ENVIRONMENTAL AND SOCIAL CONSIDERATION SURVEY

INTEGRATED SOLID WASTE MANAGEMENT MASTER PLAN FOR GUJRANWALA

Contents

List of Tables

List of Figures

1. Introduction

1.1 Background

The Environmental and Social Consideration (E&S) Survey was undertaken for "Integrated Solid Waste Management Master Plan for Gujranwala". The project is being carried out by the JICA Project Team in collaboration with the Urban Unit, Planning & Development Department Government of the Punjab. The Project will be carried out by incorporating the techniques of Strategic Environmental Assessment (SEA).

1.2 Project Area.

Gujranwala also known as the "City of Wrestlers" is an industrial city in the province of Punjab. It is the fourth-most-populous Pakistani metropolitan areas and is one of the fastest-growing cities in the world. Gujranwala is 226 metres (744 ft) above sea level. It shares borders with Ghakhar Mandi, Alipur Chatha, Kamonke and several small towns and villages.

After Punjab Local Government Ordinance (2001), the structure of local government has changed. Previously, the city Government comprised of City Districts, Towns/Tehsils and Union Council's Administration. Gujranwala has now been declared as City District Government Gujranwala. There are 192 union councils, governed by seven (7) Town Municipal Administrations (TMAs), which are working under City District Government (CDGs) Gujranwala cantonment is separately governed by the Cantonment Board and is responsible for providing the basic facilities to the residents of the cantonment area.

The City District Government Gujranwala has divided city into four main towns. Figure 1 shows the town wise classification of Gujranwala City. These four towns have been listed below

- Nandi Pur Town
- Khiali Shah Pur Town
- Aroop Town
- Qila Dedar Singh

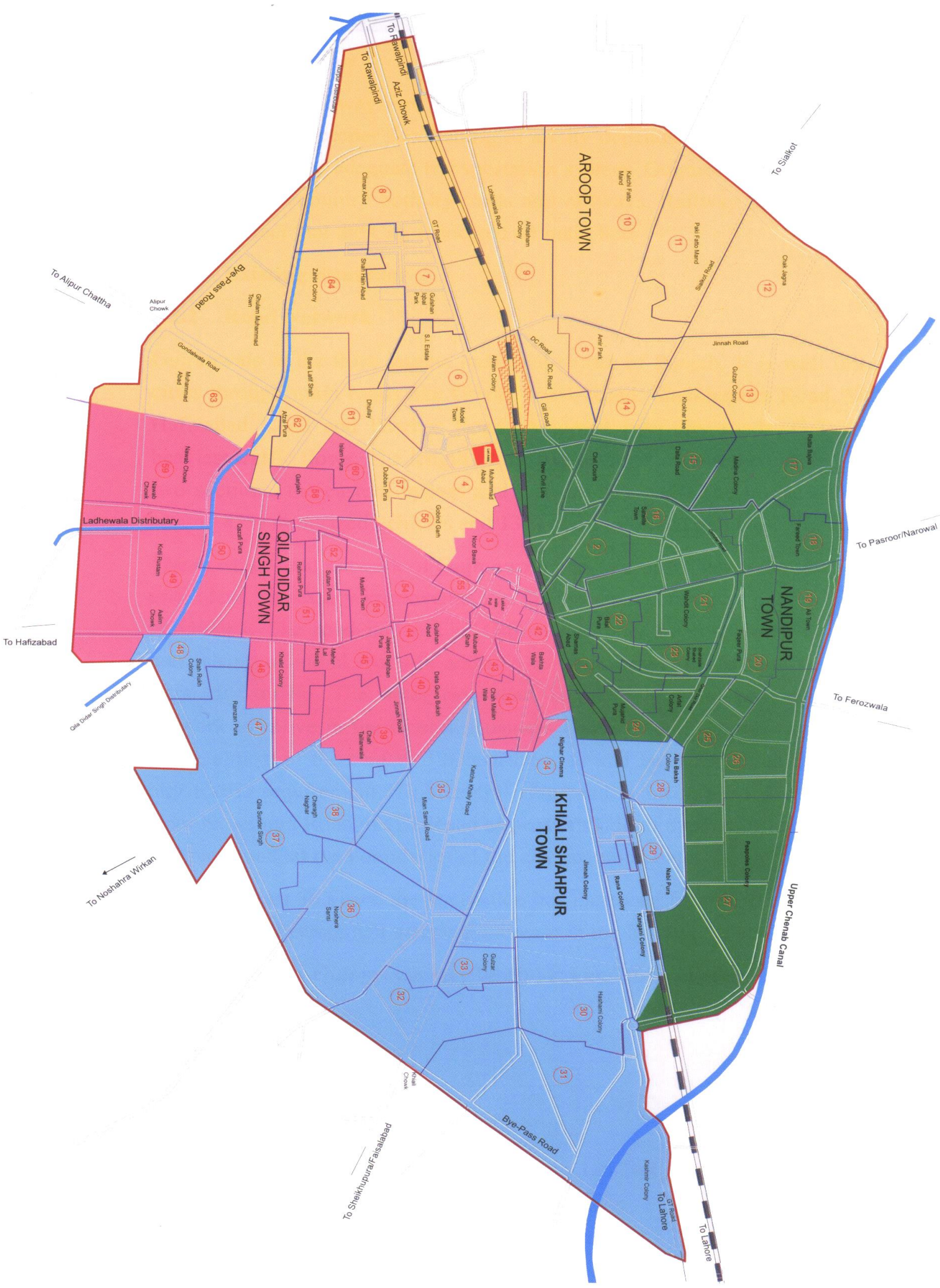


Figure 1: Town Wise Classification of Gujranwala City

1.2.1 Selected Sites

The client has identified and selected following six sites for project survey and baseline data collection.

- Chianwali closed landfill site
- Gondlanwala existing landfill site
- 2 sites for fresh food markets
- 2 sites for transfer stations

1.3 Objective of the Assignment

The purpose of this Environmental and Social Consideration Survey is to carry out the surveys, collect baseline data & information and analyze the impacts on environmental and social aspects for the alternative facilities or systems to be studied in the course of formulation of the Integrated Solid Waste Management Master Plan for Gujranwala. The project is also evaluated in accordance with the requirements of Category B projects described in "Guidelines for Social and Environmental Considerations (April 2010)" issued by JICA.

1.4 Study Methodology

In order to meet the study objectives, the following methodology will be used to evaluate the impact of master plan for solid waste management of Gujranwala city.

1.4.1 Desk Study

The first step in the preparation of report was to gather information of related studies, reports of the project area. The project team then reviewed and extracted relevant information required for the preparation of report. Based on the information available, the gaps were identified. In order to plug these gaps, field survey was carried.

1.4.2 Site Surveys

The project team visited the identified sites for primary data collection. The site survey comprised of two sets of information;

- *Baseline data collection*: Collection of baseline data and information to clarify the present status and future plan for at least in the area within 1km from the boundary line of the Sites.

- *Interview Survey:* The interview was conducted with residents in the neighboring area of the identified sites. The objective of the survey was to collect residents' opinion for the candidate sites for the solid waste management facilities and their awareness of solid waste management services.

1.5 Structure of the Report

The report has been prepared under the following chapters;

Executive summary: This chapter presents a summary of the significant findings and recommended actions, with an emphasis on expected impacts.

Chapter 1: **Introduction:** This chapter gives description of background, project area, objectives of the assignment, study methodology and structure of the report.

Chapter 2: **Legal and Regulatory Framework:** This chapter outlines the overview of legislative framework, regulatory, international guidelines and conventions relevant to this project.

Chapter 3: **Environmental Consideration:** This chapter gives description of the environmental settings of the project sites and surrounding areas, e.g. climatic conditions, soil and ground conditions, topographic and geotechnical conditions, biodiversity, landscape, sensitive/ protected areas and status of achievement of environmental quality standards.

Chapter 4: **Social and Cultural Conditions:** This chapter gives description of social and cultural conditions of the project sites e.g. population estimations, economic activities, land use, water resource utilization, traffic conditions, resettlement assessment and Public utilities.

Chapter 5: **Stakeholder and Public consultations:** This chapter gives description of findings of stakeholders and public consultations related to the project sites.

Chapter 6: **Environmental Assessment:** This chapter gives description of environmental assessment of the project area related to air quality, water quality, hydrology, geology, noise and vibration and offensive odor level.

Chapter 7: **Environmental & Social Assessment for Alternative Facilities:** This chapter describes environmental checklist of Category B project described in the latest "Guideline for of JICA on Social and Environmental Considerations (April 2010)" issued by JICA.

2 Legal and Regulatory Framework

The Government of Pakistan enacted the Pakistan Environmental Protection Act (PEPA) in 1997 which is the most recent and updated legislation on environment. It provides a framework for establishing federal and provincial Environmental Protection Agencies (EPAs), and suggestions for protection and conservation of species, habitat and biodiversity, and conservation of renewable resources. Pakistan Environmental Protection Agency (Pak-EPA) has a number of laws related to solid waste management since 1997 (i.e., the year of formation of Pak-EPA). These include national environmental policy, legislation and guidelines; as well as international conventions and guidelines. After passage of 18th amendment by the parliament, the provinces are in the process of enacting their own environmental laws. But till the time the provincial environmental act comes into force, PEPA 1997 is applicable. Punjab Environmental Protection Agency (PEPA) has developed its provincial environmental act in line with PEPA 1997.

2.1 National Laws and Regulations

National laws, regulations and guidelines related to environmental and social consideration is summarized below the below table 1;

Table 1: National Laws and Regulations

Laws	Contents
National Conservation Strategy, 2000	Prior to the approval of the National Environmental Policy (NEP), the National Conservation Strategy (NCS) was considered to be the Government's primary policy document on national environmental issues. The NCS identifies 14 core areas including conservation of biodiversity; pollution prevention and abatement; soil and water conservation; and preservation of cultural heritage, and recommends immediate attention to these in order to preserve the country's environment.
Biodiversity Action Plan, 1992	Pakistan has ratified on 5th June 1992 to the Convention on Biological Diversity, and is thereby obligated to develop a National Strategy for the Conservation and management of Biodiversity in the country. The Government of Pakistan has constituted a Biodiversity Working Group under the auspices of the Ministry of Environment to develop a Biodiversity Action Plan for the country.

National Environmental Policy, 2005	The National Environment Policy (NEP) aims to protect, conserve and restore Pakistan's environment in order to improve the quality of life of the citizens through sustainable development. In NEP, the further sectorial guidelines, Energy Efficiency and Renewable directly related to building energy code for newly constructed buildings were introduced.
National Climate Change Policy, 2012	The convention aims at stabilizing the concentration of greenhouse gases in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. To achieve the objective of the convention, all signatories are generally required to develop national inventories of emission; formulate and implement national and regional programs of mitigation measures; all developed countries and the EC were specifically obliged to take measures to limit greenhouse gas emissions by the year 2000 at 1990 levels.
Pakistan Environmental Protection Act, 1997	The Pakistan Environmental Protection Act, 1997 (the Act) is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The Act is applicable to a broad range of issues and extends to air, water, soil, marine and noise pollution, as well as the import and handling of hazardous waste.
Pakistan Environmental Assessment Procedure, 1997	The Pak EPA prepared the Pakistan Environmental Assessment Procedures with the help of Canadian International Development Agency in 1997. The guidelines pertaining to the review process of EIA have been recently given regulatory status in the Review of IEE and EIA Regulations 2000.
Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations, 2000	These regulations define the applicability and procedures for preparation, submission and review of IEEs and EIAs. These Regulations also give legal status to the Pakistan Environmental Assessment Procedures prepared by the Federal EPA in 1997. Under the schedule II of 2000 Regulations, a list of possible projects has been provided that will require an EIA
National Environmental Quality Standards (NEQS), 2000	The National Environmental Quality Standards (NEQS), 2000 specify the following standards for maximum allowable concentration of municipal and liquid industrial effluents, gaseous emissions from industrial

	sources, gaseous emissions from vehicle exhaust and noise emission from vehicles, noise levels from vehicles.
Antiquity Act, 1975	The Antiquities Act of 1975 ensures the protection of cultural resources in Pakistan. The act is designed to protect antiquities from destruction, theft, negligence, unlawful excavation, trade and export. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc.
The Cutting of Trees (Prohibition Act), 1975	Section 3 of this Act states "No person shall, without the prior written approval of the local formation commander or an officer authorized by him in this behalf, cut fell or damage or cause to cut, fell or damage any tree.
The Protection of Trees and Bush wood Act, 1949	This Act prohibits cutting or chopping of trees and bush wood without permission of the Forest Department.
The Local Government Ordinance, 2001	A schedule 4 and 8 of this Ordinance pertains to environmental pollution. Under the Ordinance, the local councils are authorized to restrict projects causing pollution to air, water or land. They may also initiate Schemes for improving the environment.
Pakistan Penal Code, 1860	This outlines the penalties for violations concerning pollution of air, water bodies and land. Sections 272 and 273 of this Act deal with the adulteration of food or drink. Noise pollution has been covered in Section 268, which defines and recognizes noise as a public nuisance.
The Forest Act 1927	The act empowers the provincial forest departments to declare any forest area as reserved or protected.
Legislation on solid waste management	Presently, following legislations are dealing with solid waste management in Pakistan: • Section 11 of the Pakistan Environmental Protection Act prohibits discharge of waste in an amount or concentration that violates the NEQS of Pakistan. Presently, there is no specific NEQS for solid waste. • Hazardous Substances Rules of 1999.
Guidelines for Solid Waste Management	Pakistan Environmental Protection Agency has developed guidelines for Solid Waste Management in collaboration with JICA and UNDP. These guidelines

	describes present status of solid waste management in Pakistan and strategy for its improvement, solid waste management guidelines, solid waste management action plan, guidelines on solid waste disposal and landfill establishments, incineration guidelines and guidelines for treatment and disposal of hazardous waste.
Hospital Waste Management Rules, 2005	Every hospital shall be responsible for the proper management of the waste generated by it till its final disposal. The medial superintendent shall constitute a Waste Management Team, responsible for the preparation, monitoring, periodic review, revision or update of Waste Management Plan.
Provincial Sustainable Development Fund Rule, 2001, 2003	Management of the Fund established under section 9 of PEPA 1997 has been entrusted to a Board constituted under section 10, comprising of officers and non-official nominees of the Provincial Government. The Rules relate to functioning of the said Board, and remain unaffected. These Rules prescribe procedure for filing, appraisal and sanction of project proposals for utilization of financial assistance from the Fund. As action is to be taken by the Provincial EPAs/ government departments, no immediate amendment is required.
Pollution charge for Industry rules, 2001	Under the Pakistan Environmental Protection Act, 1997, the Provincial Sustainable Development Fund Board constituted under section 10 of the Act; the Director General under the Guidelines for determination of pollution Charge for Industry as contained in Schedule I; will classify an Inspection Team for Industrial Units for identifying the pollution charge payable under subsection (2) of section 11 of the Act. The pollution charge will be estimated as the number of pollution units per unit of production calculated in accordance with the procedure contained in Guidelines and Schedule IV.

2.2 Framework of Environment Institutions in Pakistan

At federal level, the Ministry of Environment had been the main government organisation responsible for the protection of environment and resource conservation.

It was headed by a federal minister. The Ministry had been working under policy guidance by the PEPC, and the Federal and Provincial EPAs formed under the PEPA 1997. The roles, responsibilities and authorities of PEPC and the EPA's are defined in the PEPA 1997.

After the approval of 18th Amendment by the Parliament, the Ministry of Environment has been devolved with effect from 30th June 2011. The status of various functions of national policy, plans, strategies and programmes have been reflected in Table below:

Table 2: Framework of Environmental Institutions in Pakistan

Functions, policy, plans, strategies and programmes	**Status *(as of Feb 2015)***
Environmental pollution, ecology, forestry, wildlife, biodiversity, climate change and desertification	Were assigned to Planning and Development (P&D) Division. But later, with the enactment of Ministry of National Disaster Management (NDM), transferred to new Ministry. At present NDM has been renamed as Ministry of Climate Change with same portfolio
Improvement in environmental conditions of air, water and land	Devolved
Incorporation of environmental concerns in development schemes and Energy conservation	Devolved
Coordination, monitoring and implementation of environmental agreements with other countries, International agencies and forums	Was assigned to Planning and Development Division. But later, with the enactment of Ministry of National Disaster Management (NDM), transferred to new Ministry. At present NDM has been renamed as Ministry of Climate Change with same portfolio
Pakistan Environmental Protection Agency (Federal EPA)	Was assigned to Capital P&D Division. But later, with the enactment of Ministry of National Disaster Management (NDM), transferred to new Ministry. At present NDM has been renamed as Ministry of Climate Change with same portfolio. The domain of Federal EPA has been limited to Federal Area.

Secretariat of Pakistan Environmental Protection Council established under the PEPA97 (XXXIV of 1997)	Was assigned to Inter Provincial Coordination (IPC) Division. But later, with the enactment of Ministry of National Disaster Management (NDM), transferred to new Ministry. At present NDM has been renamed as Ministry of Climate Change.
National Council for Conservation of Wildlife (NCCW)	Devolved, staff was transferred to P&D Division and later to Ministry of National Disaster Management. The NDM has been renamed as Ministry of Climate Change and staff of defunct NCCW is working in its Forestry Wing.
National Energy Conservation Center (ENERCON)	Assigned to Ministry of Water and Power
Zoological Survey Department (ZSD)	Was assigned to Ministry of Science and Technology. But later, with the enactment of Ministry of National Disaster Management (NDM), transferred to new Ministry. At present NDM has been renamed as Ministry of Climate Change with same portfolio
Forestry Wing of MoE	Staff transferred to P&D Division and later to Ministry of National Disaster Management (NDM). At present NDM has been renamed as Ministry of Climate Change with same portfolio

2.3 International Treaties and Guidelines

Pakistan is a signatory to various international treaties and conventions on the conservation of the environment and wildlife protection. The country is thus obliged to adhere to the commitments specified in these treaties.

Table 3: International Treaties and Guidelines

Laws	**Contents**

Climate Change Convention (Montreal, 1992)	The convention aims at stabilizing the concentration of greenhouse gases in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. To achieve the objective of the convention, all signatories are generally required to develop national inventories of emission; formulate and implement national and regional programs of mitigation measures; all developed countries and the EC were specifically obliged to take measures to limit greenhouse gas emissions by the year 2000 at 1990 levels.
The Convention on Biological Diversity	The Convention on Biological Diversity was adopted during the Earth Summit of 1992 at Rio de Janeiro. The Convention requires parties to develop national plans for the conservation and sustainable use of biodiversity, and to integrate these plans into national development programmes and policies. Parties are also required to identify components of biodiversity that are important for conservation, and to develop systems to monitor the use of such components with a view to promoting their sustainable use.
The Convention on Conservation of Migratory Species of Wild Animals, 1979	The Convention on the Conservation of Migratory Species of Wild Animals (CMS), 1979, requires countries to take action to avoid endangering migratory species. The term "migratory species" refers to the species of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries. The parties are also required to promote or co-operate with other countries in matters of research on migratory species.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	This convention came into effect on 3rd March 1973 in Washington. In all 130 countries are signatory to this convention with Pakistan signing the convention in 1976. The convention requires the signatories to impose strict regulation regarding trade of all species threatened with extinction or that may become so, in order not to endanger further their survival.
IUCN Red List (2000)	The red list is published by International Union for Conservation of Nature (IUCN) and includes those species that are under potential threat of extinction.

The Convention on Wetlands of International Importance, Ramsar 1971	Pakistan is a signatory to the said Convention. So far 19 sites in Pakistan have been declared as wetlands of International Importance or Ramsar Sites. None of them falls in the project area.
Millennium Development Goals (MDGs).	The role of the MGDs in ensuring environmental sustainability through reversal of current trends in environmental degradation in order to sustain and improve sanitation conditions.

3 Natural Conditions

3.1 Climatic Conditions

The climate of the district is hot and dry during summer and moderately cold in winter. The summer season starts in April and continues till September. June is the hottest month with maximum and minimum temperatures of 40°C and 27°C, respectively[1]. The winter season begins in November and lasts till March. January is the coldest month. The maximum and minimum temperatures during this month are 19°C and 5°C, respectively.

The monsoons set in July and continue till September. The eastern part of the district receives more rain. The average annual rainfall in the district is 888 mm.

3.2 Status of achievement of environmental quality standards

In Pakistan, cities are facing problems of urban congestion, deteriorating air and water quality and waste management while the rural areas are witnessing rapid deforestation, biodiversity and habitat loss, crop failure, desertification and land degradation[2]. The status of environmental conditions and achievement of environmental quality standards for the six sites specified by JICA team are presented in the JICA's environmental checklist 13.

3.3 Status of Soil and Ground

Lying in the heart of a canal irrigated fertile region of Punjab, Gujranwala is part of Rachna Doab sloping from north-east to south-west and crossed by Upper Chenab Canal from north to south in the eastern part. The area is plain with the ground surface sloping gently from NE to SW. The average reduced level above sea is approximately 743 feet. There is a level difference of around 5.5 meters from North-East corner to the South-West corner of the City[3].

[1] Pre-Investment Study District Gujranwala, 2009

[2] Pakistan Economic Survey 2011-12

[3] Peri-Urban Structure Plan of Gujranwala, 2010

The top surface comprises vegetative cover which is underlain by Lean Clay/Silt (Soft to firm), up to 1m depth, the material is underlain by Silty Sand (Medium Dense to Dense) up to a maximum investigated depth of 30 m depth below NSL. The soil is alluvial and fertile. It is a flat strip of land running roughly East to West[4].

3.4 Status of Topographic and Geotechnical Conditions

The project area is located in Punjab, topographically the project area used to be a fairly plain with the ground surface sloping gently from NE to SW. It is also a plain of Alluvial material and scattered rocks at deeper depth. The area is underlain by Pleistocene deposits to a depth of several thousand meters. The first 200 meters of these deposits consist of approximately 70% silty sand interspersed with limited clay layers. The strata are generally heterogeneous with little vertical or lateral continuity.

3.5 Ecology of the area

3.5.1 Flora

The entire Gujranwala District has no natural forests, mainly due to vast agricultural activities. However, according to an old provincial notification, the trees along canals, provincial highways and rural roads are the responsibility of the forest department, which fall in the category of reserved forests.

Along the canal segment of the project there is some significant plantation of trees – nearly all eucalypts, which have been cultivated by the Forestry and I&PD. Species in the area also include Sheesham (Dilbergia sisoo), Keekar (Acacia arabica), Peeloo (Salvadora persica), Bohar (Ficus religiosa), Gaz (Tamarix indica), Nim (Azadrichta indica), and Mesquite (Prosopis juliflora). Eucalypts and Mesquite are exotic species and mesquite has suppressed endemic species to a great extent. The endemic species of Peeloo and Bohar are reported to be endangered, as the forest department is not propagating the same, and similarly the wild berry (Zizyphus numularia) has almost become extinct.

Local farmers are practicing a small degree of farm-forestry in the project area to meet their fuel-wood and other day-to-day needs. The common species in such plantations are Poplar (Populus alba), Eucalyptus, Keekar (Acacia arabica), mulberry (Morus alba) and Jamun (Syzygium cumini).

[4] Pre-Investment Study District Gujranwala District,2009

Cropping Pattern

Ever since the irrigation canal system was developed, cotton, rice, sugarcane and wheat have been the main crops. During more recent times cropping patterns in the region have witnessed further major changes. Cotton had always been the major cash crop earning foreign exchange for the country. Due to some serious pest/viral attack, farmers have sustained major losses, and over the last decade, cotton cultivation has almost been replaced by maize. Currently, as many as three maize crops per annum are being cultivated.

Similarly, sugarcane cultivation has also displayed considerable decrease, mainly due to pest infection and delayed payments to the growers by the sugar industry. Maize has equally replaced the sugarcane crop. Also large areas of land vacated by cotton and sugarcane have also been brought under potato cultivation.

Because of hot and humid weather, Gujranwala District is also famous for its fruit production, which includes mango, guava, banana, oranges and water-melons.

3.5.2 Fauna

Because of extensive cultivations, high population and human activities, there is little wildlife in the project area. However, the local population as well as the Wildlife Department have reported some fauna. The following is a general wildlife profile of the area:

Mammals: Common mammals reported from the project area are wild-bore, hyaena (Hyaena striata), Red Indian foxes (Vulpes bengalensis), porcupines and jackals (Canis aureus). Until a few years ago the wolf (Canis palfies) was also found in riverine forests, but the species has almost become extinct due to loss of forests.

Birds: The commonly found birds of the area are hawk (Accipiter badius cenchroides), kite (Milvus migrans govinda), parrot (Paleornis torquata), partridge (Fvancolinus pondoceraianus mecrranesis) and common crow (Corvidae splendens). A large variety of waterfowls and migratory birds also visit the region because of wetlands associated with barrages along the river systems of the area.

Reptiles: Because of hot and humid climate of the region, some population of reptiles have also been reported from the project area. Reptilian and amphibian fauna is not well documented. However, local people have reported that snakes and lizards are common in the region.

Wild-bores are reported to be inflicting serious crop damages, mainly to sugarcane and potato crops. Some degree of illegal hunting, poaching and trapping has been reported from the project area.

Fish resources

It is reported by the Fisheries Department that the main fish species found in Canal are Gulfam (Cyprinus carpio), Rahoo (Lebeorohita sp) and Mohri (Crhinus miragata). It has also been stated that no methodical fish surveys have been conducted by the Department of fresh water streams and canals, in the recent past. Because of the construction of several barrages on the river network, migratory species like Khagga, Bam and Pamphlait have almost become extinct in Punjab waters and Soal and Shangri are considered to be highly endangered.

In the month of January the canal is closed down for annual repair, maintenance and de-silting purposes. In this period fishing contracts are awarded and the contractors take the fish before the canal dries out. In this way the entire fish population in the canal is destroyed annually.

Currently, the main concentration of the Fisheries Department is upon development of private fish farms. It has been reported that there are approximately 400 – 500 acres of such farms, which meet the growing demand for fish.

3.6 Landscape and Amenities for the People to Enjoy Natural Resources

The city of Gujranwala has many places assigned under the parks and public amenity places mainly including Khawaja Ground, Sagheer Shaheed Park, Muhannadi Park, Ladies Park, Model Town, D-Park Sheranwala Bagh, Janat Bibi Park and Milad – e – Mustafa Park. There city has got numerous significant archaeological/ cultural sites like Nishan -E-Manzil, Gulshan Park, Jinnah Stadium, Gold's Gym, Jinnah Park and Rail Bazaar etc. Because parks and social amenity areas are the public sharing spaces this makes them susceptible to environmental degradation.

4 Social and Cultural Conditions

4.1 Population

The population of the city was approximately 1.67 million in 2013[5].It is the fourth-most populous city of Pakistan having the status of a district with the following towns under its administration: Khiali Shahpur, Aroop, Nandipoor, Qila Didar Singh, Wazirabad, Kamoke and Nowshera Virkan. The city of Gujranwala is divided into 64 Union Councils. For the city's strategic location on both sides of the Grand Trunk Road (GT Road), economic activity has understandably been easier both in the form of industrialization and agricultural produce. On the industrial front the city manufactures ceramics, fans, electrical switchgears, engineering tools and textile products like sweaters, hosiery products etc. Major agricultural produce of Gujranwala includes: wheat, rice, sugarcane and melons.

According to the Punjab Development Statistics 2013[6], adult literacy rate (15+ years of age) is 56 in Punjab whereas it is 68 in Gujranwala. 1981 and 1998 housing censuses claimed that there were 306,000 and 449,000 household units respectively in Gujranwala district. According to the 1998 census, population of Gujranwala was 1,927,000 (table 208, pp. 286, Punjab Development Statistics) and the estimated population as on 30 June 2013 is 4,592,000 (table209, pp. 290). According to 1998 census, population density was 359 persons per square km at Punjab level whereas it was 993 in Gujranwala. The table below shows some social indicators of Gujranwala.

4.2 Economic Activities

Gujranwala is a vibrant economic city of Punjab with palpable contribution in agriculture and industrial sector.

