure for the filing, review and approval of environmental assessment are annexed as ***Annexure – A.***

1.6 Objectives of the Project

Objectives of the construction of the subject project are:

- To enhance the economic growth of country;
- To develop a sustainable economic approach to interlink various industries;
- To provide more job opportunities to local public and to improve their living standards;
- To improve the economic activities;
- To provide better infrastructure;
- Private investment would be beneficial for the national economy and GDP as well.

1.7 Alternative Considerations and Reasons for their Rejection:

1.7.1 Location alternatives:

To fulfill the commercial aspects of the project under reference of this EIA Report, it is to be sited at a place where commercial processing activity is either already going on or there are bright prospects of the same. Concurrently, it must also meet the legal requirements of the Punjab Environmental Protection Act, 1997 (Amended 2012). Availability of land at the best convenient place is equally important among other considerations for the site selection. Availability of access roads, communication facilities, electricity, basic infrastructure, sewerage etc. is yet the other necessary requirements.

Alternative Sites:

Rejected Site A:

Before the consideration of selected project site, project proponent had considered another site in the district Kasur, but later it was rejected due to high cost of land and dense human settlements near the project site.

1.7.2 Reasons of Rejection:

This site was rejected due to the following reasons:

- Human settlements around the project site
- Dense vegetation/ tree cutting issue
- Cost of land
- Lack of road infrastructure

Another site was considered for the construction of the subject project by the management but it was also rejected due to some reasons. Aerial view of the site is given below:

This site was rejected due to the following reasons:

- Lack of sufficient road infrastructure
- Site was not found suitable for the establishment of the Refrigerator Assembling Unit.
- Land of agricultural importance
- Populated areas near the project site.

Location and site layout of the project:

Project site is located at 60-KM Multan Road, Khanky Morr District Kasur.

Project land coordinates are as follows:

Front: Access road is present.

Back: Open land is present.

Left: Open Land

Right: Diamond Product Pvt. Limited

For further details layout map and Google earth map of the project site indicating its distances from nearby residential, commercial and industrial areas on A3 size page is attached.


M/S DWP Engineering Industries Private Limited
Map of Project Site
Legend
31 10'12.3" N 73 54'56.2"E
Al Rehmat
Arif Autos AbidRaza
Haji Usman
31 10'12.3" N 73 54'56.2"E
Diamond Products (Pvt) Ltd
Haji Usman
Wardah foods industry
Arif Autos AbidRaza
Google Earth
Image © 2022 Maxar Technologies
Khanke Morr
1000 ft
N

1.8 Reasons of selection of subject project site:

Following are the reasons of selection of subject project site:

- Subject site is the property of the Government.
- Availability of access roads
- Communication facilities
- Availability of electricity
- Basic infrastructure
- Less plantation/ no tree cutting issue involved
- No fauna species at site
- Convenient plot layout
- Industrial activity already going on in the area
- No protected species in the area

Obviously, environmentally sound, neat and clean environment are the other considerations for site selection. The project will also facilitate the people of the area with increasing the opportunity of employment, and other related facilities.

Keeping these requirements and their feasibility and other basic infrastructural requirements, the selected site is ideally suited for the establishment of subject Refrigerator Assembling Unit.

1.9 Land Use on site

Site proposed for the subject project is an empty plot free of any activity and it is the property of the proponent. Figures given below are showing the existing land use at the project site.

1.10 Road Access

Link Road which connects to Multan Road is present at the front side of the project site

1.11 Vegetation features of the site

Land proposed for the subject project is clear and free of dense vegetation, only shrubs like *Parthenium* and grasses are present over there in scattered quantity. Few and scattered amount of vegetation will help to avoid land clearing at the project site. Figures given below are showing the vegetation features of the project site.

1.12 Cost and magnitude of the operation

Subject project is the establishment of Refrigerator Assembling Unit. Total cost of the project will be Approx. 200 Million rupees.

There are no other associated activities with regard to the subject project.

1.13 Schedule of Implementation

The project is land development and construction of boundary walls and offices for Refrigerator Assembling Unit which is expected to be completed within 1 year from the date of environmental approval. EPA will be informed about further delay in construction of project.

1.14 Description of the project:

The subject project is the proposed establishment of Refrigerator Assembling Unit under the name of M/S DWP Engineering Industries Private Limited at 60-KM Multan Road, Khanky Morr, District Kasur. The total area of the proposed project is 79 kanal 5 Marla and 10 SFT Total cost of the project will be Approx. 200 Million rupees which will include the cost of development works including construction of roads, sewerage, water supply, boundary walls, landscaping, provision of electricity and sui gas and establishment charges. There are no other associated activities with regard to the subject project.

The proposed project falls under Schedule-II of Review of IEE and EIA Regulations, 2000. TORs of the study under clause 5 (f) of policy and procedure for the filing, review and approval of environmental assessment are annexed as ***Annexure – A.***

1.14.1 Water requirements:

As subject project is the establishment of Refrigerator Assembling Unit, only landscaping and construction of roads and offices will be involved in this project. During the constructional phase of the project approx. 700-800 gallon/day water will be required for constructional purposes and domestic uses.

1.14.2 Waste water:

Water used for constructional purposes will be absorbed by the soil; only domestic waste water will be generated. 60-70% of the used water for domestic uses will be the waste water which will be treated in site camp septic tank.

During the operational phase of the project, each industry will install its own wastewater treatment facility for the treatment of waste water. No industry will be allowed to dispose off its wastewater without having been treated.

1.14.3 Disposal of wastewater:

After the treatment in the wastewater treatment facility water will be disposed off in the drain present nearby the project site.

A wastewater receiving Nalah is passing on nearby proposed project site. It receives wastewater from all nearby industries.

1.14.4 Solid waste:

Approx. 700-800 kg/day constructional and domestic waste will be produced during the constructional phase of the project. Constructional waste will be reused for road filling and maintenance purposes. Domestic waste will be handed over to the relevant contractors.

During the operational phase of the project, different industries will be constructed in the proposed scheme which will get their separate environmental approvals. The Solid waste will be managed in proper way by following operations:

1. Proper solid waste management plan will be formulated.
2. Agreements with EPA approved contractors will be ensured.

Schedule IV application form along with the details of water balance, solid waste disposal and liquid waste treatment is attached.

1.14.5 Dust/ PM/ Gaseous Emissions:

Following are the recommendations to control the dust emissions at the project site:

- Sprinkling of water on dusty tracts and surfaces is recommended;
- Use of wind shield around stockpiles is recommended;
- Vehicle speed restrictions should be applied in the project area;
- Raw materials should be transported in covered trucks;
- Ensuring that no stockpile is within 250 m of the community.

1.14.6 Plantation

Sufficient plantation will be done at the proposed project site after the land development process. Green belts along the roads will be established. Besides this each industrial unit will plant trees within their project premises.

1.14.7 Parking Area

Parking area will be provided in the subject proposed project.

1.14.8 Occupational Health and Safety:

All the methods and procedures of health and safety will be adopted at the project site to ensure the health and safety of the workers.

1.14.9 First Aid facility:

Proper medical facilities and proper training about first aid will be provided to workers of the subject project to cope with any accidents.

1.14.10 Personal Protective Equipment:

PPEs will be provided to the workers during the working hours to ensure personnel health and safety and their implementation will also be ensured. Details of PPEs required for different occupational hazards are given below:

1.14.11 Emergency evacuation plan:

Protection	Occupational Hazards	PPEs
Head Protection	Falling objects, inadequate height clearance, and overhead power cords	Helmets with or without electrical protection
Hand protection	Hazardous material, cuts or lacerations, vibrations, extreme temperatures	Synthetic or Rubber gloves, leather, insulating material etc
Hearing protection	Noise, ultra sound	Hearing protectors like ear plugs, ear muffs
Respiratory protection	Dust, fogs, fumes, gases, smokes, vapors, oxygen deficiency	Facemasks or air supply
Body protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration	Aprons, insulating clothing etc of appropriate materials

1.14.12 Safety signs/Safety boards:

At any workplace safety signs and symbols are very important to avoid many accidents. They must be in easy and understandable language to all the workers. Workers should have the knowledge of sign wordings and they must be trained and aware about them. Safety signs, symbols and boards will be provided at the proposed project site to protect the workers and employees from the risks of hazards that has not been controlled by other means. Safety signs and boards give safety message and they must be of different colors that workers could understand their meanings easily. At the subject project, safety signs and boards will be placed to avoid the workers and staff from any risk.

1.14.13 Security:

The proposed project site will be secured by means of boundary walls along with the presence of security guards round the clock to maintain the security. Beside this security cameras at various places will be installed.

1.14.14 Emergency evacuation plan:

Emergency preparedness and evacuation plan will be formulated and adopted for the individual industries.

1.15 Restoration / Rehabilitation Plan

All possible precautions will be taken to prevent an untoward incident in terms of life and property losses. The demolition materials will possibly be reused and recycled. All excavated surfaces will be termite proofed.

On completion of the project, the debris will be removed from the site in order to maintain aesthetics of the project. All measures will be undertaken for ensuring occupational safety, security and clean environment in the project area. Ornamental trees and flower plants will be planted on inside peripheral of the unit premises to restore the land.

1.16 Government approvals required by the project:

Proponent has secured NOC of Irrigation Department for wastewater disposal and also obtained Environmental Approval for the Industry.

3 CHAPTER # 3

DESCRIPTION OF ENVIRONMENT

This section describes the baseline conditions, which cover the existing Physical, ecological and socio-economic environment of the project as well as study area. Data was collected by reviewing secondary data and field survey.

3.1 Physical Environment/ Resources

3.1.1 Topography:

Topographically speaking, Kasur District lies between the river Satluj which flows along its boundaries with India and river Ravi which flow its boundary with Sheikhupura District. The districts may be divided into two parts, a low lying or riverine area along the two bordering rivers and upland, away from the rivers. The riverine area is generally inundates during monsoon season. The water level in this area is higher than in the upland. The soil is sandy. The upland is flat plains sloping from north-west to south-west. The general height of the area is from 150 to 200 meters above the sea level.

3.1.2 Soils:

These are river transported deposits (alluvium), which are quite thick and fairly homogeneous in extent. The top soil consists of brown, soft to firm clayey silt / silty clay having slight plasticity and contents of dissolved salts. The top layer is likely to extend about 3 to 6 meter below natural ground, where it is underlain by silty fine sand/fine sand. This layer generally continues to deeper depths. These layers of silty clay and sandy gravel may also exist below 10 meter depth.

3.1.3 Climate:

Kasur has extremes of climate; the summer season begins from April and continues till September. June is the hottest month. The mean maximum and minimum temperature for this month are about 45 and 27 degree Celsius respectively. The winter seasons lasts from November to February. January is the coldest month. The mean maximum and minimum temperatures for the coldest month are 22 and 0 degree Celsius respectively. Rainfall Towards the end of June monsoon conditions appear and during the following two and a half months the rainy season alternates with sultry weather. The winter rain falls during January, February and March ranging from 23 to 31 millimeters.

Month	Average high Temperature °C	Average low temperature °C	Rainfall in. (Cm)
January	19	03	1.6
February	21	06	2.1
March	26	12	4.1
April	33	17	2.4
May	38	22	1.9
June	42	27	1.8
July	39	27	7.6
August	37	26	11
September	37	23	4.5
October	33	16	0.7
November	28	09	0.1
December	21	04	0.9
Year	31	16	38.5

3.1.4 Air Quality:

The project is located in the Agricultural area of District Kasur. The major sources of air pollution in the area are vehicular traffic and surrounding factories.

To record the baseline ambient air quality of the project area, three samples were collected at different location to observe the level of CO, SO_2, NO_2 and Particulate Matter (PM10). The results of the samples are within the NEQS limits.

3.1.5 Noise Level:

Major sources of noise generation are animals and vehicular traffic (particular loaded and unloaded truck, van) along the main road. Noise levels were monitored at different location of the project site. The noise levels are falling in the range of 63-68.3 dB.

3.1.6 Surface water:

The surface water is of good quality. All the parameters are within the NEQS.

3.1.7 Ground water:

Underground water is available in large quantity and its quality is very good. The underground water is supplied by pumping system (motor pump, tube well, hand pump) to the residents of the area. The underground water is of good quality and all its parameters being tested are within the WHO guide lines and the water is fit for drinking purposes.

Laboratory Analysis Report of Ground Water Sample

Sr. No.	Parameter	Unit	Result	WHO Maximum allowable guideline Value
A	**Physical**			
1	Temperature	^0C	22.5	--
2	pH	---	7.98	--
3	Color	TCU	0	15
4	Turbidity	NTU	0	5
5	Taste & Odour	Objectionable/ unobjectionable	Unobjectionable	Objectionable/ unobjectionable
6	TSS	mg/l	02	…
7	TDS	mg/l	782	1000
8	Total Hardness **($CaCO_3$)**	mg/l	314	500
9	Calcium Hardness **($CaCO_3$)**	mg/l	39	--
B	**Chemical**			
10	Chloride	mg/l	158	200
11	Nitrate **(NO_3^{2-})**	mg/l	03	50
12	Sulphate **(SO_4^{2-})**	mg/l	192	200
13	Arsenic (As)	mg/l	BDL	0.010
14	Fluoride **(F^-)**	mg/l	0.14	1.5
15	Iron **(Fe^{2+})**	mg/l	0.02	0.3
16	Potassium **(K^+)**	mg/l	4.2	--
17	Sodium	mg/l	81	200
18	Nitrite **(NO_2^{-2})**	mg/l	BDL	3.0
19	Chlorine (Free)	mg/l	BDL	0.3

C	Biological			
20	Total Coliform	Number/ 100 ml	0	0
21	E. Coli	Number/ 100 ml	0	0

3.1.8 Geography and Demographics:

Kasur town is situated 55 km south of District Lahore. The district lies from30 -40' to 31—20' north latitudes and 73 – 38' to 74 – 41 east longitudes.

Kasur, one of the districts of Punjab province, is bounded on the north by Lahore district, on the south and east by the Indian districts of Feroz Pur and Amritsar respectively, and on the west by Sahiwal district. Kasur city is located on the Feroz Pur road at a distance of about 55 km. from Lahore to the south and about 25 km from Feroz Pur, situated in India to its north. Kasur is well connected to Lahore by road and also by rail, which takes off from the Raiwind junction and runs up to Lodhran. Before partition, it was also linked by rail with Amritsar and Feroz Pur city in India (Government of Pakistan, 1980).

3.2 *Ecological Resources*

3.2.1 Fisheries:

The project area is almost free from any commercial fishing activity. There are no lakes, even natural water ponds in the vicinity. Therefore, Fishery or any worth mentioning aquatic biology in this area is out of question.

