

Ministry of Urban Development  
of the Republic of Armenia

**Kotayk Solid Waste  
Management Project -  
Environmental and Social  
Due-Diligence**

Non-Technical Summary

Draft for public comments

November 2011

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# 1 Introduction

Kotayk Region (Kotayk Marz) is located in the central part of Armenia to the north from Yerevan. The location map is included in Figure 1. There are 7 cities, including the administrative centre Hrazdan, and 60 rural communities in Kotayk Region. The town of Sevan is located on the Lake Sevan coast close to the northern border of Kotayk Region (see the map in Figure 2).



Figure 1 Administrative map of Armenia



Figure 2 Map of Kotayk Region and Sevan town

### 1.1 Why improve waste management system in Kotayk Region?

The current system for waste collection in the Kotayk Region, involves both the collection of all solid waste from containers on the streets and people taking their waste directly to waste collection vehicles in cities. The waste is then taken to the big municipal dumpsites. The waste has now extended beyond the dumpsites areas. Furthermore, it often burns, is an eyesore, causes unpleasant smells, is causing various negative impacts on the adjacent areas (soil, water bodies, flora, fauna, etc.). Waste from about 30% of the population of the Kotayk Region who live in villages is accumulated at smaller dumpsites not far from the villages themselves.

Numerous dumpsites can be seen in many places in Kotayk Region. Waste collection and transportation companies can not provide good services because the tariff for waste collection is low, not all families actually pay the waste bills and waste dumping "somewhere" is a common practice in many regions of Armenia.

Both the general population and the authorities consider that waste should not be dumped in areas other than those officially designated. In order to keep the residential areas and their vicinities clean and nice, the Ministry of Urban Development (MUD) of Armenia has approached the European Bank for Reconstruction and Development (EBRD) requesting support for the improvement of waste management in the Kotayk Region through procurement of modern waste containers, trucks and establishment of regional sanitary landfill for safe disposal of waste in accordance with the EU standards.

After a site selection study, the area of former clay quarry next to existing dumpsite of Hrazdan town has been selected as a suitable location for a sanitary landfill. If a regional sanitary landfill is constructed, the dumpsites will be closed and covered with soil, so that they look like natural hills.

## **1.2 Reasons for including Sevan town**

Sevan town is located in Gegharkunik Region, but close to the border of Kotayk Region. Waste collected in Sevan town is at present taken to a dumpsite located on the coast of Lake Sevan, a beauty spot and tourist attraction of Armenia. Waste trucks have to drive to the dumpsite along track in mountainous terrain. The distance from Sevan to this dumpsite is the same as the distance to Hrazdan town, and the road is good as it forms part of the main Yerevan-Sevan road. Many tourists from Yerevan and other regions spend their weekends and holidays during the summer in Sevan municipality. They stay for a day or longer at hotels, summer houses or just in "informal camps" in the coastal zone. During weekends there can be 10 times more tourists in Sevan municipality than the local residents. The tourists leave a lot of waste. Sevan municipality needs support for the collection and disposal of waste in order to keep the Lake Sevan coast clean.

## **1.3 Who will pay for the improvements?**

EBRD is considering provision of a loan and a grant for covering the costs of establishing modern waste collection services for the Kotayk Region and Sevan town with safe disposal of waste in one specially equipped place. A grant will cover half of the cost. The other half is expected to be covered by a loan provided for 15 years. This is expected to be repaid from revenue generated by the introduction of new tariffs, which are to be established for households and other users of the new waste management system. Part of the loan could also be repaid from the revenue generated from sales of separately collected recyclable materials.

## **2 Description of the new system**

The modern waste management system for Kotayk Marz and Sevan town will assume improved collection of municipal solid waste and placing of waste at one sanitary landfill instead of many dumpsites.

### **2.1 New waste collection and transportation system**

In 6 cities (Hrazdan, Tsaghkadzor, Charentsavan, Yeghvard, Abovyan and Sevan) the new system will include containers for waste collection and new compaction trucks for mechanical emptying of containers and for transportation of waste to the new regional landfill near Hrazdan.

