



## 1.5 Million Natural Gas Connections Project in 11 Governorates

### Low Pressure Natural Gas Network Environmental and Social Management Plan

### Qena Governorate (Qeft, Naqada, Waqf, and Farshout)

**Final Report**

**November 2017**



**EGAS**

**Egyptian Natural Gas Holding Company**

Developed by



**EcoConServ Environmental Solutions**



**Petrosafe**

**Petroleum Safety & Environmental Services Company**

**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
ESIAF	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
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 <sub>2</sub>	Nitrogen dioxide
OSH	Occupational Safety and Health



P&A	Property and Appliance Survey
PAP	Project Affected Persons
PE	Poly Ethylene
PM <sub>10</sub>	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 <sub>2</sub>	Sulphur dioxide
SSIAF	Supplementary Social Impact Assessment Framework
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\$ = 18.1 EGP as of April 2017

Exchange Rate: € = 19.3 EGP as of April 2017

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# 1 Introduction

## 1.1 Project Objectives

The proposed project represents an integral component of the national energy strategy which aims for greater use of natural gas for domestic users at Qeft, Naqada, Waqf and Farshout cities in Qena governorate.

## 1.2 Environmental and Social Management Plan (ESMP)

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

### Objectives of the ESMP include:

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

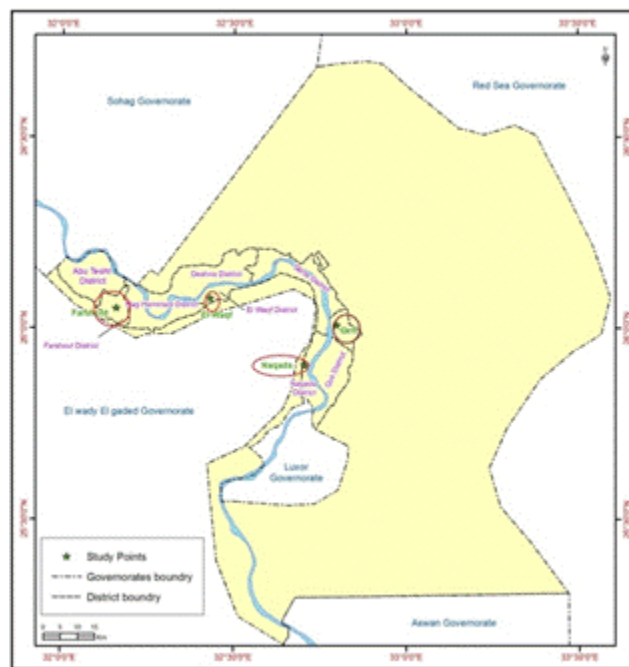


Figure 1-1 The proposed project areas



The areas and the total number of household which will be covered in this ESMP are illustrated in table 1-1:

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

Governorate	Local Distribution Companies	Areas	Households connection			
			First year 2016/2017	Second year 2017/2018	Third year 2018/2019	Total
Qena	ReGas	Naqada	500	3500	2000	6000
		Qeft	0	4000	2000	6000
		Farshout	0	4000	2000	6000
		El-Waqf	0	4000	2000	6000
<b>Total</b>		<b>4 areas</b>	<b>500</b>	<b>15,500</b>	<b>8,000</b>	<b>24,000</b>

Source: ReGas

The local distribution company responsible for project implementation is ReGas (غاز الأقاليم شركة)

Naqada and Qeft will be connected to an existing PRS in Qous, while Farshout and Waqf will each be connected to a new PRS which will have a separate ESIA study.

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

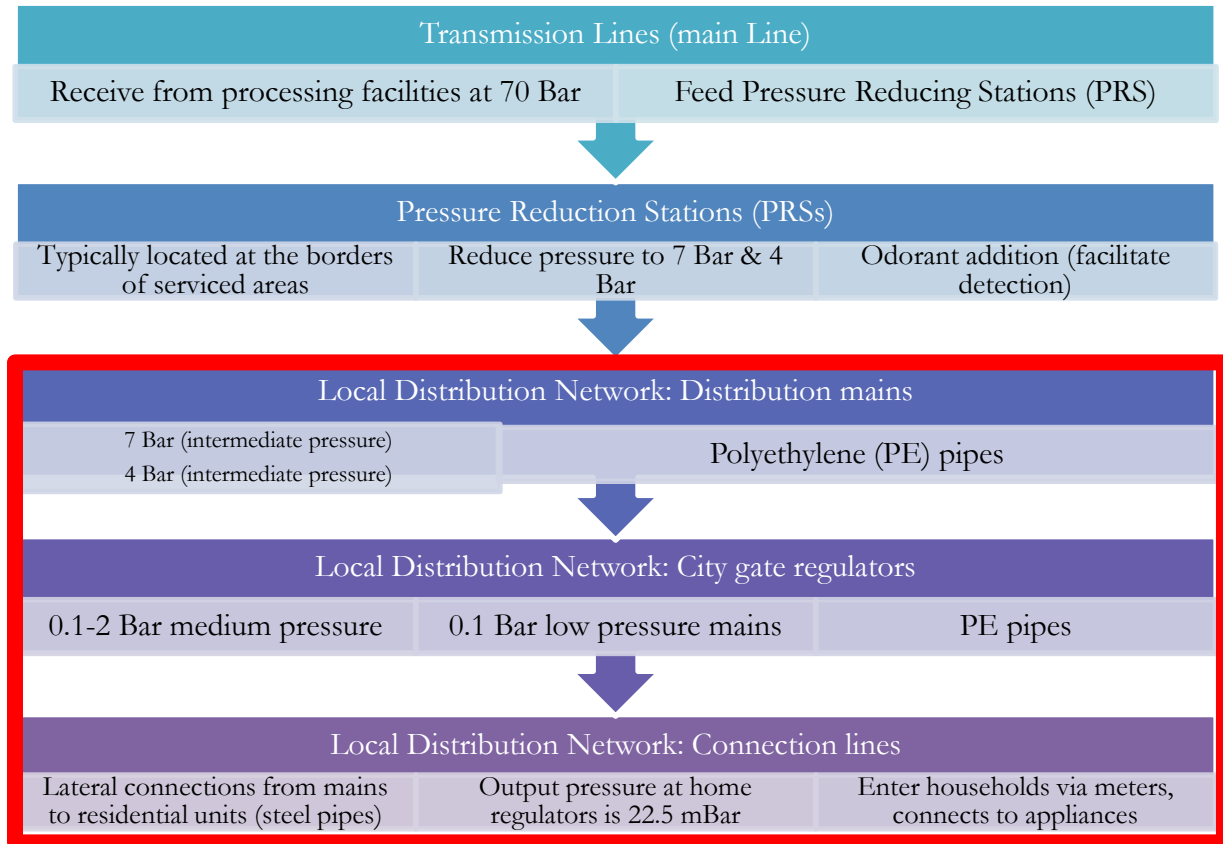


Figure 2-1: General components of the distribution networks in Naqada, Qeft, Waqf, and Farshout



## **2.2 Project Work Packages**

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### **2.2.1 Intermediate Pressure Network - Main feeding line/network “7 bar system – PE 100”**

#### **Naqada**

The path of the intermediate pressure network starts from Qous PRS till the pressure regulating kiosk at Naqada City.

The pressure of this network is 4:7 bars and made from high density polyethylene PE 100 SDR 11. High density polyethylene, HDPE, with maximum operating pressure, MOP, of 7 bar will be utilized

Intermediate Pipeline specification at Naqada City:

Pipe Diameter: 315 mm

Pipe length: 3,000m

Laying depth: 1.2:2m

The intermediate pipeline at Naqada City will not cross any agriculture land. The pipeline route will be parallel and within the main road.

The intermediate pipeline network will begin from the regulator at Al Sheikh Sayed Mahmoud street (north Naqada) to the right toward Gamal Abd El Nasr main road (the road limit Naqada from the west). Then the pipeline will go through the south edge of Naqada at El Moez Ledin Allah, than the pipeline will reach EL Gaish road (El Kornish) and the pipeline will go parallel and within the limit of EL Gaish road to the north of the Naqada again.

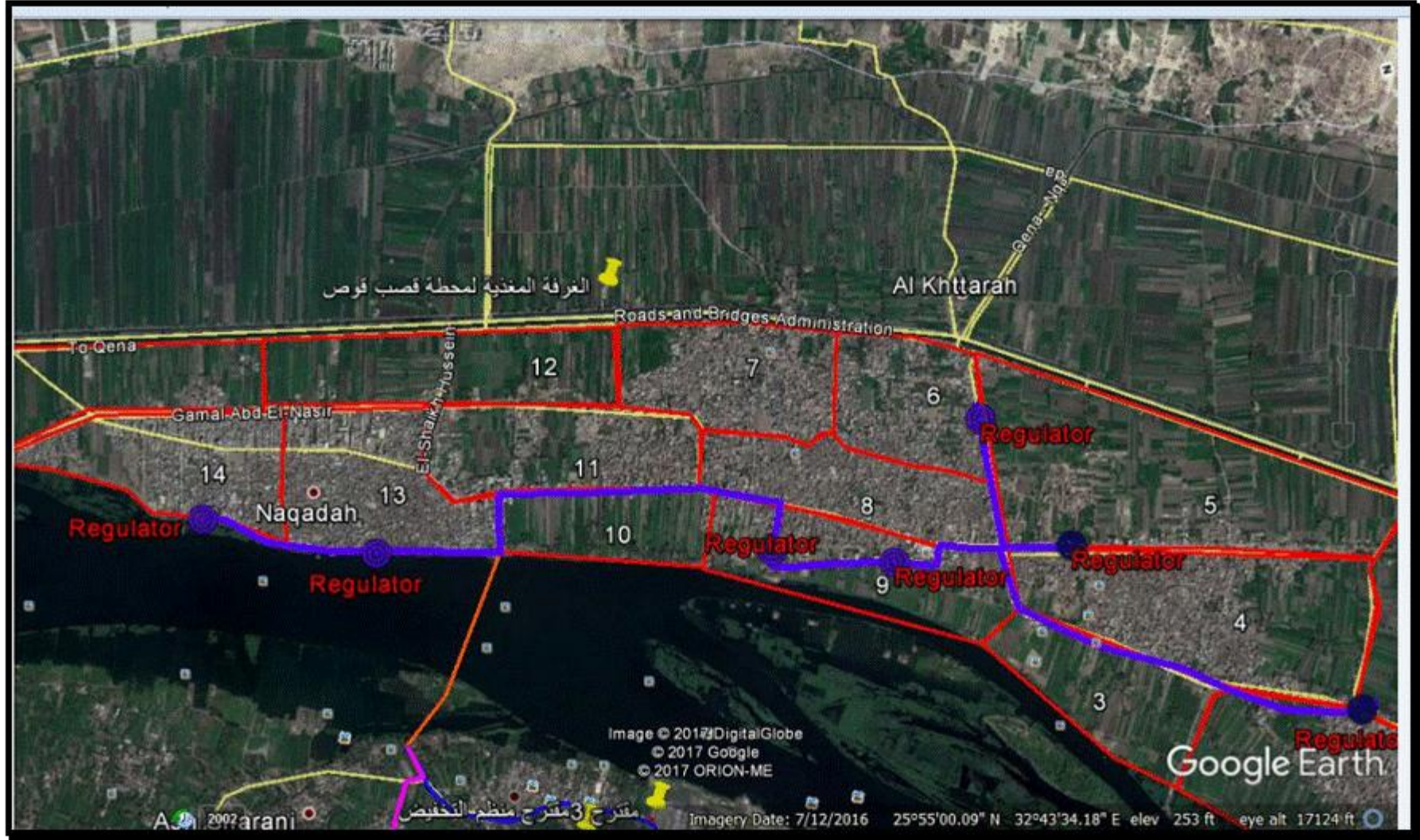


Figure 2-2 Intermediate Pressure Network - Main feeding line/network “7 bar system connecting in Naqada

Source: ReGas July 2017



## **Qeft**

The path of the intermediate pressure network at Qeft area starts from pressure regulating kiosk at Qous area (the regulator is part of the intermediate network at Qous area and it is fed from the outlet of the Qous PRS).

The pressure of this network is 7 bars and made from high density polyethylene PE 100 SDR 11. High density polyethylene, HDPE, with maximum operating pressure, MOP, of 7 bar will be utilized.

Intermediate Pipeline specification at Qeft area:

Pipe Diameter: 250 mm

Pipe length: 13,000m

Laying depth: 1.2:2m

The intermediate pipeline at Qeft area will not cross any agriculture land. The pipeline route will be parallel and within the main road.

The path of the intermediate pipeline will begin from EL Bahaa Zoheir street at Qous (where the Kiosk regulator will be constructed) toward the north east to reach Qous Qeft road. The path of intermediate pipeline network will continue through Qous-Qeft road until it reaches the intersection of EL Mahata road then it will be go through the road to Qeft area.

