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Environmental Impact Assessment El Kablat Medical Center

Livelihood and Income from the Environment Program Lead Pollution Clean-up in Qalyoubia

September 25, 2006

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Environmental Impact Assessment
El Kablat Medical Center

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Lead Pollution Clean-up in Qalyoubia

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ACRONYMS

BHHRA	Baseline Human Health Risk Assessment
CAA	Competent Administrative Authority
CAIP	Cairo Air Improvement Project
Chemonics	Chemonics International
DHHS	Department of Health and Human Services
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EEAA	Egyptian Environmental Affairs Agency
EMP	Environmental Management Plan
ER	Executive Regulations
ERP	Emergency Response Plan
FEED	Front End Engineering and Design
GOE	Government of Egypt
GOQ	Governorate of Qalyoubia
HEPA	High Efficiency Particulate Air
HI	Hazard Index
LIFE	Livelihood and Income from the Environment program
LSAP	Lead Smelter Action Plan
MSE	Millennium Science & Engineering, Inc.
PM	Particulate Matter
RBRG	Risk-Based Remediation Goal
USAID	United States Agency for International Development
USEPA	United States Environmental Protection Agency
WHO	World Health Organization
XRF	X-Ray Fluorescence

Symbols for Metals

As	Arsenic
Cd	Cadmium
Cr	Chromium
Hg	Mercury
Pb	Lead
Sb	Antimony

Units of Measurement

m	meter
m^2	square meter
mg/kg	milligram per kilogram (parts per million)
$\mu g/ft^2$	microgram per square foot
µg/g	microgram per gram (parts per million)
mg/L	milligram per liter
µm	micrometer (micron)

PROJECT DESCRIPTION

LIFE Lead Project

The Livelihood and Income from the Environment Program, Lead Pollution Clean-up in Qalyoubia project (LIFE-Lead) is funded by the United States Agency for International Development (USAID) and is being implemented by Millennium Science & Engineering, Inc. in association with Chemonics International (MSE/Chemonics). The original project scope included the remediation of five secondary lead smelters and the El Shahid Ahmed Shaalan School in Shoubra El Kheima, Qalyoubia.

The project completion date has been extended from August 17, 2006 to March 31, 2007. The project extension allows for the remediation of the Delta Solb Preparatory School, the El Kablat Medical Center, and the closed two secondary lead smelters (Osama Zakaria and Khaled Saad Smelters). In addition to site remediation, the project includes activities in community involvement and public participation, communications, capacity building, and policy/legal support.

This Environmental Impact Assessment (EIA) is a follow-up to the previous EIA studies conducted by the project during Phase I. Table 1 summarizes the dates for the submittal and approval of each EIA for sites previously remediated by the project during 2005 and 2006.

Table 1: EIA Studies for Remediation Sites in Shoubra El Kheima

Site	EIA Submittal Date	EEAA Response Date
El Shahid Ahmed Shaalan School	May 31, 2005	June 29, 2005
Awadallah Secondary Lead Smelter Sites (1,2 & 3)	November 14, 2005	December 25, 2005
Seoudi Secondary Lead Smelter	December 8, 2005	January 3, 2006
El Mahy Secondary Lead Smelter	December 18, 2005	January 29, 2006
Delta Solb Preparatory School	June 12, 2006	June 13, 2006

Scope of the EIA

This EIA focuses on the remediation activities that will take place in the El Kablat Medical Center. A number of proposed remediation alternatives are compared with respect to their environmental impact in order to select the option with the least impacts and maximum long term benefits. The selected option is subjected to more detailed analysis with the aim of evaluating its potential environmental impact. In addition, a set of mitigation and monitoring measures are recommended to minimize the impact of the selected remediation alternative on the environment.

The assessment covers the proposed on-site clean up activities to soil, buildings, and structures; as well as the transportation of the generated waste to the appropriate waste disposal sites. The scope of the EIA does not include assessment of final waste disposal activities since the contaminated waste will be disposed in a licensed hazardous waste landfill and the non-hazardous waste will be disposed in a licensed sanitary landfill. These landfills are designed and managed according to the type of waste they are licensed to receive.

This EIA involved a public consultation process, where the concerned stakeholders were consulted at the scoping stage to identify their concerns towards project implementation. All

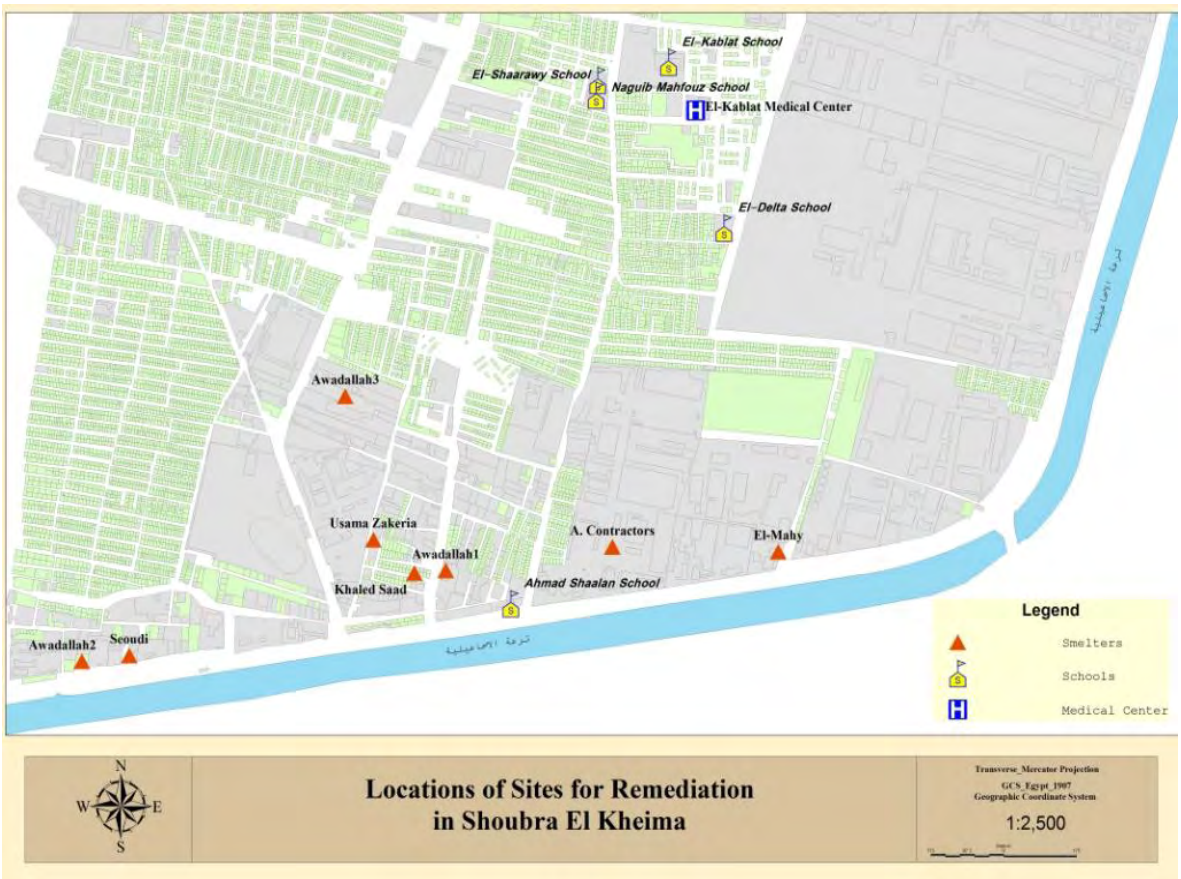
issues and concerns, relevant to the remediation activities, raised during public consultation were considered in this EIA.

Project Setting

Location--

All of the sites included in the LIFE-Lead remediation project are located near the southern border of the Governorate of Qalyoubia (GOQ) in the Hai Shark (East District) of the City of Shoubra El Kheima. The locations of the sites for both the original scope of work and the extension phase are presented in Figure 1. Remediation of the Awadallah Secondary Lead Smelters (3 sites), and the El Mahy and Seoudi Secondary Smelters in addition to El Shahid Ahmed Shaalan School were completed in June 2006 as the original scope of work for the project. The remediation of the Delta Solb Preparatory School, the first site of the extension phase scope of work, was completed on September 17, 2006.

Figure 1: Locations of the Sites for Remediation

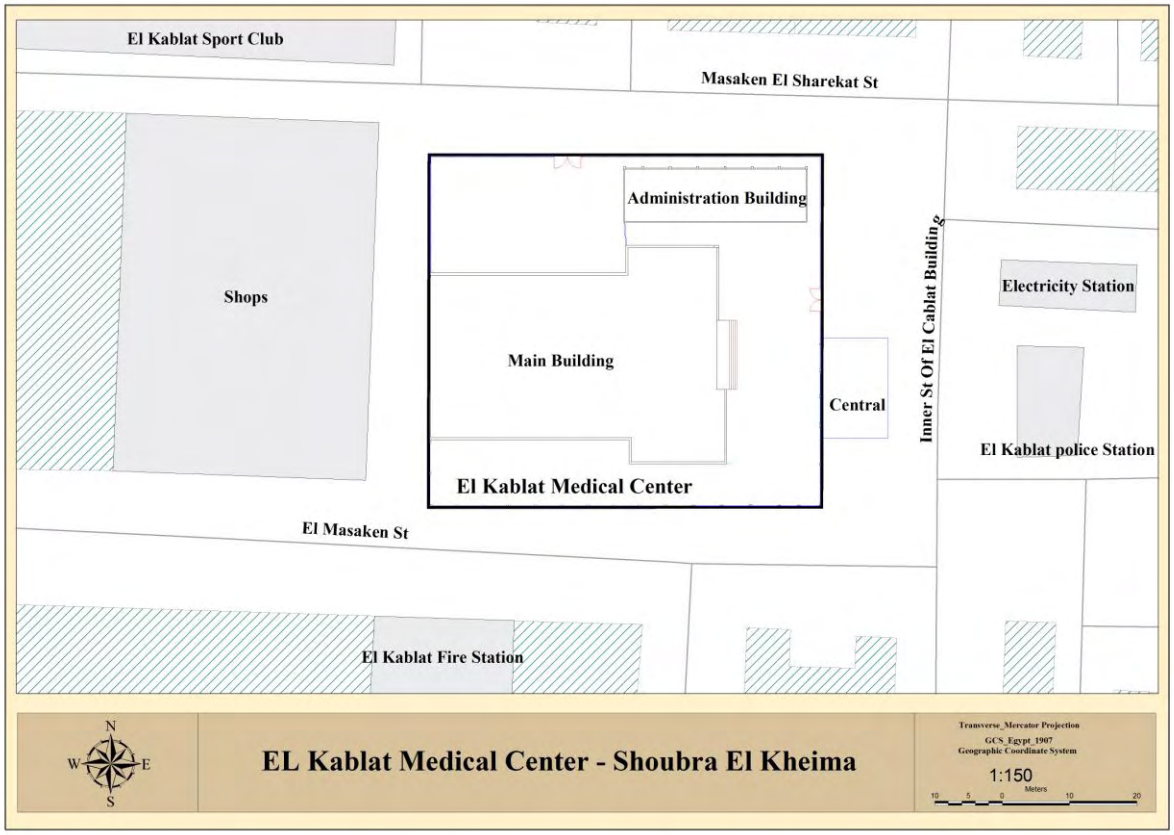


El Kablat Medical Center Facilities and Conditions--

The El Kablat Medical Center was inaugurated in 1976. The center property encompasses an area of approximately 2,112 square meters (m^2) and consists of a two-story building and landscaped areas as shown in Figure 2. The center is bordered by unpaved roads, Ben Zayoun El Kablat Street on the north, and residential blocs on the four sides as well as a local market. Currently, the center employs 59 personnel, including 15 physicians and 18

medical support staff. On an average day, approximately 350 patients visit the center for medical services.

Figure 2: Location of El Kablat Medical Center



Legal Framework

According to the Egyptian Law of the Environment, Law 4/1994, and its Executive Regulations (ERs), an Environmental Impact Assessment (EIA) must be submitted for new projects and/or extension of existing facility licensing. Therefore, environmental requirements are integrated into the existing licensing system.

According to the law, the EIA must be submitted to the Competent Administrative Authority (CAA), under which project jurisdiction falls. The CAA should assess the environmental impacts of the project and submit the EIA to the Egyptian Environmental Affairs Agency (EEAA) to issue its response within 60 days. If no response is received beyond this period, the study is automatically approved. The proponent is informed of the decision, and in the event of an approval, the requiring conditions for both construction and operation phases. The proponent has the right to issue an appeal within 30 days from the receipt of the decision. The CAA for this project is the Governorate of Qalyoubia.

Proposed developments are classified into three categories according to the severity of potential environmental impacts. The three categories include the following:

- Category A: projects with minor environmental impacts.
- Category B: projects with substantial impacts.