According to a survey conducted by the State Bank of Pakistan (2008)[7] 65% of the farmers interviewed in Gujranwala District comprise subsistence farming. Gujranwala is one of the major wheat producers in the Punjab. The average yield of wheat in the district is 31.57 maunds per acre. In addition to wheat, Gujranwala district is largest producer of rice in Punjab province, the average yield of rice is 34.41 maunds of rice per

[5] http://www.bos.gop.pk/?q=system/files/Brus_2013.pdf

[6] http://www.bos.gop.pk/?q=system/files/Dev-2013.pdf

[7] http://www.sbp.org.pk/sbp_bsc/BSC/DFSD/AgriSurveyGujranwala.pdf

acre. According to the report, 80% of the respondents had buffaloes/cows or both to meet their domestic milk needs. It is relevant to mention that 46% farmers had no access to veterinary hospitals and only 19% had veterinary hospitals within a distance of 5 km. The report identifies that water shortage, non-dissemination of latest research, lack of capital and financial resources are the major issues.

When it comes to the industrial sector, Gujranwala is one of the important commercial and industrial nerve centres of Pakistan. According to the Federation of Pakistan Chambers of Commerce and Industry (FPCCI) in Gujranwala there are almost 15,000 units operating as cottage industries whereas 6000 units are working as small and medium scale industries. Quality ceramic products are also one of the most important sector in Gujranwala. The major products are: electric fans, domestic utensils/appliances, and various types of electrical/industrial machinery. Gujranwala is known for electronics, machinery and equipment, and textiles. [8] According to Statistical Pocket Book 2011 (Table 103)[9] as on 30 June 2010 there were 2548 registered factories in Gujranwala Division out of which 1056 were in Gujranwala. However, if we set the threshold those factories employing 100 or more workers, then there were 136 in Gujranwala division out of which 37 were in Gujranwala.

When it comes to the incentives and /or facilities for the industrialists it includes: Duddar Export processing zone located on the main Gujranwala-Lahore GT road. Punjab Small Industries Corporation (PSIC) and Export Processing Zone Authority (EPZA) jointly developed this zone worth Rs. 99.40 Million (US $1.71 Million). Furthermore, the city has dry port for the export of local product. The importance of road cannot be overemphasized when it comes to economic growth and it is worth mentioning that the district has metalled road-length of 1413KM.[10]

There are few reports that give us information about economic situation of Gujranwala. So we summarize key findings of these reports. An Agricultural Survey of Gujranwala to explore district's rural economy was conducted; the following were the key findings:

- Majority of farmers in Gujranwala District comprises subsistence farming as 65% farmers interviewed hold land up to 12.5 acres.
- Wheat and Rice are two major crops.
- All the respondent farmers have been using tractors for cultivation and land preparedness.
- 76% of the farmers interviewed had awareness about agricultural research and extension (R & E) and 56% were approached by R & E department and were informed about innovations and new techniques and technologies.

[8] Hussain et al. (2012), *The Lahore Journal of Economics*
[9] http://www.bos.gop.pk/?q=system/files/Statistical_poket_book_2012.pdf
[10] http://www.fpcci.com.pk/reports/Gujranwala%20Regional%20Profile.pdf

- 47% of the respondent farmers had bank accounts.

As fan industry is a major industry in Gujranwala so the conclusion of a report by SBP on this industry is summarized as below. The road to upgrading a cluster is independent innovation. The report classifies the fan industry as a hotspot but not a cluster. The study also finds absence of firm-firm linkages and/or absence of learning in the sector. Furthermore, lack of documentation is a hindrance in loan availability on one hand and on the other hand, there is also lack of willingness on the baking side to explore the banking sector. Study also recommends coordination among industry, academia and concerned institutions.

Table 4: Baseline Data on Social and Cultural Conditions from Secondary Sources

Indicators	Gujranwala district (2007-08) in %	Punjab (2007-08) in %
Literacy (Source: MICS 2007-2008)		
Literacy rate 10+ years	72	59
Adult Literacy rate 15+ years	68	56
Adult literacy rate 15-24 years	87	73
Net Primary School attendance rate		
Government Schools	34	56
Private Schools	56	43
Environment (Source: MICS 2007-2008)		
Physical access to drinking water (within dwelling)	99	92
Use of improved drinking water sources	99	97
Use of properly treated water	7.9	4.8
Safe drinking water without bacteria	46	51
Use of sanitary means of excreta disposal	95	70
Use of improved water sources and improved sanitation	95	68
Prevalence of Chronic Cough in adult	1	2
Reported Tuberculosis	0.4	0.3
Reported Hepatitis	0.7	0.7
Under-five mortality (per 1000 births)	95	111
Infant Mortality rate (per 1000 births)	67	77

Socio-Economic Development (Source: MICS 2007-2008)		
Unemployment rate (15+years)	7.6	6.8
Family members working outside village/town	11	12

Table 5: Traffic Condition (source: Transport Planning Unit Report 2013)

Name of Intersection	Total Traffic Volume (PCUs)	Total Passenger
Chan da Qila Chowk	81544	407720
Judicial Clolony Chowk	29700	148500
Wapda Town Chowk	68690	443450
Khiyalli Bypass Chowk	27222	1361010
Jinnah Rodian Chowk	35707	178535
Malhi/Nowshera Sansi Chowk	92624	463120
Nowshara Road/Awan Road	751	3755
Alam Chowk	58932	294660
Nawab Chowk	90565	452825
Alipur Chowk	49851	249255
Pindi Bypass Chowk	179081	895405
Sui Gas Chowk	68609	343045
MAifiwala Chowk	51270	256350
Sialkot Bypass Chowk	51067	255335
Chicharwali Pull Chowk	47626	238130
Ferozwala Chowk	60478	302390
Kanganiwala bypass chowk	65972	329860

When it comes to the traffic accidents, according to the data in Gujranwala district 31382 road accidents occurred from 10/10/2014 to 31/01/2015.

4.3 Land Use in the Vicinity of the Sites and Future Land Use Plan

Peri-Urban is an area that lies between developed urban and country side rural, though currently agricultural site but likely to be urban in the next 20 years. The study about Peri-Urban areas warrants that concentric pattern of development is tamed for better living conditions. Thus the strategy basically hinges on the proper land use of the entire area.

As per the supposed 'Peri-Urban Structure Plan of Gujranwala' is concerned, the boundary of the peri-urban area has been proposed looking at the directions and trend of the urban sprawl which covers the need for the next 20 years.

For the first time in 1971, an Outline Development Plan (ODP) for Gujranwala was prepared to guide and monitor its future growth that was updated in 1985 covering the time span from 1986 to 2010.

In the strategic plan 2007-2010 following recommendations were made

- Underpass below the railway line near Katchi Pumpwali.
- Shifting of Gawallas to proposed Gujjar Basti.
- Developments of four new industrial sites: two along GT Road (Lahore side), One along GT Road near Nigar Cinema and one along GT Road (Rawalpindi side).
- Shifting of the hide market and tanneries from thickly populated area of Ferozwala road.
- Need for a defined land use policy
- Enforcement of strict development control.

Following are the salient features of proposed peri-urban structure.

- To confine urban sprawl by marketing external boundary of the peri-urban area.
- To divide peri-urban areas into sectors and sectors were divided into blocks and the proposed various blocks were: (i) Residential land use, (ii) Commercial land use (iii) Industrial land use.
- Ring road to provide access to all arterial roads emerging from the centre of the city
- Roads along distributaries, drains and Upper Chenab canal.

In Gujranwala city, ground water is mostly used for drinking purpose. Ground water resources in Gujranwala are adequate and due to recharging of the trans-missive aquifer are sustainable. However, the shallow water table in the city is being depleted due to the massive use of individual pumps. WASA currently provides only 70 % - 80 % of the population with water[11].

The Surface water is mostly used for Irrigation through irrigation canals. There are six irrigation passing through the Gujranwala district that serves as a main conduit for irrigation water.

[11] Environmental Assessment Study of prime city Housing Scheme, Gujranwala

- Gajar Gola Distributary (7.2 km)
- Kot Sujana Minor (7.7 km)
- Shori Branch (7.8km)
- Muradian Distributary (8.5 km)
- Rakh Chhichra Minor (9 km)
- Chandhar Minor (10 km)

4.4 Site Specific Land Use

For the E&S Assessment of the sites specified for the project, a detailed survey was conducted covering area within 1km radius of each site. In the following figure all the sites are presented to indicate their comparative location and land use variation.

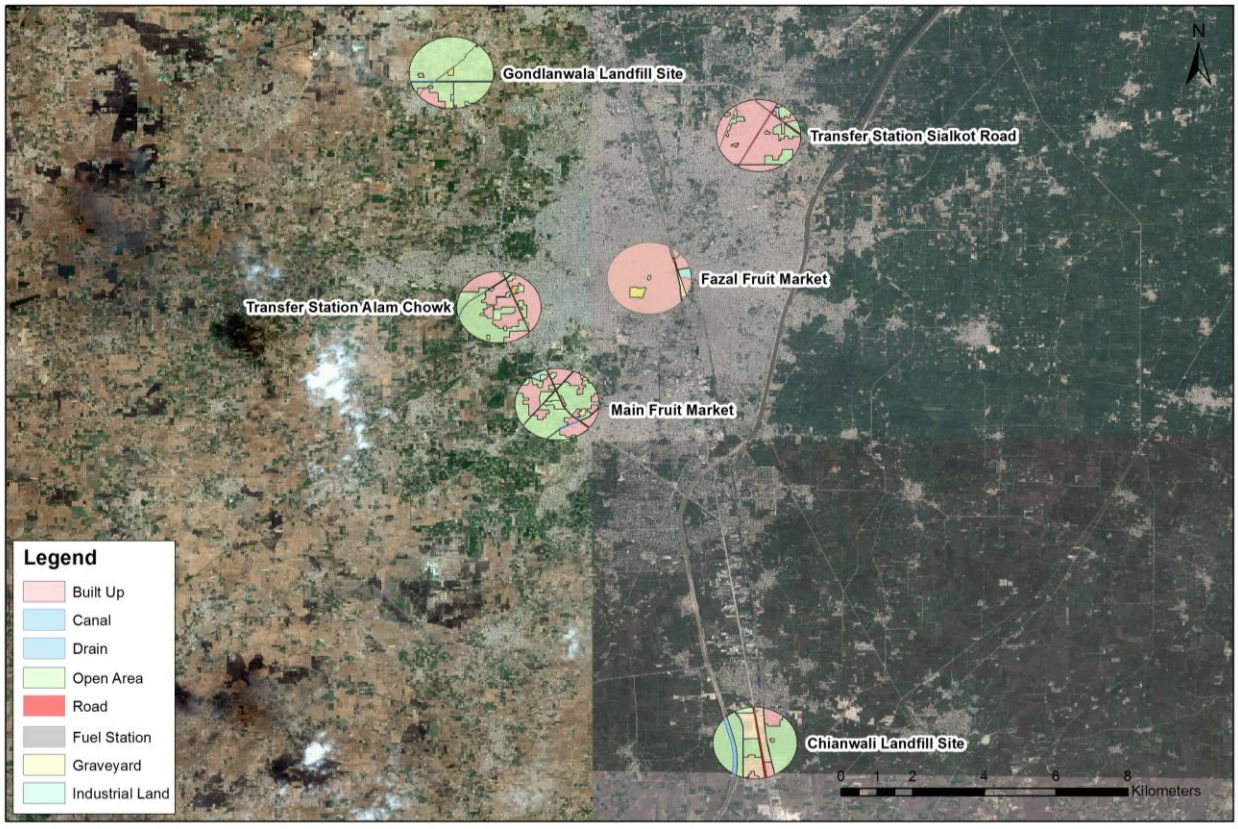


Figure 2: Land Use of Selected Sites

Table 6: Land use of Gondlanwala Dumpsite

CATEGORIES	COORDINATES	PICTURES
Mosque	32°10'29.2" N 74° 11'03.8"E	
Mosque	32°11'54.4" N 74° 7'46.0"E	

Institute	32°12'02.7" N 74° 7'42.4"E	
Mosque	32°12'00.40" N 74° 7'42.5"E	 

Institute	32°11'58.1" N 74° 7'38.5"E	
Petrol Pump	32°11'55.9" N 74° 7'40.24"E	

Mosque	32°12'06.8" N 74° 7'37.5"E	
Institute	32°12'05.7" N 74° 7'34.5"E	

Shop	32°12'6.05" N 74° 7'34.35"E	
Shop	32°12'5.80" N 74° 7'34.23"E	
Mosque	32°12'01.1" N 74° 7'31.8"E	

Civil Veterinary Dispensary	32°12'05.1" N 74° 7'25.9"E	

Mosque	32°12'06.6" N 74° 7'23.7"E	
Graveyard	32°12'06.1" N 74° 7'23.4"E	

Mosque	32°12'18.8" N 74° 7'34.3"E	
Industry	32°11'58.5" N 74° 8'02.4"E	
Mosque	32°11'52.33" N 74° 8'04.89"E	

Mosque + Poultry Farm	32°11'53.8" N 74° 8'12.9"E	

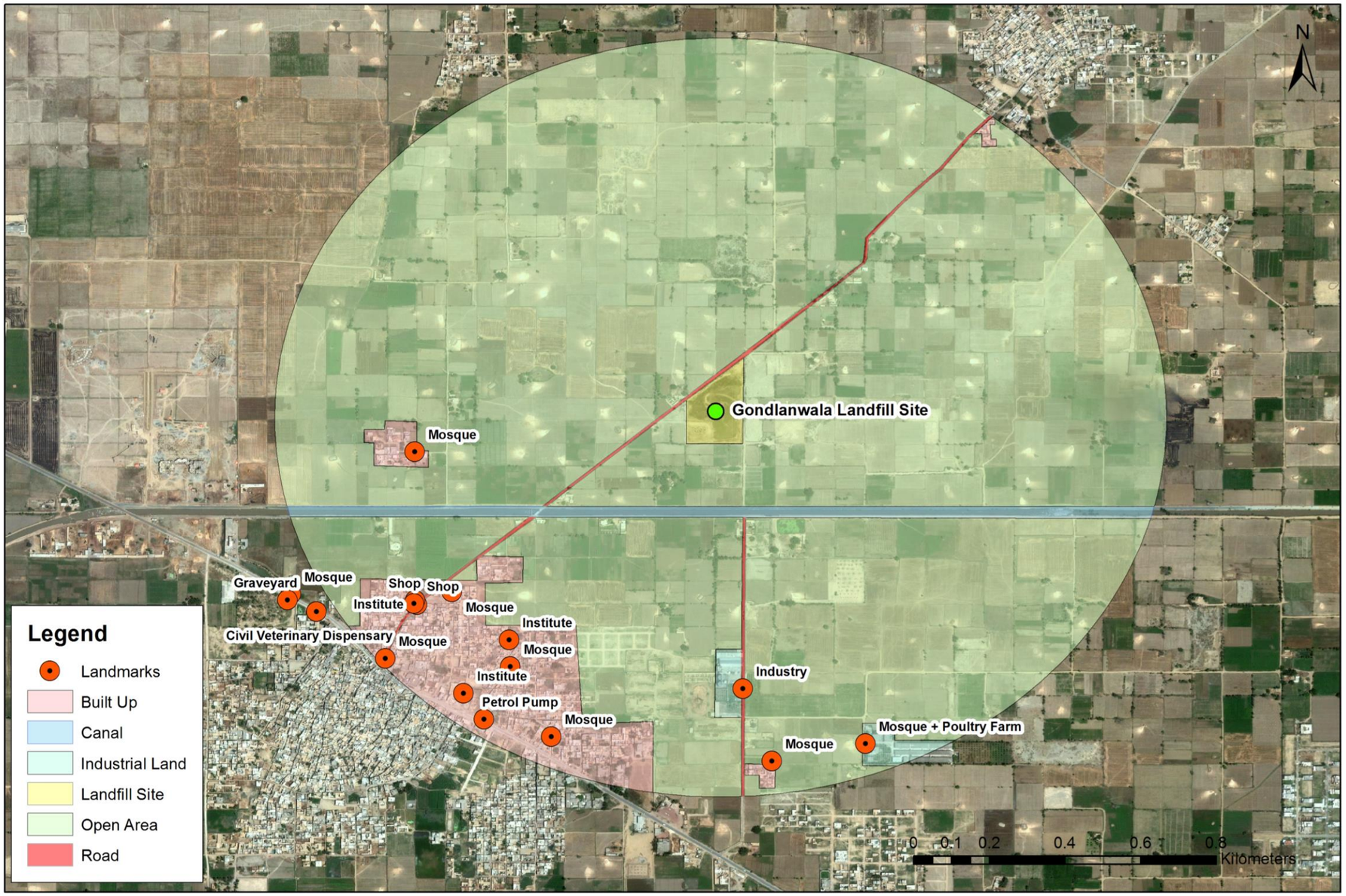


Figure 3: Land use Map of Gondlanwala Dumpsite

Table 7: Land use of Chianwali Dumpsite

LAND USE OF CHIANWALI DUMP POINT				
Sr.No.	CATEGORIES	COORDINATES		PICTURES
1	Factory	32° 2'17.10"N	74°12'40.40"E	
2	Factory	32° 2'11.00"N	74°12'41.80"E	
3	Factory	32° 2'18.20"N	74°12'50.00"E	
4	Factory	32° 2'4.80"N	74°12'42.70"E	
5	Graveyard	32° 1'57.92"N	74°12'44.10"E	

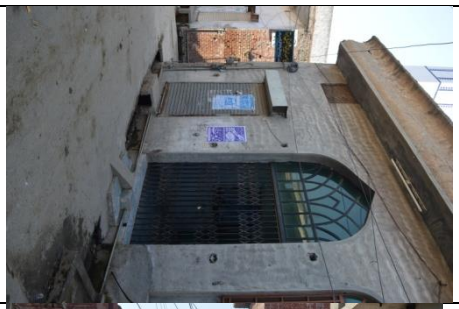
6	Shop	32° 1'47.26"N	74°12'45.46"E	
7	Shop	32° 1'45.68"N	74°12'46.13"E	
8	Shops/ Markets	32° 1'46.66"N	74°12'48.00"E	 
10	Mosque	32° 1'46.90"N	74°12'49.10"E	

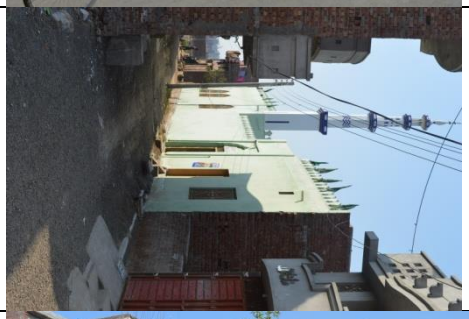
11	School	32° 1'52.70"N	74°12'47.10"E	
12	Shops	32° 1'52.64"N	74°12'46.90"E	
13	School	32° 1'46.30"N	74°12'53.80"E	
14	School	32° 1'44.10"N	74°12'57.00"E	
15	School	32° 1'44.11"N	74°12'57.75"E	

16	School	32° 1'40.00"N	32° 1'40.00"N	
17	School	32° 1'37.70"N	74°12'51.50"E	
18	Mosque	32° 1'37.12"N	74°12'47.61"E	
19	Factory	32° 1'29.80"N	74°12'46.70"E	 

20	Factory	32° 1'35.53"N	74°12'45.60"E	
21	Factory	32° 1'42.34"N	74°12'38.70"E	 
22	Factory	32° 1'48.68"N	74°12'40.01"E	
23	Factory	32° 1'58.07"N	74°12'31.13"E	

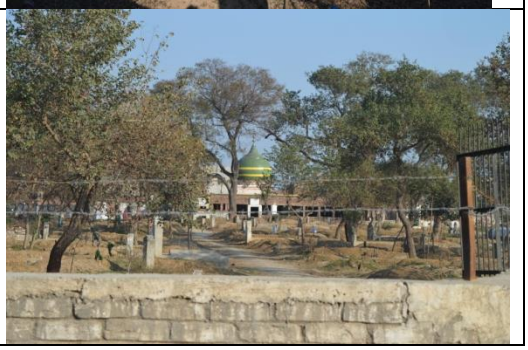
24	CNG Pump	32° 2'0.10"N	74°12'41.10"E	
25	Industry	32° 2'15.84"N	74°12'28.08"E	
26	GEPCO	32° 2'13.93"N	32° 2'13.93"N	
27	Graveyard	32° 1'44.24"N	74°12'27.30"E	
28	Mosque	32° 1'47.90"N	74°12'34.20"E	

29	School	32° 1'49.00"N	74°12'34.30"E	
30	School	32° 1'45.40"N	74°12'33.90"E	
31	Shop	32° 1'44.89"N	74°12'33.85"E	
32	Shop	32° 1'44.09"N	74°12'33.80"E	
33	Mosque	32° 1'42.10"N	74°12'35.30"E	
34	Shop/Market	32° 1'42.13"N	74°12'33.81"E	
35	School	32° 1'38.64"N	74°12'23.89"E	

36	Industry	32° 2'36.80"N	74°12'34.80"E	
37	Industry	32° 2'38.61"N	74°12'36.81"E	
38	Petrol Pump	32° 2'34.61"N	74°12'37.77"E	
39	Mosque	32° 2'42.10"N	74°12'45.20"E	
40	School	32° 2'44.20"N	74°12'47.10"E	

41	Mosque	32° 2'47.30"N	74°12'44.70"E	
42	School	32° 2'48.40"N	74°12'47.10"E	
43	School	32° 2'47.10"N	74°12'52.40"E	
44	Shops/Mini-Market	32° 2'47.75"N	74°12'52.56"E	
45	School	32° 2'48.10"N	74°12'52.42"E	

46	Shrine	32° 2'44.70"N	74°12'51.70"E	
47	School	32° 2'46.60"N	74°12'52.20"E	
48	School	32° 2'33.30"N	74°12'49.90"E	
49	Graveyard	32° 2'34.35"N	74°12'50.50"E	
50	Mosque	32° 2'41.50"N	74°12'56.60"E	

51	Mosque	32° 2'51.40"N	74°12'52.40"E	
52	Graveyard	32° 2'52.64"N	74°12'53.88"E	
53	Shrine	32° 2'53.77"N	74°12'56.95"E	

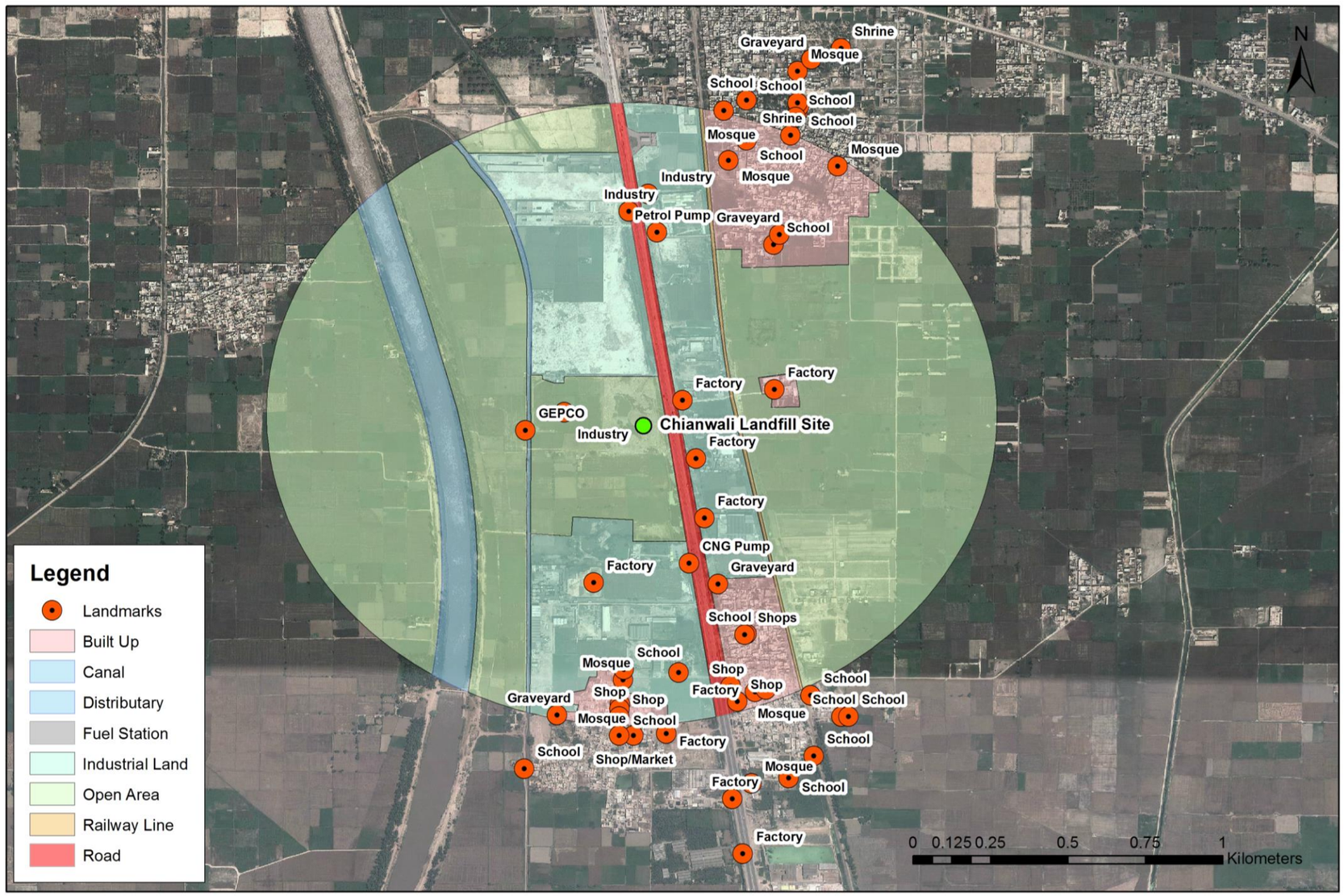
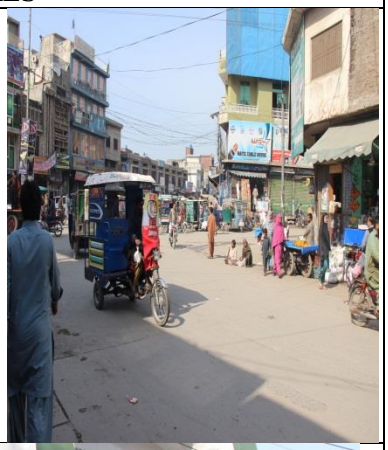


Figure 4: Land use Map of Chianwali Dumpsite

Table 8: :and use of Fazal Fruit Market

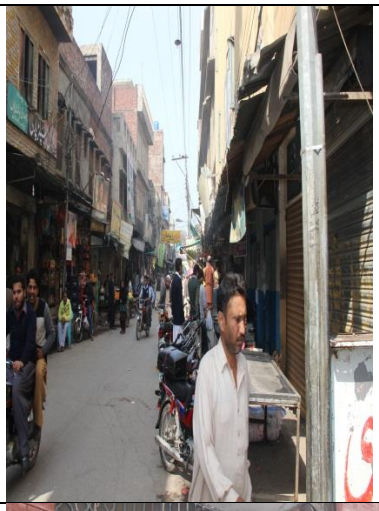
LAND USE OF FAZAL FRUIT MARKET		
CATEGORIES	COORDINATES	PICTURES
Gondlanwala Chowk	32°09'49.0" N 74° 11'14.9"E	 
Mosque	32°09'54.1" N 74° 11'03.8"E	
Small Market	32°09'52.0" N 74° 11'03.6"E	

Municipal Corporation Dispensary	32°09'45.6" N 74°11'02.0"E	
Scrap Market Metal	32°09'45.1" N 74°11'02.5"E	
Mosque + Market	32°09'41.5" N 74° 10'59.8"E	

Old Building	32°09'40.3" N 74°10'58.4"E	
Govt. MC Girls Elementary School	32°09'40.0" N 74°10'57.6"E	
Small Market	32°09'42.1" N 74°10'57.3"E	

Gharjakhe Darwaza Transfer station + Market	32°09'37.4" N 74°10'52.3"E	
Talent education School	32°09'35.5" N 74°10'50.6"E	
Masjid Noor+ Dispensary	32°09'36.3" N 74°10'47.7"E	 

The excellence Girls High School	32°09'37.5" N 74°10'47.9"E	
COMSATS Virtual Campus	32°09'39.0" N 74°10'47.1"E	
Taleem-e-Niswan Middle School	32°09'37.1" N 74°10'46.1"E	