3.2.2 Biodiversity:

Natural capital of a country mainly includes all of the country's wilderness areas and scenic landscapes, including also with their associated flora and fauna. Pakistan has a total of nine major ecological zones. The contribution of the "Natural Capital" is recognized at three distinct levels: species, genera, and communities (habitat and ecosystem) both collectively and within each level, the range or variety of the resources are referred to as the "Biological Diversity". The term has relevance for each of Pakistan's administrative units district, province, and particularly country. The more the number of species, genera, and habitats and ecosystems present within these units, the greater is said to be the Biodiversity. The biodiversity of the area, with this background, is discussed as under.

3.2.3 Flora:

Project site is free from any protected plant species. Flora of the district has been greatly modified by human agency of the old open forests of small trees and shrubs; there remains only a few Rakhs or portions of forest which are kept as gazing ground for cattle etc. Amongst trees the most important are Kikar (Acacia arbica), Shisham or Tahli (Dalbergia sissoo), Beri (Zizyphus jajaba), Toot (Morus marlaccae), Sharin (Albizzia lebbek, Dharek (Malia azerdaracb), Phulahi (Acacia modesta), and Nim (Melia indica), Piple (Ficus indica) are planted for shade.The growth in Rakhs is composed mainly of three kinds of trees Jand (Prosopis spicigera), Karril (Capparis aphylla), and van or Jal (Salvadora obeoides). Occasionally pelu (acacia Loucophhloea) and Farash (Tamarix articulate) are also found. Pilchi (Tamarix gallio) is found on moist sandy soil along the rivers and is used for wicker-work, basket making etc.

3.2.4 Fauna:

Project site is free from any protected animal species. Wolf and jackal are the only wild animals of an importance. The former being met with occasionally in the low land wastes of Kasur but jackal are

found everywhere. Changa Manga reserve a thick forest is the only area in which a few Nelgai, pig, peafowl and here are found.

3.2.5 Forests:

An area of 13784 acres is under forest in the district. There is also linear plantation of 1604 kilometers alongside the roads/rails/canals in the district. Trees grown in the area are Kau, Phalai, Kikar and Shisham.

3.2.6 Rare or endangered species:

There are no game reserves or protected lands/areas or endangered or rare species either in the area in the range of 5km from the project site.

3.3 *Social and Cultural Study*

3.3.1 Education:

Kasur is having a higher literacy rate when it is compared with other cities of the country. It is made possible due to its prolific educational institutions.

3.3.2 Banks:

Considering the ever-growing needs of trade many banks are operating in Kasur. They include;

- Bank Alflah
- The Bank of Punjab
- Habib Bank Ltd.
- Muslim Commercial Bank
- National Bank
- United Bank Ltd.
- Allied Bank Ltd.
- Bank Al Islami
- Soneri Bank Ltd.
- First Women Bank Ltd.

3.3.3 Villages:

Kasur is the only city in the Punjab which is largely associated with the very big number of villages.

3.3.4 Tribes & People

The principal tribes and tribes residing in Kasur District are Pathan, Ansari, Bhatti, Malik, Arain, Jat, Sherwani, Safdar, Sunyare Rajput, Rehmani Mayo, Dogar, and Sheikh, The refugees from East Punjab that settled in the district largely belong to these tribes and clans. There are mueens or village artisans including Christians, blacksmiths, carpenters, potters, barbers, weavers etc. These mueens are found in all villages and are generally paid in kind at the time of each harvest.

3.3.5 Customs and traditions:

Kasur past has been nurtured by Sufi Saints like Baba Bulleh Shah, Satguru Baba Lal Dayal, Baba Kamal Chishti,Imam Shah Bukhari, on one hand and by musicians, singers like Ustad Bade Ghulam Ali Khan, Ustad Barkat Ali Khan, Ustad Amanat Ali Khan, Malka-e-Tarrannam Noor Jehan etc. on the other hand. The important cultural events in the district are the Urs of Baba Bulleh Shah and Urs of Baba Imam Shah Bukhari as well as the Urs of Baba Sheikh Bhago. Kasur is also known in folklore for its slippers. A famous Punjabi folk song is:"Jutti Kasuri, Paire na puri, hai rabba ve sahnu turna paya." (The slippers of Kasur don't fit me, Oh God, I had to walk!) Food: The staple food of the area is wheat, rice and pulses. Inferior grains are not generally eaten. Meat is frequently eaten specially in the urban

towns. Wheat (flour) is baked in the form of chapattis on an iron plate placed on the fire heart. Pulses and vegetables are quite common items of diet. Spices, salts and Ghee (butter oil) are added to them for flavor and taste. The chief meals are taken just before mid-day and in the evening before sun set but city folks generally have three meals.

3.3.6 Dress:

The local dress consists of a Kurta without collar covered by a waist-coat or Kurti and a loose loin cloth or trousers. A long piece of cloth called Chaddar is usually thrown over the willers. Achkan and Sherwani are worn on formal occasions by most people, but quite a large number of Muhajirs (refugees) wear these as normal dress. In the villages, a Kurta with Tehband (sheet round of legs) and Safa on willers is the most common dress. The Pagri still carries a sign of respectability and some people in the cities while most people in the villages have this as the sole head-dress. The women's clothes are generally more colorful with popular shades of red and yellow. Women clothing consists of Shalwar, Kamiz and Dopatta or Chaddar to cover their heads and upper part of the body. Phulkari is a silk embroidered shawl often fancied by the rural women-folks. Saree is only worn by women in towns and cities on formal occasions. The most common footwear for men in the villages is shoes of rough leather usually made by the village shoemaker. Boots are worn by those living in the cities and towns while women folk-wear sandal or slippers. Purdah is very common amongst the lower, middle and upper middle class women but rare amongst women of upper class.

3.3.7 Public Health:

Though earlier very few specialist doctors were available and most of the people resorted to the adjacent city of Lahore for their health care needs. But now, in Kasur District Headquarter Hospital is providing health facilities. Where as many small hospitals and clinics are providing basic health services as well, in rural and urban area.

3.4 *Recreational Resources and Development:*

The project area has not any private recreational facilities.

3.5 *Aesthetic Values:*

Like the general trend among the citizens of area, most of the people have low awareness about environment. Even then, some people take cleanliness and neatness of the environment lightly. Some people throw municipal solid wastes (MSWs) on the streets. Sense of personal responsibility to keep the environment clean as good citizens is even now lacking among a few people.

3.6 *Archaeological and Historical Treasures:*

Archaeological or historical treasures within the project area are not available.

4 CHAPTER # 4

Screening of Potential Environmental Impacts & Their Mitigation Measures

The following chapter describes the overall possible impacts of project on the physical, biological and socioeconomic environment because of construction and operation phases and mitigation measures to minimize the significance of the possible impacts up to an acceptable level. The anticipated impacts related to project location, design, constructional and operational phases have been assessed and mitigation measures are provided accordingly.

4.1 Environmental Impacts due to project location and mitigation measures:

Following impacts related to the location of the Refrigerator Assembling Unit should be identified to avoid the sitting of the Refrigerator Assembling Unit in sensitive, difficult or unsafe area:

Impact:

- **Displacement of existing land use and other resources:**

  Important land uses and economic activity can be lost due to Refrigerator Assembling Units.

Mitigation measures:

✓ Project site is an open plot and free of any economic activity or land use. It will not cause displacement of any land use or economic activity. In fact, the establishment of Refrigerator Assembling Unit will increase the economic and land use value of the project site.

✓ No movable or immovable property and infrastructure of public and private sectors will be lost or damaged during construction and operation stages. Impact will be nil.

✓ Location can be considered as the positive impact due to enhanced infrastructure.

Impact:

- **Destruction of environmentally sensitive and critical areas:**

  Wetlands, forests, major water bodies and other areas containing rare and endangered species can all be threatened by new Refrigerator Assembling Units.

Mitigation measures:

✓ There is not any sensitive area e. g. wetland, forests, major water bodies and other areas containing rare and endangered species at or near the project site, so the project location will not have any negative impact on environmentally sensitive and critical areas due to its location.

Impact:

- **Existence of adverse natural conditions:**

Existence of adverse natural conditions such as slope of the land, unstable soil and subsurface conditions, land prone to landslide activity and land prone to seismic or volcanic activity at the project site can make the site unsuitable for establishment of Refrigerator Assembling Unit.

Mitigation measures:

- ✓ Topography of the project area is flat, soil and subsurface conditions are stable and site is not located in area prone to any landslide, seismic or volcanic activity, so the site is suitable for the establishment of Refrigerator Assembling Unit. It shows that project site doesn't fall in area prone to flood, seismic or volcanic activity.

Impact:

- **Impact on adjoining land users:**

Population concentrations or agricultural production or other resources near the proposed project site may be affected by heightened levels of pollution.

Mitigation measures:

- ✓ Project site is poor agricultural land and there are no population concentrations in the radius of 0.5 km from the project site. Project location will have no impacts on adjoining land users.
- ✓ NEQS/ PEQS compliance of environmental parameters will be ensured.

Impact:

- **Displacement of existing population:**

Relocation issues may arise if any population is occupying the project site.

Mitigation measures:

- ✓ Project site is the property of the Government. There is no involvement of displacement or relocation of population in the subject project.
- ✓ The project does not involve dislocation of the people. There is no requirement of resettling a single person. Impact is nil.

Impact:

- **Destruction of resources of historic and cultural significance:**

Project may have negative impacts due to its location if sites or areas of importance from an historic or cultural viewpoint are present near the project site.

Mitigation measures:

- ✓ There is not any area of historic or cultural importance near the project site, so the impact on destruction of resources of historic and cultural importance is insignificant.

Impact:

- **Availability of existing infrastructure and services:**

Availability of existing services e. g water provision, road infrastructure etc. to the site may be inadequate for the proposed project. The absence of institutions for communication and accident response may make hazard management impossible at the particular site.

Mitigation measures:

- ✓ Adequate road infrastructure and other resources are present at the project site. There would be no issue of congestion of traffic due to presence of good road network in the area.
- ✓ Further facilities will be provided by the management of the Refrigerator Assembling Unit and adequacy of all resources will be ensured.
- ✓ The project will provide the jobs to the local residents as well as to those from the suburban areas.

Impact significance: high

Nature of impact: Direct

Duration: Long-term

Timing: Operation phase

Reversibility: NA

Likelihood: Moderate to high

Consequences: Negative

4.2 Environmental Impacts due to the project design and mitigation measures:

The following could be the impacts related to the design of the project:

Impact:

- **Hazardous Materials:**

  If there will be any hazardous materials in the Project, inadequate treatment, storage and disposal facilities could be a negative impact related to the design of the project.

Mitigation measures:

- ✓ No hazardous materials will be allowed in the subject Project, if they will be allowed then adequate treatment, storage and disposal facilities will be ensured.

Impact:

- **Liquid waste emissions:**

  Inadequacy of liquid waste treatment facilities could be a negative impact of the project due to its design.

Mitigation measures:

- ✓ Integrated waste treatment and disposal techniques will be designed and implemented in the proposed Refrigerator Assembling Unit.
- ✓ No liquid waste will be discharged into the environment directly without being treated.

Impact:

- **Gaseous Waste emissions:**

  If gaseous emissions of the industries will not be treated at NEQS/ PEQS, it will be a negative impact related to the design of the project.

Mitigation measures:

✓ All industries will install gaseous emissions control devices and will ensure the NEQS/ PEQS compliance for gaseous emissions.

Impact:

- **Noise:**

  Noise emissions could be a negative impact of the project if proper mitigation measures will not be taken.

Mitigation measures:

✓ Noise abatement devices will be installed in the industries to control their noise emissions and NEQS/ PEQS compliance will be ensured.

Impact:

- **Transport and traffic:**

  Inadequacy of road infrastructure at the project site may cause transport and traffic issues at the project site.

Mitigation measures:

✓ Efficient road network and ample parking facilities will be provided at the project site and there will be no issue of transport and traffic.

Impact:

- **Aesthetics:**

  Installation of industries can have a negative impact on the aesthetics of the area, negative impact related to the design of the project.

Mitigation measures:

✓ Special attention will be provided to the aesthetics of the area during the designing phase of the project. Green belt areas will be constructed and sufficient plantation will be done to ensure the aesthetics of the area.

✓ Sufficient space will be provided at the project site for the storage and disposal of solid waste and the treatment and reuse of wastewater.

✓ Provision of greenbelt buffer zones around the perimeter of the site will be ensured.

✓ The detailed design of the facility should adapt to the landscape, so that scenic features are not altered by the development.

✓ Trees and plants will be planted to provide the habitat for the birds.

Impact:

- **Infrastructure design:**

Lack of efficiency of basic infrastructure design during the designing phase of the project may cause many issues in later stages.

Mitigation measures:

✓ Emergency exist points should be marked in the project area.

✓ Firefighting system should be designed for the emergency situations.

- ✓ Geo-technical investigation of the project site should be conducted.
- ✓ Electricity system should be designed safe and sound.
- ✓ Electricity wires should be covered by thick plastic/electricity resistant covers.

Impact significance: moderate to high or may be negative

Nature of impact: direct

Duration: Long-term

Timing: Constructional phase & Operation phase

Reversibility: NA

Likelihood: moderate to high

Consequences: moderate to high or may be negative

4.3 Environmental Impacts during the construction phase and mitigation measures:

Impacts related to the construction phase of the subject project are discussed below:

Impact:

- **Runoff erosion:**

  Run off erosion during rains from unprotected excavated areas may result in excessive soil erosion.

- **Local flooding:**

  Local flooding may be caused due to watering of excavations, flushing of pipes etc.

Mitigation measures:

- ✓ Temporary silt fencing is recommended to avoid local flooding or run off.
- ✓ Precautionary measures should be taken to reduce the local flooding due to over-use or leakage of pipes.

Impact:

- **Dangers to workers:**

  Dangers may arise for workers from accidents, hazardous materials, quarrying, communicable disease and emissions due to the constructional activities at the project site.

Mitigation measures:

- ✓ PPEs i.e. ear muffs, helmets and masks etc. should be provided to workers to ensure their health and safety during the construction activities.

Impact:

- **Grubbing and stripping**

Grubbing and stripping may be a minor and short term impact on the physical environment during the construction phase. It may also be a health and safety hazard for the people at or near the project site.

Mitigation measures:

- ✓ Precautionary measures should be adopted to save the environment from the impacts of grubbing, stripping, leveling and compaction and health and safety of workers should be ensured during the construction phase.
- ✓ Sprinkling of water on dusty tracks is recommended to avoid the generation of dust on dusty tracks.

Impact:

- **Loss or degradation of vegetation:**

  Loss or degradation of vegetation may be caused from unnecessary removal or mechanical damage.

Mitigation measures:

- ✓ Project site is free of any dense vegetation, only some weeds and grasses are present there.
- ✓ Add more vegetation to restore the land by more plantations.

