



**1.5 Million Natural Gas Connections Project  
in 11 Governorates**  
**Low Pressure Natural Gas Network**  
**Environmental and Social Management**  
**Plan**  
**Qalyubeya, Governorate**  
**(El Qalag and El Gabal El Asfar, Met Asem,  
 Izbet Afandena)**



**EGAS**  
 Egyptian Natural Gas Holding Company

**Executive Summary**

**March 2018**

Developed by



EcoConServ Environmental Solutions



**Petrosafe**  
 Petroleum Safety & Environmental Services Company

## 1 Introduction

The proposed project represents an integral component of the national energy strategy which aims for greater use of natural gas for domestic users at El Qalag and El Gabal El Asfar, Met Asem and Izbet Afandena in Qalyubeya governorate.

### 1.1 Environmental and Social Management Plan (ESMP)

This ESMP has been prepared based on the Terms of Reference prepared by EGAS and cleared by the World Bank; additionally the ESMP follows national and IFC requirements regarding scope and detail of assessment and procedure, and gives particular emphasis to public information and stakeholder participation. **The ESMP objectives include:**

- Describing project components at El Qalag and El Gabal El Asfar, Met Asem and Izbet Afandena villages and activities of relevance to the environmental and social impacts assessments.
- Identifying and addressing relevant national and international legal requirements and guidelines.
- Describing relevant baseline environmental and social conditions
- Assessing project alternatives if different from those presented in ESIA framework
- Assessing potential site-specific environmental and social impacts of the project
- Developing environmental & social management and monitoring plans in compliance with the relevant environmental laws
- Documenting and addressing environmental and social concerns raised by stakeholders and the Public in consultation events and activities.

**The areas and the total number of household which will be covered in this ESMP are illustrated in the following table:**

**Table 1-1: Number of Areas and Households**

Governorate	Local Distribution Companies	Areas	Households connection		
			First year 2016/2017	Second year 2017/2018	Total
Qalyubeya	Egypt Gas	Izbet Afandena	750	----	750
		Met Asem	1750	400	2150
		El Qalag and El Gabal El Asfar	14,000	6000	20,000
	Cairo Gas				
Total of Governorate		3 areas	16500	6400	22,900

**The local distribution companies responsible for project implementation are Egypt Gas and Cairo Gas**

The studied areas contain existing pressure reduction stations (PRS) and no ESMP is required for these stations.

## 2 Project Description

### 2.1 Background

Excavation and pipe laying of the distribution network, key activities of the construction phase also include installation of pipes on buildings, internal connections in households, and conversion of appliance nozzles to accommodate the switch from LPG to NG.

The city distribution network comprises the following components: The red box below denotes project activities covered by this ESMP:

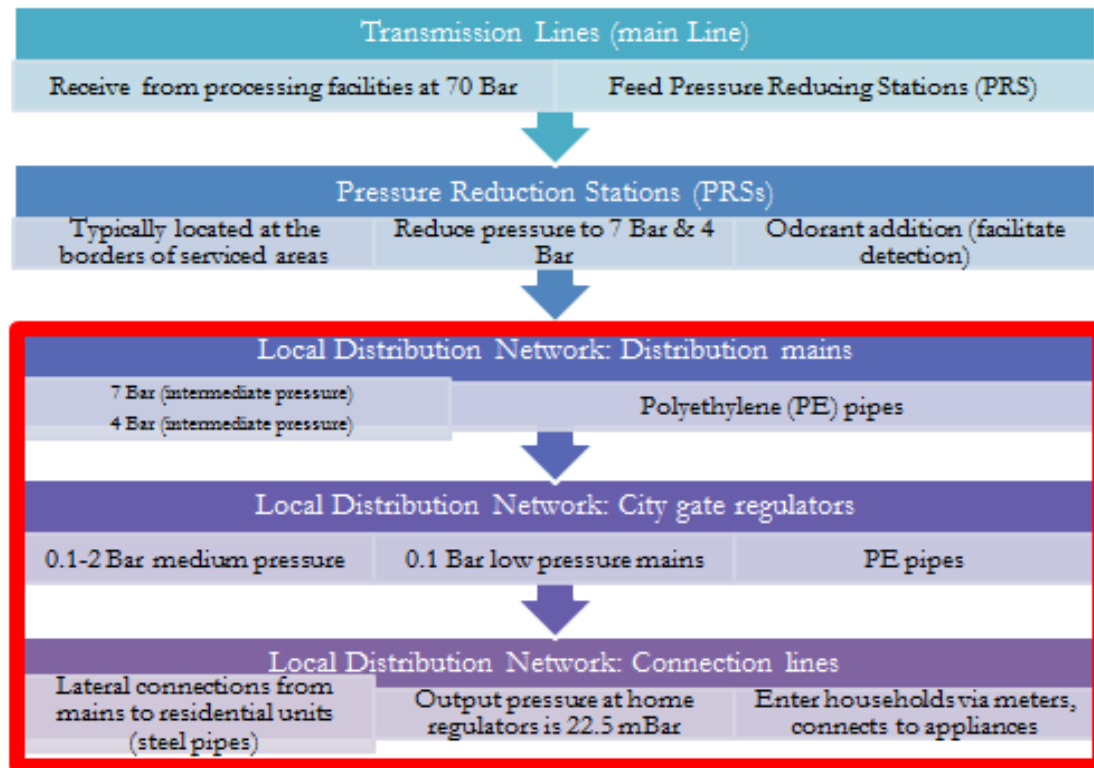


Figure 2-1: General components of the City's distribution network

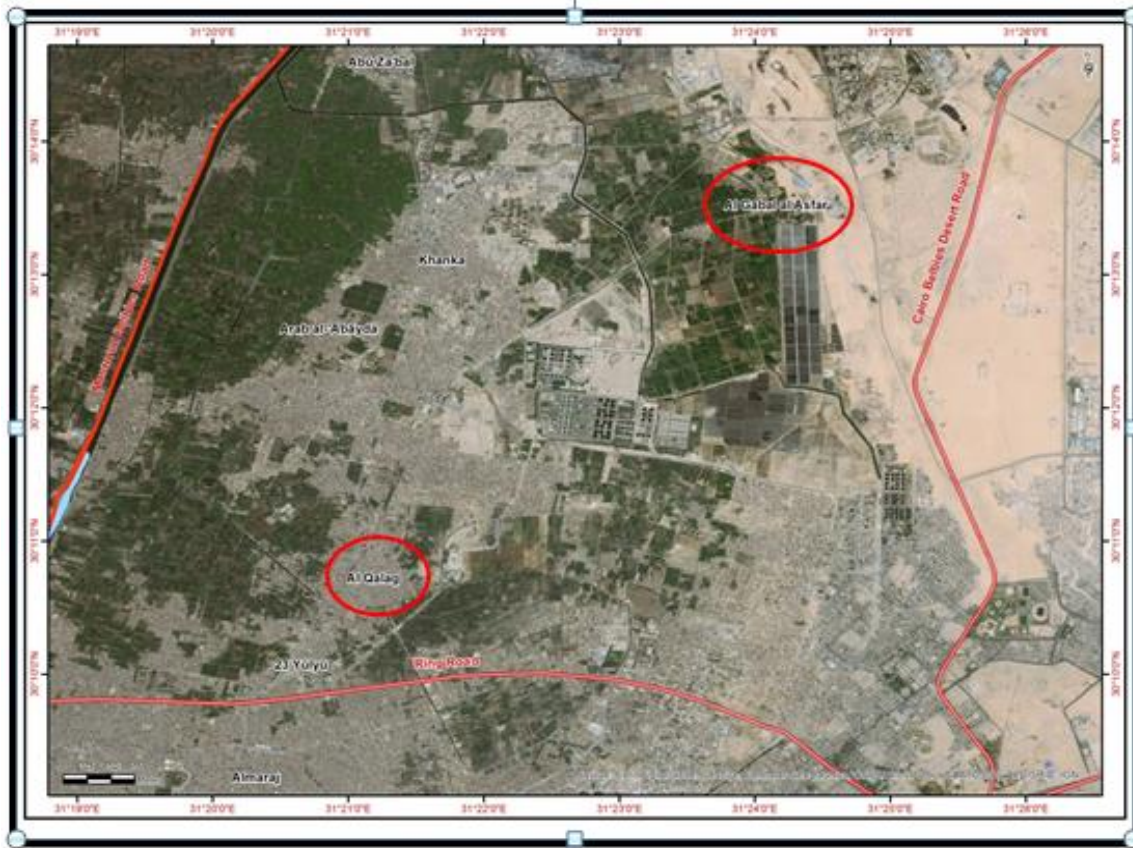
### 2.2 Project Work Packages

#### 2.2.1 Intermediate Pressure Network-Main feeding line (7 bar system)

##### 2.2.1.1 El Qalag and El Gabal El Asfar (distributed by Cairo Gas Company)

El Qalag and El Gabal El Asfar are considering as one area and it is belong to Qalubeya Governorate which is located adjacent to Khanka at the south of the Nile delta.





**Figure 2-2: El Qalag and El Gabal El Asfar location**

El Qalag and El Gabal El Asfar is supplied from the outlet of the existing Abo Zaabal pressure reduction station (PRS) affiliate to GASCO with capacity of 2000 m<sup>3</sup>/hr and 7 bar operating pressure. There is an existing pressure regulator with metering station and odorant unit affiliate to Cairo Gas is installed within Abo Zaabal station to reduce the operating pressure from 7bar to 4bar. El Qalag and El Gabal El Asfar is supplied with another feeding line branched from the existing gas network of 4bar affiliate to Nat Gas supplying El Qalag and El Gabal El Asfar with capacity of 2000 m<sup>3</sup>/hr. The branched line is 6.4 kilometers long to reach the required area.

Nat Gas has two existing gas network which are 7 bar gas network and 4 bar gas network. As per the agreement with Nat Gas, a new feeding line will be branched from the existing 7 bar gas network affiliate to Nat Gas with capacity of 5000 m<sup>3</sup>/hr.

The starting point for the new feeding line will be at the intersection between Trolley Street and ring road close to central security forces camp where the gas network (7bar) of Nat Gas is existing. A branched pipeline will be taken from this existing network. A new pressure regulator with filter and metering unit will be installed in the same area to reduce the pressure from 7bar to 4bar to link with the existing pipeline from the outlet of Abo Zabaal PRS of 4bar and 2000 m<sup>3</sup>/hr to supply El Qalag and El Gabal El Asfar.

Accordingly, El Qalag and El Gabal El Asfar are supplied with total capacity of 9000 m<sup>3</sup>/hr (4000 m<sup>3</sup>/hr existing, 5000 m<sup>3</sup>/hr future). The length and size of the pipeline of the connection from Nat Gas to El Qalag and El Gabal El Asfar

**Table 2-1: Length and size of pipes in the intermediate Pressure Network for El Qalag and El Gabal El Asfar (7-4 bar)**

Pipe diameter	90 mm	180 mm	250 mm (4bar)	250 mm (7bar)
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Pipe length	100m	2880 m	4100 m	1000 m
Laying depth	1.2 m :2 m	1.2 m :2 m	1.2 m :2 m	1.2 m :2 m

The route of the branched line from Nat Gas network is 3 km long till it reaches Abo Zaabal PRS affiliate to GASCO (2.10 km in unpaved road and 900 meters paved road at el Zaka Street) and 2.7 km from GASCO PRS to the required supplied areas. No land acquisition or resettlement activities are anticipated as the network will pass through the main urban roads/streets and side roads and far from any agriculture lands without causing any damage to private assets or lands.

### 2.2.1.2 Met Asem (distributed by Egypt Gas Company)

Met Asem belongs to Al Qalyubeya Governorate which is located adjacent to Banha at the south of the Nile delta in Egypt.



**Figure2-3: Met Asem location**

The main feeding line supplies Met Asem is coming from the outlet of the existing PRS located in Banha affiliate to Egypt Gas with capacity of 2500 m<sup>3</sup>/h and 7 bar operating pressure. This PRS is around 5 kilometers far from Met Asem. The feeding line is extended to El Zaazeea Street till matahn 23 July where the pressure regulator with odorant unit (7-4 bar) is existed. However, the construction of this extended line had been done in the previous phase.

The starting point of the new feeding line will be after crossing Zaazeea Street (in front of matahen 23 July). The pipeline will cross by Alexandria - Cairo railway and drainage path (brackish water from agriculture wastes) to reach Met Asem.

Design specifications for crossing railway will be presented in section 2.4.2 Excavation and pipe laying.

All necessary permits will be obtained from railways prior to starting work.