Masjid + Market	32°09'34.3" N 74°10'43.9"E	 
Govt. MC Public School	32°09'32.3" N 74°10'44.7"E	
Govt. Dastkari School	32°09'31.3" N 74°10'43.1"E	

Allied School	32°09'28.8" N 74°10'42.0"E	
Masjid	32°09'28.6" N 74°10'39.6"E	
Factory	32°09'27.7" N 74°10'36.7"E	

Masjid	32°09'27.5" N 74°10'35.9"E	
Small Industries	32°09'27.3" N 74°10'26.9"E	
Small Industries	32°09'27.3" N 74°10'23.5"E	

Masjid	32°09'29.6" N 74°10'21.9"E	
Masjid	32°09'27.1" N 74°10'20.0"E	
Family Welfare Center	32°09'27.1" N 74°10'20.0"E	

Masjid	32°09'22.2" N 74°10'20.3"E	
Madrassa Ashraf ul Aloom	32°09'22.4" N 74°10'23.2"E	
Alqalam Science Academy	32°09'19.3" N 74°10'23.9"E	

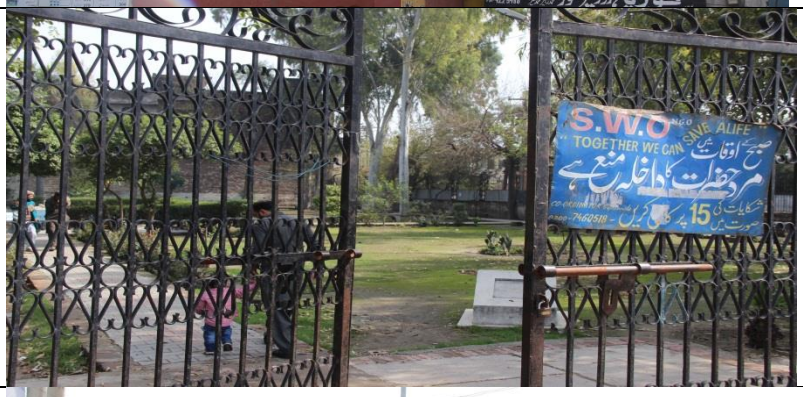
Al Huda welfare Foundation	32°09'19.1" N 74°10'24.8"E	
Masjid	32°09'17.9" N 74°10'25.9"E	
Modern Education System	32°09'19.4" N 74°10'26.4"E	

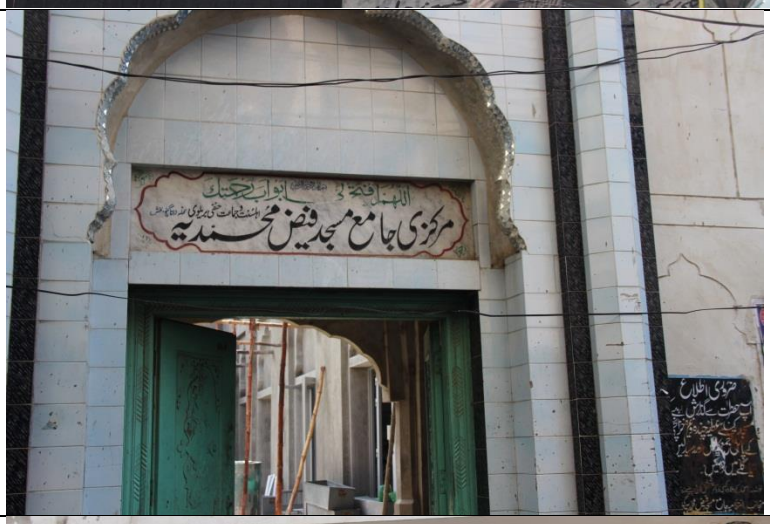
Madrassa Taleem ul Quran	32°09'19.6" N 74°10'27.1"E	
Govt. MC girls School	32°09'21.3" N 74°10'26.8"E	
Fatima Medical Complex	32°09'21.9" N 74°10'27.0"E	

Masjid	32°09'16.9" N 74°10'32.5"E	
The Right Academy	32°09'15.3" N 74°10'30.9"E	
Masjid	32°09'12.9" N 74°10'31.5"E	

School+ Clinic	32°09'12.8" N 74°10'30.2"E	
Mughal Material Industry	32°09'11.6" N 74°10'29.6"E	
Masjid	32°09'09.5" N 74°10'27.0"E	

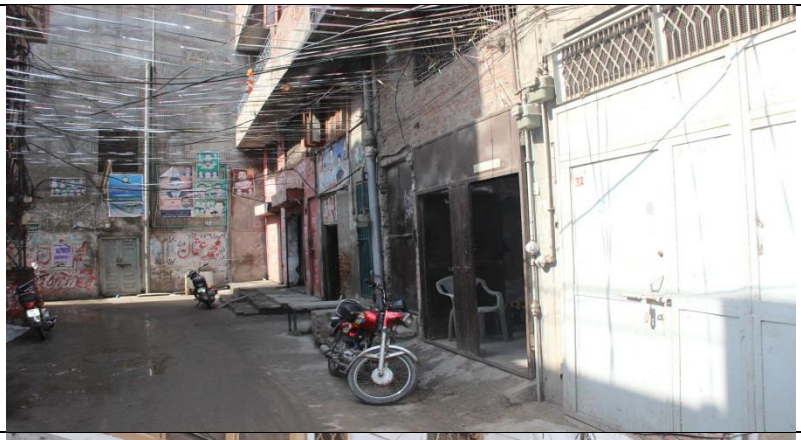
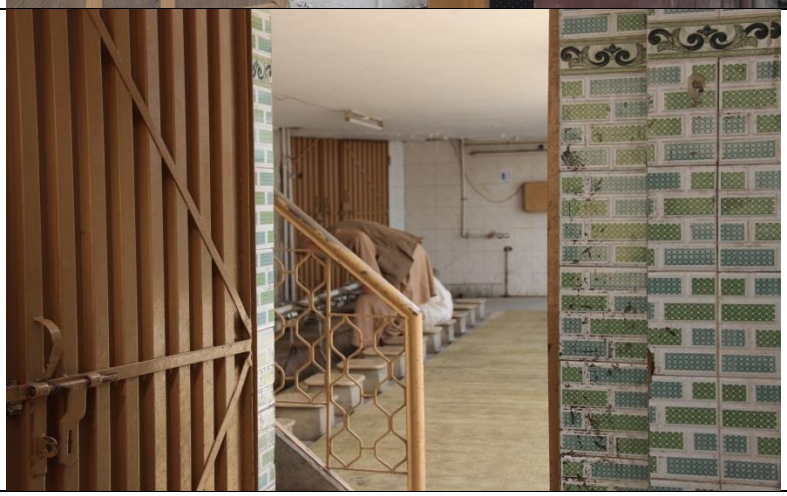
School	32°09'07.1" N 74°10'27.1"E	
Al rahee Hospital, Children blok	32°09'06.2" N 74°10'27.0"E	
Al rahee Hospital	32°09'05.3" N 74°10'24.9"E	

Small Industries	32°09'03.6" N 74°10'23.2"E	
School+ Masjid	32°09'01.8" N 74°10'23.7"E	
Sagheer park	32°09'01.8" N 74°10'23.7"E	
Govt. Girls degree college	32°09'01.1" N 74°10'30.5"E	

Govt Girls H/S School	32°09'01.1" N 74°10'34.9"E	
Masjid	32°09'00.8" N 74°10'35.4"E	
Usman English High School	32°09'04.3" N 74°10'37.3"E	

Masjid	32°09'09.8" N 74°10'40.7"E	
Govt. Health Center	32°09'09.4" N 74°10'42.6"E	
Masjid	32°09'09.1" N 74°10'45.5"E	

Graveyard	32°09'08.0" N 74°10'49.8"E	
Govt. High School	32°09'01.1" N 74°10'30.5"E	
Masjid	32°09'11.0" N 74°10'50.6"E	

Small Industry	32°09'13.0" N 74°10'52.4"E	
Hira School	32°09'11.7" N 74°10'54.2"E	
Masjid	32°09'11.4" N 74°10'58.9"E	

Small Industry	32°09'11.7" N 74°10'59.8"E	
The educator	32°09'12.0" N 74°11'00.1"E	
Al khidmat welfare Medical	32°09'10.7" N 74°10'59.3"E	

Siddique Clinic	32°09'11.6" N 74°11'07.5"E	
New Food Street	32°09'12.3" N 74°11'11.4"E	
Rehmat Clinic	32°09'12.2" N 74°11'12.1"E	
Masjid	32°09'10.7" N 74°11'18.2"E	

Study House School	32°09'11.7" N 74°11'20.1"E	
Govt. MC School	32°09'12.7" N 74°11'20.7"E	
Masjid	32°09'13.4" N 74°11'20.9"E	
Sheranwala Bagh + WASA Tank	32°09'17.2" N 74°11'23.0"E	

Fikar e Iqbal School	32°09'18.2" N 74°11'19.0"E	
Govt. Boys School	32°09'19.8" N 74°11'17.0"E	
TEVTA (Govt. Training center)	32°09'25.0" N 74°11'30.3"E	

Small Industries	32°09'27.6" N 74°11'31.5"E	
Masjid	32°09'29.9" N 74°11'30.6"E	
Civil Defense office	32°09'38.2" N 74°11'28.9"E	

Rafique Hospital	32°09'44.4" N 74°11'31.4"E	
Jinnah Stadium	32°09'46.0" N 74°11'31.5"E	
Christian school+ Church	32°09'47.6" N 74°11'24.6"E	

Warsi Hospital	32°09'55.0" N 74°11'27.5"E	
Swift Memorial Church	32°09'58.0" N 74°11'30.1"E	
School+ Hospitals	32°10'00.1" N 74°11'30.3"E	

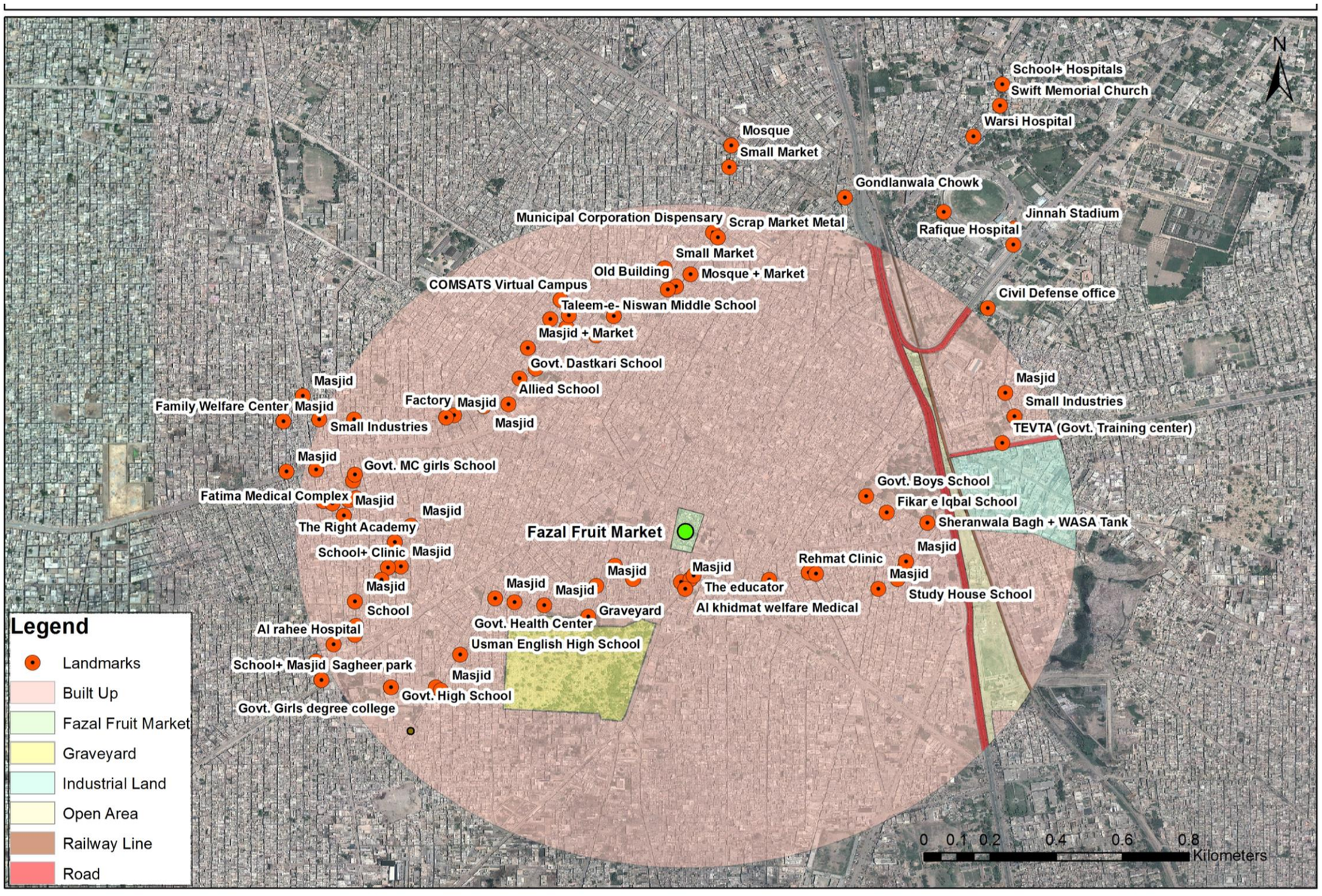
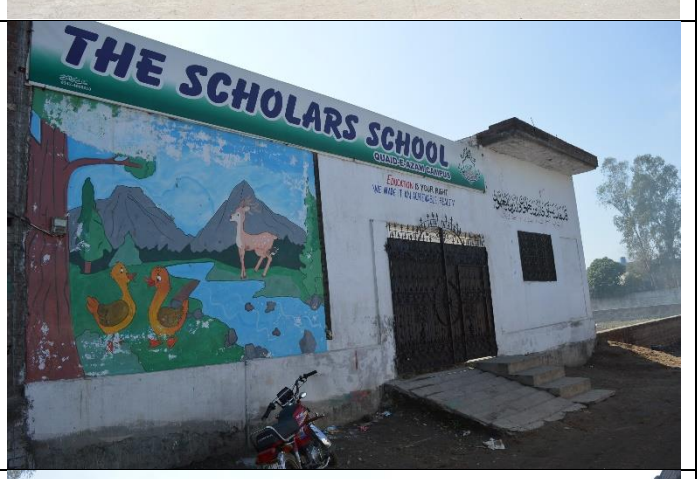


Figure 5: Land use Map of Fazal Fruit Market

Table 9: Land use of Main Fruit Market

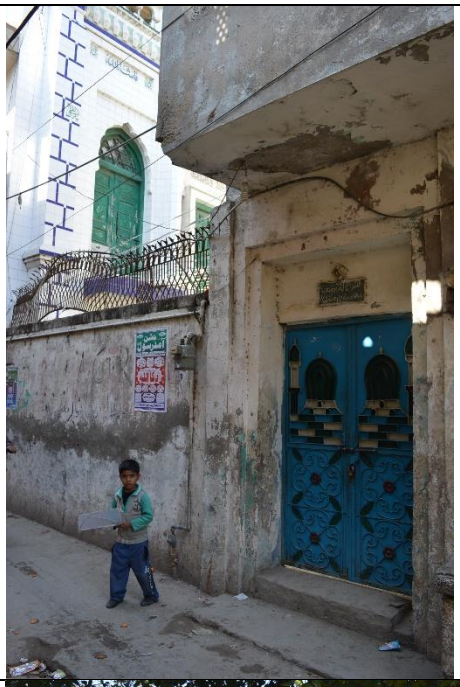
LAND USE OF MAIN FRUIT MARKET			
Sr. No	CATEGORIES	COORDINATES	PICTURES
1	Mosque	32° 7'56.8"N 74° 9'56.60"E	
2	School	32° 7'58.0"N 74°09'52.40"E	
3	School	32° 8'00.10"N 74° 9'51.40"E	

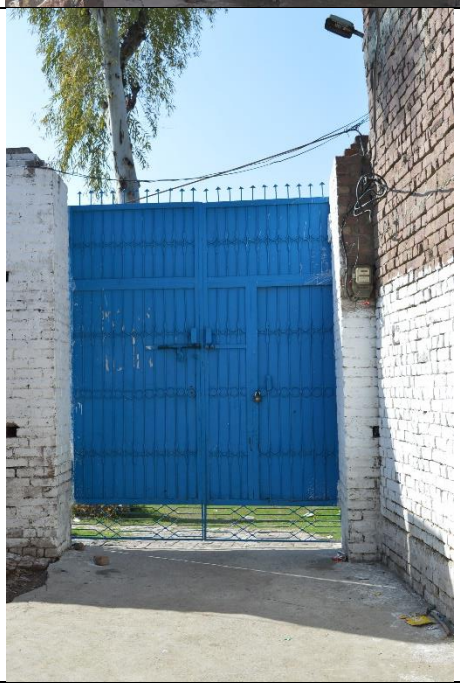
4	Industry	32° 7'56.40"N 74° 9'51.40"E	
5	School	32° 7'54.9"N 74° 9'50.20"E	
6	Industru	32° 27'54.8"N 74° 9'46.40"E	

7	School	32° 7'55.0"N 74° 9'44.80"E	

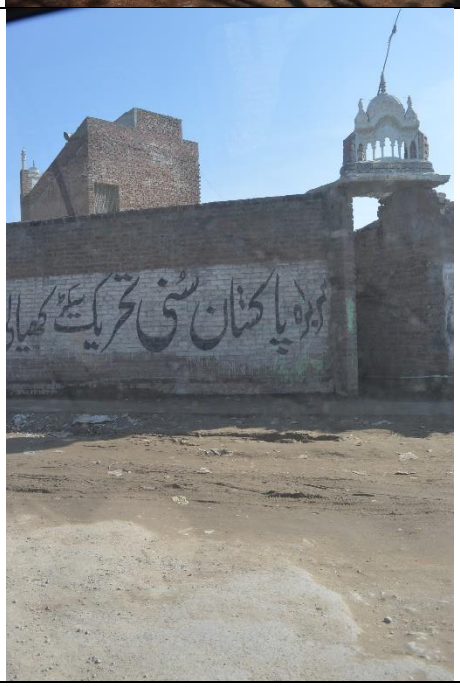
8	Industry + Mosque	32° 7'53.6"N 74° 9'47.30"E	 

9	Industry	32° 7'53.5"N 74° 9'49.4"E	
10	Market	32° 7'52.90"N 74° 9'51.6"E	
11	Market	32° 7'52.50"N 74° 9'48.20"E	

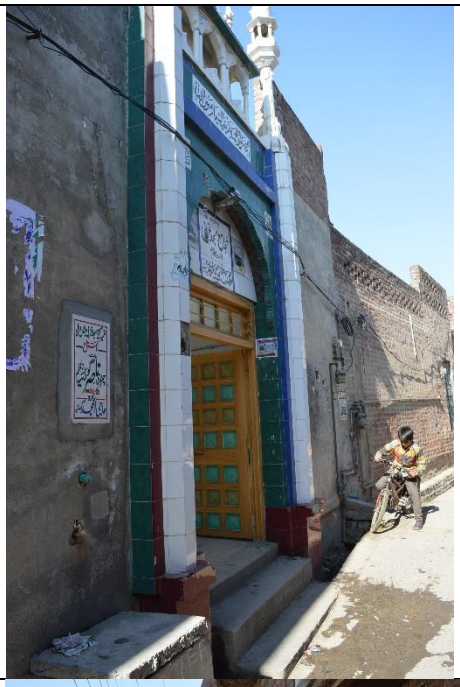
12	Mosque	32° 7'48.80"N 74° 9'41.80"E	
13	Graveyard	32° 7'41.60"N 74° 9'46.30"E	
14	School + School	32° 7'43.20"N 74°12'52.10"E	

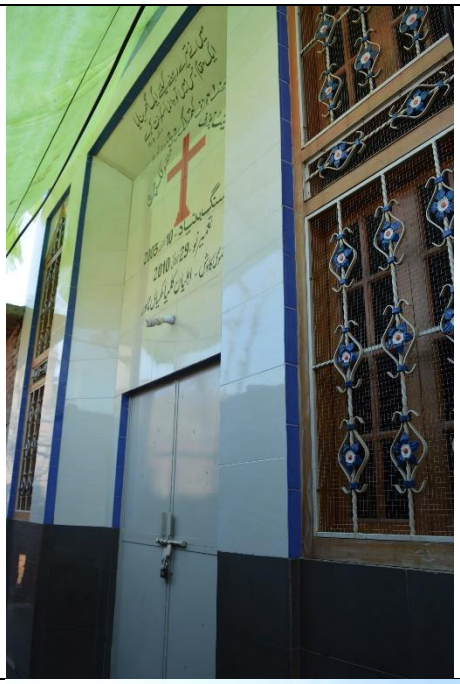
			
15	School	32° 7'41.90"N 74° 9'51.40"E	
16	Church	32° 7'48.90"N 74° 9'52.40"E	

17	Hospital	32° 7'50.80"N 74° 9'52.20"E	
	Technical Training Institute		
18	Mosque + Institute	32° 7'49.0"N 74° 9'53.10"E	

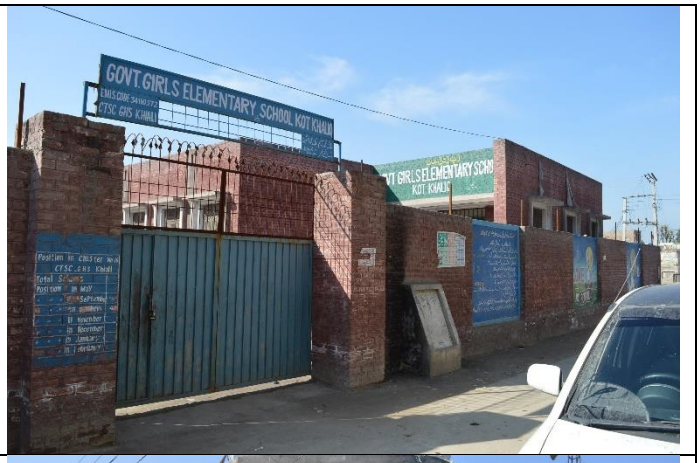
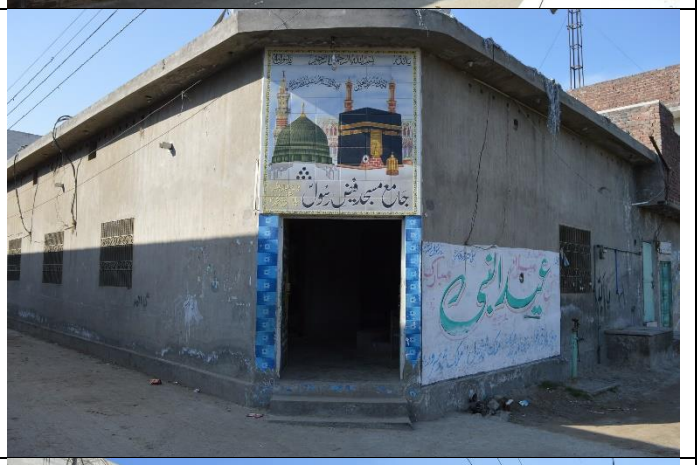
			
19	School	32° 7'50.90"N 74° 9'56.80"E	
20	Mosque	32° 7'10.50"N 74°10'04.20"E	
21	Graveyard	32° 7'13.06"N	

		74°09'58.74"E	
23	Shops	32° 7'13.60"N 74°10'15.50"E	
24	School	32° 7'11.80"N 74°10'18.70"E	

25	Mosque	32° 7'11.40"N 74°10'19.90"E	
26	Factory	32° 07'15.30"N 74°10'11.70"E	

27	Church	32° 7'16.20"N 74°10'12.30"E	
28	Mosque	32° 7'02.20"N 74° 9'45.10"E	
29	School	32° 7'33.30"N 74°09'09.60"E	

30	Mosque + Graveyard	32° 7'35.80"N 74° 9'08.30"E	 
31	School	32° 7'38.10"N 74° 9'09.10"E	

32	School	32° 7'38.30"N 74° 9'10.70"E	
33	Mosque	32° 7'39.40"N 74° 9'13.20"E	
34	Cold Storage	32° 7'44.60"N 74° 9'27.20"E	

35		32° 7'42.70"N 74° 9'29.30"E	

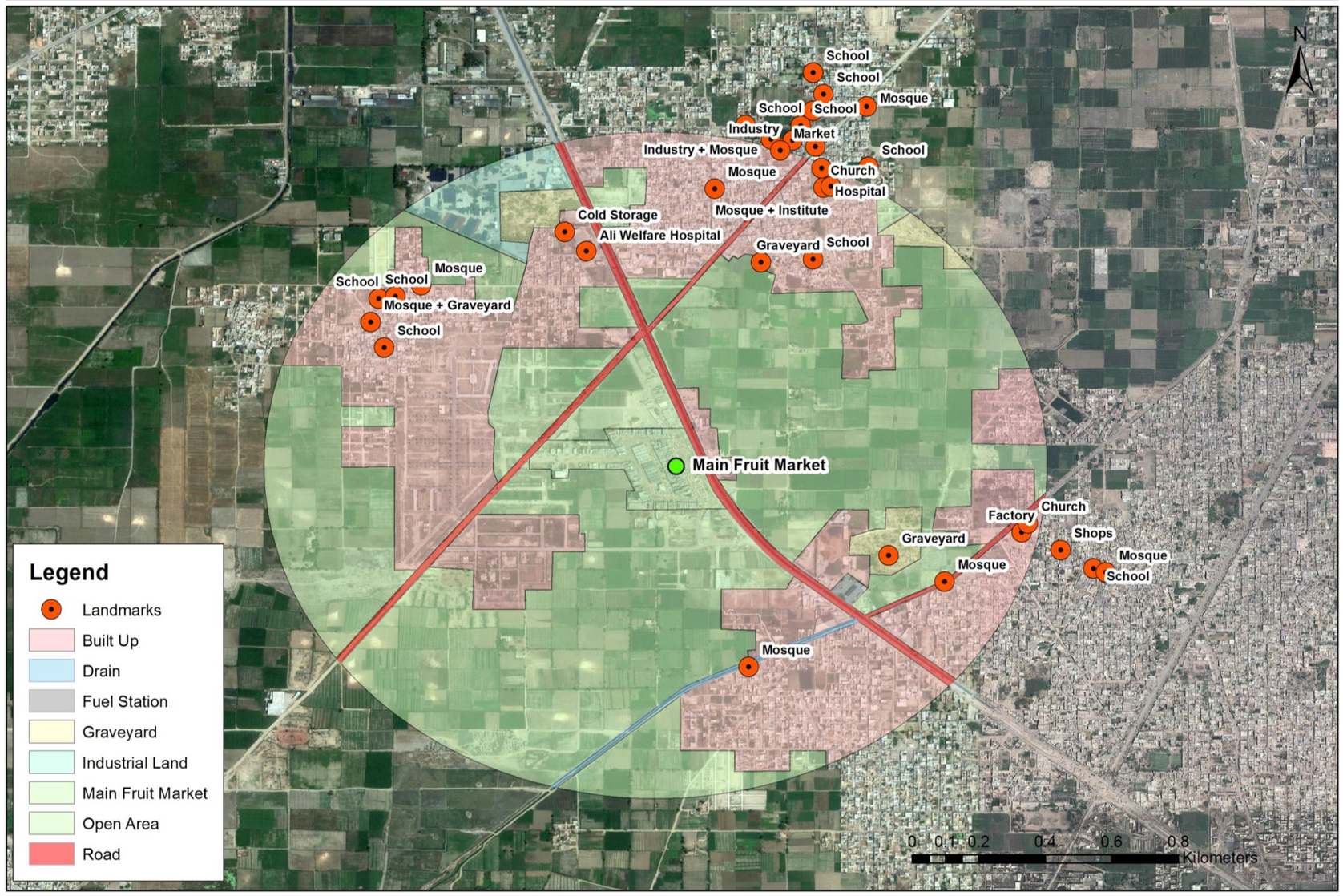


Figure 6: Land use Map of Main Fruit Market

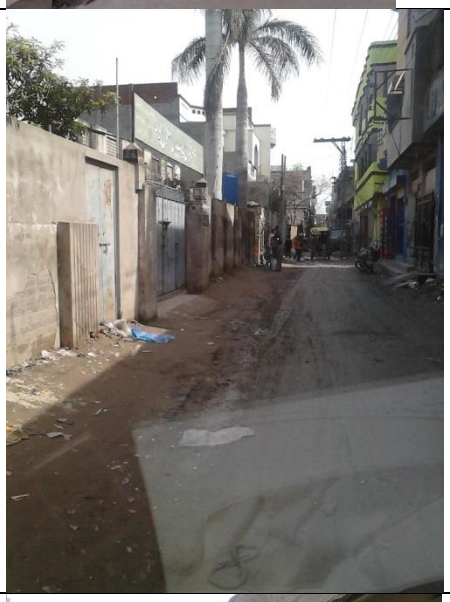
Table 10: Land use of Sialkot Road Transfer Station