Impact:

- **Disruption of local traffic patterns:**

  Disruption of local traffic patterns, congestion and blocking of access to adjoining activities may be caused due to the constructional activities at the project site.

Mitigation measures:

- ✓ Construction timings should be scheduled to cause minimum disturbance to neighbors.
- ✓ Constructional materials should be transported at night time to cause minimum disturbance to routine traffic.

Impact:

- **Any outbreak of fire due to electrical and other failures**

This issue may arise due to carelessness or improper management, and it may be a serious hazard which may affect the environment or may also cause the loss of property or life.

Mitigation measures:

- ✓ Precautionary measures should be taken to avoid any outbreak of fire due to electrical and other failures.

Impact:

- **Solid waste generation due to domestic and construction activities**

Solid waste generation due to domestic and construction activities may be a negative impact on environment if not managed properly.

Mitigation measures:

- ✓ Constructional waste should be used for land filling purposes.
- ✓ Domestic solid waste should be kept in dust bins and should be handed over to local contractors.

Impact:

- **Wastewater generation from the domestic and constructional activities**

Wastewater generation due to domestic and construction activities may be a negative impact on environment if proper wastewater treatment and management system will not be implemented.

Mitigation measures:

- ✓ Wastewater treatment facility should be incorporated in the design of the project to treat the wastewater produced due to constructional and domestic activities before the final disposal.

Impact:

- **Generation of noise on account of vehicular use and construction activities**

It is also a minor and short term impact on the physical environment and also for health and safety, which may arise during the construction phase.

Mitigation measures:

- ✓ Vehicles should be properly tuned to reduce the impacts of dust and noise.
- ✓ Proper mitigation measures should be taken to reduce the noise generation during the construction activities.

Impact significance: moderate to high or may be negative

Nature of impact: direct

Duration: Short Term

Timing: Construction phase

Reversibility: NA

Likelihood: moderate

Consequences: moderate

4.4 Environmental Impacts during Operation Stage

During the operation stage of the life of Refrigerator Assembling Unit there will be possible impacts from:

Impact:

- **Pollution:**

  Increased pollution levels are a major negative impact associated with the operational phase of the subject project.

Mitigation measures:

- It will be ensured that all the necessary measures will be taken by the industries to control their emission levels and PEQS/ NEQS compliance will be ensured.

Impact:

- **Health hazards and nuisance:**

  Health hazards and nuisance may be caused to the workers in the Refrigerator Assembling Units during the operational phase of the subject project.

Mitigation measures:

- Management of Refrigerator Assembling Units and industries as well will be responsible for ensuring the health and basic rights of workers.

Impact:

- **Occupational health and safety issues:**

Occupational health and safety issues are of important concern related to the operational phase of the subject project.

Mitigation measures:

- Occupational health and safety of the workers should be ensured at the project site.

Impact:

- **Extraction of ground water:**

Extraction of ground water for the operational purposes of the project could affect the ground water availability for the community.

Mitigation measures:

- No impact on community ground water needs is envisaged as a result of the subject project.

Impact:

- **Inadequate operation and management facilities:**

Inadequate operation and management facilities during the operational phase of the project may cause the failure of enforcement and implementation of regulatory framework.

Mitigation measures:

- Adequate operation and management facilities should be ensured at the project site.

Impact:

- **Wastewater:**

Waste water generation due to domestic and process activities could be a negative impact related to the operational phase of the subject project.

Mitigation measures:

- Wastewater should not be disposed off without treatment at PEQS/ NEQS.

Impact:

- **Fire hazards:**

Fire due to short circuits and other activities may be a hazard which may arise from the subject project.

Mitigation measures:

- Fire management system should be designed to cope with any emergency situation.
- Electricity system should be designed safe and sound.

Impact:

- **Solid waste:**

Solid waste generation due to domestic and project related activities could be a major negative impact associated with the subject project.

Mitigation measures:

- Specific area for collection of solid waste should be allocated and solid waste management system should be devised and implemented to manage the solid waste at the project site.

Impact:

- **Noise:**

Noise pollution may be major negative impact associated with the operational phase of subject proposed project.

Mitigation measures:

- Noise abatement techniques should be implemented and PEQS/ NEQS compliance should be ensured.

Impact:

- **Heavy Traffic:**

Vehicle access is required especially for transportation. The site is well served with the road network. Heavy traffic will be allowed only during tight time during operational phase. The traffic issues at any stage of project life cycle will not arise.

Mitigation measures:

- Efficient road infrastructure and ample parking facilities should be provided at the project site.

Impact significance: moderate to high or may be negative

Nature of impact: direct

Duration: Long-term

Timing: operational phase

Reversibility: NA

Likelihood: moderate to high

Consequences: moderate to high or may be negative

4.5 Potential Environmental Enhancement Measures

The proposed project will be installed with all precautionary measures to enhance and safe the environment. Following necessary measures will be adopted during construction and operational phase of the project:

- Sprinkling of water will be done on dusty roads and tracks.
- PPEs will be provided during construction activity.
- Constructional waste and domestic solid waste will be disposed-off or utilized properly.
- Local people will be informed in advance when work is about to start in an area.
- Machinery will never be left unattended.

- Efforts should also be made to discuss traffic conditions so that regular traffic is not disturbed. Transporters engaged for the project would be forced to adhere to the load specifications of the access road. No overloading would be allowed in any case.
- Safety signs and boards will be placed during construction.
- Air pollution controlling devices will be installed within the project during operation.
- Machinery will be kept maintained.
- Waste water will be treated through waste treatment system that will be installed within the premises of the subject project.
- Proper SOPs will be followed with proper schedule along with the HSE conditions.
- Area will be restored with native plants. A proper tree plantation plan will be formulated to save the environment.
- Solid waste will be handed over to contractors and agreement will be made.
- Noise will be controlled by adopting proper measures.
- PPEs will be provided to workers during working.
- Firefighting equipment's and system will be installed.
- Safety signs will be placed at all locations where required.
- Hygienic conditions will be ensured and proper quality will be maintained by quality control testing.
- First aid facilities will be made available.

5 CHAPTER # 5

Environmental Management and Monitoring Program

The primary objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified in the EIA.
- Define the responsibilities of the project proponent.
- Define a monitoring mechanism and identify monitoring parameters in order to:

1. Ensure the complete implementation of all mitigation measures.
2. Ensure the effectiveness of the mitigation measures.
3. Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
4. Identify training requirements at various levels.

5.1 Institutional Capacity

The overall responsibility for compliance with the environmental management plan rests with the project proponent. He will appoint a HSE/Project Manager of relevant qualification. HSE/Project Manager will act as Environmental Manager and will manage all HSE condition at the PEQS.

A certain degree of redundancy is inevitable across all management levels, but this is in order to ensure that compliance with the environmental management plan is crosschecked.

Following functionaries will be involved in the implementation of EMP:

- Project Proponent
- Manager of Refrigerator Assembling Unit
- HSE Executive
- In-Charge Administration
- Supervisor of project
- Environmental Engineer
- HSE Inspector

5.2 Training Schedules

Training for the management/contractors/engineers and workers on environmental aspects of the project will be arranged during the constructional phase of the project. It will be imparted by a team of experienced trainers.

Management of lahroe will hire or appoint EHS Executive before the initiation of constructional work at the project site. EHS executive will be responsible for conducting the training of the labor, which will be organized either by the management of M/S DWP Engineering Industries Private Limited or by the contractor. Following schedules of training will be implemented:

Sr. No.	Description of program	Labor/ Personnel involved	Time/ duration
1.	General HSE Training	Trainers and whole labor	Quarterly for 1 hour
2.	Instrument use/ workplace specific items	Trainers and whole labor	Quarterly for 1 hour
3.	PPEs use and safe work practices at work site.	Trainers and whole labor	Quarterly for 1 hour
4.	Reporting and investigating accidents/ incidents	Trainers and whole labor	Quarterly for 1 hour
5.	Emergency procedures	Trainers and whole labor	Quarterly for 1 hour
6.	Medical and first aid	Trainers and whole labor	Quarterly for 1 hour
7.	Health and safety promotion	Trainers and whole labor	Quarterly for 1 hour

In order to raise the level of professional and managerial staff, there is a need to upgrade their knowledge in the related areas. HSE/Project Manager should play a key role in this respect and arrange the training programs.

HSE/Project Manager will provide training to staff and workers about the best environmental management practices at the construction site and affective implementation of the EMMP.

The training modules will include air, noise and water pollution monitoring, social awareness, Environmental Laws, Punjab Environmental Quality Standards (PEQS), Usage of personal protection equipment, and health and safety related issues on the construction site.

The HSE/Project Manager will train all workers & staff in basic sanitation and health care issues (e.g., how to avoid malaria and transmission of Sexually Transmitted Infections (STI) HIV/AIDS and in general health and safety matters, and on the specific hazards of their work. Training should also consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation.

HSE/Project Manager is being conducted Training on monthly or quarterly basis regarding health & safety, hygiene, firefighting and first aid.

5.2.1 Training of building contractor

Training of building contractor & workers will be the part of the TORs regarding the construction of the scheme. The provisions given in EIA Report *Chapter 4 Screening of Potential Environmental Impacts & Their Mitigation Measures* will be followed.

TORs will be including the training and submission of reports in the following area:

1. Handling of Machineries in a safe way
2. Use of PPEs
3. Maintenance of vehicles and submission of Environmental Monitoring Reports
4. Maintenance of Water Consumption records
5. Testing of water and waste water and submission of Environmental Monitoring Reports
6. Placement of safety signs/boards during construction
7. Sprinkling of water on the roads and dusty tracks
8. Monitoring of generator emissions

Training regarding all other aspects of HSE will be ensured by the contractor during the construction phase.

5.3 Summary of impacts and their mitigation measures

Impacts	Mitigation Measures
Project Location	
• Acquisition of land • Loss of environmentally sensitive areas • Changes in traffic pattern • Potential conflicts with stakeholders • Resettlement issues	✓ It is recommended for obtaining of approval from other relevant departments. ✓ The proposed land is the property of Government and there are no landownership issues. ✓ There is not any sensitive area near the project site. ✓ Many other industries are also working near the project site. ✓ The project proponent will achieve the NEQS/ PEQS at the boundary walls of the subject project to avoid the environmental impacts on the nearby industrial unit. ✓ There is no need to change the traffic pattern due the development of the subject project because no. of industries has been developed at the same road. ✓ It is recommended to settle the issues through scoping and specific group discussions. ✓ No resettlement issues
Project Design	
• Soil structure and soil bearing capacity • Road infrastructure design • Emergency exits • Firefighting system • Wastewater disposal system design • Electricity hazards	✓ Geotechnical investigation of the project site should be conducted. ✓ Safe road infrastructure design should be provided at the project site. ✓ Emergency exit points should be marked at the project site. ✓ Firefighting equipment must be maintained at the site in good working condition to cope with any emergency situation. ✓ Efficient wastewater disposal system should be designed for

	proper treatment of wastewater. ✓ Electricity system should be designed safe and sound.
Construction and operation phase	
Land & Soil	
• Land or Soil Erosion during the construction phase • Habitat destruction • Scarring of the landscape and aesthetic beauty. • Clearing of native plants will disturb the complexity of the ecosystem of the proposed area. • Leakage of oil from storage area may contaminate soil	✓ Sprinkling of water is recommended ✓ After construction phase, the project proponent will restore the land by plantation. ✓ All spoils will be disposed of as desired and the site will be restored back to its original conditions ✓ Aesthetics of the area will be maintained. ✓ Oils, lubricants, chemicals, and other listed hazardous materials should be stored safely at their designated spots, enclosures or store rooms, which should be safe from rainfall and away from any potential source of fire
Air pollution and Dust emission	
• The transportation of the project machineries and material also may cause dust. • Un-metaled roads may cause dust. • Dust raised on dirt tracks by project-related vehicles. • Dust from drilling of deep holes. • Combustion products from vehicles used for project-related activities	✓ Air emissions controlled devices must be installed to control the air pollution. ✓ Water the construction site periodically to minimize fugitive dust generation while laying foundation. ✓ Store all construction materials in a manner to minimize generation of dust and spillage on roads. ✓ During excavation works drop heights will be minimized to control the fall of materials reducing dust escape. ✓ Sprinkling of water must be done to control the dust or PM ✓ Vehicle emissions inspection should be done on regular basis ✓ Sprinkling should be done on the

	unpaved area to avoid dust pollution/ particulate matter. ✓ Vehicles/ trucks should be serviced regularly ✓ All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke.
Noise	
• The major sources of the noise at proposed project site are project related machinery. • High noise level cause hearing loss, deafness, high blood pressure, headache, depression and mental disturbance. • Noise level will not exceed 75 dB(A) at the distance of 2 km radius, activity site is located at a safe distance from the nearest human settlement . • Noise from construction activities from site preparation, earth works, foundation and plant equipment installation	✓ Personal Protective Equipment PPEs including Ear muffs, Ear plugs and other noise abating equipment will be provided to the workers and other staff of the subject project. ✓ Proper maintenance and tuning of the vehicles should be done. ✓ Sound proof room should be built for generator (if any) to control the noise. ✓ A speed restriction of 40 km/h will be imposed on all construction vehicles.
Waste Water	
• Domestic waste water from the camp • Minor generation of waste water from construction activity. • Water Contamination due to improper storage of construction material, • Water contamination due to improper debris disposal, • Spread of diseases, underground water contamination	✓ Domestic waste water will be drained out in nearby local drain after treated in septic tanks ✓ Oils, lubricants, chemicals, and other listed hazardous materials should be stored safely at their designated spots, enclosures or store rooms, which should be safe from rainfall
Solid waste	
• Solid waste may generate from	✓ A solid waste management division should be formulated to deal with

construction activity, domestic and packing material of project related machineries. • Solid waste may generate from operation of project.	the proper disposal of solid waste, supervised by HSE Manager, SW Manager, and other related personnel. ✓ Solid waste generated from the construction activity as sand, stones residues etc. that should be utilized in restoration of the quarry area whereas solid waste from the domestic sources should be disposed off properly ✓ Proper solid waste management system is recommended for each individual industrial unit. ✓ Industrial ecology practices will be adopted wherever possible. ✓ 7 R's of sustainability is recommended ✓ Sludge will be removed and dispose off in scientific way. ✓ Solid waste related to the operation will also manage in scientific way.
Health and Safety	
• Health and safety issues will be arose during construction activity, handling of material, machinery and improper practices of work • Health and safety issue may arise during regular operations	✓ Use of PPEs should be implemented at workplace. ✓ First aid measures/medical facility should be provided to project related employees. ✓ Safe drinking water must be provided to workers, staff, and poor people of the area. ✓ Water consumption records should be maintained. ✓ Safety signs & boards should be placed at during construction activity. ✓ Construction site should be fenced properly to avoid any damage to nearby settlements ✓ smoking or any drugs should be prohibited during working hours or performing work ✓ At the time of earthwork, fencing

	will be ensured for the area under the exploration.