- Category C: projects with high potential impacts.

The EIA should be prepared according to the Egyptian Guidelines for EIAs (EEAA, 1996), which describe in detail the procedures for the preparation of an EIA.

This project is of special nature since remediation and clean-up activities are not classified under EEAA's three categories. LIFE-Lead has therefore consulted with the EIA Unit of EEAA for guidance. Based on the fact that the remediation activities to be conducted are limited in duration, with minimum and negligible negative impacts, and involve the handling, transportation, and disposal of contaminated material and the project area includes a number of sensitive receptors such as residential areas, schools, and the Ismailia Canal, the activities to be carried out required a full environmental impact assessment (Category C).

National environmental regulations relevant to the project are described below. They will be addressed as part of the EIA process.

Air Quality--

The Egyptian Law of the Environment (Law 4/1994) regulates the levels of different emissions released to the atmosphere. Article 40 of the Law and Article 42 of its Executive Regulations (amended by Decree 1741/2005) determine the maximum allowable limits for the concentrations of pollutants resulting from the burning of fuels.
In addition, Article 36 of Law 4/1994 and Article 37 of its Executive Regulations (amended by Decree 1741/2005) identify the maximum allowable limits for exhaust gases from machines, engines, and vehicles.

For ambient air pollutants, Article 35 of Law 4/1994 and Article 34 of its Executive Regulations (amended by Decree 1741/2005) determine the maximum allowable limits for those pollutants (Table 2).

Table 2: Maximum Limits of Outdoor Air Pollutants According to Annex 5 of Decree 1471/2005 Amending ERs of Law 4/1994

Pollutant	Maximum Limit	Exposure Period
Sulfur Dioxide ($\mu g/m^3$)	350 150 60	1 hr 24 hrs 1 year
Carbon Monoxide (mg/m^3)	30 10	1 hr 8 hrs
Nitrogen Dioxide ($\mu g/m^3$)	400 150	1 hr 24 hrs
Ozone ($\mu g/m^3$)	200 120	1 hr 8 hrs
Suspended Particles, measured as black smoke ($\mu g/m^3$)	150 60	24 hrs 1 year
Total Suspended Particles ($\mu g/m^3$)	230 90	24 hrs 1 year
PM_{10} ($\mu g/m^3$)	150 70	24 hrs 1 year

Solid Waste--

The Egyptian Law of the Environment regulates different activities associated with the management of solid waste. Articles 37 of Law 4/1994 and Articles 38 and 39 of the Executive Regulations regulate the collection and transportation of solid waste.

Article 39 of Law 4/1994 and Article 41 of its Executive Regulations set the precautions to be taken during excavation, construction, demolition, or transport of resulting waste and dust in order to avoid wafting.

Law 38/1967 is concerned with cleanliness and sanitation. Also, Law 38/1967's Executive Regulations (Decree 134/1968) regulates the collection, transportation, storage, and disposal of solid waste.

Noise--

Noise is one of the impacts, which is caused by equipment used for remediating the project site. Therefore, it is important to check the maximum allowable sound level permitted by the Egyptian Law of the Environment, Law 4/1994.

Article 42 of Law 4/1994 and Article 44 of its Executive Regulations determine the maximum allowable limits for sound intensity. Tables 3 and 4 show the maximum allowable sound levels for different activities and the period of exposure in case of increasing noise level intensity over 90 dB (A), respectively.

Table 3: Maximum Allowable Sound Levels for Different Activities According to Annex 7 of Decree 1471/2005 Amending ERs of Law 4/1994

No.	Type of Place/Activity	Maximum Allowable Sound Level (decibel (A))
1.	Work place with up to 8 hour shifts and aiming to limit noise hazards on sense of hearing.	90
2.	Work place where acoustic signals and good audibility are required.	80
3.	Work rooms for the follow up, measurement and adjustment of high performance operations.	65
4.	Work rooms for computers, typewriters or similar equipment.	70
5.	Work rooms for activities requiring routine mental concentration.	60

Table 4: Period of Exposure in Case of Increasing Noise Level Intensity Over 90 dB (A) According to Article 44 of Law 4/1994

Noise intensity level dB (A)	95	100	105	110	115
Period of exposure (hour)	4	2	1	1/2	1/4

Hazardous Substances and Wastes--

Hazardous waste management is addressed by Law 4/1994 and its Executive Regulations, stipulating requirements to be implemented in order to ensure the safe handling of this type of waste. Hazardous waste transportation is primarily addressed by point 3 of Article 28 of the Executive Regulations and is presented below:

- Hazardous Waste Transport Permit (Article 28.3A – Executive Regulations). Hazardous waste is to only be transported by transport operators possessing a transport permit. In addition, hazardous waste is only to be transported in transport vehicles owned by entities/operators possessing a transport permit.

- Specifications of Transport Vehicles (Article 28.3A.1&2- Executive Regulations). Hazardous waste transport vehicles are to be equipped with the necessary safety equipment. The vehicles must be in good working condition and suitable for operation and of adequate capacity and have rotation frequency suitable for the quantities of hazardous waste intended for transport.

- Drivers of Hazardous Waste Transport Vehicles (Article 28.3A.3 – Executive Regulations). Drivers of hazardous waste transport vehicles must receive adequate training to be qualified and capable to act in cases of emergency.

- Labelling of Hazardous Waste Transport Vehicles (Article 28.3A.4 – Executive Regulations). Clear and visible labels must be placed on hazardous waste transport vehicles indicating the type of transported waste and the associated hazard as well as action to be taken in cases of emergency.

- Routing of Hazardous Waste Transport Vehicles (Article 28.3B&C – Executive Regulations). Hazardous waste transport routes are to be determined. Any changes in the routing plan require notification to the Authority for Civil Defence. The concerned competent authority should be notified of the garage address in which the vehicles park as well as the number and date of their licenses. Hazardous waste transport vehicles are not allowed to pass through residential and other populated areas and city centers during daytime.

- Maintenance and Cleaning of Hazardous Waste Transport Vehicles (Article 28.3E – Executive Regulations). Hazardous waste transport vehicles must be continuously washed and cleaned after each use according to the instructions set by the Ministry of Health in coordination with the concerned competent administrative authority.

The stipulations of Law 4/1994 and the Executive Regulations with regards to hazardous waste transportation do not detail the operational procedures to be followed during transport operations, nor the technical specifications for the means of transport for this type of waste. Hazardous waste transportation guidelines were developed by EEAA presenting the operational procedures to be followed for ensuring proper control of transport operations and effective tracking of transported waste; the necessary technical and safety specifications and equipment of the means of transport; as well as the general operational provisions ensuring the safe handling of the waste during the transportation operations.

Protection of Water Resources--

Law 48/1982 and its Executive Regulations focus on protecting potable water and non-potable/agriculture use water from pollution. These waters include the Nile River, all irrigation canals, drains, and lakes.

Work Environment--

Due to the importance of workers health and safety, both the Egyptian Law of the Environment (Law 4/1994) and the Labour Law (Law 137/1981) regulate different issues related to workers at work places. As indicated by Articles 43 to 45 of Law 4/1994, protective equipment must be provided to workers at the project site.

In addition, safety and occupational health issues are addressed by Chapter 5 of Law 137/1981.

Site Specific Clean-up Levels--

Remediation and clean-up goals for heavy metals have not been established in Egypt. Several meetings were held between LIFE-Lead and the EEAA's Environmental Quality Sector, Hazardous Waste Department, and the Environmental Health Department to discuss and agree on procedures to establish clean-up levels. The consensus was reached that clean-up levels would be set on a site-specific basis determined by the results of baseline human health risk assessment.

The Baseline Human Health Risk Assessment conducted for the center assessed the potential human health risks associated with carcinogenic and non-carcinogenic heavy metals of concern in surface soil for three types of receptors, namely children and adults visiting the medical center as well as workers at the center.

For children visiting the El Kablat Medical Center, a non-carcinogenic hazard index (HI) of 0.9 was calculated. The hazard index is a ratio that, if greater than 1, may represent potential for non-carcinogenic health effects. The total carcinogenic risk to children visiting the El Kablat Medical Center is 2×10^{-6}. In general, U.S. standards require corrective action if the potential cancer risk exceeds one in ten thousand (1×10^{-4}) under the current or likely future land use.

For adults visiting the El Kablat Medical Center, a non-carcinogenic hazard index (HI) of 0.1 was calculated. The total carcinogenic risk to adults visiting the Kablat Medical Center is 1×10^{-6}.

For workers at the El Kablat Medical Center, a non-carcinogenic HI of 1.3 was calculated. Approximately 81% of this HI is attributed to antimony, 12% to cadmium, and 7% to arsenic. The total carcinogenic risk to workers at the medical center is 1×10^{-5} indicating that corrective action may be needed. This carcinogenic risk is due to exposure to arsenic in soil and dust. Table 5 provides the RBRG for heavy metals in surface soil and wipe samples.

Table 5: RBRG/Benchmarks for Surface Soil and Wipe Samples

RBRG and/or Benchmark	Lead (Pb)	Arsenic (As)	Cadmium (Cd)	Antimony (Sb)	Chromium (Cr VI)	Mercury (Hg)
RBRG in surface soil- (mg/kg)	400	1	477	260	210	--
Dust wipe levels*	40	36	145	58	437	15

***** Health Based Benchmark by EPA**-** $\mu g/ft^2$

Sampling and Site Characterization

Sampling and Analysis Plan--

Three different sampling methods were used during the sampling program at the medical center site. The first method was bulk surface soil and dust sampling. Bulk surface soils samples where collected from bare soil areas outside the center buildings at the various landscaped areas. Dust sampling was used where dust has accumulated in piles or in layers on the floors within the interior buildings of the center.

The second method was digging boreholes and collecting soil samples at depths up to 1.5 meters, from bare soil areas outside the buildings, at the various landscaped areas.

The third method was dust wipe sampling which is used on walls, floors, and doors where there is minor accumulations of dust.

Table 6: Types and Locations of Samples from El Kablat Medical Center

Type of Sample	Locations	Quantity	Total	Remarks
Bulk Surface Soil	Landscaped areas	5	72	5 locations
Bulk Subsurface Soil (Boreholes)	Landscaped areas	25		Up to 1.5 m depth in 7 locations
Bulk Dust	In rooms and corridors	21		19 locations
Wipes (floors, doors, walls)	Inside and outside rooms	21		21 locations

Site Characterization--

The site characterization encompasses efforts to define the nature and extent of contamination, and to collect information needed to select and carry out the appropriate site remediation. The collected samples were analyzed using the field portable X-Ray Fluorescence (XRF) purchased at an earlier stage by the project. Difference in contamination levels between interior dust and exterior soil is attributed to variance in particle size of the samples. Table 7 provide the results of the analysis of the heavy metals in the different media at the site and compared to the proposed remediation goals.

Table 7: Results of Analysis of Samples for El Kablat Medical Center

Type of Sample	Lead (Pb)	Arsenic (As)	Cadmium (Cd)	Antimony (Sb)	Chromium (Cr)	Mercury (Hg)
Bulk Soil/Dust RPRG (mg/kg)	**400**	**1**	**477**	**260**	**210**	**--**
Average Surface Soil (mg/kg)	83.59	08.79	33.76	66.18	70.22	--
Average Sub-surface soil (mg/kg)	32.66	05.40	36.92	76.22	59.40	--
Average Dust (mg/kg)	148.18	08.90	59.09	120.51	61.98	--
Average Dust (mg/kg)-administration buildings	222.67	01.50	30.68	55.10	88.93	--
Wipes*	**40**	**36**	**145**	**58**	**437**	**15**
Average Wipes - µg/ft^2	268.14	32	84	8,379	209	21
Average Wipes µg/ft^2-administration buildings	11.74	17.45	130.00	35.09	218.10	10.34

* Health Based Benchmark by EPA- µg/ft^2

The site characterization of El Kablat Medical Center indicated the following:

- Contamination levels of both bulk and wipe samples collected from the Administration buildings are of very minor concern.
- Contamination levels of arsenic are the primary concern in bulk samples with all samples exceeding the US-EPA Region 9 Preliminary Remediation Goals.

- Contamination levels of lead, antimony, cadmium and chromium in bulk samples are insignificant.
- For wipe dust samples collected inside the buildings of the center, contamination levels of lead, mercury and antimony exceeded EPA Health Based Benchmarks .

- For wipe dust samples taken inside the buildings of the center, contamination levels of cadmium are insignificant.

- For wipe dust samples taken inside the buildings of the center, contamination levels of chromium and arsenic are of minor concern.

- Soil stratigraphy show that the center landscaped areas cover small amounts of residential waste, including small quantities of asbestos in the wide backyard.

The following provides an explanation of the activities that should be taken at the medical center to remediate the contamination identified during the sampling and site characterization.

