



الاتحاد الأوروبي



***The Centre for Environment and Development for the
Arab Region and Europe (CEDARE)***

***Study on Improving Solid Waste
Governance Systems in Urban areas***

Case Study: Al Khosos

**By:
CEDARE**



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1. Introduction

1.1 Background

El Khosos city is located in El Khankah District (administrative Markaz) which lies in Qalyubiya Governorate at the border of Cairo Governorate. The estimated population of El Khosos city in 2016 according to CAPMAS¹ is 351,434 inhabitants divided to 181,868 males (51.7%) and 169,566 females (48.3%). Ezbet Allam is one of the sectors of El Khosos city as shown in figure 1.

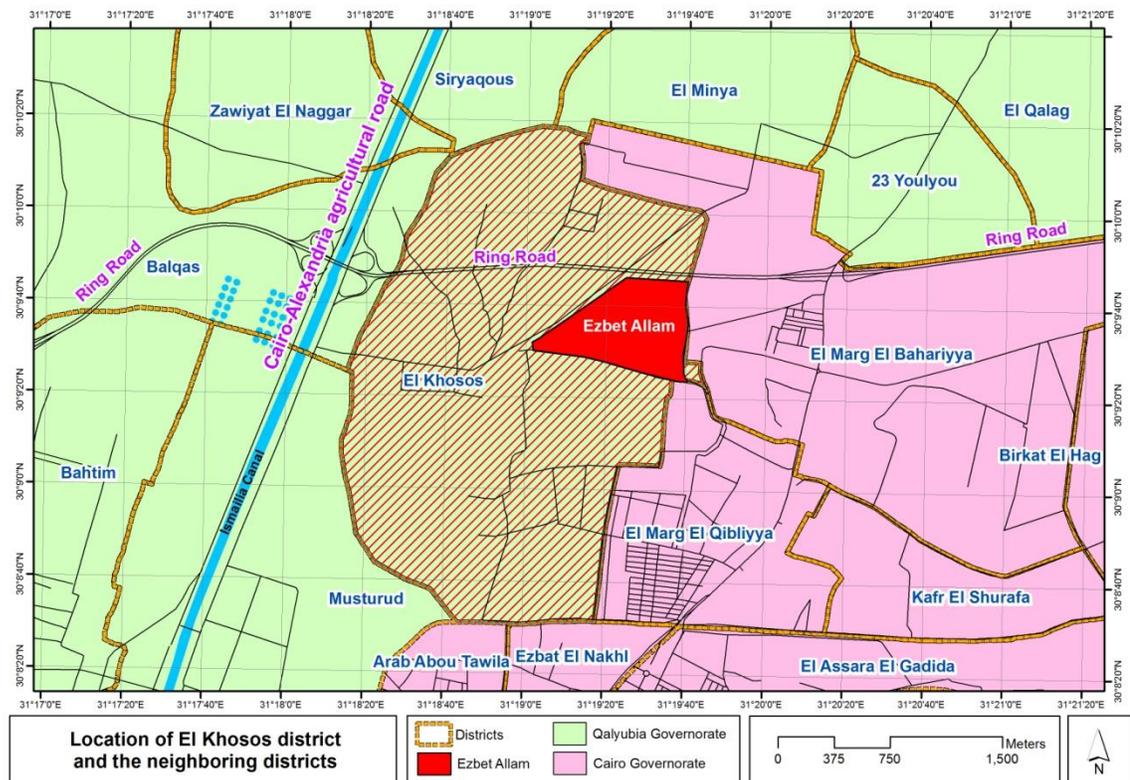


Figure 1: Location of El Khosos District and Ezbet Allam and the Neighboring Districts

Ezbet Allam is characterized by high density of population and lacks proper garbage collection mechanisms. The local authority of El Khosos city divided it to nine spatial sectors for the provision of solid waste management (SWM) service; outsourcing the service to private contractors in seven of them and providing it directly to two. The targeted community of this project which is Ezbet Allam is sector four. This sector is served by a private solid waste contractor and is divided into 12 blocks as shown in figure 2.

¹ Central Agency for Public Mobilization and Statistics

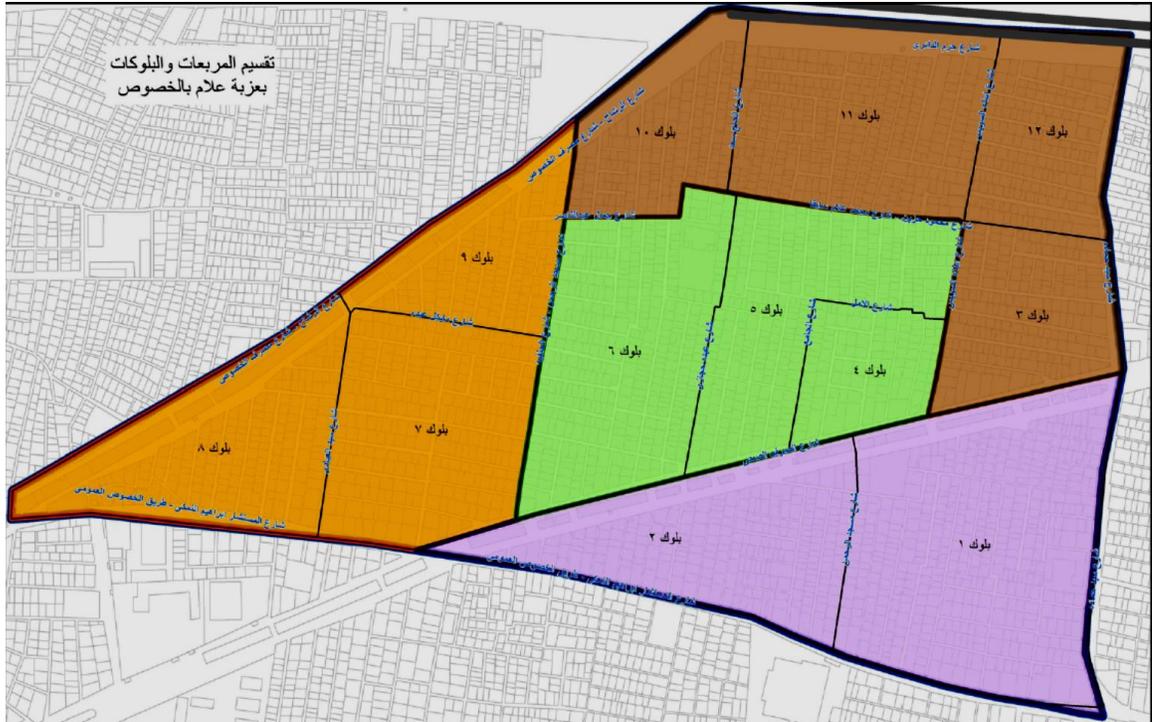


Figure 2: Block Divisions of Ezbet Allam

El Khosos was declared as a city on 2006. Before that it was administratively a village. It originally housed waste recycling communities that had pig raising dens (zarayeb). This community raised pigs till the break of the swine flu when the pig population in Egypt was exterminated. Since then the organic waste in Egypt became a problem. Pigs used to feed on the organic waste and they were an excellent source of income for the waste collection contractors. The dens also generated income from the pig waste/manure which they sold as organic fertilizer. Now as there are no pigs to consume the organic waste, there is no incentive to collect the organic waste and is usually left to accumulate and decompose or is burn in the streets, as shown in the figure 3.



