

1.5 Million Natural Gas Connections Project in 11 Governorates

Low Pressure Natural Gas Network Environmental and Social Management Plan Moharam Bek (Dreisa, Acasia and El-Said Club), Abis and Abu Quier Sectors



Alexandria Governorate

Final Report

December 2018

EGAS
Egyptian Natural Gas
Holding Company

Developed by

EcoConServ
ENVIRONMENTAL SOLUTIONS

EcoConServ Environmental
Solutions



Petrosafe
Petroleum Safety & Environmental Services Company



TABLE OF CONTENTS

TABLE OF CONTENTS	A
EXECUTIVE SUMMARY	I
1 INTRODUCTION	1
1.1 PROJECT OBJECTIVES	1
1.2 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN	2
1.3 CONTRIBUTORS	3
2 PROJECT DESCRIPTION	4
2.1 BACKGROUND	4
2.2 PROJECT WORK PACKAGES	4
2.3 PROJECT EXECUTION METHODOLOGY	5
3 LEGISLATIVE AND REGULATORY FRAMEWORK	12
3.1 APPLICABLE ENVIRONMENTAL AND SOCIAL LEGISLATION IN EGYPT	12
3.2 PERMITS REQUIRED	13
3.3 WORLD BANK SAFEGUARD POLICIES	14
3.4 WORLD BANK GROUP GENERAL ENVIRONMENTAL, HEALTH, AND SAFETY GUIDELINES, WBG ENVIRONMENTAL, HEALTH AND SAFETY GUIDELINES FOR GAS DISTRIBUTION SYSTEMS	14
4 ENVIRONMENTAL AND SOCIAL BASELINE	17
4.1 DESCRIPTION OF THE ENVIRONMENT	17
4.2 SOCIOECONOMIC BASELINE	22
5 ENVIRONMENTAL AND SOCIAL IMPACTS	28
5.1 IMPACT ASSESSMENT METHODOLOGY	28
5.2 POTENTIAL POSITIVE IMPACTS	28
5.3 RESOURCES CONSUMPTION	29
5.4 POTENTIAL NEGATIVE IMPACTS	30
6 ANALYSIS OF ALTERNATIVES	39
6.1 TRENCHLESS TECHNOLOGIES	39
6.2 OPEN-CUT METHOD	40
7 ENVIRONMENTAL AND SOCIAL MANAGEMENT & MONITORING PLAN	41
7.1 OBJECTIVES OF THE ESM&MP	41
7.2 MANAGEMENT OF GRIEVANCE	41
7.3 MANAGEMENT OF MITIGATION AND MONITORING ACTIVITIES DURING CONSTRUCTION PHASE	45
7.4 MANAGEMENT OF MITIGATION AND MONITORING ACTIVITIES DURING OPERATION PHASE	53
7.5 REPORTING OF MITIGATION AND MONITORING ACTIVITIES	56
7.6 INSTITUTIONAL FRAMEWORK FOR ESM & MP IMPLEMENTATION	56
8 STAKEHOLDER ENGAGEMENT AND PUBLIC CONSULTATION	60
8.1 LEGAL FRAMEWORK FOR CONSULTATION	60
8.2 DEFINING THE STAKEHOLDER	60
8.3 CONSULTATION METHODOLOGY AND ACTIVITIES	63
8.4 SUMMARY OF PREVIOUS CONSULTATION ACTIVITIES	63
8.5 MAIN RESULTS OF CONSULTATION DURING ESMP PREPARATION PHASE FOR THE PROJECT SITES (EL DREISA, ABIS, ACASIA, EL SAID CLUB AND ABU QUIER) IN 2018	66



8.6	SUMMARY OF CONSULTATION OUTCOMES	68
8.7	ESMP DISCLOSURE	69

LIST OF ANNEXES

Annex 1	Contributors
Annex 2	HSE Guideline for LDC
Annex 3	Air and Noise Measurements
Annex 4	Chance Find Procedures
Annex 5	Impact Assessment
Annex 6	GRM & Complaint Form
Annex 7	Public Consultation Documents
Annex 8	Emergency Response Plan

LIST OF TABLES

Table 1-1:	Number of areas and households' connections	2
Table 2-1:	Areas to be connected with NG	4
Table 3-2:	Power generation by diesel engines.....	13
Table 3-3:	Maximum allowable emissions from vehicles that operate using gasoline fuel.....	13
Table 3-4:	Maximum allowable emissions from vehicles that operate using diesel fuel.....	13
Table 3-5:	Maximum permissible noise level limits	13
Table 3-6:	WHO Ambient Air Quality Guidelines	14
Table 3-7:	Small Combustion Facilities Emissions Guidelines (3MWth – 50MWth) – (in mg/Nm ³ or as indicated)	15
Table 3-8:	Noise Level Guidelines.....	16
Table 4-2:	Eight (8) hours average ambient air pollutants' concentrations (µg/m ³)	18
Table 4-3:	Average ambient noise level measurements at Al Salhia primary school/ Kobry Al Namous, Abis Residential area	18
Table 4-4:	Monthly average temperatures in Alexandria for the Year 2015.....	19
Table 4-5:	Environmental facilities in Alexandria Governorate	21
Table 4-7:	Educational status in the project sites.....	23



Table 4-8: Health facilities in Alexandria Governorate	24
Table 4-9: Per capita consumption rate in the project areas	24
Table 8-2: Summary of consultation activities in Alexandria Governorate during 2013-2016.....	63
Table 8-3: Sample of the main issues that were raised during previous consultation activities 2013- 2016.....	64
Table 8-4: Summary of consultation activities in El Dreisa, Abis, Acasia, El Said Club and Abu Quier in February 2018	66
Table 8-5: Key comments and concerns raised during various consultation activities conducted in February 2018, and the way they were addressed in the ESMP study.....	67

LIST OF FIGURES

Figure 1-1: Project sites and area of influence	3
Figure 2-1: General components of the distribution networks for Moharam Bek, Abis and Abu Quier areas	4
Figure 2-2: Map of project areas in Alexandria Governorate.....	5
Figure 4-1: Map of project areas in Alexandria City	17
Figure 4-2: Narrow street in Moharam Bek	22
Figure 4-3:Narrow street in Abu Quier	22
Figure 4-4: Population distribution in project areas	22
Figure 6-1: Horizontal Directional Drilling.....	40
Figure 7-1:Grievance cycles	44
Figure 7-2: Town Gas H&S organizational structure (current)	57
Figure 8-1: FGD with women in Abu Quier.....	67
Figure 8-2: FGD in a workshop in Abu Quier.....	67
Figure 8-3: Face to face meeting with a genitor in Abu Quier.....	67
Figure 8-4: Meeting with women Dreisa	67
Figure 8-5: Meeting with men in Dreisa	67
Figure 8-6: Consulting with NG workers in Alexandria City.....	67



LIST OF ACRONYMS AND ABBREVIATIONS

AFD	Agence Française de Développement (French Agency for Development)
BUTAGASCO	The Egyptian Company for LPG distribution
CAPMAS	Central Agency for Public Mobilization and Statistics
CDA	Community Development Association
CO	Carbon monoxide
CRN	Customer Reference Number
CULTNAT	Center for Documentation Of Cultural and Natural Heritage
EEAA	Egyptian Environmental Affairs Agency
EGAS	Egyptian Natural Gas Holding Company
EGP	Egyptian Pound
EHDR	Egyptian Human Development Report 2010
EIA	Environmental Impact Assessment
ER	Executive Regulation
E&S	Environmental and Social
ESIA	Environmental and Social Impact Assessment
ESIAP	Environmental and Social Impact Assessment Framework
ESM	Environmental and Social Management
ESMF	Environmental and Social Management framework
ESMP	Environmental and Social Management Plan
FGD	Focus Group Discussion
GAC	governance and anticorruption
GDP	Gross Domestic Product
GIS	Global Information Systems
GoE	Government of Egypt
GPS	Global Positioning System
GRM	Grievance redress mechanisms
HDD	Horizontal Directional Drilling
HDPE	High-Density Polyethylene pipes
HH	Households
HHH	Head of the Household
hr	Hour
HSE	Health Safety and Environment
IBA	Important Bird Areas
IDSC	Information and Decision Support Center
IFC	International Finance Corporation
IGE/SR	Institute of Gas Engineers/Safety Recommendations
LDCs	Local Distribution Companies
LGU	Local Governmental Unit
LPG	Liquefied Petroleum Gas
mBar	milliBar
MDG	Millennium Development Goal
MOP	Maximum operating pressure
MP	Management Plan
MTO	Material take-off
NG	Natural Gas
NGO	Non-Governmental Organizations
NO ₂	Nitrogen dioxide
OSH	Occupational Safety and Health
P&A	Property and Appliance Survey
PAP	Project Affected Persons



PE	Poly Ethylene
PM ₁₀	Particulate matter
PPM	Parts Per Million
PRS	Pressure Reduction Station
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SDO	Social Development Officer
SIA	Social Impact Assessment
SO ₂	Sulphur dioxide
SYB	Statistical Year Book
T.S.P	Total Suspended Particulates
Town Gas	The Egyptian Company for Natural Gas Distribution for Cities
WB	The World Bank
WHO	World Health Organization
\$	United States Dollars
€	Euros

Exchange Rate: US\$ = 17.91 EGP as of November 2018

Exchange Rate: € = 20.34 EGP as of November 2018



EXECUTIVE SUMMARY

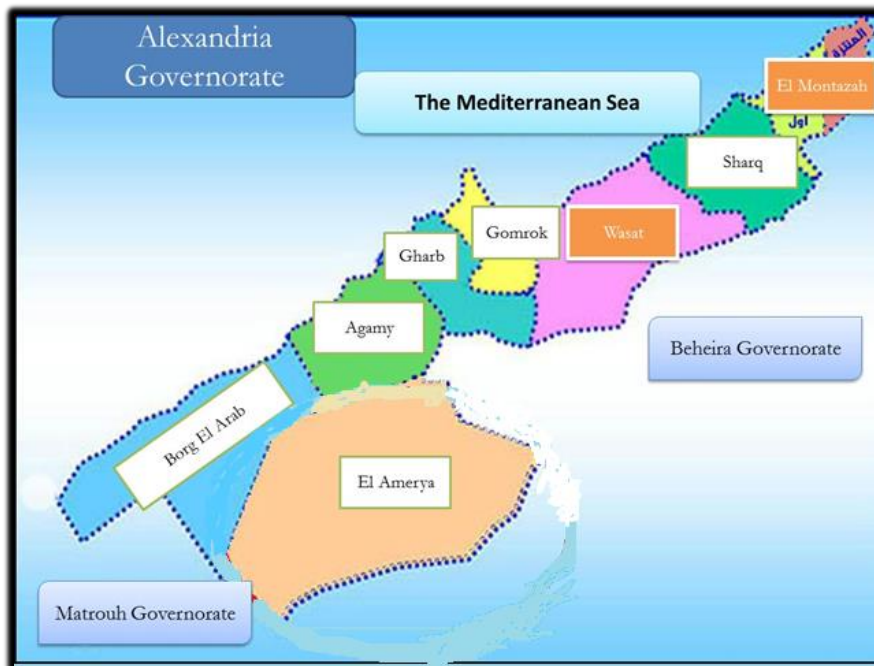
1. Introduction

The proposed project represents an integral component of the national energy strategy, which aims for greater use of natural gas for domestic users in Alexandria Governorate. This report is the Environmental and Social Management Plan (ESMP) prepared for the connections network planned in the areas Moharam Bek (Dreisa, Acasia and El-Said Club sectors), Abis and Abu Quier in Alexandria Governorate. The new house connections are supplementary to the current network. The project will be executed by the local Distribution Company Town Gas.

This Low Pressure Natural Gas Network ESMP covers the following sites:

1. **Wasat district project sites:** They are located in Moharam Bek sub-district in the areas of Dreisa, Acasia and El-Said club and Abis sectors, and
2. **El Montazah district sites:** They are located in Abu Quier sub-district

The new house connections are supplementary to the current existing natural gas connection network.



Project districts highlighted in orange
Source Alexandria Governorate website

The three areas hosting the project were screened in March 2018 and they were significantly homogeneous in terms of environmental and socioeconomic characteristics. As such, this report will present the study findings based on the homogeneity of project areas.

This ESMP has been prepared based on the Simplification Guidelines agreed upon between the World Bank and EGAS.

2. Project Description



The project covers the 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.

No land acquisition or resettlement activities are anticipated as the network will pass through the main urban roads/streets and side roads without causing any damage to private assets or lands.

The distribution system shall consist of 7-Bar mains extending through city gate regulators, which in turn feeds low-pressure networks via district regulators. Distribution mains are typically Polyethylene (PE) pipes connected to regulators. The project will entail specific activities during construction and operation phases as follows:

- **During construction phase:** Clearing and grading activities and Pipe transportation and storage, site preparation, excavation, pipe laying, welding, backfill and road repair, leakage testing, pneumatic testing. Construction works of distribution network “regulators, PE80 networks” construction works of household installation, conversion of home appliances and commissioning.
- **During operation phase:** Operation of the network and repairs in households
- The project will be in need for water and fuel during construction. However, it is not anticipated to use any resources during operation phase

3. Legislative and Regulatory Framework

The project will adhere to Egyptian legislations, WB operational policies and World Bank Group General Environmental, Health, and Safety Guidelines & WBG Environmental, Health and Safety Guidelines for Gas Distribution Systems

Applicable Environmental and Social Legislation in Egypt and LDC HSE guidelines:

- Law 217/1980 for Natural Gas
- Law 4/1994 for the environmental protection, amended by Laws 9/2009 and 105/2015. Executive Regulation(ER) No 338/1995 and the amended ER No. 1741/2005, amended with ministerial Decrees No. 1095/2011, 710/2012, 964/2015, and 26/2016
- Law 38/1967 for General Cleanliness
- Law 93/1962 for Wastewater
- Law 117/1983 for Protection of Antiquities
- Traffic Law 66/1973, amended by Law 121/2008 traffic planning
- Law 12/2003 on Labor and Workforce Safety

The LDC HSE Guideline of the Gas distribution system applicable to the project.

World Bank Safeguard Policies

During the early stages of the 1.5 million customer NG connections project, a framework study was prepared where, 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). OP/BP 4.01 will apply to this sub-project whereas It is not envisaged that the Low Pressure Natural Gas Network in Alexandria Gov. in the 3 aforementioned areas, will result in any physical or economic dislocation of people in the project location, so OP/BP 4.12 will not be applicable. No land acquisition or resettlement is 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. Although no cultural resources are located in the subproject areas, OP/BP4.11 will be applicable since Alexandria in general is famous for antiquities and cultural sites. Chance find procedures will be part of the contracts of the contractors.

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

The General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines, which provide guidance to users on EHS issues in specific industry sectors.

Gap Analysis showed that there are no significant differences between the requirements outlined by the WBG EHS GUIDELINE on GAS DISTRIBUTION SYSTEMS and the management and monitoring actions outlined by the ESMP

4. Environmental and Socio-economic Baseline

Methodology of the ESMP

Based on the site visit conducted by the consultants in 2018 and the secondary data collected, the subproject sites located in Alexandria City in the districts of Wasat and El Montazah were found to be within a radius of 10 km. The subproject sites were classified as residential urban areas of the same environmental and socioeconomic conditions. Thus, the environmental and social conditions of the subproject sites are of homogeneous characteristics.

The environmental measurements were conducted in one location based on the sensitivity of receptors (environmental and/or social) and significance of the impact (air and/ or noise)

- **Description of the Environment**

The homogeneity of the project sites, in terms of environmental aspects and economic activities, shows the following:

Moharam Bek, Abis and Abu Quier belong to Alexandria City located along the coast of the Mediterranean Sea in the north central part of Egypt

- a) Air Quality and Noise Intensity Measurement

The air quality measurements and noise intensity at the proposed site of the proposed gas pipeline network route is exhibiting low levels below those of the National and WB limits

Eight (8) hours average ambient air pollutants' concentrations ($\mu\text{g}/\text{m}^3$)

Area	NO ($\mu\text{g}/\text{m}^3$)	NO ₂ ($\mu\text{g}/\text{m}^3$)	NO _x ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	CO (mg/m^3)	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	T.S.P ($\mu\text{g}/\text{m}^3$)
Abu Quier	10.250	19.213	29.463	21.013	2.063	132.5	200.5
Limits							
National (24 hrs)	150	150	150	150	10 (mg/ m ³ , 8 hrs)	150	230
WB (24 hrs)	-	-	200(1 hr)	125	N/A	150	230

Average ambient noise level measurements



Time	Sound Level Equivalent & Percentile Recordings in dBA for 8 Hours						Permissible Limits LAeq (dBA)	
	LAeq	LA10	LA50	LA90	LA95	LCpeak	National	International
Moharam Bek	69.625	55.063	45.610	38.211	36.370	106.583	70	70

b) Climate

The variations of the monthly mean air temperature indicate a range from a minimum of 9.1 °C in January to a maximum 30.4 °C in July and August as average values.

c) Geology

The geology in project areas consists of the following deposits: Holocene deposits, Pleistocene sediments, Pliocene sediments and Miocene sediments (Moghra foundation).

d) Water resources

o Surface water

Alexandria city is fully dependent on the River Nile. Al-Mahmoudeya Canal, which is a part of Rosetta Branch of the River Nile is the source of fresh water which is used for all agricultural domestic and industrial purposes. The areas within Moharam Bek and Abis are connected to Alexandria water network which is connected to a Water Treatment Plant.

No fresh surface water bodies exist in Abu Quier subproject area.

o Subsurface water

Subsurface resources in project areas are limited in quantity and mainly formed from rainfall.

e) Groundwater

The groundwater aquifers in Alexandria Governorate are the coastal aquifer, the Nile aquifer, El Ralat aquifer, and Aquiclude system. During the project construction activities, the excavation depth does not exceed 1 meter, therefore groundwater is unlikely to be encountered.

f) Terrestrial Environment

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 free from any endangered or vulnerable species. Only some Canis sp., sparrows, and Filesdomestica have been recorded in the project area as fauna, while some Phragmitis species of flora also have been recorded.

g) Physical cultural resources

There are no identified archeological sites or sites with cultural or historical value, located within those semi-urban areas that would be affected by the NG pipework. In case of any unanticipated archeological discoveries within the project areas; **Annex 4**, entitled 'Chance Find Procedure,' details the set of measures and procedures to be followed.

h) Waste Management

Solid waste management in Moharam Bek, Abis and Abu Quier is planned, operated and monitored by the local municipality. Primary waste collection is handled using old trucks and tools. The responsibility



of service planning, delivery and monitoring in Moharam Bek and Abis is delegated to the sub –district management (Hai Wasat Alexandria) while the sub –district management (Hai Al Montazah) is responsible for Abu Quier district.

The dealing with the solid waste in the area of study seems to be organized although the existence of some scattering solid wastes was observed along the roads.

- **Socio-economic Baseline**

The jurisdiction description of project areas is as follows: Project areas located in Abis, Acasia and El Said Club that fall under the jurisdiction of Moharam Bek sub-district (Hai) in Wasat district. Abu Quier (West and East) is located under El Montazah district. Most of data collected was on the district level (2015). Limited data was available dated 2013 from Poverty Mapping. Most recent data collected from the National Census 2017 was on the Governorate level.

The majority of potential beneficiaries reside in Moharam Bek (115313 people). In Abu Quier (West and East) 41093 people were estimated. Similarly, in Abis, 41946 people were estimated.