- Elevated arsenic levels detected in the surface and subsurface soil on the center property should be remediated to levels in the soil below the RBRG.

- Elevated lead, antimony, and mercury levels detected inside the center should be remediated by thoroughly decontaminating floors, doors, and walls followed by painting.

Proposed Action

Based on the collected baseline information; site characterization; laws and regulations; future use of the site; and within a national and international policy context (i.e., Law 4/1994 and USAID requirements); a list of remediation alternatives was proposed to remediate the sites.

The No action alternative will be assessed in the EIA for the site. The No action is not a viable alternative for addressing the problem. However, it does provide a baseline against which the impacts and costs of the other alternatives will be evaluated.

Construction Activities--

Three remediation alternatives were developed for the Medical Center. The remediation alternative (3) was proposed. The construction activities associated with the proposed alternative and the expected operation and maintenance are included in the description of the remediation action.

Building Remediation--

Consists of the following:

- Interior surfaces cleaning and painting in buildings which includes:
  - Constructing temporary containment.
  - Installing a dust extraction system.
  - Removing existing paint on interior walls of the two buildings, cleaning surfaces using a HEPA vacuum and damp mops, and then applying primer and paint.
  - Cleaning and re-grouting the tiled walls inside the rooms.
  - Cleaning the ceiling using a HEPA vacuum, preparing for paint, and then applying paint.
  - Polishing mosaic of corridor walls.
- Floor tile and ceramic tile placement which includes:
  - Removing and placing non slip ceramic tiles on room floors including the administration building.
  - Removing existing vinyl and placing mosaic tiles on corridor floors including the administration building.
  - Removing existing bathroom floor and wall tiles and placing ceramic tiles.
- Removing and replacing windows (Aluminium Windows), window frames, doors, doors jams, window and door mouldings, and paint as necessary.
- Wet mopping windows and doors and cleaning equipment and furniture.
- Modifying the building layout, building a wall at the end of the main corridor, amending the corridor walls, and amending the ceiling and placing the skylight fixtures.
- Polishing the stair steps and mosaic walls.
- Loading and hauling decontaminated debris to the Abu Zaabal Landfill.
- Loading and hauling contaminated debris to Alexandria Hazardous Waste Landfill.

Ground Area Remediation--

Consists of the following:

- Capping of the ground area around the buildings which includes:
  - Placing stamped plain concrete including preparation, sand placement, and compaction around the buildings.
  - Landscaping the side area using interlocking tiles.

  - Covering the area in front of the main gate with an asphalt layer.
  - Covering the area behind the administration building with interlocking tiles.

- Fence restoration which includes cleaning (dry), repairing, preparing, and painting brick fence and gate.

Sanitary and Electrical Works--

Consists of the following:

- Excavation, removal, and replacement of the external sewer network.
- Excavation, removal, and replacement of the internal sewer network.
- Compressed air arrangement in the dental clinic.
- Cable and wire placement.

The main characteristics of this alternative include the following:

- Effectiveness: Short-term effectiveness is very good when building surfaces are properly prepared; long-term effectiveness is also very good providing that coating maintenance and dust (source) control at exterior and/or occupants education/training.
- Implementability: Technically simple to implement with conventional equipment and trained workers. Low risk from potential exposure of public during remediation with proper engineering controls.
- Cost: The cost is medium. Long-term maintenance costs may marginally increase cost of conventional janitorial services and recurring painting costs; as for the hard cap the long term maintenance cost is minimum.

The remediation activities at the center are scheduled for the period between December 1, 2006 and March 1, 2007.

Operation and Maintenance--

The proposed remediation action posses good short-term effectiveness when building surfaces are properly prepared. Long-term effectiveness will depend on coating maintenance and the ability to control dust from outside sources and/or education/training of doctors, and administrators. Long-term maintenance costs may marginally increase the cost of conventional janitorial services and recurring painting costs. As for capping of the ground area around the buildings, the expected life of the Alternative 3 hard cap is twenty years, with minimum maintenance cost.

Waste Transportation Routes--

Contractors will be responsible for transportation of waste generated from the remediation activities. The non-hazardous waste generated from remediation will be disposed in the Abu Zabaal Landfill. The waste will travel from Shoubra El Kheima to Abu Zaabal along the Ismailia Canal Road for approximately 25 km. The route passes through agricultural land and next to industrial sites and the Abu Zabaal Prison near the landfill (Figure 3).

The hazardous waste will be disposed in the Alexandria Hazardous Waste Landfill in Nasereya. The waste will travel from Shoubra El Kheima to Nasereya along the Ring Road and then the Alexandria Desert Road for approximately 250 km. The route crosses the Nile River and passes through agricultural land in route to the landfill (Figure 3).

Future Conditions without the Project

Without the project, the polluted media (soil, and exterior and interior buildings) will act as potential sources of heavy metal contamination causing further deterioration of the environmental quality as well as the health quality of the workers and users of El Kablat Medical Center. Exposure to the contaminants found in the three sites can cause the following adverse health effects:

- Chronic exposure to lead contamination may cause a wide variety of adverse health effects, ranging from reduction in the intelligence quotient of children to kidney cancer. Lead emissions are of particular concern for women of childbearing age and children under seven years of age. Children and young adults in areas that have been contaminated by smelter emissions can be exposed to lead through inhaling or ingesting dust and soil. Fugitive dust from the smelter and the surrounding area can be blown and deposited on uncovered food and water and subsequently ingested.

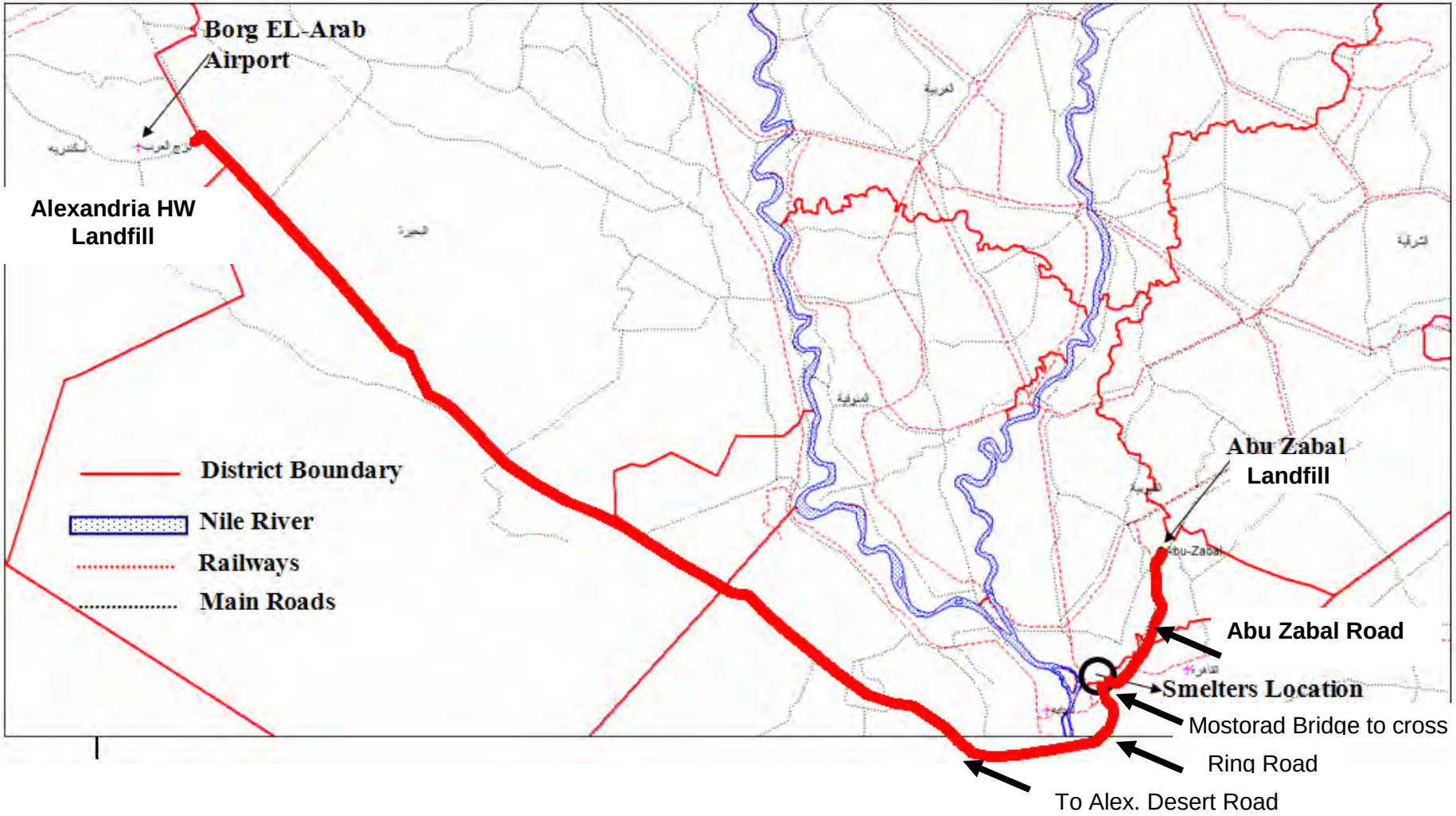
- Several studies have shown that Chromium (VI) compounds can increase the risk of lung cancer. The World Health Organization (WHO) has determined that Chromium (VI) is a human carcinogen. Non-carcinogenic health effects of Chromium (VI) range from irritation of the respiratory system to skin and stomach ulcers

- Several studies have shown that ingestion of inorganic arsenic can increase the risk of skin cancer and cancer in the lungs, bladder, liver, kidney and prostate. Inhalation of inorganic arsenic can cause an increased risk of lung cancer. The Department of Health and Human Services (DHHS) has determined that inorganic arsenic is a known carcinogen. Non-carcinogenic health effects of inorganic arsenic range from sore throats to death in case of ingesting very high levels.

- The DHHS has determined that Cadmium and Cadmium compounds may reasonably be anticipated to be carcinogens. Non-carcinogenic health effects of Cadmium range from severe damage to the lungs to kidney disease.

- Exposure to Antimony at high levels can result in a variety of adverse health effects. Breathing high levels for a long time can irritate the eyes and lungs and can cause heart and lung problems, stomach pain, diarrhoea, vomiting, and stomach ulcers. Ingesting large doses of antimony can cause vomiting

Figure 3: Transportation Routes to Waste Disposal Sites; Alexandria and Abu Zabaal



Comparative Analysis of Remediation Alternatives

All proposed alternatives (except the No-Action Alternative) are capable of meeting the health based clean-up goals of the project. The No-Action Alternative is proposed to provide a comparison of the benefits provided by the remediation alternatives. The following provides a summary description of the other alternatives evaluated.

- Alternative 1: No-Action.
- Alternative 2: Cleaning of interior and exterior walls, Cleaning of furniture, Implementing building improvements, Testing of cleaning residuals and disposal, Conventional site management practices.
- Alternative 3: Cleaning of interior and exterior walls, Cleaning of furniture, Implementing building improvements, Hard capping of the exterior area, Rehabilitation of fence, Upgrading sewer and domestic water system, Testing of residuals and disposal, Site management.

No-Action Alternative (Alternative 1)--

This alternative is not recommended. If remediation activities are not carried out, then the existing heavy metal pollution hazards will persist causing further deterioration of the environmental quality of the area. No-action will also impact the health of users and workers in the medical center.

Comparison of Alternatives--

The proposed alternatives for the site were chosen among three potential alternatives that were identified during the remediation design process. The recommended alternative was selected in consultation with EEAA, Hai Shark, the Medical Directorate of Shoubra El Kheima and USAID as being the best alternative that could be accomplished within available funding.

The detailed design is underway for the Medical Center. It may be slightly modified prior to implementation. As such, Table 8 provides an evaluation of potential impacts associated with the proposed remediation activities. The short and long term impacts of the alternatives are provided. The most feasible alternative is the one selected for implementation. The methodology used for identification and assessment of the potential impacts associated with project activities is described in detail in Appendix B.

