

Environmental Monitoring Report

#7 Semestral Report
July 2018

UZB: Solid Waste Management Improvement Project

Prepared by the State Unitary Enterprise “Maxsustrans” and Tashkent Municipality
for the Asian Development Bank.

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ABBREVIATIONS

ADB	Asian Development Bank
CDP	Corporate Development Program
CSC	Construction Supervision Consultant
EA	Executing Agency
EHS	Environmental Health & Safety
EIA	Environmental Impact Assessment
EIP	Environmental Impact Permit
EMP	Environnemental Management Plan
ES	Environmental Specialist
GoU	Government of Uzbekistan
GRM	Grievance Redress Mechanism
IA	Implementing Agency
IEE	Initial Environmental Examination
LARP	Land Acquisition and Resettlement Plan
Maxsustrans	State Unitary Enterprise “Maxsustrans”
MSW	Municipal Solid Waste
PIU	Project Implementation Unit
SC	Supervision Consultant
SCEEP	State Committee of the Republic of Uzbekistan of Ecology and Environment Protection
SLF	Sanitary Landfill Facility
SPS	Safeguard Policy Statement
SSEMP	Site-specific Environmental Management Plan
SWM	Solid Waste Management
SWMIP	Solid Waste Management Improvement Project

1. INTRODUCTION

1.1. Preamble

1. This report represents the Semi - Annual Environmental Monitoring Review (SAEMR) for Solid Waste Management Improvement Project.
2. This report is the 4th EMR for the project and covers January-June 2018 reporting period.
3. The project includes a dynamic Sanitary Landfill Facility (SLF) development concept approach. This utilizes the planned SLF as an immediate and effective solution for Tashkent's waste disposal challenges, with the potential to progressively expand the facility to become a disposal solution that can serve the Tashkent region over the long term. In comparison to the last submitted report here are no changes which has currently influent of the further developing of the SWMIP Project during the last time.
4. In addition, the project includes the necessary upgrading and refurbishment of the entire MSW collection and transport system of Tashkent. Collection points will be equipped with functional and suitably sized waste bins, with provision for recyclable materials to be segregated and collected. Outdated collection vehicle fleets will be replaced with appropriately sized and highly efficient collection vehicles, dramatically reducing operation and maintenance costs. Transfer stations will be equipped with improved infrastructure and electromechanical components, and the transfer vehicles will be replaced. With these activities an improvement of the environmental impact should be also expected.

1.2. Headline Information

5. The Government of Uzbekistan (GoU) has applied for a loan from the Asian Development Bank (ADB) for the development and improvement of Solid Waste Management (SWM) system of the capital city (Tashkent). The loan reference number is L3067-UZB: Solid Waste Management Improvement Project (SWMIP). The loan was signed between the Republic of Uzbekistan and Asian Development Bank (ADB) dated 27 February 2014 and Project Agreement dated 12 March 2014 signed between ADB, Tashkent City Municipality and the State Unitary Enterprise "MAXSUSTRANS".
6. The project was prepared to impact an improved urban environment and quality of life for the residents of Tashkent. The project will develop a sanitary landfill that meets international standards, rehabilitate transfer stations, and modernize the waste collection and transfer fleet. It will build capacity in waste management and help formulate a national strategy on solid waste management.
7. The Government of Uzbekistan (GOU) seriously recognizes the need to develop and implement a national Solid Waste Management (SWM) strategy. Therefore, the GOU has requested support from ADB to address the SWM challenges. The proposed Project will contribute to sustainable urban development in Uzbekistan by: (i) modernizing SWM to provide continuous and reliable municipal services; (ii) promoting financial sustainability of municipal services through tariff rationalization and prudent financial management; (iii)

supporting policy and institutional reforms for improved sanitation and environmental management; (iv) mitigating climate change through a major reduction of GHG emissions, and through compliance with international standards on waste minimization and material recycling; and through all these measures; (v) improving livability of cities.

8. The volume of the existing dumpsite is exhausted and the original plan of the city was to extend its dumpsite operations to an adjacent lot of additional 30 hectares of area. Being fully aware of the inevitable environmental impacts through the extension of this practice, the city asked the national government for assistance in this matter. Based on these activities, the Cabinet of Ministers approved in summer 2012 the location of new dumpsite on 30 hectares of agricultural area for the utilization for waste management activities.

9. GOU has already decided to start processing land allocation of a 30-hectare land plot immediately to the south of the existing Akhangaran dumpsite, on which to develop an interim dumpsite extension. This facility is designed to accommodate Tashkent's municipal waste for the next - 7 years, and until the longer-term solution is operational. However, following discussions, the city is now planning to reposition this 30-hectare facility to 25-hectare to the east of the existing dumpsite, and also to upgrade this facility to a sanitary landfill facility, designed to internationally accepted standards of environmental protection.

10. Last option of expansion of landfill to the east, it has the potential for progressive expansion to become a 250-hectare long-term regional landfill, which can serve Tashkent's disposal needs for at least 50-years. In other words, this initial landfill actually is the first development phase of the much larger regional landfill, should this option be later selected by the city as the long-term disposal solution. Should the alternative long-term option be selected instead however, then this interim facility could be closed, or possibly could switch to serve the disposal needs of nearby communities. A conceptual design has been completed for the interim 25-hectare facility, which is naturally included as a component of the Project.

2. PROJECT DESCRIPTION AND CURRENT ACTIVITIES

2.1 Project Description

11. The overall objective is to provide an improved solid waste management (SWM) system in Tashkent, the capital city, to upgrade urban infrastructure and services. The project will develop a sanitary landfill that meets international standards, rehabilitate transfer stations, and modernize the waste collection and transfer fleet. It will build capacity in waste management and help formulate a national strategy on solid waste management.

12. Given the current SWM practices, the option converting and allocating an area adjacent to the existing dumpsite to an engineered Sanitary Landfill was decided. The proposed sanitary landfill facility (SLF) concept will be based on the Best Environmental Practices (BEP) resulting to a *state-of-the-art* design consistent with international acceptable standards. This “stand alone” facility will drastically improve the SWM system (i.e. the handling and final disposal of MSW) with a possible integration capability for a long-solution to cover the entire Tashkent Oblast. The inclusion into the design of a multi-barrier system, leachate and gas collection systems will result in a significant reduction of anticipated impacts. Solid Waste Management Improvement Project (hereinafter called “Project”) is to contribute to the following issues:

- Segregation of Municipal Solid Waste stream;
- Proper collection and dumping to appropriate sites
- Establishment of modern SWM systems
- Remediation of old 'truck and dump' practices in cities and regions

13. The Government of Uzbekistan has agreed for a loan from the Asian Development Bank (ADB) for the development and improvement of Solid Waste Management system of the capital city Tashkent. The Loan Agreement was signed on 27.02.2014 between the Republic of Uzbekistan and Asian Development Bank and the Project Agreement dated 12.03.2014 was signed between ADB, Tashkent City Municipality and the State Unitary Enterprise “MAXSUSTRANS”. The special Decree of Uzbekistan President No.PP-2255 about the implementation of SWMIP has been issued on 31.10.2014, which specified five years project implementation period (2014-2018) and total project cost - **USD 92,25 mln.**, of which USD 69,0 mln. the loan funds from ADB and USD 23,25 mln. the contribution of SUE “Maxsustrans” and the GoU. The GoU contribution is provided as exemption of tax and customs duties in Uzbekistan for the amount of USD 5,82 mln.

14. The GoU through it Implementing Agency (IA), the State Unitary Enterprise (SUE) “MAXSUSTRANS” utilizes part of this loan proceeds towards the cost of the contract for Consulting Services related to Project Management, Implementation and Supervision, supporting the Project Implementation Unit (PIU).