**Table 2-2 Length and size of pipes in the intermediate Pressure Network for Met Asem (7-4 bar)**

Pipe diameter	90 mm	180 mm(01)	180 mm(02)
Pipe length	270 m	1600 m	1380 m
Laying depth	1.2 m :2 m	1.2 m :2 m	1.2 m :2 m

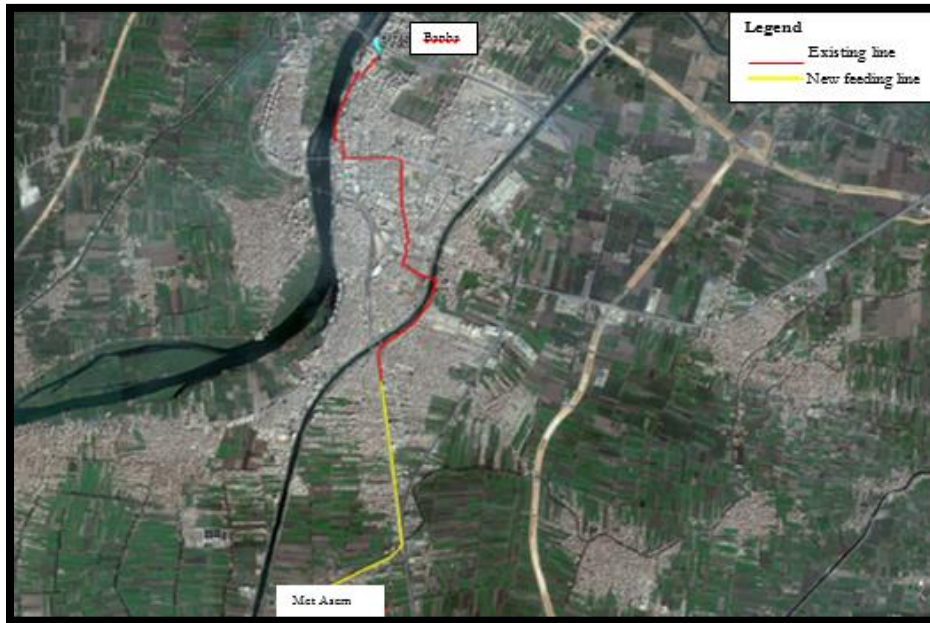


Figure2-4 Main feeding line to Met Asem

### 2.2.1.3 Izbet Afandena (distributed by Egypt Gas Company)

Izbet Afandena belongs to Al Qalyubeya Governorate which is located adjacent to Musturud, east shobra el khayma district at the south of the Nile delta in Egypt.





**Figure 2-5: Location of Azbet Afandena**

The main feeding line supplies Azbet Afandena is coming from the outlet of the Sornaga existing PRS affiliate to Egypt gas with capacity of 1000 m<sup>3</sup>/h and 7 bar operating pressure. This PRS is around 5 kilometers far from Izbet Afandena.

The gas network pipeline will extended from the feeding line coming from the PRS and a new pressure regulator with a filter meter and odorant unit will be installed on that line with inlet pressure of 7 and 4 bar outlet pressure to supply Izbet Afandena with the required gas.



**Figure 2-6: Main feeding line to Izbet Afandena**

#### Low Pressure Network - Distributions network “Regulators, PE 80 Networks”

Low pressure gas exiting city regulators is distributed via a gas distribution piping system consisting of low pressure service lines. The pressure of gas in service lines is 100 mbar. In such a system, a service regulator is not required on the individual service lines. Low pressure service lines are mainly constructed from medium density polyethylene pipes (MDPE) having a maximum operating pressure (MOP) below 100 mbar. PE80 network will be installed horizontally underground.

#### ***Regulators***

Two type of 100 mbar regulators outlet pressure were considered

- 1- Kiosk regulators
- 2- Wall mounted regulators

Kiosk regulators were preferred because:

- Easier maintenance
- Less expensive
- More safe

#### ***Installations (Steel Pipes)***

A gas distribution piping system consist of steel pipes which are connected from individual service line to vertical service pipe in a multistory dwelling which may have laterals connected at appropriate floor levels; in addition to service pipe connected to a riser and supplying gas to a meter and gas appliances on one floor of a building. Internal installation consists of pipe connecting the pressure reducing regulator/district Governor and meter Outlet (MOP 25 millibar) to appliances inside the customer’s premises.



### **Conversions**

The installation contract between the household owner and the local distribution company includes the cost of converting 2 appliances (stove and water heater). Conversion involves drilling injector nozzles to become 1.25 to 1.5 times larger in diameter. Conversion works are practiced at the client's household. Typical drill bit sizes used for conversions are either 35 or 70mm.

Conversion works also involve flue gas outlet/stack installation for bathroom heaters. The stack must lead to external/ambient atmosphere outside the HH. In order to allow the installation of the conversion of the heater and installation of the stack, the bathroom volume must exceed 5.6 cubic meters. Installation of the stack may require scaffolding and breaking of the wall or ceiling.

## **3 Legislative and Regulatory Framework**

### **3.1 Applicable Environmental and Social Legislation in Egypt**

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- \_ Law 217/1980 for Natural Gas
- \_ Law 4 for Year 1994 for the environmental protection , amended by Law 9/2009 and law 105 for the year 2015
  - Executive Regulation(ER) No 338 for Year 1995 and the amended regulation No 1741 for Year 2005, amended with ministerial decree No 1095/2011, ministerial decree No 710/2012, ministerial decree No 964/2015, and ministerial decree No 26/2016
- \_ Law 38/1967 for General Cleanliness
- \_ Law 93/1962 for Wastewater
- \_ Law 117/1983 for Protection of Antiquities
- \_ Traffic planning and diversions
  - o Traffic Law 66/1973, amended by Law 121/2008 traffic planning during
  - o Law 140/1956 on the utilization and blockage of public roads
  - o Law 84/1968 concerning public roads
- \_ Work environment and operational health and safety
  - o Articles 43 – 45 of Law 4/1994, air quality, noise, heat stress, and worker protection
  - o Law 12/2003 on Labor and Workforce Safety

### **3.2 World Bank Safeguard Policies**

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Three policies are triggered for the project as a whole: Environmental Assessment (OP/BP 4.01), Physical Cultural Resources (OP/BP 4.11), and Involuntary Resettlement (OP/BP 4.12). However, OP/BP 4.12 will not be applicable to the land obtained in Izbet Afandena, Met Asem ,Al-Qalag and El-Gabal El-Asfar as the gas network will be established in the main urban streets and local roads without affecting any private assets. No pipelines will cross agriculture land in Izbet Afandena, Met Asem, Al-Qalag and El-Gabal El-Asfar, accordingly no land acquisition or resettlement activities are anticipated. Particularly, as the network will pass through the main urban streets/roads and side roads without causing any damage to private assets or lands. In addition, it is not envisaged that the project will result in any physical or economic dislocation of people for the construction of low-pressure pipelines in the project areas. The pipelines network will not cross agricultural land in the project areas and accordingly no compensation will be applied.

#### **3.2.1 World Bank Group General Environmental, Health, and Safety Guidelines, WBG Environmental, Health and Safety Guidelines & IFC Guidelines for Gas Distribution Systems**

The General EHS Guidelines are designed to be implemented together with the relevant industry Sector EHS Guidelines. Gas distribution system – HSE Guideline (provided in Annex 2 from the report) are applicable to the project.

### **3.3 International Finance Corporation (IFC) EHS Guidelines**

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The IFC Environmental Health and Safety (EHS) Guidelines describes pollution prevention and abatement measures and emission levels that are normally acceptable to the Bank. However, it is taking into account borrower country legislation and local conditions.

In 2007, IFC Environmental, Health, and Safety (EHS) Guidelines were released which replace World Bank Guidelines previously published in Part III of the Pollution Prevention and Abatement Handbook.

The IFC EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). When one or more members of the World Bank Group are involved in a project, these EHS Guidelines are applied as required by their respective policies and standards (please see Annex 5)

### **3.4 Permits Required**

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- Railway Authority permit for crossing railways
- Constructions permit to be obtained from the Local Governmental Unit.
- Road and Bridges Directorate permission for digging of main roads in accordance to 84 of year 1968 pertaining to the public roads
- Environmental permit: according to Egyptian Law for the Environment, Law 4/1994 amended by Law 9/2009. EEAA approval on ESIA is considered the environmental permit.
- Permission from the High Council of Antiquities in accordance to Law No 117 of year 1983 and its amendment No 12 of year 1991.

The obtainable permits will be presented in the progress report.

## 4 Environmental and Social Baseline

El Qalag, El gabal El Asfar, Met asem and Izbet Afandena belongs to Al Qalyubeya Governorate.

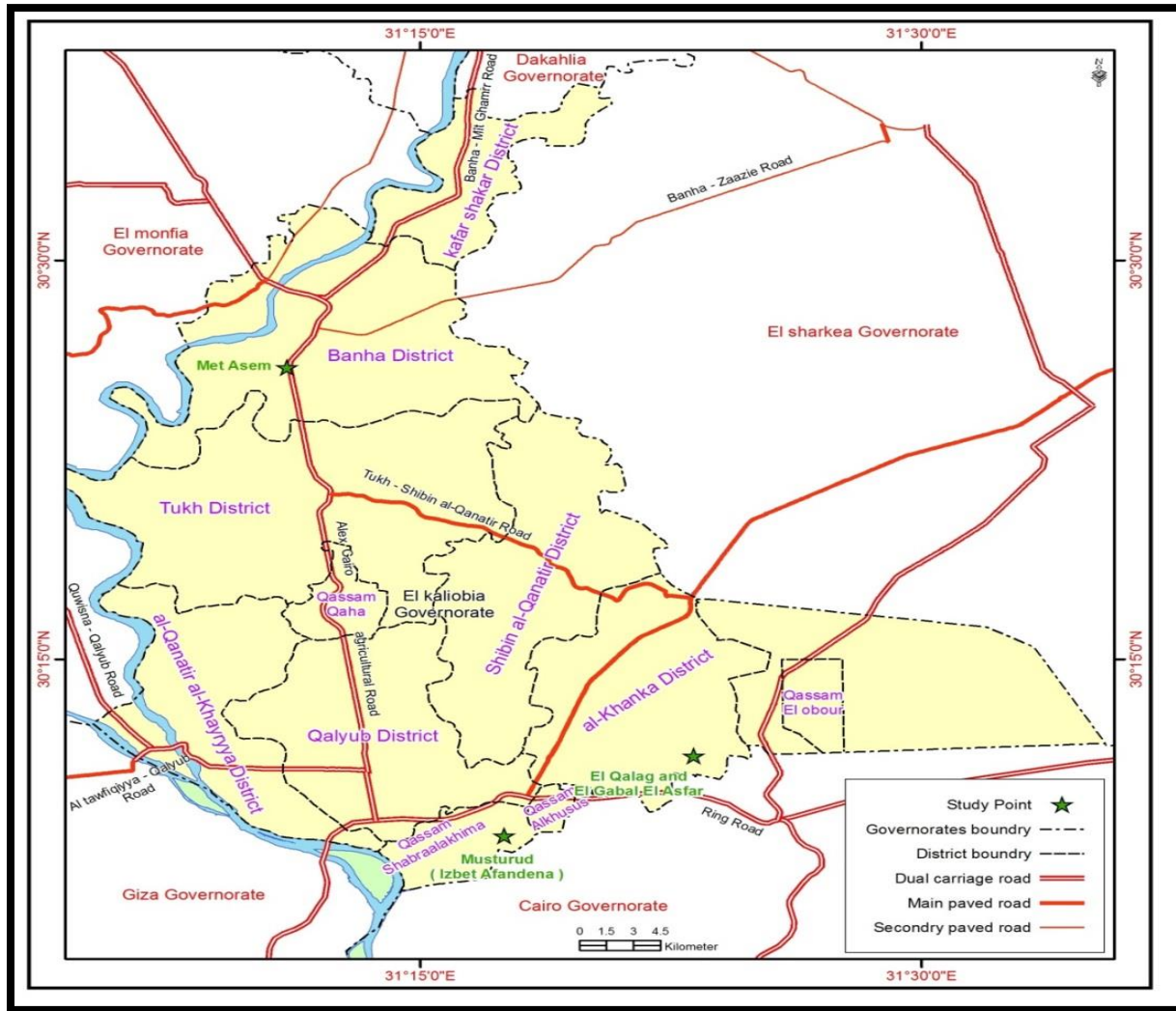


Figure4-1 Distribution of cities in Qalyubeya governorate

### 4.1 Environmental Baseline

#### 4.1.1 Climate

The mean monthly values for temperature are more or less in the same range all over the studied areas as they all are located within the same governorate which reflects regional identity. The maximum values of temperature are generally recorded from April to August (27-28 °C) and the minimum from December to February (12-13°C). (Source: [www.weatherbase.com](http://www.weatherbase.com))

#### 4.1.2 Site Specific Ambient Air Quality

The selection of the active air measurement location is based on the nature of the surrounding activities, the location of the nearest sensitive receptors with respect to the project plots, prevailing wind direction, site topography and the future layout of the proposed project components. Moreover, the selection is based on the guidelines stated in the American Society for Testing Materials (ASTM) reference method.