Education is one of the main determinants of households' poverty status. Additionally, any awareness activities should put into consideration the community level of education. Based on the data available from the Poverty Mapping data developed by CAPMAS in 2013, the residents of Abis tend to be of the least ratio of literacy among project areas as literacy rate is about 63.3%. However, the majority of residents in Moharam Bek are literate.

All project areas have proper access to potable water, sanitary system (public) and electricity. This fact reflects that the majority of project areas are eligible to be connected to the natural gas, as access to basic services is one of the prerequisites required to install NG

The community socioeconomic characteristics and the willingness of people to convert from LPG cylinders to household NG are remarkable. Community members are much in favor of the project. Site surveys showed that the majority of the community samples cannot pay NG installation costs in one installment, they strongly recommend flexible payment in installment that vary between one year to seven years

5. Environmental and Social Impacts

A. Potential positive impacts

- **Potential positive impacts during construction**
 - Provide direct job opportunities to skilled and semi-skilled laborers
 - According to information gained from LDC, the daily average number of workers during the peak time will be about 50-55 excavation workers, 2 engineers and 18 technicians.
 - Create indirect job opportunities, in terms of supporting services to the workers and contractors who will be working in the various locations. This could include, but not be limited to; accommodation, food supply, transport, trade, security, manufacturing... etc.
- **Potential Positive impacts during operation phase**
 - On a national level, reduced expenditure on imported LPG cylinders



- 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.
- Significantly lower gas leakage and fire risk compared to LPG.
- 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.
- Constantly available and reliable fuel for home use
- Improved safety due to low pressure (20 mBar) compared to cylinders

B. Potential negative impacts

The evaluation of the potential negative impacts on various receptors is based on a significance ranking process.

It is worth mentioning that impacts related to land tends to be of no significance, as the Local Distribution Company, Town Gas, will establish temporary workshops and storage areas in the side roads near to installation site. The lands are state owned lands that require a kind of arrangement with the Local Governmental Unit. Using the side road will never entail any land acquisition. Accordingly, No socio-economic impacts on lands have been identified.

Potential adverse impacts on the vulnerable structure, and culturally valuable sites are assessed of no significance during construction phase.

The Potential negative impact assessment during the Construction and Operation phases is summarized in the following table:



Summary of potential negative impacts

Potential Impact Significance (Duration, Difficulty to mitigate)													
Activity	Air emissions	Noise	Reduction of Traffic Flow	Water pollution	Solid, Hazardous Wastes and Liquid Waste	Risk on Infrastructure and underground utilities	Street condition deterioration	Community health and safety	Labor conditions and occupational health and safety	Child labor	Soil pollution	Integrity of natural gas piping	Economic disturbance to the LPG distributors
Construction Phase													
Mobilization	Temporary, medium	Temporary, low	Temporary, low	N/A	Temporary, low	N/A	Temporary, low	N/A	Temporary, medium	Temporary, low	N/A	N/A	N/A
Establishment of temporary workshops	Temporary, low	Temporary, medium	Temporary, low	Temporary, low	Temporary, low	N/A	Temporary, medium	Temporary, low	Temporary, medium	Temporary, low	Temporary, low	N/A	N/A
Establishment temporary storage areas	Temporary, low	N/A	Temporary, low	Temporary, low	N/A	N/A	Temporary, medium	Temporary, low	Temporary, medium	Temporary, low	Temporary, low	N/A	N/A
Excavation	Temporary, medium	Temporary, low	Temporary, medium	Temporary, medium	Temporary, medium	Temporary, medium	Temporary, medium	Temporary, low	Temporary, medium	Temporary, low	Temporary, low	N/A	N/A
PE Pipe laying	Temporary, medium	Temporary, low	Temporary, medium	N/A	Temporary, low	N/A	Temporary, low	N/A	Temporary, medium	Temporary, low	N/A	N/A	N/A
House connection piping installation	Temporary, medium	Temporary, low	Temporary, medium	N/A	Temporary, low	N/A	Temporary, low	N/A	Temporary, medium	Temporary, low	N/A	N/A	N/A
Leakage testing	Temporary, medium	Temporary, low	Temporary, low	N/A	Temporary, low	N/A	Temporary, low	N/A	Temporary, medium	Temporary, low	N/A	N/A	N/A
Street restoration	Temporary, medium	Temporary, low	Temporary, medium	N/A	Temporary, medium	N/A	Temporary, medium	N/A	Temporary, low	Temporary, low	N/A	N/A	N/A
Connections	Temporary, medium	Temporary, low	Temporary, low	N/A	Temporary, medium	N/A	Temporary, medium	N/A	Temporary, low	Temporary, low	N/A	N/A	N/A
Impact Assessment	Medium	Minor	Medium	Minor	Medium	Minor	Medium	Minor	Medium	Minor	Minor	N/A	N/A
Operation Phase													
Network operation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Permanent low	Permanent low	N/A	N/A	Permanent low	Permanent low
Repairs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Permanent low	Permanent low	N/A	N/A	Permanent low	N/A
Impact Assessment	Of no significance	Of no significance	Of no significance	Of no significance	Of no significance	Of no significance	Of no significance	Minor	Minor	Of no significance	Of no significance	Minor	Minor



6. Analysis of Alternatives

The Framework study of the Project discussed extensively and analysed all possible project alternatives, this ESMP discusses the alternative Pipeline installation technologies, that concluded, open cut technology is recommended since this will not negatively affect the environment and a cheap and safe option. However, for the crossings, HDD is needed for the crossings under railway specified in section 2.3.

7. Environmental and Social Management & Monitoring Plan

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. Section 7 of this report discusses the ESMMP for different receptors, identifies roles and responsibilities for implementation and monitoring of mitigations during the Construction and Operation phases of the project. Special emphasis on the Grievance Redress Mechanism was made. The report presents an assessment of the current GRM applied at Town Gas with proposed actions for effectiveness.

8. Stakeholder Engagement and Public Consultation

The new house connections in the project sites are supplementary to the current existing natural gas connection network in Alexandria Governorate. ESIA/ESMPs for other areas were prepared, stakeholder engagement and public consultation activities were held, and studies were cleared by the Bank and disclosed on EGAS website and the Bank info shop. Stakeholder Engagement activities and a series of public consultations were conducted all through the past 5 years since the early stages of the project in December 2013 until recent.

In February 2018, the study team conducted various consultation activities with a sample of stakeholders in El Dreisa, Abis, Acasia, El Said Club and Abu Quier. Stakeholders were identified and targeted by the social team. Information was tailored to each group and disseminated to the target group. Fair gender based participation and engagement of the different stakeholders and documentation of all conducted events were made. Public concerns were responded to and addressed in the ESIA/ESMPs / ESIAF of the project.

Consultation activities showed an overwhelming acceptance of the consulted participants to host the NG and their willingness to be connected to the NG. Some potential beneficiaries expressed their willingness to pay the installation cost in cash, while others were much in favor to pay in installments. This high level of enthusiasm from the local communities towards the project is attributed to the high level of awareness of the benefits of the natural gas and the current hardships that the households are facing to secure LPG provision and usage.



1 INTRODUCTION

1.1 Project Objectives

The proposed Natural Gas Connection project to 1.5 million Households in 11 Governorates represents an integral component of the national energy strategy, which aims for greater use of natural gas for domestic users

This Environmental and Social Management Plan study is one of the reports developed for the NG installation project in Alexandria Governorate. It is worth mentioning that in **March 2014**, an Environmental and Social Impact Assessment Framework (ESIAF) was developed for the project's Governorates including Alexandria Governorate.

In September 2016, 4 site specific ESIA's in Alexandria Governorate were also developed for the following project areas:

1. ESIA for Amerya District,
2. ESIA for Hagar El Nawateya, Toson, Tabia, El Mohagrein, Khorsheid and El Zawya sub-districts in Alexandria City,
3. ESIA for Izbet Sekeina and Izbet El Mozafein sub-districts
4. ESIA for Abu Soliman and El Awayed sub-districts

The aforementioned studies were cleared by the Bank and disclosed on EGAS website and the Bank info shop.

This Low Pressure Natural Gas Network ESMP covers the following sites:

3. Wasat district project sites, located in Moharam Bek sub-district in the areas of Dreisa, Acasia and El-Said club and Abis sectors, and
4. El Montazah district sites, located in Abu Quier sub-district

The new house connections are supplementary to the current existing natural gas connection network.

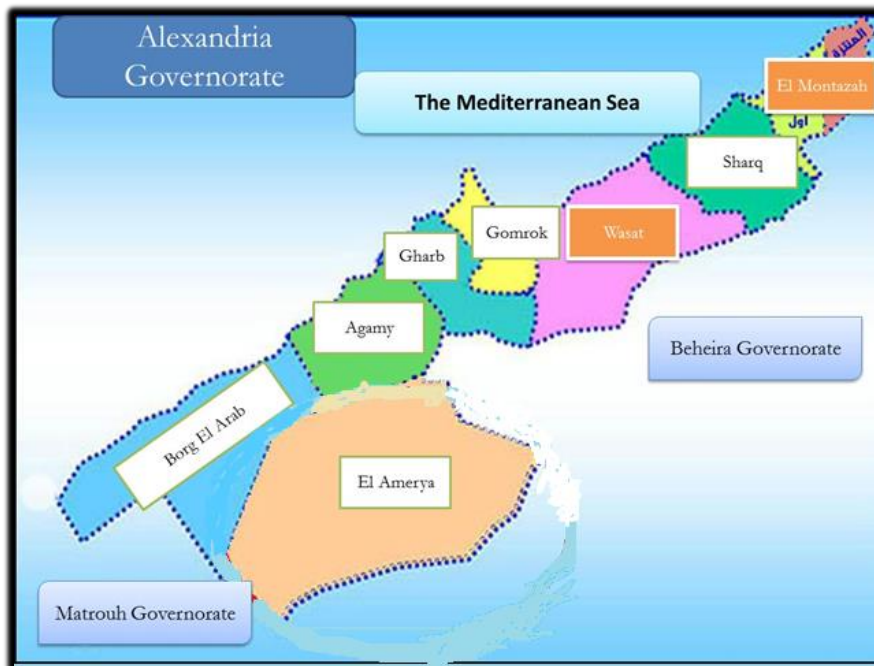


Figure 1-1: Project districts highlighted in orange

Source Alexandria Governorate website



1.2 Environmental and Social Management Plan

This ESMP has been prepared based on the Simplification Guidelines agreed upon between EGAS and the World Bank in 2018. Additionally, the ESMP follows the Egyptian legislations, WB operational policies and World Bank Group General Environmental, Health, and Safety Guidelines & WBG Environmental, Health and Safety Guidelines for Gas Distribution Systems.

1.2.1 Objectives of the ESMP

1. Describing project components and activities of relevance to the environmental and social impacts assessments in Moharam Bek (Dreisa, Acasia and El-Said club sectors), Abis and Abu Quier areas
2. Identifying and addressing relevant national and international legal requirements and guidelines,
3. Describing relevant environmental and social conditions
4. Assessing project's alternatives
5. Assessing potential site-specific environmental and social impacts of the project
6. Developing environmental & social management and monitoring plans in compliance with the relevant environmental laws
7. Documenting and addressing environmental and social concerns raised by stakeholders and the public in consultation events and activities

The local distribution company responsible for implementation is Town Gas. Project areas and the potential total number of household that will be covered in this ESMP are illustrated in the table below:

Table 1-1: Number of areas and households' connections

Governorate	Local Distribution Companies	Project site				Number of Households connections
		District	Sub-district	Areas	Sector's number	
Alexandria	Town Gas	Wasat District	Moharam Bek	Dreisa	04-16	549
				Acasia	04-17	
				El-Said club	04-18	
				Abis	40	
		El Montazah District	Abu Quier		10	656
Total						1,948

1.2.2 Methodology of the ESMP

Based on the site visit conducted by study team in 2018 and the secondary data collected, the project sites located in Alexandria City in the districts of Wasat and El Montazah were found to be within a radius of 10 km. The project sites were classified as residential urban areas of the same environmental and socioeconomic conditions. Therefore, they are considered of homogeneous characteristics.

The environmental measurement was planned to be conducted in only one location from the project different sites, based on the significance of the impact (air and/ or noise) and/or area of potential sensitivity (environmental and/or social).



Figure 1-1: Project sites and area of influence

The ESMP relied on secondary data available in the local governmental units and in the Governorate authority. Additionally various consultation activities were conducted with the community people in the area. The social consultant presented the demographic data available on the district level and project sites.

1.3 Contributors

The ESMP has been prepared by a Joint Venture between Petrosafe (Petroleum Safety & Environmental Services Company and EcoConServ Environmental Solutions (Cairo, Egypt) with collaboration, and facilitation from EGAS, Town Gas HSE and Engineering Departments. The names of the Petrosafe and EcoConServ experts who have participated in the preparation of the ESMP study are listed in **Annex 1** of this report.



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 red box below denotes project activities covered by this ESMP:

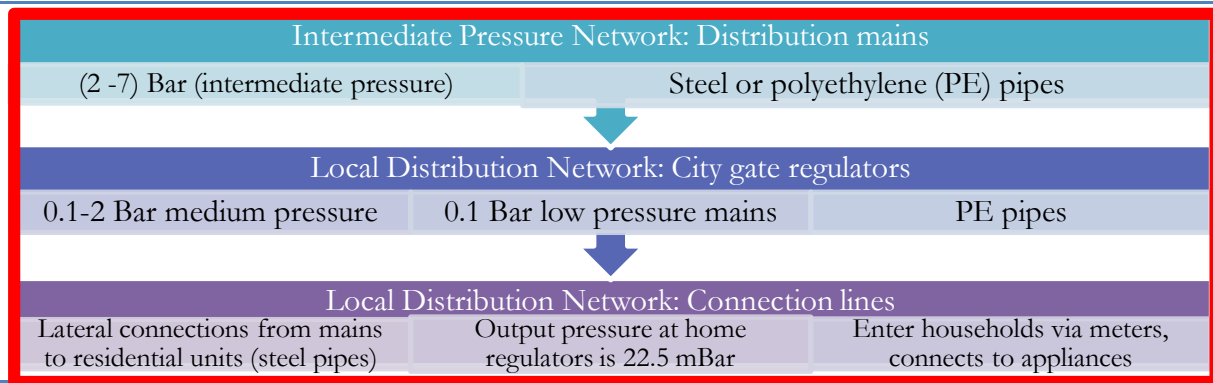


Figure 2-1: General components of the distribution networks for Moharam Bek, Abis and Abu Quier areas

No land acquisition or resettlement activities are anticipated as the network will pass through the main urban roads/streets and side roads without causing any damage to private assets or lands.

2.2 Project Work Packages

The following table presents the concerned areas of the project required to be connected to NG network in Alexandria Governorate.

Table 2-1: Areas to be connected with NG

No.	Government	District	Sub-district	Area (Hai)	No of Sectors
1	Alexandria	Wasat District	Moharam Bek	Dreisa	04-16
2				Acasia	04-17
3				El-Said club	04-18
4				Abis (Area 11)	40
5		El Montazah	Abu Quier	Abu Quier	7-9

Figure below illustrates the location of the proposed areas required to be connected to NG network in Alexandria Governorate.

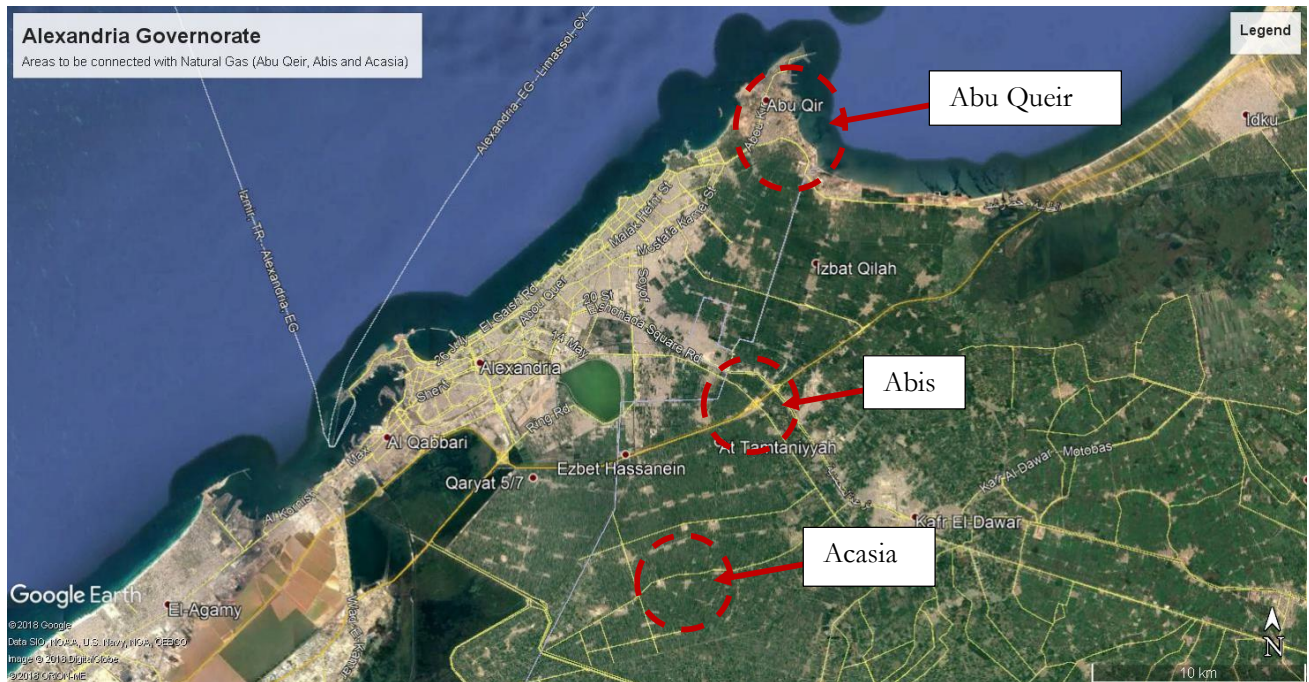


Figure 2-2: Map of project areas in Alexandria Governorate

2.2.1 Off-take & Inlet connection/network “7 bar system- PE 100”

The off take is the point on the HP national grid pipeline where a branch of the pipeline is constructed to connect the existing PRS to the national grid.

2.2.2 Polyethylene network

Main and service lines are made of polyethylene except the valves and the venting points. There are two type of polyethylene network intermediate pressure and low pressure.

2.2.3 Installations (Steel Pipes)

A gas distribution piping system consist of steel pipes which is 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 mbar) to appliances inside the customer’s premises.

2.2.4 Conversions

Conversions involve increasing the diameter of the nozzle of the burner of an appliance to work with natural gas as a fuel gas rather LPG or others.

2.3 Project Execution Methodology



2.3.1 Project area selection criteria

Preliminary project planning has applied social, economic, safety, and technical criteria to identify sub-areas eligible for connecting customers (households). The project shall further extend the network in areas, which are partially covered.

A preliminary estimate was generated through a general survey, followed by a Property & Appliance (P&A) survey. The outcome of the P&A survey is a detailed listing of individual households to be connected after passing safety and technical evaluations. The detailed listing is then used to finalize pipeline sizing and routing.