Figure 3: Burning of Waste Accumulations

The objective of this project is to improve solid waste management and health services in Ezbet Allam – El Khosos City – Qalyubeya Governorate. The Consultant, Dr. Dalia Nakhla, was contracted by CEDARE to assess and propose recommendations for improvement of the solid waste collection service provided by the local contractor and identify means for optimum operation of the transfer station

1.2 Objective and Scope of Work

The objective of the report is to assess and provide recommendations for improvement of the solid waste collection system in the area of Ezbet Allam located at Khosos city and provide the following:

- The target groups that need to be fully involved in the service
- The transfer station operation and maintenance responsibility and scenarios for improving performance
- The role of the Friends of the Environment Association (NGO) in terms of leasing of equipment
- Propose scenarios for the waste collection fees

In this respect, the following activities have been performed:

1) ***Preparation phase.***

- a) Review background documents
- b) Carry out a field visit to the project area and transfer station
- c) Meet with the local authorities
- d) Interview waste collection contractors and NGO

2) ***Description of the Current System***

Based on document review, field visits, meetings and interviews, describe the current waste collection system to the point of transport of the waste to the transfer station while identifying the system strengths and weaknesses.

3) ***Stakeholders Mapping***

Map the different stakeholders involved in the current waste collection system and operation of the transfer station and identify their contributions with the objective of providing recommendations for improved coordination and communication among the different stakeholders.

1.3 Report Content

The current report includes the following chapters:

1. Introduction (this chapter), presenting the project background, as well as scope and objectives of the study;

2. Description of the Current Situation, mapping the different stakeholders involved in the process and presenting an analysis of collected data highlighting the current SWM system with its positive and negative aspects, examining the current impacts and potential threats on the study area, as well as the main area constraints and sensitivities that could affect project implementation;
3. Conclusion and Recommendations for improvement of the solid waste collection system and for improvement of operation of solid waste transfer station
4. References
5. Annex A Laws and Regulations, presenting a review of the most important laws and decrees dealing with SWM

2. Description of the Current Situation

2.1 Consultations and Field Work

The Consultant, Dr. Dalia Nakhla, escorted by Eng. Atef Mourice (CEDARE Consultant) carried out a field visit to the project area on August 21, 2017 and on October 26, 2017 to assess the current situation of waste management in the project area. A walk through was done in the neighborhood of Ezbet Allam as well as the waste collection areas and finally the transfer station. Moreover, the following stakeholders were interviewed:

- Mr. Hassan Shabib – CEO of Friends of the Environment in Ghawar NGO
- Mr. Mamdouh Hassan- Manager of Friends of the Environment in Ghawar NGO
- Mr. Sameh El Shegeri– Waste Collection Contractor of Ezbet Allam
- Three waste collection contractors
- Mr. Sami Hassan Saleh- Head of Khosos Local District
- Mr. Mohamed Farag, responsible for operation of Khosos Waste Transfer Station
- Mr. Mohamed Mokhtar manager of Khosos Waste Transfer Station
- Mr. Akram Bahr, Waste Management Unit in Khosos Local District

A meeting was also conducted with the Project Consultant, Mr. Abdallah El Etreby as he was a team member in the first phase of the project.

Moreover the following documents were used to give background of the project area;

- GIZ, Improved Solid Waste Management and Health Services in Ezbet Allam – El Khosos City – Qalyubeya Governorate Baseline Report, May 2017
- GIZ, Participatory Needs Assessment Qalyubeya, Final Report, August 2015
- GIZ, Promoting the Use of GIS for Improvement of Solid Waste Management Services, January 2014
- GIZ SWEEPNET, The Solid Waste Management Situation in Mashreq and Maghreb Countries: Update on the Challenges and Opportunities, July 2012

- GIZ- PDP, Capacity and Needs Assessment of Friends of the Environment in Khosos NGO and Strategic Planning for Regulatory, Institutional, Financial and Human Resources in Solid Waste Management, October 2012

Based on the outcomes of the field visits, meetings, document review and the experience of the Consultant in the field of solid waste management, stakeholders' mapping was prepared and the current situation was assessed to identify strength and weakness of the operating system.

Photos of the meetings and field visit are shown in figures 4 to 7.

Figure 4: Meeting at the City Council



Figure 5: Meeting at the NGO with the Waste Contractors



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Figure 7: Field Visit to the Waste Transfer Station



2.2 Stakeholders Mapping

A list of potential stakeholders and other important actors is presented in the following table.

Table 1: Stakeholders and their relevant role and/or potential interest

Stakeholders	Role / Potential Interests
Secondary Stakeholders	
Waste Management Regulatory Agency- Ministry of Environment Greater Cairo Regional Branch office - EEAA	Overall coordinating body of monitoring, enforcement and regulating developments through setting plans and strategies, and managing the protection and preservation of natural environment in coordination with concerned and responsible authorities.
Qalyubiya Governorate Environmental Management Unit (EMU)	Governorate official bodies responsible for licensing, implementation and follow up of regulations.
El Khosos City Council/Local District	Local coordination and follow up. Responsible for contracting waste collection contractors and operating the waste transfer station
Waste Contractors	Contracted by the local authority to collect and transport waste to the designated disposal sites
NGOs Friends of the Environment NGO	Safeguard the environment and influence decision-making; representatives of the public. Involved in the solid waste collection system as it owns and leases equipment (such as loaders) to the waste collection contractors and acts as a liaison between the contractors and the city council.
Garbage scavengers (<i>nabbisha</i>)	Do not have an official role in the system. Carry out informal waste segregation to benefit from recyclable materials.
Primary Stakeholders	
Residents and local community	Project beneficiaries.
Business owners (shops, workshops, etc)	Project beneficiaries.
Other Involved Actors	
GIZ	Provision of technical and financial support to the project
CEDARE	Implementation of the component regarding improvement of Solid Waste Management and Health Services in Ezbet Allam – El Khosos City

The legal framework of solid waste management in Egypt is included in Annex A.

2.3 Waste Collection and Transportation

El Khosos is divided into 9 sectors including Ezbet Allam. Seven of these sectors are served by private waste collection contractors and two of the sectors are directly served by the local district for waste collection.

Mr. Sameh El Shegeri is the waste contractor of Ezbet Allam and Friends of the Environment NGO support the local contractors in terms of equipment and liaising with the local authorities. The waste contractor (El Shegeri) has one tipping vehicle 6 m³ capacity, one loader, five tricycles and a number of donkey carts that are used for waste collection and transport to the transfer station. The NGO owns a loader that it leases to the waste contractors.

According to GIZ Baseline Report, Ezbet Allam houses are around 16,125 residential units and 650 shops (GIZ, 2017). These units have electricity meters and those are charged **3 L.E. per month** for waste on their electricity bill. It was estimated by the waste contractor that each residential unit generates about 2.5 kg of waste per day which means it generates around **42 tons per day**.

It was also estimated in an earlier report, “Promoting the use of GIS for Improved Solid Waste Management Services”, that Ezbet Allam houses 21,456 apartments and generate **53.5 tons per day** (GIZ, 2014). It is likely that the 2014 report included all housing units including those not legally registered as there are many more unregistered residential and commercial units that generate waste and are not paying for the waste service through the electricity bill.