15. The project was prepared to impact an improved urban environment and quality of life for the residents of Tashkent. The outcome will be improved SWM services and management in Tashkent with the following key outputs:

- i. **Output 1 - Rehabilitated and expanded solid waste management (SWM) system in Tashkent.** By the project completion it is expected that (i) rehabilitation of transfer stations and possible closure of an existing transfer station 2 (ii) 3 million tons of disposal capacity established with international environmental standards, and (iii) 1,950 tons per day of disposal and operational capacity established;
- ii. **Output 2 - Strengthened operational capacity.** By the project completion it is expected that (i) at least 90% of households actively segregating waste at source, (ii) campaign to raise awareness will reach 90% of households on waste segregation with women households members' participation, (iii) improved management and operations of Maxsustrans, including a 20% improvement (reduction) in cost per ton of waste disposal, and (iv) an IT-supported MSW collection system based on a geographic information system (GIS) database is implemented and 80% of trips monitored by the system is achieved.; and
- iii. **Output 3 - National SWM strategy.** By 2016, a draft national SWM strategy prepared and submitted to the Government and ADB.

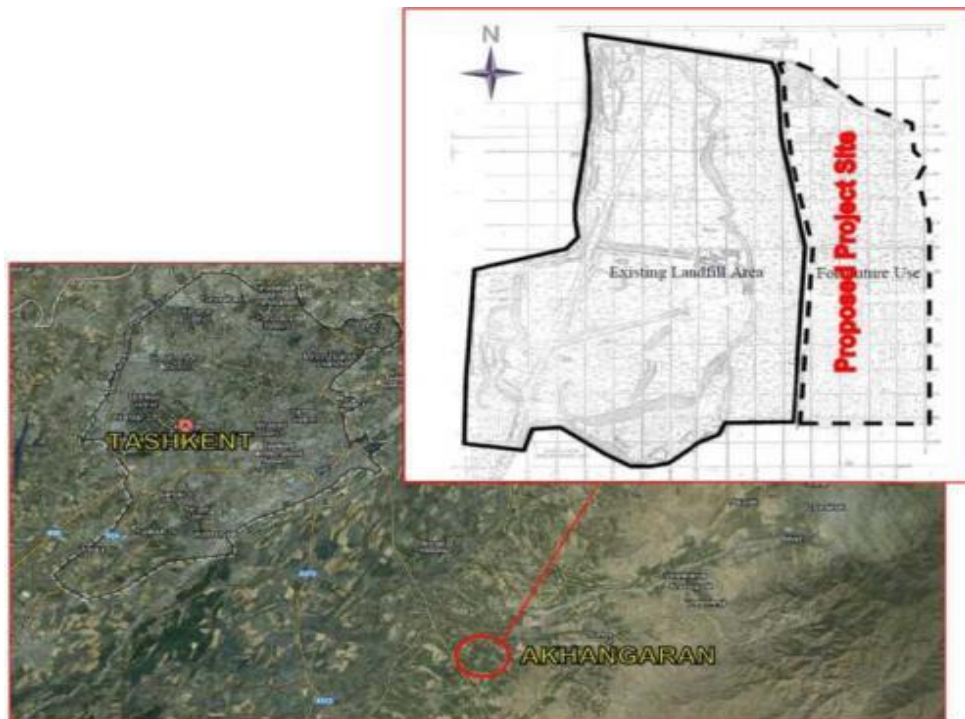
16. There are two executing agencies (EAs) for the project – the Tashkent Municipality (Hokimiyat of Tashkent city) for the overall oversight and monitoring of Outputs 1 and 2 and State Committee of the Republic of Uzbekistan of Ecology and Environment Protection (SCEEP)¹ for execution of Output 3—the national SWM strategy. Outputs 1 and 2 will be implemented by State Unitary Enterprise “MAXSUSTRANS”. A PIU was established within MAXSUSTRANS to support project implementation. This support will include project management, financial management, procurement, contract administration, safeguards implementation, construction and technical supervision, and monitoring and evaluation.

2.2. Project Site Description

17. The Akhangaran landfill is located approximately 35 km south of the center of Tashkent City in the Akhangaran district of Tashkent Province. The facility has been in use since 1967 and is currently handling the wastes collected from Tashkent city and partial from Chirchik. The proposed site for a modern Sanitary Landfill is located at the eastern side of the existing Akhangaran Landfill. The total area for Landfill will cover approximately 25 hectares of agricultural land. Location map of Akhangaran landfill is given on **Figure 1** below.

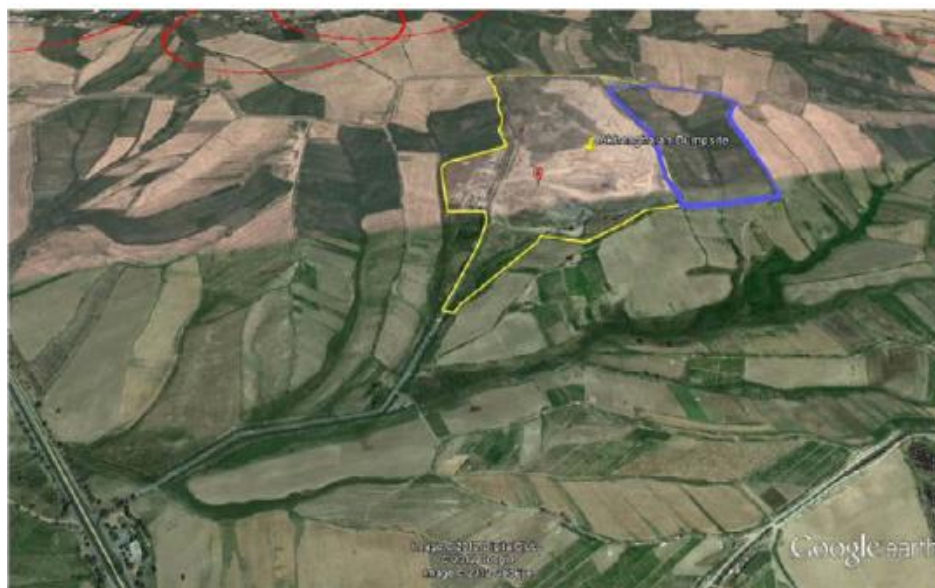
¹ Acc. to the President Decree #UP 5024 from 21.04.2017 the State Committee of Uzbekistan for Nature Protection was renamed into the State Committee of the Republic of Uzbekistan of Ecology and Environment Protection (SCEEP)

Figure 1. Location map of Akhangaran landfill



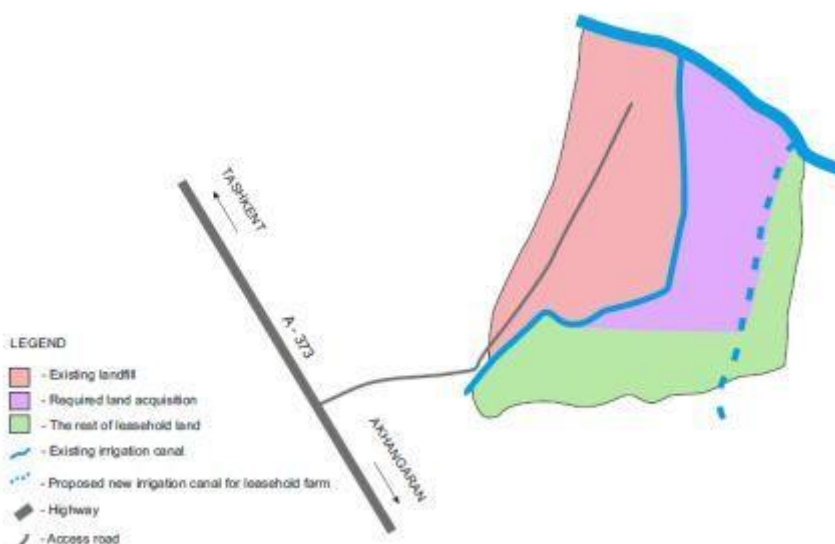
18. Access to the site: Land acquisition for the expansion of existing landfill will not require construction of any additional access road to the site. This is visualized below on given image (**Figure 2** below). Access to land will be through already functioning road. Existing access and other bypass roads should be taken in consideration for repair- and reconstructions works. Buffer zone for the SLF will be within the acquired land plots.