## **Waqf**

The path of the intermediate pressure network at Waqf area starts from the proposed new PRS (north west to Waqf area- near El Marashda village) about 7 km away from Qeft.

The pressure of this network is 4- 7 bars and made from high density polyethylene PE 100 SDR 11. High density polyethylene, HDPE, with maximum operating pressure, MOP, of 4- 7 bar will be utilized.

The route of the intermediate pipeline network is shown in the figure below. The intermediate pressure network –main feeding line network 4-7 bar system connecting the new PRS to the city regulator in Waqf.

The intermediate pipeline at Waqf area will not cross any agriculture land. The pipeline route will be parallel and within the main road.

The path of the intermediate pipeline will begin from the regulator at Road and Administration main road till it reaches Waqf road, the pipeline will go through the road (the Waqf road surrounded by agriculture land) till reach the intersection of Add El Khalek Street.



Figure 2-3: Intermediate Pressure Network - Main feeding line/network “4- 7 bar system  
Connecting the new PRS to the city regulator in Waqf

**N.B.** the PRS and the pipeline will be installed in non-residential and non-arable land.

**Farshout**

The path of the intermediate pressure network at Farshout area starts from the proposed new PRS at Farshout area.

The pressure of this network is 4- 7 bars and made from high density polyethylene PE 100 SDR 11. High density polyethylene, HDPE, with maximum operating pressure, MOP, of 4- 7 bar will be utilized. The map of the intermediate line is still under preparation by ReGas. The will design the network to pass in the main roads and streets. It will not cross any agriculture roads.

**2.2.2 Low Pressure Network - Distributions network “Regulators, PE80 Networks”**

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

**Table 2-1 Length and size of pipes in the Low Pressure Network**

<b>Qeft</b>					
Pipe diameter	180 mm	125 mm	90 mm	63 mm	32 mm
Pipe length	5600 m	1118 m	1400 m	30333 m	8400 m
Laying depth	1.2 m :2 m	1.2 m :2 m	1.2 m :2 m	1.2 m :2 m	1.2 m :2 m
<b>Naqada</b>					
Pipe diameter	180 mm	125 mm	90 mm	63 mm	32 mm
Pipe length	2800 m	800 m	1000 m	14300 m	3950 m
Laying depth	1.2 m :2 m	1.2 m :2 m	1.2 m :2 m	1.2 m :2 m	1.2 m :2 m
<b>Waqf</b>					
Pipe diameter	180 mm	125 mm	90 mm	63 mm	32 mm
Pipe length	---	---	---	---	---
Laying depth	1.2 m :2 m	1.2 m :2 m	1.2 m :2 m	1.2 m :2 m	1.2 m :2 m
<b>Farshout</b>					
Pipe diameter	180 mm	125 mm	90 mm	63 mm	32 mm
Pipe length	---	---	---	---	---
Laying depth	1.2 m :2 m	1.2 m :2 m	1.2 m :2 m	1.2 m :2 m	1.2 m :2 m

Lengths of pipes for Waqf and Farshout will be known when the final design for low pressure network finalized by ReGas.





- **Regulators**

This is a subunit for gas reduction from 7 bars to 100 mbar. It is placed to serve one or two adjacent sectors in a kiosk provided with a safety device according to international standards surrounded by guard rail fence.

Naqada, Qeft, Waqf, and Farshout will each be equipped with a city regulator. The specifications of the city regulators are outlined below:

Input pressure: 7 barg

Output pressure: 0.1 barg

Flow rate: 1000 m<sup>3</sup>/hr

Inlet diameter: 3 inches

Outlet diameter: 4 inches

- **Installations (Steel Pipes)**

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

- **Conversions**

Conversions involve increasing the diameter of the nozzle of the burner of appliances (stove and bathroom water heater) to work with natural gas as a fuel gas rather LPG and others.

## **2.3 Project Execution Methodology**

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### **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 introduce the service in new areas and 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.

Details of the methodology of selecting households to connect through the general and Property & Appliance surveys are provided in the ESIA Framework.

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

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



### **2.3.3 Construction works of Main feeding line/network “7 bar system – PE100”- Intermediate Pressure Network**

The construction activities of the network lines will involve drilling, pipeline placement, pipeline connection welding, and then surfacing. The construction activities will be located within the allocated site. The following activities will take place during the construction of network:

- Clearing and grading activities and Pipe transportation and storage
- Site preparation
- Excavation
- Pipe laying
- Welding
- Backfill and road repair
- Leakage testing
- Construction works of household installation
- Commissioning

The construction site will be mainly within the road network. The main roads are used on a temporary basis to transport personnel, equipment and material to project site area. Sensitive receptors along the route have been identified and will be presented in details in Chapter 4 (Baseline conditions) and Chapter 5 (Impact Assessment).

- ***Clearing and grading activities and Pipe transportation and storage***

The first step of construction includes flagging the locations of approved access route of pipeline, temporary workshop for the crew, install fences surrounding the area of working, clean the land from any rubbish and /or remove 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.

According to an approved implementation plan, the contractor mobilizes construction equipment and materials. The contractor will be assigned a location by the local authority for storing materials and equipment in the active "Sector", i.e., Naqada, Qeft, Waqf and Farshout. Materials such as PE pipes are covered with a fabric to prevent damage by sun. Locations for temporary storage areas had not been determined at the time of the submission of the report.

- ***Site preparation***

Before any excavation activities, ReGas 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, inspections on the presence of underground utilities are carried out by drilling exploratory drills and/or using utility detection devices. Pipeline routes are then identified and marked in the field.

The distribution system shall consist of 7-Bar mains extending from the PRSs through city gate regulators, which in turn feed low pressure networks via district regulators.

Distribution mains are 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 16 mm to 355 mm according to GIS PL2-8.



- **Excavation**

In general, the least expensive and most commonly used excavation technique is the Open cut technique. Alternatively, borings may be excavated using hydraulic drive, and finally Horizontal Directional Drilling (HDD) technique. HDD is only utilized in the case of railway crossings, and major streets where traffic cannot be interrupted. In the case of HDD under railway crossings steel or reinforced concrete sleeves will be installed to further protect the piping from fatigue. It should be noted that intersections with waterways of the Nile or its major branches are not anticipated in this project.

Pipe laying of the intermediate network in Naqada, Qeft, Waqf and Farshout will not involve crossings (e.g., railways or water bodies), therefore, the excavation technique applied will be open cut. Trenches for polyethylene pipes will be excavated at widths of 40 to 60 cm and depths of 1.2 – 2 m depending on the pipe size.

An example of a trench is shown below.



**Figure 2-4: Example of an excavated trench prior to pipe laying.**

Excavation works start by removing the asphalt layer using either a mechanical trencher or a jack hammer. The mechanical trencher also removes broken asphalt and the base stone layer. In case the jack hammer is used, road layers are then removed by excavator.

The road base soil, underneath asphalt and stones, is then excavated either by a backhoe excavator or by manual excavation.

Excavated soils, broken asphalt and other waste materials during excavation are loaded onto trucks, which are transferred to disposal areas. Because of the limited available space on most Egyptian streets, loading waste trucks shall be done upon excavation, whenever possible, in order to avoid stockpiling waste on site.

- **Pipe laying**

Before pipe laying, the bottom of the trench is cleaned of any rocks or solid objects which may damage the pipes.

- **Welding**

During the excavation works, welding works may take place above-ground.



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. Once the trench is excavated and cleared, the pipe stretch shall be laid down.

In both cases, diesel generators and relevant cabling would be needed.

- ***Backfill and road repair:***

After laying and welding works, the trench containing the PE pipe is backfilled with sand either by a front loader or manually. 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 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. Natural gas PE pipes are surrounded by sand in order to absorb loads from the road.

The sand is effectively compacted in the trench in order to avoid road settlements, and subsequent cracks. A yellow warning tape marked “Natural Gas” is placed on top of the sand layer.

In some cases, if the street width is not enough to satisfied proximity required in standard for safety requirements to sustain pressure, an inverted U-shaped reinforced concrete slab is constructed around the pipeline after laying in order to improve shock resistance.

- ***Pneumatic leakage testing***

Following construction activities, the piping will be tested to locate possible leaks using pneumatic air-gas testing, which consists of filling pipes with nitrogen and then pressurizing to 1.5 times the operating pressure and measuring the pressure at different locations. Pressure drop indicates leakage. If air is used during the pneumatic test, pipes are purged with nitrogen gas to remove air after the test.

In order to prevent deformation, dislocation, and rupture of the pipes, leakage testing through pressurization is performed after backfilling the excavation under (10 cm), around (10 cm), and above the pipes (20 cm, at least).

### **2.3.4 Construction works of distribution network “regulators, PE80 networks”- Low Pressure Network-100 mbar**

The distribution system consists of 100 mbar polyethylene (MDPE-PE80) pipes, which extend from the city gate regulators to households. PE80 pipes are yellow with diameters ranging from 16 mm to 250 mm compliant with GIS/PL2-2. Trenches will be excavated by open cut technique. The trench widths and maximum depths will be 40 – 75 cm and 1 meter, respectively. Steel pipes with length approximate 5 meters may be used in low pressure network for outlet of regulators.

### **2.3.5 Construction works of household installation**

After testing the piping for leakage, connections to the buildings commence. The connection starts from the PE80 network and crosses the road to the buildings on both sides via carbon steel pipelines. At the edge of the building, a riser (steel) feeds different laterals which ends at the customer gas meter then to different appliances. For singly occupied premises, gas will be fed from the horizontal service line through an external meter box service termination.



The size of risers depends on the number of dwellings in the block of flats, while lateral pipes will have diameters of 1 inch or 3/4 inch depending on the size of the building.

Gas meters will be installed with a suitable regulator (governor) at internal pressure of 20 mbar in each household. 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 consist of 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.

### **2.3.6 Machines used**

- Air compressor with jack hammers
- Portable generators
- Directional boring machine
- Trench drilling machine
- Control box welding machine
- Butt fusion welding machine
- Manual excavation tools

### **2.3.7 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 household. 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.

## **2.4 Activities of the operation phase**

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### **2.4.1 Operation of the networks in Qeft, Naqada, Waqf, and Farshout**

The operation of the system is undertaken by REGAS. 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:

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

The natural gas composition of the national network is mainly Methane (80%) and traces of ethane, propane, Iso-butane, Nitrogen...etc. . The main activities are the monitoring of the pipeline and the routine checking for the occurrence of gas leaks.

#### **2.4.2 Repairs in households**

Repairs include appliance adjustments or piping/metering replacement.

#### **2.4.3 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.

### **2.5 Resources Consumption**

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#### **2.5.1 During Construction**

##### **2.5.1.1 Water**

Water is mainly used during the construction phase by the workers and engineers. There is a permanent source of water from Egyptian Holding Company for Drinking Water and Sanitation.

##### **2.5.1.2 Fuel**

Diesel fuel will be mainly used for diesel generators that supplies electricity to the construction activities including welding. The fuel will come from the nearest petrol station. In addition, diesel will be the fuel used by the trucks and excavators. The fuel will be delivered to the construction site via trucks when needed.

### **2.6 Waste Generation**

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All solid wastes generating during the construction phase will be managed and disposed in accordance with applicable regulations and established best management practices. All generating wastes will be reused and/or recycled to the maximum extent possible.

#### **2.6.1 During construction**

Solid waste during construction phase will comprise domestic waste, construction waste and some hazardous wastes from the activities.

Construction waste will consist mainly of left over piping materials such as polyethylene pipes and carbon steel. The amount of waste is approximately 2% of the total amount of materials, which is collected by the Contractor and resold as scrap.



Excavated soil is used to backfill the trench after pipe laying. Small amounts of leftover soil may remain and are disposed of in legal dumpsites as per contract between the Contractor and the supplier. Official dumpsites in Qena are located near Farshout city (26°1'38"N, 32°8'3"E).

Domestic waste will be generated by approximately 20 workers per day. Works will be taking place in close proximity to the city of Naqada, Qeft, Waqf, and Farshout for intermediate pressure lines and within the city for low pressure lines. Workers will utilize public facilities provided by the village or city and use public resources (bins) to dispose of food waste, packaging materials etc.

### **2.6.2 During operation**

The operation of the intermediate and low pressure networks is not expected to generate any type of solid waste during the operation phase.