In two cities (Nor Hachn and Byureghavan), people currently take their waste to the collection vehicle as it passes the house and gives a signal. Here the new system will include new compaction trucks, which will transport the collected waste to the proposed Hrazdan landfill.

Rural communities will be provided with containers for the collection of waste in dedicated places in each village. The containers will be emptied by compaction trucks belonging to the Landfill Company, and the waste will be taken to the landfill. Rural communities will pay for these services according to fees set by the Landfill Company with approval from the Government of Armenia.

Municipalities will be provided with a number of special containers (i.e. igloo-shaped, round containers) for collection of recyclable materials (e.g. paper, glass, plastic) and making arrangements with recycling companies.

City administrations will be responsible for waste collection and transportation of all waste not fit for recycling to the new regional landfill near Hrazdan.

### **2.2 One equipped landfill instead of many dumpsites**

The landfill will be designed, constructed and operated in line with the national regulatory requirements and the EU Landfill Directive.

The new landfill will be established close to Hrazdan. The landfill will be owned by 8 municipalities (Hrazdan, Tsaghkadzor, Charentsavan, Yeghvard, Nor Hachn, Byureghavan, Abovyan and Sevan). The 8 municipalities will establish a Landfill Company (LC) as a joint-stock company with municipalities

as shareholders. The number of shares owned by each of the 8 municipalities will be proportional to the number of residents in the municipalities.

### **2.3 Will the waste be sorted at the landfill?**

All waste delivered by waste collection trucks to the new regional landfill will be weighed and registered at the landfill entrance. The trucks will then take the waste without any processing to a landfill section for disposal. Only if undesired waste items, such as drums or other containers with hazardous waste (paint, chemicals), are discovered at the unloading, will they be taken to a special hazardous waste storage area within the landfill territory, where they will be kept until further treatment/disposal elsewhere.

### **2.4 How will the waste be placed at landfill?**

The new regional landfill near Hrazdan is designed with six waste disposal sections. One section will be constructed and operated at a time. Each waste disposal section will be constructed with a bottom liner consisting of compacted clay soil covered with a layer of special high density polyethylene. This bottom liner will protect the groundwater and landfill surroundings from spreading of leachate (liquid from the waste). The leachate will be collected and stored in the landfill's evaporation pond with impermeable bottom.

Once the waste layers in a disposal section have reached the maximum allowed height, it will be covered with a 0.2 m thick layer of sand/grus/gravel for collection of landfill gas and then a 1.0 m thick soil layer and then will get a grass and vegetation cover.

Once the whole landfill is filled and no longer used for waste disposal, there will be an aftercare period for least 30 years. Aftercare will include further collection of leachate, monitoring of landfill gas, monitoring of groundwater and surface runoff. In principle, the monitoring should continue until leachate and/or landfill gas no longer pose risks for the surrounding environment.

Capacity of the first section of the regional landfill in Hrazdan will be sufficient for disposal of waste for a period of five to six years. The whole landfill will have capacity for receiving all waste from Kotayk Region and Sevan town for 20 years.

### **2.5 When will the existing dumpsites be closed?**

After opening of the new regional landfill, dumping of waste at existing dumpsites shall be prohibited. The dumpsites shall be closed and remediated, i.e. covered with soil and vegetation. Closure and remediation of existing dumpsites will be the responsibility of municipalities and will not be financed from the loan and grant provided by EBRD for establishment of the new waste management system in Kotayk Region and Sevan town.

## **3 Summary of ESIA**

### **3.1 ESIA is a document and a process**

An Environmental and Social Impact Assessment (ESIA) is the name of the document and the process needed for approval of the proposed Project by the EBRD and the local authorities of Armenia.

A draft ESIA document was prepared by international and local specialists in parallel with the Feasibility Study and formulation of the proposed Project in 2010-2011.