5.4 Equipment Maintenance Detail

Subject project is the establishment of Refrigerator Assembling Unit by the management of M/S DWP Engineering Industries Private Limited" at 60-KM Multan Road, Khanky Morr District Kasur. Subject EIA has been conducted for the establishment of Refrigerator Assembling Unit. Industries will obtain their separate NOCs for construction. Only construction equipment will be involved in the subject project and when it comes to construction equipment, regular maintenance is one of the most important factors in cost control that is entirely in the hands of the fleet owner. Proper maintenance and condition monitoring will increase uptime significantly and keep equipment working at peak levels.

Following measures will be ensured for the construction equipment maintenance:

- Operator training
- Technician training
- Scheduled maintenance
- Regular oil analysis
- Repairs

5.5 Environmental Budget

The cost which is required to effectively implement the mitigation measures is important for the sustainability of the Project in operation stage of the Project. Company will allocate 2% of total cost of the project as Environmental Budget for meeting the following purposes:

HSE training	On quarterly basis
Maintenance and management of environment	On regular basis
Maintenance of equipment	On regular basis
Restoration	As per requirement
Plantation	During the operation phase
Availability of PPEs	During construction and operation
Strategic planning to cope with any emergency situation	As per policy

Formulate the disaster management plan to cope with natural disaster	As per policy

Implementation of all these parameters will be included in the environmental budget. Any equipment failure will not be included in this budget.

6 CHAPTER # 6

Stakeholders Participation

This section deals with the social acceptability of the project and the area. Consultation with the stakeholders is a tool for managing two-way communication between the project proponent and the affected public. Its goal is to improve decision making and build understanding by actively involving individuals, groups and organizations, which have stake in the project. This involvement increases project's long term viability and enhances its benefits to locally affected people and other stakeholders. It gives the feeling of an ownership to the local population and public indolent is also helpful in smooth implementation and success of the project.

In order to evaluate the socioeconomic and environmental impacts, filed surveys are extremely essential. In addition to the surveys at the preliminary stage, consultation with the community and their active participation plays a vital role in successful implementation of the project. To identity the different types of stakeholders and ascertain their perceptions about the proposed project (Environmental Impact Assessment (EIA)) social survey was conducted. Informal group discussions were also held as an additional tool for obtaining feedback from the stakeholders that are being discussed in the following pages.

6.1 Objectives of Consultation

Public consultation plays a vital role in studying the effects of the project on the stakeholders and in the successful implementation and execution of the subject project. Public involvement is a compulsory feature of environmental assessment, which leads to better and more acceptable decision making. The objective of the consultation with stakeholders is to help verify the environmental and social issues that have been presumed to arise and to identify those which are not known or are unique to the construction of the proposed unit.

The important general objectives of the consultation process are:

- Information dissemination, education and liaison
- Informing the stakeholders about the subject project
- Providing an opportunity to local public to raise their views and helping in more sensitive considerations for the formation of mitigation measures for the subject project

- Providing those involved in the planning stage with an opportunity to ensure that the benefits of the proposal are maximized and that no major impacts have been overlooked
- It provides an opportunity to local public to influence the design of project in a positive manner
- Increasing public confidence in front of proponent, reviewers and decision makers
- Identification of problems and needs of the stakeholders and public
- Providing better transparency and accountability in decision making stage;
- Reducing conflicts through early identification of contentious issues and working on them to find acceptable solutions
- Reaction, comment and feedback of stakeholders on project
- Developing proposal which are truly sustainable

6.2 Methodology of Consultation:

The EIA team carried out public consultations at various locations around the Project Site. The stakeholder's consultation during this phase of the work targeted the project area, administrative and private offices, Govt. offices, shops, etc. near the Project area:

1) Selection of the stakeholders for consultation, reconnaissance of the project site and initial discussions with the neighboring factory workers, residents, shopkeepers, drivers etc.
2) Environmental consultants and social specialists and documenting the opinions of the stakeholders expressed during the meetings etc.

6.3 Stakeholder Identification:

Stakeholders considered at all levels according to the importance of the project. They are at provincial, district and village level. The process of consultation is an ongoing process which continues during the project life cycle and even after the submission of this environmental assessment report and so on. Therefore, three-tier approach was adopted. Stakeholders were identified, categorized and consulted at provincial (EPD Punjab, Irrigation department, Agriculture department, Wildlife department etc.), district level (EPD, Irrigation department, Agriculture department, Wildlife department etc.) & village level (Direct & indirect affecteis and Locals)

Consultations with government, provincial and district level departments were carried out through meetings and visits while consultations with locals, villagers, neighbors and directly affected peoples were under taken during baseline study of the area.

A series of public consultations were required to get the feedback/ concerns of the different departments, Industries, local public, PAPs, and general public residing near the subject area.

6.4 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.

6.5 Environmental Practitioners and Experts

Team of M/s Eco Focal Environmental Solutions (Pvt) Ltd visited the project site, had discussions with stakeholders and consulted with the local people of nearby and other villages to evaluate the project socio-economic impacts. People of the area belong to different professions like mostly belong to employment, own businesses, doctors, some in abroad, in Army, teaching, in agriculture, etc. Women were also consulted for their point of view regarding the betterment of the area by this project, some of them communicated but according to social value of the area they mostly hesitate to communicate comfortably and get pictured. People provide the massive information about the project and have positive remarks regarding the project development.

6.6 Affected & Wider Community

There is no affected community present in the radius of our study area. EFESG team has consulted with the inhabitants of the Kasur areas. They provided positive remarks regarding the proposed project. Stakeholders participation Performa's and socioeconomic questionnaire were get filled by the inhabitants to evaluate the project socio-economic impacts. List of the respondents/participants can be seen in bellow table:

List of Respondents

Sr. No	Name	Status /Education	Age	Residence
1	Hamid Ali	Student (B.A)	23	Kasur
2	Ameen ullah	Nil	44	
3	Muhammad ashfaq	Nil	30	
4	M. inayat	Middle	18	
5	M. Nafees	Nil (shopkeeper)	42	
6	Muhammad Sharif	Govt. job	48	

7	Muhammad Fahim	Worker at an industry	43	
8	Ahmad Butt	Shopkeeper	37	
9	Zoya Akhtar	House Wife	45	
10	Akhtar Zaman	Primary	32	
11	Choudry umair	Middle	24	Manga Mandi
12	Hassan Zahid	Matric (Job)	40	
13	Sohail Yousaf	Primary	35	
14	Pervaiz Irshad	Worker	43	
15	Ali Ahmad	Driver	36	
16	Muhammad Ghafoor	Laborer	29	
17	Javed sial	Nil (Care taker)	61	
18	Imran Sial	primary	35	
19	Komal Haider	House Wife	36	
20	Noor ul amin	Graduation	42	
21	Rehman habib	Student (M.Phill)	25	Bhaipheru
22	Ashraf Haider	Farmer	31	
23	Ikram Majeed	Govt. job	44	
24	Rana Akram	Businessman	43	
25	Umer Doger	Student	23	
26	Nouman Ashraf	Student	23	
27	Fayaz Shareef	Matric	25	
28	Khadija be	Nill	40	
29	Shareef bin zaid	Intermediate	24	
30	Liaqat Ali	Private Job	27	
31	Zubair Jafry	Engineer	42	Kasur
32	Jameel Haider	Engineer	35	
33	Khalid choudry	Driver	31	
34	Abdullah chisti	Employee	32	
35	Saleem Rhandhawa	Farmer	35	
36	Akram junijo	Employee	32	
37	Saif Ali	Farmer	31	
38	Fazal Karim	Guard	41	
39	Muhammad Sarwar	Accountant	40	
40	Kamal Rana	Worker	39	

6.6.1.1 Sample Size

40 sample size was selected by the Team of consultants for conducting the socioeconomic survey. Women were also consulted for the said survey; some of their names are mentioned in the above list of respondents while most of them were not willing to give personal information.

6.6.1.2 Statistical Analysis

SPSS 19.0 has been used for the statistical analysis of the data collected during the visit of study site villages through questionnaires

6.6.1.3 Results & Discussion

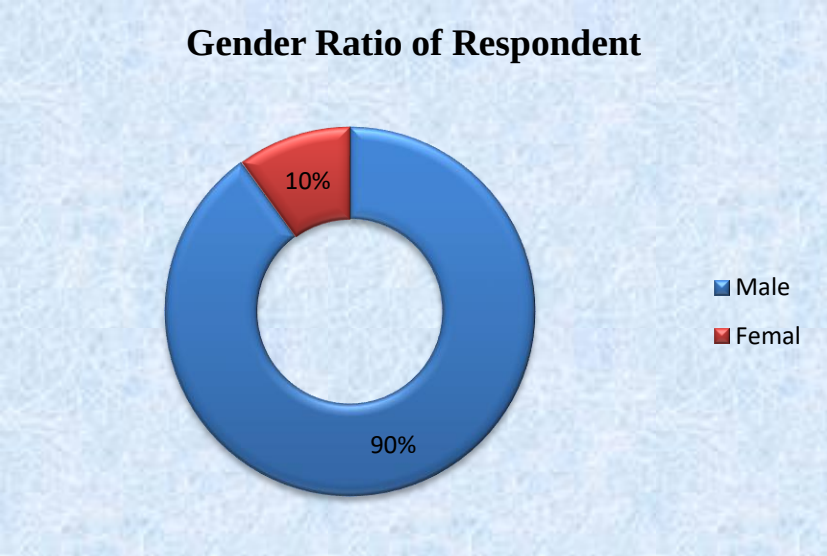


Figure 1: Gender Ratio of Respondents

6.6.2 Discussion

According to graphical representation, 90 respondents were male while 10 % respondents were female. The number of female respondents is less as compared to male respondents because according to the social binding female hesitates to respond or communicate comfortably.

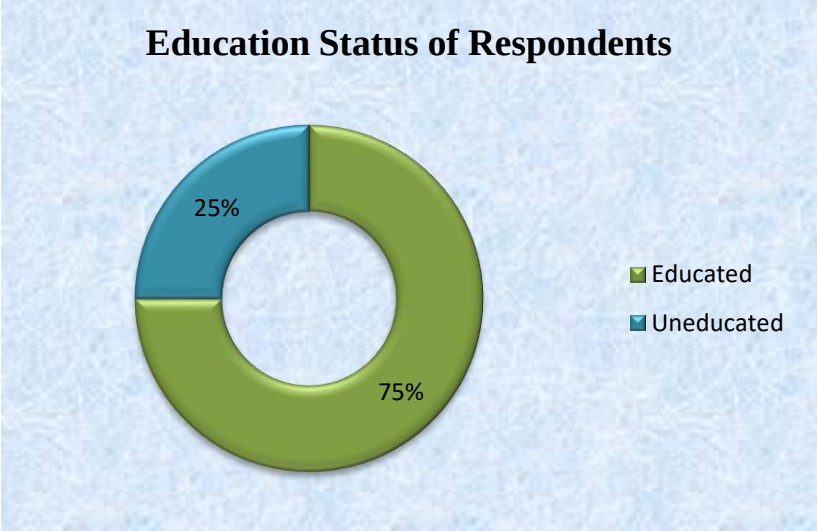


Figure 2: Education Status of Respondents

Discussion

According to above graphical representation, 75% respondents were educated while 25% were uneducated. So, according to the survey overall education status of the area is good.

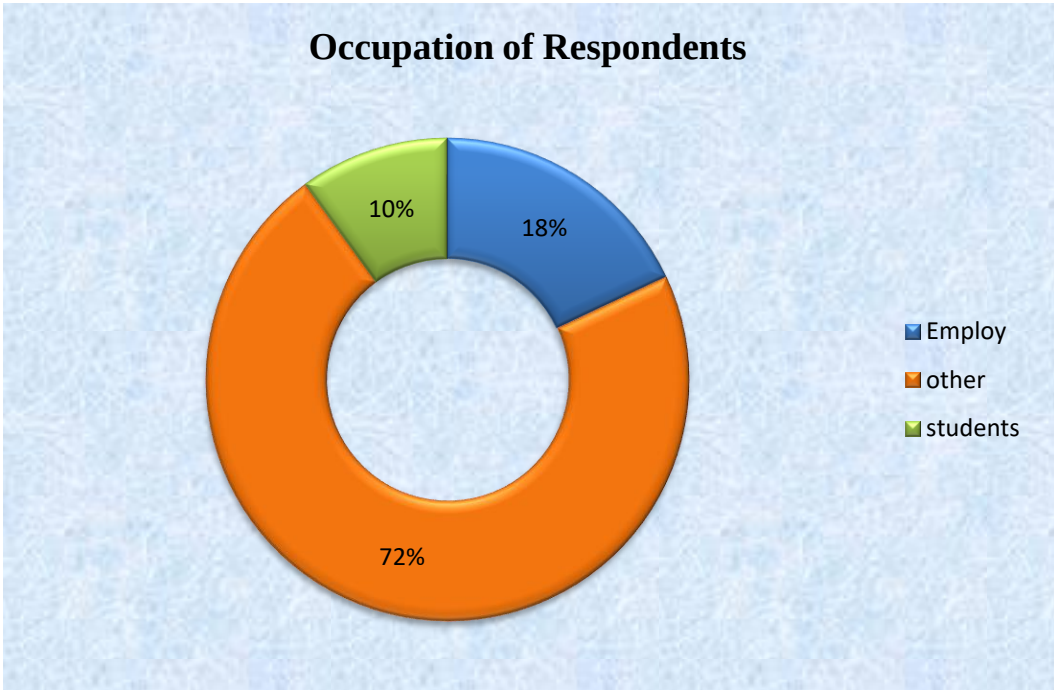


Figure 3: Occupation of Respondents

Discussion

According to above graphical representation, source of income of majority of the respondents in the area was mainly employee in the private and government sectors. According to the survey 10% were students while all other respondents' source of income was business man, farmers, doctors and teachers.