Figure 2. Proposed Akhangaran landfill expansion



* Yellow line is border of existing landfill; blue line is border of expansion

Figure 3. Map of acquired land plot and irrigation canal



2.3. Project Contracts and Management

19. Sanitary Landfill Design and Supervision Consultant has not been hired yet. On June 19, 2017 an advertisement was published to hire Landfill Design and Supervision Consultants. This consulting company will do design works of closing old landfill and establishing of new landfill, and additionally will supervise all construction works related to Landfill establishment.

20. PIU Consultants (H.P. Gauff Ingenieure GmbH & Co. KG and his JV-Partner Infratech Consulting SDN Ltd (Tashkent) supporting the PIU according to the contract and its Amendment No.2.

21. PIU Consultants has National Environmental Expert – Mr. Sergey Karandayev, who implementing environmental safeguards services.

22. Main organizations involved in the project and related to environmental safeguards are presented in the **Table 1** below:

Table 1: List of contracts under the Project

Organization	Name of main staff and Environmental Specialist	Contact data (including phone and web-site) and address of the organization	Employer	Contract Signature date	Contract Final Date
PIU Support Consultant – JV “H.P. Gauff Ingenieure GmbH & Co. KG-JBG and Infratech Consulting SDN Ltd.”	Mr. Ingo Schoebe, Team Leader Mr. Dilshod Mavlyan-Kariev, Deputy Team Leader Mr. Sergey Karandaev, Environmental Specialist	pbox-swmip.uzb@gauff.com eng-invest@consultant.com eng-invest@consultant.com	SUE “Maxsustrans”	11.01.2017	30.06.2019
Capacity Development Program Consultant - JV “GWCC-INTERIVAL-UVP-Dohwa-AI Mar”	Mr. Thomas Derntl, Team Leader Mr. Thimo Fellner, Deputy Team Leader Julia Alekseeva, Environmental Specialist	thomas.derntl@gwcc.at thimo.fellner@interval.at alekseeva@almarconsulting.org	SUE “Maxsustrans”	12.09.2017	15.10.2019

2.4. Project Activities During Current Reporting Period

23. The proposed project was estimated to cost \$92.25 million, including taxes and duties, physical and price contingencies and interest charges during implementation. Brief details are shown in the below table and project cost estimates.

Table 2: Brief details about project costs

Total project cost	–	92,25 mln. USD , of them:
IFI Input/ADB Loan	–	69,00 million USD (74,79%)
Input of the Republic of Uzbekistan	–	5,82 million USD (in form of customs and tax benefits).
Input of SUE «Maxsustrans»:		17,43 mln. USD, including: capital investments 1,5 mln.USD and cost of existing fixed assets 15,93 mln.USD.

24. Based on data available at the ADB web site as of June 28, 2018, the total disbursed amount reached USD 14,023,962.78² that corresponds to 22.32% from the total loan amount. These funds were initially used for the supply of goods, PIU maintenance, payment for services of both individual consultants and consultant firms.

25. To be mentioned that to the Commencement Date of the Consultant the IA has arranged the following procurement packages:

² Excluding USD 511,143.07 interest charges deducted from the loan account by ADB

1) Containers for collection of SDW at WCP

26. Complete lot (total number 13.500 units) of containers for collection of domestic wastes is delivered under the contract concluded between SUE "Maxsustrans" and "Uzbek Chinese Trading House". Contract value – 4,4 mln. USD. On 05.10.2017 Additional contract for the amount of 1 319 050 USD was signed for delivery of additional number of containers - 4.050 units. In compliance with the resolution of the Minutes No. 2 dated January 14, 2018 chaired by the Prime minister of the Republic of Uzbekistan 3.000 units out of the delivered containers are subject to be transferred to SUE "Toza Hudud" of Tashkent region with the subsequent repayment of the loan funds from the funds of the local budget of Tashkent region after agreement of the issue about transfer with ADB. Delivery of additional lot of containers is completed and the contract is closed.

2) Construction/reconstruction of new waste collection points

27. SUE "Maxsustrans" build 150 WCP out of the credit funds of Ipotekabank for the amount of 4,5 billion UZS, at the same time loan funds of ADB in amount of 4,52 mln. USD provided for this purpose remained unused and it is planned to use them for other purposes.

3) Waste collection trucks and special machinery

28. The contract for delivery of 182 units of waste collection trucks and special machinery *for the amount of 12, 99 mln. USD* is concluded with the *POSCO-DAEWOO company (Korea)*. For the present, the producer of waste collection trucks and special machinery Hyundai has shipped the whole consignment of goods which are at different stages of delivery: in the process of transportation, in the port terminal, customs clearance, etc. For today, 33 units of machinery which are under the process of customs clearance and registration, are delivered to the temporary warehouse of SUE "Maxsustrans" and the customs warehouse "Chukursay".

4) Consultant for support of PIU in project implementation

29. The contract is concluded between SUE "Maxsustrans" and JV "H.P. Gauff Ingenieure GmbH & Co. KG-JBG" (Germany) and LLC "Eng Invest Consulting" (Uzbekistan). The Consultant has started the activity since 01.08.2017 and continues the activity. Current date of the contract termination – June 30, 2019.

5) Consultant for support of capacity of SUE "Maxsustrans" and development of National Strategy for Solid Waste Management of the Republic of Uzbekistan

30. For the present, the contract is signed with JV "GWCC-INTERVAL ZT GmbH" (Austria), UVP Environmental Management and Engineering GmbH (Austria), Dohwa Engineering Co., Ltd. (Korea) and LLC "Al Mar Consulting" (Uzbekistan). The Consultant has started the activity since 15.02.2018 and continues the activity. Current date of the contract termination – October 15, 2019.

6) Consultant for designing and construction supervision of new landfill and closure of old landfill

31. On June 22, 2018 the results of technical evaluation of the proposals of 6 consulting firms participating in the bid were approved and financial proposals were opened. For the

moment, evaluation of financial proposals and preparation of the evaluation report on the contract award to the winner of the tender takes place. Signing of the contract is planned till the end of July, 2018.

2.4.1 Overview on Services and Operation Procedures of Maxsustrans

32. Maxsustrans Tashkent is (besides to some private collection enterprises) responsible for waste collection services in Tashkent. The organization of Maxsustrans is divided into 4 departments covering the following fields:

- **“Operation Department”** (Department for working with legal entities and operation of special trucks and machinery), responsible for Operation, Planning, Human Resources, Contracting
- **“Customer Relations Department”**, dealing with waste service customers, salaries, labour, financial issues
- **“Department for Waste Collection Points and provision of sanitary conditions”**
- **“Department for Engineering”** (Machinery repair and maintenance)

33. Maxsustrans is responsible for waste collection services in Tashkent. Approximately 1,000 waste collection points are serving mostly residential areas over 11 districts of the city. To collect household waste approximately 12,000 containers in sizes between 0,75 m³ and 1,1 m³ in operation, which has been a part of this Project. The 3 transfer stations and the Akhangaran landfill are operated by a separate state enterprise “Waste Transfer & Valorization Company” (controlled/implemented by Tashkent Municipality and SCEEP and Subsidiary of Maxsustrans – reports are submitted regularly). Tashkent is divided into 11 districts with own branches of Maxsustrans. Each branch must submit data to the City and SCEEP.