According to the waste contractor, only 25% of the residents pay extra waste collection fee to the contractor. They pay an average of 10 L.E. per month as residents of the low floors pay 5 L.E. and the higher floors that request door collection pay around 15 L.E. per month. However, usually waste is collected from in front of building and from five waste disposal sites and any accumulating waste dumps from 6 am to 12 am by the waste collection contractors.

There are about five waste collection areas; three on the El Sarf El Sehi street and two on the ring road as shown in figures 8 and 9. The capacity of each site is about 2 tons of waste and so the total daily capacity of the five sites is ten tons. The distance from waste collection areas to the transfer station is about 1 to 2 kms.

These areas suffer from poor hygienic conditions as all kinds of waste are dumped in them 24 hours a day. The contractor usually collects the waste from the residential buildings as well as waste collection areas as early as 5 or 6 am, while the residents prefer that waste collection is done from 8 am to 10 am (GIZ PDP, 2012). However, waste dumping is more regular in school days as the residents wake up as early as 6-6:30 in the morning and dump

their waste on their way to school. These uncoordinated activities result in waste accumulations throughout the day.

Waste scavengers (nabbisha), on the other hand, are continuously carrying out informal segregation on any waste accumulations in these areas or in front of buildings to get hold of valuable recyclables. They scatter the waste and sometimes they even set fire to the remaining waste. This practice degrades the value of waste collected by the waste contractor.



Figure 8: Waste Collection Area in El Sarf El Sehi Street



Figure 9: Continuous Dumping of Waste in the Waste Collection Area

The waste collection contractor states that about half of the collected waste is disposed in the transfer station and the rest go directly to Abu Zabaal site as the capacity of the transfer station is not sufficient to accommodate all collected waste from El Khosos district. This puts an extra burden on the waste contractors in terms of time and cost since the Abu Zabaal Disposal site is located about 15 km away from El Khosos (figure 10).

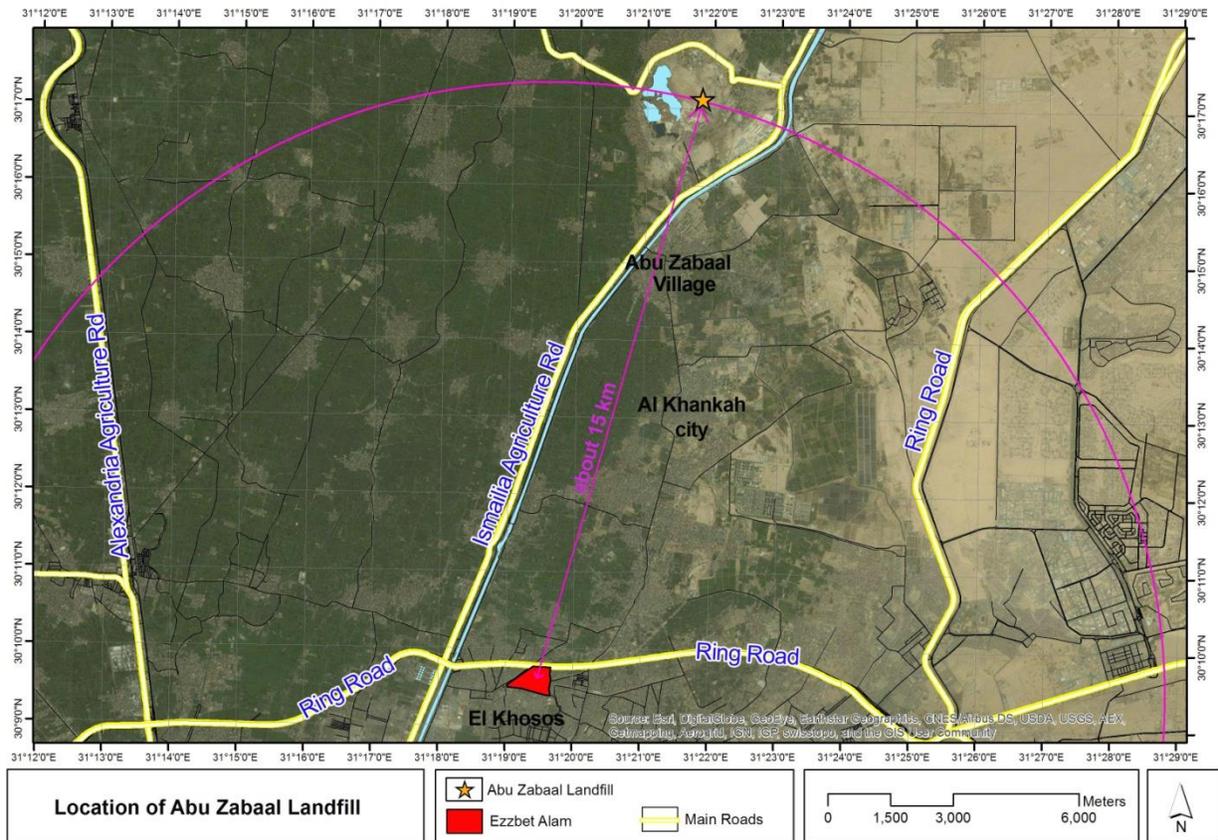


Figure 10: Location of Abu Zabaal Disposal Site from ElKhosos

The main revenues and expenditures of the waste collection contractor are summarized in Table 2. This calculation shows that the total costs of collection, transport and disposal of waste for the contractor of Ezzbet Allam is about 74,300 L.E./month which is very close the total revenue which is approximated as 82,437 L.E./month including the low contractual fee of the contractor with the local district and the door-to-door collection fees and income generated from recyclables. It should be noted that these are approximation based on interviews with the waste contractors, supervisors of the transfer station and the GIZ baseline report.

It was also not very clear if the revenue from the fees of door-to-door collection (approximated as 41,937 L.E./month) goes to the waste collection contractor or to the collection labor as the waste contractor claimed that this amount does not reach him but is rather a reward to his labor that he does not claim.

Table 2: Summary of Approximation of Revenues and Expenditures of the Waste Collection Contractor of Ezbet Allam

Item	Cost	Assumption
Revenue		
Contract with City Council	30,000 L.E./month after deduction of the taxes, fines and tips	Estimate according to waste contractor
Waste Collection Fees	41,937 L.E./month	Assuming 25% of number of units pay average of 10 L.E. 16775 unit * 0.25 * 10 L.E./unit /month
Income from recyclables	10,500 L.E./month	Assume 10% recyclables in 42ton/day waste 4.2 ton * 2500 L.E/ton (mixed recyclables including plastic, cardboard and cans)
Expenditure		
Fees of disposal in transfer station	2,500 L.E./month	Estimate according to waste contractor
Fees of disposal in Abu Zabaal	3,400 L.E./month	400 L.E./month+ (25 L.E./trip* 180 trips/month) Based on generation of 16775 units * 2.5 kg/unit= 42 tons/day Half of the waste go to Abu Zabaal= 21 tons/day If transported using 5 ton truck, no. of trips per day = 4 trips /day = 120 trips/month
Labor wages	60,000 L.E./month	30 workers * 2000 L.E./month= 60000 L.E.
Operation and Maintenance cost of equipment	8,400 L.E./month	O&M costs of trucks= 3* 1,500 L.E./ month =4500 L.E. Loader's rental fee 130 L.E/day (covering 8 hours)*30 days= 3,900 L.E.