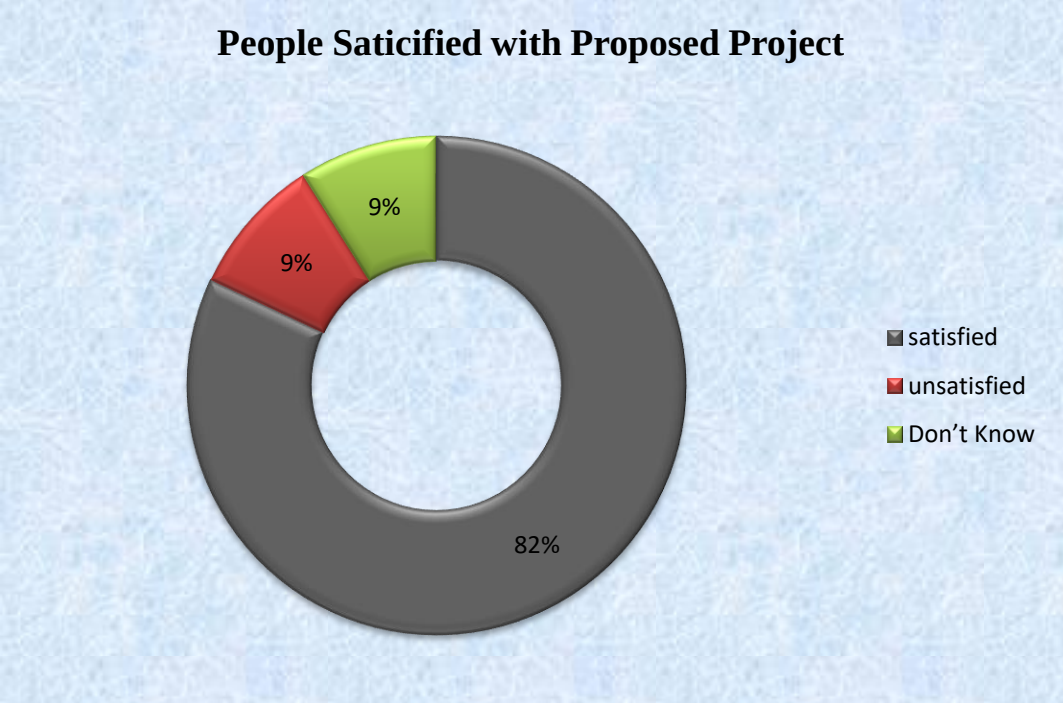


Figure 4: Ratio of people satisfied with Proposed Project

Discussion:

As per survey, 82% people were satisfied with the proposed project as they were hopeful to get job over there, their living standards will be raised by working over there. While 9% respondents had no opinion regarding the project and 9% respondents were not satisfied with the production unit due to their concerns regarding the aesthetic degradation and no preference to local people for jobs.

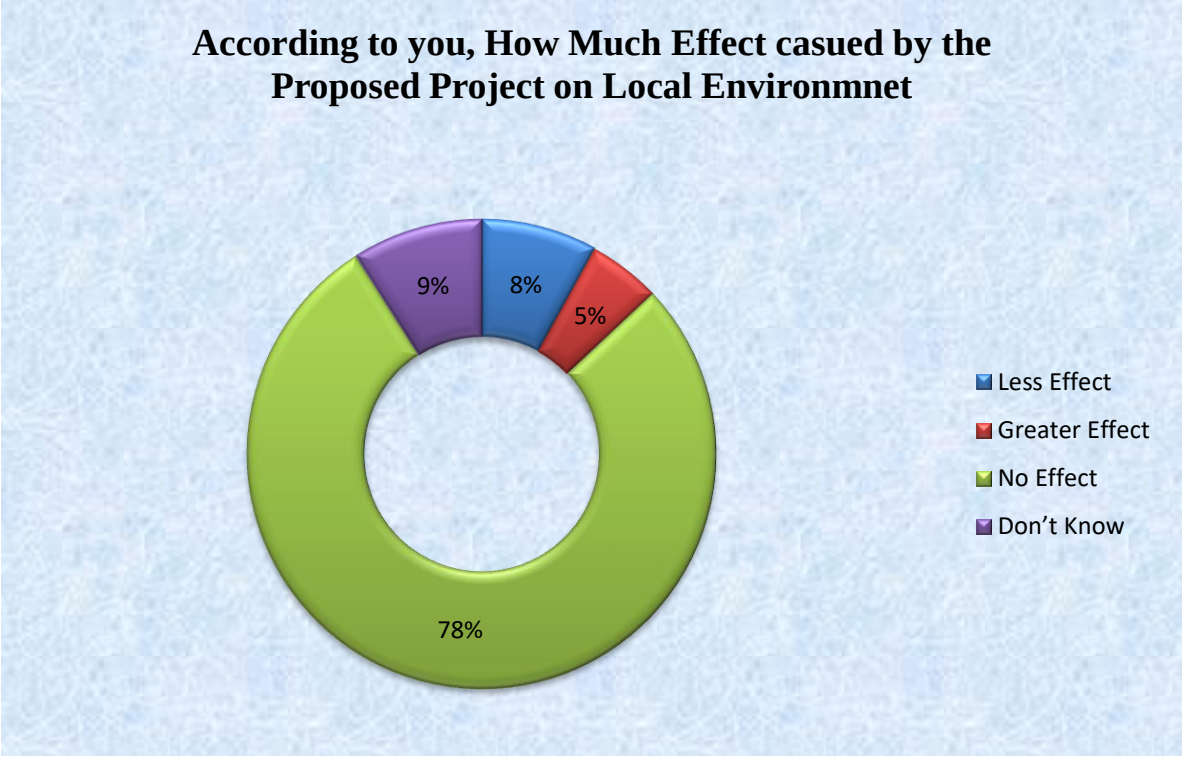


Figure 5: Ratio of Respondents having different views regarding Impact on Environment

Discussion:

As per survey, 78 % respondents remarked that there is no effect caused by the proposed project on the area environment while 9% respondents had no point of view regarding the project activity, 8% respondents remarked that subject activity has less effect on the environment of area and only 5% remarked that construction activity has greater effect on the environment of the area.

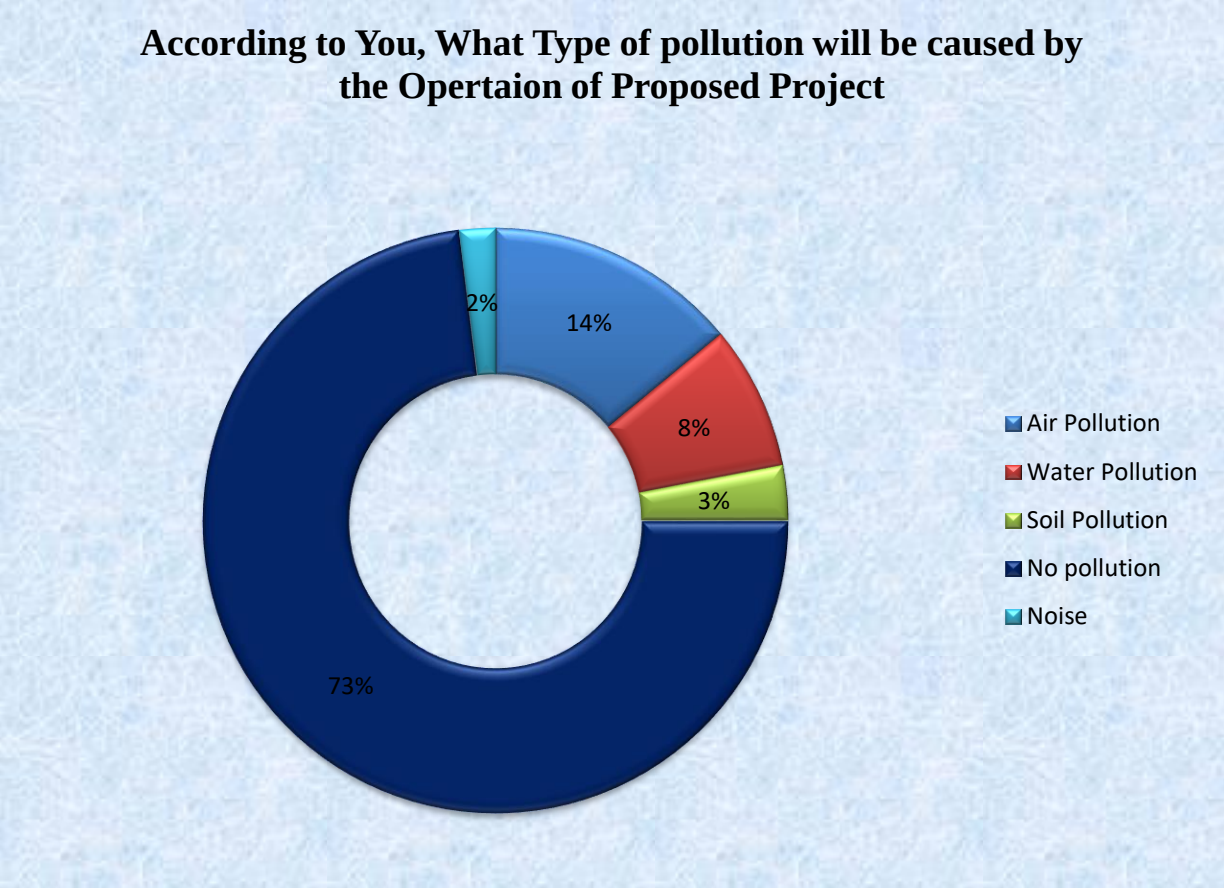


Figure 6: Types of Pollution cause by the Proposed Project

Discussion

As per survey of the area and graph indicates, 14% people said that air pollution will be caused by the subject project, 3% said that soil pollution will be caused by the proposed project activity. 8% said that water pollution will be caused by the subject project, 2% said that it will cause noise pollution. Maximum/ number of people (73%) said that it will cause no pollution.

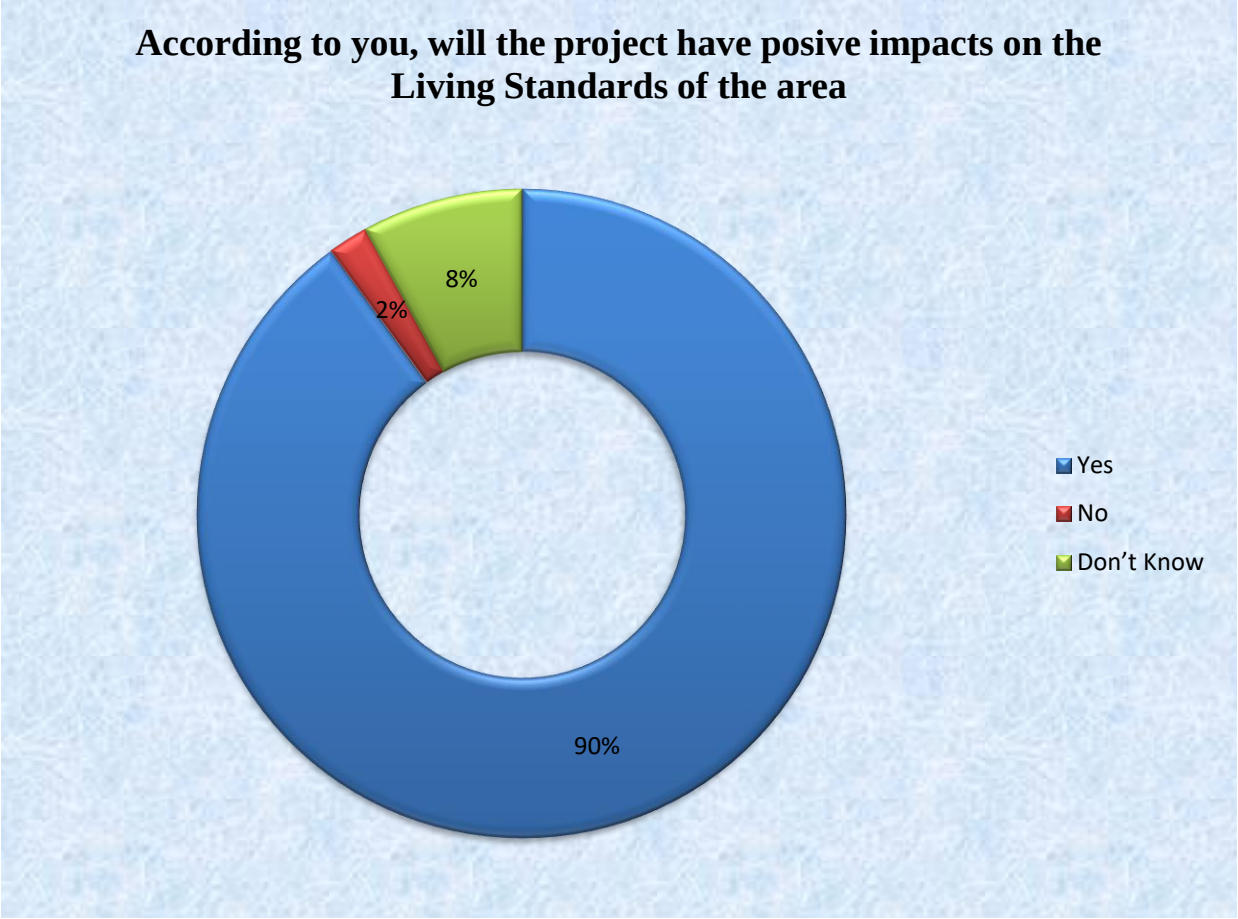


Figure 7: Effect of Proposed Project on the Living Standard of people

Discussion:

As per survey, 90% respondents said that subject project will have the positive impacts on the living standards and income level of the area, 2% said that it will have no effect on the living standard and income level while only 8% respondents had no remarks regarding the subject project.

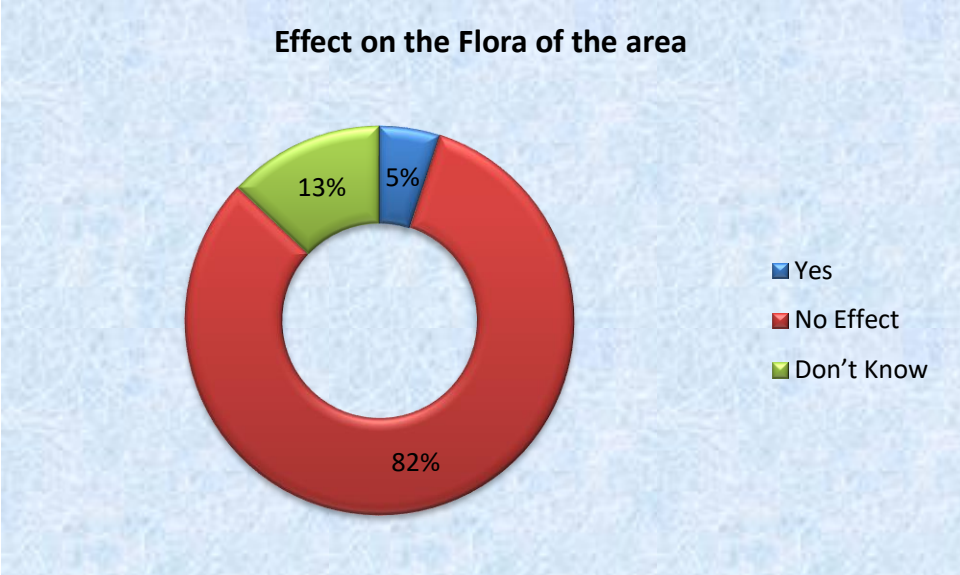


Figure 8: Effect of Proposed Project on Flora

Discussion

As above graph indicates, 5% people said that project will affect the flora of the area, 82% said that it will not affect the flora of the area, while 13% said that they have no idea regarding this question.