The concentrations of measured air pollutants in the studied areas are below national and WB guidelines. All the measurements for the gaseous pollutants are complying with the maximum allowable limits according to law 4/1994 for Environment protection and its amendments by law No.9/2009 and the executive regulation issued in 1995 and



its amendments no. 710 in 2012 and 964 in April 2015". Accordingly, the ambient air quality in the project areas is one of the tolerable areas in Egypt in terms of ambient air quality which can be attributed to the absence of any major industrial sources

#### **4.1.3 Site specific noise measurements**

One hour average results for 8 hours continuous measurements were conducted for noise level measurements in the same location of the ambient air quality measurements.

##### **4.1.3.1 Results of noise measurements**

The noise measurements in the studied areas are below national and WB guidelines. They are complying with the maximum allowable limits according to law 4/1994 for Environment protection and its amendments by law No.9/2009 and the executive regulation issued in 1995 and its amendments no. 710 in 2012 and 964 in April 2015

#### **4.1.4 Water resources**

##### **4.1.4.1 Groundwater**

Groundwater is unavailable in the 3 studied areas.

##### **4.1.4.2 Surface water**

There are no canals or drainages in the surroundings of Al-Qalag, El-Gabal El-Asfar and Izbet Afandena. The areas are mainly urban with scarce trees and palms. However, at the entrance of Met Asem, There is a drainage path (brackish water from agriculture wastes). It will be crossed by the main feeding gas pipelines.

#### **4.1.5 Terrestrial Biological Environment**

The projected work is planned along existing roads; no pipelines will be passing through any of the natural habitats. The gas route will be located in mixed agricultural urban area.

The proposed gas route and the connections of pipelines to households are planned in areas where flora and fauna of significance do not occur. The project area is eventually free from any endangered or vulnerable species.

#### **4.1.6 Waste Management**

The responsibility of service planning, delivery and monitoring in Al Qalyubeya Governorate is delegated to Cleansing Agencies. In most cases, the proportion of waste collected in the capital cities of the selected Governorates exceed 70 - 80%, however, in other cities at the Marakez, the figure is likely to be lower; - Few collection bins existed in the districts of AL-Qalyubeya Governorate.

Municipal Solid Waste (MSW) collection points, used as open transfer systems, existed in residential areas in the capital cities of Al Qalyubeya Governorate.

The responsibility of waste collection in the project areas in El Qalag falls under private company. They provide door to door waste collection. They also provide a kind of special waste collection contracts with entities and organization in El Qalag and el Gabal El Asfar.

With regards to Izbet Afandena and Meit Asem, the local Governmental Units are responsible for collecting wastes. They transfer wastes to open landfills.

#### **4.1.7 Potential Sensitive areas**

El Qalag, El gabal El asfar is the only area which sensitive receptors have been identified along the route of the main feed line and network extension which are the medical Unit, The Intellectual Education Foundation in Al-Marj, and El Qalag complex new School. Met asem and Izbet Afandena gas network extension will be in the residential areas where the safety procedures of construction can be followed in these areas.

The followed instructions during construction:

- Construction is during night, not at peak time in populated areas with following the proper implementation of the night lighting mode,
- Precaution signs, and
- Security personnel.

#### 4.1.8 Road distribution network and traffic

According to the frequent site visits and the field observations, there are main and sub streets within the project areas. The width of the main streets within the three villages varies between 6-10 meters, while the width of the sub streets varies between 3-5 meters.

Most of streets in the three villages are dusty and compacted especially the substreets. Some of the main streets are paved with asphalt.

Following are examples of some main and sub streets within the three villages:

- El Qalag, El Gabal El Asfar villages include: El-Gomhoreya Street, El-Mahata Street, El-Madena El-Menwara Street, Khaled Ebn El-Waled Street, Omar Ebn El-Khatab Street, and Abu Bakr El-Sedik Street.
- Met Asem village includes: Teraat El-Felfela Street, Muhammad Gomaa Street, SediYehia Mosque, and El-Shaheed Muhammad Zakriya Salim.
- Izbet Afandena village includes: El-Masged street, El-Forn street, El-Shekh Ahmed street, and Sabry Hussien street

## 4.2 Socio-Economic Baseline

Depending on a combination of both primary data collected from the field and secondary resources reviewed including statistical data, this section will highlight the following: administrative division, urbanization trends, demographic characteristics, human development profile, access to basic services, roads and transport, poverty index, Income and expenditure, Fuel currently used in households, Problems faced with the current household fuel, Perception towards the project, gender dimension of the current type of fuel, and physical cultural resources.

The project will be implemented in three villages of Qalyubeya governorate. The following table illustrates the project areas.

Table 4-1: Project Areas

Governorate	district ( <i>Markaz</i> )	Village
Qalyubeya	El-Khanka	El Qalag, El Gabal El Asfar
	Banha	Met Asem
	Haii Sharaa Shoubra El-Khema	Izbet Afandena <sup>1</sup>

#### 4.2.1 Administrative affiliation

According to Egyptian general survey authority, the areas of the three villages will be as the following:

Project area	Total area
El Qalag, El Gabal El Asfar	22513 km <sup>2</sup>
Met Asem	2922 km <sup>2</sup>
Musturud <sup>2</sup>	7122 km <sup>2</sup>

Source: Egyptian general survey authority <http://esa.gov.eg/>

**The administrative affiliation of the three villages is as the following:**

El Qalag, El Gabal El Asfar villages are administratively affiliated to El-Khanka district (*Markaz*).

Met Asem village is administratively affiliated to Banha district (*Markaz*).

While Izbet Afanden avillage is affiliated to Haii Sharaa Shoubra El-Khema district (*Markaz*).

The following figures illustrate the administrative affiliation of the three villages:

<sup>1</sup>The information on the level of Izbet Afandena village is very limited (Actually the limited information is justified by the small area of the village. In addition, it is located within Mostorod village in which the information is available), therefore the study team will employ data on the level of MostorAod village.