Together with this NTS, the Draft ESIA document will be disclosed to the public for 120 days, so that the relevant comments and recommendations of the stakeholders can be taken into consideration during the finalisation of the ESIA and preparation and implementation of the proposed Project.

### **3.2 Any alternatives for the Project?**

A number of project alternatives have been considered during the Project preparation as summarised in Table 1. The procedure of ESIA involves a systematic comparison of feasible alternatives of the Project in terms of location, technology or design carried out for comparison of potential environmental and social impacts.

Table 1 presents a spectrum of concepts typically discussed during feasibility studies and impact assessments related to development of regional waste management systems.

Table 1 *Alternative concepts for consideration during ESIA*

<b>Alternative concept</b>	<b>Concept title</b>	<b>Details of the concept</b>
-	Project proposal	New ordinary waste collection system including containers/hooting, bring banks, direct transportation of waste for disposal to regional sanitary landfill near Hrazdan developed in phases, landfill management company owned by 8 cities (7 cities of Kotayk Region plus Sevan town) and providing paid services to rural communities
1	No Project	No changes in the existing waste collection and disposal practice
2	Alternative location of the regional landfill	Location near Abovyan Location near Geghashen
3	Alternative design of regional landfill	Landfill of other type (e.g. without bottom liner)
4	Alternative collection system	Separation at source (e.g. in plastic bags of different colours) Sorting of collected mixed waste
5	Alternative transportation scheme	Operation with waste transfer station(s)
6	Alternative treatment and disposal technology	Baling and landfilling Incineration Anaerobic digesters, composting, bioreactors Recycling of construction and demolition waste
7	Alternative project implementation area	Not all cities/villages Only cities, not villages
8	Alternative implementation schedule	Start with pilot projects in selected area(s) Construction of all landfill sections in one go
9	Alternative financing mechanisms for full cost recovery	Combined bill for all housing services Subsidies

The alternatives may also include other combinations of facilities within the waste management centre, other timing for construction and implementation of

source separation schemes, combination of various schemes in specific areas and a variety of other alternatives.

Based on the Feasibility Study the following two technical options for the Project were considered as the most feasible:

- Ordinary waste collection system and the regional sanitary landfill,
- Dual waste collection system and the regional sanitary landfill.

Main advantages and disadvantages of the two options are presented in Table 2.

*Table 2 Main advantages and disadvantages of ordinary and dual waste collection systems*

	Ordinary collection system	Dual collection system
Main advantages	Simple, robust and cost effective waste collection Certain collection of recyclables through bring banks	High collection rate of relatively clean recyclable materials High selling price for recyclable materials due to their high quality
Main disadvantages	Less efficient recycling system	Needed change of habits for waste separation at source (at home and in correct containers) Requires available recycling industries and reliable market for materials

Based on the existing status of waste management in the Kotayk Region, Sevan municipality, in other regions of Armenia, as well as taking into account the findings of the Feasibility study and the Consultant's international experience, it was recommended that the Project introduce the ordinary waste collection system to the Kotayk Region and Sevan municipality.

A brief comparison of the proposed Project (with ordinary waste collection system) and some of alternatives, which were mentioned and discussed by participants of the meetings held during the Feasibility Study, is presented in Table 2.

In addition to proposing technical options, the Feasibility Study included consideration of alternative locations of the regional landfill. Several sites were studied from the viewpoint of the Armenian and international criteria applied for the landfill site selection. A separate report on the landfill site selection was prepared during the Feasibility Study and disclosed in Armenian language on webpages of the Ministry of Urban Development ([www.gov.mud.am](http://www.gov.mud.am)) and of Kotayk Regional Administration ([www.region.kotayk.am](http://www.region.kotayk.am)). The site next to the existing dumpsite near Hrazdan was selected as the site, which meets the criteria much better than any other location in the area of the Kotayk Region and Sevan municipality.