Transfer Station, Sialkot Road Gujranwala (Complete)			
Sr.No.	**Name**	**Coordinates**	**Pictures**
1.	The Leader **School**	32°10'33.4" 74°11'04.4"	
2.	Aysha **School** & Academy	32°10'56.3" 74°11'35.3"	
3.	**Masjid**	32°10'58.4" 74°11'46.8"	
4.	**Masjid** Ghosia Rizwiya, Jagna	32°11'06.0" 74°12'51.3"	
5.	Govt. Elementary **School** Gajna	32°11'06.5" 74°12'51.2"	

6.	**Jamia** Masjid Pakeeza Jagna	32°11'12.3" 74°12'51.9"	
7.	Makki **Masjid**, Jagna	32°11'14.6" 74°12'51.7"	
8.	MC Model High **School**	32°11'25.2" 74°12'49.6"	
9.	Zainab **School**	32°11'24.1" 74°12'44.4"	
10.	Allam Iqbal Town **Graveyard**, Jagna	32°11'25.0" 74°12'43.8"	

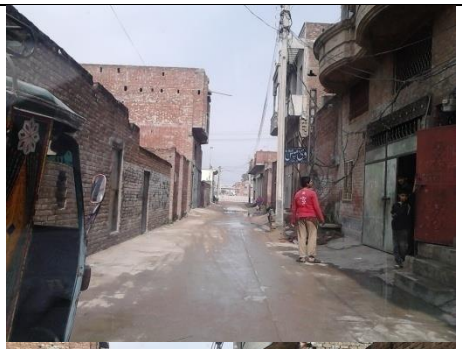
11.	**Factory**, Babar Engg. Works	32°11'24.2" 74°12'42.8"	
12.	Punjab Academy/**School**	32°11'24.1" 74°12'40.5"	
13.			
14.	Salar Surgery Clinic; **Hospital**	32°11'20.5" 74°12'34.2"	

15.	Jamia **Masjid** Faiz e Madina	32°11'20.2" 74°12'35.9"	
16.	Noor-e- Madina, **Masjid**	32°11'18.0" 74°12'41.0"	
17.	Al-Noor Science Academy; **School**	32°11'15.4" 74°12'41.2"	
18.	Jamia Atay-e-Mustafa, **Masjid**	32°11'12.5" 74°12'32.9"	

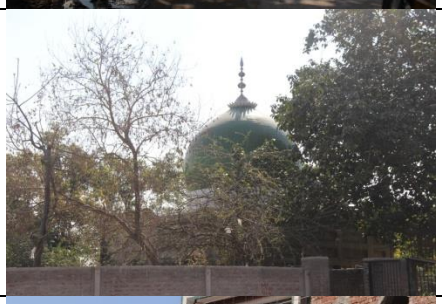
19.	Allam Iqbal Ideal **School**	32°11'09.7" 74°12'31.9"	
20.	Boys Campus **School**	32°11'07.9"N 74°12'29.4"E	
21.	Jagna Bazaar; **Shops**	32°11'14.6"N 74°12'31.6"E	

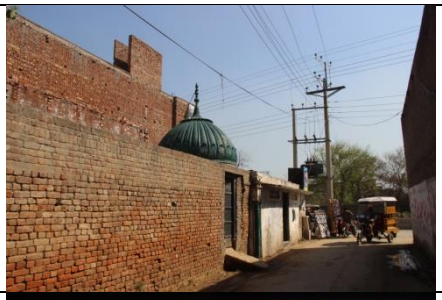
22.	Jamia **Masjid**, Bilal	32°11'30.4"N 74°12'42.0"E	
23.	Shaikh Sadiq Eye **Hospital**	32°11'33.8"N 74°12'42.6"E	 
24.	Illah Deen Plaza, **Shops**	32°11'34.6"N 74°12'43.3"E	

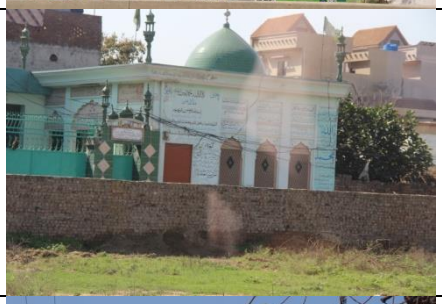
25.	Sialkot Road Market; **Shops**	32°11'36.0"N 74°12'44.0"E	
26.	Allied **School**; Faiz Campus (Lodhi Town)	32°11'38.6"N 74°12'50.8"E	
27.	Ibrahim **Masjid**	32°11'36.5"N 74°12'52.8"E	

28.	**Factory** (Ravi Pumps)	32°11'40.3"N 74°12'52.7"E	 
29.	Sialkot Bypass, **Shops**	32°11'14.5"N 74°12'30.4"E	

			
30.	**Market** Jinnah Road	32°10'58.8"N 74°12'21.5"E	
Remaining Points			
31.	**Graveyard**	32°11'25.6"N 74°12'07.9"E	
32.	Road **Shops**	32°11'23.73"N 74°12'6.66"E	

			
33.	**Shrine (**2No.)	32°11'25.37"N 74°12'8.27"E Second behind that of shown in picture 32°11'24.17"N 74°12'10.93"E	
34.	**Masjid** Noor Mustafa	32⁰11’24.8”N 74⁰12’07.7”E	
35.	FD High **School**	32⁰11’25.2”N 74⁰12’03.0”E	
36.	Hamid **Factory**	32⁰11’28.0”N 74⁰12’05.8”E	

37.	Shrine	32°11'28.0"N 74°12'08.0"E	
38.	Islamic School	32°11'37.0"N 74°12'11.8"E	
39.	Shrine	32°11'49.7"N 74°12'17.5"E	
40.	Kids School	32°11'50.6"N 74°12'17.9"E	
41.	Factory	32°12'02.0"N 74°12'27.6"E	

42.	Shrine	32°11'59.9"N 74°12'30.5"E	
43.	Shrine	32°11'57.8"N 74°12'33.1"E	
44.	Institute	32°11'55.4"N 74°12'30.8"E	
45.	Msjid	32°11'53.8"N 74°12'28.6"E	
46.	Masjid	32°11'51.0"N 74°12'30.0"E	

47.	Girls School	32°11'51.1"N 74°12'33.9"E	
48.	Shops Bypass Sialkot	32°11'50.1"N 74°12'42.9"E	
49.	Factory	32°11'47.4"N 74°12'46.5"E	
50.	Shops	32°11'44.9"N 74°12'48.9"E	
51.	Factory	32°11'42.1"N 74°12'47.2"E	

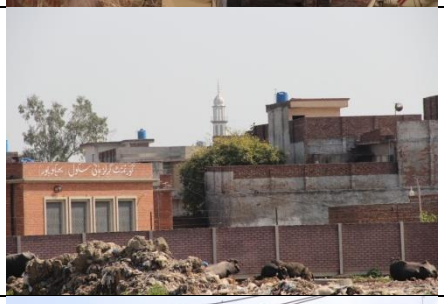
52.	Factory	32°11'37.1"N 74°12'41.9"E	
53.	Factory	32°11'37.0"N 74°12'38.8"E	
54.	Masjid	32°11'37.1"N 74°12'37.4"E	
55.	Masjid	32°11'37.1"N 74°12'36.1"E	
56.	Oxford School	32°11'33.1"N 74°12'34.7"E	

57.	Step in School	32°11'35.1"N 74°12'33.6"E	
58.	Alhikma School	32°11'38.2"N 74°12'37.6"E	
59.	Makki Madni Masjid	32°11'35.6"N 74°12'41.2"E	 
60.	Children Hospital	32°11'35.7"N 74°12'43.0"E	

61.	School	32°11'32.7"N 74°12'40.2"E	
62.	Nation School	32°11'32.6"N 74°12'39.0"E	
63.	Jamia Masjid	32°11'32.6"N 74°12'38.9"E	
64.	Jamia Tayyba Masjid	32°11'30.3"N 74°12'39.4"E	
65.	Masjid	32°11'28.5"N 74°12'38.4"E	

66.	Shops	32°11'28.0"N 74°12'38.0"E	
67.	Prime School	32°11'28.0"N 74°12'38.0"E	
68.	Shops	32°11'28.0"N 74°12'38.0"E	
69.	National Industry	32°11'25.2"N 74°12'35.0"E	
70.	Talent School	32°11'25.2"N 74°12'27.8"E	

71.	Hospital	32°11'20.3"N 74°12'33.4"E	
72.	Shops	32°11'20.2"N 74°12'31.2"E	
73.	Hospital	32°12'20.2"N 74°12'30.0"E	
74.	Annwar e Madina Masjid	32°11'18.6"N 74°12'28.3"E	
75.	Shops	32°11'20.3"N 74°12'24.4"E	

76.	Office	32°11'17.5"N 74°1213.1"E	
77.	Masjid	32°11'16.8"N 74°12'13.2"E	
78.	Govt. Girls School	32°11'16.3"N 74°12'13.1"E	
79.	Fatima Masjid	32°11'14.5"N 74°12'13.1"E	 

80.	Community School	32°11'11.4"N 74°12'13.0"E	
81.	Masjid	32°11'98.3"N 74°12'17.4"E	
82.	Guide Line School	32°11'07.8"N 74°12'25.7"E	
83.	Masjid e Kubra	32°11'03.2"N 74°12'22.8"E	
84.	Office	32°11'03.0"N 74°12'18.3"E	

85.	Shops	32°11'02.8"N 74°12'15.6"E	
86.	Market	32°10'58.7"N 74°12'16.1"E	
87.	Masjid	32°10'58.9"N 74°12'18.6"E	
88.	Jinah Road Chowk Shops	32°11'00.1"N 74°12'21.3"E	 

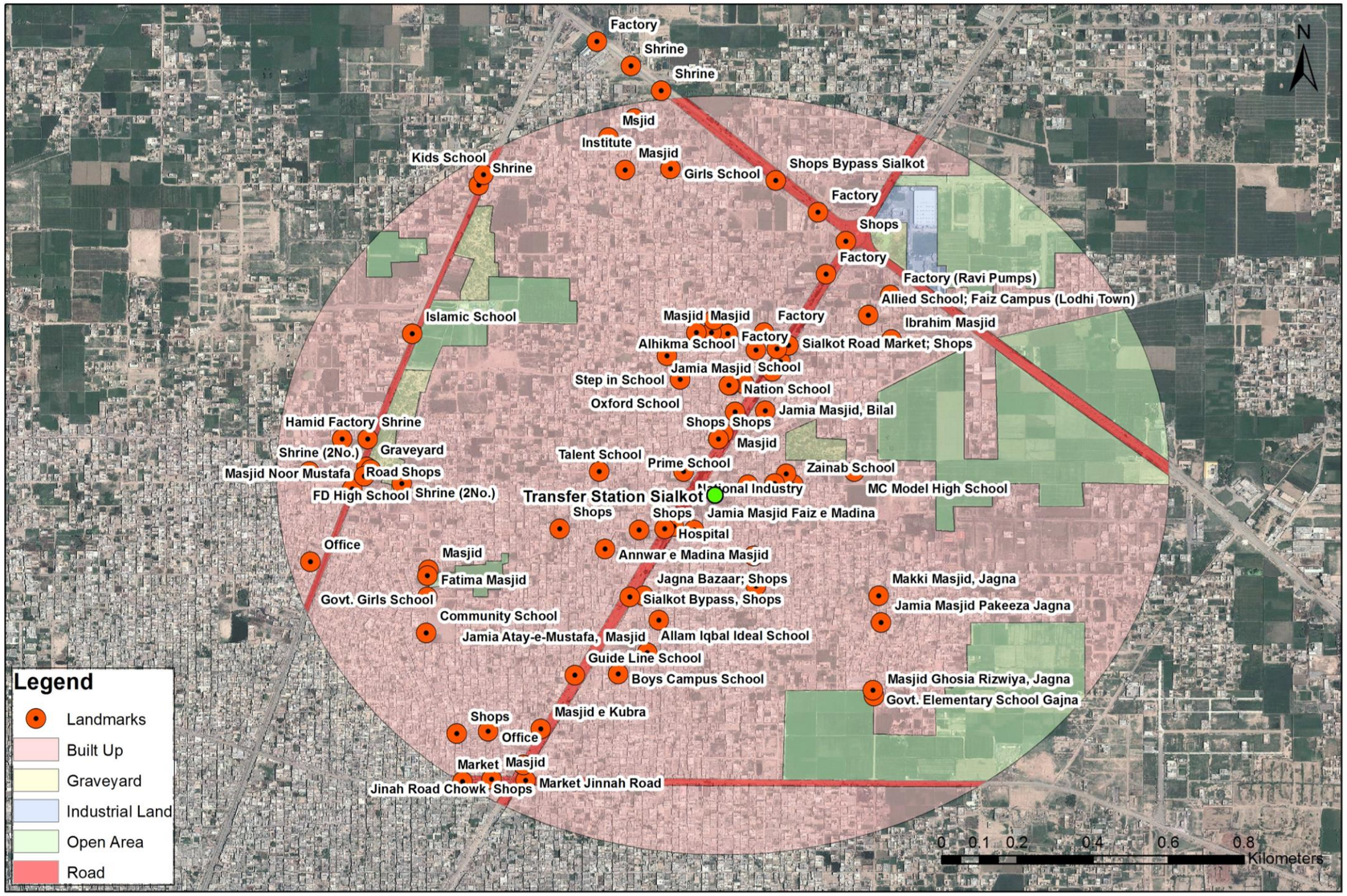


Figure 7: Land use Map of Sialkot Road Transfer Station

Table 11: Land use of Alam Chaowk Transfer Station

Sr. No.	CATEGORIES	COORDINATES	PICTURES
1	Mosque	32° 8'56.8"N 74°10'32.4"E	
2	Mosque	32° 8'25.4"N 74° 8'57.0"E	

3	School	32° 8'16.8"N 74° 8'57.20"E	
4	School	32° 8'18.5"N 74° 8'58.40"E	
5	School	32° 8'38.3"N 74° 8'43.40"E	

6	Mosque	32° 8'41.9"N 74° 8'36.10"E	
7	Mosque	32° 8'47.4"N 74° 8'38.0"E	
8	Mosque	32° 8'49.3"N 74° 8'38.0"E	

9	Mosque	32° 8'52.7"N 74° 8'47.10"E	
10	Mosque	32° 8'53.4"N 74° 8'56.70"E	
11	Mosque	32° 9'06.3"N 74° 8'48.90"E	

12	School	32° 9'05.1"N 74° 8'48.0"E	
13	Mosque	32° 9'05.1"N 74° 8'47.40"E	
14	School	32° 9'00.7"N 74° 8'35.0"E	

15	School	32° 8'59.1"N 74° 8'34.10"E	
16	Mosque	32° 8'59.6"N 74° 8'34.0"E	
17	School	32° 9'16.6"N 74° 8'38.20"E	

18	Market	32° 9'17.4"N 74° 8'37.80"E	
19	Mosque	32° 9'13.9"N 74° 8'26.0"E	
20	School	32° 9'15.1"N 74° 8'27.80"E	

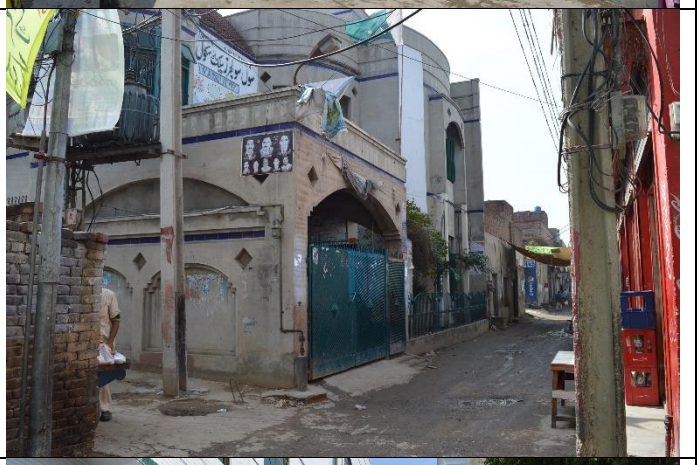
21	Mosque	32° 9'16.7"N 74° 8'48.20"E	
22	Hospital	32° 9'14.8"N 74° 8'48.60"E	
23	Mosque	32° 9'10.7"N 74° 8'39.50"E	

24	Mosque	32° 9'10.8"N 74° 8'35.20"E	
25	Graveyard	32° 7'10.9"N 74° 8'32.90"E	
26	Mosque	32° 9'09.3"N 74° 8'25.30"E	

27	CNG Station	32° 9'13.2"N 74° 8'50.50"E	
28	Industry	32° 9'05.9"N 74° 8'53.70"E	
29	Industry	32° 9'04.4"N 74° 8'54.50"E	

30	School	32° 9'01.6"N 74° 8'55.80"E	
31	Mosque	32° 8'59.8"N 74° 8'58.80"E	
32	School	32° 8'59.2"N 74° 9'03.90"E	

33	School	32° 8'57.6"N 74° 9'05.70"E	
34	Mosque	32° 9'03.9"N 74° 9'12.40"E	
35	Industry	32° 9'04.3"N 74° 9'12.50"E	

36	School	32° 9'06.3"N 74° 9'12.50"E	
37	School	32° 9'11.5"N 74° 9'13.20"E	
38	School	32° 9'11.5"N 74° 9'13.70"E	

39	Graveyard	32° 8'53.9"N 74° 9'13.30"E	
40	Mosque	32° 8'45.4"N 74° 9'11.0"E	
41	School	32° 8'46.4"N 74° 9'14.80"E	

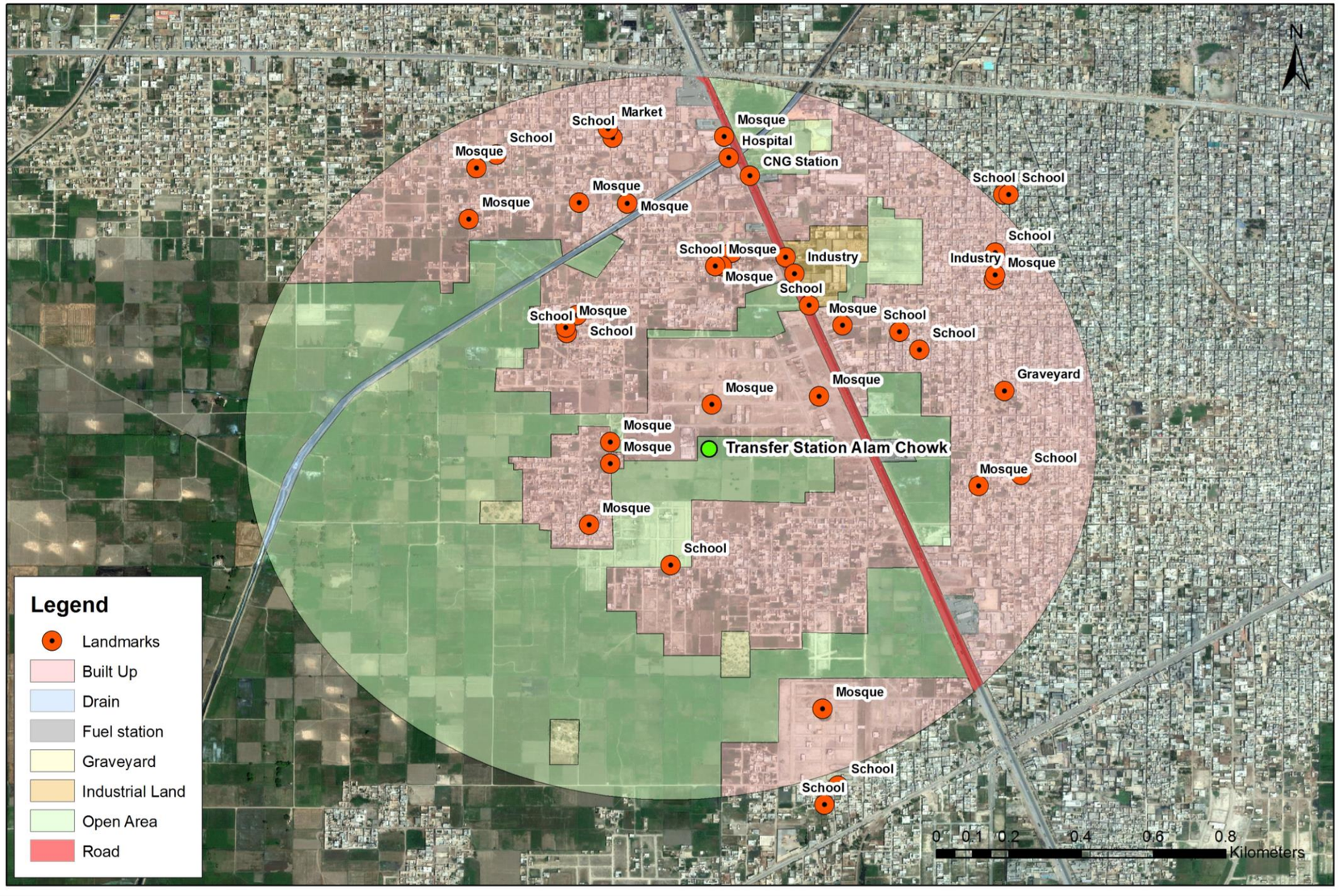


Figure 8: Land use Map of Alam Chowk Transfer Station

4.5 Protected Conservation Areas Including Regulations, Policies and Present Status

In Pakistan there are several areas of land devoted to the preservation of biodiversity through the dedication of national parks and wildlife sanctuaries. There is no sensitive/ protected area or national sanctuary in or near the project area.

4.6 Public Health and Sanitation

Public health and sanitation condition of the residents including morbidity rate, special disease, pollution condition, inhabitation of vermin, harmful insects;

a) Sanitation condition

- % of households with flush toilet in dwelling 42.8
- % of households with flush toilet on site 21.9
- % of households with no sanitation facility 35.3[12]

b) Morbidity rate

- Infant Mortality Rate 67/1000 Live births
- Under-five Mortality Rate 95/1000 Live births
- Maternal Mortality Ratio 350/100,000 [13]

c) Special diseases

The disease pattern is determined through regular and periodic reporting through surveys and studies. Punjab health department has adopted District Health Information System (DHIS) as regular reporting mechanism to collect information on diseases and other variables. Currently, DHIS is in transitional stage, and is establishing itself as a tool to be used for evidence based planning and management. The following trend of the diseases has been taken from the consolidated DHIS reports that include reports from Primary Health Care (PHC) and Secondary Health Care (SHC) facilities[14].

d) pollution condition

[12] THREE YEARS ROLLING PLAN 2010-2013 DISTRICT GUJRANWALA
[13] THREE YEARS ROLLING PLAN 2010-2013 DISTRICT GUJRANWALA
[14] THREE YEARS ROLLING PLAN 2010-2013 DISTRICT GUJRANWALA

e) inhabitation of vermin,

Primary data are not available regarding inhabitation of vermin for the city of Gujranwala.

f) harmful insects

Some data regarding araneid fauna is available. A large number of species and families of spiders are in Gujranwala but they are not dangerous for human health. They are only dangerous for crops.[15]

Table 12: Data on Diseases

Disease group		Percentage of magnitude
Respiratory Diseases		
1	Acute (upper) respiratory infection	39.02%
2	Pneumonia < 5 yrs.	1.15%
3	Pneumonia > 5 yrs.	0.63%
4	TB Suspects	1.95%
5	Chronic Obstructive Pulmonary Diseases	1.41%
6	Asthma	3.88%
Gastro Intestinal Diseases		
7	Diarrhea/ Dysentery < 5 yrs	3.37%
8	Diarrhea/ Dysentery > 5 yrs	3.44%
9	Enteric / Typhoid Fever	0.50%
10	Worm Imitations	2.60%
11	Peptic Ulcer Diseases	4.70%

[15] The Journal of Animal & Plant Sciences, 21(4): 2011, Page:812-816ISSN: 1018-7081 POPULATION DYNAMICS OF THE ARANEID FAUNA FROM DISTRICT GUJRANWALA, PAKISTAN. Department of Zoology, Government College University Faisalabad, Pakistan

Disease group		Percentage of magnitude
12	Cirrhosis of Liver	0.56%
Urinary Tract Diseases		
13	Urinary Tract Infection	2.96%
14	Nephritis / Nephrosis	0.00%
15	Sexually Transmitted Infections	0.07%
16	Benign Enlargement of Prostrate	0.00%
Other Communicable Diseases		
17	Suspected Malaria	1.02%
18	Suspected Meningitis	0.50%
19	Fever due to other	6.27%
Vaccine Preventable Diseases		
20	Suspected Measles	0.00%
21	Suspected Viral Hepatitis	0.73%
22	Suspected neonatal Tetnus	0.00%
Cardiovascular Diseases		
23	Ischemic heart disease	0.00%
24	Hypertension	4.72%
Skin Diseases		
25	Scabies	12.28%
26	Dermatitis	2.72%
27	Cutaneous Lieshmaniasis	0.00%
Endocrine Diseases		

Disease group		Percentage of magnitude
28	Diabetes Mellitus	2.78%
Neuro-Psychiatric Diseases		
29	Depression	1.27%
30	Drug Dependence	0.34%
31	Epilepsy	0.00%
Eye & ENT		
32	Cataract	0.87%
33	Trachoma	0.00%
34	Glaucoma	0.20%
35	Otitis Media	2.47%
Oral Diseases		
36	Dental Caries	3.85%
Injuries/ Poisoning		
37	Road traffic Accident	1.59%
38	Fractures	0.49%
39	Burns	0.35%
40	Dog bite	0.21%
41	Snake bite (with signs/ symptoms of poisoning)	0.00%
Miscellaneous Diseases		
42	Acute Flaccid Paralysis	0.00%
43	Suspected HIV/ AIDS	0.00%

Disease group		Percentage of magnitude
44	Any other Unusual Diseases (Specify)	Nil

5 Opinion and Awareness of Stakeholders

5.1 Analysis of Gondlanwala and Chianwali Site

5.1.1 Gondlanwala Site.

As per the project requirement a survey about opinion/problems/suggestions and awareness from 10 households in 1 km radius of Gondlanwala landfill site was conducted.

Among the 10 interviewees, 1 was the land owner whereas the rest were residents. None of the interviewees was below 18 years old and the maximum age of the interviewed person was 50 years and all the respondents were male. The following are the results of the survey.

Opinion about Current Situation

In a response to a question that "Have you ever felt any problems because of the disposal site in your neighborhood?" All the respondents replied "yes". All the respondents said that "bad smell" and "flies" are major problems. However, 5 respondents also highlighted health problem and disease. 1 of the respondents said that the site also contributed in the deterioration of landscape.

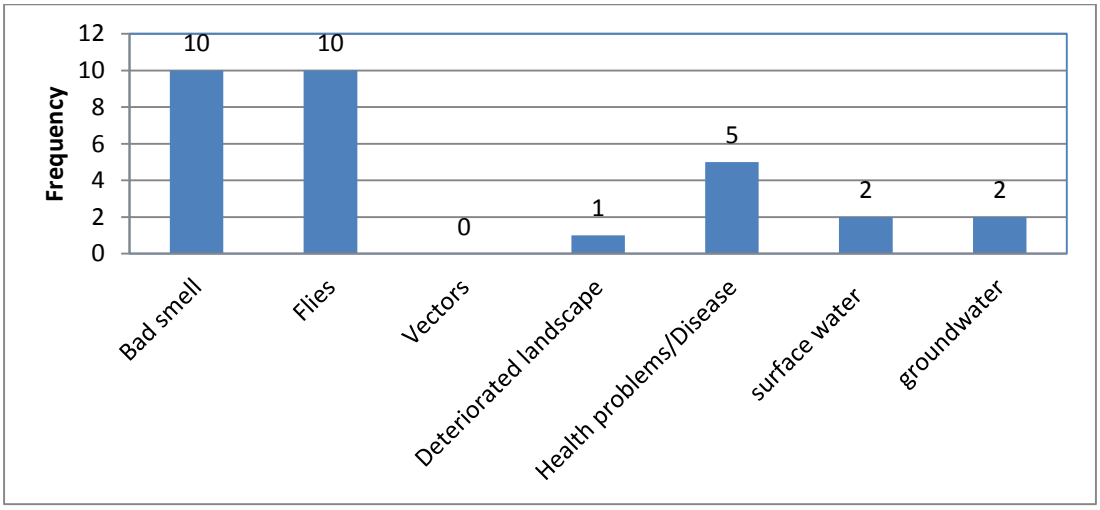


Figure 9: Problems because of Disposal Site

When their opinion was sought about environmental pollution 2 respondents said that it affects the surface water as well as ground water.