2.4 Transfer Station Operation

The transfer station is located behind the Khosos City Council. According to the Head of El Khosos city council, operation of the transfer station started from 4 years only. Before that waste went directly to Abu Zabaal Disposal site. The waste transfer station, according to interviews with waste collection contractors, is very beneficial as it encourages waste collection in El Khosos area as it reduced travel time for the contractor for transport of waste from Abu Zabaal Landfill to a closer waste disposal area.

The station occupies an area of 2000 m² and operates on two shifts from 7 am to 3 pm as it is operated by the city council staff that has official working hours. The station is designed as direct dump facility utilizing a tipping floor where refuse is dumped from

collection vehicles and then pushed or dumped into transfer trucks. The advantages of this direct dump facility design is that it needs minimal equipment requirements, simple loading method using loaders, use of open top transfer trailers that are less expensive and can finally can handle materials that are not easily compacted.

Transfer station is equipped with a ramp where the waste collection vehicles go up and dump the waste in large containers as waste arrives in tipping trucks, tricycles or donkey carts as shown in figures 11 to 14. These containers are then trucked by a large transfer trailers to Abu Zabaal Disposal Site. Around **196 tons/day** are transported from transfer station to Abu Zabaal, according to the operators of the station. About 63 tons/day of waste are delivered by the trucks of the local district and 132 tons/day are delivered by the private waste collection contractors.

The transfer station has a weight scale that is not being used by the operators; rather the waste contractors pay a lumpsum amount for disposal of the waste in the station. According to the waste contractors, they claim to pay about 2500 L.E. per month per contractor to the local authority for their waste disposal. However, the head of the local district states that the income of transfer station is 10,000 L.E. per month from the waste contractors. The operator of the transfer station, however, estimated a gate fee of 5 L.E./ton of waste received.

The station is equipped with one loader, six containers (30 tons capacity) and three trailer trucks making three to four trips per day to Abu Zabaal Disposal site. It was observed during the visit that one of the towing trailers had flat tires and was standing ideal and only two towing truck were operating. Moreover, the loader was not functional as its motor needed to be fixed. Some of the containers are also in bad condition.

The transfer station also had a number of waste collection trucks that were parked at the station. These were used for collection of waste from two of El Khosos districts that are directly served by the local district.

It was observed that the waste reaches the transfer station as mixed waste (organic and inorganic). The waste arriving at the transfer station is very poor in recyclables as it has already been scavenged before transfer to the station through the waste scavengers (nabbisha). There is also a high percentage of soil in the waste collected by the local district as it is collected by the district loader from the side of the Ring Road. The mixed waste is transferred as it is to the Abu Zabaal disposal site.

According to the Head of the City Council, all the equipment and vehicles of the station has to be maintained in the agent's workshop (tawkeel) which makes maintenance time consuming and very costly due to high professional fees and cost of original spare parts.

As shown in Table 3, the approximated costs or expenditure of the transfer station amounting to about 34,140 L.E./month is much higher that its revenue estimated as 29,400 L.E. per month. The transfer station requires therefore financial support from the local district.

Table 3: Summary of Approximation of Revenues and Expenditures of the Transfer Station

Item	Cost	Assumption
Revenue		
Gate Fee	29,400 L.E./month	196 tons per day* 30 days * 5 L.E. per ton
Expenditure		
Cost of handling of waste in TS	4,500 L.E./month	Operation and maintenance cost of loader & equipment 100 L.E./day tire fix* 30 days 1500 L.E./month filters and oils
Labor cost	12,000 L.E./month	Workers in transfer station 2 workers, 3 drivers and one supervisor 6 labor * average 1000 L.E./month Overtime for drivers (50 L.E./extra trip * 2 trips per driver * 2 drivers*30 days)
Cost of transport of waste to Abu Zabaal	17,640 L.E./month	Cost of fuel is around 3 L.E./ton * 196 tons/day * 30 days



Figure 12: Donkey Cart Emptying Waste in Container in TS

Figure 13: Loading of Waste Container on Truck

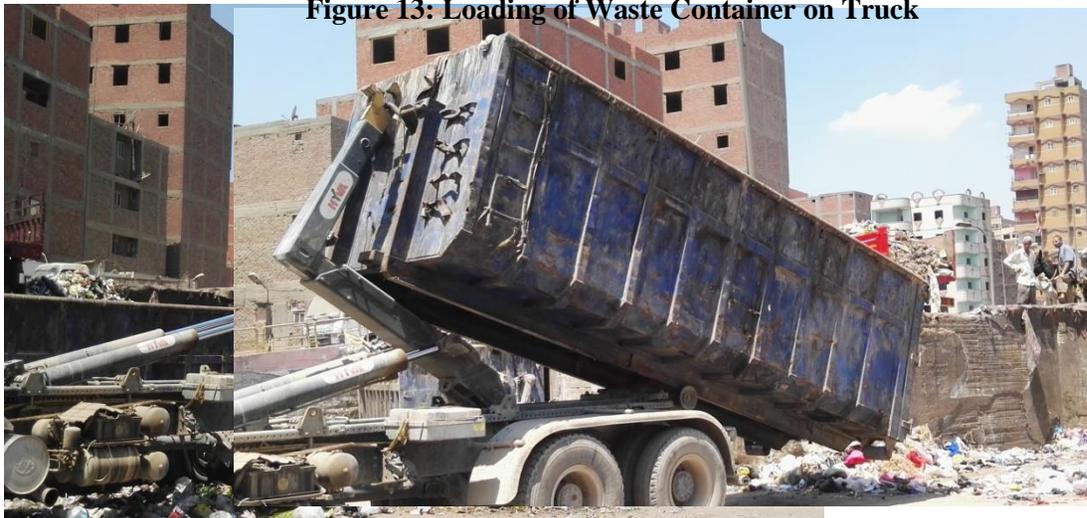


Figure 14: Placing Empty Container from Truck

3. Conclusion and Findings

There are a number of issues that were identified with regards to solid waste management system in El Khosos area in general as well as Ezbet Allam and the waste transfer station.

3.1 General Remarks

El Khosos City is suffering from illegal waste disposal and waste accumulations due to the following reasons:

- El Khosos City lies at the border of Qalyubiya Governorate with Cairo Governorate. Waste is being illegally dumped in El Khosos from neighboring areas in Cairo Governorate such as Marg and Misr El Gadida which exaggerates the solid waste issue and puts a burden on the limited resources of El Khosos local district as well as the waste contractors
- El Khosos is also suffering from illegal dumping of the construction and demolishing waste from neighboring areas
- El Khosos houses waste scavengers and waste dealers that segregate the waste in an unorganized manner and causes littering of streets and accumulation of rejects as shown in figure 15.
- Organic waste and rejects are still accumulating in some areas of El Khosos as there is no incentive for the waste dealers to collect it unlike 10 years ago when there were pig pens and pig raisers that were utilizing all the organic waste of the region to feed their pigs. It was a win-win situation as the waste collectors were not allowing for accumulation of the organic waste due to its value for pig raising.



Figure 15: Waste Accumulations in El Khosos City

3.2 Waste Transfer Station

The waste transfer station has contributed to improving the solid waste management system in El Khosos city and in Ezbet Allam as it allows for speedy transfer of waste from the streets and buildings as it minimizes the distance of transport of waste from its generation point to Abu Zabaal disposal site which is located 15 km away from El Khosos. However, the capacity of the transfer station can only accommodate half of the generated waste due to its limited capacity as it operates only during morning hours as it is run by the public sector, which is the local city council.