7 Chapter # 07

Site Selection

To fulfill the commercial aspects of the project under reference of this EIA Report, it is to be sited at a place where commercial processing activity is either already going on or there are bright prospects of the same. Concurrently, it must also meet the legal requirements of the Punjab Environmental Protection Act, 1997 (Amended 2012). Availability of land at the best convenient place is equally important among other considerations for the site selection. Availability of access roads, communication facilities, electricity, basic infrastructure, sewerage etc. is yet the other necessary requirements.

7.1 Alternative Sites:

7.1.1 Rejected Site A:

Before the consideration of selected project site, project proponent had considered another site in the district Kasur, but later it was rejected due to high cost of land and dense human settlements near the project site.

7.1.1.1 Reasons of Rejection:

This site was rejected due to the following reasons:

- Human settlements around the project site
- Dense vegetation/ tree cutting issue
- Cost of land
- Lack of road infrastructure

7.1.2 Rejected Site B:

Another site was considered for the construction of the subject project by the management but it was also rejected due to some reasons. Aerial view of the site is given below:

7.1.2.1 Reasons of rejection:

This site was rejected due to the following reasons:

- Lack of sufficient road infrastructure
- Site was not found suitable for the establishment of the Refrigerator Assembling Unit.
- Land of agricultural importance

Figure 9: Aerial view of rejected site A

- Populated areas near the project site.

7.2 Measures identified in the site selection of the proposed Refrigerator Assembling Unit:

As per sub clause 3.2 for Sectoral guidelines for Refrigerator Assembling Units following measures have been identified in the site selection of proposed Refrigerator Assembling Units:

- **Zoning or identification of Land of prime agricultural importance:**

Site selected for the subject project is poor agricultural land (water logging, salinity) was observed during visit. Site is not used for agricultural purposes and there was no cultivation previously. It is an open plot free of any activity and the property of the Government of Pakistan.

So the land selected for the subject project is not of prime agricultural importance. The establishment of Refrigerator Assembling Unit will increase the land value and economic growth of the area.

- **Sites which have special habitat significance or species diversity:**

Project site is open plot, barren/ poor agricultural land free from any protected species (as per survey by the ecologist, member EIA team). No species of fauna and flora are present at the project site nor does the site have any special habitat significance or species diversity. Further plantation will be done which will also be a habitat for the local bird species thus the impact will be positive w.r.t flora and fauna.

- **Sites of special cultural or historical interest:**

There is not any area of historic or cultural importance near the project site, so the impact of the project on destruction of resources of historic and cultural importance is not applicable.

8 Chapter # 08

Assessing Impacts

8.1 Identification of all impacts:

All the impacts related to the subject project due to the project location, design, during the construction phase and operational phase have been identified and their mitigation measures have been suggested in *Chapter # 4, Screening of potential environmental impacts and mitigation measures.*

8.2 Methodology for Impact Evaluation:

The methodology adopted for impact evaluation includes the Modified Leopold Matrix.

8.2.1 Leopold Matrix

The analysis is performed with the Leopold Matrix (LM). This matrix has

1. On the horizontal axis, the actions which cause environmental impact, and
2. On the vertical axis, the existing environmental conditions which may be affected by those actions.

This provides a format for comprehensive review of the interactions between proposed actions and environmental factors.

The most important blocks marked are evaluated individually, and a number between 0 and 10 is placed in the upper left-hand corner to indicate the relative magnitude of the impact (0 represents the least magnitude, and 10 the greatest). Likewise, a number between 0 and 10 is placed in the lower right-hand corner to indicate the relative importance of the impact (again, 0 represents the least magnitude and 10 the greatest).

Table: Type of impacts and their scale of importance and magnitude

Sr. No.	Type of Impact	Scale of Magnitude (0 – 10)	Scale of Importance (0 – 10)
1	No Impact	0	0
2	Low Impact	1 – 4	1 – 4
3	Medium Impact	5 – 6	5 – 6
4	High Impact	7 – 10	7 – 10

For the evaluation of this project, each action checked was evaluated in terms of magnitude of effect on environment characteristics and conditions [on the vertical axis]. From upper right to lower left across each block where significant interaction is expected slash \was placed diagonally. The most important blocks marked are evaluated individually, and a number between 0 to10 is placed in the upper left-hand corner to indicate the relative magnitude of the impact 1is the best magnitude, and 10 the greatest magnitude. In the same way, a number between 0 and 10 in the lower right-hand corner to indicate the relative importance of the impact again, 0 is the magnitude, and 10 the greatest.

The next step is to evaluate the numbers which have been in the slashed boxes. The high or low numbers on any one box indicates the degree of impact of the appropriate action on the given characteristic of the environment. The assignment of magnitude and importance numbers is based, to the extent possible, on factual data rather than on the evaluator's preference.

For the rating design regarding the probable impacts requires the evaluator to quantify his\her judgment. The rating scheme\scheme allows the reviewers to thoroughly follow the evaluator's line of reasoning, to aid in identifying points of agreement and disagreement. In fact, matrix is the abstract for the text of the environmental impact assessment.

Table: Leopold Matrix for Impact assessment

Construction Phase															
Magnitude / Importance			Actions											Total Score of Impact	Average Score of Impact
			Transportation of raw material	Construction Activities	Operation of generators	Water consumption	Wastewater generation	Storage of raw materials	Social activities	Public welfare	Economic activities	Employment	Infrastructure improvement		
PHYSICAL ENVIRONMENT	Soil	Soil Quality	2/1	3/2	0/0	1/1	5/2	4/4	1/1	0/1	1/1	1/3	4/6	22/22	2/2
		Erosion	2/1	6/6	0/0	0/0	2/2	1/1	2/1	0/0	1/1	1/1	3/4	18/17	1.6/1.5
		Geomorphology	0/0	5/5	0/0	4/2	5/3	2/1	0/0	0/0	1/1	2/1	4/6	23/19	2.09/1.7
	Water	River	0/0	0/0	0/0	6/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	6/0	0.5/0
		Coastal Zone	0/0	0/0	0/0	6/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	6/0	0.5/0
		Subsurface Water	1/2	1/1	0/0	7/8	5/7	1/1	0/0	0/0	1/1	0/0	2/2	18/22	1.6/2
		Sea Quality	0/0	0/0	0/0	3/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	3/0	0.2/0
	Air	Air Quality	5/5	8/8	7/7	6/1	5/4	4/4	5/5	1/1	6/4	4/6	8/8	54/53	4.9/4.8
		Odors	1	1	3	0	5	4	1	0	0	1	1	17	1.5

			1	1	3	0	7	6	1	1	1	1	1	23	2.0
		Noise	5/6	9/10	7/8	0/0	5/4	2/2	5/6	0/1	5/6	4/6	4/6	46/55	4.1/5
	Total Score of Impact		16/16	33/33	17/18	33/12	32/29	18/19	14/14	1/4	15/15	14/18	26/3		
	Average Score of Impact		1.6/1.6	3.3/3.3	1.7/1.8	3.3/1.2	3.2/2.9	1.8/1.9	1.4/1.4	0.1/0.4	1.5/1.5	1.4/1.8	2.6/3.3		

Over all the impact of project is positive in term of employment and infrastructure improvement. Mostly the average values are falling in 0.2-5 range which means the overall impact will be low to moderate. Due to the construction activities dust and gases will generate which may affect ambient air quality. To counter with the negative impacts Environmental Management plan is formulated which will be ensured by the project proponent. Beside this Environmental monitoring plan is also formulated for Environmental monitoring of various parameters which will be also implemented by the proponent.

Table: Leopold matrix for impact Assessment

Construction Phase															
Magnitude / Importance			Actions											Total Score of Impact	Average Score of Impact
			Transportation of raw material	Construction Activities	Operation of generators	Water consumption	Wastewater generation	Storage of raw materials	Social activities	Public welfare	Economic activities	Employment	Infrastructure improvement		
BIOLOGICAL EVIRONMENT	Flora	Forest	2/1	3/5	2/2	5/1	5/1	2/0	3/1	0/1	3/1	4/1	1/2	30/16	2.7/1.5
		Crops	2/2	5/6	3/2	0/0	4/6	2/2	2/3	4/3	5/7	3/3	3/3	33/37	3/3.3
		Wetlands	0/0	0/0	0/0	3/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
		Sea Grasses	0/0	0/0	0/0	3/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	3/0	0.5/0
		River Flora	0/0	0/0	0/0	3/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	3/0	0.5/0
	Fauna	Mammals	5/4	6/7	2/2	2/1	4/3	2/1	3/3	0/0	4/3	3/4	3/3	34/31	3.3/2.8
		Birds	2/2	7/7	5/5	2/1	4/4	1/1	5/4	0/0	5/5	3/4	4/4	34/37	3.4/3.3
		Fishes	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
		Other Vertebrates	5/4	6/7	2/2	2/1	4/3	2/1	3/3	0/0	4/3	3/4	3/3	34/31	3/2.8

		Invertebrates	6 / 6	6 / 7	2 / 2	4 / 3	5 / 4	4 / 3	4 / 4	1 / 1	4 / 3	3 / 4	3 / 3	42 / 40	3.8 / 3.6
	Ecosystem	Ecosystem Quality	2 / 1	5 / 6	5 / 5	5 / 5	5 / 6	4 / 4	5 / 5	1 / 1	4 / 5	3 / 3	2 / 2	41 / 43	3.7 / 3.9
		Ecosystem Destruction	2 / 2	5 / 6	4 / 4	2 / 2	5 / 6	2 / 2	4 / 4	0 / 0	4 / 5	3 / 3	2 / 2	33 / 36	3 / 3.2
	Total Score of Impact		26 / 22	43 / 51	29 / 24	28 / 14	36 / 33	21 / 2	29 / 27	6 / 6	33 / 32	25 / 26	21 / 22		
	Average Score of Impact		2.1 / 1.8	3.5 / 4.2	2.4 / 2	2.3 / 1.1	3 / 2.8	1.75 / 2	2.4 / 2.2	0.5 / 0.5	2.7 / 2.6	2 / 3.1	1.7 / 1.8		

Over all the impact of project is positive in term of employment and infrastructure improvement. Mostly the average values are falling in 1.5 – 3 range which means the overall impact will be low. Due to the construction activities, biological environment will disturb at low level. To counter with the negative impacts Environmental Management plan is formulated which will be ensured by the project proponent. Beside this Environmental monitoring plan is also formulated for Environmental monitoring of various parameters which will be also implemented by the proponent.

Table: Leopold matrix for impact assessment

Construction Phase															
Magnitude / Importance			Actions											Total Score of Impact	Average Score of Impact
			Transportation of raw material	Construction Activities	Operation of generators	Water consumption	Wastewater generation	Storage of raw materials	Social activities	Public welfare	Economic activities	Employment	Infrastructure improvement		
SOCIO-ECONOMIC EVIRONMENT	Land Use	Rural	2/1	5/6	5/5	5/4	5/7	2/3	5/4	5/6	4/5	7/8	7/7	52/56	4.7/5
		Fisheries	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	6/7	0/0	0/0
		Urban	3/4	6/6	7/7	5/5	7/8	5/5	6/5	4/4	5/6	7/8	6/7	61/65	5.5/5.9
		Industrial	5/6	7/7	5/5	4/6	6/7	4/5	6/6	5/6	8/8	9/9	7/7	66/72	6/6.5
		Recreational Use	2/3	3/4	2/3	3/3	3/3	1/1	3/4	4/5	4/5	2/1	4/3	31/35	2.8/3.1
	Patrimony	Landscape	3/3	6/7	1/1	4/3	5/5	4/2	3/3	3/3	6/6	3/2	4/4	42/39	3.8/3.5
		Historical / Cultural	2/2	7/7	2/2	2/1	4/4	1/1	5/4	4/4	5/5	3/4	4/4	39/38	3.5/3.4
		Heritage	2/2	7/7	2/2	2/1	4/4	1/1	5/4	4/4	5/5	3/4	4/4	39/38	3.5/3.4
		Wilderness Quality	2/2	2/1	2/2	2/1	4/3	1/1	3/3	1/1	4/3	1/1	2/2	24/20	2.1/1.8

	Social	Population Density	5 / 4	6 / 7	4 / 4	5 / 4	4 / 3	2 / 1	5 / 5	3 / 3	4 / 3	5 / 4	6 / 7	49 / 45	4.5 / 4.1
		Employment	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
		Hazards	5 / 4	6 / 7	2 / 2	2 / 1	4 / 3	2 / 1	3 / 3	1 / 1	4 / 3	5 / 4	4 / 5	38 / 34	3.4 / 3.1
	Total Score of Impact		31 / 35	55 / 59	38 / 35	36 / 29	46 / 44	23 / 21	44 / 41	34 / 37	49 / 3	42 / 4	50 / 57		
	Average Score of Impact		2.8 / 3.1	5 / 5.36	3.4 / 3.1	3.2 / 2.6	4.1 / 4.4	2.1 / 1.9	4 / 3.7	3.1 / 3.4	4.5 / 3	3.8 / 4	4.5 / 5.1		

Over all the impact of project is positive in term of Social activities, transportation, employment and infrastructure improvement. Mostly the average values are falling in 2 – 5 range which means the overall impact will be low to little moderate. Due to the construction activities, socio-economic environment will disturb at low moderate level. To counter with the negative impacts Environmental Management plan is formulated which will be ensured by the project proponent. Beside this Environmental monitoring plan is also formulated for Environmental monitoring of various parameters which will be also implemented by the proponent

8.3 Impact analysis and prediction:

In order to evaluate the socioeconomic and environmental impacts, filed surveys are extremely essential. In addition to the surveys at the preliminary stage, consultation with the community and their active participation plays a vital role in successful implementation of the project. For the impact analysis and predictions following methods were adopted:

8.3.1 Consultations/ case studies:

To study the impacts of the project on physical and biological environment, site visits were conducted by the environmental practitioners and experts and possible physical and biological impacts which may arise due to the subject project were identified through consultations and case studies and their mitigation measures were suggested accordingly.

8.3.2 Meetings:

For the identification of the social impacts of the project, meetings and group discussions were held with the local people, stakeholders, nearby residents and passerby because social acceptability of the project and the area is a key to success. Consultation with the stakeholders is a tool for managing two-way communication between the project proponent and the affected public. Its goal is to improve decision making and built understanding by actively involving individuals, groups and organizations, which have stake in the project. This involvement increases project's long term viability and enhances its benefits to locally affected people and other stakeholders.

To identity the different types of stakeholders and ascertain their perceptions about the project, an initial environmental examination was conducted. Informal group discussions were also held as an additional tool for obtaining feedback from the stakeholders that are being discussed in the following.