Table 8: Comparison of Alternatives for the El Kablat Medical Center

Short Term Impacts	Long Term Impacts/Benefits
Alternative 2: Cleaning of interior and exterior walls, Cleaning of furniture, Implementing building improvements, Testing of cleaning residuals and disposal, Conventional site management practices.	
Temporary negative impacts on air quality, ambient noise, workplace health and safety as well as traffic. No direct impact on soil quality, groundwater and surface water quality, biological life and public health and safety.	This alternative will result in the remediation of the buildings and its interior surfaces of the medical center, and will limit airborne pollutants from entering the building through the replacement of broken doors and windows. However, since no soil remediation actions will be carried out in the exterior areas, a major source of pollution will still persist, which is the contaminated

Short Term Impacts	Long Term Impacts/Benefits
	soil. Dust from this soil could become air borne and deposit of the surfaces of the buildings, which will regenerate the health problems presently encountered. The workers will still be exposed to the contaminated soil which will lead to the inhalation, ingestion, or dermal intake of the contaminant. This alternative is considered a partial solution to the problem and is therefore not recommended.
Alternative 3: Cleaning of interior and exterior walls, Cleaning of furniture, Implementing building improvements, Hard capping of the exterior area, Rehabilitation of fence, Upgrading sewer and domestic water system, Testing of residuals and disposal, Site management.	
This will result in incremental short-term environmental impacts to the impacts already encountered in Alternative 2 due to the environmental aspects resulting from the following extra activities: • Hard capping of the soil • Rehabilitation of fence • Upgrading sewer and domestic water system Environmental concerns associated with these activities include increased dust and fugitive emissions, noise, traffic, transportation accidents, and spills.	This alternative will result in the remediation of the buildings and its interior surfaces as well as the exterior areas through providing a hard cap over the contaminated soil. The hard capping has an expected life of 20 years. This alternative will result in long-term environmental benefits to the environmental quality of the area and the health of the public, users of the medical center, and workers. From an environmental standpoint, this alternative is recommended.

From an environmental standpoint, Alternatives 3 is recommended for the site. The choice of the proposed alternative depends on other factors that include effectiveness, implementability, and cost. The cost factor provides a decisive criterion for choosing among different alternatives. The objective of the financial analysis is to estimate the present value of the expected cost of the three alternatives under investigation, in order to propose the alternative with the most cost effectiveness.

The proposed alternatives with appropriate mitigation and monitoring measures should be implemented.

Prior to the beginning of remediation, baseline environmental conditions will be defined for monitoring during the remediation activities. Baseline conditions will be established for air quality, noise, and soil. The baseline conditions will be used to monitor the remediation activities impact to the environment and to insure that mitigation measures are established and functioning properly.

BASELINE CONDITIONS

Geology and Hydrogeology Characteristics

The area where the project is located is within the flood plain of the Nile River. The topography of the area is almost flat with an average altitude of 17 m above mean sea level.

The area, in general, is a part of the Northern tip of the Nile Delta and alluvial plain, which consists of silty and sandy clay deposits (Holocene-Q3) that overlay the graded sand and gravel Pleistocene aquifer (Pleistocene-Q1). The main aquifer belongs to the Quaternary formation that is a Nile River recharged formation. The Holocene (Q3) layer is about 15 m thick and the thickness of the Pleistocene (Q1) is not definitely known but extends beyond 200 m deep.

The main sources of groundwater recharge in the Study Area are the Nile River and the Ismailia Canal. Seepage from the sewage system and drainage networks is the secondary recharge source. The groundwater discharge is mainly from the groundwater wells. Underlying the sites there are two hydrogeologic units, an upper silt and clay layer, and a major alluvial aquifer. The water table is between 5 and 6 m below the ground surface. Eight hundred meters to the south of the site is the Ismailia Canal.

Air Quality

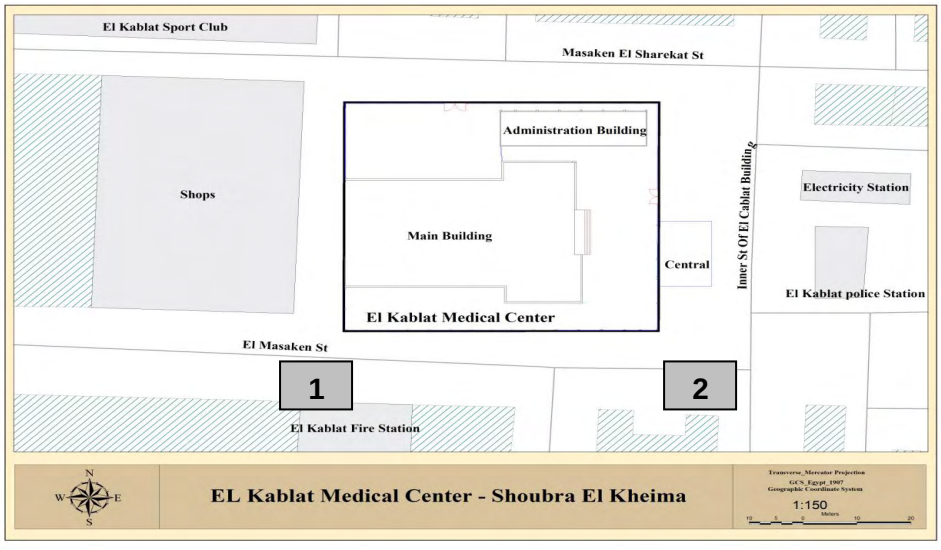
During the period from October 1998 to July 1999, high particulate matter PM10, PM2.5, and lead were detected (CAIP,2002). PM and lead were monitored in 36 sites in Greater Cairo. The results indicated that, in the industrial area of Shoubra El Kheima, the highest mean inhalable PM was found to be 313 $\mu g/m^3$ exceeding the allowable limit of Law 4/1994 of 70 $\mu g/m^3$ by more than 4 fold. Lead concentrations of 26 $\mu g/m^3$ were recorded which also exceeded Law 4/1994 annual average of 1.0 $\mu g/m^3$.

In 2004, air quality in the Shoubra El Kheima industrial area was improved, where the mean PM10 levels dropped to 178 $\mu g/m^3$. In addition, lead levels dropped to 1.02 $\mu g/m^3$ which nearly meets the Law 4/1994 annual average of 1.0 $\mu g/m^3$ (EEPP, 2004). In 2005, mean inhalable particulate matter (PM10) levels dropped to 161 $\mu g/m^3$. As for the lead levels, 1.66 $\mu g/m^3$ were recorded which exceeds the Law 4 annual average of 1.0 $\mu g/m^3$ (EEPP, 2005).

Noise

A survey was carried out to acquire baseline data for the ambient noise levels in the project area. Monitoring locations were chosen next to the main noise sources as well as the sensitive receptors as shown in Figure 4.

Figure 4: Noise Monitoring Locations next to EL Kablat Medical Center



Measurements were taken during the day, evening, and night as per the requirements of Law 4/1994. Each reading was repeated 3 times to reflect different local conditions (e.g., no, light, and heavy traffic). The results of the survey are presented in Table 9.

Measured noise levels at locations 1 and 2 during day time, evening and night are in compliance with the limits of Law 4/94, except at location 1 during day time there are two readings higher than the law limits due to the market activities during daytime.

Table 9: Results of Baseline Noise Monitoring Survey for El Kablat Medical Center

Location		Measured Noise Level, dB(A) and Noise Limit								
		Day time			Evening			Night		
		7 am – 6 pm			6 pm – 10 pm			10 pm – 7 am		
1	Southwest of Center in front of market	60	67	56	51	47	48	44	47	48
2	Southeast of Center in residential area	52	57	59	45	47	50	47	49	46
Law Limit for Dwelling Zone Including Workshops or Public Road		**50-60**			**45-55**			**40-50**		

Terrestrial Ecology

The project site is located within the urban landscape matrix of Greater Cairo, parallel to the Ismailia Canal. In general, there are no significant habitats within the project area of influence. Vegetation, an important ecological indicator, is found far from this area. The only and most important ecological feature is the Ismailia Canal that runs as a corridor to the south of the project site. The Ismailia Canal bank near the project site is used as a plant nursery with many different species of plants. Some plant species grow along the bank slope.

The project area, which can be considered as a man made environment, appears to have little ecological significance and low biodiversity due to the immense alteration of the natural ecology. In these areas, only plants and animals that tolerate urban pressures and that can live close to man are found (EEAA, 1993). None of these appear to be of conservational or ecological importance.

Demography

The population in Hai Shark (East District) of Shoubra El Kheima increased from 454,000 in 1996 to 536,900 in 2001 with an annual population growth rate of 3.7 percent. This annual growth rate is higher than in the city, governorate, or in Egypt as a whole.

The population of concern is 182,096 residents in the original Study Area, which is defined as a circle with a radius of one kilometer around Awadallah Secondary Lead Smelter No. 1.

Health Services

Health services in Hai Shark and Shoubra El Kheima City fall within the average of the total for the GOQ. The exception is the number of physicians and nurses per 10,000 people, which shows to be significantly higher in the GOQ and the total for Egypt. The nurse/

physician ratio in Hai Shark and Shoubra El Kheima City is 238.8 percent and is significantly lower than the ratio in total for the GOQ which is 287.6 percent. However, the ratio is significantly higher than the ratio for Egypt which was 224.4 percent in 2001.

The Information Decision Support Cabinet (IDSC), Statistical Book of 1998 indicates a wide range of health services in Shoubra El Kheima City. These include different public centers, units, offices, praxes, laboratories, and hospitals affiliated to the Ministry of Health with a total of 69 units. At the same time, 60 of the total are considered day care centers with no facilities for inpatients, while only 4 are equipped for inpatients (IDSC, 1998).

ENVIRONMENTAL IMPACTS

This EIA focuses on the remediation activities that will take place at the El Kablat Medical Centre. The assessment covers the proposed on-site clean-up/remediation activities as well as the transportation of the generated waste to the waste disposal sites. The scope of the EIA does not include assessment of final waste disposal activities since the hazardous waste will be disposed in a licensed hazardous waste landfill and the non-hazardous waste will be disposed in a licensed solid waste landfill. These landfills are designed and managed according to the type of waste that they are licensed to receive.

The EIA also involved a public scoping process, where concerned stakeholders were consulted at the scoping stage of the EIA process to identify their concerns pertaining to project implementation. All issues and concerns, relevant to the remediation activities, raised during public consultation were considered in the EIA.

The methodology used for identification and assessment of the potential impacts associated with project activities is described below.

Impact Evaluation

After considering the project interaction with the previously described receptors, certain interactions with other receptors still remain. These include primary and higher order impacts of the proposed project. Such impacts were then evaluated based on the following criteria:

- Magnitude of the impact.
- Impact duration.
- Reversibility of the effect on receptor.
- Spatial extent.
- Sensitivity or importance of the receptor.

The impact evaluation also takes into consideration the mitigation measures included in the Front End Engineering and Design (FEED) to which the project is committed. This is in addition to measures of good international practice.

Positive Impacts

Remediation of the existing site will lead to the following long-term positive impacts:

- Remediation of existing site will lead to long-term improvement in the soil within the remediated site and in the neighborhood due to the removal and/or treatment of the contaminated soil.

- Improvement of the health of the users and workers of the medical center through the removal/treatment of the persistent source of heavy metals hazard.

- Improvement of the quality of life due to improvement of the air quality in the project area.
- Remediation of the center will lead to new employment opportunities for the local community during the period of site remediation. Wages will be paid to local labor as the remediation activities are implemented.

- This is one of the first site remediation projects in Egypt and it is anticipated to initiate new hazardous waste site remediation businesses. A cadre of specialized construction contractors and workers have been trained as part of the project to remediate heavy metals contaminated sites.

No Impacts

Examination of the environmental setting of the area in which the project is located has shown that project activities will not interact with some of the receptors and so there will be no direct impact on these receptors including:

- Impact of On-site Remediation Activities on Terrestrial Life. The contaminated site lies within an industrial area that is devoid of sensitive terrestrial fauna and flora except for some common trees and plants that already have lead dust deposited on their leaves. Remediation activities will not therefore have any additional direct impacts on terrestrial life.

- Impact of the On-site Remediation Activities on Surface Water Quality and Marine Life. All remediation activities that will be carried within the site boundaries and thus there will be no direct impact on the Ismailia Canal or its aquatic life.

- Impact of Remediation Activities on Groundwater. There will be no direct contact between the remediation and clean-up activities carried out within the buildings and the groundwater. Moreover, no excavation works will carried out at the site. Therefore, there will be no impact from these activities on the groundwater.

- Impact of Remediation Activities of Buildings and Surfaces on Public Health and Safety. All remediation activities carried out within the buildings will be contained within decontamination zones and areas of exclusion. Therefore, their emissions will not reach the neighboring communities and thus there will be no impact on the public health and safety.

Negative Impacts

A number of potential negative impacts associated with on site remediation activities and transportation of waste to final disposal are evaluated below. Insignificant impacts are disregarded while mitigation measures are proposed to prevent/minimize significant negative impacts.

Air quality (Short Term Direct Avoidable Negative Impacts)--

The ambient air quality at the project site may be impacted by gaseous emissions and fugitive dusts from remediation activities. The main sources of emissions on site include the following:

- Decontamination activities.
- Vacuum cleaning and pressure washing.
- Removal of old paint.
- Wind erosion of exposed waste material or soil.
- Construction equipment and machinery.

Transportation of raw material, labor, and equipment to the site and transportation of the contaminated waste from the site to its final disposal site will have impacts on the air quality and noise levels along the transportation route.