## 3 Legislative and Regulatory Framework

### 3.1 Applicable Environmental and Social Legislation in Egypt

- Law 217/1980 for Natural Gas
- Law 4 for Year 1994 for the environmental protection , amended by Law 9/2009 and law 105 for the year 2015
  - Executive Regulation(ER) No 338 for Year 1995 and the amended regulation No 1741 for Year 2005, amended with ministerial decree No 1095/2011, ministerial decree No 710/2012, ministerial decree No 964/2015, and ministerial decree No 26/2016
- Law 38/1967 for General Cleanliness
- Law 93/1962 for Wastewater
- Law 117/1983 for Protection of Antiquities
- Traffic planning and diversions
  - 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

### 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.
- Construction permit to be obtained from the Local Governmental Unit in each of Qeft, Naqada, Waqf, and Farshout
- Road and Bridges Directorate permission for digging of main roads in accordance to 84 of year 1968 pertaining to the public roads
- Permission from the High Council of Antiquities in accordance to Law No 117 of year 1983 and its amendment No 12 of year 1991





### **3.3 World Bank Safeguard Policies**

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Three policies are triggered for the project as a whole: Environmental Assessment (OP/BP 4.01), Physical Cultural Resources (OP/BP 4.11), and Involuntary Resettlement (OP/BP 4.12). Environmental Assessment (OP/BP 4.01) is the only applicable policy for the proposed project. OP/BP 4.12 will not be applicable to the low pressure pipelines of Qena governorate 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 project will result in any physical or economic dislocation of people for the construction of low-pressure pipelines in Qeft, Naqada, Waqf and Farshout. The Pipelines network will not cross agricultural land in Naqada, Qeft, Waqf, and Farshout and accordingly no compensation will be applied.

#### **3.3.1 World Bank Group General Environmental, Health, and Safety Guidelines & WBG Environmental, Health and Safety Guidelines for Gas Distribution Systems- IFC Guideline.**

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. Gas distribution system – HSE Guideline (provided in **Annex 2** from the report) are applicable to the project.

Gaps between requirements outlined by WBG guidelines and actions detailed by the ESIA have been analyzed. 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 ESIA.

In addition to the above mentioned safeguards policies, the Directive and Procedure on Access to Information<sup>1</sup> will be followed by the Project.

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



## 4 Environmental and Social Baseline

### 4.1 Description of the Environment

#### 4.1.1 Introduction

Qeft, Naqada, Waqf and Farshout are located in the jurisdiction of Qena Governorate -Upper Egypt at the Nile valley in Egypt.



Figure 4-1 : Project Areas at Qena Governorate

#### 4.1.2 Climate

An extremely arid climate prevails in the Nile Valley. The warmest month of the year is July, with an average temperature of 31.2 °C. January has the lowest average temperature of the year at 14.4°C.

#### 4.1.3 Air quality and noise

The measurement location was chosen on the basis that it's beside sensitive receptors (schools, hospitals and/or near a residential area) close to the pipeline route. The GPS coordinates of the selected Ambient Air monitoring locations are shown in the following table:



**Table 4-1 Location of Air and Noise measurements**

Location	Location	Latitude	Longitude
Qeft	Nahda primary school/ Al-Qeft Residential area	25°59'58.6"N	32°48'37.9"E
Naqada	Naqada primary school/ Naqada Residential area	25°54'27.9"N	32°43'36.4"E
Waqf	Al-El Waqf Residential area	26°5'44.9"N	32°31'59.3"E
Farshout	Farshout cemeteries area	26°0'35.58"N	32° 8'12.78"E

#### 4.1.3.1 Site Specific Ambient Air Quality

8-hour average measurements were conducted for pollutants of primary concerns, namely, carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), Total Suspended Particulates (T.S.P) and particulate matter (PM<sub>10</sub>). The air measurements in the studied areas are below national and WB guidelines. Methodology, instrumentation, and results of Air Quality measurements are detailed in in **Annex 3**.

**Table 4-2: Average Air measurement's results for 8 hours at the 4 studied areas**

Location	NO <sub>2</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> )	T.S.P (µg/m <sup>3</sup> )
Farshout	25.5	16.3	3.3	99.0	112.0
Naqada	16.1	10.9	2.8	124.7	169.5
Waqf	26.4	14.1	2.7	89.0	99.0
Qeft	16.3	13.7	2.9	114.2	133.6
National Limits	350	350	30	150	230
International Limits	200	125	-	150	-

#### 4.1.3.2 Site specific noise measurements

Noise level measurements were conducted in the same location as that of the ambient air quality measurements. 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 noise measurements in the studied areas are below national and WB guidelines. They are complying with the maximum allowable limits according to law 4/1994 for Environment protection and its amendments by law No.9/2009 and the executive regulation issued in 1995 and its amendments no. 710 in 2012 and 964 in April 2015.

The excavation and construction activities may cause noise levels to further surpass permissible levels at the site. As the excavation and construction 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 noise levels beyond permissible levels are further addressed in chapter 7.

**Table 4-3 Average Ambient Noise Levels Readings for 8 hours at the 4 studied areas**

Location	LAeq (dBA)
Qeft	50.555
National Limits	70
International Limits	70

#### 4.1.4 Water resources

It is crucial to mention that pipeline network will not cross any surface waters.

##### 4.1.4.1 Surface water

- *Qeft*

The main canal is Kalabya canal which is parallel to Qeft feeds water to the cultivated areas with Zafeyrea canal along 2 kilometres from Qeft. Drainage with high detergent waste has been recorded parallel to Kalabya canal in Qeft. Project activities will not involve crossing of any surface water canal during construction and operation as a part of project activities.



**Figure 4-2 Kalabya canal Qeft alongside the canal**



- **Naqada**

The main canal is Kalabya canal in the entrance of Naqada feeds water to the cultivated areas. No pipeline will cross the canal during construction and operation activities.



**Figure 4-3: Canal of Kalabya**

- **Waqf**

Abadey Canal is a branch of 8 branch of Kalabya Canal, Abadey Canal is the main source of water for agriculture land at Waqf area. No pipeline will cross the canal during construction and operation activities.



**Figure 4-4 Abadey Canal**



- ***Farshout***

Al-Gabal canal is a branch of 8 branch of Kalabya Canal, Al Gabal Canal is the main source of water for agriculture land at Farshout area. No pipeline will cross the canal during construction and operation activities.



Figure 4-5 Al Gabal Canal

#### 4.1.4.2 Subsurface water (Groundwater)

No site specific data on subsurface water in Naqada, Qeft, Waqf and Farshout area.

#### 4.1.5 Terrestrial Environment

- ***Natural habitats***

The projected work is planned along existing roads in residential areas of the city of Waqf, Naqada, Qeft and Farshout. No natural habitats occur in the project area.

- ***Flora***

Project activities are planned in residential areas, where typical flora is not encountered. No flora of significance occur in the project areas.

- ***Fauna***

No endangered or vulnerable species occurs in the project areas.

#### 4.1.6 Protected areas

No protected areas will be encountered in the project area.



#### 4.1.7 Waste management

The responsibility of waste management service planning, delivery and monitoring is delegated to the Local Governmental Units in Qeft, Naqada, Farshout and El Waqf. Additionally, small scale contractors provide domestic waste collection services in the four project sites.

Municipal solid waste is disposed in collection points located in the streets and used as open transfer systems. Waste in collection points is collected twice a day by municipal workers using waste collection trays and wheel barrows, brooms and shovels). Collected waste is transported using covered trucks<sup>2</sup>.



Figure 4-6: A recycling factory in Qena



Figure 4-7: Waste piles in the project sites in Naqada



Figure 4-8: Closed transfer station in Qena Governorate

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<sup>2</sup> Zaki, T., Kafafi, A. G., Mounir Boushra, M., & Abdel Halim, M. A. (2013, September). Annual Report for Solid Waste in Egypt. (M. Saber, Ed.) Ministry of State of Environmental Affairs



#### **4.1.8 Physical cultural resources**

Low pressure Natural Gas installation pipework shall only take place in the semi-urbanized areas in Qeft Naqada, Farshout and El Waqf. These areas have already been excavated beforehand, in order to install other public utilities such as water, sanitary, sewage and electricity networks. It is least likely to find any artifacts or antiquities where low pressure NG installation pipework is going to take place. 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; the **Annex 4**, entitled 'Chance Find Procedure,' details the set of measures and procedures to be followed in such case.

#### **4.1.9 Physical structures**

The majority of buildings, to which NG is to be connected, are built with concrete and red bricks in relatively tight streets. The highest building in Qeft, Naqada, Farshout and El Waqf is 6-story high. The construction materials of the walls and ceilings comply with the main bases and conditions required to install the NG. The majority of streets and alleyways are leveled out. According to the field research team, around 70% of the streets are asphalted, though; the condition of the asphalt is modest. The official website of Qena governorate states that paved out roads and streets are 148 km, in total; while leveled out tracks are 10 km.

The figure below displays typical street and buildings in project areas:



**Figure 4-9: Mo'az Ibn Gabal Street in Qeft**



**Figure 4-10: A building in Qeft**





Figure 4-11 Residential neighborhood in Naqada



Figure 4-12 Corniche street, Naqada



Figure 4-13 residential neighborhood in el-Waqf



Figure 4-14 al-Mostashfa (hospital) street, el-Waqf

The majority of buildings of Farshout city, to which NG is to be connected, are built with concrete and red bricks in relatively tight streets. It was reported that all of the sample surveyed live in apartment buildings that are constructed with concrete and red bricks. The majority of streets are paved out, and in a good condition. Alleyways are mostly leveled out tracks. The figure below displays typical street and buildings in Farshout:



Figure 4-15 busy street in Farshout



Figure 4-16: Housing project building



The facades of all buildings are mostly in shabby conditions, and some are left with even cement renderings.



**Figure 4-17** Ahmed Orabi Street in Qeft



**Figure 4-18** al-Thawra Street in Qeft



**Figure 4-19** Residential Block in Naqada



**Figure 4-20** Apartment buildings in al-Rawy Street in Naqada



**Figure 4-21** : residential units in Port Saied street, el-Waqf



**Figure 4-22** : Type of modest dwellings el-Waqf



With regard to the legal status of buildings; all buildings and neighborhoods are mostly legal, and no illegal or unplanned neighborhoods were documented by the research team.

Regarding the condition of the streets in the project cities, they are mostly narrow streets with average width ranging between 1 to 2 lanes wide. As stated above; most streets, roads and alleyways are leveled out.

#### 4.1.10 Traffic profile

The project areas are located in Qena Governorate. There are three types of roads in the project areas: highways, urban streets and local roads. The following map presents the highways and main roads surrounding the project areas.

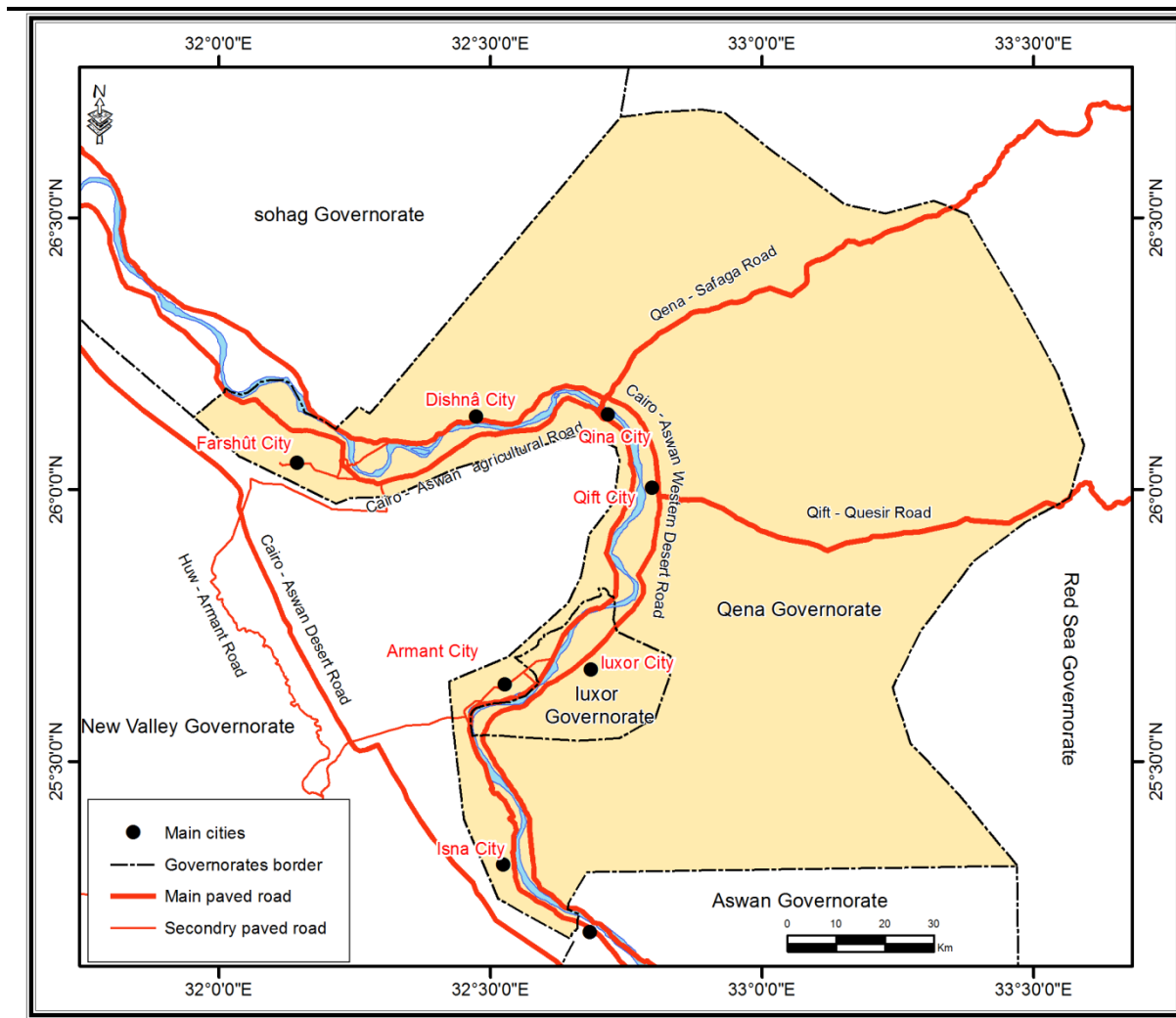


Figure 4-23: Main Roads in Qena Governorate

Source: Study GIS expert



#### 4.1.10.1 Traffic profile of Qeft City

Qeft city is one of the oldest cities in Qena. The streets are relatively wide. However, about 40% of the streets are one lane streets.