<sup>2</sup>Izbet Afandena village represents one third of Mostorod village

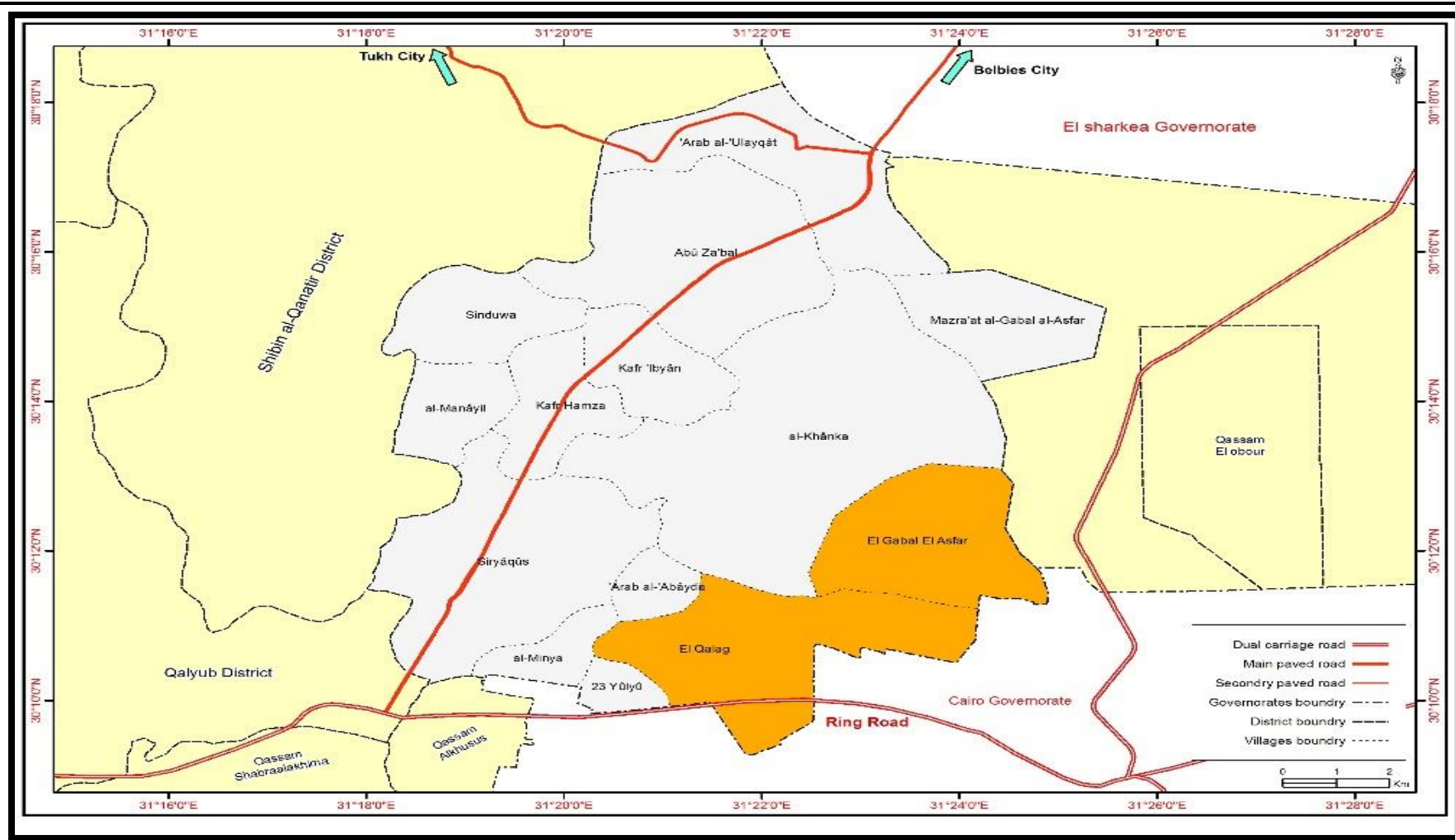


Figure 4-2 El Qalag, El Gabal El Asfar villages



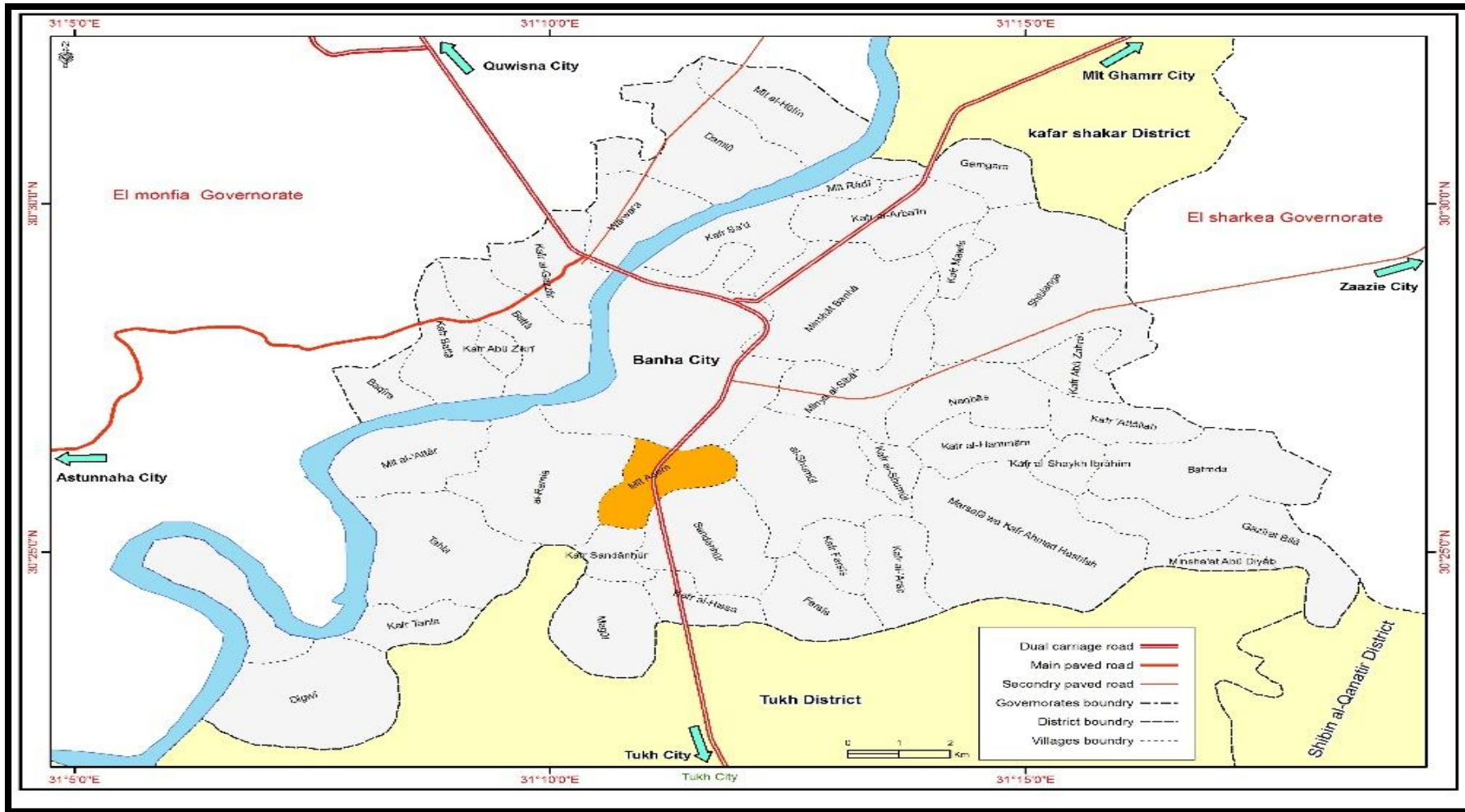


Figure 4-3: map of Met Asem village

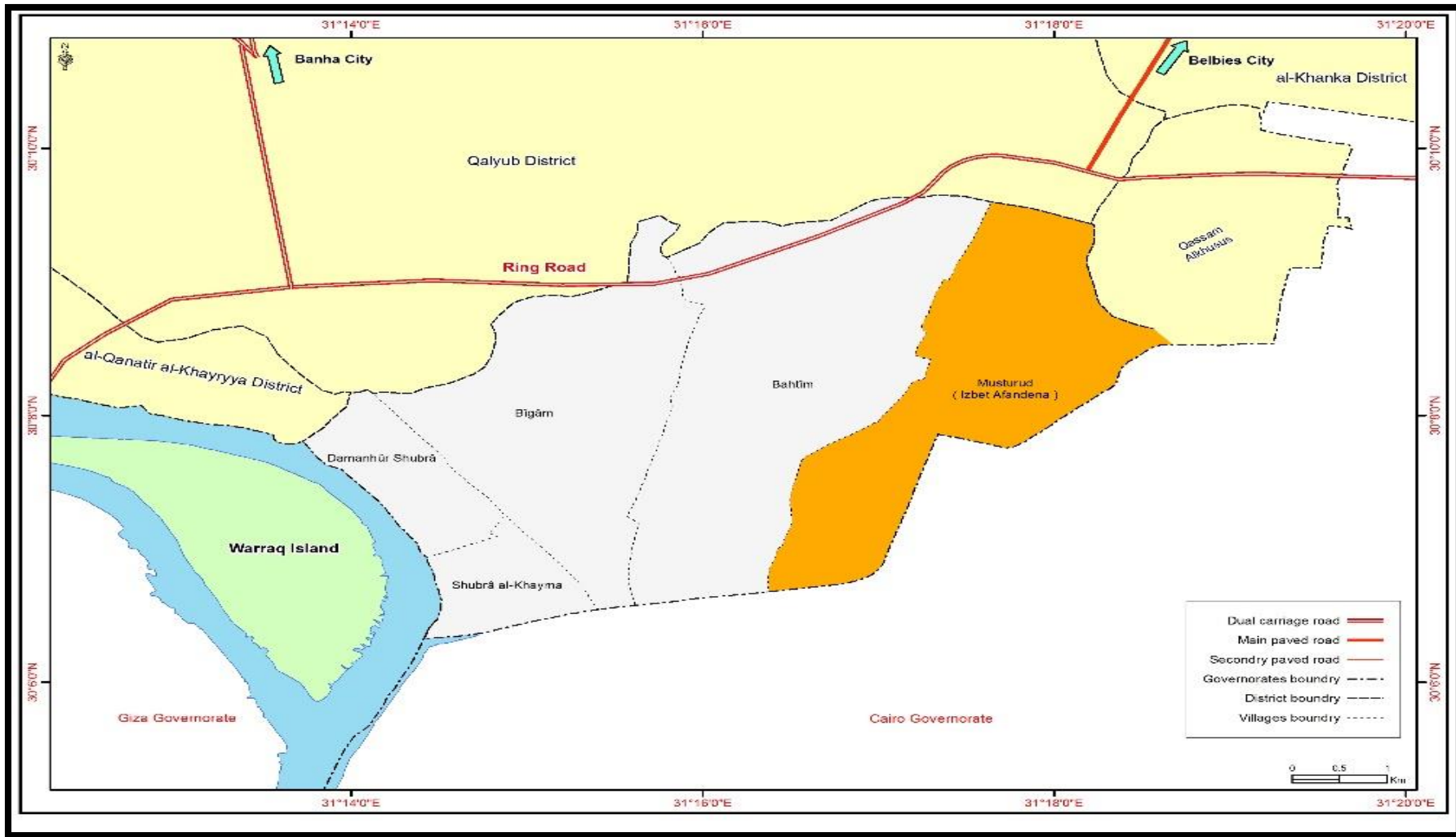


Figure 4-4: map of Izbet Afandena village

#### 4.2.2 Demographic characteristics

##### *Total population*

Total population, number of households, and the potential clients within the three villages are presented in the table below:

**Table 4-2: Distribution of population in project areas**

Village	Population			Households	Potential clients
	Male	Female	Total		
El Qalag, El Gabal El Asfar	89898	84949	174847	42855	20000
Met Asem	6009	5773	11782	2931	2150
Musturud	69040	64311	133351	33008	750

Source: Qalyubeya CAPMAS 2014

The current phase in the scope of this study will cover almost 47% of the households in El Qalag, El Gabal El Asfar villages, 73.35% of the households in Met Asem village, and nearly 75% of the households in Izbet Afandena village which represented one third of Musturud village. That is an indication that the NG project will cover most of the households within the three villages.

##### *- Rate of natural increase*

The birth rate in Qalyubeya is 27.30 births per 1000 persons. The adult mortality rate is 5 per 1000 people. That gives a natural growth rate which of 22.30 per thousand persons in Qalyubeya. The IDSC 2012 Description of the Egyptian Governorate reported that the neonatal mortality rate is 4.80 per 1000, while infant mortality is 14.4 per thousand live births. With regards to the children below five years of age, the mortality rate is 12.10 per thousand live biLiving Conditions

#### 4.2.3 Household size

The average household size in Qalyubeya governorate is about 3.97 persons. The following table illustrates the average household size in the project areas.

**Table 4-3: Average family size**

Village	Total population	No. of households	Household size
El Qalag, El Gabal El Asfar	174847	42855	4.08
Met Asem	11782	2931	4.02
Musturud	133351	33008	4.04

Source: Qalyubeya CAPMAS 2014

#### 4.2.4 Access to basic services

Access to basic services, water supply, sanitation and electricity is one of the main pillars that determine the economic well-being of the community.

According to the frequent site visits to the project areas and the focus group discussions, the three villages are access to basic services, such as; electricity, sanitation, and potable water. Thus, it will be possible to install the NG to the three villages.

The following table contains the percentage of individuals who have access to basic services in the project areas.



**Table 4-4: percentage of individuals’ access to basic services in the project areas**

Village	% of individuals having public water network	% of individuals using electricity for lighting	% of individuals having public sanitation network
El Qalag, El Gabal El Asfar	99%	99%	91% (governmental and civil sanitation)
Met Asem	100%	100%	85. %
Musturud	99%	99%	95%

Source: CAPMAS Poverty Mapping data 2013

#### 4.2.5 Human development profile

Educational and work status, poverty index, income and expenditure should be highlighted in order to determine the current socioeconomic conditions of the target areas (El Qalag, El Gabal El Asfar – Met Asem – Musturud)

##### 4.2.5.1 Education

Education is perceived as the first shell that can help population to withstand poverty. The review of secondary data, and the focus group discussions showed that the intermediate education is prevalent among the three villages. They also revealed that, the schools are available among the three villages, excluding Izbet Afandena, the schools are located in Musturud village and Haii sharia shoubra El-Khema district (*Markez*).

**Table 4-5: Distribution of the project areas’ population by educational status and sex**

Village	The percentage of those having basic education (10 years+)	The percentage of those having basic education (10 years+) among females	The percentage of those having university education	The percentage of those having university education among females	Illiteracy rate	Illiteracy rate among females
El Qalag, El Gabal El Asfar	21.5%	19%	10%	8%	29%	35%
Met Asem	15%	11%	13%	11%	25%	33%
Musturud	16%	14%	11%	9 %	28%	34%

Source: CAPMAS Poverty Mapping data 2013

##### 4.2.5.2 Unemployment and work status

With regards to the frequent site visits and the focus group discussions, the majority of population resides in El Qalag, El Gabal El Asfar villages are blacksmith, carpenters, drivers, and workers.

In Met Asem village the majority of the residents are farmers, workers, teachers, craftsmen, and employees. While in Izbet Afandena village the majority of the residents are workers, and employees. This indicates that the households can afford to pay NG installation costs.

**Table 4-6: Distribution of the project areas' population by work status and sex**

Village	% of individuals 15 years + who joined labor force	% of adult self-employed from total labor force	% of adult unpaid employee from total employed	% of adult wage workers from total employed	Unemployment rate	Unemployment rate among females
El Qalag, El Gabal El Asfar	41.6%	6.5%	0.25%	81%	9%	20%
Met Asem	46%	4%	0.36%	82%	11%	18.5%
Musturud	43%	5%	0.21%	78%	13%	24%

Source: CAPMAS Poverty Mapping data 2013

#### 4.2.6 Poverty index

According to Poverty Mapping developed by CAPMAS in 2013, the percentage of poor people in the project areas (El Qalag, El Gabal El Asfar – Met Asem – Musturud) is limited, and the majority of households in the project areas are not below the poverty line.

Based on the frequent site visits and the focus group discussions, the majority of households in the project areas expressed their willingness to be connected to the NG and that they can afford to pay NG installation costs either in cash or in installments.

**Table 4-7: Poverty indicators**

	El Qalag, El Gabal El Asfar	Met Asem	Musturud
Percentage of poor people	18%	1%	25%
Poverty gap	2.5	1.07	6.99
Gini coefficient	0.15	0.14	0.25
Per capita consumption	5321.675	5933.86	5796.68
Number of poor in 2013	14357	935	31354
Population estimations 2013	80357	108306	122573

Source: CAPMAS Poverty Mapping data 2013

## 5 Environmental and Social Impact Assessment

The environmental and social impact assessment (ESIA) is a process used to identify and evaluate the significance of potential impacts on various environmental and social receptors as a result of planned activities during (construction and operation) phases of the Project. Furthermore, the analysis of environmental and social impacts is important to detail an effective management and monitoring plan which will minimize negative impacts and maximize positives. The evaluation of the potential impacts on various receptors is based on a significance ranking process described in the following subsection.

### 5.1 Impact Assessment Methodology

To determine and assess the impacts of the project phases on environmental and social receptors, a semi-quantitative approach based on Leopold was first adopted. The impact of each activity on each receptor was assessed according to magnitude on a scale of -10 to 10, where negative values indicate a negative influence on the receptor, and importance on a scale of 0 to 10, which encompasses the probability of occurrence, frequency of the impact etc.

Importance of Impact	Impact rating	
0-25	None or irrelevant (no impact);	

26-50	<b>Minor</b> severity (minimal impact; restricted to the work site and immediate surroundings)	
51-75	<b>Medium</b> severity (larger scale impacts: local or regional; appropriate mitigation measures readily available);	
76-300	<b>Major</b> severity (Severe/long-term local/regional/global impacts; for negative impacts mitigation significant).	

## 5.2 Potential Positive Impacts

### 5.2.1 Positive impacts during construction

#### 5.2.1.1 Provide direct job opportunities to skilled and semi-skilled laborers

Many variables affect the number and type of workers needed in specific time during construction. This includes but not limited to ; the number of connections, nature of work required, and time plan.

- According to information gained from Cairo Gas & Egypt Gas, the daily average number of workers during the peak time will be about 50-55 excavation worker, two engineers and eighteen technicians.
- In order to maximize employment opportunities in the local communities it is anticipated that on the job capacity building activities will be required for currently unskilled workers. On-the-job training will also supplement opportunities for the local workforce for both temporary construction roles and for long-term operation phase positions, where these are available.

#### 5.2.1.2. Create indirect opportunities

Increased economic activity in project through the following supply chain:

- Drivers will benefit from the transportation of the workers
- Provision of food supplies, catering, and cleaning services; cafes, restaurants and grocery stores
- Implementation of works and provision of supplies related to construction from the local community.