Mitigation Measures--

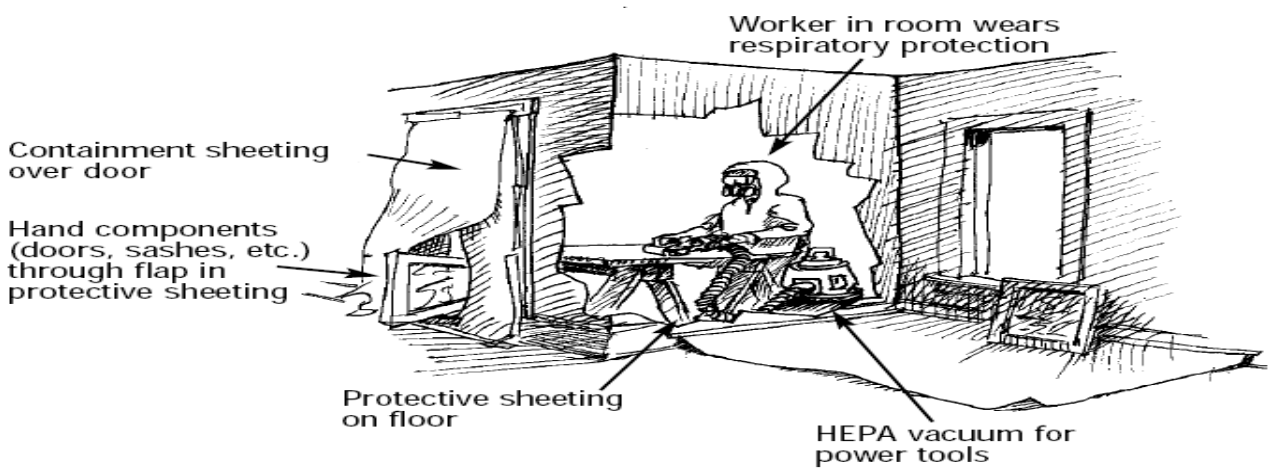
To contain dust generation during remediation and clean-up activities, decontamination areas will be established to isolate the activities and prevent heavy metals contaminated dust from emitting to the atmosphere (Figure 5). The decontamination areas will be equipped with centralized dust collection systems to capture, transport, and separate dust emitted from the processing and materials handling areas through reverse pulse dust filters. Collected dust will be properly handled and stored in closed containers until it is transported to the appropriate disposal site. Dust generated during loading and transportation will be controlled with windscreens (plastic sheets) and water spraying to suppress dust as needed.

LIFE-Lead will monitor the contractor's implementation of mitigation measures throughout the project. The mitigation measures will include dust suppression measures at the site by watering of haulage roads, and maintaining machinery and vehicles in good working condition to minimize fugitive emissions. All equipment will be frequently inspected and maintained to ensure no fugitive emissions are generated, such as volatile hydrocarbon or nitrogen oxides.

Residual Impact--

Acceptable under normal operation conditions, however, regular periodic monitoring is done to ensure compliance to standards.

Figure 5: Containment of Indoor Remediation Activities



Noise (Short Term Direct Avoidable Negative Impacts)--

During the implementation of the remediation activity, noise will arise mainly from the equipment used for dry buildings cleanings (e.g., High Efficiency Particulate Air (HEPA)). Table 10 shows the average noise level, in decibels, at a distance of 20 m between an observer and the source of noise.

Table 10: Average Noise Levels from Construction Equipment (in decibels) at a Distance of 20 m between Observer and Machinery

Equipment Type	Average Noise Level (decibels) at 20 m
Loader	78
Vibration Roller	74
Sprayer	75
Generator	86
Impact Drill	75
Concreter Mixer	79
Pneumatic Hammer	86

The remediation activity will result in an increase in the traffic load, especially heavy traffic such as buses and trucks used for the transportation of workers and material to and from the site, and transportation of the generated waste to the disposal sites. This will lead to an increasing neighborhood noise levels.

Mitigation Measures--

When construction equipment is used, such as during the site land grading, workers at distances less than 5 m from the construction equipment must wear ear protective equipment to minimize possible impacts from noise.

Equipment and transportation vehicles are periodically maintained to minimize noise levels to design limits. Monitoring will ensure that the noise levels are kept below legal limits set forth in Law 4/1994.

Residual Impact--

Acceptable under normal operation conditions, however, regular periodic monitoring will be done to ensure compliance to standards.

Soil (Short Term Direct Avoidable Negative Impacts)--

The impacts on the soil within the site boundary from soil capping will have a positive, rather than a negative impact, on the soil quality that was treated. However, dust resulting from covering of soil may have negative impacts on the soil quality out of the site boundaries if it is not prevented from forming or not properly contained.

Moreover, the soil quality along the transportation routes to and from the contaminated site to the disposal sites could be negatively impacted if the transported material or waste was not properly contained or if contaminated emissions were wind blown and deposited on soil. This impact could be significant if the soil on which the contaminated dust deposit is of high economic value (e.g. agricultural land).

Mitigation Measures--

All liquid and solid waste as well as fuel and chemicals used, during site remediation will be properly stored above ground and contained to avoid spills and leaks to the soil. The storage tanks will be frequently inspected for leaks and damage.

Residual Impacts--

Acceptable if mitigation measures are applied and site management practices are applied.

Public Health and Safety (Short Term Direct/Indirect Avoidable Negative Impacts)--

Remediation activities especially those done outside the contamination chambers such as concrete placement could disturb the neighboring residents and impact their health through inhalation of released emissions or dust or through oral intake if the contaminant reaches the food chain. Public health and safety could be jeopardized by the risk of accidents due to increased traffic in the remediation area and along the transportation routes to disposal sites. Moreover, since the medical center is currently offering its services to the residents, it cannot continue its operation during clean-up activities. This could have a direct impact on the health of the current users of the center.

Mitigation Measures--

The project is located in an industrial area where the residents live with noise and dust that may not occur in other residential areas. In addition, air pollution controls will be provided as mentioned earlier. Containment of remediation activities and the establishment of decontamination chambers during remediation and clean-up activities as well as dust suppression measures such as water spraying will greatly reduce the impact on neighboring communities. Proper training of drivers on defensive driving and by frequent inspection of the haul trucks will greatly reduce the risk of accidents.

As for the operation of the center, it has been agreed between the LIFE project and the Health authorities to halt the services during the remediation period. Joint meetings were held and it was decided that the services will be moved to the nearby Masjid El Rahman Hospital which is operated by the El Kablat Local Community Development Society. The cost of renting would be paid by the project, as instructed by USAID.

Residual Impacts--

Acceptable if mitigation measures are applied and site management practices are applied.

Work Place Health and Safety (Short Term Direct Avoidable Negative Impacts)--

Workers health could be affected during the remediation project through the following:

- Inhalation of heavy metal contaminated dust during building cleaning.
- Direct contact with contaminated soil, waste piles, or contaminated walls, floors, and ceilings.
- Inhalation of exhaust gases caused by transportation activities or utilized equipment.
- Accidents.

- Spill of solvents or other harmful materials.

Mitigation Measures--

The LIFE-Lead Site Engineer will have continuous presence on-site for close inspection and management of the construction activities. The contractors will apply a number of control measures including the following:

- Contractor's employees involved in any remediation activities must have received Health and Safety Training in the form provided by LIFE-Lead to the pre-qualified contractors. The Contractors must verify that the nominated Project Manager has provided Health and Safety of Hazardous Waste Operations Training to contractor employees working on the project. The contractor must, at a minimum, provide all required personal protection equipment (PPE), personal decontamination stations, personal medical monitoring, air monitoring, and required record keeping.

- The General Health and Safety Plan will be required as part of the bid submittal whereas the Site Specific Heath Safety Plans will be required after Notice of Award.

- The contractor will provide documentation and results that all medical monitoring has been conducted prior, during, and after the project; and provide records of air monitoring results.
- Engineering control (e.g., the design of the decontamination areas in which the workers will operate will ensure proper ventilation and dust collection).

- Personal Protection Equipment (PPE) will be used by the workers at all times.

- Flammable material will be stored in an isolated, shaded, and labelled area. Fire extinguishers will be provided in designated places at the site and will be regularly inspected.

An Emergency Response Plan was developed to mitigate the occupational health and safety hazards of the workplace, as presented below.

Residual Impacts--

Acceptable, if mitigation measures are applied and site management practices are applied.

Traffic (Short Term Direct Avoidable Negative Impacts)--

Heavy traffic during remediation activities will be experienced in the area around the remediated site and at the intersection with the main road parallel to the Ismailia Canal during transportation to the disposal site. This could result in traffic congestion and increase the probability of accidents. However, because the duration of remediation activities will be relatively short and the Ismailia Canal Road is already a busy road since it is an industrial area, the overall impact on traffic in the area should be minimal.

Risks of vehicle accidents from the hauling of waste from the remediated site to the disposal facilities are included in the Emergency Response Plan. The vehicular risks are addressed by measures such as proper training of drivers on defensive driving and by regular inspection and maintenance of the haul trucks.

ENVIRONMENTAL MANAGEMENT PLAN

Components

The Environmental Management Plan (EMP) consists of the following components:

- Mitigation measures to identify feasible and cost effective measures that will reduce potentially significant adverse environmental impacts to acceptable levels.
- Monitoring and validation during and after project implementation to provide information about key environmental aspects of the project, particularly the environmental impacts of the project and the effectiveness of mitigation measures.
- Emergency response plan to manage risks that might occur during the different project phases.
- Capacity development and training of the project workforce to support timely and effective implementation of environmental project components and mitigation measures.

Management Measures

Environmental management of the project started early in its life cycle with a “prevention” rather than “mitigation” approach. This proactive approach ensured that as many impacts as possible are taken into consideration in the planning phase and therefore are already mitigated.

Other impacts were mitigated by the incorporation of mitigation measures in the project design and others through the incorporation of management measures. Management principles that will be integrated in the specific management plans during the different project stages include the following.

Commissioning Phase--

The Commissioning Phase of the project is divided into Health and Safety and Training and Capacity Building as described below.

Health and Safety--

The following health and safety issues will be incorporated into the EMP:

- Assign a project Health and Safety Manager.
- Assign responsibilities within the contractor and project’s supervision team.
- Surround specific hazardous areas of the installation site with a fence to prevent unauthorized access to the site.
- Inform local residents and other users of the area of the equipment installation and construction schedule.

Training and Capacity Building--

Training for contractors concentrated on the following main topics:

- Health and safety of workers and the public.
- Remediation technologies and methods to implement differing remediation options.

Implementation Phase--

The following topics will be included in the Implementation Phase of the EMP.

Emissions Control--

The following emission control measures will be included in the Implementation Phase:

- Maintain machinery and vehicles in good working conditions to minimize fugitive emissions.

- Use dust control measures such as water spraying for dust suppression.

Noise Control--

Machinery and vehicles will be maintained in good working condition during the Implementation Phase to minimize noise levels.

Inventory Control--

A “first-in, first-out” policy will be applied to auxiliary material, such as chemicals. Chemicals will be properly labeled with their name, date of purchase, and date of expiration.

Waste Management--

Waste management is a very important consideration since contaminated demolition material will be produced. Responsibility for waste that is generated will be clearly specified and will follow the procedure listed below.

- Transport and dispose the waste produced in properly designated and approved disposal sites to minimize negative environmental and health impacts.

- Contain demolition material from the buildings and temporary construction facilities for disposal at the designated disposal location

Monitoring Plan

The monitoring program is an essential element of the environmental management scheme of the project. It provides information for periodic review and adjustment of the EMP as necessary. This ensures that environmental protection is achieved through early detection of negative environmental impacts.

Monitoring programs will be designed for the different parameters. The monitoring results will be fed into the decision making process as a trigger for the implementation of corrective actions, in order to maintain compliance with environmental laws and regulations, ensure environmental protection, and workplace safety, as well as to ensure appropriate operation of the mitigation measures and management plans. The monitoring results will be included in the environmental register of the project, as indicated by Law 4/1994.

Environmental Monitoring--

A monitoring program will be required during and after the implementation of the chosen alternative. Monitoring and analysis during the Implementation Phase will also provide important data for the validation phase of the contaminated land management process.

Within the monitoring program, instrumentation and its detection limits will be specified. Prior to commencement, the monitoring instruments will be checked and calibrated. Monitoring can be carried out by those implementing the chosen alternative or by an independent organization.

Monitoring of Air Quality--

Parameters that will be monitored in ambient air and the workplace include:

- Dust, including total suspended particles and inhalable particulate matter (PM10).
- Pb, Cd, Hg, and As particle concentrations at the medical center

Monitoring of Noise--

Operational noise will be monitored during the remediation phase. The measurements will take place at the same points identified during the baseline information collection phase.

Table 11 provides a detailed schedule for environmental analyses. The baseline data has already been collected and included in this EA. Additional data detailed in the above sections will be collected prior to and at the end of the remediation activities starting in November 2006.