Opinion for upgrading the service

When asked is there any problem in the operation and management system at existing disposal site? 5 out of 10 said "yes" whereas 5 responded "No". In a follow up question of what kind of problems they face? One of the household responded that there hand pump was broken because of these operations. However, dirty streets, smell and flies were the common responses. When the solution of the problem was sought. One of the respondent said "filtered water should be provided, layer of clay be used to mitigate smell, good quality spray should be done to kill insects and mad dogs vaccinations should be provided". 3 other respondents also asked for dump clay and spray and one of the respondents said that the site should be closed.

When the opinion about waste pickers was sought the entire respondent said that they have no problems from them.

The land owner specific question "As a landowner, do you have any opinions, concerns, or complaints that your land has become the final disposal site?" The opinion was proper pipes for gas evacuation and gas evacuation was a concern itself.

Awareness and Understanding about Disposal Site and Waste Collection System

In response to a question that "Do you think disposal site contributes towards betterment of Gujranwala city?" all the respondents replied that yes it does as it makes environment clean, it stores solid waste in one place. However, one of the respondents said that it is beneficial for land owner only.

System of Solid Waste Collection in the City

In another question that do you think that waste collection is beneficial for the city: 9 responded yes and 1 said no idea. In another question that what is befit of waste collection system for Gujranwala? 9 responded "Collection system keeps avoiding the waste from spreading around" out of these 9 respondents 7 also replied "Waste does not have to be treated or carried to any disposal points by each household separately".

Waste Management Operating Organization (GWMC)

When asked that do they have any problem with the waste management organization WMC)? 3 respondents replied "yes", and the problem was that waste management organization does not cover the site with soil properly and spray is also of bad quality.

Conclusion

Most of the problems are operations related, the need is the to run the site on scientific basis where dump clay is properly done, quality spray is done continually and evacuation of gas should be dealt properly as it may lead to an untoward event.

5.1.2 Chianwali site

A survey of stakeholders' opinion for waste management was conducted in the 1 km radius of Chianwali sit. Like the Gondlawala site this survey also consists of 10 households. The minimum age of the interviewee was 25 years whereas the maximum turns out to be 55 years. All the respondents were residents and male.

Opinion about Current Situation

In a response to a question that "Have you ever felt any problems because of the disposal site in your neighborhood?" All the respondents replied "yes". All the respondents said that "bad smell" and "flies" are major problems. However, 9 respondents also highlighted health problem and disease and 3 of the respondents highlighted the problem of vectors. None of the respondents responded about deteriorated landscape.

When their opinion was sought about environmental pollution 1 respondent said that it affects the surface water whereas 7 replied that it affects the ground water. 1 also replied that it affects the animals. 1 of the respondents also highlighted the issue that in rainy seasons it smells more.

Opinion for upgrading the service

This question is redundant for Chianwali landfill site as it is closed one.

Awareness and Understanding about Disposal Site and Waste Collection System

In response to a question that "Do you think disposal site contributes towards betterment of Gujranwala city?" 7 respondents replied that yes as it makes environment clean and stores solid waste in a place otherwise it would have been spreading around. However, 3 responded "No", i.e. it does not contribute towards betterment of Gujranwala as it creates/will create environmental problems such as bad smell, water contamination, vectors, etc.

System of Solid Waste Collection in the City

When asked "Do you think the waste collection system is beneficial for the city?" 5 responded yes and 5 responded no. All the five who said that it is beneficial further responded that it is beneficial as it keeps avoiding the waste from spreading around. Those who said that there is no benefit, they responded like: waste is already around as collections system is not proper (1 response), no waste collection in my area (3 responses), and Illegal open dumping in the city is evidence of poor collection system (1 response).

Waste Management Operating Organization (GWMC)

In response to a question "Do you have any problem(s) with the waste management operating organization (GWMC)?" 4 replied yes. And the problems that they identified are: improper system and nobody comes here to collect the waste.

Conclusion

Most of the problems are same as in the Gondlanwala site like bad smells, flied, health problems/disease etc. The need is to run the site on scientific basis so that the negative externalities can be mitigated as much as possible.

5.2 Analysis of Composting Facilities and Transfer Stations

5.2.1 Fazal Food Market

Fazal Food Market was surveyed for the construction of composting facility. 10 respondents were selected. All were residents ranging from 24 years old to 56 years and all were males.

Opinion about Composting Facility

When asked about the construction of composting facility, 5 responded that they agree with the construction of composting facility in the neighborhood, whereas 2 responded No and 3 replied they have no idea. In a follow up question when asked why they are positive about construction the responses were diverse like: it is necessary for the development of Gujranwala (1 response), it seems that construction is good step to solve waste management problem (3 responses), efficient use of waste (1 response). The 2 respondents who replied "no" further responded that the construction of composting facility looks dirty and gives bad smell. I don't want that waste is treated in my neighborhood and it may create problem in future.

Concern about New Facilities

In response to question about construction of new facilitates: 4 replied yes and 6 said no. The concerns were traffic congestion, smell, diseases, and flies.

Opinion as a Landowner [This question is for Landowners only]

As all respondents were residents none of them was land owner so this question becomes not applicable.

Awareness and Understandings about Disposal Site, Garbage Collection System & Operating Organization

Out of total 10 respondents 8 replied positively when asked "Do you think disposal site contributes towards betterment of Gujranwala city?" and 2 said that they have no idea. When a follow up question was asked that how it contributes the response was "contributes towards clean environment" "solid waste is stored and placed in one place" 7 and 4 responses respectively. Some of the respondents replied dirt free environment and disease free environment.

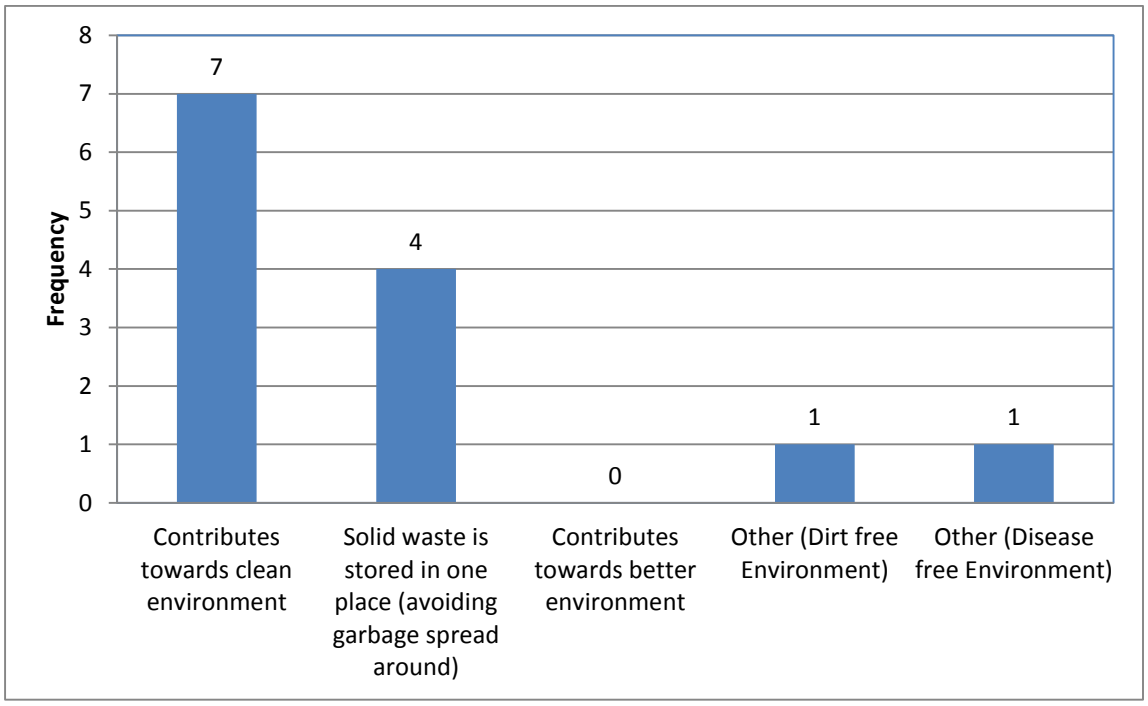


Figure 10: How disposal site contributes towards betterment of city

System of Solid Waste Collection in Town

Out of 10, 9 respondents replied that they think that waste collection system is beneficial for the city. Where one opted for "no idea". When asked about benefits, all of them said that collection system stops garbage spreading around in city.

Waste Management Operating Organization (GWMC)

3 out of 10 respondents said that they have problems with the waste management operating organization and the problems they identified were as waste collectors do not come regularly and workers come to make waste container empty after 2 weeks whereas 6 said they have no problem and 1 opted for the response "no idea".

5.2.2 Main Fruit & Vegetable Market

Main Fruit & Vegetable Market was surveyed for the construction of composting facility. 10 respondents were selected. All were residents ranging from 18 years old to 51 years and all were males.

Opinion about Composting Facility

When asked about the construction of composting facility, 6 responded that they agree with the construction of composting facility in the neighborhood, whereas 4 responded "No". In a follow up question when asked why they are positive about construction, the responses were diverse like: it is necessary for the development of Gujranwala (1 response), it seems that construction is good step to solve waste management problem (3 responses), efficient use of waste and agricultural use (1 response each). Those who were against the construction recorded that bad smell may occur, it looks dirty, it might create some problems in future. They do not want waste treated in their neighborhood and flies and diseases.

Concern about New Facilities

In response to question about construction of new facilitates: 6 replied yes and 4 said no. The concerns were smell, diseases, fly and vectors etc. etc.

Opinion as a Landowner [This question is for Landowners only]

As all respondents were residents none of them was land owner so this question becomes not applicable.

Awareness and Understandings about Disposal Site, Garbage Collection System & Operating Organization

Out of total 10 respondents 9 replied positively when asked "Do you think disposal site contributes towards betterment of Gujranwala city?" and 1 said that he has "no idea". When a follow up question was asked that how it contributes the response was "contributes towards clean environment" "solid waste is stored and placed in one place" 8 and 7 responses respectively. There was also a response disease free environment.

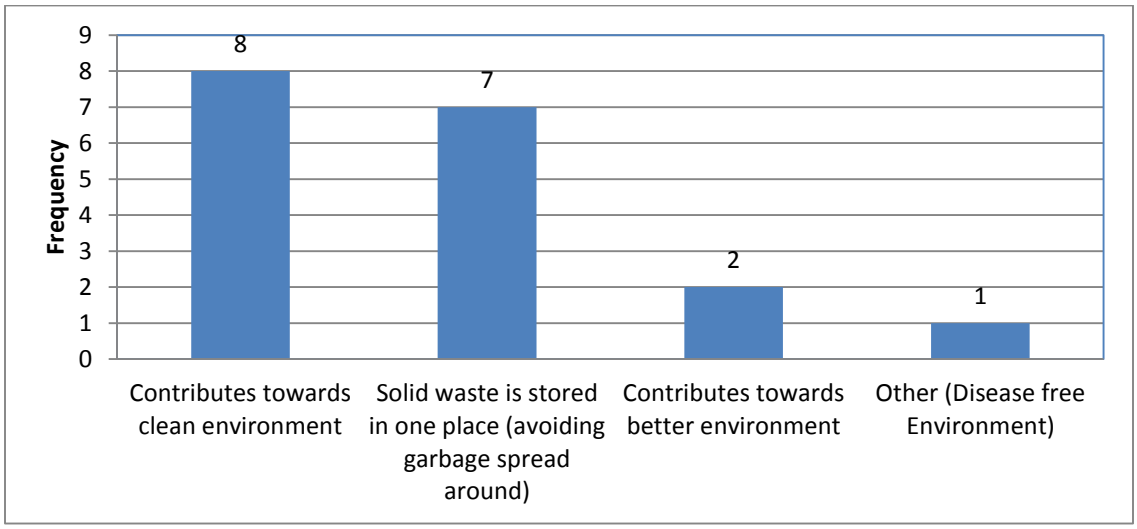


Figure 11: How disposal site contributes towards betterment of city

System of Solid Waste Collection in Town

"Waste collection system is beneficial for the city?" in response to this question, the entire sample replied "yes". In the subsequent question that what is benefit of waste collection system for the Gujranwala city? The answer was that it stops garbage from spreading around in the city. There was also a response that it makes environment clean.

Waste Management Operating Organization (GWMC)

When asked do you have any problem with the waste management operating organization? 8 out of 10 said that they have no problems with the waste management operating organization and the 1 replied that he has a problem that organization comes irregularly to collect the garbage and the other one responded that he has "no idea".

5.3 Analysis of Transfer Stations

5.3.1 Vanya Morr, Sialkot Road Transfer Station

Vanya Morr, Sialkot Road was surveyed for the construction of Transfer Station. 10 respondents were selected. Out of which 9 were residents and 1 was land owner. The respondents range from 18 years old to 46 years old and all were males.

Opinion about Composting Facility

When asked about the construction of transfer station, 9 responded that they agree with the construction of composting facility in the neighborhood, whereas 1 responded "No". In a follow-up question when asked why they are positive about construction, the responses were diverse like: it is necessary for the development of Gujranwala (1 response), it seems that construction is good step to solve waste management problem (7 responses), waste and disease free environment, waste is gathered at one place instead of spreading around. The one respondent that did not agree replied that bad smell may occur and it gives a dirty look.

Concern about New Facilities

In response to question regarding any concern about construction of new facilitates: 3 replied yes they do have concerns whereas 7 said no. The transfer stations must be timely cleaned, bad smell was the other concern.

Opinion as a Landowner [This question is for Landowners only]

The land owner opined that waste must be regularly transferred from transfer station.

Awareness and Understandings about Disposal Site, Garbage Collection System & Operating Organization

Out of total 10 respondents 9 replied positively when asked "Do you think disposal site contributes towards betterment of Gujranwala city?" and 1 said that he has "no idea". When a subsequent question was asked that how it contributes the response was "contributes towards clean environment" "solid waste is stored and placed in one place" 7 and 5 responses respectively. There were also two responses that it provides disease free environment.

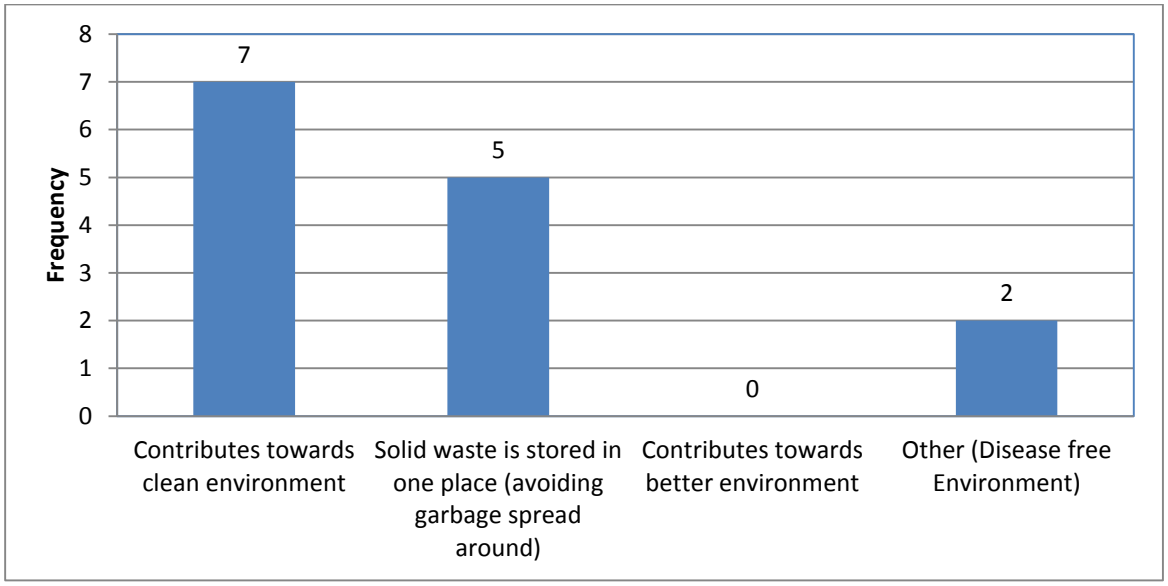


Figure 12: How disposal site contributes towards betterment of city

System of Solid Waste Collection in Town

"Waste collection system is beneficial for the city?" in response to this question, the entire sample replied "yes". In a follow-up question that what is benefit of waste collection system for the Gujranwala city? The answer was that it stops garbage from spreading around in the city. There was also a response that it makes environment clean. There was also a response that "Waste does not have to be treated or carried to any disposal points by each household separately".

Waste Management Operating Organization (GWMC)

When asked do you have any problem with the waste management operating organization? 7out of 10 said that they have no problems with the waste management operating organization whereas 3 replied that yes they have problem. The problems identified were as waste collectors come irregularly, improper cleaning and nobody comes to collect waste.

6 Environmental Impacts

6.1 Air Quality Information

The degradation of air quality in Gujranwala city is a major environmental concern these days. Air pollution levels in urban centers have either crossed safe limits given in the NEQS or have reached the threshold values. About 60 to 70 % of the deterioration in the air quality is due to the vehicular emissions. The parameters which have proved to be the major threat are particulate matter and concentration of oxides of nitrogen that are also relatively higher in all the large cities of Punjab. Further the present road infrastructure cannot cater the need of growing automobiles flow resulting in the mounting concentrations of NO_x and SO_2. There is dire need to adopt strict measures to obviate this issue, which is not only a hazard for the environment but also to the health and quality of life of the people.[16]

Following pollutants were measured during air quality monitoring of Bakhrayawala Proposed Landfill Site:

6.1.1 Carbon Monoxide (CO)

Carbon monoxide monitoring was carried out using gas filter Correlation CO analyzer (automatic potable analyzer) using 40 CFR 50, App. C (US-EPA) method. Measurement range of the analyzer is 0-100 ppm. Continuous data was recorded for duration of 24 hrs and hourly average was computed.[17]

[16] ENVIRONMENT & SOCIAL MANAGEMENT PLAN (ESMP) REPAIR/REHABILITATION OF JINNAH ROAD FROM G.T.ROAD TO SHAMSI CHOWK I/C GILL ROAD & DC ROAD, GUJRANWALA

[17] Environmental Impact Assessment (EIA) of sanitary landfillsite Gujranwala

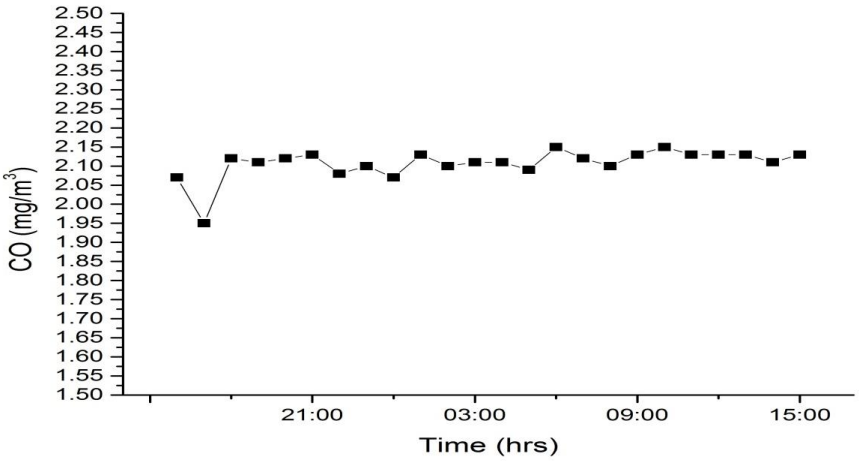


Figure 13: CO Monitoring (Outside Downstream of the proposed landfill site)

The average concentration of carbon monoxide (CO) for 08 hrs according to the National Environmental Quality Standards (NEQS) for Ambient Air should not exceed from 5.0 mg/m^3.The average values obtained at downstream and upstream dumping sites were 2.11 mg/m^3 and 1.99 mg/m^3 outside downstream dumping site and outside upstream dumping site respectively.[18]

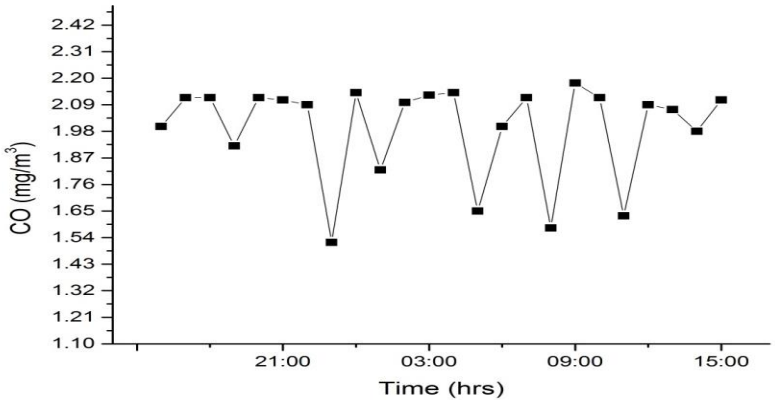


Figure 14: CO Monitoring (Outside upstream of the proposed landfill site)

6.1.2 Nitrogen Dioxide

Nitrogen Dioxide at the proposed landfill site of Bakhraywala was measured using chemiluminescent analyzer. Measurement range of the analyzer is 0-50 ppb and 0-1000 ppm. Reference method used for detection of NO_2 is USEPA Method RFNA-1289-074.[19]

[18] Environmental Impact Assessment (EIA) of sanitary landfillsite Gujranwala

[19] Environmental Impact Assessment (EIA) of sanitary landfillsite Gujranwala

Average 24 hrs concentrations in Environmental Quality Standards (NEQS) for Ambient Air for Nitrogen Dioxide (NO_2) is 80 µg/m^3 and average concentrations of Nitrogen Dioxide (NO_2) measured during monitoring were found in compliance with National Environmental Quality Standards.[20]

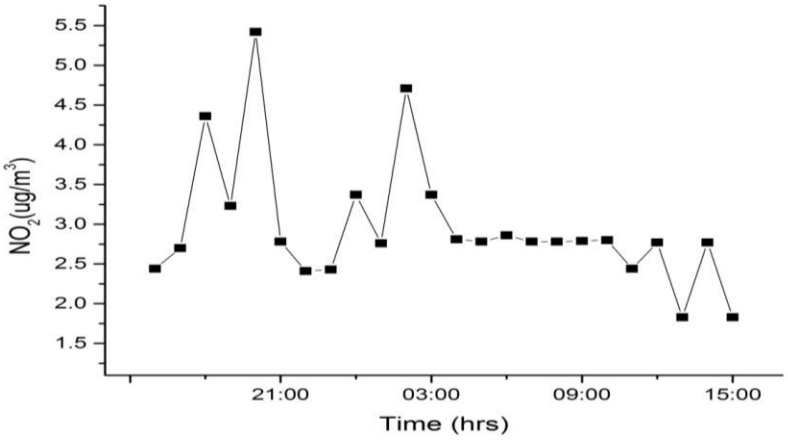


Figure 15: NO_2 Monitoring (Outside Downstream of the proposed landfill site)

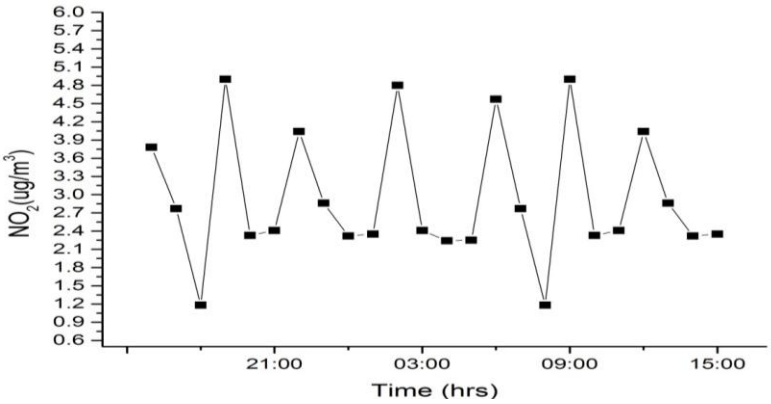


Figure 16: NO_2 Monitoring (Outside upstream of the proposed landfill site)

6.1.3 Sulphur Dioxide (SO_2)

To establish the baseline conditions of SO_2, the monitoring was done by the mobile laboratory of the SGS. Concentration of Sulphur dioxide in ambient air of the proposed landfill site at Bakhrayawala was measured by using Pulsed Fluorescent Analyzer.

[20] Environmental Impact Assessment (EIA) of sanitary landfillsite Gujranwala

Measurement range of the analyzer is 0-50 ppb and 0-1000 ppm. USEPA Designated Method EQSA-0486-060 was used to measure SO_2.[21]

According to standard, the 24 hrs concentration of Sulphur Dioxide (SO_2) in ambient air should not exceed from 120 µg/m^3 while concentration obtained was found within limit of National Environmental Quality Standards (NEQS) at both monitoring points.[22]

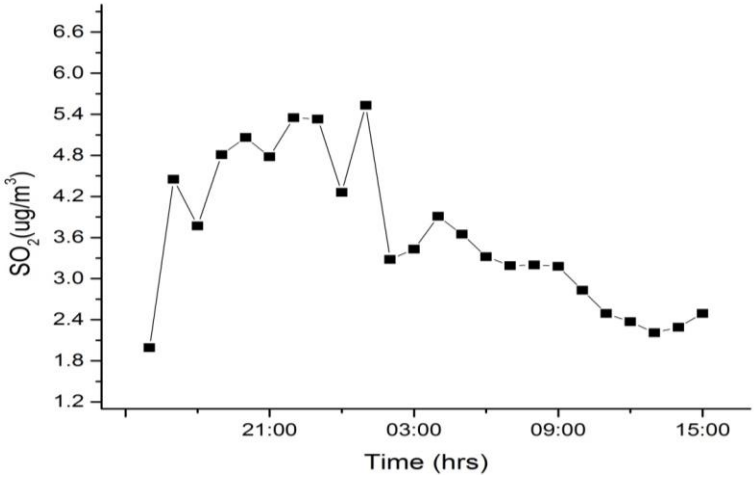


Figure 17: SO_2 Monitoring (Outside Downstream of the proposed landfill site)

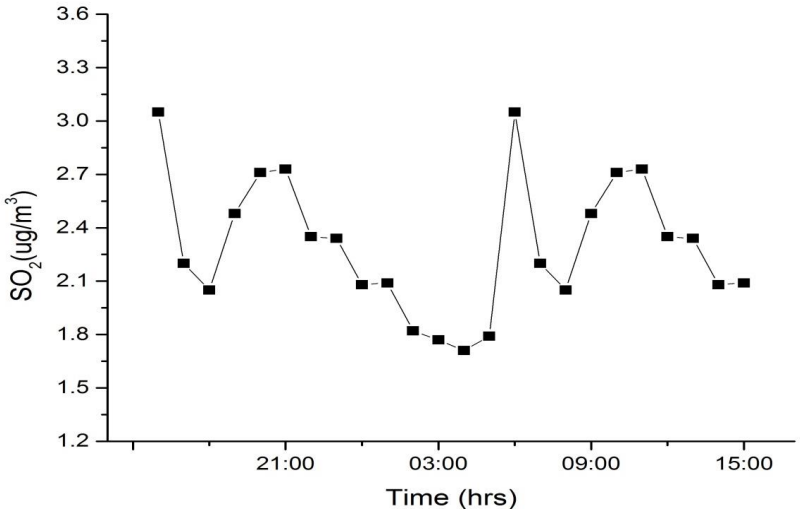


Figure 18: SO_2 Monitoring (Outside upstream of the proposed landfill site)

[21] Environmental Impact Assessment (EIA) of sanitary landfillsite Gujranwala

[22] Environmental Impact Assessment (EIA) of sanitary landfillsite Gujranwala

6.1.4 Particulate Matter (PM_{10})

Particulate matter concentration in terms of PM_{10} was monitored in the ambient air with the help of high Volume PM_{10} Sampler. Reference method used for PM_{10} determination in ambient air is 40 CFR Part 50, Appendix J (USEPA). Air sample for detection of PM_{10} concentration was drawn on fiber glass filter paper and then the collected sample was preserved in protective holder which was transported to lab for further analysis under standard environmental conditions.[23]

The ambient particulate matter PM_{10} was found in the range of 112.84 µg/m³ & 90.05 µg/m³ at outside downstream dumping site and outside upstream dumping site respectively against standards value 150 µg/m³.[24]

6.2 Water Quality Information

There is no primary data available regarding water quality of the six sites. Data is available only of two sites, Chianwali and Gondlanwala. Below are the data related to water quality extracted from Water Quality Survey Report season 1 for Integrated Solid Waste Management Master Plan for Gujranwala.