The technical criteria of survey can be summarized as follows:

EGAS prepared a list of technical specification required to have the NG installed in the area:

1. Areas that have access to all necessary public utilities especially land networks (electricity, water, sewage, telephone lines)
2. Adobe and wooden houses are not eligible for NG connections
3. Areas that comply with the British standards and/or the applied standards for NG connections that can be used for determining areas eligibility for NG connections.
4. Areas adjacent to NG national grid

Criteria for connecting to buildings, and selection of the path of external pipeline:

1. Buildings are to be located close to the local distribution network
2. Buildings are to be built with concrete and red bricks not adobe or wood
3. Buildings are to be legally permitted and has access to electricity
4. The possibility of installing the riser pipes along the length of the building depending on the following priority (service stairwell, stairwell, façade)
5. Availability of enough space for the erection of the scaffold and the existence of access door to the stairwells
6. Easy access to the entrance point of vertical line in case of emergency
7. Approval of the building administration to grant access to workers

2.3.2 Design and material take-off (MTO) including procurement

Design of the transmission and distribution pipelines is utilized to estimate the materials needed to implement the project. Procurement of the materials includes local and international components. Local purchases typically include PE piping for the distribution networks. International purchases include critical components, regulators, and metering stations.

2.3.3 Construction works of main feeding line/network “7bar system – PE100”

The distribution system shall consist of 7-Bar mains extending through city gate regulators, which in turn feeds low-pressure networks via district regulators. Distribution mains are typically Polyethylene (PE) pipes connected to regulators. Regulators are fed by 7-Bar piping which is orange in color (referred to as PE100) with diameters between 16mm to 35mm according to GIS PL2-8 and the information provided by Town Gas.

2.3.3.1 Clearing and grading activities and pipe transportation and storage (Moharam Bek, Abis and Abu Quier)

The first step of construction includes: flagging the locations of approved access route of pipeline, allocating temporary workshop for the crew, installing fences surrounding the area of working, cleaning the land from any wastes and /or removing weeds. Grading is conducted where necessary to provide a reasonably level work



surface. Additionally, equipment and piping will be transported to the site (temporary storage area). Quality control procedures during the transportation and handling of pipes should take place to ensure protection from any effects that may damage the pipes, and prevent any traffic accidents.

2.3.3.2 Site preparation (Moharam Bek, Abis and Abu Quier)

Before any excavation activities, Town Gas shall coordinate with the different authorities to determine the existing infrastructure in the project's area (e.g. water lines, sewage lines, electrical cables and telecommunication lines) so as to avoid any undue damage. In case of lacking sufficient information on the available infrastructure, they will carefully excavate a trial pit.

2.3.3.3 Excavation (Moharam Bek, Abis and Abu Quier)

Auger boring drilling is used in one of the urban road crossing. The horizontal auger boring trenchless technique involves equipment like auger boring machine, auger, and cutting head. This technique also requires the excavation of a drilling pit and a receiving pit. The process starts by lowering the auger boring machine into the drilling pit, and then the augers installed inside the casing pipe are lowered into the pit and connected to the auger boring machine. The boring operation then starts by rotating the augers and the cutting head, and pushing the casing pipe gradually forward. This process continues till the casing pipe emerges from the receiving pit side. The boring process results in cuttings (spoil) which is carried through the augers and extracted from the entry side of the boring machine. Excavation works start by removing the asphalt layer and the base stone layer using either a mechanical excavator (used in urban roads) or an air compressor jack hammer for dusty roads (used in local roads). In case the jack hammer is used, road layers are removed by excavator. The trench is excavated to a depth that provides sufficient cover over the pipeline after backfilling. The road base soil, underneath asphalt and stones, is then excavated either by a backhoe excavator or by manual excavation. The advantage of manual excavation is that it reduces the risks of breaking water, sewerage, electric or telecommunication lines which are unmapped. At locations with irregular ground elevations, additional excavation may be applied to avoid undue bending of the pipe. In addition, and in case of having crossing with other underground infrastructure lines/cables, the trench shall be deepened so that the pipeline be installed below or above the existing lines/cables.

A Horizontal Direct Drilling (HDD) method will be used for laying the underground pipe in crossing under railway. HDD is a trenchless methodology that use high excavation depths (about 30-40 meters) and can be used for high pipeline length. HDD causes very little disruption to traffic as road narrowing or diverting are not required, in addition to the smaller work area requirements and it takes 2 working days.

2.3.3.4 Pipe laying (Moharam Bek, Abis and Abu Quier)

Before pipe laying, the bottom of the trench is cleaned of any rocks or solid objects, which may damage the pipes. In cases, where groundwater table is shallow, the trench should be dewatered (Portable trash pumps are commonly used in construction projects) and discharge the water into a drain or sewer manhole, according to the arrangements with local authorities. In case that the dewatered groundwater is free of perceivable pollution, it will be (if possible) used on or around the work site or discharged into the nearest canal to be used for irrigation. Once the trench is excavated, the pipe stretch shall be laid down.

2.3.3.5 Welding

Two types of welding are used, butt fusion welding technique will be used for pipe welding (hot plate softening the tips of the PE pipes before joining) and electro fusion welding (fittings with heating coils installed inside) will be used to weld fittings. In both cases, diesel generators and relevant cabling would be needed.



2.3.3.6 Backfill and road repair

The trench will be backfilled immediately after the pipeline has been laid considering that the finished backfilling level will be the same as the road level. The initial backfill will be to a minimum height 20 cm of fine sieved sand either by a front loader or manually to protect the pipeline. The backfill will be then compacted by wet sand layers of 15 cm thickness in order to avoid road settlements and subsequent cracks. In some cases, an inverted U-shaped reinforced concrete slab is constructed around the pipeline after laying in order to improve shock resistance.

Cathodic protection is mandatory for underground gas distribution lines. Packed magnesium and cathodic protection system will be applied to the pipeline in all cases

After that, the contractor will work on restoring the road surface to its original status. A yellow warning tape marked “Natural Gas” is placed on top of the sand layer. Appropriate signage and community safety measures will be in place in addition to covering or safeguarding any open trenches that are not promptly filled.

2.3.3.7 Leakage testing

Following construction activities, the piping should be tested to locate possible leaks. As long as the operating pressure in the studied areas is low so pneumatic testing will be required.

2.3.3.8 Pneumatic testing

A pressure test is always required for a new pressure system before the flow of natural gas starts to ensure the following:

- safety; and
- reliability of operation.

It is recommended only for low-pressure applications. Pressure relief devices are a must during the test to ensure no over pressurization, and in order to prevent deformation, dislocation, and rupture of the pipes.

Leakage testing through pressurization must be performed AFTER backfilling the excavation under (10 cm), around (10 cm), and above the pipes (20 cm, at least).

Before testing, checking of weld joints is needed to be very careful thoroughly. It needs the involvement of senior experienced staff to monitor the test. Testing media is air. Test pressure is normally 1.5 higher than the design pressure. Pressure drop indicates leakage.

Construction works of distribution network “regulators, PE80 networks” (Moharam Bek, Abis and Abu Quier)

The distribution system shall consist of 100 mbar mains extending from the city gate regulators through distribution networks are typically Polyethylene (MDPE) pipes connected to regulators. Regulators are fed by 100 mbar piping which is yellow in color (referred to as PE80) with diameters between 16mm to 250mm according to the information given from Town Gas.

2.3.3.9 Construction works of household installation

Connections work will connect the distribution network to the households. The connection starts from the main line (PE) and crosses the road to the buildings on both sides. Connection work will include the following activities:

1. Connections work will connect the distribution network to the households.
2. Gas will be fed into the property at 100 mbar maximum, through risers and laterals for flats and an external meter box service termination for singly occupied premises.



3. Sizes of risers depend on the number of dwellings in the block of flats but laterals will be normally 1 inch or 3/4 inch.
4. Gas meters will be installed with a suitable regulator (governor) at internal pressures of 20 mbar.
5. Internal piping inside the household will be steel pipes of 1 inch, 3/4 inch and 1/2 inch diameter and will generally supply a cooker and a water heater. Connections from steel pipes to appliances are typically flexible rubber tubing in the case of stoves and copper tubing for water heaters

The underground portion of the riser is sleeve-protected, while above-ground pipes are painted. Risers and laterals are fixed on walls by steel clips. This will involve drilling the walls to attach the necessary bolts and rivets. The laterals enter the household through the wall. Connections are tested for leakage by increasing pressure to 2 bar and monitoring pressure drop.

2.3.3.10 Conversion of home appliances

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 70 mm.

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.

2.3.3.11 Commissioning

Before starting the flow of Natural gas, the pipeline will be purged by flushing with dry nitrogen at ambient temperature to ensure that no operational problems arise from air or water left in the pipeline. The pressure of Nitrogen is gradually increased till it reaches the operating pressure, and then the operation starts by replacing the Nitrogen with Natural gas.

Machines to be used

1. Air compressor with jack hammer
2. Portable generators
3. Directional boring machine
4. Trench drilling machine
5. Control box welding machine
6. Butt fusion welding machine
7. Mechanical excavation tools

The following are the expected impacts from the above mentioned equipment.

1. Exhaust from excavation equipment and heavy machinery mainly from air compressor with jackhammer, generators, boring machine, trenchers, containing SO_x, NO_x, CO, VOCs, etc.
2. Noise and vibration mainly from air compressor with jackhammer, generator, boring machine, trench drilling machine, and the excavation tools.
3. Heat stress mainly from the welding machine

More detailed impacts and their mitigation measures are addresses in details in sections 5 and 7.

The following presents the piping system, and regulators in the concerned areas:



Moharam Bek (Dreisa, Acasia and El Said Club)

1. From the exist 16" (7 Bar) pipe (Mahmoudeya PRS outlet).
2. From the exist 250 mm (2 Bar) in El Hadra el Gedida.
3. From the extension 6" valve feeding sector 04/15.
4. Execute 1 special crossing under Matrouh railway by 250 mm pipe with approximate length 50 m.
5. Execute 1 special crossing under Cairo/Alexandria agriculture high road by 250 mm pipe with approximate length 50 m.

Abis

1. From the exist 16" pipe at the outlet of Abis P.R.S .
2. From the exist 10" extension valve at sector 08/18
3. Execute 1 special crossing under Cairo/Alexandria agriculture high road by 315mm pipe with approximate length 200 m.
4. Execute 1 special crossing under Cairo/Alexandria agriculture high road by 180mm pipe with approximate length 200 m.
5. Execute 2 special crossings at depth 180mm pipe with total approximate length 400 m.
6. Execute 1 Hot tapping 16"/6".

Abu Quier

1. From the under construction 16" pipe in Mostafa Kamel road
2. Execute 3 special crossings under railway by 315mm pipe with approximate length 150 m.
3. Execute 3 Hot tapping 16"/3".

2.3.3.12 Employment and Labour

Local skilled, unskilled and experienced personnel in sufficient numbers will be hired to cover the workloads required. Although it varies by the contractor, an estimated peak of 50-55 casual and excavation workers, 2 site engineers and 18 technicians is to be expected.

Site offices will be located in residential areas during excavation of the pressure distribution network.

For local personnel, no accommodation will be needed during the construction activities onsite. However, workers from outside Alexandria governorate receive accommodation allowance added to their salaries. Based on meetings conducted with workers in February 2018, they reported that they lease apartments in the nearest residential areas to construction sites. Laborers rely on the surrounding community facility. They obtain potable water from shops located in the project sites. Regarding, sanitation and toilet facilities, they use available toilets in the mosques. Workers generate limited domestic waste that is put in the public waste bins located in the streets.

2.3.3.13 On-site workshops, warehouses and types of activities.

The contractor will rent an empty shop (3*4 meter) to be used as workshop/warehouse during the construction and installation activities; where the workers/labors will carry out the welding and painting of the pipelines, in addition to the storage of the chemicals used such as paints and solvents. This shop must be facing the main street. In case of no availability for such shop, the contractor occupies an open street area that is affiliated to local governmental unit.

2.3.3.14 Use of chemicals or other hazardous materials.

The expected chemicals that will be consumed during this phase of the Subproject are 80 paint containers of capacity 20 liters and 20 solvents jerry cans of capacity 20 liters.



2.3.4 Activities of the operation phase

2.3.4.1 Operation of the network (Moharam Bek, Abis and Abu Quier)

The operation of the system is undertaken by LDCs. Normal operation will include routine audits on pressures and condition of the network. Normal maintenance and monitoring works for the network include:

- Monitoring valves at selected points on the pipeline. Gas leaks are routinely monitored using gas detection sensors;
- Checking cathodic protection on "Flange Adaptors" by taking voltage readings and changing anodes whenever needed.

In case of a leak detection, or damage to part of the network, the damaged pipe is replaced. The following procedures are usually followed:

1. Stopping leaking line by valves when available or by squeezing the lines before and after the damaged part.
2. Excavating above the effected part (in case of distribution main or underground line)
3. Venting the line
4. Removing affected pipe, replacing and welding, backfilling and road repair

2.3.4.2 Repairs in households

Repairs include appliance adjustments or piping/metering replacement.

2.3.4.3 Hotline

A 24-7 Hotline (**129**) is available for customers and the public to report leaks, damage, emergencies, and/or incidents related to gas connections, components, infrastructure, and activities (inside or outside households) and to request repairs/emergency response/assistance.



3 LEGISLATIVE AND REGULATORY FRAMEWORK

3.1 Applicable Environmental and Social Legislation in Egypt

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

The following tables present the Egyptian limits for ambient air quality, noise levels, and allowable emissions from vehicles and power generation units.

Table 3-1: Maximum limits of outdoor air pollutants

Annex 5 of the ER amended by Decree No. 710/2012					
Pollutant	Location Area	Maximum Limit [$\mu\text{g}/\text{m}^3$ unless otherwise noted]			
		1 hour	8 hours	24 hours	1 Year
Sulphur Dioxide	Urban	300	---	125	50
	Industrial	350	---	150	60
Carbon Monoxide, mg/m^3	Urban	30	10	---	---
	Industrial	---	---	---	---
Nitrogen Dioxide	Urban	300	-	150	60
	Industrial	300	-	150	80
Ozone	Urban	180	120	---	---
	Industrial	180	120	---	---
Total Suspended Particles (TSP)	Urban	---	---	230	125
	Industrial	---	---	230	125
Particulate Matter less than $10 \mu\text{m}$ (PM_{10})	Urban	---	---	150	70
	Industrial	---	---	150	70
Particulate Matter less than $25 \mu\text{m}$ ($\text{PM}_{2.5}$)	Urban	---	---	80	50
	Industrial	---	---	80	50
Suspended Particles Measured as Black Smokes	Urban	---	---	150	60
	Industrial	---	---	150	60
Lead	Urban	---	---	---	0.5
	Industrial	---	---	---	1.0
Ammonia (NH_3)	Urban	---	---	120	---
	Industrial	---	---	120	---



Table 3-2: Power generation by diesel engines

Table 2 of Annex 6 of the ER amended by Decree No. 710/2012				
Fuel Type	Maximum Emission Limits (mg/m ³)			
	TSP	CO	SO ₂	NO _x
Natural Gas	50	150	100	600
Diesel	100	250	400	600

Reference conditions: O₂ is 15% & Temperature 273K & Pressure 1 atm.

Table 3-3: Maximum allowable emissions from vehicles that operate using gasoline fuel

Table 23 of Annex 6 of the ER amended by Decree No. 710/2012						
Pollutants	Before the year 2003		From 2003 to 2009		Year 2010 and later	
	Hydrocarbons HC (ppm)	CO%	HC (ppm)	CO%	HC (ppm)	CO%
Maximum allowable Limit	600	4	300	1.5	200	1.2

Measurements should be done at the idle speed from 600 to 900 rpm

Table 3-4: Maximum allowable emissions from vehicles that operate using diesel fuel

Table 24 of Annex 6 of the ER amended by Decree No. 710/2012		
Manufacturing Year (model)	Before the year 2003	From 2003 and later
Smoke density factor K (m ⁻¹)	2.8	2.65
Opacity %	30	25

Measurements are done in accordance with the ISO-11614 international standard.

Opacity measured at light flow device 127 mm.

Table 3-5: Maximum permissible noise level limits

Table 3 of Annex 7 of the ER amended by Decree No. 710/2012		
Area Type	Maximum Permissible Equivalent Noise Level [dB(A _{eq})]	
	Day (7am – 10pm)	Night (10pm – 7am)
Sensitive areas to noise	50	40
Residential suburb with low traffic and limited activities service	55	45
Residential areas in the city and have commercial activities	60	50
Residential areas are located on roads less than 12 m and have some workshops or commercial activities or administrative activities or recreational activities ... etc.	65	55

3.2 Permits Required



- 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.
- Road and Bridges Directorate permission for excavation of main roads
- Excavation permission to be obtained from the Local Governmental Unit
- Permission from the High Council of Antiquities

3.3 World Bank Safeguard Policies

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). It is not envisaged that the Subproject will result in any physical or economic dislocation of people in Moharam Bek, Abis and Abu Quier .

OP/BP 4.01 will apply to the Subproject. Although there are no identified cultural sites in Moharam Bek, Abis and Abu Quier, since Alexandria is well known of archeological and cultural sites, OP/BP 4.11 will be applicable. .

OP/BP 4.12 will not be applicable to the low pressure pipelines of Moharam Bek, Abis and Abu Quier areas since no land acquisition or resettlement is 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 Subproject will result in any physical or economic dislocation of people for the construction of low-pressure pipelines in the Subproject areas.

“Gap analysis for key environmental and social issues concerns: Egyptian laws and WB Policies was conducted in the ESIAF of the project and disclosed on EGAS website as per the following link <http://www.egas.com.eg/docs/RPF%20for%20NG%20connections%20project%20for%2011%20Governorates.pdf>”

3.4 World Bank Group General Environmental, Health, and Safety Guidelines, WBG Environmental, Health and Safety Guidelines for Gas Distribution Systems

The General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines, which provide guidance to users on EHS issues in specific industry sectors.

In addition to the above mentioned safeguards policies, the Directive and Procedure on Access to Information¹ will be followed by the Project.

The following tables present the IFC limits for ambient air quality, noise levels, and allowable emissions from vehicles and power generation units.

Table 3-6: WHO Ambient Air Quality Guidelines²³

Pollutants	Averaging Period	Guideline value in mg/m ³
Sulphur Dioxide	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)
	10 minute	500 (guideline)

¹<https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=3694>

² World Health Organization (WHO). Air Quality Guidelines Global Update, 2005. PM 24-hour value is the 99th percentile.

³ Interim targets are provided in recognition of the need for a staged approach to achieving the recommended guidelines.



Pollutants	Averaging Period	Guideline value in mg/m ³
Nitrogen Dioxide	1-year	40 (guideline)
	1-hour	200 (guideline)
Particulate Matter less than 10 µm (PM ₁₀)	1-year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)
	24-hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)
Particulate Matter less than 25 µm (PM _{2.5})	1-year	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)
	24-hour	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)

Table 3-7: Small Combustion Facilities Emissions Guidelines (3MWth – 50MWth) – (in mg/Nm³ or as indicated)

Combustion Technology / Fuel	Particulate Matter (PM)	Sulfur Dioxide (SO ₂)	Nitrogen Oxides (NO _x)	Dry Gas, Excess O ₂ Content (%)
Engine				
Gas	NA	NA	200 (Spark Ignition) 400 (Dual Fuel) 1,600 (Compression Ignition)	15
Liquid	50 or up to 100 if justified by project specific considerations (e.g. Economic feasibility of using lower ash content fuel, or adding secondary treatment to meet 50, and available environmental capacity of the site)	1.5 percent Sulfur or up to 3.0 percent Sulfur if justified by project specific considerations (e.g. Economic feasibility of using lower S content fuel, or adding secondary treatment to meet levels of using 1.5 percent Sulfur, and available environmental capacity of the site)	If bore size diameter [mm] < 400: 1460 (or up to 1,600 if justified to maintain high-energy efficiency.) If bore size diameter [mm] > or = 400: 1,850	15
Notes: N/A/ - no emissions guideline; Higher performance levels than these in the Table should be applicable to facilities located in urban / industrial areas with degraded airsheds or close to ecologically sensitive areas where more stringent emissions controls may be needed.; MWth is heat input on HHV basis; Solid fuels include biomass; Nm ³ is at one atmosphere pressure, 0°C.; MWth category is to apply to the entire facility consisting of multiple units that are reasonably considered to be emitted from a common stack except for NO _x and PM limits for turbines and boilers. Guidelines values apply to facilities operating more than 500 hours per year with an annual capacity utilization factor of more than 30 percent.				