Table 11: Schedule of Environmental Analyses

Media to be Analyzed	Dates for Analyses		
	Inclusion in the EA	**Prior to Remediation**	**Completion of Remediation**
Air Quality	September 2006	November 2006	Monitoring will be continuous during the remediation process using data provided by EEAA.
Noise	September 2006	November 2006	Monitoring will be continuous, if needed, during the remediation process.
Soil	Site characterization information are included in the EA for the site.		Clearance sampling will be conducted following the completion of remediation activities. February 2007

Risk Prevention and Emergency Response Plan

The Emergency Response Plan (ERP) was developed to provide the following control measures:

- Identification of potential sources of hazards that may be present during the lead remediation activities.
- Identification of the chain of events that may occur and result in environmental risk.
- Qualitative evaluation of the likelihood of the occurrence of each of these events.
- Qualitative assessment of the severity of the potential consequences.
- Ranking of the environmental risks in terms of severity.
- Recommendation of appropriate mitigation measures and emergency response procedures to properly manage the identified risks.

The ERP was developed for the remediation option which was deemed most favorable as a result of the multi-criteria analysis. It has been prepared as a guideline document to provide contractors with procedures that will allow them to identify risk situations and to respond appropriately to emergencies that may occur during project implementation. LIFE-Lead will require contractors to modify and update the plan periodically during the remediation process as needed. Table 12 provides a detailed summary of the environmental risks.

Table 12: Summary of Environmental Risks

Hazard Type	Prevention Measure	Hazard Rating	Response (Table 13)
Onsite Storage and Handling of Hazardous Materials			
Spills associated with liquids, causing impact to soil, possibility of fire erupting.	Worker's training on chemical handling and storage, provision of proper containment mechanisms.	Moderate.	SP, ME, FE
Hazards associated with human contact with chemicals.	Workers' training, strict operational procedures, containment.	Moderate to high.	SP, ME
Cleaning of the Interior Building and Building Improvements			
Accidents involving workers slipping, tripping, or falling; and resulting from the use of equipment.	Worker's training, use of PPE at all times, exercising common sense, using harness and wires when working at elevated surfaces.	Low to moderate.	ME
Transportation Accidents			
Accidents during transportation causing personal injury, spills onsite or along the road to the final disposal site(s).	Strict safety procedures for drivers, regular vehicle maintenance, appropriate containment of waste while transporting, escort service as much as practicable, especially during risky reaches.	Moderate to high (human error is an important factor that needs to be managed).	TR

Specific emergency response procedures are developed for each type of emergency situation (e.g., transport accident, fire, etc.) based on the general principles outlined in Table 13.

Table 13: Guidelines for Response Procedures

Ref.	Risk Situation	Potential Substances or Facilities Involved	Hazard	Key Elements of the Emergency Response Plan
TR	Transportation.	Transport within and near the site, and along long access roads to the Abu Zaabal (non hazardous waste) and the Alexandria Hazardous Waste Landfills.	Injury or fatality, and spill of transported materials.	Notification and containment of spills on-site or near-site as per procedures in Item SP. Medical emergencies will adopt procedures as per Item ME. For fires located along the transport route, the following will be applied: • Each truck will be equipped with a fire extinguisher that will vary depending on the material being shipped. • For small fires, dry chemical CO_2 extinguishers will be used. • For large fires, the fire area will be flooded with water from a distance. The water jet will not be projected over the spilled material. Water will not be used if the material is acidic. Vehicles will be equipped with proper fire extinguishing materials. • The truck will be removed from the fire area if possible without invoking further risk. • Water will be applied to the shipment to cool the sides exposed to flames until the container is within normal temperatures. • Workers will stay at a safe distance from the burning materials.

Ref.	Risk Situation	Potential Substances or Facilities Involved	Hazard	Key Elements of the Emergency Response Plan
SP	Spills.	Solvents and chemicals used to remove paints. Paint materials for walls.	Potential health hazard due to ingestion, inhalation, or dermal contact. Possible flammability and corrosivity depending on chemical.	Notification of emergency to the Site Engineer and the Egyptian Environmental Affairs Agency.
ME	Medical Emergencies.	On site, all activities.	Injuries to workers.	The contractor will have a specialized person (or a person of the team) on site and at all times who is trained in the disciplines of first aid, CPR, fire rescue, and evacuation. All workers will be trained in the proper response to specific injuries (e.g., not moving workers with potential spinal injuries). The injured workers will be transported to the local medical facility. The following procedure will be employed at the location of the incident: • Assess the location and severity of the situation. • Avoid taking health or safety risks by entering a dangerous or unstable area. • Restrict access to the area. • Notify the Health and Safety Manager. • Assist in extinguishing the fire and securing the area only under the direction of the Health and Safety Manager. • Contact the local fire fighting authority to start mobilizing.

Ref.	Risk Situation	Potential Substances or Facilities Involved	Hazard	Key Elements of the Emergency Response Plan
FE	Fire within project site.	Onsite, particularly chemical or fuel storage areas.	Fire with potential subsequent damage to property, injury, or explosion.	Fire fighting equipment will be maintained onsite during all site operations. Key procedures within the project site include the following: • Assess the location and severity of the situation. • Avoid taking health or safety risks by entering a dangerous or unstable area. • Address life threatening issues such as the lack of pulse, blocked air passages, or severe bleeding using basic first aid techniques. • Notify the Health and Safety manager/site manager according to established protocols. • Assist in securing the situation and transporting the victim under the direction of the Health and Safety Manager on site.

INTERAGENCY COORDINATION AND PUBLIC CONSULTATION

LIFE-Lead was initiated on August 18, 2004. The expected completion date of the project was August 17, 2006, but has been extended through a contract modification that allows additional remediation activities until March 31, 2007. The project consists of two primary activities which are subsequently divided into tasks and subtasks that further define the work to be accomplished. Activity 1 includes the technical work required to complete site remediation activities. Activity 2 provides community awareness and communications support for the technical activities and is intended to raise the awareness of the community pertaining to environmental issues and concerns from industrial facilities.

Previous studies funded by the USAID have helped understand industrial pollution in Shoubra El Kheima. Background data collection activities associated with Activity 1 started in January 2006 to provide data relative to the present status of heavy metals contamination in the study area. Meetings and coordination with governmental agencies, NGO's, community representatives, smelter owners and others were held to facilitate the sampling and site characterization phase of the project and to collect primary data for the Environmental Assessment.

A Scoping Session was held in the Shoubra El Kheima City Council on August 9, 2006 in preparation for environmental assessments. The session focused on environmental issues related to the remediation activities at the site.

Meetings with Governmental Agencies

Meetings with EEAA--

Working Group on EA/EIA--

An EA/EIA Working Group was formed to facilitate the preparation of the EA. The working group consisted of staff from LIFE-Lead as well as the EEAA and GOQ. The EEAA staff included members from the EIA, Hazardous Waste, Hazardous Substances, Regional Branch, and Industrial Departments. The Working Group meets to prepare and discuss EA/EIA project components.

Proposed Remediation Goals--

Remediation clean-up goals have not been established in Egypt. Several meetings were held with the EEAA's Environmental Quality Sector, Hazardous Waste Department, and Environmental Health Department to discuss clean-up levels and to agree upon a procedure to establish clean-up levels.

The consensus was reached that clean-up levels would be set on a site specific case based on the results of a Human Health Risk Based Analysis. In addition, the EEAA agreed to set action levels that would trigger investigation of a potentially contaminated site.

Meetings with Governorate of Qalyoubia (GOQ)--

GOQ-Shoubra El Kheima East District--

Weekly meetings were convened with General Fawzy El Shamy, Head of Shoubra El Kheima East District. Although those regular weekly meetings were for the overall coordination of project activities; issues related to the EA/EIA tasks were also on the agenda at these meetings. The administration has also facilitated visits for the EA/EIA team to the site.

Health Directorate--

GOQ-Health Department--A meeting was held on Wednesday May 24, 2006 in Shoubra El Kheima City Council with the Health Department in Qalyoubia. The purpose of the meeting was to discuss the joint activities to be implemented by LIFE-Lead and Takamol projects including the remediation alternatives to be undertaken at the medical center.

GOQ-El Kablat Medical Center--The medical center employees and administration attended a planning session held by the project on Thursday August 3, 2006. The purpose of the meeting was to inform and coordinate with the center administration the upcoming site remediation activities.

Meetings with Community Representatives and NGO's--

Local NGO's attended the weekly meetings at Shoubra El Kheima East District. A meeting was held at the Shoubra El Kheima City Council with the Local Community Health Advisory Committee on Sunday March 26, 2006 in which the EA/EIA process was discussed and explained. Results of sampling at all sites to be remediated during the extension phase were presented and next steps were communicated with the attendees.

Meetings with the Smelter Owners--

The smelter owners/representatives were invited to attend meetings with LIFE-Lead. This has been a significant factor in opening a forum with them on the different stages of the project. The process of the EA/EIA and the need for a defined future use for the sites were the primary issues discussed with the smelter owners and their representatives. An orientation session was held on Wednesday July 19, 2006 with Mr. Salah Saad (current occupant of Osama Zakaria smelter) and Tarek Amin and Atef Gad (current occupants of Khaled Saad smelter). This session was focusing on the negotiated agreements to be signed between the East District, EEAA, and smelters owners towards facilitating the remediation work of the project. In addition, owners/representatives were always involved and informed during site characterization and sampling activities undertaken by the project.

Scoping Meeting

The scoping meeting was held on August 9, 2006 in the Shoubra El Kheima City Council Main Hall. Presentations and comments at the meeting were in Arabic. Comments and statements by the participants were recorded. A scoping comments statement was provided to allow participants an opportunity to comment in writing if they were reluctant to provide verbal comments.

Ninety-nine invitations to stakeholders and individuals outside EEAA and the project team were circulated one week prior to the meeting. An announcement for the meeting was posted in the public announcements board at the Shoubra El Kheima City Council, Shoubra El Kheima East District five days before the meeting. Sixty-one participants registered at the meeting. A breakdown of the attendees is provided in the following:

- Four from the GOQ and Central Government Departments.
- Fifteen representatives from EEAA
- Five representatives of the Shoubra El Kheima East District.
- Eight representatives from the Education Directorate Agency for Educational Buildings and Schools.

- Five representatives from active local NGO's in the East District.
- Four representatives from the Youth Centers, and Cultural and Social Affairs organizations.
- Eleven representatives from the Health Directorate.
- Six representatives from universities, contractors, and consultancies.
- Three representatives from the local media and library.

In addition, two representatives from USAID, and nine members of the LIFE-Lead project team participated in the meeting.

The Head of Shoubra El Kheima City, Qalyoubia, General Mohamed Seif El Deen addressed the meeting in the opening session. Opening remarks by Eng. Ahmed Abou El-Soeud, Environmental Quality Sector, EEAA concluded the opening session.

Comments Received--

The comments session was moderated by Eng. Ahmed Abou El Seoud from EEAA. Seven participants outside the project team made statements. In addition, Dr. Fatheya Soliman, Mrs. Madiha Afifi, Dr. Heba Wafa and Eng. Dalia Nakhla from the project team, Eng. Ahmed Abou El-Seoud, EEAA, and Mr. Fawzy El Shamy, East District Head provided informational responses to comments or offered comments on behalf of EEAA and GOQ. A summary of the issues raised in these comments and to be addressed in the EA is presented below:

- Operation of the Medical Center during remediation
- Air Quality.
- Noise.
- Public Health and Safety.
- Workplace Health and Safety.
- Traffic.
- Additional Sampling of the Administration Building.

Written Statements Received--

During the meeting, participants were encouraged to provide written comments. A period of one week ending on Tuesday August 15, 2006 was announced as a deadline for submittal of written comments. One participant submitted written responses to the scoping comments statement.