The transfer station also lacks basic infrastructural needs and main components such as administrative offices, toilets, water source and wastewater drainage network. It also lacks fire fighting system and basic health, safety and environment (HSE) needs such as personal protective equipment of its workers as shown in figure 16.



Figure 16: Transfer Station Workers with No Personal Protection Equipment

The transfer station also suffers from equipment maintenance issues due to bureaucratic procedures faced for procurement of basic needs such as tires and spare parts as well as high maintenance cost of the equipment and vehicles as they have to be maintained in their agents' workshops. The equipment and vehicles of the station have no home based mechanic to follow up on the daily maintenance and does not have a workshop or even a store room for storage of emergency requirements such as oils, and small spare parts.

Moreover, the weighing scale at the station entrance is not usually operated according to the operators of the station, as they claim it will cause delay at the gate of receipt of the waste. The operators are able to estimate from experience the amounts of waste entering the station through the different modes of transport including trucks, tricycles and donkey carts.

3.3 Waste Management of Ezbet Allam

Ezbet Allam like other districts of El Khosos is suffering from continuous dumping of waste in the streets and waste collection areas. There is lack of synchronization between the waste collection hours by the waste contractor and the disposal of waste by the local residents and shop owners. Waste scavengers are taking advantage of this issue as they open the waste sacks in search of valuable material and leave behind the open sacks and scattered waste.

According to the Head of the City Council, when the city council placed waste bins in streets, they were sabotaged and broken and the nabbisha emptied them from waste in the street, took the recyclables and then set the bins on fire. He also complained that illegal dumping of waste in streets does not face any fines.

Moreover, the waste contractors complained from lack of funds as they claim that the City Council has not paid them their monthly fees since August 2017 to date.

4. Recommendations

4.1 Waste Scavenging

Waste scavenging is a source of income for some communities but it causes significant environmental problems. It is proposed to discourage this practice in the study area through one or more of the following measures:

- Setting up drop-in stand points where people can return plastic or glass bottles and receive a refund from recycling institutions. This will encourage housewives to segregate valuable recyclables at source and so they will not be disposed with the waste.
- Set up a waste segregation line in the transfer station and employ the waste scavengers to work on the waste segregation line and get a share of the revenue from recyclables resale. This however can only be achieved if the transfer station is operated by a private sector which has the flexibility in employment.

4.2 Waste Collection Service

The waste contractors are collecting their waste directly from buildings as well as waste collection areas during early morning hours while the local community and sometimes neighboring communities continue to dispose waste throughout the day. This problem can be mitigated through the following measures:

- The local council should play a better role in street cleaning including clearing of waste from the waste collection areas
- Local council should provide bins and containers for disposal of waste by the local community. This should minimize the street littering and dispersion of waste.
- The Friends of the Environment NGO could also assist in the street cleaning service and removal of waste accumulations from the streets.

It is also recommended based on interviews with the informal and formal sector to increase the contractual fees of the waste collection contractors through the following measures:

- Refer to the latest census of CAPMAS to confirm the real number of residential and commercial units served by the waste collection service as this is the basis for calculation of the contractual fees of the waste collection contracts. The waste collection contractors claim that the actual numbers of served units is much higher than the approximated number mentioned in their contracts.
- Raise the waste collection fee of waste service on the electricity bills to **5 L.E./unit for residential and 7 L.E./unit for commercial** as the current fees are not covering the costs of waste collection and transport. Hence the unit cost contractual cost of collection and transport for the waste collection contractors can be raised from 2.25 L.E./unit to 3.5 L.E./unit. This will in turn enhance the waste collection service.

It is worth mentioning that the door-to-door collection fee that is sometimes paid by the residents to the waste collection labor is a voluntary fee and cannot be reinforced by law as the residents are already paying for the service through their electricity bills. Moreover, there are a considerable number of residential units that are not paying for the waste service as their electricity service is not legalized.

4.3 Waste Transfer Station

The transfer station operation can be enhanced through the a number of recommendations

Privatization of Operation of the Waste Transfer Station

Operation of the transfer station through a private company or a public private partnership with the city council has the following advantages:

- Extension of the working hours from 10-12 hours (2 shifts) to 18 hours (3 shifts). This will allow for more waste entering the transfer station which would enhance the waste collection service in El Khosos area as it will encourage waste collection contractors to transfer the waste to the transfer station rather than leaving it to accumulate for the following day or transporting the waste to Abu Zabaal Landfill.
- Ensure speedy and enhanced maintenance of equipment and vehicles due to the absence of bureaucratic procedures for approval of maintenance and purchase of spare parts.

The private contractor should be compensated for the cost of handling of waste inside transfer station, cost of transport of waste to Abu Zabaal site and the cost of disposal of waste in Abu Zabaal site. On the other hand, the local district should closely monitor the performance of the private contractor running the transfer station through monitoring of the amount of waste entering the transfer station and that reaching the Abu Zabaal disposal site.

Continuous weighing of the waste entering the transfer station as well as the Abu Zabaal site coming from the station is the main key performance indicator (kpi) for operation of the station. Visual inspection of the daily performance and housekeeping of the station is

also essential as well as working conditions of the labor in terms of health and safety measures.

The station operator should be responsible for maintaining the equipment and vehicles and keeping them in good operating conditions.

Revisiting Tipping or Gate Fee of the Transfer Station

It is estimated that the amount of waste disposed daily in the transfer station is about 196 tons and according to the operators of the transfer station they charge about 5 L.E./ton gate fee for tipping. It is recommended to increase the tipping fee to **10 L.E./ton** to cover the daily expenses of the station in terms of handling and transport costs as shown in table 3.

Measures to Enhance the Performance and Work Conditions of the Transfer Station

To improve the performance of the transfer station it is recommended to do the following:

1. Provide the station with **water source** to allow for cleaning of equipment and station floor and construct a **wastewater drainage network** to drain excess.
2. Surround the transfer station with a **green belt** of trees that would act as a natural buffer between the station and the neighboring communities. The trees could be irrigated from the drainage of cleaning water from the station (provided no detergents are used). The trees will enhance the environmental quality of the station and the area in general.
3. Construction of **toilets** for the workers as it is a basic need.
4. Construction of a **store** for vehicle tires, batteries and maintenance equipment
5. Establishment of a **workshop** for maintenance of equipment and vehicle tires.
6. Set up of **firefighting equipment** such as fire hose, fire hydrant, water source etc.
7. Assignment of a **full time mechanic** to look after the equipment and vehicles
8. Provision of labor with **personal protective equipment**
9. Apply **rodent and pest control plan**

The purchase of a new loader and two trailer trucks will enhance the performance of the operation. The **loader** will help in handling of the **waste littering** in the station and reduce the risk of waste handling by the station labor. The station overall housekeeping and cleanliness level will be enhanced to look as it should be in figure 17.

Two extra **trailer trucks** will allow for increase of the transport frequency and amount of waste to the Abu Zabaal disposal site. It will also relieve pressure on the existing trailer trucks and allow for more time for maintenance of the existing trailers.

Moreover, the station requires more containers as the existing ones have deteriorated and are not containing the waste properly which puts them at risk of littering during waste transport.