34. Maxsustrans is the only public waste collection operator in Tashkent, but based on a presidential decree also private operator - 46-Companies - are nowadays allowed to collect waste in the city. For the operation of the waste collection services a license permit is needed. With this strategy the competition between the companies is aimed to strengthen the business performance (nevertheless the private companies are working under control of Tashkent Municipality).

35. The operator of the transfer stations and the landfill is called “Waste Disposal & Utilization” (WDU); the company is a subsidiary of Maxsustrans. The 3 stations are in similar condition but it is foreseen that 1 transfer station should be closed and the other two stations should be reconditioned with an increasing of their capacities. Main client of WDU is Maxsustrans itself but also the private waste collectors are also delivering the waste to the transfer stations.

36. Detailed data on waste quantities can be obtained from the transfer stations – gathered from 4 of 8 weight bridges. The other ones are out of service since a long time. Maxsustrans only receives data on total waste amount per day in written. The digital storage works only partially due to the age of the electronic.

37. In total Maxsustrans owns 355 waste collection trucks (waste collection vehicles, dumper trucks, other vehicles). A list of the vehicle fleet with specifications regarding brand, type, year of manufacture, load capacity and number of trucks was handed over 280 of the collection trucks already have installed GPS in their vehicles (the rest was not equipped because of high age of the vehicle and frequent periods of maintenance). Software for processing the data from the GPS devices is not yet in operation.

38. The Monitoring section of the Department also collects vehicle related data covering mileage, condition, repairs, fuel consumption etc. and can be made available upon request and authorization from the head of the department.

2.4.2 Proper Collection and Dumping to Appropriate Sites

39. In order to implement a proper waste management system, existing practices should be changed and an effective system should be implemented. The matrix below distinguishes the existing waste management from the proposed project.

Matrix 1: Existing waste management

Existing Dumping Practices	Sanitary Landfill (SLF)
<ul style="list-style-type: none"> ➤ Limited capacity; ➤ No Site Preparation and no cell planning- waste deposited across large part of the site; ➤ Thin layers of waste-relatively rapid aerobic decomposition; ➤ No leachate gas management; ➤ Limited compaction of waste; ➤ Litter blown within and beyond site boundary- no fence; ➤ Uncontrolled presence of Vermin, pests and scavenging animals; ➤ Waste picking and trading. 	<ul style="list-style-type: none"> ➤ Project design based on environmental assessment; ➤ Planned capacity with phased cell development; ➤ Full controlled emission and effluent management with abstraction and treatment; ➤ Extensive site preparation and containment Engineering; ➤ Compaction of waste to maximum specified target densities; ➤ Full record of waste Volume, types and sources; ➤ Specified operational procedure to protect local amenity including vector controls; ➤ Fence, gate and other site infrastructure to ensure no trespassing and waste picking; ➤ Promotes segregation and recycling at source or at collection points; ➤ Promotes segregation and recycling at source or at collection points.

2.4.3 Strategic Orientation of the SWM Sector

40. At present, the solid waste management system in Uzbekistan is of traditional, low standard type all over the country. The waste is collected from individual houses and container stations and transported to simple landfills outside the cities. The collection covers

only the bigger communities whereas the rural areas are left without service. Recycling is almost non-existent.

41. There are a number of laws and regulations which govern the solid waste operations in the country. Two important acts are the Law of Waste from 2002 and the Regulation for Collection and Removal of Solid and Liquid Wastes of 2014. The Presidential Decree of 2017 changed the rules to a large extent as it opened up for private companies to enter the market. Before the year 2017 all work was carried out by the municipalities, sometimes via municipal companies. The decree introduced competition by inviting new private companies to take over contracts in the bigger cities. However, the privatization has not yet changed the actual mode of operation.

42. The following list in the **Table 3** is intended to show excerpts of the relevant legal acts and other documents which govern and have an effect on solid waste management in Uzbekistan.

Table 3: National legislation related to waste management

Title	Content
Constitution of the Republic of Uzbekistan	The Khokimiyats (Local Executive Power) are responsible for organization of the waste sector
Law on Wastes No. 362-II 05/04 2002	Definitions, Ownership, Responsibility of various governmental and regional/ local authorities, Legal entities, etc.
Regulation for Collection and Removal of Solid and Liquid Wastes Res. CoM N.194 dated 15 July 2014	Definitions, responsibilities of actors, including consumers, rules for payment of tariffs, contracts between contractor and waste generator, contractors responsibilities, etc.
Decree of the President of the Republic of Uzbekistan of 21.04.2017 No. PP-2916 "On Measures for Cardinal Improvement and Development of the Waste Management System for 2017-2021"	Establishing Toza Hudud for waste operations outside Tashkent A comprehensive scheme for placement, collection, transportation, processing and disposal of MSW A contract to construct WCP:s Development program for old and new landfills Approval of investments for waste handling in cities
Norm No. 35 of August 30, 2016	Norms for the accumulation of solid domestic waste, the procedure for their removal and installation of garbage container sites
Norm No. 33 of August 19, 2014	Requirements for the collection, sorting and storage of solid and liquid household waste
Decree of 28.01.2013 of the State Committee for Nature Protection No. 1, Ministry of Emergency Situations No. 1, Ministry of Finance No. 8 and Ministry of Health No. 2	On approval of the Regulations on the disposal of pesticides and other toxic substances, as well as protection and maintenance of special polygons "(Registered by the Ministry of Justice on March 20, 2013, N 2438)

2.4.4 Establishment of Modern SWM Systems

43. The current waste disposal system has been through controlled dumpsites. These dumpsites often characterized by an area where garbage is simply transported, unloaded, and at times leveled by a bulldozer. Nearly all these sites operate with no protection against soil and groundwater contamination. The situation is further exacerbated by operators' seldom attempt to control pungent smoke, objectionable odor and vermin. Sorting is only achieved through scavenging, which at times tolerated, with no checks in place for the health and safety. Such dumpsites are inexpensive operate, but pose serious damage to the land,

water, air, aesthetics, and the health of the surrounding population. These dumpsites are also difficult to rehabilitate after they are filled and abandoned. Failure to implement the project will result to allocation of land only to be subjected to the existing practice. Alternatives in this context will mean the establishment of the SLF at alternative sites or the project not pushing through. Although what is obvious is such alternatives shall not negate the disadvantages of allocating land for disposal purposes only to be subjected to the existing dumping practice.

44. SWM alternatives at the other end of the SWM technology spectrum include incinerators, pyrolysis chambers (high-temperature incineration in the absence of oxygen) or chemical/biochemical decomposition systems which have begun to establish in the SWM market. These systems are able to support additional to break down or substantially reduce the volume of waste on the Landfill. They also have the capacity to destroy pathogens and render most toxic substances inert. However, most of the modern incinerators are often costly to set up and operate. In addition, ash and other residue from incinerators still require a sanitary landfill for their final disposal, but also the rest should be handled carefully due to the possibility of heavy metal and other hazard ingredients. This has been extensively discussed by the GoU and has deemed this alternative not economically feasible so was abandoned.

45. An orderly collection and presorting of domestic waste, bottle deposit systems, reduction in the volume of plastic bags and plastic film, separate collection of organic waste, etc., also contribute significantly to the reduction in waste.