APPENDIX A

SOIL SAMPLING

Exhibit 1: Location of Surface and Boreholes Samples for El Kablat Medical Center

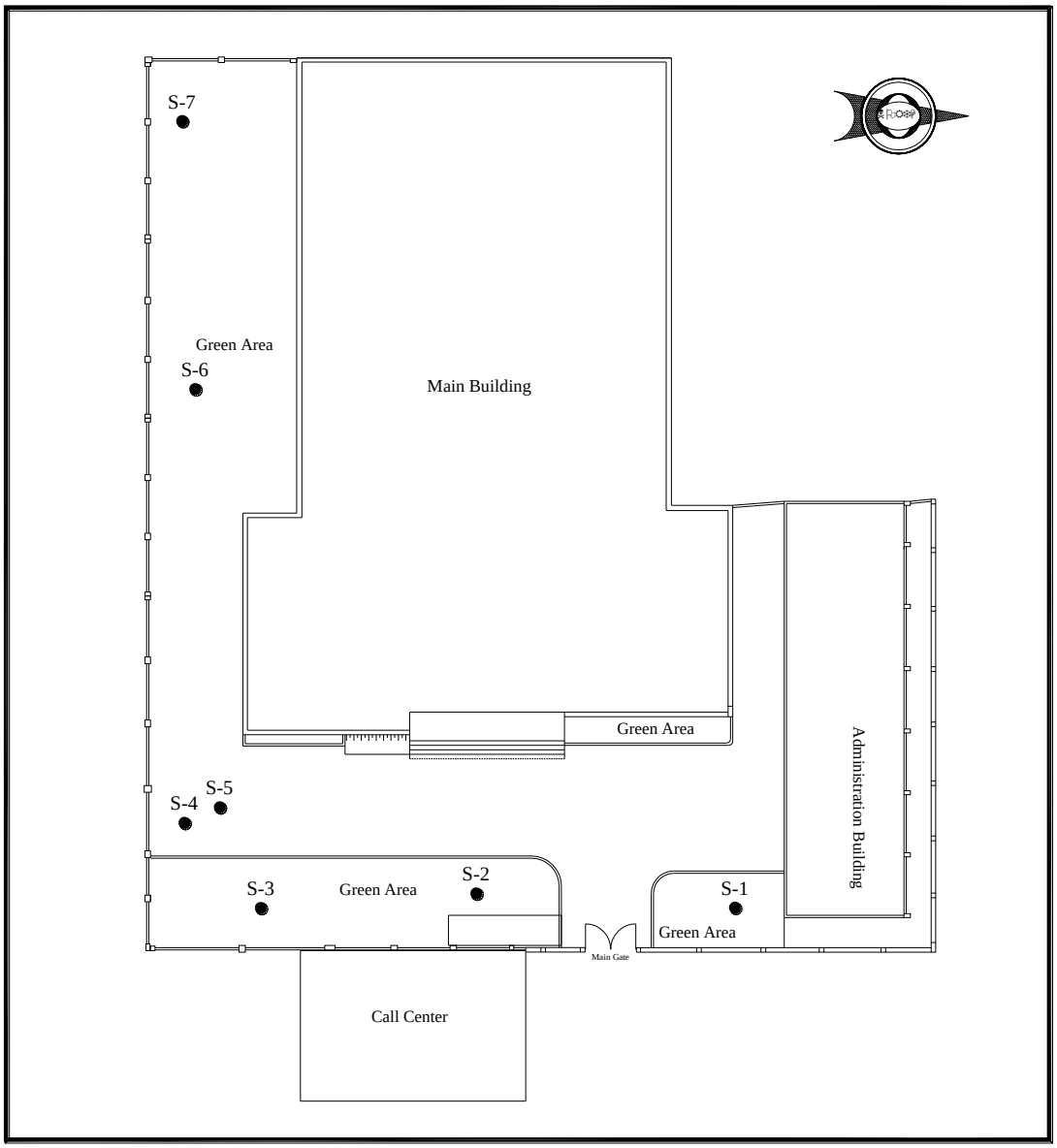
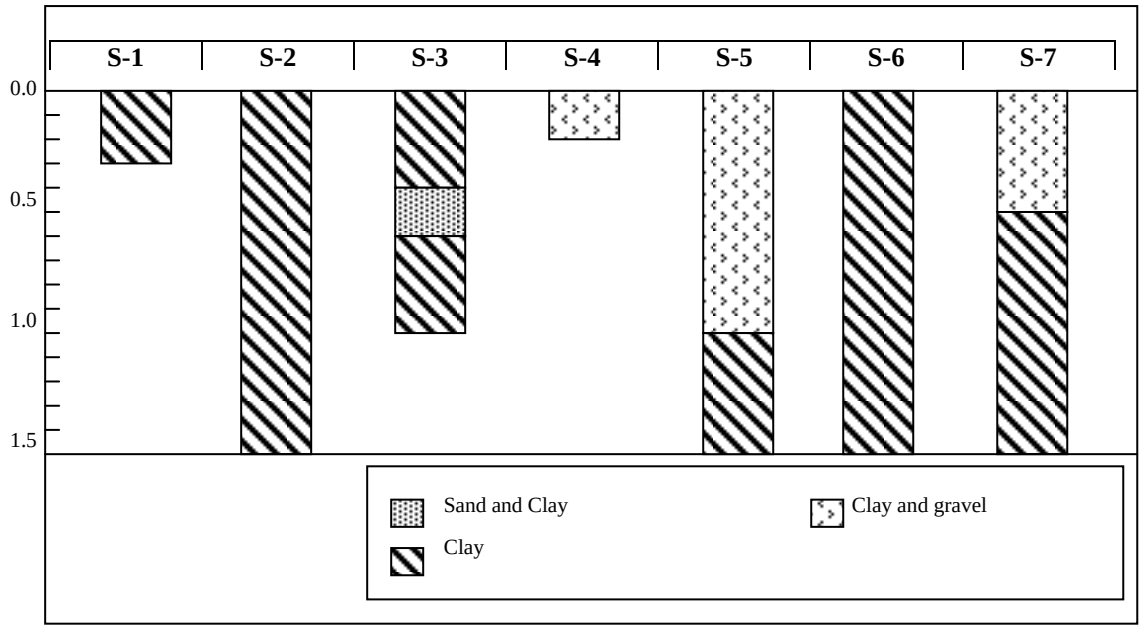


Exhibit 2: Boreholes at El Kablat Medical Center



APPENDIX B

IDENTIFICATION AND ASSESSMENT METHODOLGY

Identification and Assessment Methodology

The impact identification and assessment methodology (Figure 1) starts with identifying potential primary environmental impacts caused by the proposed remediation alternatives. This is carried out using a modified version of the Leopold matrix (Table 1). Impact identification was based on the analysis of project specifications and baseline information collected in the field, literature review and internet search of similar projects, interviews with governmental and non-governmental stakeholders as well as information received from stakeholders during the Scoping Meeting (LIFE-Lead Scoping Report, 2006).

The interactive scoping matrix was used to pinpoint areas where project activities would interact with components of the receiving environment (potential impacts). These could be both positive and negative interactions. The layout of the matrix is arranged as follows:

- The “y” axis of the matrix consists of a list of remediation activities. It also contains in a parallel column a list of aspects associated with each activity or group of activities.

- The “x” axis consists of the resources and receptors encountered in the receiving environment including its physical, biological, and socio-economic components. Resources and/or receptors of the receiving environment include the following:

    - Air quality
    - Noise
    - Soil quality
    - Surface water quality
    - Groundwater quality
    - Terrestrial life
    - Aquatic life
    - Public health and safety
    - Employment and training
    - Work place health and safety
    - Traffic
    - Utilities
    - Livelihood

Using this matrix, interaction between project activities and environmental components were identified. The identified interactions are then subjected to further analysis to examine whether they produce direct effects on the environment (primary impacts) or they would trigger sequential events that would finally affect other environmental receptors (secondary and higher order impacts).

The identified impacts were then subjected to a process of impact evaluation. The impact evaluation was based on pre-established criteria including:

- Magnitude of the impact.
- Impact duration.
- Reversibility of the effect on receptor.
- Spatial extent.
- Sensitivity or importance of the receptor.

The impact evaluation also takes into consideration the mitigation measures included in the Front End Engineering and Design (FEED) to which the project is committed. This is in addition to measures of good international practice.

A comparative analysis among the short list of remediation alternatives with respect to the identified significant impacts is carried out. Based on this analysis, the alternative(s) with the least significant impacts on the environment and which are easy to mitigate and/or mange are selected.

Significant environmental impacts of the selected alternative were subjected to further analysis for consideration of alternative mitigation measures, while insignificant impacts were not considered further. Mitigation measures were either incorporated as an integral part of the design or through management measures.

A monitoring plan was then formulated to ensure that project performance meets the standards and that the mitigation measures effectively achieve the desired level of impact minimization.

Key Sensitivities

A key input in the process of impact assessment is the identification of the sensitivities and constraints specific to the receiving environment and its vicinity. Potential impacts are usually evaluated in respect to their effects on specific receptors. Therefore, knowledge and information on the environment within which the proposed project will be located are essential.

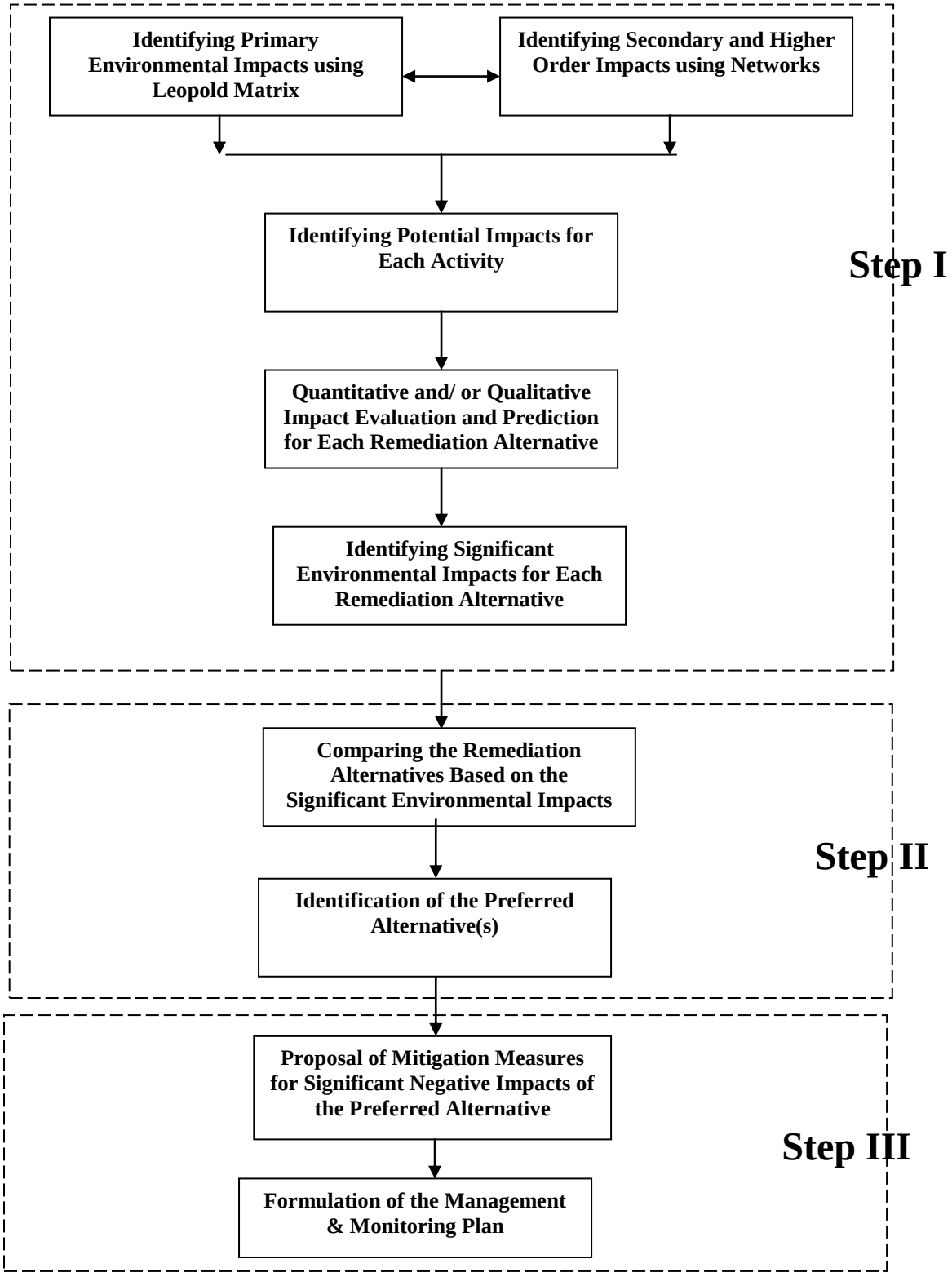
The EA team has gathered sufficient information on the project area and has analyzed their sensitivities as a crucial step in the assessment process. This information was gathered through literature reviews, interviews with officials and local residents, satellite image analysis, aerial photography analysis and field surveys.

The sensitivity or importance of the receptors depends on its nature, value, scarcity, zone of effect, etc. They can be categorized as follows:

- On site receptors such as soil, workplace health.
- Receptors surrounding the site such as ambient air, noise, public health.
- Final sinks/receptors such as surface and groundwater qualities. Impacts on these receptors are usually indirect (secondary/tertiary).

The network diagram (Figure 2) shows that dust emissions caused by the act of wind will primarily affect the ambient air quality. It could then deposit on the soil and surface water and potentially leach to the groundwater. Contaminated dust deposited on the soil could also affect public and/or worker health through direct contact. Human health could also be impacted through the inhalation of contaminated dust or the ingestion of contaminated groundwater or surface water.