Photo 17: Ideal Operation of the Transfer Station

4.4 Waste Investment Opportunities

The ‘dry recyclables’ of the municipal solid waste generated in El Khosos is scavenged and collected by the informal sector whether through the waste scavengers or the labor of the waste collection contractor.

The waste reaching the transfer station is poor in recyclables and is mainly composed of organic waste, waste that can be used as refuse derive fuel (RDF), rejects as well as dust and soil. For these components to be segregated on site, it will require a sorting line and sieves to separate the waste components. However, the transfer station was not designed for that purpose as it complements that overall waste management system of the area which plans that all waste is transported to the Abu Zabaal site which already has a waste recycling center including composting plant. It is therefore recommended not to include any waste recycling facilities in El Khosos but rather concentrate the efforts on improving the system of waste collection and transport.

References

GIZ, Improved Solid Waste Management and Health Services in Ezbet Allam – El Khosos City – Qalyubeya Governorate Baseline Report, May 2017

GIZ, Participatory Needs Assessment Qalyubeya, Final Report, August 2015

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GIZ SWEEPNET, The Solid Waste Management Situation in Mashreq and Maghreb Countries: Update on the Challenges and Opportunities, July 2012

GIZ- PDP, Capacity and Needs Assessment of Friends of the Environment in Khosos NGO and Strategic Planning for Regulatory, Institutional, Financial and Human Resources in Solid Waste Management, October 2012

Annex A: Legal Framework

A1. Laws

1. Law No. 38 of 1967 concerning cleanliness and its Executive Regulation issued by the Minister of Housing, Utilities and Urban Communities' Decree No.134 of 1968.
2. Law No. 43 of 1979 (Local Administration Law) concerning responsibilities related to infrastructure to City Councils.
3. Law No. 137, 1981 concerning occupational safety.
4. Law No. 4 of 1994 promulgating the Law concerning the Environment and its Executive Regulation issued by Prime Minister's Decree No. 338 of 1995.
5. Law No. 9 of 2009 amends Law No. 4/1994 for the protection of the environment.
6. Law No. 10 of 2005 amending certain Provisions of Law No. 38 of 1967 concerning the Public Cleanliness.

Accordingly, solid waste management is regulated by several environmental laws and ministerial decrees. Main aspects of the laws are presented below.

A1.1 Public Cleanliness Law No. 38 of 1967 and its Executive Regulations

The main legislation relating to solid waste management is Law 38/1967 as amended by Law 31/1976. The law regulates the collection and disposal of solid waste from residential areas, commercial and industrial establishments, and public places. It imposes a cleanliness tax on all housing units equivalent to 2% of the rental value.

Article 6

It requests a license to be issued by the local council for all workers employed as waste collectors. Law No. 31/1976 defines garbage and solid wastes as including domestic and industrial waste. It also specifies garbage containers, means of transportation, and the periodicity of solid waste collection.

Provisions of the Law and its Executive Regulation aim at avoiding throwing all kinds of waste in places not allocated for this purpose in order to protect the public health of the citizens and to avoid fires or spoil the aesthetic appearance and cleanliness of the city or village. It also regulates the process of keeping, transporting, processing and final disposal of the waste, either by the competent local councils or the private sector, which must obtain a license before practicing its work. The regulation also defined the specifications of Waste Storage Containers and waste and leftovers trucks whether solid or liquid, in addition to the requirements on landfills and waste disposal methods. The provisions of the law shall be applied on cities and villages by a decree of the competent governor.

Articles of the law include the following:

- The law prohibits throwing garbage and leftovers in places other than allocated by the Local Council.
- All kinds of garbage and leftovers shall be kept in special containers and discharged in accordance with the specifications and conditions prescribed by the Executive

- Regulation. In the case of absence of the mentioned containers, the local council shall prepare these containers and get the price from the violator.
- The collection, transportation and disposal of garbage and leftovers as well as transporting and storing volatile materials shall meet terms, conditions and specifications prescribed by the Regulation.
 - 2% Cleaning fees shall be collected from rental value of dwellers of buildings for public cleanliness affairs.

Executive Regulations of the Law

Collection, transportation and final disposal

Shall be carried out by the agency responsible for cleaning services:

- Local government units in the rest of the governorates (in accordance with Law No. 38 of 1967)
- To arrange with a licensed private contractor so that waste and garbage are delivered in containers to the garbage collector. The municipalities' authorities specialized in public cleanliness shall identify the places where waste would be put, to be then transferred by the competent authorities of the municipalities.

Specifications of Waste Storage Containers

- The container shall be made of metal material or the likes
- It shall be free from holes
- It shall be provided with tight lid and two handles.
- Its capacity shall fit the amount of waste.

Specifications and requirements of means of transport

The garbage and waste shall be only transferred by the means of transport of the competent authority of public cleanliness or the contractor or those who are authorized to do so and must have the following requirements:

- It shall have a sufficient capacity and in a good condition.
- It shall not have holes through which wastes can fall.
- It shall be provided with tight lid
- It shall be padded from inside with tin or zinc or any similar material.
- It shall be washed and cleansed regularly
- It shall only be used in this purpose. It shall only be positioned or cleaned in the places allocated for this purpose.

Public or private landfill

Garbage and waste shall be transferred to the places prepared for that purpose which is determined by the competent authority. Public or private landfills shall have the following requirements and specifications to get rid of garbage and waste, as mentioned in the Executive Regulations, including:

- The site shall be in the area of easy transportation and in the opposite direction of the prevailing wind.
- The distance between the site and residential areas shall be 250 m.

- The area of the site shall absorb the amount of waste
- The site shall be surrounded by a wall of a suitable material with height of not less than 1.8 m. it also shall be provided with a door allow garbage or waste trucks to enter.
- Other requirements stipulated in the Regulation.

Waste and garbage disposal

- Waste and garbage shall be disposed by healthy backfilling in layers as it shall be covered by dust of thickness of 15 cm with well tamping
- In the case of disposal by burning. The site shall be equipped with oven or more with suitable capacity allows the waste to be burned fully. The burning process shall not be resulted in volatile exotic materials lead to pollute the air. The waste shall be sorted before burning.

A1.2 Law No. 43 of 1979 (Local Administration Law)

The law assigned the responsibilities of infrastructure to City Councils. In accordance with Local Government Law No. 43 of 1979, occupant fees may be imposed by no more than 4% of the total rental value paid by dweller of the premises, whether an owner or a lessee. Imposing this fee requires a decree issued by the competent Governor or by the Minister of Local Government.

A1.3 Law No. 137 of 1981

Law No. 137/1981 deals with occupational safety. It only has peripheral relevance here, but includes (Article 117) the requirement that an employer should inform his workers of the hazards associated with his non-compliance with safety measures and that personal safety equipment, together with training on its use, should be provided to the worker.

A1.4 Environment Law No. 4 of 1994 and its Executive Regulations

The protection of the environment is a collective task carried out by many parties of the society including official bodies, individuals and civil societies. Law No. 4/1994 (the Environmental Protection Law) had adopted this principle in Article 103, which stipulates that every citizen or association concerned with protecting the environment shall have the right to report any violation of the provisions of this Law.