### 5.2.2 Positive impacts during operation phase

- On a national level, reduced expenditure on imported LPG cylinders and subsidies
- As indicated in Baseline Chapter, women are key players in the current domestic activities related to handling LPG and managing its shortage. Being the party affected most from the shortfalls of the use of LPG, the NG project is expected to be of special and major benefits to women. This includes but is not limited to; clean and continuous sources of fuel that is safe and does not require any physical effort and is very reasonable in terms of consumption cost. Time saving is among the benefits to women. The use of a reliable source of energy will allow women to accomplish the domestic activities in less time and this will potentially open a space for better utilization for the saved time.
- The NG connection will help the household achieve a higher level of privacy by eliminating the need for informal LPG distributors from entering private homes.
- Constantly available and reliable fuel for home use.
- Significantly lower gas leakage and fire risk compared to LPG.
- Improved safety due to low pressure (20 mBar) compared to cylinders.
- Beneficiaries to benefit from good customer service and emergency response by qualified personnel/technicians.
- Eliminate the hardships that special groups like the physically challenged, women, and the elderly had to face in handling LPG.
- Limiting possible child labor in LPG cylinder distribution

## 5.3 Potential Negative Impacts



The results of impact assessment reflected that the following impacts were irrelevant:

- 1- During construction phase the irrelevant impacts are ground water, ecology, visual intrusion, possible effect on vulnerable structures, effect on the cultural resources, labor influx and impacts related to lands,
- 2- During operation phase, the irrelevant impacts are risks pertaining to child labor, noise, air emissions, soil, ecology and waste

**Table 5-1: Summary of Impacts**

Construction			
Receptor	Description of impact	Type of impact	Significance
<b>Air Emissions</b>	<p><i>Environmental impacts</i></p> <p>Construction of the network pipeline will include several activities which are expected to emit air pollutants to the ambient air with exceeding the permissible limits, however it will be conducted for a short periods. The following air pollutants are foreseeable for most of the construction activities:</p> <ul style="list-style-type: none"> <li>- Particulate matter and suspended solids from excavation/backfilling operations</li> <li>- Possible dispersion from stockpiles of waste or sand used for filling trenches.</li> <li>- Exhaust from excavation equipment and heavy machinery (excavators, trenchers, loaders, trucks) containing SO<sub>x</sub>, NO<sub>x</sub>, CO, VOCs, etc.</li> <li>- Traffic congestions resulting from road closure or slowing down of traffic due to excavation works.</li> <li>- Fugitive dust emissions ( PM10, PM2.5)</li> </ul> <p><b>Dust</b></p> <p>The impact of dust generation (particulate matter) will be limited to the working hours as excavation and backfilling are carried out within the same day. Excavation on dusty or rocky roads such as local roads and some urban roads are likely to generate more dust compared to asphalted streets due to the dusty status of those roads.</p> <p><b>Gaseous pollutants emissions</b></p> <p>Provided machinery used during construction is certified and maintained as per guidelines, the increase in emissions stemming from the exhaust of machinery is unlikely to increase ambient levels beyond national and WB permissible levels.</p> <p>On urban roads, traffic congestion may lead to increased exhaust emissions. Traffic management with local authority will reduce the impact of works on road congestion and associated emissions.</p> <p><i>Socioeconomic Impacts</i></p> <p>Air impacts related to excavation works will differ from one village to another according to the population, time of excavation work, the nearby of excavation place to the places crowded with people such as: schools, markets, and microbus and Tuk Tuks stations.</p>		Medium
<b>Noise</b>	<p><i>Environmental impacts</i></p> <p>Construction activities of the gas distribution network will likely increase noise levels due to excavation and heavy machinery but not exceeding the WB/IFC guidelines and Law 4/1994-9/2009-105/2015</p>	Negative impact	Minor

Construction			
Receptor	Description of impact	Type of impact	Significance
	<p>standards for noise intensity. However, the activities will be temporary and for short time.</p> <p>Traffic interruption due to excavation can cause congestions, which can result in increased ambient average noise intensity levels.</p> <p><i>Socioeconomic Impacts</i></p> <p>Noise impacts related to excavation works will differ from one village to another according to the population, time of excavation work, the nearby of excavation place to the places crowded with people such as: schools, markets, and microbus and Tuk Tuks stations.</p>		
<b>Soil</b>	<p>Degradation of soil quality, Excavation and movement of heavy machinery on unpaved surface soils during site preparation and foundation-laying could cause a physical breakdown of soil particles potentially causing destabilization of the soil structure.</p> <p>Soil disturbance at higher depths will also take place in case of applying HDD technologies in crossing the railway in Met Asem. In addition, potential soil contamination may take place as a result of spillage or leaks</p>	Negative impact	Medium
<b>Surface Water</b>	<p>Surface waters consisting of canal branches may be susceptible to pollution resulting from uncontrolled dumping of wastes generated during construction.</p>	Negative impact	Minor
<b>Waste generation</b>	<p><i>Environmental impacts</i></p> <p>Inappropriate waste disposal and improper management of construction waste materials which could lead to spillages that will cause soil contamination.</p> <p>Excavated soil and concrete/bricks waste are inert materials. Improper disposal of such wastes will only have aesthetic effects on the disposal site. These wastes should be disposed in licensed sites by the local authority, which minimizes any aesthetic effects of such waste.</p> <p>Poor handling of Hazardous and non-hazardous materials may result in poor containment of induced leaks.</p> <p><i>Socioeconomic impacts</i></p> <p>Waste contractors and recycling/disposal sites will benefit from waste disposal contracts .If waste is not managed properly, it will result in health problems to the surrounding communities.</p>	Negative impact	Medium
<b>Traffic &amp; Accessibility</b>	<p>Traffic Flow is not expected to be disturbed by the workers due to the limited expected number of workers. However, it will be affected by the excavation works of the project which does not exceed one day or two days at most. It may result in some adverse impacts:</p> <ul style="list-style-type: none"> <li>• Traffic congestion and loss of access due to the excavation and installation works will be vary from village to another according to the population, time of excavation work and the services within each village.             <ul style="list-style-type: none"> <li>○ <b>In El Qalag, El Gabal El-Asfar villages</b>, the traffic density is limited in the sub streets and some of the main streets. However, some of the main streets have high traffic density such as El-Gomhoreya Street, which is the main road for the residents. As well as, the sensitive receptors in El Qalag and El Gabal Asfar (the medical Unit, The Intellectual Education Foundation in</li> </ul> </li> </ul>	Negative impact	Medium

Construction			
Receptor	Description of impact	Type of impact	Significance
	<p>Al-Marj, and El Qalag complex new School) ,the main commercial areas and the services are found within it. Therefore, there is a high traffic density at peak times.</p> <ul style="list-style-type: none"> <li>○ Congestion and traffic disturbance for both pedestrians, cars as well as the livelihoods of taxi, Tuk Tuk and microbus drivers; such as the microbus station in <b>Met Asem</b> village.</li> <li>● Affect the drivers and vehicles in case of non-rehabilitation of streets after the project implementation</li> <li>● Reduction of Traffic Flow Mobilization of heavy machinery, asphalt breaking, excavation, placement of piping, and backfill activities are bound to limit traffic and accessibility during construction. This may entail narrowing major roads by longitudinal and/or lateral excavation or totally blocking narrow or side roads.</li> <li>● In addition to reducing the lanes/space available for traffic, impacts May also entail limiting or prohibition of parking along the length of the works.</li> <li>● Access to buildings and shop entrances may be limited or constricted in cases where excavations form obstacles for persons and cargo.</li> <li>● Negative effects on the business of neighboring shopkeepers due to excavation close to such shops. The excavation activities affect having access to the shops.</li> </ul>		
<b>Occupational health and safety</b>	<p>General risks associated with construction sites and anticipated include slips and falls; moving lorries and machinery; exposure to chemicals and other hazardous materials; exposure to electric shock and burns, exposure to high noise intensity levels.</p> <p><b>Noise impacts</b> on construction workers, technicians and engineers in direct vicinity of the excavation works and heavy machinery are considered more significant than those on residents. Traffic congestions, which could be caused by excavation works, may increase ambient average noise intensity levels.</p> <p><b>Vibrations</b></p> <p>The use of jackhammers will results in the generation of hand-arm vibrations; the typical vibration value is of 9 m/s<sup>2</sup>, which exceeds the ACGIH Threshold limit value of 5 m/s<sup>2</sup> (8 hour equivalent total value), but is below the exposure limit of 12 m/s<sup>2</sup> for a total daily duration of less than an hour. Typical drilling activities for excavation works are intermittent.</p> <p><b>Electrical</b></p> <p>Faulty equipment or exposed cables can cause risks of electrocution.</p> <p><b>Working at heights</b></p> <p>Household installations will require working at heights, which can result in falls and pose a safety hazard.</p>	Negative impact	Medium



Construction			
Receptor	Description of impact	Type of impact	Significance
<b>Risk on Infrastructure and underground utilities</b>	<p><i>Environmental Impacts</i></p> <p>Prior to excavation the LDC (Egypt gas and Cairo gas) performs exploratory drills to investigate the presence of underground utilities that may have been installed without accurate documentation and maps for its routes and depths. Therefore, the risk of damage to such utilities during excavations for natural gas pipeline installation is possible but minimal.</p> <p>The most significant potential environmental impact will arise in case a sewerage pipe is broken and wastewater potentially accumulating in the trench. There is also the possibility of overflowing to the streets causing nuisance to the surrounding environment.</p> <p><i>Socioeconomic impacts</i></p> <p>Breaking a water supply pipe may result in cutting the supply to a number of residential units, which may lead residents to use other sources of water which may be either expensive or unsafe.</p> <p>Damaging sanitary pipelines, electricity and water supply result in severe disturbance to community people. Yet such problem takes short time (no more than 4-8 days). Additionally, the contractor will be responsible of compensating for damaged pipes.</p>	Negative impact	Minor
	<p>The excavation works within the project areas will affect the community health and safety by the following means:</p> <ul style="list-style-type: none"> <li>• <b>Waste accumulation</b> illegal dumping and potential burning of construction waste, which will consist mainly of excavated soil and leftover PE and carbon steel pipes can pose health and safety threats to local community as it might become a hub for insects and unfavorable smells, which will negatively affect the surrounding communities. This is one of the potential unfavorable impacts.</li> <li>• <b>Project infrastructure</b> excavation works will result in the presence of open trenches in areas accessible to local community (e.g., in front of building and shops.) The presence of open trenches can pose risks of accidental falls and injuries. Trenches are expected to be open during the workday, with no trenches being left open after working hours.</li> </ul> <p>There was a fear that negligent workers may cause accidents harmful to themselves or to the community members, particularly children, especially close to the excavation sites.</p>		
<b>Community health and safety</b>	<p>In addition to a full array of safety and emergency precautions taken by EGAS, Egypt Gas and Cairo Gas, user safety is prioritized by stating emergency precautions on the household gas meter and by setting up emergency response centers. Impacts on user health and safety may occur through improper handling of piping and valves by the user, which can result from lack of awareness, illiteracy, or failures in piping or sealants. Low probability to affect the aesthetic appeal of the buildings, this is due to the installing of the pipelines on the walls of the building.</p> <p>Concerns of the community people regarding the pipelines safety. The project should increase the community awareness about the</p>	Negative impact	Minor

Construction			
Receptor	Description of impact	Type of impact	Significance
	emergency place and number.		
<b>Risk pertaining to child labor</b>	As mentioned in the baseline, child labor is a common practice in Egypt at large. Children below 18 are favorable labor as they receive low salaries and they are less demanding. There is a risk that this common practice is used in the project. This risk should be carefully handled in the ESMP and restrict obligations and monitoring should be applied in the contractor obligations.	Negative	Low-Medium
<b>Temporary Labor Influx</b>	Generally speaking having workers in small cities might result in unfavorable impact on the available resources, e.g. pressure on accommodation, food, health care and medication and potable source of water. Given the size of population in project sites and the availability of most of services; the limited number of workers (100 worker) will not result in any significant impact on the community resources.	Negative impact	Irrelevant
<b>Street condition deterioration</b>	<p><i>Environmental Impact</i></p> <p>Streets rehabilitation or restoration following pipeline network installation: is referred to by an Egyptian legal/institutional expression (ردالشي لأصله) that signifies the responsibility to “restore to original condition”. In the context of the project, it applies to the responsibility of the implementing company to provide the necessary resources to re-pave roads and streets to the original state after natural gas excavation and installation works. The current arrangement is that the implementing entity performs the backfilling of the excavated trenches and agrees a restoration fee with the local government unit (district) to cover the balance of the restoration and pavement cost. The local unit uses the fee to include the restoration and re-pavement of the streets in its “pavements plan”.</p> <p><i>Socioeconomic impacts</i></p> <p>Delays in street restoration may lead to varying degrees of damage to vehicles, loss of access and business, traffic congestions with associated delays and emissions, and a potentially significant public discontentment.</p>	Negative impact	Minor
		Negative impact	Minor
<b>5.3.1 Land Needed</b>	<p>Regard to the land needed, there will no land needed for the project, as there is PRS already existed in each project area.</p> <p>The implementation companies will rent site storage areas in order to store the equipment and excavation tools, in addition, As well as, the companies will coordinate with the district in order to provide portable toilets</p>	Negative impact	Minor
Operation			
<b>Integrity of natural gas piping</b>	<p><i>Environmental impacts</i></p> <p>Low-probability events may impact the integrity and safety of the NG network and components during the years of the operation phase</p> <p>Geological and geotechnical events: earthquakes may result in geotechnical instabilities that lead to network breakage or leakage in multiple locations simultaneously.</p> <p>Sabotage: pipelines and other components may be targeted for sabotage.</p> <p><i>Socioeconomic impacts</i></p>	Negative impact	Minor