The EIA team carried out public consultations at various locations around the Project Site. The stakeholder's consultation during this phase of the work targeted the project area, administrative and private offices, Govt. offices, shops, etc. near the Project area:

- Selection of the stakeholders for consultation, reconnaissance of the proposed project site and initial discussions with the neighboring factory workers, villagers, shopkeepers, drivers etc.
- Environmental consultants and social specialists and documenting the opinions of the stakeholders expressed during the meetings etc.

8.4 Characteristics of impacts:

8.4.1 Impact assessment criteria:

The impacts were assessed in the light of criteria given as under:-

- Magnitude or degree of impact
- Time and duration of impact
- Likelihood of impact occurrence
- Sensitivity of impact
- Risk related to impact

8.5 Potential Positive Impacts:

The project is envisaged to have following major positive impacts;

8.5.1 Employment opportunities:

Installation of Refrigerator Assembling Unit in the area will generate new jobs for the local population. The requirement of Managers, Engineers, Workers, technicians, skilled and unskilled labor etc. during the constructional and operational phases of the project will generate employment opportunities. It is estimated about 200 persons will work during constructional phase of the project. So the generation of the employment opportunities will be a potential positive impact of the subject.

8.5.2 Business Enhancement:

As different industries will be installed in the proposed Refrigerator Assembling Unit, it will be a source of industrial growth and business enhancement of the country, which is also a potential positive impact of the subject project.

8.5.3 Improved Infrastructure:

Establishment of Refrigerator Assembling Unit in the district will improve the infrastructure of the area which is also a potential positive impact of the subject project.

8.5.4 Economic benefits:

Establishment of Refrigerator Assembling Unit will be a source of economic growth; it is a great investment for the economy of our country. In the long run it will positively impact not only the local population but also the economy of country and will bring many economic benefits to Pakistan.

8.6 Potential Negative Impacts:

8.6.1 Types of Negative Impacts

8.6.2 Minor Impacts

These are of minor intensity. For mitigation of the minor impacts routine and limited actions are required.

8.6.3 Moderate Impacts

These impacts need specific and additional mitigation measures.

8.6.4 Major Impacts

These impacts have severe adverse impact. These are intolerable. All possible preventive and multiple control measures are adopted to minimize their intensity and duration.

8.6.5 Mitigation assessment criteria:

The Mitigation Hierarchy establishes a structure to guide development and application of measures to mitigate impacts on environmental values and associated components.

8.6.6 General principles

1. Maintaining the integrity and natural functions and processes of ecosystems, and the resilience of ecosystems, is prerequisite to sustainable use of natural resources, and essential to maintaining ecosystem goods and services over time.
2. The mitigation hierarchy is applied in order of priority as follows:
    a. Avoid
    b. Minimize
    c. Restore On-Site
    d. Offset (Off-Site or On-Site)
3. Generally, the "higher" the priority of the environmental value and associated component, the more protective the mitigation measures.
4. For an action or measure to be considered "mitigation", a party must accept responsibility for implementation of appropriate mitigation measures, and there must be certainty that the mitigation measures will be carried out.
5. Implementing mitigation measures can help resolve issues that may delay or prevent a proposed project or activity.

8.6.7 General considerations

1. Which environmental values and associated components will be impacted by the proposed project or activity? (This will be determined from the output of the environmental impact assessment, i.e., the Environmental Impact Assessment and Mitigation Plan)
2. Have the criteria being used to determine relative priorities among environmental values and associated components?
3. Have mitigation measures for impacts on environmental values and associated components, at all scales, been considered?
4. What is the current condition of each environmental value and associated component actually present within the footprint and area of influence of the proposed project or activity?
5. Can impacts on one or more environmental values or associated components be more fully mitigated than impacts on other environmental values and associated components?
6. Are there multiple environmental values and associated components with conflicting management needs and potential conflicts that need to be considered?
7. Is sound guidance available and being used, e.g., are best management practices (BMPs) and guidelines available for affected environmental values and associated components?
8. Is there opportunity to collaborate with other proponents that may have interest in overlapping mitigation measures?

Impact significance of:

8.7 Ecological importance

8.7.1 Natural Vegetation

Project site is free of any dense vegetation. No trees are present in the vicinity of the project site which will be cleared for the installation of industries. Only some weeds and shrubs are present in the project area which will be cleared for the purposes of construction of industries.

Assessment of Impact:

A significant impact will be interpreted if unnecessary or excessive removal and burning of plants for fuel wood is observed.

Nature of impact: Direct

Duration: long term

Timing: construction phase

Reversibility: irreversible

Likelihood: moderate

Consequences: Mild, as no rare plant species are not present in the project area.

Impact significance: not significant

Mitigation Measures:

The following mitigation measures and recommendations to reduce any impact on vegetation:

- Do not park vehicles on green belts/ grass
- Unnecessary damage to vegetation should be strictly avoided.
- Plantation should be done in the project area, green belts should be constructed and maintained.
- Vehicles should be parked on green belts/ grasses.

Residual Impact:

Given the current state of the vegetation, and proper implementation of the proposed mitigation measures, no significant residual impact on the natural vegetation of the area is anticipated.

8.7.2 Fauna

The fauna including wildlife species do not exist at the project site**.**

Nature of impact: Direct

Duration: short term

Timing: construction phase

Reversibility: not applicable

Likelihood: low

Consequences: Nil, as no rare plant species are not present in the areas.

Impact significance: not significant

Residual Impact:

Given the current state of the fauna there is no significant residual impact on the wild life of the area.

8.8 Social importance

Following parameters were adapted for the assessment of the well-being of the poor people near the project site that are used to assess the social, economic, and cultural impacts of the project.

8.8.1 Inconvenience due to construction and other Vehicles:

During the construction period a minor impact may be the movement of vehicles from the main road to the proposed project site; it may affect the traffic on other roads and may cause minor annoyances to the residents and other industrialists of the area. The transportation of heavy materials and equipment is likely to damage the existing roads if they were used for the transportation of heavy machinery.

Mitigation measures: Efforts should also be made to discuss traffic conditions so that regular traffic is not disturbed. Transporters engaged for the project would be forced to adhere to the load specifications of the access road. No overloading would be allowed in any case.

Nature of impact: Direct

Duration: Long term

Timing: construction and operation phase

Reversibility: reversible

Likelihood: moderate to high

Consequences: moderate to high

Impact significance: significant

8.8.2 Cultural Issues:

Induction of outside workers in the Contractor's labor may cause cultural issues with the local community as the local community is very sensitive about their cultural values. Also theft problems to the local community may arise by the labor force and vice versa.

Mitigation Measures: Good relations with the local communities will be promoted by encouraging contractor to provide opportunities for skilled and unskilled employment to the locals, as well as on-the-job training in construction for young people. Project manager will restrict his staff to mix with the locals to avoid any social problem.

Contractor will keep the copies of Computerized National Identity Cards (CNIC) of his workers and will warn them not to involve in any theft activities. And if anyone would involve, he will have to pay heavy penalty. Similarly, at the time of employment contractor has to take care that the workers should be of good repute. The contractor camp will be properly fenced and main gate will be locked at night with a security guard to check the theft issues.

Contractor will also be the responsible for the sensitivity towards the local customs and traditions.

Nature of impact: Direct

Duration: Long term

Timing: construction and operational phase

Reversibility: reversible

Likelihood: moderate

Consequences: moderate, if project proponent implements mitigation measure, its impact will be low

Impact significance: significant

8.8.3 Accident risks:

Unmonitored construction activities may create an accident risk for the local residents particularly children and labor force.

Mitigation measures: Contractor must have first aid kits along with the medical officer in the field if a minor injury takes place, but for an unfortunate accident services of nearby hospitals will be availed. Routine medical check-ups of all the field staff including unskilled labor need to be conducted by a qualified doctor.

Training of the workers should be arranged regarding safety procedures, environmental awareness, equipping all construction workers with PPEs, safety boots, safety helmets, ear plugs, gloves and protective masks. Monitoring must be carried out to check for the sustainable use of PPEs.

Nature of impact: Direct

Duration: Long term

Timing: construction and operational phase

Reversibility: not applicable

Likelihood: moderate

Consequences: moderate, as complete trainings and mitigation measure will be implemented.

Impact significance: significant

8.8.4 Privacy Issues:

Disturbance may happen to the privacy of people residing near the project area when workers will work at height.

Mitigation Measures: Contractor must take care for the privacy of residents, especially women near the working area.

Nature of impact: Direct

Duration: Short term

Timing: construction phase

Reversibility: reversible

Likelihood: low

Consequences: low, as contractor will take care of the matter

Impact significance: slightly significant

8.8.5 Sharing of resources:

During the construction and operational phase of the project, workers will share the common resources like potable water, fuel, wood. It may create conflicts between work force and local population.

Mitigation measures: The contractor will be required to maintain a close friendly relationship with the local communities to ensure that there may not be any conflict related to common resources

utilization. He must get permission of the local population before using their common sources of water and other resources.

Nature of impact: Direct

Duration: Short term

Timing: construction phase

Reversibility: reversible

Likelihood: low

Consequences: low, if the terms & conditions will be followed and mitigation measures have been employed

Impact significance: significant

8.8.6 Noise Problems:

Residents of nearby areas may face the problems of noise during the construction and operational phase.

Mitigation measures: Large noise generating activities should be carried out in fixed hours. The timing will be known to all the people in 500 m radius of the site.

Nature of impact: Direct

Duration: Short term

Timing: construction phase

Reversibility: reversible

Likelihood: Moderate

Consequences: Moderate, project contractor will follow the safety guidelines & NEQS

Impact significance: significant

8.8.7 Mobilization issues:

During the construction phase, the general mobility of the local residents and their livestock in and around the study area is likely to be hindered.

Mitigation measures: It will be the responsibility of project contractor and drivers to follow the speed limits in the area.

Nature of impact: Direct

Duration: Short term

Timing: construction phase

Reversibility: reversible

Likelihood: low

Consequences: low, as it links the main Multan road and vehicles will rarely use the sub roads

Impact significance: slightly significant

8.8.8 Health:

People from the project area regularly travel to other cities, and thus cannot be considered isolated from the rest of the country. They are regularly exposed to illnesses common to urban populations, and have similar levels of immunity. The project is therefore very unlikely to lead to an epidemic of any sort among local communities.

Mitigation measures: Regular medical check-ups of all the workers need to be conducted to ensure the health of workers and local population.

Nature of impact: Indirect

Duration: Long term

Timing: construction / operation phase

Reversibility: reversible

Likelihood: moderate

Consequences: low to moderate, it may cause disturbance or spread of disease in the area if mitigation measure will not followed

Impact significance: significant

8.8.9 Safety:

Project activities could become a hazard as it is located in populated area local people, especially children, are likely to gather around to watch the activity. The other safety issue is that of traffic, especially along access roads close to settlements. To reduce the hazards, the following mitigation measures will be implemented:

- Local people will be informed in advance when work is about to start in an area.
- This may result in people keeping young children away from work areas.
- Machinery will never be left unattended.
- Safe driving practices will be adopted, particularly while passing through settlements.

Nature of impact: Direct

Duration: long term

Timing: construction / operation phase

Reversibility: irreversible

Likelihood: moderate to high

Consequences: moderate if all safety measure will be taken care

Impact significance: Significant

8.9 Environmental standards

8.9.1 Topography:

The project will not change the topography of the area as proponent committed to sustainable development of the proposed project. The infrastructure of the area will be maintained after the construction activities.

8.9.2 Residual Impact:

The residual impact of project activities on the topography of the area is expected to be insignificant.

The residual effects are summarized below:

Nature of impact: direct

Timing: construction Phase

Duration: during construction activities

Likelihood: Nil

Consequences: no change

Impact significance: Not significant

8.9.3 Mitigation measures:

The project design should include measures to maintain the project landscape that matched the pre project natural green features achievable through extensive plantation. Project activities must be executed in a way it will not harm naturally available resources.

8.9.4 Land Acquisition Resettlement:

One of the major impacts includes acquisition of land from the land owners and the resulting displacement of their families and disturbances in the livelihood of the affected persons (AP) in the

project area. But present project land is ownership of Government and do not involve any type of land acquisition and resettlement activity.

8.9.5 Residual Impact:

The residual impact of project activities for the land acquisition & resettlement of the area is expected to be insignificant.

The residual effects are summarized below:

Nature of impact: direct

Timing: Planning stage

Duration: not applicable

Likelihood: Nil

Consequences: no change

Impact significance: Not significant

Mitigation measures:

If any resettlement involve, proponent must consult the affected persons and incorporate their interests and demands.

8.9.6 Changes in Land Use:

Project site is free of any activity and currently the land is not in any use. Project is expected to increase land use value particularly near the main road creating easy economic and employment opportunities for locals.

8.9.7 Residual Impact:

The residual impact of project activities on land use of the area is expected to be insignificant.

The residual effects are summarized below:

Nature of impact: direct

Timing: construction phase

Duration: not applicable

Likelihood: Nil as it is not involving any constructional activity that may cause change in land use

Consequences: no change

Impact significance: Not significant

Mitigation measures:

The impact of change in land use must incorporate in planning stage so that it may not cause any hindrance during the constructional phase.

8.9.8 Solid waste/ sludge management:

Proper solid waste management system is necessary for the prompt, timely and efficient disposal of solid waste & sludge for the reduction of its impacts. Impacts due to solid waste & sludge are expected to be temporary and minor in nature.

Nature of impact: Direct

Duration: Short term

Timing: operation/ construction

Reversibility: Not applicable

Likelihood: Low (unlikely) as mitigation measures will ensure that Solid waste management will be efficient

Consequences: Mild, as it will be removed from site within few hours

Impact significance: Low, based upon low likelihood and mild to moderate consequence.

Mitigation measures:

- Planning of solid waste disposal sites with reasonable distance from the human settlements
- A minimum distance of 1 km should be maintained between the solid waste disposal site and nearest human settlement
- Devise plan & develop guidelines for the safe handling, storage & disposal
- Sludge must not be placed at the site after cleaning of wastewater treatment tank
- PPEs are strongly recommended for workers for the handling of sludge

Residual Impact:

After implementing the mitigation measures listed above, the residual impact of the solid waste/ sludge is expected to be insignificant.

8.9.9 Air Quality Potential Impact:

Air emissions from project-related activities are likely to include:

- Dust raised on dirt tracks by project-related vehicles.

- Combustion products (nitrogen oxides, sulfur dioxide, particulate matter, carbon monoxide, and volatile organic compounds) from vehicles used for project-related activities

8.10 Assessment of Impact

8.10.1 Dust Emissions:

Dust emissions caused by vehicular traffic on dirt track are an important concern, primarily when such traffic passes near community settlements. Dust emissions cause the amount of particulate matter in the air to increase, and thus become a health concern. Dust clouds also reduce road visibility, creating a traffic hazard.