Complaint or report shall be submitted to the Egyptian Environmental Affairs Agency (EEAA), its branches or offices of Environmental Affairs of the governorates or local units of the districts. The complaint or the report may be submitted to the prosecution, which in turn will seek the assistance from the judicial officer of these authorities to verify it and take the necessary inference procedures towards it. In all cases, judicial officers shall take the responsibility of verifying the facts subject of complaints and reports.

Law No. 4/1994 has influence on solid waste management. Prime Ministers Decree No. 338, 1995 promulgates the Executive Regulations of Law No. 4, and the Executive Regulations cover many areas of environmental protection.

The law requires environmental review assessments of certain new developments, including industrial projects. It established the Environmental Protection Fund to fund various relevant environmental projects. The Fund is supported financially by the government, donors, and the proceeds from fines paid by those contravening environmental regulations.

The Law advocates setting up a system of incentives to be offered to organizations, individuals, and others, to carry out projects for environmental protection; and covers the protection from pollution of the land, water and air environments.

In terms of solid waste management, the most specific stipulations of Law No. 4/1994 deal with the handling and circulation of hazardous materials, including wastes, and the prohibition of the installation of facilities for treating hazardous waste without a license (the place and conditions of any such license to be determined by the Ministry of Housing after consultation with the Ministry of Health and Industry and the EEAA). More particularly:

Articles of the Law directly concerning solid waste include:

- Article 37 / Act, prohibits dumping the solid waste in places not allocated for this purpose.
- Article 87 / Act, determines sanctions on violators of the previous article.
- Article 38 / Regulation, sets the requirements of solid waste disposal and procedures in the case of burning some solid waste.
- Article 103 /Law, which stipulates that every citizen or association concerned with the protection of the environment shall have right to report any violation of the provisions of this Law.

Article 29

It forbids, without a license from the competent administrative authority, the handling of hazardous substances and wastes.

Article 30

It declares that the management of hazardous wastes shall be subject to the procedures and regulations stated in the Executive Regulations of the Law. The Executive Regulations shall designate the competent authority which, after consulting EEAA, shall issue tables of dangerous wastes to which the provisions of Law No. 4 shall apply.

Article 31

It forbids the construction of any establishment for treating dangerous wastes without a permit from the competent administrative authority and before consulting with the EEAA. The disposal of hazardous wastes shall be according to the norms and conditions stated in the Executive Regulations of the Law. The Minister of Housing, Utilities and New Communities shall assign, after consulting with the Ministries of Health, Industry and the EEAA, the disposal sites and the required conditions to authorize the disposal of hazardous wastes.

Article 33

It makes it mandatory for those who produce or handle dangerous materials in gaseous, liquid or solid form to take precautions to ensure that no environmental damage shall occur.

The owner of an establishment whose activities may result in the generation of hazardous wastes shall maintain a register of those wastes and the method of disposing thereof, as well as contracting concerned agencies for receiving those wastes. The Executive Regulations shall state what data are to be recorded in that register and the EEAA shall be responsible for following up the register to ensure that it conforms with reality.

Article 37

It prohibits the burning, disposal or treatment of solid waste except in designated areas far away from housing or industrial or agricultural areas as well as from waterways. (Article 38 of the Executive Regulations for the Law permits the incineration of infectious waste generated by medical care in hospitals and health centers, with certain provisos).

Article 102

Without prejudice to the provisions of Article (78) of this Law, the staff of the EEAA and its branches in the governorates, who shall be appointed by the Minister of Justice' decree in agreement with the competent Minister of Environmental Affairs shall have the capacity of judicial officers to prove the crimes that violated the provisions of this Law and its decisions.

Article 104

Inspectors of competent administrative authorities, as well as the Egyptian Environmental Affairs Agency inspectors, who have the capacity of judicial police in relation to environment areas all in their areas of competence, shall notify their authorities on any violation of the provisions of this Law; the competent authorities shall take the necessary legal procedures.

Certain Articles of the Prime Ministers Decree No. 338, 1995 promulgating the Executive Regulations or the Law for the Environment are also of particular relevance:

Article 39

It states that collectors of garbage and solid waste shall maintain their garbage bins and vehicles in a clean state. Garbage bins shall be covered tightly so that no offensive odors shall emit, and also to avoid becoming a source for attracting and growing flies and other similar insects, or a focus for attracting stray animals. The garbage contents shall be collected and transported at suitable intervals according to the conditions of each area. The quantity of garbage shall not exceed the capacity of any of these bins at any time.

Annex 11 of Prime Minister's Decree No. 710 of 2012

Annex 11 of Prime Minister's Decree No. 710 of 2012, amending the Executive Regulations of Law 4/1994 states that:

First: Requirements and specifications of the means of collecting and transporting municipal solid wastes

A) Wastes Collection Means

1. Waste collection containers shall be made of metal or plastic with appropriate dimensions and capacities which are determined by the authority responsible for wastes collection and in accordance with the required logistics of waste transportation vehicles and equipment. The responsible authority shall identify the sites where the containers are to be positioned and their distribution.
2. Those who are responsible for municipal waste collection shall be committed to cleanliness of the collection containers. Continuous cleanliness shall be one of the prescribed conditions for security and durability of the waste collection means.
3. Waste bins shall be tightly covered so that no foul odors are emitted, and not to be a source of proliferation of flies or any other insect.
4. Wastes must be collected at appropriate intervals consistent with the circumstances of each region, provided that the waste amount in any bin never exceeds its capacity at any time.

B) Wastes Transfer Means

1. The waste transfer vehicle shall be equipped and holds a license of waste transportation issued by the Local Competent Departments.
2. Wastes should be tightly covered to ensure no waste dispersal during transport.
3. The truck driver and assistants are committed to wearing the appropriate uniform as well as to the application of all Occupational Health and Safety requirements and wearing protective gloves, helmets and appropriate safety shoes.
4. All previous requirements shall be applied to all vehicles and operating equipment as well as to workers collecting and transporting wastes and streets sweeping and street sweepers.
5. Signs should be positioned on the waste collection and transportation vehicles and equipment indicating phone numbers assigned to receive complaints.
6. Vehicles and equipment of waste collection and transportation must be washed daily to ensure their cleanliness and to avoid diseases and epidemics transfer.

Second: Requirements and Specifications of Selecting and Establishing Centers and Plants for Municipal Wastes Recycling and Treatment and Compost Production

5. The site should be appropriate for the activity of the facility in terms of its compatibility with the nature of the area' division and in accordance with the landuse plan which is approved by the Ministry of Housing, Utilities and Urban Development.
6. The site should be away from agricultural areas and waterways, in accordance with the specifications, regulations and the minimum distance from these areas. Opinion shall be expressed on the determination of this distance according to the Environmental Impact Assessment study.
7. The selected site should be located downwind in the residential or industrial areas and shall be provided with the necessary public infrastructure.

8. Adherence to dispose the generated rejects into the disposal site within the sanitary or controlled landfill.
9. The plant shall be surrounded by a fence up at least 2 meters, in addition to cultivation of timber trees fence.
10. Provision of a sound system for protection and safety, preparation of Emergency Response Plan for the plant and provision of the necessary equipment and system as well as availability of an appropriate plan to combat harmful rodents and insects and removing foul odors during production.
11. The need to provide an adequate management and living room along with the necessary infrastructure of lighting, drainage and water for the disposal sites of sanitary or controlled landfills.
12. The need of preparing an Environmental Register for the plant in accordance with Law no. 4/1994 on the Environment Protection, modified by Law 9/2009, and its Executive Regulations.