46. Engineered sanitary landfills, on the other hand constitute another type of solid waste disposal system. Landfills store and compress the waste without neutralizing toxins or pathogens, but have in place stronger controls against soil, water and air pollution than dumpsites. Moreover, sanitary landfills allow the recovery of methane gas, a byproduct of anaerobic decomposition of organic matter, which can be used for power generation. Well sited and operated sanitary landfills provide the best option in waste management in view of their relatively low construction and operating costs and the type of wastes they are expected to handle. This can be complemented by waste minimization and recycling strategies which is part of the next phase of the project.

2.5. Description of Any Changes to Project Design

47. Not applicable.

2.6. Description of Any Changes to Agreed Construction methods

48. Not applicable.

3. ENVIRONMENTAL SAFEGUARD ACTIVITIES

3.1. General Description of Environmental Safeguard Activities

49. IEE for project was prepared for SUE Maxsustrans in May 2013 and it was published on ADB's website.

50. The IEE report covers the general environmental profile of the project and includes an overview of the potential environmental impacts and their magnitude on physical, ecological, economic, and social and cultural resources within the subproject's influence area during design, construction, and operation stages. Additionally, National Environmental Expert has reviewed this Environmental Management Plan (EMP) as part of this report (**Annex 1**). The level of details and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the Project's impact and risks.

3.2 Site Audits

51. Pursuant to the Terms of Reference (TOR) for the PIU Consultants, the Consultant undertook environmental monitoring and inspection of the Project and the sites with environmental relevance. Two site visits were done in the past by PIU Consultant, National Environmental Expert, Sergey Karandaev, who implements environmental safeguards services and supports the PIU. The first monitoring was conducted on 03-04 April 2018, while the second one was conducted on 25 June 2018. Environmental Expert visited Akhangaran Landfill.

52. Summary of significant findings revealed during the monitoring are described below:

- Currently, unclassified wastes are dumped within an allocated area in Akhangaran commonly referred as the "Akhangaran Landfill". Occasionally, a bulldozer is available for leveling solid waste and to 'clear' and 'cover' the dumped wastes. The required equipment and machinery (facilities) for a properly operation and to handle or treat residues even from simple domestic wastes (ex. liner or leachate collection) doesn't exist on site or not functioning. Operating, Handling and disposal of delivered solid wastes are done haphazardly. In addition to this, open burning as a result of missing compaction and missing interim dump site closure is indiscriminately exacerbating the situation.
- The adjacent areas are irrigated farmland predominantly characterized by undulating valleys. There are no residential areas or industrial facilities within a 4-kilometer radius. Farmers come primarily from villages located about 5 kilometers from the site. A possibly existing pollution of water from existing channels has not been tested yet.
- At the landfill area, there are established basic facilities such as a weighbridge, administrative building, a maintenance shed, security gate and record-keeping shed. The area is connected to the main road Highway P2 via by a badly damaged asphalt access road that leads directly the landfill. The distance from the highway to the landfill area is about one kilometer.

- At the existing landfill, it was observed that there is no fence and caution signs around facility.

53. Notwithstanding the installed systems for the Akhangaran landfill, the facility resembles more like a controlled dumpsite rather than an uncontrolled landfill as commonly referred too. The existing disposal practice at the Akhangaran Landfill may be generally characterized as:

- ❖ Generally organized but employs sporadic dumping of wastes;
- ❖ Absence of data / information actual volume of waste stored at the site
- ❖ No controls over potential pollutants and residues generated and released from waste decomposition;
- ❖ Occasional vectors are attracted to the site due to exposed wastes;
- ❖ Potential generation of odors and pungent smoke from spontaneous combustion.

54. All in all, the existing practices of handling such wastes does not necessarily solve the problem but instead bring about additional environmentally deleterious issues which may affect the health and safety of the adjacent communities. This situation is similar to other smaller dump site areas within the jurisdiction or adjacent of the Tashkent region.

55. **Waste collection points.** The 1,000 waste collection points are serving mostly residential areas over 11 districts of the City, especially in high-rise residential clusters. These collection points have to be improved because they are a crucial element of Tashkent's recycling efforts. The waste collection points are able to reduce the volume of waste for collection by manual segregation of recyclables. This system in its simplicity proved to be more efficient. The recyclables are than handled by the informal sector and treated and processed for further use. There are in general two types of waste collection points within the city; these are guarded and unguarded collection points. As shown at the collection points survey, there are 650 guarded and 350 unguarded collection points. Aim of the project is the increase the total number of collection points within the city as also to convert unguarded points into guarded collection points.

56. **Waste Collection Bins.** Maxsustrans has right now about 10,000 -12,000 thousand waste bins in operation. The city utilizes mainly open 0.75m³ steel bins as also standard 1.1m³. This kind of bins proofed reliability and sufficiency and served its purpose well. The delivery of new bins under the Project (17,550 in total) has been completed and the main part of these are used. It is also recommended to integrate the bins utilized within the city into the above recommended integral logistic software solution, this in conjunction within the waste collection point survey of this project.

57. **Waste Transfer Stations.** Maxsustrans operates today three waste transfer station within the vicinity of the city. Original the WB project from 2002 recommended the installation of 4 stations. The current SWMI-Project envisages a full refurbishment of 2 Transfer Stations.

58. The initial assessment of the existing waste collection situation and the above discussed charges in the type of vehicles sizes used leads to the conclusion that only two transfer stations would be sufficient to surf the whole city and would also be of economic advantage. It's being considered that the eastern part of the city would be served by the bigger collection trucks which can travel to the landfill at Akhangaran directly. It is currently recommended that

the Khamza district transfer station be abandoned. However, the existing stations Yakkasaray and Yunusobod need extensive/ fundamental reconstruction overhauling for its buildings, equipment and infrastructure as also for its electro-mechanical components. The system could serve the existing road transport approach as also possible later waste to rail solutions in case of.

59. The utilized transfer system with hook-lift trucks as also the containers need urgent replacement. It was recommended to purchase a new generation of hook-lift trucks and equip them with trailers. It was further recommended to replace all old waste collection trucks of the City collection. To reach savings by consumption of diesel and reduction of air pollution and CO₂ emissions. This is now ongoing with the realization of Package G_2 "Waste Collection Trucks and Transfer Trucks and Containers".

60. It is recommended a full logistical study on this issue including the implementation and utilization of transport logistics optimizing software because the current route planning for the waste collection trips are estimated partially as insufficient.

61. **Landfill Akhangaran:** The landfill is located far away from the urban area in the south of Tashkent. The nearest settlements are located 3 km away from the landfill. The landfill covers an area of about 59 ha; it was established in the 70ies. Every day about 1.800 t of waste are entering the landfill.

62. For operating the landfill no compactor vehicles are used (only small bulldozers are used). For intermediate covers of the landfill soil is used. At the moment the soil reserve is exhausted, therefore the last soil layer was processed last year. Normally, after a 2 m-layer of waste a 20 cm soil layer is used for covering the waste.

63. During the site visit in 03-04 April 2018 (conducted by National Environmental Expert, Sergey Karandaev), waste pickers are picking out recyclables from the landfill. Approx. 100 waste pickers are working at the landfill (30-40 of them are officially registered as personnel).

64. Several gas wells (~ 42) are located at the perimeter of the landfill. Since 2011 a private company is operating a gas pumping station. The gas (mainly methane) is burned using a gas flare (at the moment the gas flare is under maintenance). The methane concentration was recently measured by a Japanese company (for analyse the waste to energy potential). Acc. to them, the methane concentration is reaching 65%. The daily gas production is estimated with 2.000 standard m³ gas.

65. Besides the pathway a small channel is collecting accumulated water. There is no leachate collection because no leachate is produced at the landfill.