Table 3-8: Noise Level Guidelines⁴

Area Type	One Hour LAeq (dBA)	
	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential; institutional; educational ⁵	55	45
Industrial; commercial	70	70

⁴ Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, World Health Organization (WHO), 1999. 55 For acceptable indoor noise levels for residential, institutional, and educational settings refer to WHO (1999).

⁵ Noise monitoring should be carried out using a Type 1 or 2 sound level meter meeting all appropriate IEC standards.



4 ENVIRONMENTAL AND SOCIAL BASELINE

4.1 Description of the Environment

Moharam Bek, Abis and Abu Quier belong to Alexandria Governorate which is one of the 27 Egyptian Governorates, which is extending about 32 km along the coast of the Mediterranean Sea in the north central part of Egypt

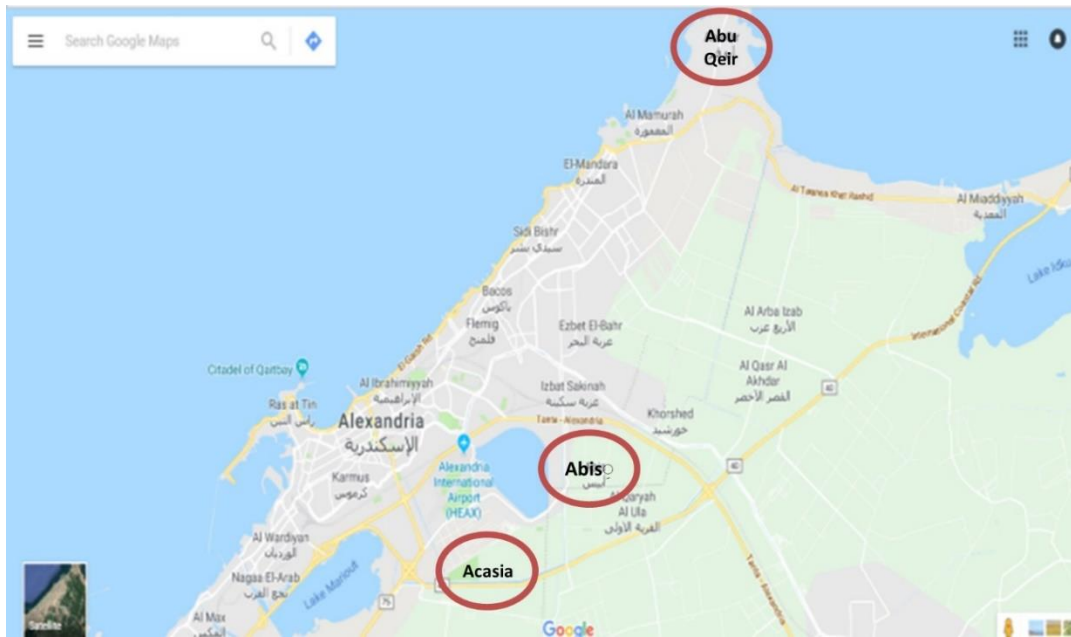


Figure 4-1: Map of project areas in Alexandria City

4.1.1 Air quality and noise intensity measurement

The measurement location was chosen based on the nature of the surrounding activities, prevailing wind direction, site topography, and the future layout of the proposed project components. The main sensitive receptors identified on the route of gas feeding pipes in the project areas are Al Salhia primary school/ Kobry Al Namous, Abis Residential area and PRS at Abu Quier , Alexandria. The GPS coordinates of the selected monitoring locations are shown in **Table 4-1**.

Table 4-1: Location of air and noise measurements

Location	Type of Measurement	Latitude	Longitude
Al Salhia primary school/ Kobry Al Namous, Abis Residential area	Noise intensity	31°13'18"N	29°58'31"E
PRS at Abu Quier , Alexandria.	Ambient air	31°15'52"N	30°5'32"E

4.1.1.1 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.

8-hour average measurements were conducted for pollutants of primary concerns, namely, carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), Total Suspended Particulates (T.S.P) and particulate matter (PM₁₀).

Methodology and instrumentation of Air Quality measurements are detailed in Annex 3.

The following tables present the results for ambient air quality measurements conducted at the monitoring location at Abu Quier , Alexandria. Daily average results are shown in the following table for all the measured parameters.

Table 4-2: Eight (8) hours average ambient air pollutants’ concentrations (µg/m³)

Area	NO (µg/m ³)	NO ₂ (µg/m ³)	NO _x (µg/m ³)	SO ₂ (µg/m ³)	CO (mg/m ³)	PM ₁₀ (µg/m ³)	T.S.P (µg/m ³)
Abu Quier	10.250	19.213	29.463	21.013	2.063	132.5	200.5
Limits							
National (24 hrs)	150	150	150	150	10 (mg/ m ³ , 8 hrs)	150	230
WB (24 hrs)	-	-	200(1 hr)	125	N/A	150	230

During the construction phase, excavation and rehabilitation activities will likely cause dust levels to surpass permissible levels in construction areas. That said, excavation and rehabilitation are done on the same work day. Therefore, the duration of permissible levels being surpassed will be intermittent for the duration of the work day i.e., 8-10 hours. Management and mitigation plans for dust concentration beyond permissible levels are further addressed in chapters 5 and 7.

4.1.1.2 Site specific noise measurements

Noise level measurement was conducted at the technical education secondary school in Moharam Bek, Alexandria. The duration of the measurements is 8 hours with one hour averaging intervals.

Methodology, instrumentation, and results of Noise measurements are detailed in Annex 3.

The tables below present the results of ambient noise measurements and their corresponding national and World Bank permissible limits.

Table 4-3: Average ambient noise level measurements at Al Salhia primary school/ Kobry Al Namous, Abis Residential area

Time	Sound Level Equivalent & Percentile Recordings in dBA for 8 Hours						Permissible Limits LAeq (dBA)	
	LAeq	LA10	LA50	LA90	LA95	LCpeak	National	International
10:00	59.3	55.57	61.129	67.2421	73.96	118.6	50	55



Time	Sound Level Equivalent & Percentile Recordings in dBA for 8 Hours						Permissible Limits LAeq (dBA)	
	LAeq	LA10	LA50	LA90	LA95	LCpeak	National	International
11:00	60.4	53.9	59.3	65.2	71.82	113.6		
12:00	62.5	62.5	68.81	75.69	83.26	115.4		
13:00	68.3	63.1	69.42	76.37	84.010	116.3		
14:00	66.4	57.7	63.57	69.93	76.923	103.07		
15:00	65.8	59.9	65.96	72.566	79.8227	116.1		
16:00	64.1	67.0	73.73	81.11	89.22	115.4		
17:00	66.4	64.5	70.99	78.08	85.89	109.164		

The results of ambient noise measurements were compared to the national and international permissible limits. The results showed noncompliance when compared with both, the national and international guidelines. This is due to the increase of the traffic in the area includes all types of cars and pedestrians and presence of some commercial or administrative activities although the area is considered a sensitive area.

4.1.2 Climate

Temperature

The variations of the monthly mean air temperature indicate a range from a minimum of 9.1 °C in January to a maximum 30.4 °C in July and August as average values.

Table 4-4: Monthly average temperatures in Alexandria for the Year 2015

Month Property	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Average Min. Temp. (°C)	9.1	9.3	10.8	13.4	16.6	20.3	22.8	23.1	21.3	17.8	14.3	10.6
Average Max. Temp. (°C)	18.1	19.3	20.9	23	25.5	28.6	29.7	30.4	29.6	27.6	23.7	19.8

Source: weatherbase.com

4.1.3 Geology

4.1.3.1 Geomorphology

The geology in project areas consists of the following deposits:

1. Holocene deposits
2. Pleistocene sediments
3. Pliocene sediments



4. Miocene sediments (Moghra foundation)

4.1.4 Water resources

4.1.4.1 Surface water

Alexandria is irrigated from the River Nile. The areas of Moharam Bek and Abis get their water from Al-Mahmoudeya Canal, which is a part of Rosetta Branch of the River Nile. The Canal is a strategic source of drinking water as well as a fluvial navigation waterway with a length of 77 km.

The projected work is planned along existing roads; no pipelines will be passing through any of the aforementioned surface waters.

As for Abu Quier ; there is no existence for any surface water body in the study area.

4.1.4.2 Subsurface water

Subsurface resources in project areas are limited in quantity. They are mainly formed from rainfall and usually characterized by low quality.

4.1.4.3 Groundwater

The groundwater aquifers in Alexandria Governorate are the coastal aquifer, the Nile aquifer, El Ralat aquifer, and Aquiclude system. **During the project construction activities, the excavation depth does not exceed 1 meter, therefore groundwater is unlikely to be encountered.**

4.1.5 Terrestrial environment

The projected work is planned along existing roads; no pipelines will be passing through any of the natural habitats. The gas routes will be located in an 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.

Only some Canis sp., sparrows, and Filesdomestica have been recorded in the project area as fauna, while some Phragmitis species of flora also have been recorded.

4.1.6 Physical cultural resources

As the natural gas connections project will only take place in urbanized and semi-urbanized areas in an already existing street network, no physical cultural resources are expected to be disturbed by project activities. In addition, one of the conditions for connecting natural gas to a given area is the presence of all other underground utilities in that area. This means that excavation will take place in streets that have already been excavated and include underground utilities.

There are no identified archeological sites or sites with cultural or historical value, located within those semi-urban areas that would be affected by the NG pipework. In case of any archeological discoveries within the project areas; **Annex 4**, entitled 'Chance Find Procedure,' details the set of measures and procedures to be followed in such case.



4.1.7 Waste management

Solid waste management in Moharam Bek, Abis and Abu Quier is planned, operated and monitored by the local municipality. Primary waste collection is handled using old trucks and tools. The responsibility of service planning, delivery and monitoring in Moharam Bek and Abis is delegated to the sub –district management (Hai Wasat Alexandria), while the sub –district management (Hai Al Montazah) is responsible for Abu Quier district. The collected SW is then transferred to the legal landfill area for final disposal.

4.1.8 Environmental facilities

The Nasiriya Hazardous Waste Treatment Centre (NHWTC), located in Borg El Arabic District in Alexandria Governorate, is conceived for the treatment of inorganic hazardous waste and is designed in accordance with the European standards.

The LDC will be in need to sign a contract with cleansing company in order to collect domestic wastes. In addition, LDC will be in need to sign a contract with a licensed hazardous waste collector to collect hazardous wastes. This will not be a problem due to the availability of different service providers.

The following table presents the available environmental facilities in Alexandria Governorate.

Table 4-5: Environmental facilities in Alexandria Governorate

District	Environmental Monitoring station	Dumping site (Nasiriya Landfill)	Recycle factory	Cleansing company
El Montazah	4		1	
Wasat	6		2	1
Total Governorate	17	1	3	1

Statistical Year Book Alexandria Governorate 2015

4.1.1 Roads and traffic

Roads and traffic might be influenced by excavation activities to be conducted in the roads. It will be useful to shed light on the current roads' condition and their density, as well as, define traffic related aspects that might also be affected by the project.

The project will pass by the main roads which is dense during rush hours 8-10 a.m. and 4-8 p.m.. Basically, the network will be constructed in the main streets and allies. Thus, there is a probability that the project will cause traffic congestion in these roads.

Generally speaking regional and domestic roads in the project sites are well paved. However, they are overcrowded particularly during summer time and rush hours (8-10 in the morning and between 4-8 p.m.) The streets inside project areas are wide. Consequently, the probability to affect main streets is not high. However, digging activities in narrow allies (less than 6 meter width) might affect traffic and pedestrian for one working day. A sample of narrow roads are presented below.



Figure 4-2: Narrow street in Moharam Bek



Figure 4-3: Narrow street in Abu Quier

4.2 Socioeconomic Baseline

Project areas located in Abis, Acasia and El Said Club that fall under the jurisdiction of Moharam Bek sub-district (Hai) in Wasat district. Abu Quier (West and East) is located under El Montazah district. Most of data collected was on the district level (2015). Limited data was available dated 2013 from Poverty Mapping. Most recent data collected from the National Census 2017 was on the Governorate level.

4.2.1 Demographic characteristics

The total population reside in Moharam Bek (115313 people). In Abu Quier (West and East) 41093 people were estimated. Similarly, in Abis, 41946 people were estimated.

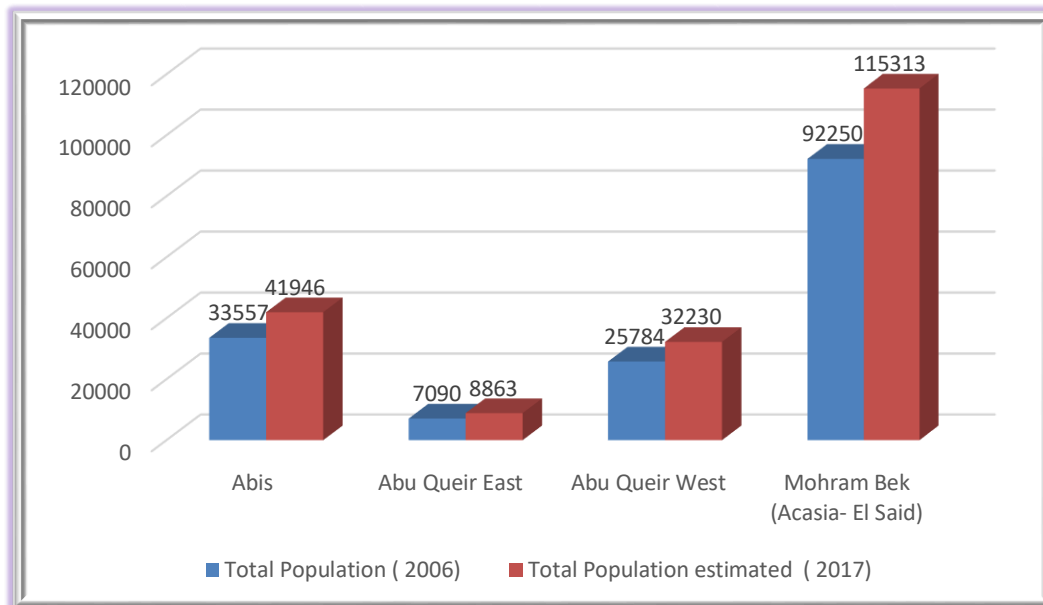


Figure 4-4: Population distribution in project areas

Distribution of population data by sex reflected that about 51.0% of the residents in El Montazah are males, whereas the percentage of males in Wasat district is about 49.5%.



Table 4-6: Distribution of population by sex and district in Alexandria project sites

District	Total population			Households
	Male	Female	Total	
El Montazah	690,535	660,432	1,350,967	321,658
Wasat	296,608	301,960	598,568	142,516

Source: Statistical Year Book 2015

Based on Description of Egyptian Governorates by Information 2012, the average household size is estimated 3.83 per household in Alexandria Governorate. Total birth rate is estimated at 27.6 Live birth/ Thousand persons, whereas the mortality rate is estimated with 7.9 dead person/ Thousand persons. Population normal increase rate is 19.7 per thousand persons. Life expectancy increased to be 72 years in 2007.

The average household (HH) size in the project areas is as follow: 4 people in Moharam Bek, while it is estimated at 4.8 people in Abis. In Abu Quier , the household size is 4.15 people/HH.

4.2.2 Human development profile

4.2.2.1 Educational status

Education is one of the main determinants of households' poverty status. Additionally, any awareness activities should put into consideration the community level of education. Based on the data available from the Poverty Mapping data developed by CAPMAS in 2013, the residents (above 10 years old) of Abis tend to be of the least percentage of literacy among project areas as literacy rate is about 63.3% in Abis. However, the majority of residents in Moharam Bek (90.5%) are literate. 78.0% of the residents above 10 years old in Abu Quier East are literate, whereas, 86.6% of residents in Abu Quier West are literate. The following table presents variation among project sites in terms of literacy status.

Table 4-7: Educational status in the project sites

Educational indicators	Abis	Abu Quier East	Abu Quier West	Moharam Bek (Acasia- El Said)
% of illiterate people	36.7%	22.0%	13.4%	9.5%
% of illiterate females	51.7%	30.6%	21.1%	20.2%
% of illiterate household heads	66.1%	44.8%	28.2%	24.4%

Source: Poverty Mapping 2013

4.2.2.2 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. All project areas have proper access to potable water, sanitary system (public) and electricity. This fact reflects that the majority of project areas are eligible to be connected to the natural gas, as access to basic services is one of the prerequisites required to install NG.

4.2.3 Health facilities available

Provision of health facility is essential as one of major factors to achieve proper working conditions. Given the importance of provision of health services to the workers, the study team managed to define various health



facilities available to be used by workers. In Alexandria City, there are 22 hospitals and 4 medical treatment institutions. They are segregated as follow:

Table 4-8: Health facilities in Alexandria Governorate

Ministry of Health Hospitals & other Entities:	Unit	Alexandria
No. of hospitals affiliated with the Ministry of Health's Public Bureau	Hospital	2
No. of public and central hospitals	Hospital	6
No. of specialized hospitals	Hospital	10
Hospitals of the Public Authority of Health Insurance	Hospital	4
Medical treatment institutions	Institution	4

Source: Governorates' Description by Information, IDSC 2012

4.2.4 Economic characteristics

4.2.4.1 Poverty index

The poverty indicators reflected that about 11.0% of the Population in Alexandria Governorate are defined as poor in 2012 (Income, Expenditure and Consumption Report 2013). The poverty level escalates to be 12% in 2013. Per capita consumption value was high in Alexandria Governorate 5139 EGP per year. The consumption per capita reflects high economic conditions in the project sites in Alexandria Governorate. The percentage of poor persons to the total population is 6.4%. The Gross Domestic Product (GDP) ⁶ per capita is 8978.3 EGP.

The per capita consumption rate tends to be high in Moharam Bek (2439.752 EGP). However, it is the least in Abis (1448.673 EGP). This will be reflected on the prediction of affordability to be connected to NG. Special attention will be given to poor people in order to enable them to gain the benefits of the project. The AFD and EU managed to provide an in-kind grant to support poor people.

Table 4-9: Per capita consumption rate in the project areas

Abis	Abu Quier East	Abu Quier West	Moharam Bek (Acasia- El Said)
1,448.6	2,055.8	2,205.5	2,439.8

Source: Poverty mapping 2013

6 Gross domestic product (GDP) is the monetary value of all the finished goods and services produced within a country's borders in a specific time period. Though **GDP** is usually calculated on an annual basis, it can be calculated on a quarterly basis as well.



4.2.4.2 Unemployment and work status

4.2.4.2.1 Work status

The Statistical Year Book 2015 reported that total labor force⁷ (citizens 15+) are estimated at 30.46% of the total population. The total employed people are 36.14% from the total labor force. The percentage of women in labor force is estimated at 21.7%.