Table 2 Comparison of key features of the Project and its selected alternatives

	Features included in the alternative	Alternatives			
		No Project (existing situation)	Ordinary waste collection, sanitary landfill	Dual collection system, sanitary landfill	Waste collection, incineration, landfill for residual
Handling of waste at households / at waste generation sources	Source separation of waste	-	-	√	√
Waste collection	Separate collection of recyclables	-	√	√	√
Transportation	Direct transport to disposal / treatment	√	√	√	√
	Transport via transfer station	-	-	-	-
Treatment	Central sorting of mixed waste	-	-	-	-
	Central sorting of recyclable fraction	-	-	√	√
	Interim storage of hazardous waste	-	√	√	√
	Treatment of construction & demolition waste	-	-	-	-
	Composting of organic fraction (optional)	-	-	-	-
	Incineration of waste	-	-	-	√
Disposal	Disposal at open dumpsites	√	-	-	-
	Disposal at sanitary landfill	-	√	√	√
Required investment for Kotayk Region and Sevan municipality, MEUR		n/a	6.7 <sup>*)</sup>	8.7 <sup>*)</sup>	180 <sup>**)</sup>
Operation and management costs per ton of safely disposed waste, EUR		n/a	100 <sup>*)</sup>	120 <sup>*)</sup>	200 <sup>**)</sup>
Average monthly tariff for waste collection (AMD/person)		150	459 <sup>*)</sup>	550 <sup>*)</sup>	950 <sup>**)</sup>

<sup>\*)</sup> Assessment based on the Feasibility Study

<sup>\*\*)</sup> Assessment based on Consultant's international experience

### 3.3 What will be the Project impacts?

The ESIA process involves an assessment and comparison of potential major impacts which may occur during some of the Project phases and the identification of adequate measures for mitigation of negative impacts, as well as for enhancement of possible positive impacts.

#### 3.3.1 Environmental impacts

Key impacts of the proposed Project on the environment will be mostly related to the construction works during establishment of landfill and to the accumulation of a big quantity of waste.

To minimise the negative impacts on the environment the landfill location is selected in a former clay quarry, where the low natural permeability of remaining clay layers at bottom of the landfill can provide good protection of soil and groundwater against any contamination from accumulated waste. In addition to natural protection, the bottom and sides of landfill will be covered with several layers including a layer of compacted natural clay covered by a layer of strong impermeable synthetic material. The landfill site and access road to it are located far from protected nature areas, rivers, lakes. Waste will be transported in closed trucks and along the existing roads. Thus the landfill will be equipped for protection of soil, surface water and groundwater from contamination. Waste delivered to the landfill will be covered on a daily basis with locally available soil. The landfill will be equipped with a landfill compactor and front-end loader for compression of the waste and daily cover of the waste with soil.

The operation and filling of the landfill assumes the following:

- The landfill will be divided in smaller areas, allowing for one day's waste to be spread in the area.
- The waste in each small cell will be spread in layers not exceeding 0.3 m
- Each layer of waste will be covered by a layer of soil of at least 0.2 m thickness on a daily basis.
- It is expected that the filling height of the landfill will be about 11 m, i.e. comparable with the depth of the existing quarry.

After the quantity of accumulated waste has reached the landfill capacity, the landfill will be equipped with a top cover and a system for collection and flaring/utilisation of landfill gas.

The final top cover of the total landfill will include the following layers:

- 0.1 -0.2 m soil with vegetation (upper layer of the top cover)
- 0.8 m clayed soil
- gravel drainage layer

- HDPE liner (strong impermeable synthetic material)
- gravel protection and gas distribution layer
- 0.1 -0.3 m regulation layer (to provide smooth basis for the top cover)

The shape of the closed and covered landfill will be developed to match the surrounding landscape; the slopes will not exceed 1:5 to ensure stability of the cover.

Landfill gas flaring/utilisation system will be established at the regional landfill after the final cover is installed for landfill cells. Installation of initial gas collection wells and connecting pipes is included in the design for the new landfill, but the pumps and flaring units are supplied and installed after 2-3 years of active operation of the landfill when they can be put directly in operation. The international experience shows that many deliveries of gas flaring equipment for new landfill projects happen too early. The recommended later purchase of this equipment or Kotayk landfill will allow to avoid the corrosion during storage and to put the equipment in operation, when the performance guarantee and defects liability period are still valid.