66. There are no documents demonstrating the operation of the landfill. According to instructions from Maxsustrans, daily reports about waste volume have to be submitted to them. From time to time (no specific interval) personnel from SCEEP is monitoring the labour safety and health/safety conditions. Every 3 months trainings and operating procedures are instructed by the Chief Engineer.

67. The Consultant also asked about any explosions due to small burnings. According to the head of operations there are no explosions occurring because of the open disposal.

68. Small repair and maintenance works are done by themselves: for large repair works they have a service agreement with a Chinese company.

Figure 4. Photo from site visit on 03-04 April 2018



3.2.1 ADB Mission

68. ADB mission took place from 5-12 March 2018. A project review mission (the Mission)³ of the Asian Development Bank (ADB) for the Solid Waste Management Improvement Project (the Project) visited Tashkent, Uzbekistan from 5-12 March 2018. The main objectives of the Mission were to review and confirm with the Government of Uzbekistan: (i) the key project implementation issues, (ii) project implementation schedule and procurement plan, (iii)

³ The Mission comprised Ruoyu Hu, Urban Development Specialist, CWUW (Mission Leader); Lu Shen, Unit Head, Portfolio Management, CWUW; Charles Felix Simbillo, Associate Project Analyst, CWUW; Doniyor Mukhammadaliyev, Social Sector Officer, URM; Feruza Insavaliyeva, Associate Project Analyst, URM; and Umida Rasul-Zade, Operations Assistant, URM. Hidemasa Fukuda, Director's Adviser for Japan, joined the Mission 6-12 March.

contract awards and disbursements (CAD) targets, (iv) loan covenants, and (v) Project Administration Manual (PAM).

69. The Mission visited the sanitary landfill site and waste transfer stations, conducted meetings with the State Committee for Investment (SCI), the State Committee for Ecology and Environmental Protection (SCEEP), Ministry of Finance (MOF), the Ministry of Economy (MOE), Tashkent City Hokimiyat (Tashkent Municipality), State Unitary Enterprise “Maxsustrans” (Maxsustrans) and Project Implementation Unit (PIU). A wrap-up meeting with Tashkent Municipality, Maxsustrans, and PIU was held on 12 March 2018. This Memorandum of Understanding (MOU) summarizes the findings, recommendations, and key agreements reached by the Mission, which are subject to further confirmation from the higher authorities of the Government of Uzbekistan and ADB.

70. The Mission reminded Maxsustrans that the design, construction, and operation and maintenance of the facilities under the project should be carried out in accordance with ADB SPS, 2009, applicable laws and regulations of Uzbekistan, and recommendations of the IEE and its EMP, though the civil works have not started yet. Maxsustrans assured the Mission that potential adverse environmental impacts arising from the project are minimized by implementing all mitigation and monitoring measures as presented in the EMP of the IEE. If necessary changes should be made in the project design, the updated IEE will be prepared and all necessary government permits and licenses, including ecological expertise opinion, to construct the sanitary landfill facility will be obtained prior to commencing SLF civil works. Baseline environmental measurements will be carried out by the contractor before commencement of the civil works. The Quarterly EMR for January-March 2018 have been submitted and disclosed on ADB’s website.

3.2.2 Issues Tracking (Based on Non-Conformance Notices)

71. Not yet applicable.

3.2.3 Trends

72. Not yet applicable.

3.2.4 Unanticipated Environmental Impacts or Risks

73. Not yet applicable.

4. RESULTS OF ENVIRONMENTAL MONITORING

4.1. Overview of Monitoring Conducted during Current Period

74. Monitoring and reporting of the project will be conducted prior to construction, during construction, and during operation. The PIU shall monitor the performance and implementation of the EMPs. Monitoring reports on the performance and in implementing the EMPs, shall be prepared prior to construction (detailed engineering design and procurement stages), during construction and during project operation, as follows: i) monthly progress reports; and ii) quarterly monitoring reports to be submitted to ADB. The monitoring report/s shall also document the relevant environmental aspect and its respective mitigation measure, as well as grievances received and resolved, if any.

75. Prior to commencement of any construction work, contractors will submit an EMP and compliance report to PIU ensuring that all identified impacts detailed in the environmental assessment have been undertaken. The PIU will review reports submitted by CC as soon as construction works commence.

76. The PIU will organize an induction training to discuss the submitted CEMP including environmental monitoring requirements and reporting of unexpected adverse impacts or impractical mitigating measures observed during the construction phase. A monthly report will be prepared by the PIU summarizing compliance with monitoring requirements, details on any noncompliance, remedial actions taken and additional environmental mitigation measures if necessary.

77. Based on monthly reports and measurements, the PIU will draft quarterly EMP implementation report which will include (i) construction activities over the last 3 months; (ii) reporting on EMP implementation; (iii) sampling results (iv) findings on the compliance status; (v) summary of any non-compliance and remedial actions taken; and (vi) recommendations for improvement, revision of the mitigation measures and/ or the EMP if any. The safeguard specialist of the PIU will review the draft EMP implementation report which upon approval by the Project Director will be submitted to ADB. Depending on findings, future modifications in the EMP could be undertaken with the concurrence of the ADB. These will be generally undertaken, if required, upon review of the EMP progress reports submitted by the PIU to ADB for review and further action.

78. The IEE goal was to maximize the use of available secondary data (without baseline instrumental measurements) in the understanding of the present condition of the project site. It should be noted that secondary information made available by pertinent governmental agencies and secondary literature was maximized to establish the baseline for the site. IEE described the baseline environmental conditions, including physical, ecological and socio-economic resources in project site, assesses environmental impacts of the intended project activity, and provides remedial/mitigation measures. The baseline parameters would be established prior to construction for the purpose of monitoring the situations of environment affected during construction. The baseline measurements will become the conditions against which any changes due to project effects will be measured. All data must be collected so that their source can be traced by anyone who picks up the document.

Instrumental monitoring of quality of environment during this reporting period was not conducted since construction activities have not been yet commenced. According to Environmental Management Plan and Environmental Monitoring Plan the Contractor would be responsible for conduction monitoring of the following parameters indicated in the **Table 4** below with defined frequency and responsible organizations.

Table 4. Environmental Monitoring Plan during the Construction

Environmental Components	Parameters	Frequency	Responsible Party	Station/ Location
Air Quality	<ul style="list-style-type: none"> • Nitrogen Dioxide (NO₂), VOCs • Particulates - PM₁₀ and PM_{2.5}. Nitrogen Dioxide (NO₂), Sulfur Oxides (SO_x), • Noise / Objectionable Odour 	<ul style="list-style-type: none"> • Quarterly • Bi –annually • Quarterly / Monthly 	Contractor / PIU to monitor for compliance and reporting to PCMU / SCNR	<ul style="list-style-type: none"> • On the identified point sources within the premises of the SLF and the old dumpsite • Within the project site including areas at old dumpsite • Within and outside the SLF (1-2 Km North-west and West-North-West end)
Groundwater / Leachate Contamination	<ul style="list-style-type: none"> • pH • Conductivity • DO • BOD₅ • TDS • Salinity • Total Hardness • Alkalinity • Carbonates • Oil and Grease • Trace Metals • Coli form 	Quarterly	Contractor / PIU to monitor for compliance and reporting to PCMU / SCNR	<ul style="list-style-type: none"> • Ground Water Monitoring Wells (whenever installed – see discussion) • Leachate Collection and Pump shafts
Residual Wastes	<ul style="list-style-type: none"> • Volume / quality • Characterization of wastes / Type • Efficiency of storage facilities 	<ul style="list-style-type: none"> • Annually • Quarterly • Quarterly 	Contractor / PIU to monitor for compliance and reporting to PCMU / SCNR	Within the SLF
Noise generation		Monthly	Contractor / PIU to monitor for compliance and reporting to PCMU / SCNR	At the construction site and near the sensitive receptors

4.2. Trends

79. Not yet applicable.

4.3. Summary of Monitoring Outcomes

80. Not yet applicable.

4.4. Material Resources Utilisation

81. Not yet applicable.

4.5. Waste Management

82. Not yet applicable.

4.6. Health and Safety

83. Not yet applicable.

4.7. Training

84. On 23 April 2018, Mr. Gerald Kurz, Support Non-Key Expert SWM O&M of the JV “GWCC - INTERVAL ZT GmbH & UVP Environmental Management and Engineering GmbH, Dohwa Engineering Co., Ltd, and Al Mar Consulting Ltd. who implemented Capacity Development Program of Solid Waste Management Improvement Project, presented the outlines for the Chapter on Waste to Energy in SWM and to have further discussion with Maxsustrans staff.