The main roads (highways) in Qena can be summarized as follow:

- Cairo Aswan Desert Road
- Cairo Aswan Agriculture Road
- Qeft- Quseir road

##### Urban roads

The main streets noticed in the city are El Gesr Street, El Gomhoria Street and El Qasr Street. Almost all streets are paved. However only 70% are covered with asphalt. There are also plenty of schools, institutes and mosques.

##### Local roads

There is a proper network of local roads that consists of one lane streets and alleyways.

Public transportations are limited in the city. Some of the residents use motorcycles and bicycles for transportation purposes. Additionally, there are some carts and Tuk Tuks. The density of traffic is extremely limited in the area.



Figure 4-24: A Cart in Qeft



Figure 4-25: Motorcycle in Qeft

In Qeft, the alleyways are relatively narrow. The majority are one lane streets. This will influence community people mobility in case of digging in such narrow streets. Additionally, there might be risk to the community as digging such streets might result in accidents, especially, among children and old people.



Figure 4-26: Motorcycle and bicycles



Figure 4-27: Narrow alley way in Qeft

There is a market in Ahmad Oraby Street. The market is relatively small. Consequently, traffic related impacts are anticipated to be minor.

#### 4.1.10.2 Traffic profile of Naqada City

Naqada city is classified as one of the oldest cities in Egypt. The city can be described as of semi urban nature. The majority of streets are paved. However, the majority of streets are not asphalted.

##### Highways:

Naqada city is located close to Western Cairo Aswan Road

##### Urban roads

The urban roads in Naqada vary between two lanes to three lanes width. Nile Cornish Street is the main urban road passing in all sites.

##### Local roads

Side streets and alley ways were detected in Naqada city. They are not all asphalted but they were paved.

The density of traffic was extremely low. The streets were vacant along the day. There were limited number of Tuk Tuks and minibuses. The project impacts related to traffic in Naqada will be limited.



**Figure 4-28: Shokry El Khawatry street**



**Figure 4-29: Nile Cornish street in Naqada**

#### **4.1.10.3 Traffic profile of El Waqf City**

El Waqf district is one of the major districts in Qena Governorate. It is located in the western bank of the Nile.

##### Highways:

El Waqf city is bordered by two high ways namely Cairo Aswan Agriculture Road and Cairo Aswan Western Desert Road.

##### Urban roads

The streets are paved and most of the city's streets are asphalted. This enabled community people to move along the city. The majority of the main streets is two lane width.

##### Local roads

Local roads are of good condition in El Waqf. The roads are paved and some of them were asphalted.

The total area of El Waqf city is estimated at 55 km<sup>2</sup>. There are three main access roads to the city, namely, El Khamsein, El Ma'raga and Abu Deib.

The minibuses are the main means of transportation that transfer people from the surrounding areas to El Waqf city. There are also some tricycles, motorcycles and Riksha (Tuk Tuk). There is no traffic congestion in almost all project areas. There were old cars dated 1970. Additionally, the study team noticed carts. There were no crowded markets. This will influence the rating of traffic impacts in El Waqf.



**Figure 4-30 : Old cars and carts**



**Figure 4-31 : El Mostashfa Street**

#### **4.1.10.4 Traffic profile of Farshout City**

The City of Farshout is one of the biggest cities in Qena Governorate. It is relatively dense and overcrowded. The streets are two lane width. There are various means of transportation. Motorcycles and tuk tuks are the main type of transportation. There are also some animals that are used for transporting people.

##### Highways

Farshout city is located in the vicinity of Cairo Aswan Agriculture Road and Cairo Aswan Desert Road.

##### Urban roads

The city is privileged with proper road network that is affected by markets and street vendors in some of the project sites

##### Local roads

Local roads and alleys are relatively of less congestion. The majority of streets are compacted. However, the majority of them are not covered with a layer of Asphalt

The city is overcrowded, particularly from 7 a.m. to 2 p.m. No digging activities can take place in the main streets from 7 to 2 p.m. unless poor arrangement with the traffic department.



Figure 4-32 Overcrowded market



Figure 4-33 Pedestrians in a market

With regards to schools, they influence the traffic in Farshout, especially in the morning and in the afternoon. There are also some community services' buildings that are targeted by community people.



Figure 4-34: A mosque and a clinic in Farshout



Figure 4-35: Cart in Farshout

## 4.2 Socio-economic Baseline of project sites

Naqada city and markaz is one of the 9 main administrative centers of Qena governorate. It is 31 km away from Qena City –the capital city of Qena governorate. The total area is 83.33 km<sup>2</sup>.

El-Waqf city and markaz is one of the 9 main administrative centers of Qena governorate. It is situated on the western bank of the Nile; bordered by al-Samanyya village to the north, and to the south lies the desert elongation of Dandara village. The total area is 55.37 km<sup>2</sup>, out of which 6 km<sup>2</sup> are inhabited.

Farshout is located in the northern part of Qena governorate, on the western bank of the Nile. It is bordered by Abou Tesht markaz to the north, and Nagaa Hamady to the south-east, and el-Gabal el-Gharby to the west.





Qeft lies under the jurisdiction of Qena governorate. It is located on the East bank of the Nile. There are 8 villages affiliated with Qeft markaz, in addition to Qeft City.

#### **4.2.1 Administrative affiliation**

Naqadaa lies under the jurisdiction of Qena governorate. It is located on the west bank of the Nile. There are 9 villages affiliated to Naqada markaz, in addition to Naqada City –the capital city.

Qeft city and markaz is one of the 9 main administrative centers of Qena governorate. It is 20 km away from Qena city –the capital city of Qena governorate. The total area is 1860.33 km<sup>2</sup>. According to 'Governorates' Description by Information 2010,' Qeft markaz hosts an industrial zone situated in Kalabeen.

Waqf lies under the jurisdiction of Qena governorate. It is located on the west bank of the Nile. Waqf was transformed into city in accordance with the Cabinet minister's decree no. 760 on 3<sup>rd</sup> July 1988.

Farshout is administratively affiliated with Qena governorate. According to the Information Center of Farshout's LGU, there are 9 villages along with Farshout City falling under the jurisdiction of Farshout markaz.

#### **4.2.2 Urbanization trends**

Qeft city is of classified as a semi-urban area. It includes urbanized and rural areas. The total area of Qeft is 1860.33 km<sup>2</sup>, out of which 83.67 km<sup>2</sup> are inhabited residential areas. The total of agrarian lands is 12,966.4 feddans, according to Qena governorate official website. According to CAPMAS data from 2013, the percentage of individuals living in apartments is 74.3%, while individuals living in rural houses represent 9.6%.

Naqada city is of classified as a semi-urban area. It encompasses urbanized and rural areas. The total of agrarian lands is 15,882.4 feddans, according to Qena governorate official website. According to CAPMAS data from 2013, the percentage of individuals living in apartments is 41.65%, while individuals living in rural houses represent 36%. The remaining individual reside in one room/ two rooms in an apartment.

Waqf city is similar to the above mentioned two cities, as it includes semi-urbanized areas and rural areas. According to the Information Center of Waqf Markaz, the total area of agrarian lands is 13,839 feddans, and there are 3,000 feddans available for land reclamation. According to CAPMAS data from 2013, the percentage of individuals living in apartments is 27.04%, while individuals living in rural houses represent approximately 60%.

Farshout City is considered as a semi-urbanized area. The total area of Farshout is 775 km<sup>2</sup>. According to the Information Center of Farshout's LGU, the total area of agrarian lands in Farshout City is 588 feddans. According to CAPMAS data from 2013, the percentage of individuals living in apartments is 54%, while individuals living in rural houses represent 21.5%. The remaining persons live in one room/ two rooms in an apartment.



### 4.2.3 Demographic characteristics

- **Total Population**

According to the official the Poverty Mapping data, 140,738 individuals will be targeted to benefit from the NG project. 41.79% of the population live in Farshout City, while only 17.62% reside in Naqada City.

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

City	Farshout City	Naqada	Qeft	el-Waqf	Total
<b>Population</b>	58,811	24,802	25,416	31,709	140,738
<b>%</b>	41.79	17.62	18.06	22.53	100.00

Source: Poverty Mapping Data, 2013, CAPMAS

- **Rate of Natural Increase**

According to 'Governorates' Description by Information 2010,' the birth rate in Qena Governorate is 26.90 births per 1000 persons, while mortality rate stands at 5.40 per 1000 persons. That gives a natural growth rate which of 21.50 per thousand persons in Qena.

The 'Governorates' Description by Information 2010' reported figures from 2010 that the newly born mortality rate 7.40 per 1000, while infant mortality is 19 per thousand live births. Infant mortality rate below five years old stood at 24.50 per 1000.

### 4.2.4 Living Conditions

- **Household Size and Density**

A household is defined as “**Family (and non-family) members who share residence and livelihood, and operate as one social and economic unit**”. The average household’s size in Qena Governorate is about 4.73 individuals, according to 'Governorates' Description by Information 2010.' This figure varies among the project sites. As reported in the Poverty Mapping 2013, the HH size is 4.4 person/household in Naqada City, 4.5 person/household in Qeft, 4.8 person/household in Farshout and 4.9 person/household in El Waqf.

### 4.2.5 Access to Basic Services

- **Access to Electricity**

According to CAPMAS Poverty Mapping data of 2013, 99.6% of individuals in Qeft use electricity for lighting. Moreover, 100% of focus groups' participants use electricity for water heating. 99.2% of individuals in Naqada use electricity for lighting. In addition, the majority of stakeholders, interviewed during the focus group discussions, use electricity for water heating. 96.8% of individuals in Waqf use electricity for lighting. The Information Center of Farshout's LGU reports that the number of commercial subscribers to the electricity grid, in Farshout markaz, reaches 1,238 subscribers, while the number of household connected is 12,375 households. Additionally, the majority of stakeholders of Farshout interviewed throughout focus group discussions use electricity for water heating.



- ***Access to potable water and sanitary system***

According to CAPMAS Poverty Mapping data of 2013, accessibility to water networks is high in Qeft, as almost 100% of individuals have access to the public water network; and 96.7% of individuals have tap water inside their houses. In Naqada, the accessibility to water network is high, as almost 98.8% of individuals have access to the public water network; and 87.2% of individuals have tap water inside their houses. In el-Waqf, almost 94.8% of individuals have access to the public water network; and 35% of individuals have tap water inside their house. Accessibility to water network is high in Farshout, as 98.7% of individuals have access to the public water network; and 80.2% of individuals have tap water inside their houses.

However, the coverage of the public sanitation network stands at 1.2%, in Qeft, 4.26% in Naqada, 4.6% in El Waqf and 2.0% in Farshout according to CAPMAS Poverty Mapping 2013. The project areas are covered with sanitary system as it is prerequisite required to install the NG to the house.

#### **4.2.6 Human development profile**

- ***Education***

In Qeft City, according to CAPMAS Poverty Mapping data of 2013, approximately 22.8% of adult individuals have finalized their basic education, while only 10.17% have university degrees. Currently, there are 99.22% of individuals, between the age (6 to 18) years old, enrolled at schools. In the same respect, the percentage of females with basic education stands at approximately 26%. The percentage of females having university degrees is 5.8%. The percentage of females, between the age of 6 to 18 years old, enrolled in schools is 99%. The percentage of female drop-outs from schools is 0.14%.

17.5% of adult individuals in Naqada have finalized their basic education, while only 11.3% have university degrees. Currently, there are 97.6% of individuals, between the age (6 to 18) years old, are enrolled at schools. In the same respect, the percentage of females with basic education stands at 16.26%. The percentage of females having university degrees is approximately 8%. The percentage of females, between the age of 6 to 18 years old, enrolled at schools is 97.26%.