Appropriate measures for control the accumulated gas and migration of gas is included in the project and satisfy the EU landfill directive. The landfill will have a system for monitoring of gas emissions, groundwater and surface water runoff. A weighing bridge with an electronic system will be installed for registration of waste delivered to the landfill.

### **3.3.2 Social impacts**

Key negative elements of the proposed Project in terms of social impact will be related to the introduction of changes in the waste collection system (e.g. types of containers for recyclables and other waste, location of containers, waste collection schedule) and related to the increase of waste tariffs.

To minimise the negative social impacts, the changes should be discussed with the communities and staff of waste collection companies. The changes should be introduced gradually, starting from trial areas. The containers and waste collection trucks will be purchased not in one go, but according to the lessons learned from the trial areas.

## **3.4 Environmental and social benefits of the Project**

The Project is expected to provide major environmental and social benefits for Kotayk Region and Sevan municipality where a modern system will be introduced for collection and disposal of municipal solid waste, so that the waste dumping and its burning could be stopped.

The following specific benefits could be achieved during the Project implementation:

- Improved collection and transportation of waste in urban and rural municipalities;
- Improved environmental conditions and visual image of residential areas and their surroundings;
- Sound and safe disposal of waste and one regional sanitary landfill;
- Improved working conditions for workers of waste collection companies;
- Cleaner yards and streets, better conditions for women and children;
- Improved environmental awareness, education, public participation, background for better waste collection habits;
- Improved attractiveness of the region for tourists;
- Local business development and capacity building;
- Improved governance and transparency of waste management system.

It is expected that the environmental and social benefits of the Project will have a long-lasting effect for Kotayk Region and Sevan municipality, but will also have a demonstration effect for Armenia and other countries.

## 4 Summary of ESAP

According to the Environmental and Social Policy of the EBRD, an Environmental and Social Action Plan (ESAP) should be developed for and implemented during the Project in order to ensure implementation of the project according to the EBRD Performance Requirements (PRs).

The ESAP prepared for the propose Project is related to the establishment of a new waste collection system and regional sanitary landfill (new facility) and to closure of existing dumpsites (old facilities).

The ESAP includes the programmes and systems to address the environmental and social impacts with allocated timeframes, responsibilities and resources required. The ESAP also includes a provision for capacity building such as training of project staff and third parties (staff of municipal waste collection companies), contingency and emergency response plans and measures.

The national EIA procedure and obtaining the Project approvals according to the procedures of the Republic of Armenia are among the activities included in the ESAP.

Closure of existing dumpsites is an integral element for the establishment and sustainable operation of the new regional waste collection system in Kotayk Region and Sevan town including the regional sanitary landfill. Therefore, closure of existing dumpsites will be a precondition for the EBRD loan provided for the Project.

The new facilities will be established within the regional sanitary landfill. The ESAP includes the environmental and social management systems and measures to be implemented:

- by the PIU during pre-construction phase (preparation of documentation, procurement of contractor works for construction of landfill and procurement of waste collection and transportation equipment from suppliers),
- by the PIU and contractors during landfill construction,
- by the Landfill Company and contractors during operation and development of the landfill and the new regional waste collection system.

The ESAP for the Project is part of the ESIA package disclosed in the Armenian language via the website of the Kotayk Regional Administration [www.region.kotayk.am](http://www.region.kotayk.am).

## 5 Planned engagement of stakeholders

### 5.1 Who are the stakeholders?

The stakeholders are the organisations and individuals, who are responsible for, interested in or affected by the proposed Project. The employees of Landfill Company are the internal stakeholders of the Project. Other parties are the external stakeholders.