85. Mr. Gerald Kurz presented and explained the following issues:

- Available and proven waste incineration technologies in Europe;
- Waste Disposal and Landfill Operations in Europe (risk analyses of existing dump);
- Definition of minimum criteria for requirements of new landfills for: site, technical standards, equipment and operational standards;
- Availability of waste-to-energy plants according to BAT (Best Available Techniques);
- Existing landfill gas extraction for generation of power and heat;
- Potential for Waste to Energy;
- Analyses of waste characteristics for waste-to-energy processes.

86. The list of participants in the meeting is presented in **Table 4** below:

Table 4: The list of training participants

Name	Position
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Mr. Sh. Inogamov	Deputy Head on Operations, SUE “Maxsustrans”
Mr. Rakhimov	Chief of O&M, SUE “Maxsustrans”
Mr. Yuldashev	Deputy Chief of O&M, SUE “Maxsustrans”
Mr. Ibragimov	Chief Inspector, SUE “Maxsustrans”
Mr. Mingbayev	Leading safety equipment engineer, SUE “Maxsustrans”
Mr. Ishonkhodjaev	Leading civil protection engineer, SUE “Maxsustrans”
Mrs. O. Andreychenko	PIU accountant
Mr. D. Mavlyan-Kariev	Deputy Team Leader, PIU Support Consultant
Mr. T. Kabashev	Financial Management Specialist, PIU Support Consultant
Mr. T. Khaydarov	Procurement Specialist, PIU Support Consultant

Figure 5. Training photos



87. From 24.06. until 29.06.2018 two staff members of Maxsustrans and Project Implementation Unit, Mr. Muzaffar Mansurov and Mr. Takhir Nurbaev have participated in the site visits and study tour “Waste to Energy” in Austria and Czech Republic organized by

International Solid Waste Association (ISWA). After this study tour the both staff have continued to visit the SWM enterprises in Germany and Switzerland.

5. FUNCTIONING OF THE SEMP

5.1. SEMP Review

88. Specific Environmental Management Plan (SEMP) for the project “Solid Waste Management improvement Project” will be prepared by Environmental Specialist of construction company before commencement of the civil works. SEMP will be endorsed by SC and approved by PIU, after which Construction Company can start construction activities. Such plans can be further subdivided into Topic Specific and/or Site Specific EMP's. The number of such plans will depend upon the type of project, complexity and sensitivity of the receiving environment.

6. GOOD PRACTICE AND OPPORTUNITY FOR IMPROVEMENT

6.1. Good Practice

89. Not yet applicable.

6.2. Opportunities for Improvement

90. Not yet applicable.

7. SUMMARY AND RECOMMENDATIONS

7.1. Summary

91. As soon as construction works commence, environmental monitoring will be conducted.
92. The preparation of the quarterly environmental reports will be continued but all items / paragraphs, which haven't changed or developed will not repeated as in the Bi-Annual Report.
93. Specific Environmental Management Plan (SEMP) for the project will be prepared by Environmental Specialist of construction company before commencement of the civil works.
94. The Semi-annual Environmental Monitoring Reports upon review and approval by ADB will be posted on the Maxsustrans website and disclosed at ADB web-site as before.
95. The next Semi-annual EMR will be submitted to the Client/ADB in January 2019.

ANNEXES:

Annex 1: Environmental Management Plan

Sources of Impact	Impacts	Type / Degree of Effect	Mitigation / Enhancement Measures	Institutional Responsibilities	Cost
I. Pre-Construction Phase					
Land Acquisition	Loss of Agricultural Land	Significant and Long Term	<ul style="list-style-type: none"> • Proper appraisal and timely compensation as defined in the LARP. • Ensure that irrigation to affected plot/s aside from the allocated area remains unimpeded. • Select optimal location of facilities, access routes and construction sites to minimize temporary or permanent use of land • Ensure clear delineation and fencing of landfill area 	PIU for implementation and monitoring	Included in project Cost
Environmental and Social Appraisal And Management	Organizational capacity and commitment	Temporary and short term	<ul style="list-style-type: none"> • Establish and maintain Environmental, Social and Health & Safety Management System (ESHS). Employ EHS management staff with the Company. 	PIU, PIU consultant	Own resources, Consultant remuneration
Occupational Health and Safety	PPE provision	Temporary and short term	<ul style="list-style-type: none"> • Carry out and keep updated OHS risk assessment of work places prepared by authorized consultant • Provide PPE for the staff of Company and include in tender documents the requirement for all contractors including the municipal waste collection company to provide adequate PPE according to OHS assessment of workplaces and the local regulations. 	PIU, PIU consultant	Own resources, Consultant remuneration

II. Construction Phase					
Land clearing	Generation of fugitive dusts	Temporary but long term	<ul style="list-style-type: none"> • Open only one area for development on a by phase basis as planned. • Minimize movement of vehicles inside the construction area • Cover exposed areas with tarps or similar materials / application of slope stabilization materials • Establish buffer zones and fences 	Contractor/ PIU Consultant to monitor for compliance and reporting to PIU/ SCEEP (State Committee on Ecology and Environmental Protection	Include such measure in the Contractor's TOR
	Noise generation	Temporary and short term	<ul style="list-style-type: none"> • Notify the affected communities, adequately in advance, about the expected nuisance. • Reduce project traffic routing through community areas wherever possible. • Install mufflers and silencers for machines and equipment • Avoid working during rest periods / night time • Regularly maintain equipment • Establish fences around the work area as barrier • Impose minimum speed limits within the project site 	Contractor / PIU Consultant to monitor for compliance and reporting to PIU / SCEEP	Include such costs in the Contractor's contract
	Possible Soil erosion	Short-term and temporary	<ul style="list-style-type: none"> • Contain excavation and other similar activities within design boundaries • Immediately stabilize areas once cut and fill activities are completed • Introduce vegetative cover in areas that will remain permanently open • Cover with pebbles or gravel areas that are to remain open for a long period of time • Peak Ground Acceleration (PGA) values for the site should be determined and incorporated in the design. 	Contractor / PIU Consultant to monitor for compliance and reporting to PIU / SCEEP	Include such measure in the Contractor's TOR
	Waste	Temporary and short term	<ul style="list-style-type: none"> • Ensure that all hazardous waste from temporary storage facility 	Contractor / PIU	Management time, as per contract