Construction			
Receptor	Description of impact	Type of impact	Significance
	Adverse impact is expected in raising the fear of disruption of Gas supply		
<b>Economic disturbance</b>	<ul style="list-style-type: none"> <li>For those who will pay in installments, this may be an added financial burden on the poor families (a grant is available through AFD to help the poor people based on an eligibility criteria (section 6.6))</li> <li>There could be a minor negative economic impact on LPG cylinders distributors</li> </ul>	Negative impact	Minor

## 6 Analysis of Alternatives

### 6.1 Pipeline Installation Technology Alternatives

To install a natural gas pipeline beneath the ground level, this can either be done by digging a trench or using trenchless technologies. Trenchless technologies can be further classified as guided methods and non-guided methods. In this analysis, the most famous technology in each category will be considered; namely, horizontal directional drilling representing the guided trenchless technology, auger boring representing the non-guided trenchless technology, and the open-cut representing the trench technology. This technology will be applied only in Met Asem since the pipeline route will cross by railway.

#### 6.1.1 Trenchless Technologies

HDD has some advantages compared to auger boring and open-cut technique as follows:

- Compared to the open-cut technology, it doesn't cause interruption to traffic flow.
- Compared to the open-cut technology, it causes fewer disturbances to the surface and sub-surface soil layers.
- Compared to the auger boring technology, it can be used for larger distances and wider range of pipeline diameters.
- Compared to the auger boring technology, it is a surface-launched process which doesn't require drive pits.
- Compared to the auger boring technology, it is a guided method, and accordingly can achieve high accuracy for the pipeline path.
- Can be employed for high depths, and accordingly can avoid any breakage accidents to the existing infrastructure lines/cables.

On the other hand, HDD suffers from some disadvantages including:

- Like any other trenchless technology, and according to the geologic condition, soil collapse may take place during the installation.
- In case of having existing infrastructure lines/cables, there will be less flexibility in choosing the pipeline depth, the fact which may necessitate drilling through soil layers which may be of insufficient strength to withstand the slurry's pressure.
- Not favorable with soils containing gravels and cobbles.

### 6.1.2 Open-Cut Method

This is the traditional method for pipeline installation. It is very simple technology which just depends on excavating the soil, laying the pipeline, and backfilling. However, it is technically not possible to be used in crossings with major waterways. It can be used in crossings with major roads and railways; however, this will cause huge interruption to traffic as this will necessitate either re-routing or reducing the number of lanes. This will lead to reduction in the average speed of the vehicles on the road, and may affect the areas devoted for parking. This may also increase the probability of having car accidents, in addition to negative socio-economic impacts as a result of interrupting the flow of people and goods. Open-cut method may be the only possible recommended solution in the 3 studied areas since the pipeline route passes through urban and local roads and does not cross any main road or railway (Except in Met Asem as mentioned in section 3.1.1), and this will not negatively affect the environment, and it will be a cheap and safe option

### 6.2 Routing

The preferred route was selected on parameters like:

- Study Area Identification: Identifying major features in the study area like main roadways, residential and commercial areas to help identify constraints during the selection of the routes
- Mapping the resources: Existing linear corridors include major streets, waterways, railroads, and utility lines. Existing linear corridors are considered opportunity areas for pipeline routing because they have already been developed and therefore are generally considered a compatible land use. In addition, these linear corridors generally provide existing access for construction and maintenance requirements.

Cairo Gas proposed an alternative route to the chosen route shows the alternative route.

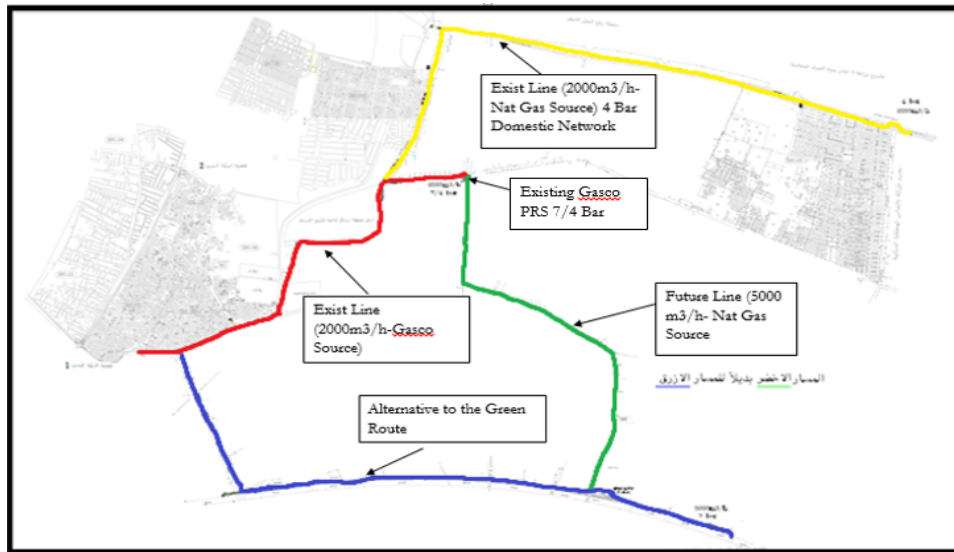


Figure 6-1: Future and Existing feeding line

### 6.3 Regulators

Two type of 100 mbar regulators outlet pressure were considered

- 1- Kiosk regulators
- 2- Wall mounted regulators

Kiosk regulators were preferred because:

- Easier maintenance
- Less expensive
- More safe



## 6.5 Working time

As stated in the traffic baseline, the traffic density in El Qalag, El Gabal El-Asfar villages, is limited in the sub streets and some of the main streets. However, some of the main streets have high traffic density such as El-Gomhoreya Street, which is the main road for the residents. As well as, the main commercial areas, the schools and the services are found within it. Therefore, there is a high traffic density at peak times. While In Met Asem and Izbet Afandena villages, the traffic density is limited all days. The five alternatives related to working time are:

- Excavation during off-peak periods
- Time limited excavation permits granted by local unit & traffic department
- Announcements + Signage indicating location/duration of works prior to commencement of work
- Traffic detours and diversion, there will be signs, which indicate the construction areas and deviations.
- Road restructuring and closing of lanes

## 6.6 Installation Costs

The average natural gas connection installation cost is about 7000 EGP. Consumers contribute a part of this cost as the balance is subsidized by the Government. The government of Egypt is negotiating with the project's financing organizations in order to secure additional subsidy to poor and marginalized groups. Currently, they offer flexible payment schemes for the installation cost. The customer can select between various payment schemes. Paying in installment is one of the proposed alternatives that might facilitate installation of the NG, especially, for poor and disadvantaged groups. No financial assistance will be provided by the NGOs for the poor to install the NG. All NGOs interviewed expressed their willingness to act as communication channels with poor but no one of them will provide financial aid to the poor. However, the AFD in cooperation with the European Union will provide the poor with a kind of grant to be able to install the NG. Eligible households are those households with average monthly electricity consumption, calculated over a period of 12 months, is in the range of 50kWh and 130 kWh/month. This initiative has been approved and is currently being applied to all project areas. The grant covers 50% of the installation costs.

# 7 Environmental and Social Management & Monitoring Plan

## 7.1 Objectives of the ESM&MP

The objective of the Environmental and Social Management and Monitoring Plan (ESMMP), is to outline actions for minimizing or eliminating potential negative impacts and for monitoring the application and performance of mitigation measures. The ESMMP identifies roles and responsibilities for different stakeholders for implementation and monitoring of mitigations. This section also presents an assessment of the institutional capacity and institutional responsibilities for implementing the ESMMP.

Wherever applicable, the ESMMP is designed to accommodate alternative context-specific mitigations and monitoring we measures.

**Overall, the following Environmental and Social measures are complementary to and do not substitute compliance to the detailed HSE guidelines, procedures, and actions adopted by EGAS and its subsidiary LDCs.**

In the following Management and monitoring measures the term Local Distribution Company (LDC) refers to the gas companies in charge of project implementation: **Egypt Gas and Cairo Gas.**

The following tables summarize the impacts and the corresponding mitigation measures within the management plan, in addition the monitoring plans proposed for implementation.

## 7.2 Management of Mitigation and Monitoring activities During CONSTRUCTION Phase

Table 07-1 Environmental and Social Management Matrix during CONSTRUCTION

Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Ambient air quality	Increased emissions of dust and gaseous pollutants	<ul style="list-style-type: none"> <li>Controlled wetting and compaction of excavation/backfilling surrounding area</li> <li>Excavated soil stockpiles and stored sand should be located in sheltered areas. Stored fine sand should be covered with appropriate covering material<sup>3</sup>, such as polyethylene or textile sheets to avoid soil dispersion.</li> <li>Transportation of excavation/construction waste should be through licensed and sufficiently equipped vehicles with a suitable special box or provided with a cover to prevent loose particles of waste and debris from escaping into the air or dropping on the road.</li> <li>Appropriate maintenance, engine tuning and servicing of construction equipment to minimize exhaust emissions</li> <li>Minimize unnecessary journeys and switching off machinery and equipment when not in use (idle mode).</li> </ul>	Minor	- LDC - contractor	LDC HSE department	Contractual clauses + Field supervision	- Contractor costs - LDC management costs
Noise	Increased noise levels	<ul style="list-style-type: none"> <li>Ear muffs, ear plugs, certified noise PPE for workers</li> <li>Avoid noisy works at night whenever possible</li> <li>Complaints receipt from local administration</li> </ul>	Minor	- LDC - Contractor	LDC HSE department	Contractual clauses + Field supervision (audits)	- Contractor costs - LDC management costs
Soil	Degradation of soil quality	<ul style="list-style-type: none"> <li>Decrease erosion by minimizing disturbances and scarification of the surface</li> <li>Best practices for soil management should be followed</li> <li>Good housekeeping to minimize spills/leaks</li> <li>Proper handling and management of wastes</li> </ul>	Minor	- LDC - Contractor	LDC HSE department	Field supervision (audits)	- Contractor costs - LDC management costs
Surface water	Uncontrolled dumping of waste in canals can result in water pollution	<ul style="list-style-type: none"> <li>Control all onsite wastewater streams and ensure appropriate collection, treatment and discharge. Prevent discharge of contaminants and wastewater streams to ground.</li> <li>Adequate management and proper handling and storage of construction materials, oils and fuel to avoid spillages</li> </ul>	Irrelevant	- LDC - Contractor	LDC HSE department	Field supervision (audits)	- Contractor costs - LDC management costs
Waste generation	Hazardous waste accumulation	<ul style="list-style-type: none"> <li>Temporary storage in areas with impervious floor</li> <li>Safe handling using PPE and safety precautions</li> <li>Empty cans of oil-based paint resulting from painting the steel connection pipes to households are to be collected and sent back to nearest LDC depots for temporary storage until disposal at a hazardous waste facility (Nasreya or UNICO in Alexandria).</li> <li>Transfer to LDC depots for temporary storage</li> <li>Disposal at licensed Alexandria hazardous waste facilities (Nasreya or UNICO). Table 7-2 shows the solid wastes generated during construction and means of disposal.</li> </ul>	Irrelevant	- LDC - Contractor - Water Authority	LDC HSE department	Field supervision and review of certified waste handling, transportation, and disposal chain of custody	Indicative cost items included in contractor bid: Chemical analysis of hazardous waste Trucks from licensed handler Pre-treatment (if needed) Disposal cost at Nasreya

<sup>3</sup> Sufficient sheets should accompany work groups during the construction phase.