63.3% of the labor force work in service fields that encompasses tourism, education, trading and administrative work. 33.7% of labor force work in industrial fields. Only 3.0% work in agriculture related works. The professional and technical staff represent 22.6%. Such percentage is relatively the highest among Egyptian Governorate.

4.2.4.2.2 Unemployment

The unemployment ratio according to the Statistical Year Book 2015 is 11.4% in Alexandria. Unemployment ratio is higher among vocational secondary school graduates 51.6%, whereas the university graduates unemployment rate is about 34.9%. For those below secondary education the unemployment ratio does not exceed 14.0% of the total labor force.

4.2.4.2.3 Child labor

The formal Statistics obtained from the Poverty Mapping Data 2013 regarding manpower reflected that the age of starting work is 15 years old. Both the Child Law and the Labor Law state that children shall not be employed before they complete 14 years old, nor shall they be provided with training before they reach 12 years old; however, children between 12 and 14 years old are permitted to work as trainees. Furthermore, the governor concerned in each governorate, in agreement with the Minister of Education may permit the employment of minors aged 12-14 years in seasonal work which is not harmful to their health and growth, and which does not conflict with regular school attendance. Consequently, there is always a high probability to detect child labor in most of the projects implemented in Egypt. In the project areas, the shops tend to recruit children (10-18 years old) in sales activities. Additionally, the contractors who built newly constructed structures in the area relied on young people 16-18 years old. Thus, there is a probability that subcontractors employ children. Therefore, rigid restrictions to employ this category must be added to the contractor obligations.

4.2.5 Perception towards the project

Throughout various consultation activities conducted by the research team; participants displayed remarkable and overwhelming public acceptance and support towards the proposed project. The hardship and financial burdens that the people of project areas have to go through in order to obtain LPG cylinders created a dire need for NG connections.

Beside some concerns regarding street rehabilitation after construction works and options of installation fee payment; the glaring message from governmental and community consultations was to commence and expedite

⁷ Labor force is defined as “all people who are willing and able to work. The size of the labor force is used to determine the unemployment rate. The percentage of the unemployed in the labor force is called the unemployment rate.



the implementation of the project. Some respondents considered the project, as 'restoration of their dignity as Egyptian citizens.'

It is very obvious that almost all of the surveyed samples have positive perception about NG connections project. The majority of the samples reported that NG has many outstanding benefits:

- Reduce financial burden as it cost less than the LPG
- Safer than LPG
- Substitute for LPG and electricity shortages
- Ends the indignity and hardships of acquiring the LPG cylinder

4.2.6 Gender dimension of the current type of fuel

As the case all over Egypt, women play a key role in running households. Women's role includes buying the LPG cylinders and installing them to their stoves or water heaters. As mentioned above; LPG outlets are located in specific areas within the city which adds more pressure on women in terms of time, money and effort exerted to bring the LPG to their houses.

In official LPG distribution business, women are not attracted to this business. Additionally, women were not detected as street vendors working in LPG distribution.

4.2.7 Willingness and affordability to pay

As noted above, the majority of respondents stated their complete support of NG connection project. Such attitude is attributed to the high and fluctuating LPG prices (reaching in some cases over 70 EGP, especially during winter).

Based on focus group discussions, each household consumes between (1 – 3) LPG cylinders monthly, indicating that each household will pay up to 200 EGP per month, in the worst cases.

Participants of the FGD were asked about their opinion of the NG Installation fee. They stated that the installation fee which goes around (2300 to 3000 EGP) is too high to be paid in one installment, given the level of income of all participants. Basically, the majority of participants demanded a system of monthly installments to settle the Installation fee within a period between one to two years. Participants of focus group discussions stated that they can pay around (100 to 200 EGP) per month to settle the Installation fee.

The community socioeconomic characteristics and the willingness of people to convert from LPG cylinders to household NG are remarkable. Community members are much in favor of the project. However, there is a need to provide clear information about the project in order to guarantee full support to the project. 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.

There are two initiatives implemented to support poor people. They are as follows:

1. The first one is AFD initiative:

AFD in full cooperation with the European Union provide grant to poor people in order to support them to benefit from NG project. A targeting mechanism was developed by independent consultant recruited by the AFD in order to put basis or targeting mechanism. The eligibility criterion for the initial targeting strategy depends on selecting the beneficiary households based on their electricity consumption rate, where the latter is not only a transparent and accessible data, but also proves to be highly correlated to the poverty level of households. The average monthly consumption for eligibility shall range from 50 kWh to 300 kWh on average, calculated over a period of 12 months. Consumers have to submit their application to the relevant LDC, which will liaise with the involved entities to check the eligibility of the



households. Subsequently, eligible consumers will receive the subsidy in the form of a deduction applied to the connection fees.

The implementation of the Targeted Financial Support based on this eligibility criterion therefore involves a number of entities; namely EGAS and LDCs under the Ministry of Petroleum, Ministry of Social Solidarity as well as Ministry of Electricity and Renewable Energy.

Based on the current approved eligibility criteria, it is expected that the grant would support in covering the expenses to connect to natural gas to a targeted 500,000 deprived households by the end of October 2019, the eligibility is based on the average electricity consumption. It was agreed to increase the unit subsidy amount from EGP 800 to 1,500 and of the average monthly electricity consumption threshold from 50 to 300 kWh/month.. Town Gas has disclosed all information about the grant in October 2017.

2. The second one is the Egyptian Presidential Initiative to install the NG in installment:

The main objective of this initiative is to support poor people to install the NG. The initiative name is (NG in Installment). Citizens pay to install natural gas in their houses by monthly installments over six years. The Petroleum Minister announced this initiative in July 2018. Beneficiaries pay 30 EGP a month over six years without any interest, along with the monthly bill of their natural gas consumption. This initiative encouraged poor people to install the NG in their houses. Based on reports developed from the LDCs, this initiative managed to expand the introduction of gas to houses in various governorates of Egypt –especially areas with high residential density in Upper Egypt – and substituted and reduced the usage of (LPG) cylinders. This initiative managed within few months to duplicate the number of beneficiaries as the monthly installment plus the monthly consumption is less than 50 EGP. Additionally, there is no advance payment.



5 ENVIRONMENTAL AND SOCIAL IMPACTS

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

The impact assessment methodology adopted for this ESIA is a semi-quantitative “cause-effect” matrix modified from Leopold and Buroz’s Relevant Integrated Criteria. The Leopold matrix is two-dimensional, where the stages of the project (activities) are assessed in relation to the existing environmental characteristics and conditions that may be affected during the execution of those actions. 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. The numbering system is used as a relative measure, where more negative numbers correspond to impacts having a higher negative magnitude. Susceptible receptors and corresponding activity are deduced if magnitude and importance are of minor severity. Then the importance of each impact by activity is determined based on the Buroz relevant integrated criteria. The importance of each impact by activity is assessed by assigning a score for intensity (IN), extension (EX), momentum (MO), persistence (PE), reversibility (RV), recoverability (MC), synergy(SI), accumulation (AC), effect (EF) and frequency (PR) of the impact. The importance, I, is determined according to $I = \pm (3IN + 2EX + MO + PE + RV + SI + AC + EF + PR + MC)$.

For both methods, the severity of the impact is defined as either of no significance, minor, medium, or major. Results from both methods are summarized and presented according to the following scheme:

Impact rating	Color
None or of no significance (no impact);	
Minor severity (minimal impact; restricted to the work site and immediate surroundings)	Yellow
Medium severity (larger scale impacts: local or regional; appropriate mitigation measures readily available);	Orange
Major severity (Severe/long-term local/regional/global impacts; for negative impacts mitigation significant).	Red

Details including impact assessment results for both methods and definitions of each assessment criterion and corresponding score scale for the Buroz Relevant Integrated Criteria are presented in **Annex 5**.

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 Town 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

As part of the construction stage, a lot of indirect benefits are expected to be sensed in the targeted areas due to the need for more supporting services to the workers and contractors who will be working in the various locations. This could include, but will not be limited to accommodation, food supply, transport, trade, security, manufacturing... etc.

5.2.2 Positive impacts during operation phase

1. On a national level, reduced expenditure on imported LPG cylinders
2. 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.
3. The NG connection will help the household achieve a higher level of security by eliminating the need for informal LPG distributors from entering private homes.
4. Constantly available and reliable fuel for home use.
5. Significantly lower gas leakage and fire risk compared to LPG.
6. Improved safety due to low pressure (20 mbar) compared to cylinders.
7. Eliminate the hardships that special groups like the physically challenged, women, and the elderly had to face in handling LPG.
8. Limiting possible child labor in LPG cylinder distribution

5.3 Resources Consumption

5.3.1 During Construction

5.3.1.1 Water

Small quantities of water will be mainly used during the construction phase for domestic purposes by workers and engineers. Water will be provided from the nearest mosque in the area.

5.3.1.2 Fuel

Diesel fuel will be mainly used for diesel generators that supplies electricity to the difficult construction activities including welding. The contractor will be responsible to provide fuel for his equipment and vehicles before arriving to the site and start the construction activities. No fueling will be done on site. Fuel will be provided from the nearest petrol station.



5.3.2 During Operation

No resources will be consumed during the operation phase.

5.4 Potential Negative Impacts

5.4.1 Negative impacts during Construction and Operation Phases

The following table presents the negative impacts expected from the project's activities during construction, operation and maintenances phases.



Table 5-1: Summary of Potential Project Negative Impacts

Impacts During Construction			
Receptor	Description of impact	Type of Impact	Significance
Air quality	<ul style="list-style-type: none"> • Air emissions (gases and particulates) during construction can exceed permissible limits and shall arise from: <ul style="list-style-type: none"> ○ Particulate matter and suspended solids from excavation/backfilling operations ○ Possible dispersion from stockpiles of waste or sand used for filling trenches. ○ Exhaust from excavation equipment and heavy machinery (excavators, trenchers, loaders, trucks) containing SO_x, NO_x, CO, VOCs, etc. • Traffic congestions resulting from road closure or slowing down of traffic due to excavation works. • Dust: 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. • Construction workshops located in the side streets that will cause emissions due to using various cutting machines 	Negative impact	Medium
Noise	Construction activities of the gas distribution network, including workshops located in the side streets, will likely increase noise levels beyond permissible limits due to excavation and heavy machinery. Typical construction noise includes noise intensity due to engine operation, and intermittent impacts which may take place during demolition of asphalt by jack hammers	Negative impact	Minor
Water quality	No crossings of surface waters are expected. However, uncontrolled dumping of waste in canals can result in water pollution.	Negative impact	Minor
Solid, hazardous wastes and liquid waste	<p>Inappropriate waste disposal and improper management of construction waste materials, including wastes generated from the site workshops, 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>Empty containers of chemicals, lubricating oils from fueling/lubricating activities, and paint are considered hazardous waste.</p> <p>It is highly unlikely that groundwater may be encountered at the routes of the pressure distribution networks as these have been previously excavated with no record of groundwater.</p> <p>In the unlikely case that subsurface water is encountered during excavation, improper drainage of dewatering water</p>	Negative impact	Medium



Impacts During Construction			
Receptor	Description of impact	Type of Impact	Significance
	may result in forming stagnant water ponds around the construction site, which can develop, if not drained, infiltrated or evaporated, to form nuisance and an environment for breeding of insects. Normally dewatered product is relatively clean water, which should be drained to the sewer system. To conserve water, if dewatered subsurface water is free of perceivable pollution, it will be to the extent possible- used on- or around the work site or discharged into the nearest canal to be used for irrigation. When dewatering is performed from a contaminated trench or near a source of pollution seepage to subsurface water, contaminated water is collected for certified treatment/disposal according to WB/IFC guidelines and National Laws 93/1962 and 48/1982, respectively.		
Traffic	<ul style="list-style-type: none"> • During the mobilization, preparation phases and construction phases: Mobilization of heavy machinery, site workshops works, storage areas in site, asphalt breaking, excavation, placement of piping, and backfill activities are bound to limit traffic and accessibility. The impact of works on traffic flow and local access will be dependent on the type of road accessed during project activity. • Coordinating with and obtaining approvals from local government and traffic police is vital to avoid delays, objections, and public inconvenience to the work program. • HDD works are planned in crossings under railway; it is temporary and will last for a maximum of 2 working days therefore, the project will not directly affect the trains/railway. • On urban roads, mobilization, preparation and construction phases will entail narrowing roads by longitudinal and/or lateral excavation or totally blocking narrow or side roads as well as limiting or prohibiting parking along the length of the works. Access to buildings and shop entrances may be limited or constricted in cases where excavations form obstacles for pedestrians and cargo. • As pipeline installation will be taking place on roads, local access on selected parts of the road will be ceased and will likely restrict local access to residents into and out of their households. As regular sized vehicles are not the principal mode of transport on local roads, congestion of cars is not anticipated. The inconvenience is expected to affect the flow of Tuk Tuks by slowing them down. However, considering their small size, congestion is not likely to be significant. • Inconvenience to the residents will last for the duration of the construction phase activities, namely, excavation and rehabilitation of the road, which will be done on the same day with no pits being left open overnight. Therefore, the duration of inconvenience and slowed traffic of Tuk Tuks etc. in affected areas will last for the duration of the work day i.e., 8-10 hours. 	Negative impact	Medium
Infrastructure and underground	Underground utilities and infrastructure pipelines (such as water, sewerage and telecommunication) have been installed years ago without accurate documentation and maps for its routes and depths. Therefore, the risk of damage to such	Negative impact	Minor



Impacts During Construction			
Receptor	Description of impact	Type of Impact	Significance
utilities	<p>utilities during excavations for natural gas pipeline installation is possible.</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>		
Street condition	<p>Streets rehabilitation or restoration following pipeline network installation: is referred to by an Egyptian legal/institutional expression (رد الشئ لإصله) 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>	Negative impact	Medium
	<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
Community health and safety	<ul style="list-style-type: none"> Impacts on community health and safety are expected to result from emissions of gaseous pollutants and dust, increased background noise levels, uncontrolled dumping of construction waste, accidental falls in temporary excavated trenches, accidental contact with equipment, accidental dropping of equipment due to works at height etc. Emissions of gaseous pollutants and dust from equipment and machinery used in the excavation works and in the site workshops. Increased background noise levels resulting from the operation of jackhammers, which surpasses permissible limits for residential areas in the vicinity of commercial areas during the day. Waste accumulation in illegal dumping and potential burning of construction waste, which will consist mainly of excavated soil and leftover PE and carbon steel pipes. 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. Installation of household connections may involve working at height, which can result in falling objects causing health and safety hazards to local community. 	Negative impact	Minor



Impacts During Construction			
Receptor	Description of impact	Type of Impact	Significance
	<ul style="list-style-type: none"> Construction works will involve the use of equipment such as jackhammers and welding machines, which can cause injuries to local community as a consequence of contact. Excavation works may cause rupture of underground utilities such as water supply pipes. 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. Damaging sanitary pipes, electricity underground cables and water pipelines result in severe disturbance to community people. The time needed to resolve problems with damaged utilities is relatively short (no more than 4-8 calendar days). Additionally, the contractor will be responsible of compensating for damaged pipes. Children in schools might get affected in case of excavating in the proximity of their schools. Women, disabled, old people and children might get injured if they crossed the excavated areas in main streets and allies. Children in particular are vulnerable to falling in the excavated areas 		
Labor conditions and occupational health and safety	<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>Noise: The noise intensity level resulting from jackhammers surpasses permissible level of 85 dB (A) for work place with up to 8 hour shifts</p> <p>Vibrations: The use of jackhammers will results in the generation of hand-arm vibrations; the typical vibration value is of 9 m/s², which exceeds the ACGIH Threshold limit value of 5 m/s² (8 hour equivalent total value), but is below the exposure limit of 12 m/ s² for a total daily duration of less than an hour.</p> <p>Electrical: Faulty equipment or exposed cables can cause risks of electrocution.</p> <p>Working environment temperature: The exposure of workers to high temperatures can result in dehydration and sunstrokes.</p> <p>Working at heights: Household installations will require working at heights, which can result in falls and pose a safety hazard.</p>	Negative impact	Medium
Child labor	As mentioned in the baseline, child labor is a common practice in Egypt at large. This could be also an applicable risk in the project areas. Children below 18 are favorable labor as they receive low salaries and they are less demanding.	Negative impact	Low-Medium



Impacts During Construction			
Receptor	Description of impact	Type of Impact	Significance
	There is a risk that this common practice is used in the project.		
Labor influx	The LDC recruits a number of workers and technicians during the construction phase. If not managed properly, the recruited workers' interactions with the local community may result in inconvenience, inappropriate and unappreciated acts, negative impacts on privacy or may even result in serious misconducts (e.g. harassment) or inappropriate behaviors that could affect different groups including women. Although not very much expected in the project, In the meantime the increase of workers might mean in some areas influx of additional population and increased pressure on local resources, prices of commodities, accommodation and rents.	Negative impact	Minor
Soil quality	Soil may be susceptible to pollution resulting from uncontrolled dumping of wastes generated during construction.	Negative impact	Minor
Ecological system	No protected areas will be encountered in the alignment of the lines. In addition, no fauna and/or flora of significance have been identified in the project areas.	Negative impact	Of no significance
Impacts related to lands	The project will need plots of lands for the workshops and temporary storage areas. Town Gas will establish the workshops and temporary storage areas in the side roads near to installation site. The lands are state owned lands that require a kind of arrangement with the Local Governmental Unit in to use the lands for storage purpose and establish a temporary workshop. Using the side road will never entail any land acquisition. No socio-economic impacts on lands have been identified.	Negative impact	Of no significance
Possible effects on vulnerable structures⁸	Drilling vibrations: Workers are accustomed to manually drill to prevent vibrations near sensitive structures (if any). Another possible impact on structurally vulnerable buildings is weakening the structural system during drilling holes in the walls for riser connections on the side of the building or for internal connections to the household. The hole for the pipe usually is small compared to the wall section. Moreover, beams can easily be avoided by carefully selecting the distance of the drilling from the ceiling. For skeleton type buildings, drilling in columns or beams could have a significant effect on the structure, but this risk is well understood among connection workers and could be avoided.	Negative impact	Of no significance
Effect on Culturally Valuable Sites	The works for the gas distribution network are not planned nearby physical cultural resources as described in the baseline of the project area in chapter 5.	Negative impact	Of no significance

⁸ If encountered within project areas.