6.2.1 Surface Water Quality

Sample was collected from three specific points around Gondlanwala dumping site. Results of specific parameters are given in the Table 13. The findings are presented as follows:

Table 13: Surface water Test Results (Gondlanwala Dumping Site)

Sr. No.	Water Quality Parameters	Units	NEQS for Municipal Effluents	Lab Results GSW1	Lab Results GSW2
1.	Temperature	^{0}C	40	30	29
2.	Turbidity	NTU	< 5 NTU	39	19
3.	Electric conductivity	µS/cm		3870	271
4.	pH	pH unit	10-Jun	8.59	6.59
5.	Nitrogen, Total Kjeldahl (TKN)	mg/L		15.93	0.28

[23] Environmental Impact Assessment (EIA) of sanitary landfillsite Gujranwala

[24] Environmental Impact Assessment (EIA) of sanitary landfillsite Gujranwala

6.	Chemical Oxygen Demand (COD)	mg/L	150	607	10
7.	Biochemical Oxygen Demand (BOD_5)	mg/L	80	152	<3
8.	Suspended Solids (SS)	mg/L	150	65	26
9.	Cadmium (Cd)	mg/L	0.1	<0.003	<0.003
10.	Lead (Pb)	mg/L	0.5	<0.005	<0.005
11.	Chromium (Cr^{6+})	mg/L	1	0.013	<0.005
12.	Selenium (Se)	mg/L	0.5	<0.005	<0.005
13.	Arsenic (As)	mg/L	1	0.038	<0.005
14.	Total Mercury (T-Hg)	mg/L	0.01	<0.001	<0.001

Source: *Water Quality Survey Report season 1 for Integrated Solid Waste Management Master Plan for Gujranwala.*

6.2.2 Summary of Results Gondalanwala Ground Water

Total 7 samples were taken for laboratory analysis. These samples are from underground sources near Gondalanwala dumpsite. Most of results seem to be satisfactory however values of turbidity are higher in some of the sample. These results are higher due to poor quality of casing used in the hand pumps and overall shallow depth of installation.

Sample was collected from five specific points around Chianwali dumping site. Results of specific parameters are given in the table below. The findings are presented as follows:

Table 14: Surface water Test Results (Chianwali Dumping Site)

Sr. No.	Water Quality Parameters	Units	NEQS for Municipal Effluents	Lab Results CSW1	Lab Results CSW2	Lab Results CSW3	Lab Results CSW4	Lab Results CSW5
1.	Temperature	0C	40	30	29	30	24	26
2.	Turbidity	NTU		16	89	19	12	21
3.	Electric conductivity	µS/cm		1639	1530	1608	111	185
4.	pH	pH unit	10-Jun	6.87	7.27	7.27	6.97	6.51
5.	Nitrogen, Total Kjeldahl (TKN)	mg/L		8.4	9.85	505	0.28	0.28
6.	Chemical Oxygen	mg/L	150	341	508	292	<5	27

	Demand (COD)							
7.	Biochemical Oxygen Demand (BOD5)	mg/L	80	165	178	151	<3	7
8.	Suspended Solids (SS)	mg/L	150	39	45	18	17	185
9.	Cadmium (Cd)	mg/L	0.1	<0.003	<0.003	<0.003	<0.003	<0.003
10.	Lead (Pb)	mg/L	0.5	<0.005	<0.005	<0.005	<0.005	<0.005
11.	Chromium (Cr6+)	mg/L	1	<0.005	<0.005	<0.005	0.011	<0.005
12.	Selenium (Se)	mg/L	0.5	<0.005	<0.005	<0.005	<0.005	<0.005
13.	Arsenic (As)	mg/L	1	0.009	0.012	0.008	<0.005	<0.005
14.	Total Mercury (T-Hg)	mg/L	0.01	<0.001	<0.001	<0.001	<0.001	<0.001

Source: *Water Quality Survey Report season 1 for Integrated Solid Waste Management Master Plan for Gujranwala.*

6.2.3 Summary of Results Chianwali Surface Water

The chemical analysis have been done at 3 place on effluent drain passing by the dumping site and the secondary drain which is present along the side wall of dumping site. The highest values for BOD and COD have been observed in sample which is collected near the effluent drain of the juice factory. The values decrease as the distance from the effluent pipe increases. Two samples have been taken from irrigation canal flowing west of the dumping site, the upstream and downstream sample shows satisfactory results. The fact that quantity of effluent from the drain is very low in comparison with quantity if water in canal. This factor lowers down the concentration of effluents

6.2.4 Ground Water Quality

In order to establish the groundwater quality of the study area, samples were collected from groundwater wells and hand pumps already pivoted at the project site. Following samples were selected for ground water quality testing;

Samples were collected from seven different ground water sources near Gondalanwala dumpsite. Results of all seven samples are presented below in **Table.**

.

Table 15: Ground Water Quality Test Results (Gondlanwala Dumping Site)

Sr. No.	Water Quality Parameters	Units	NSDWQ	WHO	Lab Results GGW1	Lab Results GGW2	Lab Results GGW3	Lab Results GGW4	Lab Results GGW5	Lab Results GGW6	Lab Results GGW7
1.	Temperature	^{0}C	-	-	30	30	29	28	28	28	28
2.	Turbidity	NTU	< 5 NTU	< 5 NTU	1	11	1	1	<0.20	14	2
3.	Electric conductivity	µS/cm	-	-	1165	1216	1408	966	1317	1114	115
4	pH	pH unit	6.5 – 8.5	6.5 – 8.5	6.87	7.12	7.69	7.02	6.85	7.61	7.23
5.	Nitrogen, Total Kjeldahl (TKN)	mg/L	< 3	3	0.58	0.58	0.28	0.28	0.28	0.28	0.28
6.	Chemical Oxygen Demand (COD)	mg/L	-	-	<5	17	<5	<5	<5	9	<5
7.	Biochemical Oxygen Demand (BOD_5)	mg/L	-	-	<3	<3	<3	<3	<3	<3	<3
8.	Suspended Solids (SS)	mg/L	-	-	<5	35	<5	<5	<5	7	<5
9.	Cadmium (Cd)	mg/L	0.01	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
10.	Lead (Pb)	mg/L	≤ 0.05	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
11.	Chromium (Cr^{6+})	mg/L	≤ 0.05	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
12.	Selenium (Se)	mg/L	0.01 (P)	0.01	<0.005	<0.005	0.006	0.005	<0.005	<0.005	<0.005
13.	Arsenic (As)	mg/L	≤ 0.05 (P)	0.01	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	0.008
14.	Total Mercury (T-Hg)	mg/L	≤ 0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

***Source**: Water Quality Survey Report season 1 for Integrated Solid Waste Management Master Plan for Gujranwala.*

6.2.5 Summary of Results Gondalanwala Ground Water

Total 7 samples were taken for laboratory analysis. These samples are from underground sources near Gondalanwala dumpsite. Most of results seem to be satisfactory however values of turbidity are higher in some of the sample. These results are higher due to poor quality of casing used in the hand pumps and overall shallow depth of installation.

Samples were collected from five different ground water sources near Chianwali dumpsite. Results of all five samples are presented below in **Table.**

Table 16: Ground Water Quality Test Results (Chianwali Dumping Site)

Sr. No.	Water Quality Parameters	Units	NSDWQ	WHO	Lab Results CGW1	Lab Results CGW2	Lab Results CGW3	Lab Results CGW4	Lab Results CGW5
1.	Temperature	^{0}C	-	-	24	28	24	26	26
2.	Turbidity	NTU	< 5 NTU	< 5 NTU	2	<0.20	1	1	<0.20
3.	Electric conductivity	µS/cm	-	-	564	1854	330	798	332
4.	pH	pH unit	6.5 – 8.5	6.5 – 8.5	7.05	6.92	6.73	7.02	6.89
5.	Nitrogen, Total Kjeldahl (TKN)	mg/L	< 3	3	0.28	0.28	0.28	0.28	0.28
6.	Chemical Oxygen Demand (COD)	mg/L	-	-	<5	<5	<5	<5	<5
7.	Biochemical Oxygen Demand (BOD_5)	mg/L	-	-	<3	<3	<3	<3	<3
8.	Suspended Solids (SS)	mg/L	-	-	<5	<5	<5	<5	<5
9.	Cadmium (Cd)	mg/L	0.01	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
10.	Lead (Pb)	mg/L	≤ 0.05	0.01	<0.005	<0.005	<0.005	<0.005	<0.005
11.	Chromium (Cr^{6+})	mg/L	≤ 0.05	0.05	<0.005	<0.005	<0.005	<0.005	<0.005
12.	Selenium (Se)	mg/L	0.01 (P)	0.01	0.005	<0.005	<0.005	0.007	<0.005
13.	Arsenic (As)	mg/L	≤ 0.05 (P)	0.01	0.014	0.19	<0.005	<0.005	0.005

14.	Total Mercury (T-Hg)	mg/L	≤ 0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001

***Source**: Water Quality Survey Report season 1 for Integrated Solid Waste Management Master Plan for Gujranwala.*

6.2.6 Summary of Results Chianwali Ground Water

Water samples have been obtained from the ground water source near the Chianwali dumping site. The samples which are obtained from the depth of more than 100 feet show satisfactory results. However one of the water sample which is taken from the hand pump installed at depth of 65 feet outside the boundary of a juice factory shows significant amount of Arsenic.

6.3 Hydrological Situation

The estimated amount of surface runoff is about 2000 Cusecs (ft^3/s) per year. Currently, this significant amount of storm runoff is not fully utilized in order to meet the water requirements of the inhabitants of the city. The quality of storm water is a very serious issue for proper runoff management in the project area.[25]

As water moves across the land surface during or after a storm, it transports dissolved and suspended materials present along the path of flow. In many cases, the pollutants carried to streams and lakes by surface runoff are a significant contribution to water pollution. Wash-off materials of more importance are sediment, mineral salts, heavy metals, nutrients, pesticides, biodegradable organics and microbial pollutants[26].

The rainfall water is overall polluted in the open spaces of the project area except few playgrounds and parks.[27] It is mainly due to the improper discharge of effluent from industries with toxic elements in the urban area, animal dung on roads & streets, garbage and mixing of rainfall water with sewage because of the leakage of existing sewer system. So the quality of storm water runoff has to be improved before its use. The pollution of storm runoff can be managed by improving the existing sewer system,

[25] Journal of River Engineering Vol. 1.Utilization of Storm Runoff for Ground water Recharge in Urban Areas-A Case Study of Gujranwala City in Pakistan

[26] Linsley, R.K., Kohler, M.A. and Paulhaus, J.H. Hydrology for Engineers, 3rd Edition, 5th Reprinting, McGraw-Hill Co. Singapore, ISBN: 0-07-Y66389-0, 1985

[27] Journal of River Engineering Vol. 1.Utilization of Storm Runoff for Ground water Recharge in Urban Areas-A Case Study of Gujranwala City in Pakistan

maintaining cleanliness in the city and avoiding the effluent discharge from industries in the urban area.

The main source of drinking water is groundwater in the city. The groundwater is available in some areas at shallow depths (3-12 m) as unconfined aquifers[28]. But typically groundwater is present in deep strata (300-500 ft or more deep) as confined aquifers[4]. Due to massive rate of pumping the groundwater table is decreasing each year approximately by 1.5 ft. The water quality of drinking water drawn from shallow depths is not good in some areas as reported by PCRWR and World Bank [4, 29]. As the shallow water is seriously contaminated due to mixing of sewage through the leakage of underground sewerage and therefore this resource as a drinking water resource without water purification is actually in danger[4]. The pollution of drinking water can be reduced by treating the groundwater drawn from shallow aquifers and also improving the existing sewer system.

For groundwater recharge, confined aquifers are available at various locations in Gujranwala city. The water in unconfined aquifers is mostly less or unavailable and contaminated due to infiltration of toxic elements from the ground surface into the aquifers and mixing of sewage by the possible leakage of underground sewer system. The confined aquifers are available at different locations in Gujranwala at an average depth of about 276 ft with an average saturated thickness of 243 ft.

6.4 Soil Contamination

Gujranwala's soil is fine loamy, alluvial and fertile consisting of a flat strip which was the result of the old river traces. But the soil fertility varies according to the nature, cropping pattern and management practices adopted in the different areas.

According to one of the institutes named as Soil and Water Testing Research Laboratory, 35% of the Gujranwala land has degraded soil reaching the pH/alkalinity value to around 8.50. The soil lacks the basic nutrients like nitrogen, potash and phosphorous by 90 percent, 30 percent and 85 percent respectively which in turn decelerates the growth of plants[30].

According to one of the research articles published in the Journal of Soil Science Society of Pakistan, 2013; the total concentrations of Cadmium (Cd), Copper (Cu), Lead (Pb) and Nickel (Ni) were found to be higher than the permissible limits as compared to the limits

[28] Status Quo Report Gujranwala Urban Water Supply and Sewerage Reform Strategy, World Bank & Govt. of Punjab, FICHTNER Germany, 2006.

[29] http://www.pcrwr.gov.pk

[30] Pre-Investment Study District Gujranwala, 2009

proposed by Food and Agriculture Organisation (FAO). The long term and continuous exposure of untreated municipal and industrial effluent may account for these significantly high heavy metals concentrations in the soil[31].

According to a study conducted by Bahauddin Zikariya University, 2008, the concentrations of all the elements of concern were high in the Gujranwala test samples of the soil. Numerours factors such as industrial and agricultural activities and operations, waste disposal from industrial and domestic point sources and vehicular discharges accounts for soil contamination in Gujranwala. The nature of Gujranwala's soil defines to be clay loam type which is considered to be very fertile for agricultural production[32].

6.5 Noise and Vibration Analysis

According to Pakistan's National Environmental Quality Standards (NEQS), the level of noise should not exceed 85 decibels (dB) at a distance of 7.5 m from the source. The World Bank (WB) Standards for industrial sites/areas, as a receptor, is at 70 dBA. For residential receptors the day time allowable level is 55 dBA and night time 45 dBA or within 3 dBA increase if the background already exceeds these.

For noise measurement sound level meter was utilized, having level range from 35dB to 130dB with resolution limit of 0.1dB. Noise level was monitored at three sampling points for two consecutive days (P1: upstream of the proposed landfill site, P2: Centre of the proposed landfill site, P3: Downstream of the proposed landfill site).

[31] Akhtar et al., 2013, Metal tolerance potential of filamentous fungi isolated from soils irrigated with untreated municipal effluent, Land Resources Research Institute, National Agriculture Research Centre, Islamabad.

[32] Syed Noorullah Hussaini, 2008, A Study Of Polluted Eco-System Of Industrial Areas Caused By The Industrial Effluents, Bahauddin Zikariya University.

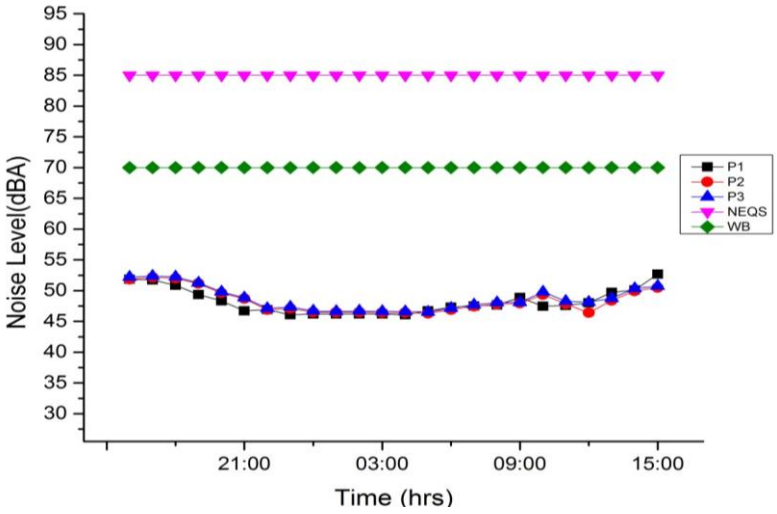


Figure 19: Noise Level during 24 Hrs. Monitoring

6.6 Offensive Odor Level Information

There is no secondary data available regarding offensive odor level of the six sites. Whereas according to the survey carried out for opinion and awareness of stakeholders; some respondents highlighted that bad smell is one of the problems that people are facing there due to dump sites of Chianwli and Gondlanwala. But information regarding level of odor is not available.

7 E & S Assessment for Alternative Facilities/ Systems

Under the project activities and assessments, E&S assessment of various facilities and systems of solid waste management system were analysed according to the requirement of category B projects described in the latest Guidelines of JICA on social and environmental considerations (2010).

Following tables illustrate various options and their impacts respectively. Key to these assessments is presented below.

Key

No Impact	
Minor Negative Impact	Minor Positive Impact
Moderate Negative Impact	Moderate Positive Impact
Major Negative Impact	Major Positive Impact

7.1 E & S Assessment of Waste Discharge Options

For the first option, waste discharge by the households without separation is considered. For this option environmental and social considerations are presented in the Table below which is self-explanatory.

Table 17: E&S Assessment for Waste Discharge without Separation

SWM Facilities/Systems:	**Waste Discharge Method**
Prospective Option:	**No Separation of Recyclables**
Scope of Area:	**Waste Generation Sources**
Environmental Assessment	
Impact on Environment	
Air	No Impact
Water	No Impact
Soil	Minor Negative Impact
Waste	Moderate Negative Impact
Accidents	No Impact
Water Usage	No Impact
Climate Change	No Impact
Ecosystems	Minor Negative Impact

Fauna	No Impact
Flora	No Impact
Social Assessment	
Impact on Society	
Migration of Population	No Impact
Involuntary Settlement	Moderate Negative Impact
Employment & Livelihood	Moderate Positive Impact
Utilisation of Land & Local Resources	Major Negative Impact
Social Institutions	No Impact
Social Infrastructures and Services	No Impact
Vulnerable Social Groups	No Impact
Equality of Benefits and Losses	No Impact
Equality in the Development Process	No Impact
Gender	No Impact
Children's Rights	No Impact
Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	Moderate Negative Impact
Working Conditions	No Impact

The other option considered for waste discharge method is when the households separate different components before the take out the waste from their house. The parameters of environment and social consideration are presented below.

Table 18: E&S Assessment for Waste Discharge with Separation

Scope of Area:	**Waste Generation Sources**
Prospective Option:	**Separation of Recyclables**
Environmental Assessment	
Impact on Environment	
Air	No Impact
Water	No Impact
Soil	Minor Positive Impact
Waste	Moderate Positive Impact
Accidents	No Impact

Water Usage	No Impact
Climate Change	No Impact
Ecosystems	Minor Positive Impact
Fauna	No Impact
Flora	No Impact
Social Assessment	
Impact on Society	
Migration of Population	No Impact
Involuntary Settlement	No Impact
Employment & Livelihood	Moderate Positive Impact
Utilisation of Land & Local Resources	Moderate Positive Impact
Social Institutions	No Impact
Social Infrastructures and Services	No Impact
Vulnerable Social Groups	No Impact
Equality of Benefits and Losses	No Impact
Equality in the Development Process	No Impact
Gender	No Impact
Children's Rights	No Impact
Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	Moderate Positive Impact
Working Conditions	No Impact

7.2 E & S Assessment for Waste Collection and Transport

After the waste discharge, waste is brought to the collection points and transported to treatment or disposal. There are some options which may be adopted for the waste collection and transportation based on their environmental and social impacts. Following tables presents E&S assessment for these options.

First of all the table below presents the assessment for current practice of waste collection and transport. It means what impacts we will observe if GWMC continues to operate on business as usual mode.

Table 19: E & S Assessment for Current Waste Collection and Transport

SWM Facilities/Systems:	Collection and Transport
Prospective Option:	Current Practices of Collection and Transport Operation
Scope of Area:	Entire Collection Service Area
Environmental Assessment	
Impact on Environment	
Air	Minor Negative Impact
Water	No Impact
Soil	Minor Negative Impact
Waste	Minor Negative Impact
Accidents	No Impact
Water Usage	No Impact
Climate Change	No Impact
Ecosystems	Minor Negative Impact
Fauna	No Impact
Flora	No Impact
Social Assessment	
Impact on Society	
Migration of Population	No Impact
Involuntary Settlement	Moderate Negative Impact
Employment & Livelihood	Moderate Positive Impact
Utilisation of Land & Local Resources	Major Negative Impact
Social Institutions	No Impact
Social Infrastructures and Services	No Impact
Vulnerable Social Groups	No Impact
Equality of Benefits and Losses	No Impact
Equality in the Development Process	No Impact
Gender	No Impact
Children's Rights	No Impact
Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	Moderate Negative Impact
Working Conditions	No Impact

Coming to the second option of direct transport, let us consider the following table which present the impacts.

Table 20: E & S Assessment for Direct Transport

SWM Facilities/Systems:	**Collection and Transport**
Prospective Option:	**Direct Transport**
Scope of Area:	**Entire Collection Service Area**
Environmental Assessment	
Impact on Environment	
Air	Minor Negative Impact
Water	No Impact
Soil	No Impact
Waste	Minor Negative Impact
Accidents	No Impact
Water Usage	No Impact
Climate Change	No Impact
Ecosystems	Minor Negative Impact
Fauna	No Impact
Flora	No Impact
Social Assessment	
Impact on Society	
Migration of Population	No Impact
Involuntary Settlement	No Impact
Employment & Livelihood	Minor Negative Impact
Utilisation of Land & Local Resources	Major Negative Impact
Social Institutions	No Impact
Social Infrastructures and Services	No Impact
Vulnerable Social Groups	No Impact
Equality of Benefits and Losses	No Impact
Equality in the Development Process	No Impact
Gender	No Impact
Children's Rights	No Impact
Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	Moderate Negative Impact

Working Conditions	No Impact

One of the collection and transport options is through transfer station. Below the table summarizes E&S considerations for this option.

Table 21: E&S Assessment for Transfer Stations

SWM Facilities/Systems:	**Collection and Transport**
Prospective Option:	**Transfer Station (T/S)**
Scope of Area:	**Specific Sites in the Collection Service Area**
Environmental Assessment	
Impact on Environment	
Air	No Impact
Water	No Impact
Soil	Minor Negative Impact
Waste	Moderate Positive Impact
Accidents	Minor Positive Impact
Water Usage	No Impact
Climate Change	Minor Positive Impact
Ecosystems	Minor Positive Impact
Fauna	No Impact
Flora	No Impact
Social Assessment	
Impact on Society	
Migration of Population	No Impact
Involuntary Settlement	No Impact
Employment & Livelihood	No Impact
Utilisation of Land & Local Resources	Minor Negative Impact
Social Institutions	No Impact
Social Infrastructures and Services	No Impact
Vulnerable Social Groups	No Impact
Equality of Benefits and Losses	No Impact
Equality in the Development Process	No Impact
Gender	No Impact

Children's Rights	No Impact
Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	Moderate Positive Impact
Working Conditions	Minor Positive Impact

Table 22: E&S Assessment for Separate Collection

SWM Facilities/Systems:	**Collection and Transport**
Prospective Option:	**Separate Collection**
Scope of Area:	**A Part of Entire Collection Service Area**
Environmental Assessment	
Impact on Environment	
Air	Minor Positive Impact
Water	No Impact
Soil	No Impact
Waste	Minor Positive Impact
Accidents	Minor Positive Impact
Water Usage	No Impact
Climate Change	Minor Positive Impact
Ecosystems	No Impact
Fauna	No Impact
Flora	No Impact
Social Assessment	
Impact on Society	
Migration of Population	No Impact
Involuntary Settlement	No Impact
Employment & Livelihood	No Impact
Utilisation of Land & Local Resources	Minor Positive Impact
Social Institutions	No Impact
Social Infrastructures and Services	No Impact
Vulnerable Social Groups	No Impact
Equality of Benefits and Losses	No Impact

Equality in the Development Process	No Impact
Gender	No Impact
Children's Rights	No Impact
Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	Moderate Positive Impact
Working Conditions	Moderate Positive Impact

7.3 E & S Assessment for 3R and Intermediate Treatment

In many countries and even in Pakistan material recovery is being carried out. It mainly is because of the economic value of waste components. For the time being, private sector has shown interest to make business from waste, however, if it is proven profitable for the public sector organisations, it would be much better in terms of waste management. In the following two tables, 3R activities if performed by both sectors is presented respectively.

Table 23: E&S Assessment for Current 3R Practices by Private Sector

SWM Facilities/Systems:	**3 R & Intermediate Treatment**
Prospective Option:	**Current Practices by Private Sector Initiative**
Scope of Area:	**Entire Collection Service Area**
Environmental Assessment	
Impact on Environment	
Air	Moderate Positive Impact
Water	No Impact
Soil	No Impact
Waste	Moderate Positive Impact
Accidents	No Impact
Water Usage	No Impact
Climate Change	Minor Positive Impact
Ecosystems	Minor Positive Impact
Fauna	No Impact
Flora	No Impact
Social Assessment	
Impact on Society	

Migration of Population	No Impact
Involuntary Settlement	Minor Positive Impact
Employment & Livelihood	Minor Positive Impact
Utilisation of Land & Local Resources	Minor Positive Impact
Social Institutions	No Impact
Social Infrastructures and Services	No Impact
Vulnerable Social Groups	No Impact
Equality of Benefits and Losses	No Impact
Equality in the Development Process	Minor Positive Impact
Gender	No Impact
Children's Rights	No Impact
Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	Moderate Positive Impact
Working Conditions	Minor Positive Impact

Table 24: E&S Assessment for 3R Practices by GWMC

SWM Facilities/Systems:	**3 R & Intermediate Treatment**
Prospective Option:	**Implementation of 3R Activities by GWMC Initiative**
Scope of Area:	**A Part of Entire Collection Service**
Environmental Assessment	
Impact on Environment	
Air	Minor Positive Impact
Water	No Impact
Soil	No Impact
Waste	Moderate Positive Impact
Accidents	No Impact
Water Usage	No Impact
Climate Change	Minor Positive Impact
Ecosystems	Minor Positive Impact
Fauna	No Impact
Flora	No Impact

Social Assessment	
Impact on Society	
Migration of Population	No Impact
Involuntary Settlement	No Impact
Employment & Livelihood	Minor Positive Impact
Utilisation of Land & Local Resources	Minor Positive Impact
Social Institutions	No Impact
Social Infrastructures and Services	Minor Positive Impact
Vulnerable Social Groups	No Impact
Equality of Benefits and Losses	No Impact
Equality in the Development Process	No Impact
Gender	No Impact
Children's Rights	No Impact
Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	Moderate Positive Impact
Working Conditions	Minor Positive Impact

Another option for 3R and intermediate treatment is that there is no treatment prior to disposal. Following table presents the E&S assessment for the option of no treatment.