Receptor	Impact	Mitigation measures	Residual Impact	Responsibility Mitigation	Responsibility Supervision	Means of supervision	Estimated Cost of mitigation / supervision
		<ul style="list-style-type: none"> <li>- In case of damaging of asbestos pipes during excavation, the Water Authority, which will carry out the repairs, will be responsible for handling the waste asbestos according to their procedures.</li> <li>- Preplanning drainage of dewatering water (subsurface water) and taking necessary permits from the Water and Wastewater Company, or irrigation authority. No land disposal should be accepted for the water</li> <li>- If dewatering is taking place from a contaminated trench, or contains hydrocarbons that could be observed or smelled, contaminated water should be collected in barrels and transported to a wastewater treatment facility.</li> <li>- Testing the subsurface water sample before selecting the appropriate disposal option.</li> <li>- To the extent practical, seek to combine leftovers or residuals of the same liquid material/waste in order to minimize the number of containers containing hazardous residuals</li> <li>- Ensure hazardous liquid material/waste containers are always sealed properly and secured from tipping/falling/damage/direct sunlight during transportation and storage</li> <li>- In case of spillage:                             <ul style="list-style-type: none"> <li>o avoid inhalation and sources of ignition</li> <li>o cover and mix with sufficient amounts of sand using PPE</li> <li>o collect contaminated sand in clearly marked secure containers/bags</li> <li>o Add sand to inventory of hazardous waste</li> </ul> </li> </ul>					Approximate cost of the above (to be revised upon project execution): 8,000-10,000 LE per ton
	<b>Non Hazardous waste accumulation</b>	<ol style="list-style-type: none"> <li>1. Allocating certain areas, in each Sector, for stockpiling waste soil and construction waste, in coordination with the local authority.</li> <li>2. No soil stockpiling is allowed on banks of waterways.</li> <li>3. Segregate waste streams to the extent possible to facilitate re-use/recycling, if applicable</li> <li>4. Maximize re-use of excavation waste as backfill for natural gas pipeline trenches.</li> <li>5. Normally asphalt waste could be disposed of with other excavation waste/aggregates in the local non-hazardous waste site.</li> <li>6. Solid waste from unlikely scenarios such as domestic site activities (such as temporary offices or rest areas) should be addressed in specific waste management plans, as appropriate</li> </ol> <p><b><u>If septic tanks are used in case of temporary toilet facilities, make contractual arrangements with a wastewater removal contractor (in coordination with the local unit) to purge and dispose of possible septic tanks in the case they are utilized in work sites</u></b></p>	Irrelevant	Excavation Contractor	LDC HSE department	Official coordination proceedings signed by representatives of utility authorities - Examination of site-specific reports and records - Field supervision	<ul style="list-style-type: none"> <li>- Contractor management costs</li> <li>- LDC management costs</li> </ul>
<b>Local traffic and accessibility</b>	<b>Traffic congestion (and associated noise/air emissions)</b>	<ul style="list-style-type: none"> <li>• Excavation during off-peak periods</li> <li>• Time limited excavation permits granted by local unit &amp; traffic department</li> <li>• Announcements + Signage indicating location/duration of works prior to commencement of work</li> <li>• Traffic detours and diversion, there will be signs, which indicate the construction areas and deviations.</li> </ul>	Minor	<ul style="list-style-type: none"> <li>- Excavation contractors</li> </ul>	<ul style="list-style-type: none"> <li>- LDC + Traffic department</li> <li>- LDC HSE</li> <li>- Local Unit Traffic department</li> </ul>	Contractor has valid conditional permit + Field supervision  Ensure inclusion in contract +	Contractor costs  LDC management costs
				<ul style="list-style-type: none"> <li>- LDC</li> </ul>			

Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
		<ul style="list-style-type: none"> <li>Road restructuring and closing of lanes</li> </ul>		Excavation contractors	LDC HSE	Field supervision	
				Contractor		Field supervision	
				Traffic Department	Traffic Department	Field supervision for detouring efficiency	Additional budget not required
						Complaints received from traffic department	
						Fluidity of traffic flow	
<b>Occupational health and safety</b>	<b>Health and Safety</b>	<ol style="list-style-type: none"> <li>The project will hire a qualified sub-contractor with the high health and safety standards. In addition, the ToR for the contractor and the ESMP will provide the provision of the health, safety and precaution of the environmental impacts and its mitigation measures to be followed during construction.</li> <li>Standard protection by placing clear project signs.</li> <li>Time management for vehicles movement; especially avoiding the peak hours</li> <li>Standard protection for the workers especially working at elevated heights or trench.</li> <li>Regular inspection to compelling worker to used their PPE</li> <li>Training and licensing industrial vehicle operators of specialized vehicles.</li> <li>The contractor also should keep attendance worksheet and laborers ID in order to verify the age of workers</li> <li>Health insurance should be applicable to the contractor workers and workers contracted by a sub-contractor</li> <li>Full compliance to EGAS and LDC HSE requirements, manuals, and actions as per detailed manuals developed by Egypt Gas</li> <li>Ensure the provision of the appropriate personal protective Equipment and other equipment needed to ensure compliance to HSE manuals</li> </ol>	Minor	- LDC Excavation Contractor	LDC-HSE department	Field supervision and review of HSE report+ Field supervision (audits)	- Contractor costs  LDC management costs
	<b>Risk pertaining to child labor</b>	<ul style="list-style-type: none"> <li>The ToR to be prepared for both contractor and subcontractors will prohibit any kind of child labor in the project</li> <li>Rigid obligations and penalties will be added to the contractor/subcontractors' ToR in order to warrantee no child labor is occurred in the project</li> <li>The ToR also will oblige the contractor/subcontractor to keep a copy of IDs of laborers in order to monitor the hired staff below 18 years old</li> </ul> <p>The contractor/subcontractor also will be obliged to maintain daily attendance sheets in order to verify the attendance of workers not include staff below 18 years old</p>	Minor	<ul style="list-style-type: none"> <li>LDC</li> <li>- Excavation Contractor /subcontractor</li> </ul>	LDC-HSE department	Field supervision and review of HSE report+ Field supervision (audits)	<ul style="list-style-type: none"> <li>Contractor costs</li> <li>- LDC management costs</li> </ul>



Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
<b>Risk on Infrastructure and underground utilities</b>	<b>Damage to underground utilities resulting in water/wastewater leaks, telecommunication and electricity interruptions</b>	<p>If maps/data are unavailable:</p> <ul style="list-style-type: none"> <li>○ Perform limited trial pits or boreholes to explore and identify underground utility lines using non-intrusive equipment</li> <li>○ In case of breaking underground utility and infrastructure line, the company supervisor stops work in the affected area, calls the Police Department and emergency department in the relevant utilities company for immediate repair of the damage, which the contractor is invoiced for.</li> </ul> <p>The mitigation measures on preventive measures and documentation:</p> <ul style="list-style-type: none"> <li>○ Preparation and analysis of accidental damage reports</li> <li>○ Arrange Restoration and re-pavement (ردالشي لأصله) with local unit</li> <li>○ Communication with local community on excavation and restoration schedules.</li> </ul> <p>Standard protocols adhering to national/local administrative requirements are to be followed:</p> <ul style="list-style-type: none"> <li>- Close and early coordination between the LDC (and the excavation contractor, if applicable), the local unit, and any other relevant authorities (in the case of public roads, the Roads and Bridges Directorate may become the counterpart to the LDC)</li> <li>- Agreement on the restoration arrangements, , fees, and payment schedules</li> <li>- Coordination with the General Utilities before starting work especially the Traffic Department, sewerage, water, telephones and electricity departments.</li> <li>- Payment of restoration fees by the LDC before works commencement</li> <li>- Documentation of the agreement and adoption by all involved parties</li> <li>- Communication with the Public and relevant authorities (such as the security and the traffic departments) regarding excavation and restoration plans</li> </ul>	Minor	<ul style="list-style-type: none"> <li>● LDC</li> <li>● Local Governmental unit</li> </ul>	LDC	Field supervision and review of complaints Coordination minutes of meeting with the local governmental unit	LDC management costs
<b>Local communities and businesses</b>	<b>Lack of accessibility to businesses due to delay in street rehabilitation</b>	<ul style="list-style-type: none"> <li>● Access to business due to digging out the streets will be mitigated through enabling alternative entrances to the business. Also special wooden bars will be used to enable the shoppers to get into the markets. Additionally, the duration of work will not exceed one working day. In case of digging main streets in the commercial areas, this can be only done during night after business closing</li> <li>● Compliance with the Environmental management plan concerning timely implementation of the construction schedule to minimize impact on local business</li> <li>● Follow up the procedure of Grievance Redress Mechanism as showed in annex 6.</li> <li>● Ensure transparent information sharing</li> <li>● The telephone numbers of the social development officer responsible for grievances should be shared with the community people</li> </ul>	Minor	<ul style="list-style-type: none"> <li>- LDC</li> <li>- contractors</li> </ul>	LDC and EGAS SDO	_ Ensure the implementation of GRM (see Annex 6) Supervision on Contractors performance	No cost
<b>Local community Health and safety</b>	<b>Threat to Safety of users and houses (due to limited level of awareness and misconceptions)</b>	<ul style="list-style-type: none"> <li>● Prepare Citizen engagement and stakeholder plan</li> <li>● Awareness raising campaigns should be tailored in cooperation with the community-based organization</li> </ul> <p>Following are some mitigation procedures to be adopted</p> <ul style="list-style-type: none"> <li>● Using caution tapes that help to keep people away of the site,</li> <li>● Informing residents and shopkeepers about the timeline of the project (street by street) in order for the residents to know when to avoid certain streets</li> </ul>	Minor	LDC	LDC and EGAS SDO	_ List of awareness activities applied _ Lists of participants _ Documentation with photos Awareness reports	LDC management costs

Receptor	Impact	Mitigation measures	Residual Impact	Responsibility Mitigation	Supervision	Means of supervision	Estimated Cost of mitigation / supervision
		<ul style="list-style-type: none"> <li>Install wooden bars or decks over trenches to allow safe crossing</li> <li>A worker should support old people to cross the digging areas, especially, on the wooden bars.</li> </ul>					
<b>Labor conditions</b>	Occupational Health and Safety	1. Total number of complaints raised by workers 2. Periodic Health report Periodic safety inspection report	LDC HSE	- Biannual	Construction site	Documentation in H&S monthly reports Complaints log	No cost
<b>Labor conditions</b>	Child labor	Attendees lists with workers IDs Complaints and accidents reports	LDC HSE	- Biannual	Construction site	Documentation in H&S monthly reports Complaints log	No cost

**Table7-2: Solid wastes during Construction**

Waste Type	Description	Treatment and Disposal
<b>Non-Hazardous</b>		
Excavated soil and excess sand	Excess sand not used in construction, and excavated soil other than broken asphalt.	Dispose to an approved non-hazardous waste disposal facility: <u>Municipal solid waste Qalyubeya</u> (to be agreed with local unit)
Metal – Scrap	Includes sheet metal, piping, tubing, wire, cable, , welding residue, valves, fittings, and vehicle and equipment parts.	
Paint Containers – Water Based	Pails used for latex paint and paint related solvent containers.	
Welding Rods	Generated from piping welding. Remaining portions of used rods or unused but opened packaged.	
Concrete and bricks waste	Excess liquid cement that not used in cementing operations, loose fragments of solidified cement , concrete debris from construction, and bricks waste	
Broken asphalt	Streets excavation will produce broken asphalt	
Domestic Waste	Food waste, paper and packaging discarded from kitchens, living quarters, bathrooms, laundries, warehouses and offices.	
<b>Hazardous</b>		
Paint Containers – Oil Based	Pails used for oil based paints, solvents and paints that contain lead, silver, chromium or other toxic heavy metals.	Dispose to an approved hazardous waste disposal facility Nasreya Hazardous Waste Treatment Centre.
Possibly damaged asbestos water pipes during excavation	Any waste material containing more than 1 wt% asbestos including piping/equipment/vehicle gaskets, pump packing brake pads, etc.	
Contaminated Soil – Refined Fuel and Oil	Contaminated soil from routine activities and minor accidental releases spills or leaks.	
Oil Containers – (Including Drums and Barrels)	Drums and barrels used for bulk oils and lubricants.	
Shop Towels (Not Laundered - Contaminated)	Shop towels, rags, Nomex, and other cloth wipers that are contaminated with a hazardous or that exhibit a hazardous characteristic and are not commercially dry cleaned or laundered	