8.10.2 Gaseous Emissions:

Emissions produced by vehicles and equipment will be similar to those produced by generators in terms of the resulting pollutants (SO_2, NO_X, PM, etc.). However, the extent to which they are produced will be kept considerably lower, since much smaller engines are used in vehicles and construction machinery.

Nature of impact: Direct

Duration: long term

Timing: operation/ construction

Reversibility: irreversible

Likelihood: moderate as mitigation measures will ensure that air pollution remains within acceptable limits.

Consequences: moderate, as pollutant levels in the ambient air will be well within acceptable limits.

Impact significance: moderate, based upon low likelihood and mild to moderate consequence.

Mitigation Measures

None of the potential effects discussed above are expected to exceed acceptable limits.
The mitigation measures given below will further reduce their impact, and ensure that they remain within acceptable limits.

- All equipment and vehicles used during the project will be properly tuned and maintained in good working condition in order to minimize exhaust emissions.
- Vehicle speed will be reduced on track passing through or close to shops.
- Imposing speed limits and encouraging more efficient journey management will reduce the dust emissions produced by vehicular traffic. Water will be sprinkled where necessary to contain dust emissions.

- Management will make sure process is environmental friendly.

Residual Impact:

After implementing the mitigation measures listed above, the residual impact of the proposed activities on ambient air quality is expected to be low.

8.10.3 Noise level:

Noise may be a major concern during the construction/ operation phase. It can be generated from the machinery used for construction and operations. Generators and boilers are another source of noise pollution.

Nature of impact: Direct

Duration: long term

Timing: operation/ construction

Reversibility: Not applicable

Likelihood: moderate

Consequences: slightly significant, if above mentioned mitigation measure will be strictly followed

Impact significance: moderate, based upon low likelihood and mild to moderate consequence.

Mitigation measures:

- Keep the traffic load aligned and minimum during working hours of project
- Machinery and vehicles must be well tuned and maintained
- Impose the limits on unnecessary use of horns
- Safety signs must be displayed and public & drivers must be well aware of them
- Do not work in night time

Residual Impact:

After implementing the mitigation measures listed above, the residual impact of the noise level will be slightly significant.

8.10.4 Conclusion

Management of Refrigerator Assembling Unit has to achieve the following goals.

- Identification of regulatory requirements that apply to the project activities in the context of environmental protection.
- Identification of the environmental features of the project area and the likely impact of the project on the environment,

- Recommendation of appropriate mitigation measures that management will incorporate into the project implementation to minimize all adverse environmental impacts.
- Baseline environmental and socioeconomic information collection from a variety of sources, including field surveys.

The impacts of project in area will be insignificant, provided the generic mitigation measures proposed in this report are implemented.

After assessing the project activities and investigating the project area, it is concluded that, if the activities are undertaken in this report, and the recommended mitigation and environmental management measures are adopted, the project will not result in any long-term or significant impacts on the local community or the environment.

9 Chapter # 09

Mitigation and Impact Assessment

9.1 Purpose of Mitigation measures

9.1.1 What is the problem i.e. in terms of "major environmental impacts" which may arise by the subject project activity?

The major impacts which may arise by the subject project are air, water and noise pollution. Other impacts are of minor importance. These impacts may arise during operational phase of the project because the constructional phase of the project includes the construction of boundary walls, roads and offices, so they will not cause any major harmful impacts on the environment and during the operational phase of the subject project, as different industries will be installed in the Refrigerator Assembling Unit, they may cause the issues of air, water and noise pollution if proper precautionary measures to avoid this pollution will not be taken but it will be ensured that precautionary measures will be adopted prior to start the activity, during the activity and post activity to cause minimum impacts to the environment.

9.1.2 When the problem will occur and when it should be addressed?

Negative impacts may arise during the constructional and operational phase of the project if proper precautionary measures and procedures will not be followed. If proper precautionary measures and procedures will be implemented, there will not be any major problem. If any impact would arise due to the subject project activity, it will be addressed on site. Trainings will be conducted on site prior to start work while other precautionary measures will also be adopted to make the project safe and environmental friendly.

9.1.3 Where and how the problem should be addressed?

The problem should be address at the site and immediate response should be provided to address the problem which may arise. Institutional capacity responsible for the implementation of EMMP will be responsible for addressing such problems if arise. Details of persons involved in this process are provided in detail in section 5.1 of this report. They will assess any impact that could be arisen during both phases and they would also be responsible to address the problem and to mitigate it.

9.2 Whys of achieving mitigation measures

9.2.1 Changing in planning and design:

By adopting proper mitigation measures, any anticipated major or minor environmental impacts could be controlled or mitigated. The details of impacts and mitigation measures have been discussed in previous chapters.

9.2.2 Compensation in money terms:

Site proposed for the subject project is the property of the Government and free of any activity. As the site is the property of the government and vacant that's why there is no need of money in terms of land cost or any other mean. However, rehabilitation will be done in the vicinity of the project site to restore the beauty of the area.

9.2.3 Replacement, relocation and rehabilitation:

Subject project site is the property of the government, there is no need of replacement or relocation of a single person or economic activity. Management of M/S DWP Engineering Industries Private Limited will develop Restoration/ reclamation or tree plantation plan to restore the project area after the construction phase of the project. Maximum Plantation will be done with native species within and outside the premises of the Refrigerator Assembling Unit, along the boundary wall and road side if directed. Also, in-front of main area, horticulture plan will be formulated and area for this will be kept reserved.

9.3 ENVIRONMENTAL MANAGEMENT PLAN FOR M/S DWP Engineering Industries Private Limited (REFRIGERATOR ASSEMBLING UNIT)

Serial. No	Aspects	Impact & Mitigations to be taken			
		Impacts	**Mitigation measures** **Construction/Operation**	**Responsibility**	**Monitoring**
Land acquisition for the proposed project					
1	Land acquired for the subject proposed project	Nil	• The site proposed for the subject project is the property of OWNER.	Proponent	Environmental Consultant/ EPA Punjab
Land use & soil erosion					
2	Land Use & Soil	Particulate Matters (PM) pollution, Clearing of the vegetation Undulated patches. Scarring of the landscape and aesthetic beauty. Clearing of native plants will disturb the complexity of the ecosystem of the proposed area.	• Measures will be taken to avoid soil erosion and dust pollution. • Restoration and reclamation plan will be developed to restore the natural landscape of the area. • Plant nursery, garden will be developed to rehabilitate the native plants of the area. • Project proponent will make all possible efforts to limit the impact on flora and	HSE Department	Environmental Consultant/ EPA Punjab

		Dust emissions will be generated during the construction. Flue gases will be generated due to the involvement of generators and other machinery.	fauna.		
Ambient Air Quality					
3	Air Quality	• Particulate matter and fugitive dust emissions. • Dust emission due to vehicles on un-metaled roads. • Dust due to Construction. • Dust raised on dirty tracks by project-related vehicles. • Dust emission during earthwork • Gaseous emissions from the vehicles • Air pollution due to site visiting vehicles/ transporting trucks, hauled trucks, machinery & generator (if any)	• Sprinkling of water is recommended on dusty roads and unpaved tracks to control the generation of dust and PM. • Water the construction site periodically to minimize fugitive dust generation while laying foundation. • Store all earthwork and construction materials in a manner to minimize generation of dust and spillage on roads. • During excavation works drop heights will be minimized to control the fall of materials reducing dust escape: Temporary cover may be provided for earthwork if necessary. • Vehicle emissions inspection should be done on regular basis. • Sprinkling should be done on the unpaved area to avoid dust pollution/ particulate matter.	HSE Department	Environmental Consultant/EPA Punjab

			• Vehicles/ trucks should be serviced regularly. • All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke. • Monthly monitoring is recommended by EPA certified labs to check the compliance with NEQS as per EPA NEQS Rules 2001.		
Noise & Vibration					
4	Noise	The major sources of the noise at site are project related machinery. High noise level cause hearing loss, deafness, high blood pressure, headache, depression and mental disturbance. Noise level will not exceed 75 dB (A) at the distance of 2 km radius, project site is located at a safe distance from the nearest human settlements. Noise from construction activities from site	• Personal Protective Equipment PPEs including Ear muffs, Ear plugs and other noise abating equipment will be provided to the workers and other staff of the subject project. • Proper maintenance and tuning of the vehicles should be done. • Sound proof room should be built for generator (if any) to control the noise. • A speed restriction of 40 km/h will be imposed on all construction vehicles. • Monthly monitoring is recommended by EPA certified lab to check the compliance with NEQS as per EPA NEQS Rules 2001.	HSE department	Environmental Consultant/ EPA Punjab

		preparation, earth works, foundation and plant equipment installation.			
Soil Contamination					
5	Soil contamination	Contamination of soil due to oil and other chemicals leakage or spillage Soil contamination due to waste water generated from the project activities	• SOPs will be developed for the storage of oil and other chemicals handling and transportations. • Soil contamination must be controlled by adopting mitigation measures such as storage of oil, fuels etc. under paved area, by maintaining leakage record of construction vehicles, and by regular inspection (admitted by proponent). • Waste water treatment facilities should be installed during construction and operational phases of the project to treat the wastewater. • Water from the treatment facility must not be injected into the sub soil. • Tarpaulin sheets should be placed under generators and other leaching substances • Treated water will be used for plantation. • Proper storage of oil, fuel etc. is recommended under paved area.	HSE Department	Environmental Consultant/ EPA Punjab
Health and safety					

6	Health and safety	Health & safety issues of workers and nearby community	• Trainings of the workers is recommended for health & safety, first aid and firefighting. • Proponent must provide First aid facilities to workers in case of any injury or accident. • Safe drinking water must be provided to workers, staff, and poor people of the area. • Water consumption records should be maintained. • Provision of Proper PPEs must be ensured at workplace. • Assembly point and exit points must be available at workplace. • Electric wires, D.Bs must be kept covered & closed to avoid any electric hazards. • Smoking or any drugs should be prohibited during working hours or performing work. • Safety signs & boards will be placed at the time of construction activity. • Security guards will be appointed at the construction site. • At the time of construction and earthwork, fencing will be ensured for the area under the exploration. Further proper housekeeping and safety	HSE Department	Environmental Consultant/ EPA

			arrangements must be ensured at the subject project.		
Waste Water					
7	Waste water	Minor generation of waste water from construction activity. Water Contamination due to improper storage of construction material, Water contamination due to improper debris disposal, Waste water pollution, Spread of diseases, underground water contamination	• Waste water generated from the constructional activity will be used as sprinkling on the dusty tracks or for restoration of the land. • Waste water monitoring is recommended on monthly basis. • After the treatment in wastewater treatment facility, water will be disposed off in the wastewater drain present at the project site.	HSE department	Environmental Consultant
Solid waste generation					
8	Solid Waste Generation	Land & soil contamination, aesthetic degradation, foul smell etc. Solid waste generation from the construction activity, domestic and project process sources	• A solid waste management division will be formulated to deal with the proper disposal of solid waste, supervised by HSE Manager, SW Manager, and other related personnel. • Constructional waste must be utilized for road filling or maintenance purposes. • Recycling of material should also be	HSE Department	Environmental Consultant/ EPA Punjab

			implemented up to possible extent. • Existing Project related solid waste should be handed over to contractors. • Sludge from the septic tank must be replaced on regular basis. • It is recommended to ensure Proper housekeeping. • It is recommended to adopt proper waste management system. • Industrial ecology practice will be adopted wherever applicable and possible. • 7 R's of sustainability is recommended.		
Odor					
9	Odor	There will be no source of odor from the both construction and operation of the project	Nil	NA	
Energy requirement					
10	Energy requirement	Resource depletion	• Do not waste the energy/electricity when there is no need of it. • Use energy efficient machinery and equipment • Use energy saving products • Conduct and maintain records	HSE Department	Environmental Consultant/ EPA Punjab

			for energy audits • Do not leave the machinery in running form when there is no working being done • Machinery must never be left unattended • It is recommended to save and conserve the energy and adopt energy efficient technologies during the construction phase		
Socio economic impacts					
11a	Resettlement	Resettlement issues	• The proposed area under the investigation is devoid-off any human settlement and it is the property of the government.	NA	NA
11b	Language	Change in cultural language	• Maximum employment of Local people is recommended to preserve the local cultural language. • It will help in communication with the local people to resolve any emerging issue near the project area	Proponent	NA
11c	Education	Change in social behavior and economic gains	• School and colleges exist in the area. The project proponent will initiate an educational awareness program with the coordinator of the local people.	Proponent	NGO survey

11d	Health	Social performance of the individuals in the area	• The project proponent will assist the local impacted community for the improvement of health services • Health clinic must be established for the project workers.	Proponent	Proponent
11e	Culture and norms of the area	Change in culture by the influx of nomadic people	• Maximum local employment should be ensured to preserve the culture of the area	Proponent	NGO survey/Environmental Consultant
11f	Women empowerment	Gender inequality	• Women involvement in decision making process should be ensured • Equal employment opportunity in suitable department of the proposed project should be ensured	Proponent	NGO survey/ Environmental Consultant
11g	Sewage and waste disposal	Diseases caused by improper sanitation	• Subject project will uplift the economic status of the nearest human settlements. • Awareness program will be initiated regarding the disposal of waste.	Proponent/ local NGO	NGO survey/ Environmental Consultant

10 CHAPTER # 10

Conclusion and Recommendations

Based on the study conducted for Environmental Impact Assessment (EIA) report for the subject project, the following conclusions are made:

10.1 Conclusion

The EIA study reveals that the project is economically viable and socially acceptable and the proponent will implement the project in the environment friendly manner. He will adopt all the necessary measures to control any impact if resulting from the project. He will provide the safe drinking water, safe working environment, proper training and first aid facility to all workers and staff. The project will generate additional jobs during construction and operation phases.

10.2 Recommendations

- In view of the comprehensive screening process and findings of the present study there is no need of conducting further investigations.
- Tree plantation inside and near the project area is recommended.
- Any seepage and leakage will be controlled through proper mitigation measures.
- Sound proof room should be constructed for generator to control its sound.
- Use of narcotics and smoking must be prohibited during working, filling or handling of fuel.
- PPEs must be provided to workers such as gloves, masks, etc.
- Proper solid waste management system must be adopted.
- Safety signs, safety board's etc. must be placed on site during various developmental stages.
- Machinery will never be left in running condition.
- First Aid measures, health & safety Equipment (PPEs) will be provided to workers.
- Fire Fighting station & system will be installed.
- The management of subject project will assist the local communities as a corporate social responsibility.
- Jobs and employment will be provided to the local area.

The present EIA report is enough to meet the administrative and legal framework. After the complete study of the project, it is concluded that project will not have significant adverse impacts on the nearby community and on environment. Overall the project will have positive impacts on the local population and country as a whole. Therefore, it is requested for the environmental approval for the subject project.