Third: Conditions and Specifications of Site Selection of Municipal Solid Wastes Final Disposal in Controlled and Safe Sanitary landfills or through Waste Incinerators and Energy Generation

1. The Competent Executive Authority shall prepare an Integrated Topography study for the designated area within which solid wastes will be received, and shall study its nature and the waste quantity required to be disposed in accordance with the activities of urban and rural areas and the census of its population.
2. The Competent Authority shall prepare an Environmental Impact Assessment study and submit it to EEAA for review and opinion before proceeding with the allocation of the site in coordination with EEAA.
3. The site shall be down the prevailing wind in residential and industrial areas, and in an area where groundwater pollution is not applicable. The surrounding area shall be planted with appropriate trees.
4. Access roads to these sites should be provided and paved. The traffic should be compatible with the daily vehicles loads and numbers. It is preferable to allocate these sites at a distance of 1 km from the main roads and 250 meters from the sub-roads.
5. Wastes must be covered daily with soil or an insulating material with a thickness of at least 15 cm and compacting. Moreover, it is necessary to resort consultation of the competent entities for the site preparation in accordance with the technical and environmental bases.

Annex 11 included minimal distances for recycling, treatment, compost production and final disposal facilities from residential and industrial areas, watercourse banks, etc. However, it has been recently amended by Prime Minister's Decree 964 of 2015. Accordingly, all distances have been deleted and would be evaluated through the Environmental Impact Assessment study, on a case by case basis.

Table A1: Crimes and faults related to solid waste management

Type of Violation	Penalty	Articles in Law 4/1994
Crimes		
Intentional commission of acts of violation of the provisions of Law 4/1994:		
– Resulting in the injury of one person with a permanent disability which cannot be healed	Imprisonment not exceeding 10 years	95
– Resulting in the injury of three or more persons with this permanent disability	Imprisonment from 3 to 15 years	95
– Resulting in the death of one person	Temporary hard labor from 3 to 15 years	95
– Resulting in the death of three or more persons	Life imprisonment (hard labor)	95, 101
Faults		
Disposal or discharge of solid, liquid or gaseous waste in waterways without a license	A fine from 200 to 20,000 EGP; in case of recidivism the punishment shall be imprisonment and the mentioned fine. The offender is required to remove the infringing works or correct them within the time specified by the Ministry of Irrigation. If this is not undertaken, removal or correction would be carried out through administrative means at the expenses of the offender with the right to cancel the license.	– 2, 3 of Law 48/1982 – 89 of Law 4/1994
Discharge or disposal of any untreated material or waste or liquid causing pollution of Egyptian beaches or their adjacent waters (whether it is done intentionally or unintentionally, directly or indirectly).	A fine of 200 to 20,000 EGP. In case of recidivism the punishment shall be imprisonment and the mentioned fine. Each day of discharge is considered as a separate violation.	69, 87

Type of Violation	Penalty	Articles in Law 4/1994
Disposal, treatment or burning of garbage and solid waste in non-designated areas (away from residential, industrial and agricultural areas or waterways as defined in ER articles 38 and 39).	A fine of 1000 to 20,000 EGP. In case of recidivism the punishment shall be imprisonment and the mentioned fine.	37, 97
Failure to take the necessary precautions for safe storage and transportation of waste or dust resulting from excavation or digging or construction or demolition, or their transfer without preventing volatility and dispersion.	A fine of 500 to 1000 EGP with the possibility of suspending the license from a week to 6 months. In case of recidivism license can be cancelled.	39, 86

A1.5 Law No. 9 of 2009 Amending Law No. 4 of 1994

Articles 29 - 33 of this law regulate collection, disposal and treatment of hazardous solid waste. Moreover, *Article 37/2* of this law prohibits the open burning of solid waste, as well as the sorting, treatment and placement of wastes in areas other than those specified, away from residential, agricultural and industrial areas and waterways.

A1.6 Law No. 10 of 2005 Amending Certain Provisions of Law No. 38 of 1967 Regarding Public Cleanliness

This law was promulgated after the rejection of most citizens to pay subscription of cleanliness on electricity bill and filing lawsuits and a ruling to stop these decisions, which urged the government to issue the Law No. 10 of 2005 amending certain provisions of Law No.38 of 1967 concerning public cleanliness, shall be replaced by text of the articles (8 and 9) of Law No.38 of 1967 concerning public cleanliness. The two following texts:

Article 8

Occupants of the built property and exploited vacant lands in the governorates shall pay a monthly fee as follows:

- a. From one pound to ten pounds for one residential unit in the capitals of the governorates and cities that for which a Republican decree of a private nature was issued.
- b. From one pound to four pound for one residential unit in the cities which are not the capitals of the governorates.
- c. From ten pounds to thirty pounds for commercial and industrial shops and exploited vacant lands and units used as headquarters of profession activities and entrepreneurship.
- d. Places of worship shall not pay this fee. The collection of the fee shall be for providing waste and garbage collection services from units and vacant lands, which are subject to the provisions of this Law and transporting it to the places allocated for this purpose, to get rid of it safely by competent local unit - alone or by a third party

The payment of the referred fee shall not contradict the special contracts signed by the local unit with some facilities on the fees it shall pay for providing all or some the referred services.

The amount of the fee shall be determined among the amounts set forth in clauses (a, b, c) of this Law and collection procedures by a decree of the competent Governor, with the consent of the municipal council of the governor, and after taking the opinion of municipal council of the local unit which is subject to the provisions of this law. This determination shall take into account the economic and social conditions for each unit.

The fund for cleanliness shall be established in every unit of local administration and public bodies for cleanliness that are subject to the provisions of this law, in which proceeds of the following shall be deposited:

- Proceeds of the fines, reconciliation charges and the amount prescribed in accordance with the provisions of Article (9) of this Law, with an exception of the requirements of Article (18 bis) of the Criminal Procedure Code.
- Revenue of recycling the waste and garbage
- Credits included in the budget of the Governorate for cleaning services.

The proceeds of this account shall only be use in this purpose. The competent local units shall establish local offices to receive the complaints of citizens in the case of being affected by the violation of provisions of this law, and refer them to the competent authorities to take the necessary action.

Article 9

Without prejudice to any severer penalty prescribed in another law, perpetrator of any violation of the provisions of this Law or its resolution shall be punished with a fine of no less than twenty pounds and no more than fifty pounds. The local Unit shall have the right to mandate the violator to remove the causes of the violation within the period specified by it or otherwise it shall remove it at his expense with the collection of expenses administratively. The violations due to non-compliance with the provisions of articles (1, 4) of this Law may be reconciled for paying five pounds for pedestrians and ten pounds for other violators during the week from the date of the offense, and criminal case shall be finished upon this reconciliation.

A2. Decree for the Establishment of Waste Regulatory Agency

Prime Ministerial Decree No. 3005 of 2015 was issued for the establishment of a new Waste Management Regulatory Agency (WMRA) which is responsible for planning, follow up and monitoring of all operations relevant to solid waste management on the central and local levels and promotion of investments in collection, transport, management and safe disposal of waste.

The Waste Management Regulatory Agency takes the role of the Egyptian Environmental Affairs Agency in the execution of Articles 25, 26, 27, 28, 29, 30, 31, 32, 38, 39, 41, 55, 56 of the Executive Regulations No. 338 of 1995.