In El Waqf, approximately 19% of adult individuals have finalized their basic education, while 8.2% have university degrees. Currently, there are 98.7% of individuals, between the age (6 to 18) years old, are enrolled at schools. The percentage of females with basic education stands at 19.7%. The percentage of females having university degrees is 4.14%. The percentage of females, between the age of 6 to 18 years old, enrolled at schools is 98.4% .



Figure 4-36 Waqf primary Azhar institute



Figure 4-37 Waqf primary school

According to CAPMAS Poverty Mapping data of 2013 in Farshout, approximately 20% of adult individuals have finalized their basic education, while 12% have university degrees. Currently, there are 96.25% of individuals, between the age (6 to 18) years old, enrolled at schools; while the percentage of drop-outs stands at 0.5%. The percentage of females with basic education stands at 19.5%. The percentage of females having university degrees is approximately 6%. The percentage of females, between the age of 6 to 18 years old, enrolled at schools is 96%.

- ***Illiteracy rate***

According to the Poverty Mapping data (CAPMAS 2013), the illiteracy rate in Naqada stands at approximately 30%, while the illiteracy rate among females stands at 39%. The illiteracy rate in Qeft stands at 20%, while the illiteracy rate among females stands higher at 28.1%. The illiteracy rate in Waqf stands at approximately 36.5%, while the illiteracy rate among females stands at 50%. The illiteracy rate in Farshout stands at 33.67%, while the illiteracy rate among females stands higher at 44.1%.

- ***Unemployment and Work Status***

According to Poverty Mapping data (CAPMAS 2013), the percentage of manpower which joined labor force at the age of 15 years old to 65 years is 38.35% in Qeft City. Manpower, at the age of 25 years old to 65 years is 45.08% in Qeft. The percentage of agriculture workers from total employed persons is 6.3%. The unemployment rate in Qeft stands at 18.2%.

The Poverty Mapping data 2013 showed that the percentage of manpower in Naqada City which joined labor force at the age of 15 years old to 65 years old is 40.3%. Manpower, at the age of 24 years old to 65 years old, is 46.7%. The percentage of agriculture workers from total employed persons is 11.4%. The unemployment rate in Naqada stands at 11.36%.

Poverty Mapping data 2013 reflected that the percentage of manpower which joined labor force is approximately 38% in El Waqf. Manpower, at the age of 24 years to 65 years, is 44.55%. The percentage of agriculture workers from total employed persons is 46.1%. The unemployment rate in Waqf stands at 2.8%.



The Poverty Mapping reflected that the percentage of manpower is 38.3% in Farshout. Manpower, at the age of 24 years old to 65 years, is 46.6%. The percentage of agriculture workers from total employed persons is 11.6%. The unemployment rate in Farshout stands at 15.7%.

The formal Statistics obtained from the Poverty Mapping Data 2013 regarding manpower reflected that the age of starting work is 15 years old.<sup>3</sup> Both the Child Law and the Labor Law state that children shall not be employed before they complete 14 calendar years old, nor shall they be provided with training before they reach 12 calendar 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 where agriculture work and sales activities are in place, there is a big number of underage laborers were noticed. As a conclusion, there is a high risk that the contractors might employ young people below 18 years old. Therefore, rigid restrictions to employ this category must be added to the contractor obligations.

The following table illustrates the distribution of manpower in the project areas:

**Table 4-5: Distribution of manpower in the project areas**

	Farshout City	Naqada City	Qeft City	El Waqf City
<b>% of individuals 15 years to 65 years who joined labor force</b>	38.29	40.28	38.35	37.98
<b>% of females 15 years to 65 years who joined labor force</b>	11.30	15.45	10.29	4.98
<b>% of adult 24 to 65 years employed from the total labor force</b>	46.61	46.70	45.08	44.55
<b>% of agriculture workers from total employed persons</b>	11.62	11.44	6.31	46.11
<b>% of Unemployment rate</b>	15.74	11.36	18.23	2.79
<b>Females unemployment rate</b>	37.23	23.90	47.25	5.25

Source: CAPMAS Poverty Mapping data

The following table illustrates the distribution of manpower among different sectors:

**Table 4-6: Employment Status in the Project Sites**

City	Self-employed	Government/public sector	Private sector	Permanent jobs	Temporary jobs	Wage workers	Unpaid worker
Qeft	5%	19%	26.6%	97.18%	3.6%	74%	0.35%
Naqada	<b>8.87%</b>	23.4%	26.77%	95%	5.17%	76.87%	1.04%
El-Waqf	<b>1%</b>	13.35%	57.7%	90.4%	9.63%	95.1%	0.25%
Farshout	<b>6.17%</b>	15.8%	29.1%	93.3%	7.2%	75.2%	0.2%

Source: CAPMAS Poverty Mapping, 2013

According to CAPMAS Poverty Mapping data 2013, female labor percentage tends to be much less than males' ratio as 15.45% of Naqada females perform any type of work. The least percentage of females contributing to labor force was reported in El Waqf City (4.98%). However the least willingness to work was reported in El Waqf City. Therefore, only 5.25% seek for jobs in Naqada. Table 4.3 presents more information about female employment and unemployment in the project areas.

The following table displays more figures related to type of work in the project sites.

**Table 4-7: Female employment in the Project Sites**

City	Self-employed females/total employed females	Female wage workers/total employed females	Female agriculture workers/total employed females	Females working in temporary jobs	Unpaid females
Qeft	1.2%	51.3%	0.5%	3.3%	0
Naqada	1.7%	72%	9.35%	6.34%	1.6%
El-Waqf	1.1%	92.34%	7.85%	6.46%	0.22%
Farshout	0.7%	61.5%	0.5%	17%	0.1%

Source: CAPMAS Poverty Mapping data

#### 4.2.7 Health Facilities

There are relatively sufficient health facilities in the project sites that will be used to provide workers with health services. Qeft has one central hospital, in addition to a clinic attached to al Hoda mosque. Naqada has two hospitals (Naqada's Central Hospital and Nile Hospital), in addition to an ambulance center. There are, also, a number of pharmacies serving Naqada.

There are five hospitals serving el-Waqf, according to the Information Center of el-Waqf's LGU. Additionally, there are a number of private clinics offering their services to the public.



According to the Information Center of Farshout's LGU, there is one central hospital serving Farshout, in addition to 41 private medical clinics and 7 dental clinics. Additionally, there are 5 ambulance cars serving Farshout City.



Figure 4-38: Qeft Central Hospital



Figure 4-39: Nile Hospital in Naqada

#### 4.2.8 Poverty index

According to Poverty Mapping developed by CAPMAS in 2013, the number of poor people in Qeft in 2013 is 7274 individuals, representing 28.62%. The number of poor people in Naqada in 2013 is 11,781 individuals, representing 47.5%. The number of poor people in el-Waqf in 2013 is 21638 individuals, representing 68.24%. The number of poor people in Farshout City in 2013 reached 36,310 individuals, representing 61.74%.

The Gini Coefficient as mentioned in the Poverty Mapping data (CAPMAS 2013), which indicates income inequality, stands at 0.21. The percentage of female-headed households is 14.13%. While in Naqada, it stands at 0.22. The percentage of female-headed households is 15.33%. The Gini Coefficient in El Waqf, which indicates income inequality, stands at 0.21. The percentage of female-headed households is 14.74%. The Gini Coefficient in Farshout stands at 0.21. The percentage of female-headed households is 15%.

According to CAPMAS Poverty Mapping of 2013, the per capita consumption in Qeft city is 5236.34 EGP. Focus group discussions revealed that the average family expenditure is above 1600 EGP. The per capita consumption in Naqada is 4364.38 EGP. Focus group discussions revealed that the average family expenditure is above 1000 EGP. The per capita consumption in Waqf is 3,558.93 EGP. Focus group discussions revealed that the average family expenditure is above 1500 EGP. The per capita consumption in Farshout City is 3792.99 EGP. Focus group discussions revealed that the average family expenditure is about 1750 EGP.

Table 4-8: Poverty index

	Farshout City	Naqada City	Qeft City	El Waqf City
<b>Population 2013</b>	58,811	24,802	25,416	31,709
<b>Number of poor in 2013</b>	36310	11781	7274	21638
<b>% of poor people</b>	61.74	47.5	28.62	68.24



	Farshout City	Naqada City	Qeft City	El Waqf City
<b>% of female headed household</b>	15.0288	15.3321	14.128	14.7378
<b>Per capita consumption</b>	3792.99	4364.38	5236.34	3558.93

Source: CAPMAS Poverty Mapping data

#### 4.2.9 Human activities in the project areas

As noted above, the size of agriculture activities are very slim; as it encompasses only 6.3% of total employed individuals living inside Qeft. According to the official website of Qena governorate, the total are of agrarian lands is 12966.4 feddans. Qeft hosts limited number of small industries and services such as garments, soap, furniture, carpets, ropes, in addition to car maintenance and services.

Focus group discussions revealed that the people of Qeft are engaged in commercial activities, agricultural activities and civil services. The majority of employees work for the government/public sector at 19%, while 26.6% work for the private sector. Many participants of the focus groups reported a high percentage of unemployment among youths, though they did not give any estimation.

Agriculture activities are substantial in el-Waqf, as it absorbs 46.1% of total employed individuals. According to the Information Center of el-Waqf's LGU, Waqf produces a number of crops including sugar cane, corn, wheat and tomatoes.

Focus group discussions revealed that the people of Waqf are engaged in mainly agriculture activities, commercial activities, teaching and civil service.

As noted above, the size of agriculture activities are slim, compared to other activities. Agriculture activities absorb 11.6% of total employed individuals living inside Farshout City. According to the Information Center of Farshout's LGU, Farshout city hosts a number of small industries and crafts such as carpentry, carpets production, tiles production, leather products, foodstuffs production, in addition to blacksmith workshops.

Focus group discussions revealed that the majority of the people of Farshout are engaged in commercial activities and civil services.

#### 4.2.10 Fuel currently used in households and its problems

The predominant majority of individuals surveyed in all project areas use LPG cylinders for cooking. The main source of LPG cylinders is LPG outlets and LPG vendors. Participants of the focus group discussions reported that the price of LPG cylinder range between 20 to 50 EGP. And, mostly each household consumes between (2 - 3) cylinders per month.





**Figure 4-40 LPG vendor in Qeft**



**Figure 4-41 Empty LPG cylinders left on the side of the street in Naqada**

#### **4.2.11 Perception towards the project**

Throughout the various consultations with civil servants and focus group 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 sites 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 the implementation of the project.

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.

#### **4.2.12 Gender dimension of the current type of fuel**

Women play a key role in running households in the project areas. Women's role includes buying the LPG cylinders and installing them to their stoves or water heaters. Women take up the heavy burden of fetching and carrying LPG cylinders from LPG outlets or vendors to their own houses.

#### **4.2.13 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 to 50 EGP).

Based on focus group discussions, each household consumes between ( 1 – 3 ) LPG cylinders monthly, indicating that each household will pay 50-150 EGP on average per month, in the worst cases.

Participants of the focus groups were asked about their opinion of the NG Installation fee. They stated that the installation fee is relatively high to be paid in one installment, given the level of income of all participants. All participants demanded a system of monthly installments to settle



the Installation fee. Participants of focus group discussions stated that they can pay around (50 to 500 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.



## 5 Environmental and Social Impacts

The environmental impact assessment (EIA) 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 irrelevant, minor, medium, or major. Results from both methods are summarized and presented according to the following scheme:

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

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 Impacts during construction phase**

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### **5.2.1 Positive impacts during construction**

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

- The project is anticipated to result in creation of different job opportunities. Based on similar projects implemented recently by EGAS and the local distribution company, the daily average number of workers during the peak time will be about 50-55 drilling worker, two engineers and eighteen technicians in the project sites. This number is flexible and might be changed in case of the need to work in all project sites in parallel
- 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 job 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. For example the transportation of workers from Qena to Farshout district will work for the benefit of car lease offices.

### **5.2.2 Negative impacts**

#### **5.2.2.1 Reduction of Traffic Flow (disruption of local and regional traffic)**

##### *Environmental impacts*

During the mobilization, preparation phases and construction phases: Mobilization of heavy machinery, 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.

##### **Main roads (highways)**

No works are planned on main roads; therefore, the project will not directly impact circulation on main roads. An indirect impact can be increased flow of vehicles as urban roads are avoided.

##### **Urban roads**

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.

**Coordinating with and obtaining approvals from local government and traffic police is vital to avoid delays, objections, and public inconvenience to the work program.**

On urban roads, the impact on traffic flow and local accessibility are of **medium** severity.



## **Local roads**

As pipeline installation will be taking place on roads, local access on select 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 hours in the alley way and local streets. With regards to urban roads, the work should be stopped between 7-2 p.m. This is classified as the rush hour period.

On local roads traffic congestion of regular sized vehicles will be insignificant. The main impact will be inconvenience to residents in accessing residential buildings and will likely be of minor severity.