Impacts During Construction			
Receptor	Description of impact	Type of Impact	Significance
Resources	Water is mainly used by the workers and engineers. There is a permanent source of water from Egyptian Holding Company for Drinking Water and Sanitation.	Negative impact	Of no significance
	Fuel: Diesel fuel will be mainly used for diesel generators that supplies electricity to the difficult construction activities including welding. The fuel will come from the nearest petrol station. The fuel will be delivered to the construction site via trucks when needed	Negative impact	Of no significance



Impacts During Operation			
Receptor	Description of impact	Type and Magnitude	Significance
Occupational health and safety	Possible impacts to health and safety during operations include exposures to odorant, noise, accidental injury to workers. In addition; health and safety issues include working around energized equipment, and possible contact with natural hazards. However, during the operation and maintenance phase, the impacts on workers tend to be low.	Negative	Minor
Air quality	No gaseous emissions are expected to occur during the operation phase except for the potential natural gas leak or in case of accidents (odorant handling or storage) and during maintenance activities.	Negative	Of no significance
Noise	No noise is generated from the operation of gas network. Therefore, no impacts due to noise during the operation of the gas network have been identified.	Negative	Of no significance
Soil quality	The normal operation of the gas network does not have any impact on soil. Risks of soil contamination are only associated with the possible spillage or leakage.	Negative	Of no significance
Water quality	No impacts due the normal operation of the gas network on water bodies have been identified.	Negative	Of no significance
Ecology	No impacts due the normal operation of the gas network on ecological systems have been identified. In addition, no impacts due the normal operation of the gas network on fauna and/or flora have been identified in the project areas.	Negative	Of no significance
Waste management	No wastes are expected during the operation phase.	Negative	Of no significance
Resources	No resources will be consumed	Negative	Of no significance
Community health and safety	In addition to a full array of safety and emergency precautions taken by EGAS and Town 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.	Negative impact.	Minor
Integrity of natural gas piping	Low-probability events may impact the integrity and safety of the NG network and components during the years of the operation phase. Geological and geotechnical events: earthquakes may result in geotechnical instabilities that lead to network breakage or leakage in multiple locations simultaneously. The geological and geotechnical history of the area may also lead to possible events. Sabotage: pipelines and other components may be targeted for sabotage.	Negative impact.	Minor



Economic disturbance to the LPG distributors	There could be a Minor negative economic impact on LPG cylinders distributors. (Governmental sector- private sector licensed to distribute LPG cylinders- non-official distributors). The LPG distributors will lose their income. However, their ability to move to other areas or change their business is high. Various previous NG projects have not influenced the informal LPG vendors.	Negative	Minor
---	---	----------	-------



6 Analysis of Alternatives

This Natural Gas Connections to Households Project is expected to yield many economic and social benefits in terms of providing a more stable, energy source, achieve savings in LPG consumption and enhance safety in utilizing energy.

In March 2014, an ESIA framework was developed for the project's Governorates including Alexandria Governorate. This report managed to identify all project alternatives that can be addressed in project locations. This ESMP utilized the alternative that is only applicable to Alexandria City sites.

Pipeline Installation Technology Alternatives

To install a natural gas pipeline beneath the ground level, this can either be done by excavation 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.

6.1 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.

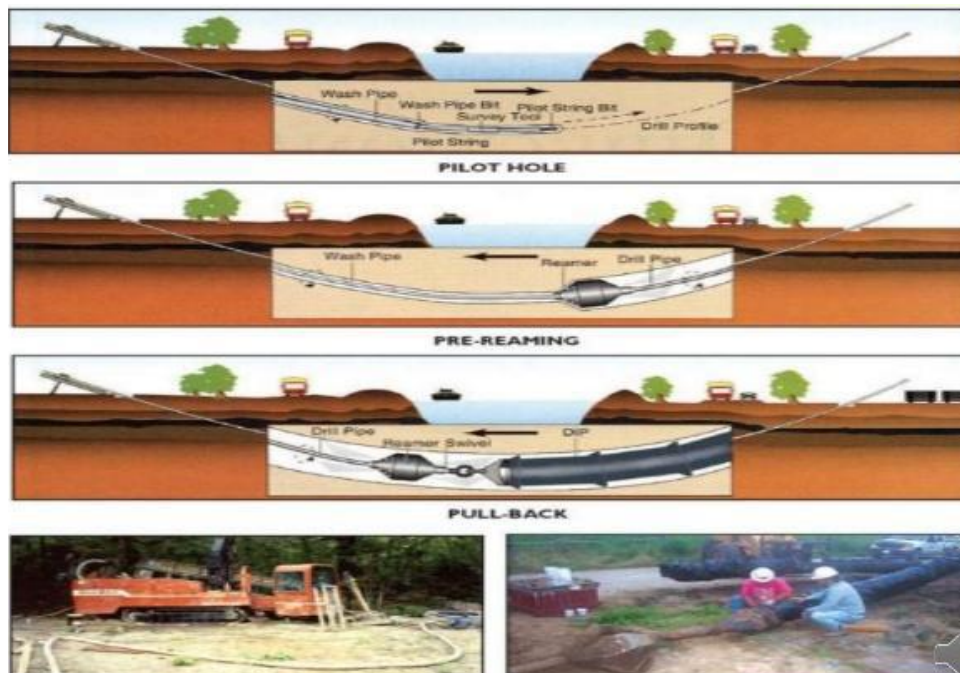


Figure 6-1: Horizontal Directional Drilling

6.2 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 solution in case of having long pipeline distances such as in agricultural lands or desert areas.

In conclusion, open cut is recommended since this will not negatively affect the environment, and it will be a cheap and safe option. However, for the crossings, HDD is needed for the crossings under railway specified in **section 2.3**.

Description and details of the preferred routing selected, types of regulators, preferred working hours to avoid the rush hours, as well as the alternative of payment for installations costs are discussed in details in the ESIAF developed for the whole project (1.5 Million Natural Gas Connections Project in 11 Governorates).



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 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.

The term Local Distribution Company (**LDC**) used below refers to the gas company in charge of project implementation “**Town Gas**”

7.2 Management of Grievance

7.2.1 Introduction

EGAS and the LDCs are committed to preventing, limiting and, if necessary, remedying any adverse impacts caused by its activities on local populations and their social and physical environment. Identifying, preventing and managing unanticipated impacts are facilitated by a grievance redress mechanism (GRM). As the World Bank’s governance and anticorruption (GAC) agenda moves forward, grievance redress mechanisms (GRMs) are likely to play an increasingly prominent role in Bank-supported projects.

Current GRM mechanism applied

Town Gas and its sub-contractors adhere to organized grievance mechanism. It can be summarized as follows:

Aspect	Details
Complaints channels	The customers and community people can bring forward their complaints to: 1) site manager, 2) Governmental complaint gate, 3) Ministry of Petroleum and Town Gas customer services’ offices.
Time interval	There is no time interval to handle the grievances.
Staff and responsibilities	There is in place an assigned general manager supported by two junior administrative staff who receive, transfer and document all grievances. They also responsible for monitoring and reporting grievances to the headquarter
Disclosure	Community people are informed about complaints mechanism. They use the hotline during construction and operation phases.
Confidentiality	Confidentiality is assured to the aggrieved person.

Generally speaking, current grievance mechanism is functioning and informed about. However, there might be a room for enhancement through applying the proposed corrective measures mentioned in the coming section.



7.2.2 Proposed GRM mechanism

Anyone will be eligible to submit a grievance to the Project if they believe a practice is having an adverse impact on the community, the environment, or on their quality of life. They may also submit comments and suggestions to the GRM.

The GRM was designed in order to handle all grievances during the construction and operation phases. The aggrieved person has the full right to lodge his complaint anonymously. However, this might cause a challenge to inform him about any corrective procedures. Additionally, if the complaint is related to service seeking, the aggrieved person should provide full information about himself and about his residential unit.

Objectives: The objective of a grievance procedure is to ensure that all comments and complaints from any project stakeholder are considered and addressed in an appropriate and timely manner. This will manage to build trust and detect any weak signal. The process will reduce risk of litigation and conflicts with the community

Disclosure of the GRM: The Community people will be fully informed about the Grievance procedures in simple language. Information about grievance mechanism will be tailored according to the community. All information about GRM will be made available on the contracting offices during the construction phase and on customer services offices during the operation phase.

Mode and channels of Grievance: The Company will accept all comments and complaints associated with the project from any stakeholder. Comments can be made via email, post, fax, on the telephone or in person. The comments and complaints will be summarized and listed in a Complaints/Comments Log Book, containing the name/group of commenter/complainant, date the comment was received, brief description of issues, information on proposed corrective actions to be implemented (if appropriate) and the date of response sent to the commenter/complainant.

The proposed mechanism is built on three tiers of grievances:

- The foreman working on the ground in **Alexandria sectors**
- The project manager in **in Alexandria Governorate**
- The regional department of Town Gas in Alexandria Governorate

The aggrieved person has the full right to immediately use tier 2 or 3 upon his convenience and there is no need to exhaust the first tier. Additionally, he can resort to any other governmental entities i.e. Ministry of Petroleum. He/ She also have the full right to bring a lawsuit without resorting to any of the grievances tiers.

Grievance channels:

A. During construction phase:

- Foremen act as the main channel for complaints. They are always available on the construction sites. However, complaints raised to him/her are mostly verbal. Thus, s/he should document all received grievances in writing form using a fixed serial number that the complainant should be informed about to be able to follow up on the complaint
- Hotline: 129 is the hotline in Egypt Gas.
- The SDO within the LDC and EGAS
- SDO name and cell phone Eng. Sheref Mahmoud Ahmed Ali - 01009406815
- Email. info@towngas.com.eg

B. During operation phase:

1. Customer service office
2. Hotline: 129 is the hotline in Egypt Gas.



3. The SDO within the LDC and EGAS
4. Email. info@ towngas.com.eg

Response to grievances: All comments and complaints will be responded to either verbally or in writing, in accordance to preferred method of communication specified by the complainant. Comments will be reviewed and taken into account in the project preparation; however they may not receive an individual response unless requested.

Registration of GRM: All grievances will be registered and acknowledged within 5 business days and responded to between to 15- 30 business days (depending on the nature of grievance). The project management will keep a grievance log and report on grievance management, as part of annual project progress reports, which will be available on the LDC and EGAS.

Confidentiality: Individuals who submit their comments or grievances have the right to request that their name be kept confidential, though this may mean that the LDC is unable to provide feedback on how the grievance is to be addressed. Confidentiality should be informed about during the process of disseminating GRM information.

Management of GRM: During construction and operation phases, grievances in relation to construction activities will be managed by the LDC and the construction contractor(s). The LDC will provide contact information to project areas

A separate grievance mechanism is available in the same manner for workers, including employees of both the LDC-employed and contractors.

Grievance Cycle: The grievance received via any of communication channels and tiers will follow the following cycle. The aggrieved person has the full right to submit his grievance to any of the assigned tiers. The aggrieved person also has the full right to submit his grievance to any entity he prefers i.e the Minister of Petroleum, the Governorate ...etc. It is essential to mention that the acknowledgement of grievance should not exceed two working days.

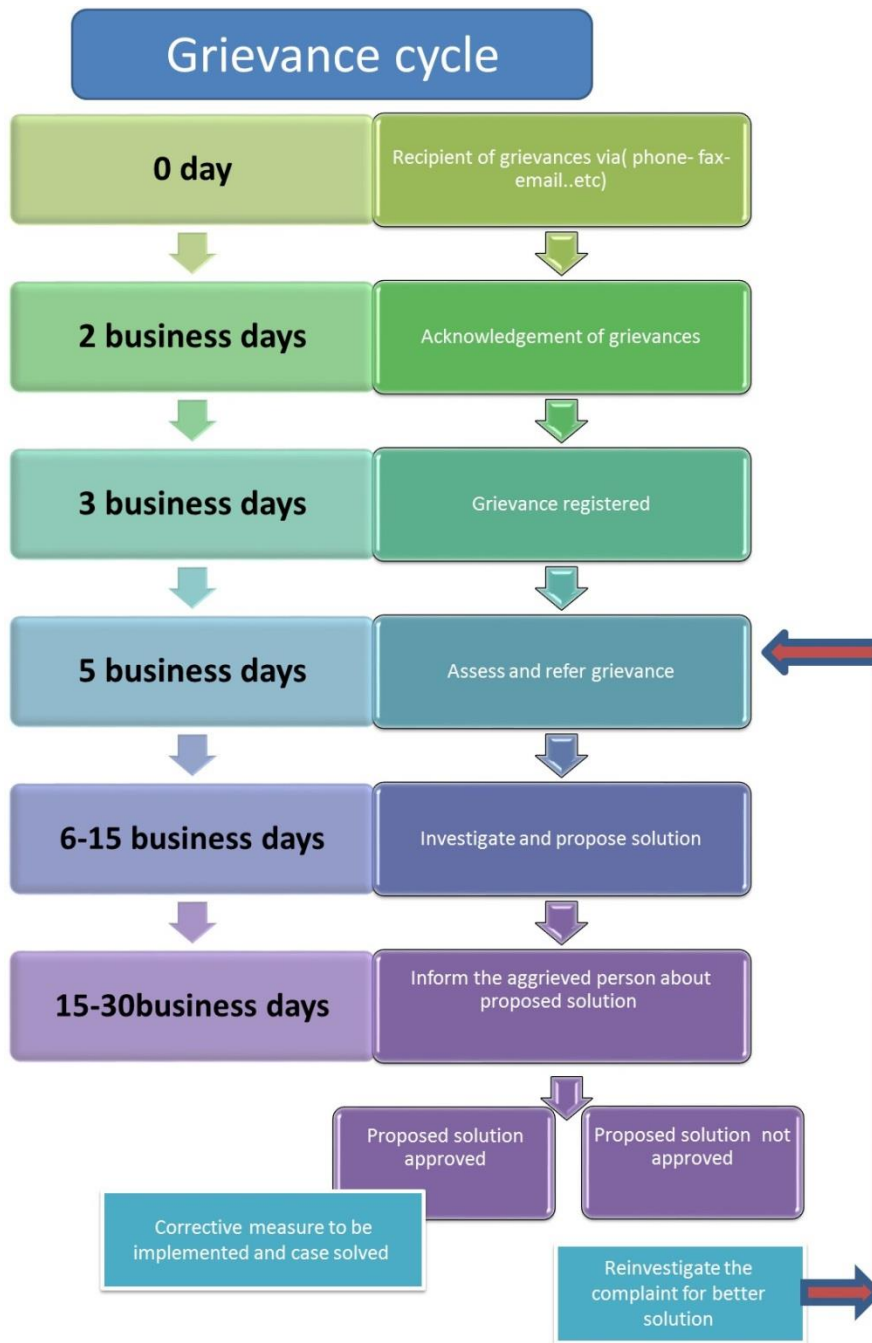


Figure 7-1:Grievance cycles

Monitoring of grievances: All grievances activities should be monitored in order to verify the process. The monitoring process should be implemented on the level of EGAS and the LDC (both in the site and in the headquarter). For more information about GRM please see Annex 6



7.3 Management of Mitigation and Monitoring activities During CONSTRUCTION Phase

Table 7-1: Environmental and Social Management Matrix during CONSTRUCTION

Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Local traffic and accessibility	Traffic congestion (and associated noise/air emissions)	Excavation during off-peak periods Time limited excavation permits granted by local unit & traffic department	Negligible	Excavation contractors	LDC HSE for guidance supervision +EGAS for overall supervision+ Traffic department	Contractor has valid conditional permit + Field supervision	Contractor costs LDC management costs
		Announcements + Signage indicating location/duration of works prior to commencement of work	Negligible	LDC Excavation contractors	LDC HSE for guidance supervision +EGAS for overall supervision +Local Unit + Traffic department	Ensure inclusion in contract + Field supervision	
		Apply Horizontal Directional Drilling under critical intersections whenever possible to avoid heavy traffic delays	Negligible	Contractor	LDC HSE for guidance supervision +EGAS for overall supervision	Field supervision	
		Traffic detours and diversion Pedestrian crossings can be provided if necessary.	Negligible	Traffic Department	Traffic Department	Field supervision for detouring efficiency Complaints received from traffic department	Additional budget not required
		Road restructuring and closing of lanes	Negligible			Fluidity of traffic flow	
Ambient air quality	Increased emissions of dust and gaseous pollutants	Controlled wetting and compaction of excavation/backfilling surrounding area	Negligible	Excavation Contractor	LDC HSE for guidance supervision +EGAS for overall supervision	Contractual clauses + Field supervision	Contractor costs LDC management costs
		Excavated soil stockpiles and stored sand (if any) should be located in sheltered areas. Stored fine sand should be covered with appropriate covering material ⁹ , such as polyethylene or textile sheets to avoid soil dispersion. 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. Disposal of excavation/construction waste should be in locations licensed by the local authority.	Minor			Contractual clauses + Field supervision	
		Compliance to legal limits of air emissions from all relevant equipment	Minor			Measure and document emissions of machinery by regular audits request emission measurements	
		Availability of 24-7 hotline service (129) to all beneficiaries and the public for reporting possible leaks, damages or emergencies Quick response to gas leaks by evacuation of the affected area Repair or replacement of failed component	Minor	LDC	LDC HSE for guidance supervision +EGAS for overall supervision	Field Supervision	

⁹ Sufficient sheets should accompany work groups during the construction phase.



Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Ambient noise levels	Increased noise levels beyond WB/National permissible levels	<p>Ear muffs, ear plugs, certified noise PPE for workers</p> <p>Noise exposure periods should be minimized for workers so as not to exceed the safe limits mentioned in the environmental laws in addition to the occupational health and safety standards. .</p> <p>Workers operating in areas or activities of high noise level intensities should be supplied with earmuffs</p> <p>Contractors should train all the workers before the commencement of construction activities about this hazard and how to avoid it.</p> <p>Restrictions on lorry movements to prevent noise nuisance in the early morning/late evening</p> <p>All machine and vehicles should be shut-off when not used.</p>	Negligible	Excavation contractors	LDC HSE for guidance supervision +EGAS for overall supervision	Contractual clauses + Field supervision (audits)	Contractor costs LDC management costs
Local community Workers		<p>Avoid noisy works at night whenever possible</p> <p>Avoid construction activities during peak hours of heavy traffic whenever possible; especially when the project site is in proximity of a sensitive receptor.</p>	Negligible				
Ground utilities' integrity Local community	Damage to underground utilities resulting in water/wastewater leaks, telecommunication and electricity interruptions	<p>Coordination with departments of potable water, wastewater, electricity, and telecom authorities to obtain maps/ data on underground utilities, whenever available</p> <p>Mitigation measures for avoiding breaking underground utilities and infrastructure pipes:</p> <ul style="list-style-type: none"> • Collecting most accurate maps for underground utilities and infrastructure routes from Information Centers in the various Governorates and asking them for site markings, whenever available, and making such data available to the contractor prior to commencing the works. • Boreholes to locate underground utilities before using mechanical excavation. • Once underground utilities are mapped or uncovered, horizontal and vertical clearances between natural gas lines and electricity lines must be respected for safety considerations. • In case an underground utility and infrastructure pipe has been damaged, standard procedures should be followed, as described before, in addition to preparing a documentation report for the accident. The documentation report should include: <ul style="list-style-type: none"> ○ Time and place of accident; ○ Name of contractor; ○ Type of underground utilities and infrastructure line; ○ Description of accident circumstances and causes; ○ Actions taken and responses of different parties, such as infrastructure company; ○ Duration of fixing the damage; and ○ Damage caused (description shall be 	Negligible	Excavation Contractor	LDC HSE for guidance supervision +EGAS for overall supervision	<p>Official coordination proceedings signed by representatives of utility authorities</p> <p>Examination of site-specific reports and records</p> <p>Field supervision</p>	Contractor management costs LDC management costs



Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
		according to observation, expertise judgment, reports of infrastructure company).					
		If maps/data are unavailable: Perform limited trial pits or boreholes to explore and identify underground utility lines using non-intrusive equipment	Negligible		LDC HSE for guidance super vision +EGAS for overall super vision	Contractual clauses + Field supervision	
		LDCs follow established procedures to deal with emergency situations related to breaking underground utility and infrastructure lines. 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. The mitigation measures below focus on preventive measures and documentation. Preparation and analysis of accidental damage reports	Negligible		LDC HSE for guidance super vision +EGAS for overall super vision	Review periodic HSE reports	
		Repair and rehabilitation of damaged components	Negligible		LDC HSE for guidance super vision +EGAS for overall super vision + Local Government Unit Local Police	Contractual clauses + Field supervision	
Streets (physical status) local community and workers (health and safety)	Hazardous waste accumulation	<ul style="list-style-type: none"> Temporary storage in areas with impervious floor Safe handling using PPE and safety precautions 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 (Nassreya /Unico). Transfer to LDC depots for temporary storage Disposal at licensed Alexandria hazardous waste facilities (Nassreya) If hazardous waste quantities generated are too small for isolated transport to the Nassreya /Unico landfill, a temporary storage site can be created. Coordination with waste authority will be imperative to secure a location and implement adequate procedures for storage depending on quantities and type of wastes until collection and shipping to Nassreya /Unico landfill. Hand-over selected oils and lubricants and their containers to Petrotrade for recycling 	Minor	LDC Excavation Contractor	LDC HSE for guidance super vision +EGAS for overall super vision	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 Nassreya Approximate cost of the above (to be revised upon project execution): 8,000-10,000 LE per ton
		<ul style="list-style-type: none"> 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. Adequate management of asbestos and any possible hazardous waste 	Negligible	Water Authority + contractor		Field supervision + review of Water Authority manifests	Contractor costs LDC management costs
		<ul style="list-style-type: none"> Minimize fueling, lubricating and any activity onsite that would entail production of hazardous materials empty containers 	Minor	LDC Excavation Contractor		Field supervision	



Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
		<ul style="list-style-type: none"> Pre-Plan the anticipated amounts of hazardous liquid materials (such as paint, oils, lubricants, fuel) to be used in the various activities in order to minimize leftovers and residuals. 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. 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 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. Testing the subsurface water sample before selecting the appropriate disposal option Asphalt waste may contain hazardous components, such as tar, lubricating oils, heavy metals, etc. However, its solid nature minimizes the transport risk of such components to the environment. Disposal of asphalt waste to the municipal waste disposal site is common practice in Egypt as this is normally not associated with significant environmental risks because of the dry weather nature of the country. 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 Ensure hazardous liquid material/waste containers are always sealed properly and secured from tipping/falling/damage/direct sunlight during transportation and storage In case of spillage: <ul style="list-style-type: none"> avoid inhalation and sources of ignition cover and mix with sufficient amounts of sand using PPE collect contaminated sand in clearly marked secure containers/bags Add sand to inventory of hazardous waste 					
Local community	Non-hazardous waste accumulation	<p>Allocating certain areas, in each Sector, for stockpiling waste soil and construction waste, in coordination with the local authority.</p> <p>No soil stockpiling is allowed on banks of waterways.</p> <p>Segregate waste streams to the extent possible to facilitate re-use/recycling, if applicable</p> <p>Maximize re-use of excavation waste as backfill for natural gas pipeline trenches.</p> <p>Reuse non-hazardous waste to the extent possible</p> <p>Estimate size of fleet required to transport wastes.</p> <p>Transfer waste to Nassreya disposal facility</p>	Minor	Excavation Contractor	LDC HSE for guidance supervision +EGAS for overall supervision	Contractual clauses Monitoring of waste management plan Field supervision	Contractor costs LDC management costs



Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
		<p>Normally asphalt waste could be disposed of with other excavation waste/aggregates in the local non-hazardous waste site.</p> <p>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</p> <p><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></p>					
Local community	Destruction of streets and pavement	<p>Arrange Restoration and re-pavement (رد الشئ لأصله) with local unit</p> <p>Communication with local community on excavation and restoration schedules.</p> <p>Standard protocols adhering to national/local administrative requirements are to be followed:</p> <p>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)</p> <p>Agreement on the restoration arrangements, schedules, fees, and payment schedules</p> <p>Coordination with the General Utilities before starting work especially the Traffic Department, sewerage, water, telephones and electricity departments.</p> <p>Payment of restoration fees by the LDC before works commencement</p> <p>Documentation of the agreement and adoption by all involved parties</p> <p>Communication with the Public and relevant authorities (such as the security and the traffic departments) regarding excavation and restoration plans</p>	Negligible	LDC in coordination with LGU	EGAS	Field supervision Coordination with LGU as needed	Included in re-pavement budget agreed by LDC with local units or Roads and Bridges Directorate
Local community	Affecting children by excavating in the proximity of their schools	<p>As an avoidance measure, constructions in the proximity of schools should be avoided during the entrance and exit times.</p> <p>The contractor is obliged to use yellow warning caution tape.</p> <p>Arrangement with school administration to avoid dismissing children without informing site engineer in order to be ready for supporting children.</p> <p>The contractor should secure safe access roads to children. In case of excavating close to the entrance gate, the site workers should be sure that a proper access is installed.</p> <p>The contractor should ask school administration's support to share information with the school children in terms of safety aspects</p> <p>Workers should oversee children exit/ entrance roads to avoid any accidents</p>	Minor	Excavation Contractor	LDC HSE for guidance supervision +EGAS for overall supervision +SDO	Field supervision	Contractor costs LDC management costs



Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Occupational health and safety	Health and safety	<p>The project will hire a qualified contractor/sub-contractor with the high health and safety standards. In addition, the ToR for the contractor and the ESIA will provide the provision of the health, safety and precaution of the environmental impacts and its mitigation measures to be followed during construction.</p> <p>Standard protection by placing clear project signs.</p> <p>Time management for vehicles movement; especially avoiding the peak hours</p> <p>Standard protection for the workers especially working at elevated heights or trench.</p> <p>Regular inspection to compelling worker to use their PPE</p> <p>Training and licensing industrial vehicle operators of specialized vehicles.</p> <p>The contractor and subcontractors also should keep attendance worksheet and laborers ID in order to verify the age of workers</p> <p>Health insurance should be applicable to the contractor workers and workers contracted by a sub-contractor</p> <p>The contractor and sub-contractors are obliged to cooperate with the nearest health facilities that can provide health care to workers during construction phase</p> <p>Full compliance to EGAS and LDC HSE requirements, manuals, and actions as per detailed manuals adopted by EGAS</p> <p>Ensure the provision of the appropriate personal protective Equipment and other equipment needed to ensure compliance to HSE manuals</p>	Minor	Excavation Contractor	LDC HSE for guidance supervision +EGAS for overall supervision SDO	Field supervision	Contractor costs LDC management costs
	Child labor	<p>The ToR to be prepared for both contractor and subcontractors will prohibit any kind of hiring child labor in the project</p> <p>Rigid obligations and penalties will be added to the contractor/subcontractors' ToR in order to warrantee no child labor is occurred in the project</p> <p>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</p> <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	LDC Excavation Contractor/subcontractor	LDC HSE for guidance supervision +EGAS for overall supervision	Field supervision and review of HSE report+ Field supervision (audits)	Contractor costs LDC management costs
Local communities and businesses	Lack of accessibility to businesses due to delay in street rehabilitation	<p>Access to business due to excavation 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.</p> <p>Additionally, the duration of work will not exceed one working day. In case of excavation main streets in the commercial areas, this can be only done during night</p>	Negligible	LDC The subcontractors	LDC HSE for guidance supervision +EGAS for overall supervision SDO	Ensure the implementation of GRM Supervision on Contractors performance	No cost



Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
		<p>after business closing</p> <p>Compliance with the Environmental management plan concerning timely implementation of the construction schedule to minimize impact on local business</p> <p>Follow up the procedure of Grievance Redress Mechanism (see Annex 6)</p> <p>Ensure transparent information sharing</p> <p>The telephone numbers of the social development officer responsible for grievances should be shared with the community people</p>					
Local community	Disturbance to Community due to Labor Influx	<p>In order to minimize impacts pertaining to labor influx the following should be thoroughly implemented:</p> <ul style="list-style-type: none"> Develop appropriate code of conducts and ensure that all types of workers are obliged to comply with through contractual measure and fining clauses as appropriate. Ensure that the contractors are offering Received training on the code of conduct as part of the daily safety induction Ensure that the GRM system in all project areas is designed appropriately to receive and deal with complaints related to labor misconduct (e.g. anonymous channels, ensuring privacyetc.) 	Negligible	Contractors	LDC	Contractual Clauses & Field Supervision	Contractor costs
Local community Health and safety	Threat to safety of users and houses (due to limited level of awareness& misconceptions	<p>Prepare Citizen engagement and stakeholder plan</p> <p>Awareness raising campaigns should be tailored in cooperation with the community-based organizations</p> <p>Following are some mitigation procedures to be adopted</p> <p>Using caution tapes that help to keep people away of the site,</p> <p>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</p> <p>A worker should support old people and children to cross the excavation areas, especially, on the wooden bars</p>	Negligible	During the construction LDC	LDC HSE for guidance supervision +EGAS for overall supervision SDO	<p>List of awareness activities applied</p> <p>Lists of participants</p> <p>Documentation with photos</p> <p>Awareness reports</p>	<p>2250 \$ per awareness raising campaign</p> <p>2250 \$ for brochure and leaflets to be distributed (material available by EGAS-\$ spent)</p>
All receptors	All impacts	<p>As a crosscutting mitigation measure, a grievance mechanism should be implemented.</p> <p>The detailed grievance mechanism (GRM) is presented in Annex 6. It will to be shared with the community beneficiaries.</p> <p>The GRM presented various tiers of complaints, time to respond to the aggrieved person and reporting requirement for grievances. It is crucial to notify that time frame allocated for responding to a complaint will not exceed 15 business days.</p>	Negligible	Contractor	LDC HSE for guidance supervision +EGAS for overall supervision	Contractual clauses + Field supervision	<p>Contractor costs</p> <p>LDC management costs</p>



Table 7-2: 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
Local traffic and accessibility	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
Ambient air quality	Increased air emissions	HC, CO% and opacity	LDC HSE	Once before construction + once every six months for each vehicle	Vehicles licensing Department	Measurements and reporting of exhaust emissions of construction activities machinery Complaints log	LDC management costs
Ambient noise levels	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
Underground utilities	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
Physical state of street	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
		Comparing the subsurface water quality with the permissible law's requirements	LDC HSE	During construction. Audit (Biannual, annual based on the construction time)	Around construction site	Sampling subsurface water	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
Local community	Damage to the streets	Streets quality after finishing excavation Number of complaints due to street damage	LDC, EGAS	Quarterly monitoring (every 3 months)	Site and Desk work	Checklists and complaints log	No cost
Local community	Threat to Safety of users and houses (due to limited level of awareness and misconceptions)	Number of awareness raising implemented Number of participants in information dissemination	LDC, EGAS	Quarterly monitoring (every 3 months)	Office	Reports Photos Lists of participants	No cost
Labor conditions	Occupational Health and Safety	Total number of complaints raised by workers Periodic Health report Periodic safety inspection report	LDC HSE	Biannual	Construction site	Documentation in H&S monthly reports Complaints log	No cost



Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
		Insurance Policy Attendance lists with workers' copy of IDs					
Labor conditions	Child labor	Attendees lists with workers' copy of IDs Complaints and accidents reports	LDC HSE	Biannual	Construction site	Documentation in H&S monthly reports Complaints log	No cost
Local community	Disturbance to local community due to labor influx	<ul style="list-style-type: none"> Grievances received related to labor influx, Number of incidents violating the code of conduct, Disciplinary actions taken with violating workers 	LDC in coordination with contractor	When reported	Construction sites	Supervision & reporting	Contractor Cost

7.4 Management of Mitigation and Monitoring activities During Operation Phase

Table 7-3: Environmental and Social Management Matrix during OPERATION

Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost
				Mitigation	Supervision		
Integrity of Natural Gas piping	Network integrity	<p>Detailed review of the geotechnical and geological history of the project area</p> <p>Development of a full emergency response plan</p> <p>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.</p> <p>Availability of 24-7 hotline service (129) to all beneficiaries and the public for reporting possible leaks, damages or emergencies</p> <p>Quick response to gas leaks by evacuation of the affected area</p> <p>Repair or replacement of failed component</p> <p>Scheduled inspection and preventive maintenance activities</p> <p>Inspection will include any activities that could potentially lead to damage in the pipeline</p> <p>In case of emergency, the source of the leak will be isolated until the maintenance team performs the required maintenance</p> <p>Signs will be posted over the pipeline path showing the numbers to be called in case of emergency</p>	Minor	LDC	LDC HSE.	<ul style="list-style-type: none"> Map and local geotechnical report review Site inspections Awareness actions Periodical trainings and drills 	LDC management costs
Informal LPG distributors	Loss of revenue for LPG distributors	<p>LPG distributors should be informed about the NG potential areas in order to enable them to find alternative areas</p> <p>They should be informed about the GRM in order to enable them to voice any hardship</p>	Minor	Butagasco	EGAS	<ul style="list-style-type: none"> Information sharing activities with the LPG vendors Grievances received from them 	No cost
Community health and safety	Possibility of Gas leakage	<p>Information should be provided to people in order to be fully aware about safety procedures</p> <p>The hotline should be operating appropriately</p> <p>People should be informed of the Emergency Numbers</p> <p>The complete integrated, comprehensive and robust Emergency Response Plan of the LDC (in Arabic) is in Annex 8 A of the study and only a small part concerning the</p>	Minor	LDC	LDC	<ul style="list-style-type: none"> Complaints raised due to Gas leakage 	No cost



Labor conditions	Occupational Health and Safety	followed procedures during some emergency scenarios is translated in Annex 8 B Total number of complaints raised by workers Periodic Health report Periodic safety inspection report	Minor	LDC HSE	LDC	<ul style="list-style-type: none">• Safety supervisor should follow the commitment of workers to use the protective equipment• Inspection and recording of the performance• Reports about the workers and complaints	LDC management costs
-------------------------	---------------------------------------	--	-------	---------	-----	--	----------------------



Table 7-4: Environmental and Social Monitoring Matrix during OPERATION

Impact	Monitoring indicators	Responsibility of monitoring	Monitoring Frequency	Location of monitoring	Methods of monitoring	Monitoring Cost	Estimated
Network integrity	Earthquakes or geotechnical settlements Emergency response time and corrective actions during emergency drills Reports of alteration or tampering with ANY gas components	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	
Impact on the informal LPG distributors	Grievance received from the informal LPG distributors Information shared with them	EGAS, LDC	Quarterly	Desk work	• Complaints log	No cost	
Possibility of Gas leakage	Complaints raised by the community people Number of leakage accidents reported/raised	LDC, EGAS	Four times per year, each three months	Site and Desk work	• Complaints log • LDC	No cost	



7.5 Reporting of Mitigation and Monitoring Activities

LDC HSE Departments are to prepare monthly and quarterly reports to be submitted to EGAS Environment Department during the construction phase.

During construction phase monthly reports should include as a minimum:

- Conditional permits and any comments or recommendations by Traffic Department and Supreme Council for Antiquities
- Number and date of paint cans shipped to company depot or returned to supplier
- Evaluation of LDC and contractor's performance on applying relevant mitigation measures
- Any occupational or community health and safety work-related accidents or
 - Incidents of breaking of utility pipes
 - Monitoring results of excavation machinery exhaust emission, noise and vibrations
 - The number of complaints received and how they were dealt with
 - Communication and information sharing activities done by the LDC on the field

Important Note:

1. In case of worker/community work-related severe accidents or fatalities, immediate reporting should take place by the LDC to the relevant regulatory authorities and to the Project Management at EGAS.
2. EGAS will report the accident to the World Bank within 24 hours at the latest including all actions taken to investigate the root cause of the accident and the plan to prevent the occurrence of future accidents.

During Operation phase monthly reports should include as a minimum:

1. Evaluation of the adherence of staff to safety measures
2. Pipeline leakage or damage incidents
3. The number of complaints received and how they were dealt with

7.6 Institutional Framework for ESM & MP Implementation

7.6.1 Environmental and social management structures

EGAS is the supervisory body, while Town Gas is the implementing body. The following represents the management structure of Town Gas.

Being the implementing body of the natural gas network in the project areas, Town Gas has a direct involvement with the environmental and social management and monitoring of the natural gas network in Alexandria City. They have a wide range of experience in managing occupational health and safety aspects. They received the following training: 1) occupational health and safety specialist tasks, 2) advanced course on health and safety, 3) firefighting and first aid...etc. However, they are still enhancing their capacity in terms of environmental and social aspects.

The organizational chart provided by Town Gas has no social development officer. However, there is an assigned person (General Manager of technical and data) supported by two junior staff who handles complaints of employees, community and clients by maintaining database for all received complaints and how they were solved.

As a conclusions, Town Gas will be in need to upgrade their capacity regarding the environmental and social aspects. EGAS will provide Town Gas staff with the needed information.

One of the standard tasks of the HSE Departments of Town Gas, supervised by EGAS, is to ensure that the Environmental and Social Management Plan of the project is implemented in all



the phases of the Project. There must be an immediate training to inform health and safety, social and environmental staff about the management plan.

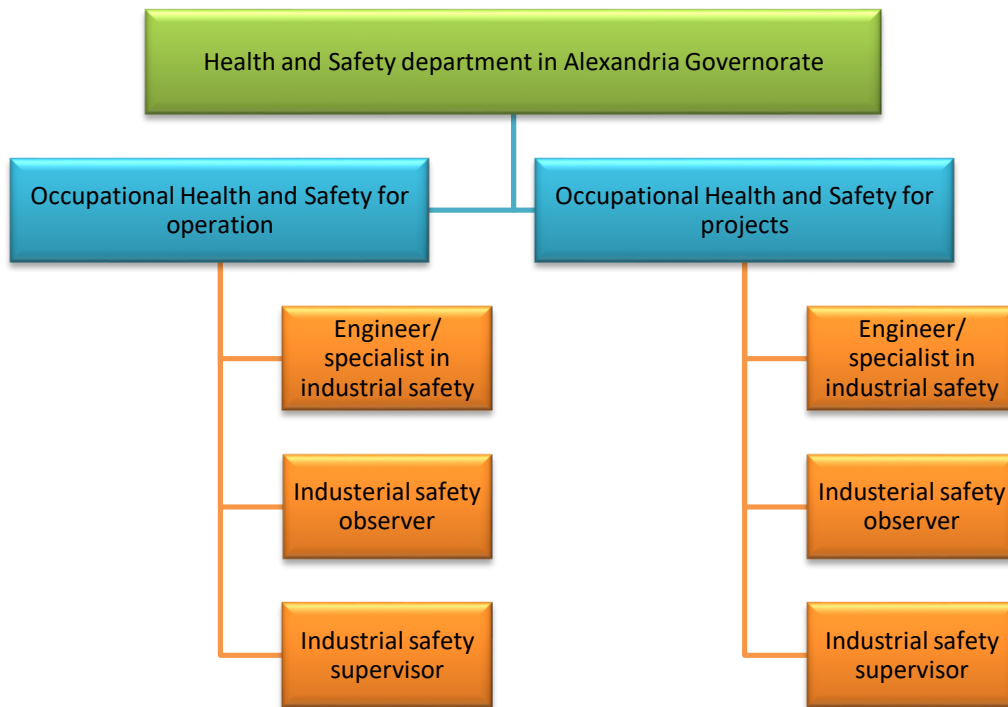


Figure 7-2: Town Gas H&S organizational structure (current)

7.6.2 Roles and responsibilities of EGAS and LDCs Environmental and H&S Officers

Generally speaking, roles and responsibilities of the ESMP is divided between two main entities, namely, EGAS and the LDC (Town Gas). EGAS is mainly responsible for high level monitoring. EGAS is responsible also for the implementation of an overall supervision and ensuring that the measures are adhered to.