### 5.2 How and when are the stakeholders engaged?

The Project Implementation Unit (PIU) will be established in the Kotayk Region. The PIU will make sure that the local governmental agencies in Kotayk Region and Sevan town, local community organisations, NGOs, the mass media and the general public including men and women are informed about the Project and can participate in the process of identifying and communicating issues of concern, and in an analysis of the Project and its alternatives. This involvement is particularly essential during the ESIA process, which will allow incorporating the relevant recommendations into the Project design. However, the Project related information and consultation activities will be also carried out during all other phases of the Project preparation and implementation, so that concerns of people potentially affected by the Project could be known and addressed.

The information provided about the Project should be sufficient at least for describing what changes will be caused by the Project, where these changes are expected and when they are expected.

A lot of information about the Project preparation was provided to stakeholders during the Feasibility Study and the Environmental and Social Due Diligence. Draft Stakeholder Engagement Plan (SEP) was prepared and disclosed in the Armenian language via the website of the Ministry of Urban Development [www.gov.mud.am](http://www.gov.mud.am) and via website of Kotayk Regional Administration [www.region.kotayk.am](http://www.region.kotayk.am). The PIU will update the SEP and use it as an instrument for planning and recording of the public information and consultation activities. The updated versions will be disclosed in internet.

Local television companies have been recommended by the local authorities and NGOs as being the most reliable media channel to regularly present local news and information to the general public in the Kotayk Region. Majority of the households in towns and rural areas have TV sets at home and are used to see the local news programs of TV companies currently operating in Hrazdan, Nor-Hatch, Charentsavan and Sevan towns.

### **5.2.1 Telephone line for information requests**

People in Armenia typically prefer to ask questions and express their opinions on the phone. Questions regarding the Project preparation and requests for additional information will be received from 10:00 to 16:00 during the week days on the following telephone line in Hrazdan:

Kotayk Regional Administration, Secretariat: +374 223 2 37 16  
e-mail: kotayk@hrazdan.am

The requests for information can be received in Armenian, Russian or English.

### **5.2.2 Information in hard copies**

Hard copies of ESIA documents in Armenian and English will be available for reading during the office hours in MUD office in Yerevan and in Kotayk Regional Administration.

Hard copies of Non-Technical Summary of the ESIA in Armenian will be available for reading during the office hours in the Mayor offices in Abovyan, Byuregavan, Charentsavan, Nor-Hatchn, Sevan, Tsaghkaszor and Yegvard.

Hard copies of the ESIA documents could be provided on request at the cost of the copying.

Printed information about the Project will be provided to all households together with the bills for municipal services.

Information boards with posters and leaflets about the Project will be established in the office of MUD, office of Kotayk Regional Administration and mayor offices in the towns.

### **5.2.3 Comments during ESIA disclosure**

During the ESIA disclosure the comments will be received through comment forms containing contact details for the forms to be submitted. The contact details of the local authorities and NGOs will be provided in announcement on TV, in posters and information leaflets distributed in the project affected communities to ensure the public consultation. Questions and comments expressed during the public meetings will be recorded and addressed in the final version of ESIA document and then during the design and implementation of the Project.

The contact details for submitting the comment forms filled in during the ESIA procedure in Armenian, Russian or English are as follows:

Mr. Mihran Mikaelyan  
Deputy Mayor of Hrazdan City  
Kentron District, Hrazdan City  
Armenia  
Tel: +374 223 2 39 64, +374 223 2 23 45  
E-mail: [info@hrazdan.am](mailto:info@hrazdan.am)

### **5.3 Grievance mechanisms for stakeholders**

At the stage of construction and operation of the Project facilities (regional sanitary landfill near Hrazdan, new collection points for mixed municipal waste and for recyclables) the comments, questions and possible complaints will be addressed within the grievance mechanism. The Project Stakeholder Engagement Plan includes special mechanism for receiving and addressing the grievances from the internal stakeholders (workers of Landfill Management Company) and external stakeholders during the Project implementation. This grievance mechanism will be based on written forms, which can be filled in by any affected person or organisation and submitted to the Landfill Management Company or the Project Implementation Unit in Hrazdan, who will take action, if required, and within 10 days inform the author of grievance on the action taken in response to the submitted grievance.