### *Socioeconomic impacts*

The project will result in inconvenience and disturbance to local communities and business and delay in the various daily activities due to the following:

- Traffic congestion will result in various unfavourable socioeconomic impacts. i.e.:
  - Microbuses and tuk tuks may find difficulty in crossing the streets that will be dug during the project construction. This will increase their oil consumption and reduce their ability to move quickly and transport less clients as each errand will take more time.
  - There might be a disturbance to community people due to the traffic congestion

**On local roads, traffic and access limitation impacts are temporary, local, and of **minor** severity**

### **5.2.2.2 Air quality**

#### *Environmental impacts*

WB requirements and Law 4/1994 (modified by laws 9/2009 & 105/2015) stipulates strict air quality standards. Air emissions (gases and particulates) during construction shall arise from:

- 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, loaders, trucks) containing SO<sub>x</sub>, NO<sub>x</sub>, 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.



### **Gaseous pollutants emissions**

Machinery used during construction is certified, therefore, emissions stemming from the exhaust of machinery are unlikely to increase ambient levels beyond permissible levels.

On urban roads, traffic congestion may lead to increased exhaust emissions. Traffic management with local authority will reduce the impact of works on road congestion and associated emissions.

#### *Socioeconomic impacts*

Air emission might result in health problems to allergic community members, especially in the vicinity of digging areas.

Air emissions impacts are expected to be temporary, local, and of **medium** severity.

### **5.2.2.3 Noise**

#### *Environmental impacts*

Construction activities of the gas distribution network will likely increase noise levels due to excavation and heavy machinery. Typical construction noise includes noise intensity due to engine operation and the use of jack hammers for excavation works. A typical team will operate 2-3 jack hammers, each generating a noise intensity of 107dBA intermittently throughout the day.

As discussed previously, the WB/IFC guidelines and Law 4/1994-9/2009-105/2015 have defined standards for noise intensity and exposure periods in the work place, in addition to certain limits for ambient noise levels for different types of urban and rural areas.

Traffic interruption due to excavation can cause congestions, which can result in increased ambient average noise intensity levels.

#### *Socioeconomic impacts*

Noise might result in health problems to the workers, engineers and technicians

Noise impacts are expected to be temporary, local, and of **minor** severity

### **5.2.2.4 Impacts related to soil**

#### *Environmental impacts*

Soil may be susceptible to pollution resulting from uncontrolled dumping of wastes generated during construction.

The impact on soil pollution is of **minor** severity

### **5.2.2.5 Impacts on water**

#### *Groundwater*

Information on groundwater in the residential areas of Qeft, Naqada, Waqf, and Farshout, where distribution networks are planned is unavailable. Considering that the project areas are residential and that excavation will be carried out in lands that have previously been excavated for other



underground utilities installation, groundwater is not anticipated. **Impact assessment on groundwater is not applicable.**

#### *Surface water*

Surface waters consisting of canal branches may be susceptible to pollution resulting from uncontrolled dumping of wastes generated during construction.

The impact on surface water pollution is of **minor** severity

#### **5.2.2.6 Impact on ecological systems**

##### *Environmental impacts*

During construction of the gas distribution network, excavations and pipe laying will mostly be aligned along routes previously excavated or paved.

No protected areas will be encountered in the alignment of the lines. **Assessment of impact on ecological systems is not applicable.**

##### *Impacts on fauna*

Fauna identified is unspecific to the project areas and consist of stray dogs and cats and pigeons. Open trenches may pose risks to stray animals, which can become trapped. Considering that trenches are backfilled in the daylight and that no trenches are left open overnight, animals trapping is not anticipated.

Dumping sites attract animals as sources of food. Uncontrolled dumping of waste can pose threats to animals accessing the uncontrolled dumping sites. Considering the nature and small quantities of the waste generated mostly composed of broken asphalt and left over pipes, **impacts on dogs, cats, and pigeons are of irrelevant severity.**

Impacts on fauna are of **irrelevant** severity

No fauna of significance have been identified in the project areas. **Impact assessment on fauna of significance is not applicable.**

##### *Impacts on flora*

Flora have been identified along the banks of canals and along roads. The projected works are not planned in the proximity of canals or trees alongside roads.

Dumping of wastes alongside canals and roads can pose risks to the flora. Considering the nature and small quantities of the waste generated mostly composed of broken asphalt and left over pipes, **impacts on flora alongside canals and roads are of irrelevant severity.**

Impacts on flora alongside canals and roads are of **irrelevant** severity

No flora of significance have been identified in the project areas. **Impact assessment on flora of significance is not applicable.**

#### **5.2.2.7 Waste generation related impacts**

Wastes that are generated during the construction phase include:

- Excavated soil and excess sand; concrete and bricks waste;
- Broken asphalt in the case of paved roads;



- Cans containing paint used on steel pipes in household connections
- Containers of chemicals and lubricant oils used for construction machinery;
- Possibly damaged asbestos water pipes during excavation; and
- Dewatered product from trenches, if encountered
- Construction waste estimates are in the range of 100-120 m<sup>3</sup>/km.

Excavated soil and concrete/bricks waste are inert materials. Improper disposal of such wastes will only have aesthetic effects on the disposal site. The legal standards of Law 4/1994-9/2009-105/2015 for the Environment and Law 38/1967 stipulate that these wastes should be disposed of in licensed sites by the local authority, which minimizes any aesthetic effects of such waste.

Asphalt waste may contain hazardous components, such as tar, lubricating oils, some heavy metals, etc. However, its solid nature minimizes the transport risk of such components to the environment. Disposal of asphalt waste to a construction waste disposal site is common practice in Egypt, and is not normally associated with environmental risks because of dry weather.

Empty containers of chemicals, lubricating oils, and paint are considered hazardous waste. They should be disposed of in an approved hazardous waste handling facility. This is not a direct result of construction activities, but rather relates to maintenance of equipment. By preventing fueling/lubricating activities on construction sites no empty containers will need disposal.

Asbestos waste could result if an underground water pipe is broken during excavation. If encountered, wasted parts of the pipe must be sprayed with water, to prevent emissions of asbestos-containing dust, and transported to an approved hazardous waste landfill. Asbestos waste may pose significant health risks to workers, pedestrians and residents of neighboring areas. Therefore, efficient management of such waste, if generated, will be very important. The probability of generating asbestos waste is relatively low as the damage is usually repaired locally without the need for pipe replacement. Management and disposal of the generated waste is the responsibility of the Water Authority performing the repairs.

Impacts due to waste generation are of **minor** severity

#### **5.2.2.8 Risk on Infrastructure and underground utilities**

##### *Environmental impacts*

Prior to excavation the LDC (ReGas) performs exploratory drills to investigate the presence of underground utilities that may have been installed without accurate documentation and maps for its routes and depths. The risk of damage to such utilities during excavations for natural gas pipeline installation is possible, but minimal. In the event that an underground utility is fractured, the most significant potential environmental impact will arise in case a sewerage pipe is broken and wastewater potentially accumulating in the trench. There is also the possibility of overflowing to the streets causing nuisance to the surrounding environment.

##### *Socioeconomic impacts*

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.

Impacts on underground utilities are expected to be temporary, local, and of **minor** severity

### 5.2.2.9 Impacts related to land

#### *Socioeconomic impact*

The project will use plots of lands for the workshops and temporary storage areas. It is envisaged that the network installation will not entail any land acquisition in the four project areas rather than storage areas and workshops that will always located in the side roads near to installation site.

Additionally, the connection network will pass through the main urban roads and streets. No land acquisition either temporary or permanent will result from project activities. Temporary storage areas are located in the street side. The lands are state owned lands that require a kind of arrangement with the Local Governmental Unit to use the lands for storage purpose and establish a temporary workshop. Using the side road will never entail any land acquisition.



Figure 5-1: Sample of a workshop located in the street side



Figure 5-2: Sample of a temporary storage area

Construction activities will be carried on the main streets for only one calendar day. Accordingly impacts pertaining to socioeconomic and livelihood deterioration is **significantly negligible**.

Land acquisition impacts are of **negligible** severity

### 5.2.2.10 Possible effects on vulnerable structures<sup>4</sup>

#### *Environmental impact*

<sup>4</sup> If encountered within project areas.



Works involving drilling will generate vibrations, which could threaten weak structures. Construction workers are accustomed to manually drill to prevent vibrations near sensitive structures.

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.

Structural impacts on vulnerable buildings are of **irrelevant** severity

#### 5.2.2.11 Effect on Culturally Valuable Sites<sup>5</sup>

Effects on culturally valuable sites (monuments, archaeological, paleontological, historical, architectural, religious, aesthetic or other cultural significance) may involve:

1. Structural damage to a monument due to dewatering during excavation.
2. Damages to monuments' foundations due to excavation works.
3. Damage to the monument body by vibration of machinery.
4. Reducing the aesthetic appeal of the site or building.
5. Improper management of discovered antiquities during excavation (chance finds).

If dewatering is needed, may lead to differential settlement of the soil surrounding the monument foundations could result. Shallow foundations may be affected by excavation works. This may cause differential settlement and may cause cracks and stability risks to the monument body.

Vibrations caused by machinery such as jack hammers may cause cracks and surface damage to the stones of the monument, and risks to its stability.

According to the CULTNAT classification, a site may be classified as architecturally-valuable for its artistic design, its elevation view, artistic balcony, windows, domes or other components. Fixing gas risers and connections next to such components may reduce their artistic value.

Chance finds during excavation are highly unlikely within the project area as the streets have been previously excavated for installing underground utilities. However, Antiquities Law provides clear guidelines for action in the case of chance finds. It also states that a representative of the antiquities department must be present during excavations in areas adjacent to antiquities sites. Please see **Annex 4** that outlines procedures in case of chance finds.

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.

Impacts on culturally valuable sites and buildings are of **irrelevant** severity

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<sup>5</sup> If encountered within project areas.



### **5.2.2.12 Street condition deterioration**

#### *Environmental impacts*

Streets rehabilitation or restoration following pipeline network installation: is referred to by an Egyptian legal/institutional expression (رد الشيء 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”.

#### *Socioeconomic impacts*

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.

Although the restoration impact may be temporary, localized, and of **minor** severity, it is perceived by the public as major inconvenience.

### **5.2.2.13 Community health and safety**

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*

Increased emissions of dust can result in health problems to community members. Excavation work will be intermittent over a duration of 8 hours a day.

#### *Background noise levels*

The noise intensity levels resulting from the operation of jackhammers surpasses permissible level of 65 dBA for residential areas in the vicinity of commercial areas during the day. Increased noise intensity will be intermittent over the duration of one work day between 9 am and 5 pm.

#### *Waste accumulation*

Illegal dumping and potential burning of construction waste, which will consist mainly of excavated soil and leftover PE and carbon steel pipes can pose health and safety threats to local community.

#### *Project infrastructure*

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 work day, 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.

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.

Impacts due to construction activities on community health and safety are of **minor** severity.

#### **5.2.2.14 Labor conditions and occupational health and safety**

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; weather related impacts (dehydration; heat stroke), exposure to high noise intensity levels. Because of the large number of unskilled workers who are reluctant to use Personal Protective Equipment (such as helmets, ear muffs, and masks), risks can be higher.

#### **Noise**

The noise intensity level resulting from jackhammers surpasses permissible level of 90 dB (A) for work place with up to 8 hour shifts. Therefore, the use of construction equipment constitutes an occupational and safety health risk on workers operating and in the vicinity of the equipment.

#### **Vibrations**

The use of jackhammers will results in the generation of hand-arm vibrations; the typical vibration value is of  $9 \text{ m/s}^2$ , which exceeds the ACGIH Threshold limit value of  $5 \text{ m/s}^2$  (8 hour equivalent total value), but is below the exposure limit of  $12 \text{ m/s}^2$  for a total daily duration of less than an hour. Typical drilling activities for excavation works are intermittent.

#### **Electrical**

Faulty equipment or exposed cables can cause risks of electrocution.

#### **Working environment temperature**

The exposure of workers to high temperatures can result in dehydration and sun strokes. The execution of the project works for Qeft and Naqada are planned during the months of July and August. The average temperatures for Qeft, Naqada, Waqf and Farshout in July, the hottest month of the year, are above  $30 \text{ }^\circ\text{C}$ , which can cause heat strokes.

#### **Working at heights**



Household installations will require working at heights, which can result in falls and pose a safety hazard.

### **Chemical hazards**

Chemical hazards are associated with the construction and connection of the odorant unit. Inadequate handling or compromised integrity of the connections can result in leaks/released hazardous material (tertiobutylmercaptin and methylsulphide), to which workers will get exposed resulting in a health hazard.

The impact of construction activities on OHS is of **medium** severity.

#### **5.2.2.15 Risk pertaining to child labor**

As mentioned in the baseline, child labor is a common practice in Egypt at large. Children below 18 are favorable labor as they receive low salaries and they are less demanding. There is a risk that this common practice is used in the project. This risk should be carefully handled in the ESMP and restrict obligations and monitoring should be applied in the contractor obligations.