The second entity is the LDC (Town Gas) who are responsible for full implementation of mitigation measures in full cooperation with the contractor. In the structure above, designated site engineers/foremen perform daily implementation, monitoring and reporting of activities as per the ESMP with special attention to:

1. Workers and contractor compliance to EGAS HSE manuals and procedures
2. Occurrence of HSE incidents and suggestions for incident avoidance
3. Management of broken asphalt (if any), unused backfill, solid waste, metal scrap
4. Management of paint cans, refueling & lubrication, soil contamination
5. Management of liquid waste such as leaked condensate hydrocarbons (if any) or chemicals used in heaters; and
6. Checking that handling of hazardous waste is done according to the requirements of the Environmental Law, where a permit for handling hazardous material and Hazardous wastes is issued from EGAS Environment Department



7. Using analyzers to measure noise, SO₂, CO, CH₄ and NO₂ in ambient air, and detect possible natural gas leaks
8. Other tasks as outlined in ESM&MP
Daily reports are to be compiled and sent to the governorate H&S and Environmental officers for preparation of monthly summary reports.

Monthly reports are sent to H&S and Environmental officer at LDC head office for compilation into quarterly reports to EGAS.

7.6.3 Roles and responsibilities of EGAS and LDCs Social Development Officers

EGAS, its subsidiary Local Distribution Companies (LDCs), and the contractors will be responsible for adopting the following procedures:

7.6.3.1 Compliance with World Bank safeguards

- Preparing internal guidelines for the preparation, implementation, monitoring and reporting of social documents required by various safeguard instruments;
- Reviewing, as applicable, ESMP and other social safeguard documents prepared by consultants to ensure compliance with relevant safeguard policies of the National and the World Bank;
- Providing recommendations to EGAS/LDC management and other subsidiary companies accordingly and make necessary changes prior to submission of relevant social documents to the World Bank – ensure consistency in the level of proficiency and presentation of the documentation;
- Carrying out documentation review pertaining to social compliance (including bidding documents, reviews on-site, reports from contractors etc.) throughout project implementation;
- Coordinating and facilitating the work of consultants engaged to carry out environmental and social impact assessments and resettlement planning and external monitoring of safeguard instruments implementation;
- Organizing the technical aspects of workshops and meetings as required, as outlined in the ESMF/RPF training and capacity building section;
- Preparing training materials, and conducting technical training workshops to EGAS/LDC staff and project implementation agencies on social safeguards requirements.

7.6.3.2 Monitoring and reporting

1. Conducting internal monitoring of the implementation of the social component of the ESMP in matters pertaining to timely payments and the provision of temporary measures to affected persons;
2. Contributing to project progress reports pertaining to overall implementation of social requirements of the project.

7.6.3.3 Communication with and responsiveness to targeted communities

1. Design community friendly grievance redress mechanism with clear and timely bound tiers and responsibilities and ensure dissemination on the local level. Develop quarterly grievance and redress report to be shared with EGAS.



2. Conducting field visits to ensure that the established grievance redress mechanisms are functioning properly and that the individual projects are implemented in a socially sustainable manner;
3. Participate in the process of disbursing compensations and keep track record of the compensation process documentation.
4. Reach out to local communities, including PAPs, to raise awareness about the project and the implementation schedule.
5. Build the capacity and provide support to the field staff as needed.

7.6.3.4 Required Actions

7.6.3.4.1 Required actions from Town Gas

- Assign an environmental specialist to be included in the above organizational chart,
- Assign a social development officer,
- Involvement of environmental and social officers during the design, costing, tendering, and construction phases would be advantageous,
- Detailed HSE manuals covering each activity must be developed and institutionalized in Town Gas. However, several versions of such manuals have been developed by Town Gas and should be mainstreamed to other LDCs, accompanied by the appropriate capacity building,
- An updated and detailed assessment of Town Gas EHS institutional capacity and available resources for implementation of the ESMP
- Specifically, Town Gas should take steps to develop capacity of site engineers and HSE officers with specific courses focused on implementation of the ESMP detailed in this ESMP.



8 Stakeholder Engagement and Public Consultation

The new house connections in the project sites are supplementary to the current existing natural gas connection network in Alexandria Governorate. ESIA/ESMPs for other areas were prepared, stakeholder engagement and public consultation activities were held, and studies were cleared by the Bank and disclosed on EGAS website. Stakeholder Engagement activities and a series of public consultations were conducted all through the past 5 years since the early stages of the project in December 2013 until recent. In February 2018 consultation was conducted for the project sites under study in El Dreisa, Abis, Acasia, El Said Club and Abu Quier. Stakeholders were identified, an engagement plan was developed, information adequately disclosed, used different engagement instruments. Fair gender based participation and engagement of the different stakeholders and documentation of all conducted events were made. Public concerns were responded to and addressed in the ESIA/ESMPs / ESIAF of the project.

Consultation activities showed an overwhelming acceptance of the consulted participants to host the NG. Their willingness to be connected to the NG, Some potential beneficiaries expressed their willingness to pay the installation cost in cash, while others were much in favor to pay in installment. This high level of enthusiasm from the local communities towards the project is attributed to the high level of awareness of the benefits of the natural gas and the current hardships that the households are facing to secure LPG provision and usage.

8.1 Legal Framework for Consultation

The consultation activities were conducted in full compliance with the following legislations:

- WB policies and directives related to disclosure and public consultation, namely,
 - Directive and Procedure on Access to Information
 - World Bank Operational Policy (OP 4.01)
- Egyptian regulations related to the public consultation
 - The environmental law No 4/1994 modified by Law 9/2009 modified with ministerial decrees no. 1095/2011 and no. 710/2012

8.2 Defining the Stakeholder

In order to ensure an inclusive and meaningful consultation process, a stakeholder's analysis was conducted to get better understanding of the various groups and their roles, interests and influence on the project. For the purpose of this site specific ESMP, a focused stakeholders' identification shown in Table 8-1, was developed to identify the key groups of relevance to the project in this specific location. The main identified groups are very similar to those identified on the Governorate level but on a smaller scale. Local communities involving both men and women of projects beneficiaries, as well as the PAPs, local NGOs/CDAs, contractors and supply were among the key stakeholders on the local level.



Table 8-1: Stakeholders identified in Alexandria Governorate

Stakeholder Category	Stakeholder Group	Relevance/Importance of the Stakeholder to the Project
Communities in the project sites	Residents of communities within the project sites: <ul style="list-style-type: none"> Abis, Acasia, El Said Club, El Dreisa Abu Quier 	Residents of these communities are more likely to be adversely affected by environmental and social impacts; for example traffic during construction and other impacts relating to community health and safety. Residents of local communities will also potentially benefit from job opportunities or other positive economic outcomes, particularly, they will have access to the natural gas.
	Residents in Alexandria City	Residents of other districts in Alexandria will benefit from job opportunities available in the project. Additionally, they will benefit from the savings of the LPG cylinders result due to the project implementation
	Vulnerable groups within the local communities	Vulnerable groups may be likely to be adversely affected by environmental and social impacts, while also being least likely to benefit from the Project. For example, poor families who will not be able to benefit from the project
	Small business owners	Local businesses have the potential to benefit economically from the Project. However, as local residents this group also have the potential to be impacted by any social and environmental risks and impacts (positive and/or negative). For example the excavation work
Businesses outside of the Area of Influence	Suppliers and contractors	They will benefit from any supplies available for the project.
Project Workforce (both direct and through subcontractors)	Project workers	The workforce is fundamental to the Project and a sound worker-management relationship is key for the sustainability of a company. Failure to maintain and foster a sound worker-management relationship can undermine worker commitment and retention, and can jeopardize a project. They also will benefit from job opportunities available in the project.
Health care providers	Community health care providers Health institutions Health services providers	The Project will secure health facilities to the workers through contracting health facility in Alexandria City to provide required service



Stakeholder Category	Stakeholder Group	Relevance/Importance of the Stakeholder to the Project
NGOs and civil society	El Shoban El Moslemein, Resala, Misr El Kheir NGO	NGOs might share information about the project: terms of contracting and safety measures of the NG
National government stakeholders	Egyptian Environmental Affair Agency (HQ and RBOs)	Responsible for reviewing and approving ESIA's, and monitoring implementation of the Environmental Management Plan
	Information Centers on the governorate level	Provide NG companies with underground utilities and infrastructure maps.
	Security Department	Secure the construction sites and prevent people from in-flushing into it
	Ministry of Antiquities	Very important to issue permissions for excavations and accompany the working teams, particularly, in Sohag and Aswan which are rich in monuments.
	Ministry of Transportation	This Ministry may have interest in issues relating to transportation and traffic planning related to the Project.
	General Authority for Roads, Bridges and Land Transport	Responsible for permitting related to any road work for the Project (e.g., road cutting)
Local/provincial government stakeholders	Alexandria Governorate Authority	They are cooperating with the project in terms of facilitating permissions and
	Alexandria City authority	The main role of the city authority is the provision of support to the project through mobilizing people to gain information about the project.
	Local Governmental units (District authorities and village authorities)	Permissions for the lands needed for PRS should be prepared by the governorate and approved by the LGU. Rehabilitation of roads, which is one of the major issues raised by the community, will be performed by the LGU. Provision of solid waste management facility
Media	Television and radio representatives Newspaper Websites	Inform the community about the project and its impacts and support dissemination of ESIA studies
Universities and Educational institutes	Faculty of Engineering	Review and enrich the ESIA study with feedback
	Secondary vocational schools	Propose needed capacity building for their students to potentially find employment with the project
	Researchers/consultants	Review results of the study and provide feedback



Stakeholder Category	Stakeholder Group	Relevance/Importance of the Stakeholder to the Project
Natural Gas companies	EGAS	Implementing agency overseeing activities of the Environmental and Social Management Plan
	Egypt Gas	Local distribution company (LDC) who will implement, operate, and manage the ESMP
	Town Gas	Local distribution company (LDC) who will implement, operate, and manage the ESMP
	Butagasco	It is the firm responsible for the LPG distribution. They will benefit from the project in terms of reducing the demand on LPG cylinders
	Petro trade	They are the responsible entity for collecting the consumption fees and the bank installment

The abovementioned stakeholders were consulted using various tools (i.e. individual interviews, group meetings and public consultation). Most of the stakeholders have attended the public consultation hearings conducted during December 2013 in the 11 Governorates. However, some of them were interviewed in their premises in order to enable them to spell out their concerns and worries freely.

8.3 Consultation Methodology and Activities

The consultation process was a dynamic and evolving process which has been adapted according to the nature and expectations of the host community. Engaging with the potential beneficiaries and potential impacted groups using various communication tools (FGD, face to face meetings, public consultation, posters, leaflets and hotline) will bridge communication channels with the community. Additionally, special attention has been given to include all project areas in consultation and engagement activities in order to avoid sidelining fractions of the host communities.

The social team managed to consult with women and men in the project areas as well as consulting with NG workers in Alexandria. Various FGDs, in-depth interviews and public consultation events were conducted for 5 years starting from December 2013 to December 2017.

8.4 Summary of previous consultation activities

The predominant majority of participants expressed very strong approval of the project. It is noteworthy to mention that the different groups concurred on the point that NG is, by all means, a far better substitute for LPG cylinders. The general viewpoint of the local community is that the benefits of NG outweigh its downsides. The only downsides associated with NG are firstly, the impact on the streets during construction; secondly, the cost of NG installation to households.

Table 8-2: Summary of consultation activities in Alexandria Governorate during 2013-2016

Participants	Number	Methods	Date
During the preparation of framework during the year 2013			



Participants	Number		Methods	Date	
	Males	Females			
Data collection	16	8	FGD	December 2013	
	4	1	In-depth		
	94	56	Questionnaire	November 2013	
Public consultation event	26	29	PPT and public discussion	26th Dec 2013	
Total	140	94			
During the site specific of El Amreya and sectors in Alexandria City during 2015-2016					
Potential beneficiaries and government officials	34	38	FGD	October-November 2015	
Governmental entities	5	9	In-depth		
NGOs	4	1	In-depth		
LPG distributor and NGOs	5		In-depth		
	6	7	In-depth	November 2015	
Community people	Sharq District	73	127	Structured questionnaire	October-November 2015
	El Amreya District	82	118		
	Thany Raml District	74	176		
	Total	229	421		
Potential beneficiaries, government officials, NGO representatives	119	30	Public consultation	8 th of February 2016	
Total	631	927			
During the site specific study of sectors in Alexandria City during January 2016					
Government officials	2	1	In-depth	January 2016	
NGOs	2		In-depth		
Potential beneficiaries people	H. El Nawateia	10	15		FGD
	Iz. Sakena	0	5		
	Iz. Mozafeen	8	0		
Community people	H. El Nawateia	17	33		Structured questionnaire
	Iz. Sakena	15	35		
	Iz. Mozafeen	26	24		
LPG cylinders vendors	3	0			
Public hearing for the ESIA of the governorate level. Potential beneficiaries, government officials, NGO representatives, (25 people have attended from Iz. Sekena, Iz. El Mozafeen and Hagar El Nawateya). Please refer to annex 7 for more details	39	26	Public consultation	8 th of February 2016	
Total	122	139			

The Detailed Public Consultation event held at the Grand Royal Hotel in Alexandria Governorate in February 2016 is attached; annex 7, to the ESMP

Table 8-3: Sample of the main issues that were raised during previous consultation activities 2013- 2016

Subject	Questions and comments	Responses
---------	------------------------	-----------



Subject	Questions and comments	Responses
Streets damage	The project results in damaging of streets. There is no restoration to street conditions in almost all project areas	The NG companies in cooperation with the Local Governmental Units can rehabilitate the streets. The NG company pays the cost of rehabilitation. However, it takes the LGU some time to restore the streets.
Noise	The project might result in disturbance to the community due to noise generated from drilling equipment	The noise results from the project activities are limited to one day maximum in the area.
Traffic congestion	Traffic might be affected due to construction activities	Traffic impacts are limited to one or two days in the area. However, the NG companies coordinate with traffic authority
Economic impacts	The project will result in positive impacts on the Egyptian economy as it will save the subsidy allocated for the LPG (50 EGP per each cylinder)	The subsidy exceeds 70 EGP per LPG cylinder.
Information center	It is crucial to have an information center to provide clear instructions about the NG	There are three channels that will provide information: The site engineers who provide information through house visits The contracting and customer services offices also share information about contracting aspects Hotline 129 is also useful to share information
Seminars and conferences	It will be useful to conduct seminars and conferences about the NG	This recommendation will be considered
Direct and indirect job opportunities	The project will provide direct job opportunities. It will also provide indirect job opportunities through leasing offices to the LDCs	
Contribution of NGOs	There are famous NGOs that can support poor people e.g. Plan. They can support poor people.	
LPG vendors	The project might affect the LPG vendors' source of income. It is strongly recommended to have a kind of coordination between the NG companies and the government in order to support the vendors	The vendors will provide their services to the areas that have not been served by the NG.
LPG problems	Sometimes the cylinder leaks. The street vendors take it upstairs. They install the LPG to the cooker. If it leaks, the vendor has to take it downstairs to be replaced. This places a burden on the LPG vendors.	
Strategies of LPG vendors to reduce the impacts of the project on their business	The LPG cylinders vendors might lose their source of income. They are entitled for remedial actions. Yet, they have their own strategies to overcome project's impacts	The LPG vendors will not be seriously affected due to the following reasons: Not all target units will be connected to the NG. Therefore, their market share might be the same They have also their own asset (cart- mini van- motorcycle) that can be used in alternative jobs i.e. moving goods to people Based on various NG projects conducted since 2005, this category of people have never been affected or raised any complaints.



Subject	Questions and comments	Responses
Role of mosques and churches	It is recommended to share information after Friday prayer and Sunday speech	Information will be shared with the community through all available channels
LPG problem during winter time	The LPG vendors don't pass in the areas in winter, particularly, during heavy rains. Thus, the residents have to buy cooked food which is relatively expensive. The residents might borrow LPG from neighbors but it still remains as a problem for us. Water heater can't heat water in the absence of LPG during winter. Thus, we can't take shower. In some cases we go to our relatives to take shower.	

8.5 Main results of consultation during ESMP preparation phase for the project sites (El Dreisa, Abis, Acasia, El Said Club and Abu Quier) in 2018

Based on consultation activities conducted during February 2018, 43 women and 58 men were consulted with. It was notable that the reactions and attitudes of the local communities towards the project are in favor of the project. The field research team noted a strong public support and eagerness towards the project. Beside some legitimate concerns expressed by the public, the field research team recorded the general view that NG is a far better substitute for the type of fuel currently in use. The following table illustrates the different subjects, questions, comments and responses that were discussed throughout the different public consultation activities.

Table 8-4: Summary of consultation activities in El Dreisa, Abis, Acasia, El Said Club and Abu Quier in February 2018

Participants	Area	Number		Methods	Date
		Male	Female		
During the site specific study					
Government officials	Alexandria city	2	1	In-depth	February 2018
NGOs	Alexandria City	2		In-depth	
Potential beneficiaries people	El Dreisa	8	9	FGD	
	Acasia	10	8		
	Abis	9	8		
	El Said club	8	8		
	Abu Quier	8	8		
LPG cylinders vendors			1	In-depth	
LDC workers		11	0	In-depth	
Total		58	43		



Figure 8-1: FGD with women in Abu Quier



Figure 8-2: FGD in a workshop in Abu Quier



Figure 8-3: Face to face meeting with a genitor in Abu Quier



Figure 8-4: Meeting with women Dreisa



Figure 8-5: Meeting with men in Dreisa



Figure 8-6: Consulting with NG workers in Alexandria City

Table 8-5: Key comments and concerns raised during various consultation activities conducted in February 2018, and the way they were addressed in the ESMP study

Subject	Questions and comments	Responses	Addressed in the ESMP Study
---------	------------------------	-----------	-----------------------------



Subject	Questions and comments	Responses	Addressed in the ESMP Study
Importance of the NG	NG is essential to all households, it is strongly recommended to install it immediately to all houses	The Government of Egypt in full cooperation with the funding agencies is committed to install to the NG to all eligible houses. However, there must be basic technical specification to assure safety of houses and the NG connection. Additionally, the NG installation is subsidized by the government, therefore sufficient budget should be allocated to connect all houses	The study described technical specification in 2.3.1 in the project areas selection criteria
Methods of payment to install the NG	The NG connection cost about 3000 EGP. How this amount of money can be paid?	EGAS proposed two methods of payments: In cash In installment Paying in installment will be based on flexible payment procedures that vary between one year to seven years	Section 4.2.7 presents detailed information about alternative payment methods Section 3.4.5 Willingness to pay for the NG in the ESIAF
Damaging streets	In some project areas in Alexandria, street conditions deteriorated for a long time. It is strongly recommended to restore streets immediately after finishing the installation work	Street restorations activities are classified as one of the most important unfavorable impact caused by the project. Therefore, the LDC disburses rehabilitation cost prior to cutting streets to the LGU in order to restore street condition immediately after finalizing installation work. However, the LGU tries to examine the underground utilities during the installation of the NG. They try not to excavate streets several times, therefore, as the streets have already been damaged, they try to check the underground utilities	Table 7-1: Environmental and Social Management Matrix during CONSTRUCTION
Time plan	You have worked in Alexandria for a long time. When it is expected to cover El Dreisa	According to the time plan, Moharam Bek, Acasia, El Said Club and El Dreisa will be served in 2018	Introduction section presented information about the project area

8.6 Summary of consultation outcomes

The consulted groups expressed their overwhelming acceptance to host the NG. They also indicated their willingness to be connected to the NG regardless to the amount of money they can afford to pay. Almost all surveyed sample were willing to have the NG installed to their houses. Some of them expressed their willingness to pay the installation cost in cash, while others were much in favor to pay in installment. This high level of enthusiasm from the local communities towards the project is attributed to the high level of awareness of the benefits of the natural gas and the current hardships that the households are facing to secure LPG usage



8.7 ESMP Disclosure

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 Town Gas websites. An executive summary in Arabic will be published on EGAS and Town 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.