Figure 1: Impact Identification, Evaluation and Mitigation Framework



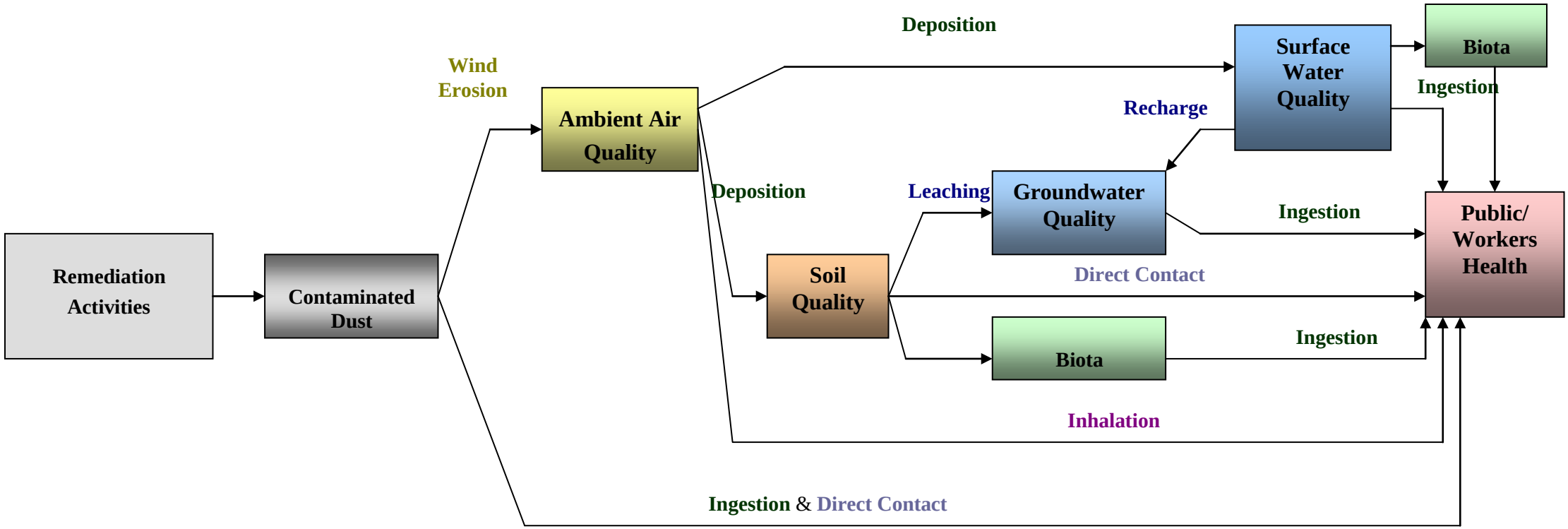


Figure 2: Ecological Pathways Leading to First and Higher Order Environmental Impacts (primarily due to lead dust)

Table 1. Summary of Potential Environmental Impacts During Remediation of El Kablat Medical Center

Activities (Sources of Impacts)	Aspects	Environmental Attributes											
		Physical Environment					Biological Environment		Socio-economic				
		Air Quality	Noise	Soil Quality	Groundwater Quality	Surface Water Quality	Terrestrial Life	Aquatic life	Public Health & Safety	Employment	Work place Health &Safety	Traffic	Utilities
Shoubra El Kheima													
Alternative 1: No action	• Pollution sources persist	-	NA	-	-	-	-	-	-	NA	NA	NA	NA
Alternatives 2,3: Dry Vacuum Cleaning with HEPA vacuum	• Dust Emissions • Emissions & Noise (vehicles & equipment) • Polluted Filters	-	-	NA	NA	NA	NA	NA	NA	+	+	NA	NA
Alternatives 2,3: Wet Cleaning and Surface Preparation Window and Furniture Washing	• Contaminated Cleaning Mops • Spills of detergents • Waste packing and packaging	NA	NA	NA	NA	NA	NA	NA	NA	+	NA	NA	NA
Alternatives 2,3: Removal and Replacement of Windows and Doors	• Waste window and doors • Noise	NA	-	NA	NA	NA	NA	NA	NA	+	-	NA	NA
Alternatives 2,3: Containment/Storage of Waste On Site	• Dust Emissions • Spills of Wastewater and solid waste (hazardous & non-hazardous)	-	NA	-	-	NA	NA	NA	-	+	-	NA	-
Alternatives 2,3: Transportation of Material, Labor and Equipment to Site	• Dust Emissions • Vehicles Emissions & Noise • Traffic Accidents	-	-	NA	NA	-	-	-	-	+	-	-	NA
Alternatives 2,3: Washing of equipment and showering in decontamination chamber	• Contaminated wastewater	NA	NA	-	-	NA	NA	NA	NA	+	+	NA	NA
Alternative 3: Interior and Exterior Wall Painting	• Waste paint & solvents • Emission of volatile vapors	NA	NA	NA	NA	NA	NA	NA	NA	+	-	NA	NA
Alternative 3: Capping exterior area with plain concrete cap	• Emissions & Noise (vehicles & equipment) • Waste concrete	-	-	+/-	NA	NA	NA	NA	NA	+	-	NA	NA
Alternative 3: Upgrading sewer and domestic water system	• Emissions & Noise (vehicles & equipment) • Waste pipes	-	-	+/-	NA	NA	NA	NA	NA	+	-	NA	+
Route from Remediated Site to Alexandria Hazardous Waste Landfill in Nasreya													
Alternatives 2,3: Transportation of Contaminated Soil, Hazardous Waste to Nasereya	• Dust Emissions • Vehicles Emissions & Noise • Traffic Accidents • Spillage of hazardous waste or contaminated soil	-	-	-	NA	-	-	-	-	+	-	-	NA
Route from Remediated Site to Abu Zabaal Landfill													
Alternatives 2,3: Transportation of Non-hazardous Waste to Abu Zabaal	• Dust Emissions • Vehicles Emissions & Noise • Traffic Accidents	-	-	-	NA	-	-	-	-	+	-	-	NA

- Negative Impact + Positive Impact NA Not Applicable

APPENDIX C

SUMMARY OF COMMENTS AND SCOPING MEETING RESPONSES

The LIFE Lead Pollution Clean-Up in Qalyoubia Scoping Session for El Kablat Medical Center and Osama Zakaria and Khaled Saad smelters was held on Wednesday August 9, 2006 at the Shoubra El Kheima City Council Hall. The session was attended by approximately 61 participants from local government, executive agencies, and community representatives in addition to the project team. The following is a summary of comments either made by the participants during the session or submitted in writing during or within one week after the session in response to a scoping response form distributed at the beginning of the session.

The session was headed by General Seif Mohamed El Deen, Mayor of Shoubra El Kheima City and General Fawzy El Shamy, Head of Shoubra El Kheima East District. It was moderated by Eng. Ahmed Abu El Soud, Head of Air Quality Unit in EEAA.

Summary of Comments Made during the Session[1]

Mohamed Ismail, Hazardous Waste Management Unit, EEAA--

Dr. Ismail asked whether the Remediation Guidelines will be one of the outputs of the LIFE Lead project. He also inquired whether the risk assessment was based solely on mathematical models or whether field samples were taken. He also commented that he felt that remediation options were selected based on cost not on technology. He also asked if noise control measures were considered.

Madiha Afifi, Training & Communication Manager, LIFE Lead Project--

Ms. Afifi assured that the remediation guidelines will be a main output of the LIFE Lead project. She added that the guidelines will include remediation from lead and other heavy metals. It is presently being prepared by the project and will be disseminated among working groups containing representatives from the concerned governmental agencies as well as remediation contractors for feedback. The guidelines should be ready by January 2007.

Ahmed Abu El Soud, Head of Air Quality Unit, EEAA--

Eng. Abu El Soud added that EEPP had prepared remediation guidelines but it was very theoretical and focused only on lead. It will therefore be updated, and modified to include other heavy metals. It will be produced in English as well as Arabic.

Heba Wafa, Health Risk Assessment Specialist, LIFE Lead Project--

Dr. Wafa said that mathematical modeling is used to assess the health risks associated with the identified levels of contamination. However, blood samples were taken before initiation of the project from a sample population in Shoubra El Kheima and will be repeated at the end of the project to monitor improvement due to remediation activities. This is done in collaboration with the Ministry of Health and EEAA.

Dalia Nakhla, EIA Specialist, Environics--

Eng. Nakhla responded regarding noise control that the project try to minimize the use of noise producing equipment by minimizing dry cleaning and using more wet cleaning.

[1] Recorded in sequence of speaking during the session

Moreover, demolishing of existing structures in the two smelters will be done manually and so no demolition equipment will be used. Anther measure that is usually taken is restricting noisy activities to the morning shift.

Amani Gamal El Din, Cognizant Technical Officer, USAID--

Eng. Gamal El Din asked about Delta Solb Company and whether it is progressing towards environmental compliance since it is one of the main existing sources of pollution in the project area. The other issue that she raised was how remediation of the medical center will take place during the operation of the center.

Fawzi El Shami , Head of Shoubra El Kheima East District--

General El Shami responded that Delta Solb Company is currently working on substituting its fuel with natural gas and this will improve the environmental conditions of the Company.

Gamal Moawad, Director of El Kablat Medical Center--

Dr. Moawad said that the medical services and activities could go on in parallel with remediation activities by providing only some services and others not at all. In addition, buildings that will not be remediated could be used as well as some of the medical staff houses.

Ahmed Abu El Soud, Head of Air Quality Unit, EEAA--

Dr. Abu El Sud wondered if this is possible since the patients using the medical center are a very vulnerable receptor and they should not be exposed to any pollution resulting from remediation activities.

Fatheya Soliman, Technical Design Manager, LIFE Lead Project--

Dr. Soliman emphasized that it will not be possible to have any activities in the medical center other than those of remediation. The working area should be completely isolated and the workers have to use the decontamination chamber before exiting the work site. The medical center should shift its activities to neighboring medical centers.

Hassan Meky Hassan, El Kablat Medical Development NGO--

Mr. Meky said that he has no problem accommodating the activities of El Kablat Medical Center until remediation works are over.

Ahmed Abu El Soud, Head of Air Quality Unit, EEAA--

He recommended that the work schedule of the remediation activities in the medical center should be shortened to minimize the time the medical center would be out of service.

Mahmoud Shawki, Industrial Unit, EEAA--

Eng. Shawki commented that natural gas usage will only reduce the SOx emissions from Delta Solb Company but will not in fact reduce the heavy metal emissions which are the cause of the current environmental problem that the project are trying to resolve. Installation of special filters and proper waste management should be considered. He also added that the remediated sites should be monitored to check if heavy metals and lead will be detected again in the soil and swap samples since this will be an indicator if the pollution sources are persistent in the project area.

Ahmed Abu El Soud, Head of Air Quality Unit, EEAA--

He agreed that the project should take samples to test with the XRF from Ahmed Shalaan School. He added that the Inspection Unit of EEAA should monitor the environmental compliance of Delta Solb Company and the Hazardous Substances Department to monitor the other sources of emissions through the emission inventory project.

He added that USAID is concerned with the risk of future contamination of the remediated sites. He said that since there are no sources of lead in the area, it should not be detected in future monitoring. However, he expects that other heavy metals will be detected due to the present operation of the other smelters in the project area.

Essam Zaki, Manager of the Environment Office, Shoubra EL Kheima City--

Mr. Zaki commented that the two smelters that will be remediated (Osama Zakaria and Khaled Saad) are different in nature from those already remediated by the project (El Mahy, Seoudi and Awadallah) since they are located in a very densely populated area and are only accessible by very narrow streets. He therefore recommended not to use large or heavy equipment and vehicles in their remediation.

Fatheya Soliman, Technical Design Manager, LIFE Lead Project--

Dr. Soliman said the local environmental and engineering setting of the smelter will be taken into consideration in the process plan and design. In Osama Zakaria, a neighboring 200 m2 land will be used by the project and will eventually be remediated. In the second smelter the decontamination chamber will be minimized in size and will probably be located on the roof of the smelter.

Elham Refaat, Head of Hazardous Substances Department, EEAA--

Ḗng. Refaat said that she had just visited Delta Solb Company. She said that their environmental conditions in general and work place environment in specific are in very bad shape. Hazardous spills and leaks and contaminating the soil, pollution is everywhere and the workers are in poor health conditions and some have dermal eczema.

Ahmed Abu El Soud, Head of Air Quality Unit, EEAA--

Eng. Abu El Soud said that these polluting establishments are the responsibility of the EEAA and the Governorate and they should ensure that they are working towards compliance.

Summary of Comments Submitted in Writing (during and within one week of the session)[2]

Gamal Moawad, Director of El Kablat Medical Center--

Dr. Gamal wrote that the project should plan on planting green areas to minimize the effects of heavy metals. He was questioning why the authorities are not monitoring the SOx emitted from the vehicles that cause air pollution in the study area and suggest prevention measures. The project should adopt a plan for paving the streets around the remediated sites.

[2] Received until Tuesday August 15th 2006.

APPENDIX D

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