The impact of construction activities pertaining to child labor is of **low-medium** severity.

#### **5.2.2.16 Visual intrusion**

Project activities will entail piling of sands and moving of vehicles in various construction sites. Moreover, the temporary storage areas will be used to store pipes, painting materials and safety equipment. That will result in significant visual intrusion impact.

Impact related to the visual intrusion during the construction phase is **irrelevant**

#### **5.2.2.17 Labor influx**

##### *Socioeconomic impacts*

ReGas employ a number of workers and technicians during the drilling and installation phases. The number of workers varies according to the size of the work in each area; consequently, the impact differs and varies according to each area. The temporary workers labor may have impacts on the project areas in terms of:

- **Risk of social conflict:** There are no potential effects of temporary labor influx on the culture of the society in the project areas; this is due to the focus of the implementing companies on the labor, whom are often from areas adjacent to the project areas. This helps in the reduction of the hours of their presence in the project areas, as well as their limitation to the working hours only; as such labors are not permanently resident during the project duration. Moreover, the temporary labor influx shares the same culture and values as those in the study areas. The implementation companies may depend on NGOs and mayors in training the workers on how dealing with the community people in order to avoid social conflict.
  
- **Increased risk of illicit behavior and crime:** the implementation companies and the contractors should revise the criminal records of the workers, in order to avoid the risk of illicit behavior and crime in the project areas.



- **Influx of additional population, Increased pressure on accommodation and rents:** The number of temporary labor influx are limited, in addition, they present during the working hours only and does not reside in the project areas during the project construction period, which will lead to the absence of potential impacts for high prices or rental values of homes in the project areas.
- **Local inflation of prices:** The prices of some food commodities and services may be rise
- **Overconsumption of community resources:** The temporary labor influx may affect the public facilities available in the project areas, which are the ones attached to the places of worship, cafes and restaurants. This may cause some problems; therefore, the implementing companies must commit to provide mobile premises attached to the workplaces for workers to change their clothes and eliminating their needs.

Generally speaking having workers in small cities might result in unfavorable impacts on the available resources, e.g. pressure on accommodation, food, health care and medication and potable source of water. Given the size of population in project sites and the availability of most of services; the limited number of workers (100 workers) will not result in any significant impact on the community resources particularly as about half of them were from the project areas.

The impact of labor influx is of irrelevant severity given that the limited number of workers is small in comparison to the number of residents in the area.

Impact related to the labor influx during the construction phase is **irrelevant**

### 5.3 Impacts during operation phase

#### 5.3.1 Positive impacts

- 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.
- Constantly available and reliable fuel for home use.
- Reduced expenditure on LPG cylinders' import and subsidies, as 24 thousand connections will be installed in the area. Each household consumes on average 1.5 LPG monthly. Accordingly the total number of LPG cylinders that will be saved is anticipated to be about 36 thousand LPG cylinder per month. The subsidy value is about 90 EGP per each LPG. Consequently, the total saved monthly subsidy will be about 3.240 million EGP monthly. That will result in total annually savings of 38.880 million EGP.
- Significantly lower leakage and fire risk compared to LPG.
- Improved safety due to low pressure (20 mBar) compared to cylinders.
- Beneficiaries to benefit from good customer service and emergency response by qualified personnel/technicians.



- Eliminate the hardships that special groups like the persons with disabilities, women, and the elderly had to face in handling LPG.
- Limiting possible child labor in LPG cylinder distribution

### 5.3.2 Negative impacts during operation

#### 5.3.2.1 Impact on worker 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

Therefore the impact related to health and safety of workers is assessed as low

#### 5.3.2.2 Risk pertaining to child labor

The LDC have never employed any children during the operation of the networks as they adhere to labor law. Additionally, maintenance and operation activities need highly professional technicians who graduated from secondary schools. They all are above 18 years old.

Child labor risk is assessed as irrelevant

#### 5.3.2.3 Air emission

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.

Impact due to air emissions are considered to be **irrelevant**

#### 5.3.2.4 Noise impact

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.

No impacts due to noise have been identified.

#### 5.3.2.5 Impact on soil

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.

Impact on soil are considered to be **irrelevant**

#### 5.3.2.6 Impact on water

No impacts due the normal operation of the gas network on water bodies have been identified.

No impacts on water bodies have been identified.



### 5.3.2.7 Impact on ecology

No impacts due the normal operation of the gas network on ecological systems have been identified.

No impacts on ecological systems have been identified

### 5.3.2.8 Impacts on fauna

No impacts due the normal operation of the gas network on fauna have been identified.

No impacts on fauna have been identified.

No fauna of significance have been identified in the project areas. **Impact assessment on fauna of significance is not applicable.**

### 5.3.2.9 Impacts on flora

No impacts due the normal operation of the gas network on flora have been identified.

No impacts on flora have been identified.

No fauna of significance have been identified in the project areas. **Impact assessment on fauna of significance is not applicable.**

### 5.3.2.10 Waste generation

The only potential source of waste is the refilling of the odorant tank in the odorant units of Naqada and Qeft. No empty or filled tanks are stored onsite. Empty drums are shipped back to the supplier (Egypt Gas or Town Gas.) No wastes are expected during the operation phase.

Impacts due to the generation of waste are considered to be **irrelevant**

### 5.3.2.11 Community health and safety

In addition to a full array of safety and emergency precautions taken by EGAS and the implementing entities (**local Distribution companies: ReGas**), 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. This may be due to a lack of awareness, illiteracy, or failures in piping or sealants.

Considering the low probability of occurrence and the lower density of natural gas (compared with current practice of LPG), impacts on community health and safety due to gas leaks is of **minor** severity.

### 5.3.2.12 Integrity of natural gas piping

#### *Environmental impact*

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.

Adverse impact is expected due to the possibility of disrupting the Gas supply to households.





*Socioeconomic impacts*

Adverse impact is expected due to the possibility of disrupting the Gas supply to households.

Leak impacts may be permanent and highly severe, however, considering the extremely low probability of occurrence, the impact is of **minor** severity.

**5.3.2.13 Visual intrusion impacts**

The installation of house connection and the chimney will affect buildings. There is a probability to affect the building, particularly, unique old buildings. Under certain technical and safety conditions it is not possible to avoid visually impacting the entrance of the apartment and dwellings with installed pipes.

Visual intrusion Impacts will be of **irrelevant** severity

**5.3.2.14 Economic disturbance to the LPG distributors**

There could be a Minor negative economic impact on LPG cylinders distributors. (Governmental sector- private sector who have license 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. Based on the meetings conducted with the LPG cylinder distributors, they reported that the NG will not cover all areas. Inside the same areas covered by the NG not all of the units are technically eligible to be connected to the NG. Therefore, they will continue working in the same areas and in the uncovered areas.

The surveyed LPG distributors have their vehicle in transporting the LPG cylinders. They reported that this vehicle might be used in transporting other goods. Such activity is also lucrative for them in case of not being able to distribute the LPG cylinders and such approach was adopted during the shortage of LPG cylinders occurred two years ago..

The probability of such impact is **minor** as LPG distributors manage to perform alternative job.



Table 5-1: Summary of impacts

Impact	Description of impact	Nature of impact	Significance
<b>During Construction Phase</b>			
<b>Reduction of Traffic Flow (disruption of local and regional traffic)</b>	During the mobilization, preparation phases and construction phases: Mobilization of heavy machinery, 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. <b>Coordinating with and obtaining approvals from local government and traffic police is vital to avoid delays, objections, and public inconvenience to the work program.</b>	Negative	Minor
	<b>Main roads (highways)</b> No works are planned on main roads; therefore, the project will not directly impact circulation on main roads. An indirect impact can be increased flow of vehicles as urban roads are avoided.	Negative	Minor
	<b>Urban roads</b> 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.	Negative	Medium
	<b>Local roads</b> 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 hours.	Negative	Minor
<b>Air Emissions</b>	Air emissions (gases and particulates) during construction can exceed permissible limits and shall arise from: <ul style="list-style-type: none"> <li>- Particulate matter and suspended solids from excavation/backfilling operations</li> <li>- Possible dispersion from stockpiles of waste or sand used for filling trenches.</li> <li>- Exhaust from excavation equipment and heavy machinery (excavators, trenchers, loaders, trucks) containing SO<sub>x</sub>, NO<sub>x</sub>, CO, VOCs, etc.</li> <li>- Traffic congestions resulting from road closure or slowing down of traffic due to excavation works.</li> </ul> <b>Dust</b> 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.	Negative	Medium
	<b>Gaseous pollutants emissions</b> Provided machinery used during construction is certified and maintained as per guidelines, the increase in emissions stemming from the exhaust of machinery is unlikely to increase ambient levels beyond national and WB permissible levels.  On urban roads, traffic congestion may lead to increased exhaust emissions. Traffic management with local authority will reduce the impact of works on road congestion and associated emissions.	Negative	Minor



Impact	Description of impact	Nature of impact	Significance
Noise	Construction activities of the gas distribution network 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	Minor
Soil pollution	Soil may be susceptible to pollution resulting from uncontrolled dumping of wastes generated during construction.	Negative	Minor
Water pollution	Uncontrolled dumping of waste in canals can result in water pollution	Negative	Minor
Waste generation	<p>Wastes that are generated during the construction phase include:</p> <ul style="list-style-type: none"> <li>- Excavated soil and excess sand; concrete and bricks waste;</li> <li>- Broken asphalt in the case of paved roads;</li> <li>- Cans containing paint used on steel pipes in household connections</li> <li>- Containers of chemicals and lubricant oils used for construction machinery;</li> <li>- Possibly damaged asbestos water pipes during excavation; and</li> <li>- Dewatered product from trenches.</li> <li>- Construction waste estimates are in the range of 100-120 m<sup>3</sup>/km.</li> </ul> <p>Excavated soil and concrete/bricks waste are inert materials. Improper disposal of such wastes will only have aesthetic effects on the disposal site. The legal standards of Law 4/1994-9/2009-105/2015 for the Environment and Law 38/1967 stipulate that these wastes should be disposed of in licensed sites by the local authority, which minimizes any aesthetic effects of such waste.</p> <p>Asphalt waste may contain hazardous components, such as tar, lubricating oils, some heavy metals, etc. However, its solid nature minimizes the transport risk of such components to the environment. Disposal of asphalt waste to a construction waste disposal site is common practice in Egypt, and is not normally associated with environmental risks because of dry weather.</p> <p>Empty containers of chemicals, lubricating oils, and paint are considered hazardous waste. They should be disposed of in an approved hazardous waste handling facility. This is not a direct result of construction activities, but rather relates to maintenance of equipment. By preventing fueling/lubricating activities on construction sites no empty containers will need disposal.</p> <p>Asbestos waste could result if an underground water pipe is broken during excavation. If encountered, wasted parts of the pipe must be sprayed with water, to prevent emissions of asbestos-containing dust, and transported to an approved hazardous waste landfill. Asbestos waste may pose significant health risks to workers, pedestrians and residents of neighboring areas. Therefore, efficient management of such waste, if generated, will be very important. The probability of generating asbestos waste is relatively low as the damage is usually repaired locally without the need for pipe replacement. Management and disposal of the generated waste is the responsibility of the Water Authority performing the repairs.</p> <p>It is highly unlikely that groundwater may be encountered on routes of the low pressure distribution networks as these have been previously excavated with no record of groundwater.</p> <p>Project works will be located in residential areas. Workers and employees typically utilize the bathrooms of surrounding facilities; especially mosques.</p>	Negative	Minor
Risk on and underground utilities	<p>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 utilities during excavations for natural gas pipeline installation is possible.</p> <p>The most significant potential environmental impact will arise in case a sewerage pipe is broken and wastewater potentially accumulating in the trench. There is also the possibility of overflowing to the streets causing nuisance to the surrounding environment.</p>	Negative	Minor



Impact	Description of impact	Nature of impact	Significance
	<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 calendar days). Additionally, the contractor will be responsible of compensating for damaged pipes.</p>	Negative	Minor
<b>Impacts related to lands</b>	<p>The project will need plots of lands for the workshops and temporary storage areas. Their exact locations were not determined to date. However, they are always selected from the side roads and vacant lands affiliated to the state. It is envisaged that the network installation will not entail any land acquisition in the four project areas rather than storage areas and workshops in the vicinity of the project sites. Additionally, the connection network will penetrate the main urban roads and streets. No land acquisition either temporary or permanent will result from project activities. <b>No socio-economic impacts on lands have been identified.</b></p>	Negative	Negligible
<b>Possible effects on vulnerable structures<sup>6</sup></b>	<p>Drilling vibrations: Workers are accustomed to manually drill to prevent vibrations near sensitive structures.</p> <p>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.</p>	Negative	Negligible
<b>Effect on Culturally Valuable Sites</b>	<p>Effects on culturally valuable sites (monuments, archaeological, paleontological, historical, architectural, religious, aesthetic or other cultural significance) may involve:</p> <ol style="list-style-type: none"> <li>1. Damages to monuments' foundations due to excavation works.</li> <li>2. Damage to the monument body by vibration of machinery.</li> <li>3. Reducing the aesthetic appeal of the site or building.</li> <li>4. Improper management of discovered antiquities during excavation (chance finds).</li> </ol> <p>Vibrations caused by machinery such as a trencher and jack hammer may cause cracks and surface damage to the stones of the monument, and risks to its stability.</p> <p>According to the CULTNAT classification, a site may be classified as architecturally-valuable for its artistic design, its elevation view, artistic balcony, windows, domes or other components. Fixing gas risers and connections next to such components may reduce their artistic value.</p> <p>Chance finds during excavation are highly unlikely within <b>Naqada and Qeft</b> as the streets have been previously excavated for installing underground utilities. However, Antiquities Law provides clear guidelines for action in the case of chance finds. It also states that a representative of the antiquities department must be present during excavations in areas adjacent to antiquities sites. Please see <b>Annex 4</b> that outlines procedures in case of chance finds.</p>	Negative	Negligible
<b>Street condition deterioration</b>	<p>Streets rehabilitation or restoration following pipeline network installation: is referred to by an Egyptian legal/institutional expression (رد الشيء 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	Minor

<sup>6</sup> If encountered within project areas.