Table 25: E&S Assessment for No Treatment

SWM Facilities/Systems:	**3 R & Intermediate Treatment**
Prospective Option:	**No Treatment**
Scope of Area:	**Not Applicable**
Environmental Assessment	
Impact on Environment	
Air	Minor Negative Impact
Water	No Impact
Soil	Minor Negative Impact
Waste	Moderate Negative Impact
Accidents	No Impact
Water Usage	No Impact
Climate Change	Minor Negative Impact

Ecosystems	Minor Negative Impact
Fauna	No Impact
Flora	No Impact
Social Assessment	
Impact on Society	
Migration of Population	No Impact
Involuntary Settlement	No Impact
Employment & Livelihood	Minor Negative Impact
Utilisation of Land & Local Resources	Major Negative Impact
Social Institutions	No Impact
Social Infrastructures and Services	No Impact
Vulnerable Social Groups	No Impact
Equality of Benefits and Losses	No Impact
Equality in the Development Process	No Impact
Gender	No Impact
Children's Rights	No Impact
Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	Moderate Negative Impact
Working Conditions	Minor Negative Impact

One of the treatment options which might be preferred in our cultural context is making compost which is then utilized as soil fertilizer. Following table presents the social and environmental consideration for treatment of waste to convert it into compost.

Table 26: E&S Assessment for Composting

SWM Facilities/Systems:	**3 R & Intermediate Treatment**
Prospective Option:	**Composting**
Scope of Area:	**In the compound of fresh food market(s) or in the compound of the proposed landfill site at Bhakhraywala**
Environmental Assessment	
Impact on Environment	
Air	Minor Positive Impact
Water	No Impact

Soil	Minor Positive Impact
Waste	Minor Positive Impact
Accidents	No Impact
Water Usage	No Impact
Climate Change	Minor Positive Impact
Ecosystems	Minor Positive Impact
Fauna	No Impact
Flora	No Impact
Social Assessment	
Impact on Society	
Migration of Population	No Impact
Involuntary Settlement	No Impact
Employment & Livelihood	No Impact
Utilisation of Land & Local Resources	Minor Positive Impact
Social Institutions	No Impact
Social Infrastructures and Services	Minor Positive Impact
Vulnerable Social Groups	No Impact
Equality of Benefits and Losses	No Impact
Equality in the Development Process	No Impact
Gender	No Impact
Children's Rights	No Impact
Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	Minor Positive Impact
Working Conditions	Minor Positive Impact

One other option for waste treatment is developing a material recovery facility which diverts many waste streams into re-useful productive life. Following table present E&S considerations for this option.

Table 27: E&S Assessment for Material Recovery Facility

SWM Facilities/Systems:	**3 R & Intermediate Treatment**
Prospective Option:	**Material Recovery Facilities (MRF)**

Scope of Area:	Closed landfill site at Chianwali or in the compound of the proposed landfill site at Bhakhraywala
Environmental Assessment	
Impact on Environment	
Air	No Impact
Water	No Impact
Soil	Minor Positive Impact
Waste	Moderate Positive Impact
Accidents	No Impact
Water Usage	No Impact
Climate Change	Minor Positive Impact
Ecosystems	Minor Positive Impact
Fauna	No Impact
Flora	No Impact
Social Assessment	
Impact on Society	
Migration of Population	No Impact
Involuntary Settlement	No Impact
Employment & Livelihood	Minor Positive Impact
Utilisation of Land & Local Resources	Minor Positive Impact
Social Institutions	No Impact
Social Infrastructures and Services	No Impact
Vulnerable Social Groups	No Impact
Equality of Benefits and Losses	No Impact
Equality in the Development Process	No Impact
Gender	No Impact
Children's Rights	No Impact
Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	Minor Positive Impact
Working Conditions	No Impact

One of the options of treating waste to useful power generation is incineration. However, this process may have some environmental or social impacts. Following table presents the probable impacts for incineration with power generation.

Table 28: E&S Assessment for Incineration with Power Generation

SWM Facilities/Systems:	**3 R & Intermediate Treatment**
Prospective Option:	**Incineration with Power Generation**
Scope of Area:	**In the compound of the proposed landfill site at Bhakhraywala**
Environmental Assessment	
Impact on Environment	
Air	Moderate Negative Impact
Water	No Impact
Soil	No Impact
Waste	Moderate Positive Impact
Accidents	No Impact
Water Usage	Minor Negative Impact
Climate Change	Minor Negative Impact
Ecosystems	Minor Negative Impact
Fauna	No Impact
Flora	No Impact
Social Assessment	
Impact on Society	
Migration of Population	No Impact
Involuntary Settlement	No Impact
Employment & Livelihood	Minor Positive Impact
Utilisation of Land & Local Resources	Minor Positive Impact
Social Institutions	No Impact
Social Infrastructures and Services	No Impact
Vulnerable Social Groups	No Impact
Equality of Benefits and Losses	No Impact
Equality in the Development Process	No Impact
Gender	No Impact
Children's Rights	No Impact

Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	Minor Positive Impact
Working Conditions	No Impact

Other than power generation through incineration, RDF is also used to run the combustion process. RDF can be used in combination with coal to generate enough heat to run boilers or kilns. Following table summarizes the E&S considerations for such option.

Table 29: E&S Assessment for Refuse Derived Fuel

SWM Facilities/Systems:	**3 R & Intermediate Treatment**
Prospective Option:	**Refused Derived Fuel (RDF)**
Scope of Area:	**In the compound of the proposed landfill site at Bhakhraywala**
Environmental Assessment	
Impact on Environment	
Air	Moderate Negative Impact
Water	No Impact
Soil	No Impact
Waste	Moderate Positive Impact
Accidents	No Impact
Water Usage	No Impact
Climate Change	Minor Positive Impact
Ecosystems	Minor Positive Impact
Fauna	No Impact
Flora	No Impact
Social Assessment	
Impact on Society	
Migration of Population	No Impact
Involuntary Settlement	No Impact
Employment & Livelihood	Minor Positive Impact
Utilisation of Land & Local Resources	Minor Positive Impact
Social Institutions	No Impact
Social Infrastructures and Services	No Impact
Vulnerable Social Groups	No Impact

Equality of Benefits and Losses	No Impact
Equality in the Development Process	No Impact
Gender	No Impact
Children's Rights	No Impact
Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	No Impact
Working Conditions	No Impact

Bio-gasification process may also be adopted as intermediate treatment option for municipal solid waste. Following table presents the E&S considerations for bio-gasification plant.

Table 30: E&S Assessment for Bio-gasification Plant

SWM Facilities/Systems:	**3 R & Intermediate Treatment**
Prospective Option:	**Bio-gasification Plant**
Scope of Area:	**In the compound of the proposed landfill site at Bhakhraywala**
Environmental Assessment	
Impact on Environment	
Air	Moderate Negative Impact
Water	No Impact
Soil	No Impact
Waste	Moderate Positive Impact
Accidents	No Impact
Water Usage	No Impact
Climate Change	Minor Positive Impact
Ecosystems	Minor Positive Impact
Fauna	No Impact
Flora	No Impact
Social Assessment	
Impact on Society	
Migration of Population	No Impact
Involuntary Settlement	No Impact
Employment & Livelihood	Minor Positive Impact

Utilisation of Land & Local Resources	Minor Positive Impact
Social Institutions	No Impact
Social Infrastructures and Services	No Impact
Vulnerable Social Groups	No Impact
Equality of Benefits and Losses	No Impact
Equality in the Development Process	No Impact
Gender	No Impact
Children's Rights	No Impact
Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	Minor Positive Impact
Working Conditions	No Impact

Moving forward to the waste management stage is the waste disposal method. Considering a zero option is that there is no new landfill to be constructed. Following table presents the E&S considerations for such situation.

Table 31: E&S Assessment for No New Disposal Site

SWM Facilities/Systems:	**Final Disposal**
Prospective Option:	**No New Final Disposal**
Scope of Area:	**Existing disposal site in Gondlanwala**
Environmental Assessment	
Impact on Environment	
Air	Minor Negative Impact
Water	Minor Negative Impact
Soil	Moderate Negative Impact
Waste	Minor Negative Impact
Accidents	No Impact
Water Usage	Minor Negative Impact
Climate Change	Minor Negative Impact
Ecosystems	Moderate Negative Impact
Fauna	No Impact
Flora	No Impact
Social Assessment	
Impact on Society	

Migration of Population	No Impact
Involuntary Settlement	Minor Negative Impact
Employment & Livelihood	Minor Negative Impact
Utilisation of Land & Local Resources	Moderate Negative Impact
Social Institutions	No Impact
Social Infrastructures and Services	No Impact
Vulnerable Social Groups	Minor Negative Impact
Equality of Benefits and Losses	No Impact
Equality in the Development Process	No Impact
Gender	No Impact
Children's Rights	No Impact
Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	Minor Negative Impact
Working Conditions	Minor Negative Impact

If instead of making no new disposal site, a sanitary landfill is constructed, there will be some social and environmental impact. The assessment on these two parameters is presented in table below.

Table 32: E&S Assessment for Sanitary Landfill

SWM Facilities/Systems:	**Waste Discharge Method**
Prospective Option:	**Sanitary Landfill**
Scope of Area:	**Proposed site at Bhakraywala**
Environmental Assessment	
Impact on Environment	
Air	Minor Positive Impact
Water	Minor Positive Impact
Soil	Minor Positive Impact
Waste	Minor Positive Impact
Accidents	No Impact
Water Usage	No Impact
Climate Change	Minor Positive Impact
Ecosystems	Minor Positive Impact
Fauna	No Impact
Flora	No Impact
Social Assessment	

Impact on Society	
Migration of Population	No Impact
Involuntary Settlement	No Impact
Employment & Livelihood	Minor Positive Impact
Utilisation of Land & Local Resources	Minor Positive Impact
Social Institutions	No Impact
Social Infrastructures and Services	Minor Positive Impact
Vulnerable Social Groups	Minor Positive Impact
Equality of Benefits and Losses	No Impact
Equality in the Development Process	No Impact
Gender	No Impact
Children's Rights	No Impact
Cultural Heritage	No Impact
Local Conflicts of Interest	No Impact
Infectious Diseases	Minor Positive Impact
Working Conditions	Minor Positive Impact

Gondlanwala Dumpsite

Category	Environmental	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from	(a) N (b) N (c) N (d) N	(a) Gondlanwala is not a designed disposal site. It's a temporary dumping site so no EIA report has been prepared for it. The site is expected to be closed as soon as the sanitary landfill starts working. (b) No EIA study was conducted for Gondlanwala disposal site. (c) No EIA study was conducted for Gondlanwala disposal site. (d) No additional permits have been obtained from regulatory authority.
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) Y (b) N	(a) The potential impacts have been adequately explained during the E&S survey to local stakeholders. (b) As the Gondlanwala was not planned dumping site, so there is no design of the site.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) N	(a) The alternative plans were not examined as it was nonscientific dumping ground and is not a planned site.
	(1) Air Quality	(a) Do air pollutants, such as sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust, and dioxins emitted from various sources, such as incinerators, and vehicles used for waste collection and transportation comply with the country's emission standards and ambient air quality standards?	(a)N	(a) Vehicles used for collection and transportation were never checked to comply with country's emission standards and ambient standards.

2 Pollution Control	(2) Water Quality	(a) Do effluents from various facilities comply with the country's effluent standards and ambient water quality standards? (b) Does the water quality of leachates from the waste disposal sites comply with the country's effluent standards and ambient water quality standards? (c) Are adequate measures taken to prevent contamination of surface water and groundwater by these effluents and leachates?	(a) N (b) N (c) N	(a) Water quality was tested and found that many parameters didn't comply with the effluent standards. (b) No leachate quality tests have been conducted for the site. (c) No measures have been taken to prevent contamination of surface and ground water by these effluents and leachates.
	(3) Wastes	(a) Are wastes, such as treatment residues, cinder, and fly ash generated from crushing and segregation processes, and diverted wastes from composting process properly treated and disposed of in accordance with the country's regulations? (b) Are hazardous and dangerous wastes properly segregated from other wastes, stabilized, treated, and disposed of in accordance with the country' s standards?	(a)N (b) N	(a) There is no treatment of waste at the dumping site. (b) There was no segregation of hazardous and dangerous waste at the dumping site.
	(4) Soil Contamination	(a) Are adequate measures taken to prevent contamination of soil and groundwater by leachates from the waste disposal sites?	(a) N	(a) No measures have been taken to prevent the contamination of soil and groundwater from leachates.
	(5) Noise and Vibration	(a) Do noise and vibrations generated by the facility operations (especially incinerators, waste segregation and crushing facilities), and vehicle traffic for waste collection and transportation comply with the country's standards?	(a) N	(a) Noise and vibration was not tested at the dumping site for the compliance with country's standards.
	(6) Odor	(a) Are adequate odor control measures taken?	(a) N	(a) No measures have been opted to control odor problem.

Category	Environmental	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) The project site is not located in the notified protected area.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Is there a possibility that the project will adversely affect aquatic organisms? If impacts are anticipated, are adequate measures taken to reduce the impacts on aquatic organisms? (e) Is there a possibility that the project will adversely affect vegetation and wildlife? If impacts are anticipated, are adequate measures taken to reduce	(a) N (b) N (c) Y (d) Y (e) Y	(a) The project site doesn't have primeval forests, tropical rain forests or ecologically valuable habitats. (b) The project site doesn't have protected habitats of endangered species according to national and international law (c) No impacts were identified and no mitigation measure were implemented at the Gondlanwala dumping site. (d) No impacts were identified on aquatic organism, therefore no measures have been taken to protect it. (e) The project is expected to impact vegetation and wildlife, but no measures have been taken to protect it.
	(3) Management of Abandoned Sites	(a) Are environmental protection and restoration plans (such as landfill gas and leachate collection and treatment systems, prevention of illegal dumping, and reforestation) after facility closure considered? (b) Is a sustainable management framework for the abandoned sites established? (c) Are adequate financial provisions secured to manage the abandoned sites?	(a) N (b) N (c) N	(a) The Gondlanwala site will be closed when the sanitary landfill starts functioning but no plan has been prepared for environmental protection and restoration. (b) No sustainable management framework for the abandoned sites are in place. (c) The administration and financial provisions lies with Gujranwala Waste Management Company (GWMC). At present no financial provision is in plan.

Category	Environmental	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Is the compensations going to be paid prior to the resettlement? (e) Is the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, and people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans	(a) N (b) N (c) N (d) N (e) N (f) N (g) N (h) N (i) N (j) N	(a) There will be no resettlement for the proposed project (b) There will be no resettlement or compensation for the proposed project (c) There will be no resettlement or compensation for the proposed project (d) There will be no resettlement or compensation for the proposed project (e) There will be no resettlement or compensation for the proposed project (f) There will be no resettlement or compensation for the proposed project (g) There will be no resettlement or compensation for the proposed project (h) There will be no resettlement or compensation for the proposed project (i) There will be no resettlement or compensation for the proposed project (j) There will be no resettlement or compensation for the proposed project

Category	Environmental	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
4 Social Environment	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary? (b) Are considerations given to the existing recovery systems, including waste pickers? (c) Is there a possibility that waste transportation will adversely affect the regional traffic? (d) Is there a possibility that effluents from the project and leachates form the waste disposal sites will adversely affect fisheries and other water uses by local inhabitants (especially drinking water)?	(a) Y (b) N (c) N (d) Y (e) Y	(a) The project is expected to affect the living conditions of inhabitants, but no measures have been considered so far. (b) Informal waste pickers recover waste from the dumping site but no formal plan has been prepared. (c) The proposed site is away from main city, so waste transportation will hardly have adverse effects the regional traffic. (d) Yes the project will adversely affect water uses by local inhabitants. (e) There is a possibilities that disease vector will breed at the proposed disposal site.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) There is no archeological, historical, cultural, and religious heritage nearby the Gondlanwala dumping site.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) Y	(a) The project has affected the landscape. No measures have been taken to reduce it.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	(a) N (b) N	(a) No consideration has been given to reduce the impact on the culture and lifestyle of indigenous peoples. (b) No consideration has been given on indigenous peoples in relation to land and resources.

	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures taken to ensure that security guards involved in the project not to violate	(a) Y (b) N (c) N (d) N	(a) The project proponent didn't violate any laws and ordinances as the site is already closed. (b) No safety consideration were addressed at site. (c) No Training needs were assessed for workers at the dumping site. (d) No security considerations are addressed at the operational stage.

Category	Environmental	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures	(a) N (b) N (c) N	(a) No adequate measures were considered to reduce the impacts of operation. (b) No adequate measure has been considered for natural environment. (c) No adequate measure has been considered for social environment.
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the	(a)N (b) N (c) N (d) N	(a) No monitoring program was developed and implemented to reduce the potential impacts. (b) No monitoring program was prepared and implemented. (c) No monitoring framework was established by the proponent. (d) There is no regulatory requirement pertaining to monitoring report.
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation).	(a) N	(a) As the project doesn't fall in the protected forestry. So no item described in the Forestry Projects checklist is necessary that implies on the project.
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) N	(a) There is no such issue that is related to transboundary or global issue.

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.

In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which the project is located.

Category	Environmental	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from	(a) N (b) N (c) N (d) N	(a) Chianwali is not a designed disposal site. It's a simple dumping site so no EIA report has been prepared for it. The site is now being designed to be closed. (b) No EIA study was conducted for Chianwali disposal site. (c) No EIA study was conducted for Chianwali disposal site. (d) No additional permits have been obtained from regulatory authority.
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) Y (b) N	(a) The potential impacts have been adequately explained during the E&S survey to local stakeholders. (b) As the Chianwali was not planned dumping site, so there is no design of the site.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) N	(a) The alternative plans were not examined as it was nonscientific dumping ground and is not a planned site.
	(1) Air Quality	(a) Do air pollutants, such as sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust, and dioxins emitted from various sources, such as incinerators, and vehicles used for waste collection and transportation comply with the country's emission standards and ambient air quality standards?	(a)N	(a) Vehicles used for collection and transportation were never checked to comply with country's emission standards and ambient standards.

2 Pollution Control	(2) Water Quality	(a) Do effluents from various facilities comply with the country's effluent standards and ambient water quality standards? (b) Does the water quality of leachates from the waste disposal sites comply with the country's effluent standards and ambient water quality standards? (c) Are adequate measures taken to prevent contamination of surface water and groundwater	(a) N (b) N (c) N	(a) Water quality was tested and found that many parameters didn't comply with the effluent standards. (b) No leachate quality testing has been carried out for the site. (c) No measures have been taken to prevent contamination of surface and ground water by these effluents and leachates.
	(3) Wastes	(a) Are wastes, such as treatment residues, cinder, and fly ash generated from crushing and segregation processes, and diverted wastes from composting process properly treated and disposed of in accordance with the country's regulations? (b) Are hazardous and dangerous wastes properly segregated from other wastes, stabilized, treated, and disposed of in accordance with the country' s	(a)N (b) N	(a) There was no treatment of waste at the dumping site. (b) There was no segregation of hazardous and dangerous waste at the dumping site.
	(4) Soil Contamination	(a) Are adequate measures taken to prevent contamination of soil and groundwater by leachates from the waste disposal sites?	(a) N	(a) No measures have been taken to prevent the contamination of soil and groundwater from leachates.
	(5) Noise and Vibration	(a) Do noise and vibrations generated by the facility operations (especially incinerators, waste segregation and crushing facilities), and vehicle traffic for waste collection and transportation comply with the country's standards?	(a) N	(a) Noise and vibration was not tested at the dumping site for the compliance with country's standards.
	(6) Odor	(a) Are adequate odor control measures taken?	(a) N	(a) No measures have been opted to control odor problem.

Category	Environmental	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) The project site is not located in the notified protected area.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Is there a possibility that the project will adversely affect aquatic organisms? If impacts are anticipated, are adequate measures taken to reduce the impacts on aquatic organisms? (e) Is there a possibility that the project will adversely affect vegetation and wildlife? If impacts are anticipated, are adequate measures taken to reduce the impacts on vegetation and wildlife?	(a) N (b) N (c) Y (d) Y (e) Y	(a) The project site doesn't have primeval forests, tropical rain forests or ecologically valuable habitats. (b) The project site doesn't have protected habitats of endangered species according to national and international law (c) No impacts were identified and no mitigation measure were implemented at the Chianwali dumping site. (d) No impacts were identified and no mitigation measure were implemented at the Chianwali dumping site. (e) No impacts were identified and no mitigation measure were implemented at the Chianwali dumping site.
	(3) Management of Abandoned Sites	(a) Are environmental protection and restoration plans (such as landfill gas and leachate collection and treatment systems, prevention of illegal dumping, and reforestation) after facility closure considered? (b) Is a sustainable management framework for the abandoned sites established? (c) Are adequate financial provisions secured to manage the abandoned sites?	(a) N (b) N (c) N	(a) The Chianwali site is closed now but no such plan has been prepared for environmental protection and restoration. (b) No sustainable management framework for the abandoned sites are in place. (c) The administration and financial provisions are the responsibility of Gujranwala Waste Management Company (GWMC). At present no financial provision is in plan.

Category	Environmental	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Is the compensations going to be paid prior to the resettlement? (e) Is the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, and people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans	(a) N (b) N (c) N (d) N (e) N (f) N (g) N (h) N (i) N (j) N	(a) There will be no resettlement for the proposed project (b) There will be no resettlement or compensation for the proposed project (c) There will be no resettlement or compensation for the proposed project (d) There will be no resettlement or compensation for the proposed project (e) There will be no resettlement or compensation for the proposed project (f) There will be no resettlement or compensation for the proposed project (g) There will be no resettlement or compensation for the proposed project (h) There will be no resettlement or compensation for the proposed project (i) There will be no resettlement or compensation for the proposed project (j) There will be no resettlement or compensation for the proposed project

Category	Environmental	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary? (b) Are considerations given to the existing recovery systems, including waste pickers? (c) Is there a possibility that waste transportation will adversely affect the regional traffic? (d) Is there a possibility that effluents from the project and leachates form the waste disposal sites will adversely affect fisheries and other water uses by local inhabitants (especially drinking water)?	(a) Y (b) N (c) N (d) Y (e) Y	(a) The project might have affected the living conditions of inhabitants, but no measures have been considered so far. (b) Informal waste pickers recover waste from the dumping site but no formal plan has been prepared. (c) The proposed site is away from main city, so waste transportation will hardly have adversely affect the regional traffic. (d) The project is expected to have affected water uses by local inhabitants. (e) There is a possibility that disease vector are breeding at the proposed disposal site.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) There is no archeological, historical, cultural, and religious heritage nearby the Chianwali dumping site.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) Y	(a) The project has affected the landscape badly. No measures have been taken to reduce it.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	(a) N (b) N	(a) No consideration has been given to reduce the impact on the culture and lifestyle of indigenous peoples. (b) No consideration has been given on indigenous peoples land and resources.

4 Social Environment	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures taken to ensure that security guards involved in the project not to violate	(a) Y (b) N (c) N (d) N	(a) The project proponent didn't violate any laws and ordinances as presently no operations are taking place at the site. (b) No safety consideration were addressed at site. (c) No Training needs were assessed for workers at the dumping site. (d) No security considerations were addressed at the operational stage.

Category	Environmental	M	Yes: Y	Confirmation of Environmental Considerations
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social	(a) N (b) N (c) N	(a) No adequate measures were considered to reduce the impacts of construction. (b) No adequate measure has been consider for natural environment. (c) No adequate measure has been consider for social environment
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent	(a)N (b) N (c) N (d) N	(a) No monitoring program was develop and implemented to reduce the potential impact (b) No monitoring program was prepared and implemented. (c) No monitoring framework was established by the proponent. (d) There is no regulatory requirement pertaining to monitoring report.
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation).	(a) N	(a) As the project doesn't fall in the protected forestry. So no item described in the Forestry Projects checklist is necessary that implies on the project.
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming)	(a) N	(a) There is no such issue that is related to transboundary or global issue.

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.

In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which the project is located.

Chianwali Dumpsite

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) N (b) N (c) N (d) N	(a) Chianwali is not a designed disposal site. It's a simple dumping site so no EIA report has been prepared for it. The site is now being designed to be closed. (b) No EIA study was conducted for Chianwali disposal site. (c) No EIA study was conducted for Chianwali disposal site. (d) No additional permits have been obtained from regulatory authority.
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) Y (b) N	(a) The potential impacts have been adequately explained during the E&S survey to local stakeholders. (b) As the Chianwali was not planned dumping site, so there is no design of the site.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) N	(a) The alternative plans were not examined as it was nonscientific dumping ground and is not a planned site.
	(1) Air Quality	(a) Do air pollutants, such as sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust, and dioxins emitted from various sources, such as incinerators, and vehicles used for waste collection and transportation comply with the country's emission standards and ambient air quality standards?	(a)N	(a) Vehicles used for collection and transportation were never checked to comply with country's emission standards and ambient standards.

2 Pollution Control	(2) Water Quality	(a) Do effluents from various facilities comply with the country's effluent standards and ambient water quality standards? (b) Does the water quality of leachates from the waste disposal sites comply with the country's effluent standards and ambient water quality standards? (c) Are adequate measures taken to prevent contamination of surface water and groundwater by these effluents and leachates?	(a) N (b) N (c) N	(a) Water quality was tested and found that many parameters didn't comply with the effluent standards. (b) No leachate quality testing has been carried out for the site. (c) No measures have been taken to prevent contamination of surface and ground water by these effluents and leachates.
	(3) Wastes	(a) Are wastes, such as treatment residues, cinder, and fly ash generated from crushing and segregation processes, and diverted wastes from composting process properly treated and disposed of in accordance with the country's regulations? (b) Are hazardous and dangerous wastes properly segregated from other wastes, stabilized, treated, and disposed of in accordance with the country' s standards?	(a)N (b) N	(a) There was no treatment of waste at the dumping site. (b) There was no segregation of hazardous and dangerous waste at the dumping site.
	(4) Soil Contamination	(a) Are adequate measures taken to prevent contamination of soil and groundwater by leachates from the waste disposal sites?	(a) N	(a) No measures have been taken to prevent the contamination of soil and groundwater from leachates.
	(5) Noise and Vibration	(a) Do noise and vibrations generated by the facility operations (especially incinerators, waste segregation and crushing facilities), and vehicle traffic for waste collection and transportation comply with the country's standards?	(a) N	(a) Noise and vibration was not tested at the dumping site for the compliance with country's standards.
	(6) Odor	(a) Are adequate odor control measures taken?	(a) N	(a) No measures have been opted to control odor problem.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) The project site is not located in the notified protected area.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Is there a possibility that the project will adversely affect aquatic organisms? If impacts are anticipated, are adequate measures taken to reduce the impacts on aquatic organisms? (e) Is there a possibility that the project will adversely affect vegetation and wildlife? If impacts are anticipated, are adequate measures taken to reduce the impacts on vegetation and wildlife?	(a) N (b) N (c) Y (d) Y (e) Y	(a) The project site doesn't have primeval forests, tropical rain forests or ecologically valuable habitats. (b) The project site doesn't have protected habitats of endangered species according to national and international law (c) No impacts were identified and no mitigation measure were implemented at the Chianwali dumping site. (d) No impacts were identified and no mitigation measure were implemented at the Chianwali dumping site. (e) No impacts were identified and no mitigation measure were implemented at the Chianwali dumping site.
	(3) Management of Abandoned Sites	(a) Are environmental protection and restoration plans (such as landfill gas and leachate collection and treatment systems, prevention of illegal dumping, and reforestation) after facility closure considered? (b) Is a sustainable management framework for the abandoned sites established? (c) Are adequate financial provisions secured to manage the abandoned sites?	(a) N (b) N (c) N	(a) The Chianwali site is closed now but no such plan has been prepared for environmental protection and restoration. (b) No sustainable management framework for the abandoned sites are in place. (c) The administration and financial provisions are the responsibility of Gujranwala Waste Management Company (GWMC). At present no financial provision is in plan.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Is the compensations going to be paid prior to the resettlement? (e) Is the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, and people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans developed to monitor the impacts of resettlement? (j) Is the grievance redress mechanism established?	(a) N (b) N (c) N (d) N (e) N (f) N (g) N (h) N (i) N (j) N	(a) There will be no resettlement for the proposed project (b) There will be no resettlement or compensation for the proposed project (c) There will be no resettlement or compensation for the proposed project (d) There will be no resettlement or compensation for the proposed project (e) There will be no resettlement or compensation for the proposed project (f) There will be no resettlement or compensation for the proposed project (g) There will be no resettlement or compensation for the proposed project (h) There will be no resettlement or compensation for the proposed project (i) There will be no resettlement or compensation for the proposed project (j) There will be no resettlement or compensation for the proposed project

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations
4 Social Environment	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary? (b) Are considerations given to the existing recovery systems, including waste pickers? (c) Is there a possibility that waste transportation will adversely affect the regional traffic? (d) Is there a possibility that effluents from the project and leachates form the waste disposal sites will adversely affect fisheries and other water uses by local inhabitants (especially drinking water)? (e) Is there a possibility that pathologic insects or other disease vectors will breed as a result of the project?	(a) Y (b) N (c) N (d) Y (e) Y	(a) The project might have affected the living conditions of inhabitants, but no measures have been considered so far. (b) Informal waste pickers recover waste from the dumping site but no formal plan has been prepared. (c) The proposed site is away from main city, so waste transportation will hardly have adversely affect the regional traffic. (d) The project is expected to have affected water uses by local inhabitants. (e) There is a possibility that disease vector are breeding at the proposed disposal site.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) There is no archeological, historical, cultural, and religious heritage nearby the Chianwali dumping site.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) Y	(a) The project has affected the landscape badly. No measures have been taken to reduce it.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	(a) N (b) N	(a) No consideration has been given to reduce the impact on the culture and lifestyle of indigenous peoples. (b) No consideration has been given on indigenous peoples land and resources.