			located at the landfill is sent to an appropriate final disposal facility		
	Flora	Temporary and short term	<ul style="list-style-type: none"> • Re-introduce local occurring vegetative cover in areas within the SLF where it would be most appropriate. Shallow rooted vegetation is recommended 	Contractor / PIU Consultant to monitor for compliance and reporting to PIU / SCEEP	Include such measure in the Contractor's TOR
	Traffic	Temporary and short term	<ul style="list-style-type: none"> • Regulate the entry and exit of vehicles and equipment in the construction site • Properly regulate delivery of materials into the project site • Impose minimum speed within the project site • Do not allow vehicles to stay within the project site for a long period of time • Regular monitoring to ensure that traffic flow remains optimal and clean- up of any debris can be undertaken immediately. • Regular maintenance of equipment. 	Contractor / PIU Consultant to monitor for compliance and reporting to PIU	Include such measure in the Contractor's TOR
	Occupational health and safety	Temporary and short term	<ul style="list-style-type: none"> • Induction and orientation meetings will be undertaken by all workers. Tool box talks are also recommended. • Only qualified workers will be hired • Strictly impose and monitor use of PPE by workers. Regular inspections will be conducted. • Provide HSE manuals and require placement of safety signs and placards • Restrict movement of personnel in danger zones • Insurance Policy for Workmen Compensation should be provided. • Conduct awareness and training programs on safety and health 	Contractor / PIU Consultant to monitor for compliance and reporting to PIU	Include such cost / measure in the Contractor's contract

			issues to be handled by the designated HSE Officer.		
Community Impacts	Community health, safety and security	Temporary and short term	<ul style="list-style-type: none"> Develop and implement procedures for protecting public health and safety (e.g. traffic management plan, fencing, drivers training program, pedestrian access and trespassing plan, road design, slope stability, clean-up of spills, well visible signage, awareness-raising) 	Contractor / PIU Consultant to monitor	Include such cost / measure in the Contractor's contract
	Loss of income of informal waste pickers		<ul style="list-style-type: none"> Identify alternative livelihood options for the waste pickers in accordance with the principles of livelihood framework prepared as above and in consultation with the affected people. 	PIU, PIU consultant	Consultant remuneration
Closure of the existing dumpsite		Temporary and long term	<ul style="list-style-type: none"> Conduct a detailed site assessment covering the entire 59 hectares Development of a 'safe closure plan' Adequate and prompt covering and compaction to prevent exposure of wastes Induction and orientation meetings with special focus in the use of PPE will be undertaken by all workers. Require placement of safety signs and placards Conduct of post-closure environmental monitoring Maintenance of installed facilities. Precautionary measures should be taken to ensure uncontrolled fires are not started as a consequence of the closure activities. 	<p>Contractor / PIU Consultant to monitor for compliance and reporting to PIU / SCEEP</p> <p>Post closure management shall be handled by the IA / PIU</p>	Include such cost / measure in the Contractor's contract
III. Operation Phase					
Operation of the SLF	Air Emissions / Air Quality	Permanent and long term	<ul style="list-style-type: none"> Gas emission (i.e. generation of objectionable odors) from the landfill is expected to be moderate. 	PIU and SCEEP for monitoring	Cost should be included in the

			<ul style="list-style-type: none"> • Provide all employees with appropriate PPE • Monitor air quality based on a specified in the monitoring program • Regulate movement of vehicles inside the landfill to minimize emissions 		operating budget
	Health & Safety	Significant, permanent and long-term	<ul style="list-style-type: none"> • Strictly impose and monitor use of PPE by personnel especially those engaged in the handling of wastes • Provide and require safety signs and manuals • Restrict movement of personnel in danger zones • HSE manual and Insurance Policy for Workmen Compensation should be provided. • Conduct awareness and training programs on safety and health issues • Make available first aid kits in the landfill area • Make available a vehicle that can bring victims to hospitals • Strictly monitor the entry and exit of outsiders inside the landfill • Precautionary measures should be taken to ensure uncontrolled fires are not started as a consequence operational activities. 	PIU and PIU Consultant for monitoring	Cost should be included in the operating budget
	Noise	Insignificant, long term and permanent	<ul style="list-style-type: none"> • Install mufflers and silencers for machines and equipment • Avoid working during rest periods • Regularly maintain equipment • Impose minimum speed limits within the project site 	PIU and SCEEP for monitoring	Cost should be included in the operating budget
	Groundwater quality	Significant, permanent, long term	<ul style="list-style-type: none"> • Use of HDPE liner and establish leachate collection and treatment 	PIU Consultant, PIU and SCEEP for monitoring	Cost should be included in the

			<p>system as designed and planned</p> <ul style="list-style-type: none"> • Monitor leachate quality, if any • Ensure that no leachate percolate into the ground by consistently conducting quality checks of liner prior to disposal. • Ensure that all leachate are collected and treated • Properly cover the landfill after the cell is filled • Introduce vegetative cover in areas where it would be applicable to promote evapo-transpiration and re-direct portions of the precipitation. 		operating budget
	Vermin & other pests	Significant, temporary and short term	<ul style="list-style-type: none"> • Ensure that all containers are properly enclosed to avoid manifestation • Covering should be done every end of the day's operations 	PIU Consultant, PIU / SCEEP for monitoring	Cost should be included in the operating budget
Operation of the SLF	Traffic	Significant, long term and permanent	<ul style="list-style-type: none"> • Regulate the entry and exit of vehicles and equipment in the SLF • All dump trucks should carry a waste manifest / legal papers to avoid long stand by times at the gate. • Impose minimum speed within the project site. • Do not allow vehicles to stay within the project site for a long period of time • Proper maintenance of the internal road network. • Employ a traffic management system at the ingress/egress of the project site. A traffic circulation plan should be developed not to hamper the traffic flow. 	PIU Consultant, PIU for monitoring	Cost should be included in the operating budget
Operation of auxiliary facilities (e.g.	Air Emissions	Significant, permanent and long term	<ul style="list-style-type: none"> • Foul odors are expected to be a permanent feature of the plant. It is therefore necessary that most 	PIU, SCEEP for monitoring	Included in the operating budget

Leachate Treatment Plant)			<p>appropriate ventilation system is implemented. This system should also maintain the appropriate air exchange ratio to minimize stagnation within the plant.</p> <ul style="list-style-type: none"> • provide all employees with appropriate PPE • monitor air quality (indoor and outdoor) based on a specified in the monitoring program • Regular monitoring for any leaks (loss in pressure) and/or for spills 		
	Health & Safety	significant, permanent and long term	<ul style="list-style-type: none"> • Training for personnel pertinent to operations and maintenance. • Provide the necessary PPE and strictly impose and monitor its use by employees • Provide require safety signs and placards and restrict movement of personnel in danger zones • Conduct awareness and training programs on safety and health issues • Make available first aid kits • Strictly monitor the entry and exit of outsiders inside the facility 	PIU Consultant, PIU/ SCEEP for monitoring	Included in the operating budget
Operation of auxiliary facilities (e.g. Leachate Treatment Plant)	Groundwater quality	Moderate, permanent and long term	<ul style="list-style-type: none"> • Ensure that all containers and tunnels are properly sealed • Ensure no leakages in the containers and tunnels • Whenever applicable, all floors must be properly sealed • Ensure that leachate and other spills are properly collected and not disposed in sensitive areas • Water usage shall be monitored. 	PIU Consultant, PIU/SCEEP for monitoring	Cost should be included in the operating budget
	Noise	Insignificant, negligible and short term	<i>Note: There are no sources of high level noise from the operation of the plant.</i>	PIU and SCEEP for monitoring	Cost should be included in the

			<i>Whenever excessive noise is to be generated, this will be short term.</i>		operating budget
	Vermin & other pests	Insignificant, negligible and short term	<i>The presence of vermin and pest will be very minimal since the facility and its equipment are totally closed. To ensure that employees are not exposed to deleterious materials;</i> <ul style="list-style-type: none"> • All workers and personnel shall be provided with appropriate PPE • Use of the PPE must be strictly implemented and monitored. 	PIU Consultant, PIU for monitoring	Cost should be included in the operating budget