### 7.3 Environmental and Social Monitoring Matrix during CONSTRUCTION

**Table 0-3: Environmental and Social Monitoring Matrix during CONSTRUCTION**

Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
<b>Local traffic and accessibility</b>	Reduction of traffic flow and accessibility to local community	Comments and notifications from Traffic Department	LDC HSE	Monthly during construction.	Construction site	Documentation in HSE monthly reports Complaints log	LDC management costs
<b>Ambient air quality</b>	Increased air emissions	HC, CO% and opacity	LDC HSE	Once before construction + once every six months for each construction machine	Vehicles licensing Department	Measurements and reporting of exhaust emissions of construction activities machinery  Complaints log	LDC management costs

Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
<b>Ambient noise levels</b>	Increased noise levels	Noise intensity, exposure durations and noise impacts	LDC HSE	Regularly during site inspections and once during the night in every residential area or near sensitive receptors such as hospitals	Construction site	Measurements of noise levels Complaints log	LDC management costs
		Complaints from residents	LDC HSE	Monthly during construction.	Construction site	Documentation in HSE monthly reports	LDC management costs
<b>Underground utilities</b>	Damages to underground utilities and infrastructure	Official coordination reports with relevant authorities Accidents documentation	LDC HSE	Monthly during construction.	Construction site	Documentation in HSE monthly reports	LDC management costs
<b>Physical state of street</b>	Waste generation	Observation of accumulated waste piles	LDC HSE	During construction. Monthly reports	Construction site	Observation and documentation	LDC management costs
		Observation of water accumulations resulting from dewatering (if encountered)	LDC HSE	During construction. Monthly reports	Around construction site	Observation and documentation	LDC management costs
		Chain-of-custody and implementation of waste management plans	LDC HSE	Zonal reports	Construction site and document examination	Site inspection and document inspection	LDC management costs
		Chain-of-custody and implementation of domestic wastewater (sewage) management	LDC HSE	During construction. Monthly reports	Construction site	Site inspection and document inspection	LDC management costs
<b>Local community</b>	<b>Damage to the streets</b>	<ul style="list-style-type: none"> <li>- Streets quality after finishing digging</li> <li>- Number of complaints due to street damage</li> </ul>	LDC, EGAS	Four times per year, each three months	Site and Desk work	Checklists and complaints log	No cost
<b>Local community</b>	<b>Threat to Safety of users and houses (due to limited level of awareness and misconceptions)</b>	<ul style="list-style-type: none"> <li>- Number of awareness raising implemented</li> <li>- Number of participants in information dissemination</li> </ul>	LDC, EGAS	Quarterly monitoring	Office	Reports Photos Lists of participants	No cost

**7.4 Management of Mitigation and Monitoring activities During OPERATION Phase**

**Table 07-4: Environmental and Social Management Matrix during OPERATION**

Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost
				Mitigation	Supervision		
<b>Integrity of natural gas piping</b>	<b>Network integrity</b>	<ul style="list-style-type: none"> <li>- Detailed review of the geotechnical and geological history of the project area</li> <li>- Random inspections and awareness campaigns to ensure that NG piping and components (both inside the household and outside) are not be altered, violated, or intruded upon in any way without written approval from, or implementation of the alteration by, the LDC.</li> <li>- Availability of 24-7 hotline service (129) to all beneficiaries and the public for reporting possible leaks, damages or emergencies</li> <li>- evacuation of the affected area</li> <li>- Repair or replacement of failed component</li> </ul>	Minor	LDC	LDC HSE.	<ul style="list-style-type: none"> <li>- Map and local geotechnical report review</li> <li>- Site inspections</li> <li>- Awareness actions</li> <li>- Periodical trainings and drills</li> </ul>	LDC management costs
<b>Economical disturbance</b>	<ul style="list-style-type: none"> <li>• <b>Financial burden on economically disadvantaged due to the installments</b></li> <li>• <b>Loss of</b></li> </ul>	<ul style="list-style-type: none"> <li>- Petro Trade should collect the installment immediately after the installation of NG</li> <li>- The installments should be collected on monthly basis in order not to add burden to the</li> </ul>	Minor	Petro trade (Company responsible for collecting the consumption fees and the installments)	EGAS	<ul style="list-style-type: none"> <li>- Banks loans log</li> <li>- Complaints raised by poor people due to the frequency of collecting the installments</li> </ul>	No cost



Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost
				Mitigation	Supervision		
	<b>revenue for LPG distributors</b>	<p>poor, as it will be easier for them to pay on monthly basis</p> <ul style="list-style-type: none"> <li>- The installment should not be high</li> <li>- LPG distributors should be informed about the NG potential areas in order to enable them to find alternative areas</li> <li>- They should be informed about the GRM in order to enable them to voice any hardship</li> </ul>		Butagasco	EGAS	<p>Information sharing activities with the LPG vendors</p> <p>Grievances received from them</p>	No cost
<b>Community health and safety</b>	<b>Possibility of Gas leakage</b>	<ul style="list-style-type: none"> <li>- Information should be provided to people in order to be fully aware about safety procedures</li> <li>- The hotline should be operating appropriately</li> <li>- People should be informed of the Emergency Numbers</li> <li>- The complete integrated, comprehensive and robust <b>Emergency Response Plan of the LDC</b> ( in Arabic) is in annex 7 A of the study and only a small part concerning the followed procedures during some emergency scenarios is translated in annex 7 B</li> </ul>	Minor	LDC	LDC	Complaints raised due to Gas leakage	No cost

Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost
				Mitigation	Supervision		
		-					
<b>Labor conditions</b>	<b>Occupational Health and Safety</b>	<ul style="list-style-type: none"> <li>- Total number of complaints raised by workers</li> <li>- Periodic Health report</li> <li>- Periodic safety inspection report</li> </ul>	Irrelevant	LDC HSE	LDC	<ul style="list-style-type: none"> <li>- Safety supervisor should follow the commitment of workers to use the protective equipment</li> <li>- Inspection and recording of the performance</li> <li>- Reports about the workers and complaints</li> </ul>	LDC management costs

**7.5 Environmental and Social Monitoring Matrix during OPERATION**

Table 07-5 Environmental and Social Monitoring Matrix during OPERATION

Impact	Monitoring indicators	Responsibility of monitoring	Monitoring Frequency	Location of monitoring	Methods of monitoring	Monitoring Estimated Cost
<b>Network integrity</b>	<ul style="list-style-type: none"> <li>- Earthquakes or geotechnical settlements</li> <li>- Emergency response time and corrective actions during emergency drills</li> <li>- Reports of alteration or tampering with ANY gas components</li> </ul>	LDC HSE	Bi-annual inspections and annual emergency response drills	Along the network and inside and outside households	- Inspection, leakage detection, running the drills	LDC management costs
<b>Financial burden on economically disadvantaged due to the installments</b>	<ul style="list-style-type: none"> <li>- Number of economically disadvantaged people who complained</li> <li>- Number of those who can't pay the installment</li> </ul>	LDC and Petro Trade, EGAS	Quarterly	Desk work	<ul style="list-style-type: none"> <li>- Complaints log</li> <li>- Bank reports</li> <li>- Petro trade reports</li> </ul>	No cost
<b>Impact on the informal LPG distributors</b>	<ul style="list-style-type: none"> <li>- Grievance received from the informal LPG distributors</li> <li>- Information shared with them</li> </ul>	EGAS, LDC	Quarterly	Desk work	- Complaints log	No cost

Impact	Monitoring indicators	Responsibility of monitoring	Monitoring Frequency	Location of monitoring	Methods of monitoring	Monitoring Estimated Cost
<b>Possibility of Gas leakage</b>	<ul style="list-style-type: none"> <li>- Complaints raised by the community people</li> <li>- Number of leakage accidents reported/raised</li> </ul>	LDC, EGAS	Four times per year, each three months	Site and Desk work	Complaints log LDC	No cost

## 8 Stakeholder Engagement and Public Consultation

The public consultation chapter aims at highlighting the key consultation and community engagement activities and their outcomes, in addition to outlining the validity and reliability of the collected data.

Public consultation activities have been implemented during the preparation of the framework and the site specific studies. Following are the public consultation activities that have been implemented:

- Public consultation session was conducted on 21 December 2013 in Qalyubeya city
- Public consultation session was conducted on 10 February 2016 in Qalyubeya city
- Consultation activities were conducted on February and March 2017

### 8.1 Legal framework for consultation

The consultation activities used multiple tools and mechanisms (scoping, interviews, focus group discussions, public hearings/consultations) with various stakeholders and community people in the host communities were held for the proposed 1.5 million household NG connections project in compliance with the following legislations:

- WB policies and directives related to disclosure and public consultation, namely:
  - o Directive and Procedure on Access to Information
  - o World Bank Operational Policy (OP 4.01)
- Egyptian regulations related to the public consultation
  - o Environmental law No 4/1994 modified by Law 9/2009 modified with ministerial decrees no. 1095/2011 and no. 710/2012
- While WB safeguards and regulations state that a minimum of two large-scale, well-publicized public consultation sessions are a must for projects classified as category 'A' projects like the one at hand<sup>4</sup>, additional consultation efforts (for example through focus group discussions, in-depth meetings, and interviews) were implemented to reach the most vulnerable and difficult to reach community members. Additionally, in order to obtain larger scale and more quantifiable information, the consultant should assess conducting surveys in the different sites.

**Table 8-1: Summary of Consultation Activities in Qalyubeya Governorate**

Participants	Number		Methods	Date
During the preparation of framework(2013)				
	Males	Females		
Potential beneficiaries and government officials	6	8	FGD	October- November 2013
Governmental and NGOs	3	2	In-depth	Nov-13
Community people	69	206	Structured questionnaire	October- November 2013
Potential beneficiaries, government officials, NGO representatives	63	8	Public consultation	21 <sup>st</sup> of December 2013
<b>Total</b>	<b>141</b>	<b>224</b>		

<sup>4</sup> Clause 14 of OP 4.01 states that: "For Category A projects, the borrower consults these groups at least twice: (a) shortly after environmental screening and before the terms of reference for the EA are finalized; and (b) once a draft EA report is prepared. In addition, the borrower consults with such groups throughout project implementation as necessary to address EA-related issues that affect them."





During the site specific study (2015 -2016)					
Potential beneficiaries and government officials	80	78	FGD in depth	September and October 2015	
Governmental and NGOs	12	4	In-depth		
Community people	477	727	Focus Structured questionnaire		
Potential beneficiaries, government officials, NGO representatives,	64	19	Public consultation	10 <sup>h</sup> of February 2016	
During ESIA (2017)					
Potential beneficiaries	El Qalag, El Gabal El Asfar	10	7	- FGD -In depth	February and March 2017
	Met Asem	7	6		
	Izbet Afandena	10	8		
LPG vendors	El Qalag, El Gabal El Asfar	4	0	Structured questionnaire	
	Met Asem	0	0		
	Izbet Afandena	0	0		
Governmental and NGOs	El Qalag, El Gabal El Asfar	3	2	In-depth	
	Met Asem	4	0		
	Izbet Afandena	1	2		
Community people	El Qalag, El Gabal El Asfar	85	65	-FGD -Structured questionnaire	
	Met Asem	40	35		
	Izbet Afandena	30	25		
Representatives from Egypt Gas and Cairo Gas	Egypt Gas	6		In-depth	
	Cairo Gas	5			

## 8.2 Summary of consultation outcomes

### The consultation outcomes revealed that:

- A. The key message from the consultation events carried out for this project is that Public and government acceptance for and support to the project are very strong.
- B. There are many problems related to LPG cylinders such as: ( high cost, price fluctuations, unavailable, the exerted effort to hold and install the cylinder, and the risks related to the existence of LPG cylinder within the household)
- C. The interviews and the focus group discussions revealed some concerns raised by the community regarding the NG connection such as:



- The majority of the community people cannot afford to pay NG installation costs in one installment, they strongly recommended to pay in installments.
  - Some concerns about LPG security and safety.
  - Actual need to provide clear information about the project
  - Actual need to response to grievances in timely manner
- D. The interviews with the implemented companies revealed that, they are fully aware about security and safety procedures. As well as, the excavation work dates in accordance with the nature of the region, the traffic density and the population.
- E. For poor people, the study recommended that NGOs can pay for the installation of the NG to poor households. (the recommendation is not obligated for the project)
- F. The study recommended the participation of the community people in sharing information about NG project with the other people especially the illiterate groups. (The recommendation is not obligated for the project)

### **8.3 ESMP disclosure**

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As soon as the site-specific ESMPs gets approval from the World Bank and EEAA, a final report will be published on the WB, EGAS and Egypt Gas and Cairo Gas websites. An executive summary in Arabic will be published on EGAS and Egypt Gas websites. A copy of the ESMP report in English and a Summary in Arabic will be made available in the customer service office. Additionally, an Arabic summary will be made available in the contracting offices. An A3 poster will be installed in the contracting office informing about the results of the ESIA and the website link for the full ESMP study.