	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	(a) Y (b) N (c) N (d) N	(a) The project proponent didn't violate any laws and ordinances as presently no operations are taking place at the site. (b) No safety consideration were addressed at site. (c) No Training needs were assessed for workers at the dumping site. (d) No security considerations were addressed at the operational stage.

Category	Environmental Item	M a	Yes: Y No: N	Confirmation of Environmental Considerations
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered	(a) N (b) N (c) N	(a) No adequate measures were considered to reduce the impacts of construction. (b) No adequate measure has been consider for natural environment. (c) No adequate measure has been consider for social environment.
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(a)N (b) N (c) N (d) N	(a) No monitoring program was develop and implemented to reduce the potential impact (b) No monitoring program was prepared and implemented. (c) No monitoring framework was established by the proponent. (d) There is no regulatory requirement pertaining to monitoring report.
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation).	(a) N	(a) As the project doesn't fall in the protected forestry. So no item described in the Forestry Projects checklist is necessary that implies on the project.
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) N	(a) There is no such issue that is related to transboundary or global issue.

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.
In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).
2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which the project is located.

Fazal Fruit Market

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) N (b) N (c) N (d) N	(a) No EIA report has been prepared for the proposed transfer station. (b) No EIA study was conducted for proposed transfer station. (c) No EIA study was conducted for proposed transfer station. (d) No additional permits have been obtained from regulatory authority.
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) Y (b) N	(a) The potential impacts have been adequately explained during the E&S survey to local stakeholders. (b) The site is recently selected for proposed transfer station and stakeholder comments will be incorporated at the designing stage.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) The alternative plans have been examined with respect to social and environmental considerations.
	(1) Air Quality	(a) Do air pollutants, such as sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust, and dioxins emitted from various sources, such as incinerators, and vehicles used for waste collection and transportation comply with the country's emission standards and ambient air quality standards?	(a)N	(a) Vehicles used for collection and transportation were not checked to comply with country's emission standards and ambient standards.

2 Pollution Control	(2) Water Quality	(a) Do effluents from various facilities comply with the country's effluent standards and ambient water quality standards? (b) Does the water quality of leachates from the waste disposal sites comply with the country's effluent standards and ambient water quality standards? (c) Are adequate measures taken to prevent contamination of surface water and groundwater by these effluents and leachates?	(a) N (b) N (c) N	(a) No data is available for water quality of the site. (b) No data is available for leachate quality of the site. (c) No data is available for water quality of the site.
	(3) Wastes	(a) Are wastes, such as treatment residues, cinder, and fly ash generated from crushing and segregation processes, and diverted wastes from composting process properly treated and disposed of in accordance with the country's regulations? (b) Are hazardous and dangerous wastes properly segregated from other wastes, stabilized, treated, and disposed of in accordance with the country' s standards?	(a)N (b) N	(a) There will be no treatment of waste at the transfer station. (b) There will be no segregation of hazardous and dangerous waste at the proposed transfer station.
	(4) Soil Contamination	(a) Are adequate measures taken to prevent contamination of soil and groundwater by leachates from the waste disposal sites?	(a) Y	(a) Concrete pad will be proposed to be prepared to prevent soil and ground water contamination.
	(5) Noise and Vibration	(a) Do noise and vibrations generated by the facility operations (especially incinerators, waste segregation and crushing facilities), and vehicle traffic for waste collection and transportation comply with the country's standards?	(a) N	(a) No data of noise and vibration of the proposed transfer station is available.
	(6) Odor	(a) Are adequate odor control measures taken?	(a) Y	(a) Transfer station will be proposed to be covered with side walls to control odor.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) The project site is not located in the notified protected area.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Is there a possibility that the project will adversely affect aquatic organisms? If impacts are anticipated, are adequate measures taken to reduce the impacts on aquatic organisms? (e) Is there a possibility that the project will adversely affect vegetation and wildlife? If impacts are anticipated, are adequate measures taken to reduce the impacts on vegetation and wildlife?	(a) N (b) N (c) N (d) N (e) N	(a) The project site doesn't have primeval forests, tropical rain forests or ecologically valuable habitats. (b) The project site doesn't have protected habitats of endangered species according to national and international law (c) The proposed transfer station is located in the city area so its effect on ecological environment is minimal. (d) There were no impacts on aquatic organism, (e) The project will no impact vegetation and wildlife, as it is small contained place.
	(3) Management of Abandoned Sites	(a) Are environmental protection and restoration plans (such as landfill gas and leachate collection and treatment systems, prevention of illegal dumping, and reforestation) after facility closure considered? (b) Is a sustainable management framework for the abandoned sites established? (c) Are adequate financial provisions secured to manage the abandoned sites?	(a) Y (b) N (c) N	(a) The restoration plan will be in place after the facility closure. (b) No sustainable management framework for the abandoned sites is in place. (c) The administration and financial provisions lies with Gujranwala Waste Management Company (GWMC). At present no financial provision is in plan.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Is the compensations going to be paid prior to the resettlement? (e) Is the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, and people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans developed to monitor the impacts of resettlement? (j) Is the grievance redress mechanism established?	(a) N (b) N (c) N (d) N (e) N (f) N (g) N (h) N (i) N (j) N	(a) There will be no resettlement for the proposed project (b) There will be no resettlement or compensation for the proposed project (c) There will be no resettlement or compensation for the proposed project (d) There will be no resettlement or compensation for the proposed project (e) There will be no resettlement or compensation for the proposed project (f) There will be no resettlement or compensation for the proposed project (g) There will be no resettlement or compensation for the proposed project (h) There will be no resettlement or compensation for the proposed project (i) There will be no resettlement or compensation for the proposed project (j) There will be no resettlement or compensation for the proposed project

Category	Environmental Item	M a	Yes: Y No: N	Confirmation of Environmental Considerations
4 Social Environment	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary? (b) Are considerations given to the existing recovery systems, including waste pickers? (c) Is there a possibility that waste transportation will adversely affect the regional traffic? (d) Is there a possibility that effluents from the project and leachates form the waste disposal sites will adversely affect fisheries and other water uses by local inhabitants (especially drinking water)? (e) Is there a possibility that pathologic insects or other disease vectors will breed as a result of the project?	(a) N (b) N (c) N (d) N (e) Y	(a) The project will not adversely affect the living conditions of inhabitants (b) Recovery system will not be considered at the proposed transfer station. (c) Transportation plan will be prepared to avoid traffic problems (d) The project will not have any adverse effects on water uses by local inhabitants. (e) There is a possibility that disease vector will breed at the proposed disposal site.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) There is no archeological, historical, cultural, and religious heritage nearby the proposed transfer station.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) The project will not affect the landscape of the area.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	(a) N (b) N	(a) The proposed transfer station will not affect the culture and lifestyle of indigenous peoples. (b) No rights of ethnic minorities and indigenous peoples will be violated with the construction of proposed transfer station.

	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	(a) Y (b) Y (c) Y (d) Y	(a) The project proponent didn't violate any laws and ordinances. (b) Safety consideration will be taken into consideration at the design phase. (c) Training needs will be assessed for workers at the transfer station. (d) Security considerations will be addressed at the operational stage.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?	(a) Y (b) Y (c) Y	(a)Adequate measures will be considered to reduce the impacts of construction. (b) Adequate measure will be considered for natural environment. (c) Adequate measure will be considered for social environment.
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(a)Y (b) Y (c) Y (d) N	(a) Monitoring program will be developed and implemented to reduce the potential impact (b) Monitoring program will be prepared for implementation. (c) The proponent will establish the monitoring framework. (d) There is no regulatory requirement pertaining to monitoring report.
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation).	(a) N	(a) As the project doesn't fall in the protected forestry. So no item described in the Forestry Projects checklist is necessary that implies on the project.
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) N	(a) There is no such issue that is related to transboundary or global issue.

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.
In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which the project is located.

Main Fruit and Vegetable Market

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) N (b) N (c) N (d) N	(a) No EIA report has been prepared for the proposed transfer station. (b) No EIA study was conducted for proposed transfer station. (c) No EIA study was conducted for proposed transfer station. (d) No additional permits have been obtained from regulatory authority.
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) Y (b) N	(a) The potential impacts have been adequately explained during the E&S survey to local stakeholders. (b) The site is recently selected for proposed transfer station and stakeholder comments will be incorporated at the designing stage.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) The alternative plans have been examined with respect to social and environmental considerations.
	(1) Air Quality	(a) Do air pollutants, such as sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust, and dioxins emitted from various sources, such as incinerators, and vehicles used for waste collection and transportation comply with the country's emission standards and ambient air quality standards?	(a)N	(a) Vehicles used for collection and transportation were not checked to comply with country's emission standards and ambient standards.

2 Pollution Control	(2) Water Quality	(a) Do effluents from various facilities comply with the country's effluent standards and ambient water quality standards? (b) Does the water quality of leachates from the waste disposal sites comply with the country's effluent standards and ambient water quality standards? (c) Are adequate measures taken to prevent contamination of surface water and groundwater by these effluents and leachates?	(a) N (b) N (c) N	(a) No data is available for water quality of the site. (b) No data is available for leachate quality of the site. (c) No data is available for water quality of the site.
	(3) Wastes	(a) Are wastes, such as treatment residues, cinder, and fly ash generated from crushing and segregation processes, and diverted wastes from composting process properly treated and disposed of in accordance with the country's regulations? (b) Are hazardous and dangerous wastes properly segregated from other wastes, stabilized, treated, and disposed of in accordance with the country's standards?	(a)N (b) N	(a) There will be no treatment of waste at the transfer station. (b) There will be no segregation of hazardous and dangerous waste at the proposed transfer station.
	(4) Soil Contamination	(a) Are adequate measures taken to prevent contamination of soil and groundwater by leachates from the waste disposal sites?	(a) Y	(a) Concrete pad will recommended to be prepared to prevent soil and ground water contamination.
	(5) Noise and Vibration	(a) Do noise and vibrations generated by the facility operations (especially incinerators, waste segregation and crushing facilities), and vehicle traffic for waste collection and transportation comply with the country's standards?	(a) N	(a) No data of noise and vibration of the proposed transfer station is available.
	(6) Odor	(a) Are adequate odor control measures taken?	(a) Y	(a) Transfer station will proposed to be covered with side walls to control odor.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) The project site is not located in the notified protected area.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Is there a possibility that the project will adversely affect aquatic organisms? If impacts are anticipated, are adequate measures taken to reduce the impacts on aquatic organisms? (e) Is there a possibility that the project will adversely affect vegetation and wildlife? If impacts are anticipated, are adequate measures taken to reduce the impacts on vegetation and wildlife?	(a) N (b) N (c) N (d) N (e) N	(a) The project site doesn't have primeval forests, tropical rain forests or ecologically valuable habitats. (b) The project site doesn't have protected habitats of endangered species according to national and international law (c) The proposed transfer station is located in the city area so its effect on ecological environment is minimal. (d) There were no impacts on aquatic organism, (e) The project will no impact vegetation and wildlife, as it is small contained place.
	(3) Management of Abandoned Sites	(a) Are environmental protection and restoration plans (such as landfill gas and leachate collection and treatment systems, prevention of illegal dumping, and reforestation) after facility closure considered? (b) Is a sustainable management framework for the abandoned sites established? (c) Are adequate financial provisions secured to manage the abandoned sites?	(a) Y (b) N (c) N	(a) The restoration plan will be in place after the facility closure. (b) No sustainable management framework for the abandoned sites is in place at present. (c) The administration and financial provisions lies with Gujranwala Waste Management Company (GWMC). At present no financial provision is in plan.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Is the compensations going to be paid prior to the resettlement? (e) Is the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, and people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans developed to monitor the impacts of resettlement? (j) Is the grievance redress mechanism established?	(a) N (b) N (c) N (d) N (e) N (f) N (g) N (h) N (i) N (j) N	(a) There will be no resettlement for the proposed project (b) There will be no resettlement or compensation for the proposed project (c) There will be no resettlement or compensation for the proposed project (d) There will be no resettlement or compensation for the proposed project (e) There will be no resettlement or compensation for the proposed project (f) There will be no resettlement or compensation for the proposed project (g) There will be no resettlement or compensation for the proposed project (h) There will be no resettlement or compensation for the proposed project (i) There will be no resettlement or compensation for the proposed project (j) There will be no resettlement or compensation for the proposed project

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary? (b) Are considerations given to the existing recovery systems, including waste pickers? (c) Is there a possibility that waste transportation will adversely affect the regional traffic? (d) Is there a possibility that effluents from the project and leachates form the waste disposal sites will adversely affect fisheries and other water uses by local inhabitants (especially drinking water)? (e) Is there a possibility that pathologic insects or other disease vectors will breed as a result of the project?	(a) N (b) N (c) N (d) N (e) Y	(a) The project will not adversely affect the living conditions of inhabitants (b) Recovery system will not be considered at the proposed transfer station. (c) Transportation plan will be prepared to avoid traffic problems (d) The project will not have any adverse effect on water uses by local inhabitants. (e) There is a possibility that disease vector will breed at the proposed disposal site.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) There is no archeological, historical, cultural, and religious heritage nearby the proposed transfer station.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) The project will not affect the landscape of the area.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	(a) N (b) N	(a) The proposed transfer station will not affect the culture and lifestyle of indigenous peoples. (b) No rights will be violated with the construction of proposed transfer station.

	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	(a) Y (b) Y (c) Y (d) Y	(a) The project proponent didn't violate any laws and ordinances. (b) Safety consideration will be taken into account at the design phase. (c) Training needs will be assessed for workers at the transfer station. (d) Security considerations will be addressed at the operational stage.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?	(a) Y (b) Y (c) Y	(a)Adequate measures will be considered to reduce the impacts of construction. (b) Adequate measures will be considered for natural environment. (c) Adequate measures will be considered for social environment.
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(a)Y (b) Y (c) Y (d) N	(a) Monitoring program will be developed and implemented to reduce the potential impact (b) Monitoring program will be prepared for implementation. (c) The proponent will establish the monitoring framework. (d) There is no regulatory requirement pertaining to monitoring report.
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation).	(a) N	(a) As the project doesn't fall in the protected forestry. So no item from Forestry Checklist that that implies on the project.
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) N	(a) There is no such impact that is related to transboundary or global issue.

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.

In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which the project is located.

Alam Chowk Transfer Station

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) N (b) N (c) N (d) N	(a) No EIA report has been prepared for the proposed transfer station. (b) No EIA study was conducted for proposed transfer station. (c) No EIA study was conducted for proposed transfer station. (d) No additional permits have been obtained from regulatory authority.
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) Y (b) N	(a) The potential impacts have been adequately explained during the E&S survey to local stakeholders. (b) The site is recently selected for proposed transfer station and stakeholder comments will be incorporated at the designing stage.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) The alternative plans have been examined with respect to social and environmental considerations.
	(1) Air Quality	(a) Do air pollutants, such as sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust, and dioxins emitted from various sources, such as incinerators, and vehicles used for waste collection and transportation comply with the country's emission standards and ambient air quality standards?	(a)N	(a) Vehicles used for collection and transportation were not checked to comply with country's emission standards and ambient standards.

2 Pollution Control	(2) Water Quality	(a) Do effluents from various facilities comply with the country's effluent standards and ambient water quality standards? (b) Does the water quality of leachates from the waste disposal sites comply with the country's effluent standards and ambient water quality standards? (c) Are adequate measures taken to prevent contamination of surface water and groundwater by these effluents and leachates?	(a) N (b) N (c) N	(a) No data is available for water quality of the site. (b) No data is available for leachate quality of the site. (c) No data is available for water quality of the site.
	(3) Wastes	(a) Are wastes, such as treatment residues, cinder, and fly ash generated from crushing and segregation processes, and diverted wastes from composting process properly treated and disposed of in accordance with the country's regulations? (b) Are hazardous and dangerous wastes properly segregated from other wastes, stabilized, treated, and disposed of in accordance with the country' s standards?	(a)N (b) N	(a) There will be no treatment of waste at the transfer station. (b) There will be no segregation of hazardous and dangerous waste at the proposed transfer station.
	(4) Soil Contamination	(a) Are adequate measures taken to prevent contamination of soil and groundwater by leachates from the waste disposal sites?	(a) Y	(a) Concrete pad will proposed to be prepared to prevent soil and ground water contamination.
	(5) Noise and Vibration	(a) Do noise and vibrations generated by the facility operations (especially incinerators, waste segregation and crushing facilities), and vehicle traffic for waste collection and transportation comply with the country's standards?	(a) N	(a) No data of noise and vibration of the proposed transfer station is available.
	(6) Odor	(a) Are adequate odor control measures taken?	(a) Y	(a) Transfer station will proposed to be covered with side walls to control odor.

Category	Environmental	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) The project site is not located in the notified protected area.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Is there a possibility that the project will adversely affect aquatic organisms? If impacts are anticipated, are adequate measures taken to reduce the impacts on aquatic organisms? (e) Is there a possibility that the project will adversely affect vegetation and wildlife? If impacts are anticipated, are adequate measures taken to reduce the impacts on vegetation and wildlife?	(a) N (b) N (c) N (d) N (e) N	(a) The project site doesn't have primeval forests, tropical rain forests or ecologically valuable habitats. (b) The project site doesn't have protected habitats of endangered species according to national and international law (c) The proposed transfer station is located in the city area so its effect on ecological environment is minimal. (d) There were no impacts on aquatic organism, (e) The project will no impact vegetation and wildlife, as it is small contained place.
	(3) Management of Abandoned Sites	(a) Are environmental protection and restoration plans (such as landfill gas and leachate collection and treatment systems, prevention of illegal dumping, and reforestation) after facility closure considered? (b) Is a sustainable management framework for the abandoned sites established? (c) Are adequate financial provisions secured to manage the abandoned sites?	(a) Y (b) N (c) N	(a) The restoration plan is in place after the facility closure. (b) No sustainable management framework for the abandoned sites are in place. (c) The administration and financial provisions lies with Gujranwala Waste Management Company (GWMC). At present no financial provision is in plan.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Is the compensations going to be paid prior to the resettlement? (e) Is the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, and elderly people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans developed to monitor the impacts of resettlement? (j) Is the grievance redress mechanism established?	(a) N (b) N (c) N (d) N (e) N (f) N (g) N (h) N (i) N (j) N	(a) There will be no resettlement for the proposed project (b) There will be no resettlement or compensation for the proposed project (c) There will be no resettlement or compensation for the proposed project (d) There will be no resettlement or compensation for the proposed project (e) There will be no resettlement or compensation for the proposed project (f) There will be no resettlement or compensation for the proposed project (g) There will be no resettlement or compensation for the proposed project (h) There will be no resettlement or compensation for the proposed project (i) There will be no resettlement or compensation for the proposed project (j) There will be no resettlement or compensation for the proposed project

Category	Environmental	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
4 Social Environment	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary? (b) Are considerations given to the existing recovery systems, including waste pickers? (c) Is there a possibility that waste transportation will adversely affect the regional traffic? (d) Is there a possibility that effluents from the project and leachates form the waste disposal sites will adversely affect fisheries and other water uses by local inhabitants (especially drinking water)? (e) Is there a possibility that pathologic insects or other disease vectors will breed as a result of the project?	(a) N (b) N (c) N (d) N (e) Y	(a) The project will not adversely affect the living conditions of inhabitants (b) Recovery system will not be considered at the proposed transfer station. (c) Transportation plan will be prepared to avoid traffic problems (d) The project will not have any adversely affect water uses by local inhabitants. (e) There is a possibilities that disease vector will breed at the proposed disposal site.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) There is no archeological, historical, cultural, and religious heritage nearby the proposed transfer station.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) The project will not affect the landscape of the area.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	(a) N (b) N	(a) The proposed transfer station will not affect the culture and lifestyle of ethnic minorities and indigenous peoples. (b) No rights will be violated with the construction of proposed transfer station.

	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	(a) Y (b) Y (c) Y (d) Y	(a) The project proponent is not expected to violate any laws and ordinances. (b) Safety consideration will be taken into consideration at the design phase. (c) Training needs will be assessed for workers at the transfer station. (d) Security considerations will be addressed at the operational stage.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?	(a) Y (b) Y (c) Y	(a)Adequate measures will be considered to reduce the impacts of construction. (b) Adequate measure will be considered for natural environment. (c) Adequate measure will be considered for social environment.
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(a)Y (b) Y (c) Y (d) N	(a) Monitoring program will be developed and implemented to reduce the potential impact (b) Monitoring program will be prepared for implementation. (c) The proponent will establish the monitoring framework. (d) There is no regulatory requirement pertaining to monitoring report.
	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation).	(a) N	(a) As the project doesn't fall in the protected forestry. So no item described in the Forestry Projects checklist is necessary that implies on the project.

6 Note	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) N	(a) There is no such issue that is related to transboundary or global issue.

1) Regarding the term “Country’s Standards” mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.

In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which the project is located.

Vanya Morr Transfer Station

Category	Environmental	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from	(a) N (b) N (c) N (d) N	(a) No EIA report has been prepared for the existing transfer station. (b) No EIA study was conducted for existing transfer station. (c) No EIA study was conducted for existing transfer station. (d) No additional permits have been obtained from regulatory authority.
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) Y (b) Y	(a) The potential impacts have been adequately explained during the E&S survey to local stakeholders. (b) The stakeholder comments will be incorporated at the designing stage.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) The alternative plans have been examined with respect to social and environmental considerations.
	(1) Air Quality	(a) Do air pollutants, such as sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust, and dioxins emitted from various sources, such as incinerators, and vehicles used for waste collection and transportation comply with the country's emission standards and ambient air quality standards?	(a)N	(a) Vehicles used for collection and transportation were not checked to comply with country's emission standards and ambient standards.

2 Pollution Control	(2) Water Quality	(a) Do effluents from various facilities comply with the country's effluent standards and ambient water quality standards? (b) Does the water quality of leachates from the waste disposal sites comply with the country's effluent standards and ambient water quality standards? (c) Are adequate measures taken to prevent contamination of surface water and groundwater by these effluents and leachates?	(a) N (b) N (c) N	(a) No data is available for water quality of the site. (b) No data is available for leachate quality of the site. (c) No data available for water quality of the site.
	(3) Wastes	(a) Are wastes, such as treatment residues, cinder, and fly ash generated from crushing and segregation processes, and diverted wastes from composting process properly treated and disposed of in accordance with the country's regulations? (b) Are hazardous and dangerous wastes properly segregated from other wastes, stabilized, treated, and disposed of in accordance with the country' s	(a)N (b) N	(a) There is no treatment of waste at the transfer station. (b) There is no segregation of hazardous and dangerous waste at the proposed transfer station.
	(4) Soil Contamination	(a) Are adequate measures taken to prevent contamination of soil and groundwater by leachates from the waste disposal sites?	(a) Y	(a) Adequate measures are taken to prevent soil and ground water contamination.
	(5) Noise and Vibration	(a) Do noise and vibrations generated by the facility operations (especially incinerators, waste segregation and crushing facilities), and vehicle traffic for waste collection and transportation comply with the country's standards?	(a) N	(a) No data of noise and vibration of the proposed transfer station is available.
	(6) Odor	(a) Are adequate odor control measures taken?	(a) Y	(a) Transfer station is covered with side walls to control odor.

Category	Environmental	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) The project site is not located in the notified protected area.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Is there a possibility that the project will adversely affect aquatic organisms? If impacts are anticipated, are adequate measures taken to reduce the impacts on aquatic organisms? (e) Is there a possibility that the project will adversely affect vegetation and wildlife? If impacts are anticipated, are adequate measures taken to reduce	(a) N (b) N (c) N (d) N (e) N	(a) The project site doesn't have primeval forests, tropical rain forests or ecologically valuable habitats. (b) The project site doesn't have protected habitats of endangered species according to national and international law (c) The existing transfer station is located in the city area so its effect on ecological environment is minimal. (d) There were no impacts on aquatic organism. (e) The project has no impact on vegetation and wildlife, as it is small contained place.
	(3) Management of Abandoned Sites	(a) Are environmental protection and restoration plans (such as landfill gas and leachate collection and treatment systems, prevention of illegal dumping, and reforestation) after facility closure considered? (b) Is a sustainable management framework for the abandoned sites established? (c) Are adequate financial provisions secured to manage the abandoned sites?	(a) Y (b) N (c) N	(a) The restoration plan will be in place after the facility closure. (b) No sustainable management framework for the abandoned sites is in place. (c) The administration and financial provisions lies with Gujranwala Waste Management Company (GWMC). At present no financial provision is in plan.

Category	Environmental	M	Yes: Y	Confirmation of Environmental Considerations
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Is the compensations going to be paid prior to the resettlement? (e) Is the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, and people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans	(a) N (b) N (c) N (d) N (e) N (f) N (g) N (h) N (i) N (j) N	(a) There will be no resettlement for the proposed project (b) There will be no resettlement or compensation for the proposed project (c) There will be no resettlement or compensation for the proposed project (d) There will be no resettlement or compensation for the proposed project (e) There will be no resettlement or compensation for the proposed project (f) There will be no resettlement or compensation for the proposed project (g) There will be no resettlement or compensation for the proposed project (h) There will be no resettlement or compensation for the proposed project (i) There will be no resettlement or compensation for the proposed project (j) There will be no resettlement or compensation for th proposed project

Category	Environmental	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary? (b) Are considerations given to the existing recovery systems, including waste pickers? (c) Is there a possibility that waste transportation will adversely affect the regional traffic? (d) Is there a possibility that effluents from the project and leachates form the waste disposal sites will adversely affect fisheries and other water uses by local inhabitants (especially drinking water)?	(a) N (b) N (c) N (d) N (e) Y	(a) The project is not adversely affecting the living conditions of inhabitants (b) Recovery system is not in place at the existing transfer station. (c) There is no traffic problem because of transfer station operation. (d) The project has no adverse effects on water uses by local inhabitants. (e) There is a possibilities that disease vector will breed at the proposed disposal site.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) There is no archeological, historical, cultural, and religious heritage nearby the existing transfer station.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) The project did not affect the landscape of the area.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	(a) N (b) N	(a) The existing transfer station has no effect on the culture and lifestyle of indigenous peoples. (b) No rights has been violated with the construction of proposed transfer station.

4 Social Environment	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures taken to ensure that security guards involved in the project not to violate	(a) Y (b) Y (c) Y (d) Y	(a) The project proponent didn't violate any laws and ordinances. (b) Safety consideration has been taken into consideration at the design phase. (c) Training needs has been assessed for workers at the transfer station. (d) Security considerations has been addressed at the operational stage.

Category	Environmental	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?	(a) Y (b) Y (c) Y	(a)Adequate measures have been considered to reduce the impacts of construction. (b) Adequate measures have been considered for natural environment. (c) Adequate measures have been considered for social environment.
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?	(a)Y (b) Y (c) Y (d) N	(a) Monitoring program has been developed and implemented to reduce the potential impacts. (b) Monitoring program is prepared for implementation. (c) The proponent has established the monitoring framework. (d) There is no regulatory requirement pertaining to monitoring report.
6 Note	Reference to Checklist of Other	(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation).	(a) N	(a) As the project doesn't fall in the protected forestry. So no item described in the Forestry Projects checklist is necessary that implies on the project.
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) N	(a) There is no such issue that is related to transboundary or global issue.

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.

In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which the project is located.