Impact	Description of impact	Nature of impact	Significance
	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.	Negative	Minor
<b>Community health and safety</b>	<p>Impacts on community health and safety are expected to result from:</p> <p>Emissions of gaseous pollutants and dust, where increased emissions of dust can result in health problems to community members.</p> <p><i>Increased background noise levels</i> resulting from the operation of jackhammers, which surpasses permissible limits for residential areas in the vicinity of commercial areas during the day</p> <p><i>Waste accumulation</i> in illegal dumping and potential burning of construction waste, which will consist mainly of excavated soil and leftover PE and carbon steel pipes</p> <p><i>Project infrastructure</i></p> <p>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 work day, with no trenches being left open after working hours.</p> <p>Installation of household connections may involve working at height, which can result in falling objects causing health and safety hazards to local community.</p> <p>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.</p> <p>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.</p>	Negative	Minor
<b>Occupational health and safety</b>	<p><b>Noise</b></p> <p>The noise intensity level resulting from jackhammers surpasses permissible level of 90 dB (A) for work place with up to 8 hour shifts</p> <p><b>Vibrations</b></p> <p>The use of jackhammers will results in the generation of hand-arm vibrations; the typical vibration value is of 9 m/s<sup>2</sup>, which exceeds the ACGIH Threshold limit value of 5 m/s<sup>2</sup> (8 hour equivalent total value), but is below the exposure limit of 12 m/ s<sup>2</sup> for a total daily duration of less than an hour.</p> <p><b>Electrical</b></p> <p>Faulty equipment or exposed cables can cause risks of electrocution.</p> <p><b>Working environment temperature</b></p> <p>The exposure of workers to high temperatures can result in dehydration and sun strokes. The execution of the project works for Qeft and Naqada are planned during the months of July and August. The average temperatures for Qeft, Naqada, Waqf and Farshout in July, the hottest month of the year, are above 30 °C, which can cause heat strokes.</p> <p><b>Working at heights</b></p> <p>Household installations will require working at heights, which can result in falls and pose a safety hazard.</p> <p><b>Chemical hazards</b></p> <p>Chemical hazards are associated with the construction and connection of the odorant unit. Inadequate handling or compromised integrity of the connections can result in leaks/released hazardous material (tertiobutylmercaptin and methylsulphide), to which workers will get exposed resulting in a health hazard.</p>	Negative	Medium



Impact	Description of impact	Nature of impact	Significance
<b>Risk pertaining to child labor</b>	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 in Qeft, Naqada, Waqf and Farshout. Children below 18 are favorable labor as they receive low salaries and they are less demanding. There is a risk that this common practice is used in the project. This risk should be carefully handled in the ESMP and restrict obligations and monitoring should be applied in the contractor obligations.	Negative	Low-Medium
<b>Labor influx</b>	Generally speaking having workers in small cities might result in unfavorable impact on the available resources, e.g. pressure on accommodation, food, health care and medication and potable source of water. Given the size of population in project sites and the availability of most of services; the limited number of workers (100 worker) will not result in any significant impact on the community resources.	Negative	Negligible
<b>Labor conditions and Employment &amp; workers condition</b>	The project is expected to result in the creation of job opportunities, both directly and indirectly. Based on similar projects implemented recently by EGAS and the local distribution company, the daily average number of workers during the peak time will be about 60 workers. The local community of Qena Governorate could provide a proportion of this temporary labor force dependent on skills needed and the strategies of the individual contractors in sourcing their workforce	Positive	
	Influx of construction workers in may stress local health services (e.g. hospitals, clinics).	Negative	Minor
	Influx of construction workers may cause transmission of communicable disease among the villagers or workers	Negative	Minor
	Influx of construction workers village may stress local utilities (e.g. potable water, sanitation, electricity, waste management).	Negative	Minor
	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 not limited to accommodation, food supply, transport, trade, security, manufacturing... etc.	Positive	
<b>During Operation Phase</b>			
<b>Community health and safety</b>	In addition to a full array of safety and emergency precautions taken by EGAS and ReGas, 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	Minor
<b>Integrity of natural gas piping</b>	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. Sabotage: pipelines and other components may be targeted for sabotage. Adverse impact is expected in raising the fear of disruption of Gas supply	Negative	Minor
<b>Improper handling of the Odorant (Qeft and Naqada)</b>	An odorant is added to the NG in order to enable detection upon leakage. The odorant containing Tertiobutylmercaptin (80%) and Methylehylsulphide (20%) is classified as a hazardous substance. The MSDS of the odorant identifies the following hazardous properties: Highly flammable, flammable and toxic products upon thermal decomposition, irritant, and toxic to aquatic flora and fauna.  Odorant leak can result from improper handling of the odorant during tank refill <ul style="list-style-type: none"> <li>• Storage in unsafe conditions, in terms of occupational health and safety.</li> <li>• Discharge of remaining odorants in containers, after use, in land or sewers;</li> <li>• Disposal of used containers with domestic waste, or by open disposal.</li> </ul>	Negative	Minor
<b>Visual intrusion impacts</b>	The installation of house connection and the chimney will affect the building, particularly, unique old buildings. Under certain technical and safety conditions it is not possible to avoid visually impacting the entrance of the apartment and dwellings with installed pipes.	Negative	Negligible



Impact	Description of impact	Nature of impact	Significance
<b>Economic disturbance to the LPG distributors</b>	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.

**The No-Project alternative is not favored as it simply deprives the Egyptian Public and Government of the social, economic, and environmental advantages.**

### 6.1 Pipeline Installation Technology Alternatives

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

#### 6.1.1. Trenchless Technologies

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

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





Figure 5-3: Horizontal Directional Drilling

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

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

• **Open-Cut Method**

This is the traditional method for pipeline installation. It is very simple technology which just depends on excavating the soil, laying the pipeline, and backfilling. However, it is technically not possible to be used in crossings with major waterways. It can be used in crossings with major roads and railways; however, this will cause huge interruption to traffic as this will necessitate either re-routing or reducing the number of lanes. This will lead to reduction in the



average speed of the vehicles on the road, and may affect the areas devoted for parking. This may also increase the probability of having car accidents, in addition to negative socio-economic impacts as a result of interrupting the flow of people and goods. Open-cut method may be the only possible recommended solution in the 4 studied areas since the pipeline route passes through urban and local roads and does not cross any main road or railway, and this will not negatively affect the environment, and it will be a cheap and safe option

In the sectors of Qeft, Naqada, Waqf, and Farshout, the pipeline route passes through existing urban roads and will not involve crossing of railways or water bodies etc. Hence, open-cut method has been selected.



**Figure 5-4: Open Cut by ReGas**

## 6.2 Routing

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The preferred route was selected on parameters like:

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

## 6.3 Regulators

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Two type of 100 mbar regulators outlet pressure were considered

1- Kiosk regulators

2- Wall mounted regulators

Kiosk regulators were preferred because:

- Easier maintenance



- Less expensive
- They are safer to the surrounding communities

#### **6.4 Working time**

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As stated in the traffic baseline, some areas are overcrowded from 7 a.m. to 2 p.m. Therefore, it will be useful to apply flexible working time that can avoid working during rush hours. Additionally, in some residential areas, it will be extremely difficult to work during night. Working during morning can be applied in such areas. Moreover, in some areas, there is a weekly market e.g. the market located in Farshout city. Such market should be avoided. As a wrap up, the three alternatives related to working time are:

- Working during day time in most of project areas
- Working during night in overcrowded areas
- Avoid market working hours

#### **6.5 Installation Costs**

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The average natural gas connection installation cost is about 7000 EGP and consumers contribute a part of it because the balance is subsidized by the Government. No financial assistance will be provided by the NGOs for the poor to install the NG. All NGOs interviewed expressed their willingness to act as communication channels with poor but no one of them will provide financial aid to the poor. However, the AFD in cooperation with the European Union will provide the poor with a kind of grant to be able to install the NG. This initiative has been approved and currently are applied to all project areas in all Egyptian 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.**

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



7.2 Management of Mitigation and Monitoring activities during CONSTRUCTION

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		
Ambient air quality	Increased emissions of dust and gaseous pollutants	<ul style="list-style-type: none"> <li>Controlled wetting and compaction of excavation/backfilling surrounding area</li> <li>Excavated soil stockpiles and stored sand should be located in sheltered areas. Stored fine sand should be covered with appropriate covering material<sup>7</sup>, such as polyethylene or textile sheets to avoid soil dispersion.</li> <li>Transportation of excavation/construction waste should be through licensed and sufficiently equipped vehicles with a suitable special box or provided with a cover to prevent loose particles of waste and debris from escaping into the air or dropping on the road.</li> <li>Appropriate maintenance, engine tuning and servicing of construction equipment to minimize exhaust emissions</li> <li>Minimize unnecessary journeys and switching off machinery and equipment when not in use (idle mode).</li> </ul>	Minor	<ul style="list-style-type: none"> <li>LDC</li> <li>Contractor</li> </ul>	LDC HSE department	Contractual clauses + Field supervision	<ul style="list-style-type: none"> <li>Contractor costs</li> <li>LDC management costs</li> </ul>
Noise	Increased noise levels	<ul style="list-style-type: none"> <li>Ear muffs, ear plugs, certified noise PPE for workers</li> <li>Avoid noisy works at night whenever possible</li> <li>Complaints receipt from local administration</li> </ul>	Minor	<ul style="list-style-type: none"> <li>LDC</li> <li>Contractor</li> </ul>	LDC HSE department	Contractual clauses + Field supervision (audits)	<ul style="list-style-type: none"> <li>Contractor costs</li> <li>LDC management costs</li> </ul>
Soil	Degradation of soil quality	<ul style="list-style-type: none"> <li>Decrease erosion by minimizing disturbances and scarification of the surface</li> <li>Best practices for soil management should be followed</li> <li>Good housekeeping to minimize spills/leaks</li> <li>Proper handling and management of wastes</li> </ul>	Minor	<ul style="list-style-type: none"> <li>LDC</li> <li>Contractor</li> </ul>	LDC HSE department	Field supervision (audits)	<ul style="list-style-type: none"> <li>Contractor costs</li> <li>LDC management costs</li> </ul>
Surface water	Uncontrolled dumping of waste in canals can result in water pollution	<ul style="list-style-type: none"> <li>Control all onsite wastewater streams and ensure appropriate collection, treatment and discharge. Prevent discharge of contaminants and wastewater streams to ground.</li> <li>Adequate management and proper handling and storage of construction materials, oils and fuel to avoid spillages</li> </ul>	Irrelevant	<ul style="list-style-type: none"> <li>LDC</li> <li>Contractor</li> </ul>	LDC HSE department	Field supervision (audits)	<ul style="list-style-type: none"> <li>Contractor costs</li> <li>LDC management costs</li> </ul>

<sup>7</sup> 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		
Waste generation	Hazardous waste accumulation	<ul style="list-style-type: none"> <li>Temporary storage in areas with impervious floor</li> <li>Safe handling using PPE and safety precautions</li> <li>Empty cans of oil-based paint resulting from painting the steel connection pipes to households are to be collected and sent back to nearest LDC depots for temporary storage until disposal at a hazardous waste facility. Table 7-2 describe the treatment and disposal of all waste category.</li> <li>Transfer to LDC depots for temporary storage</li> <li>Disposal at licensed Alexandria hazardous waste facilities (Nasreya)</li> <li>In case of damaging of asbestos pipes during excavation, the Water Authority, which will carry out the repairs, will be responsible for handling the waste asbestos according to their procedures.</li> <li>If dewatering is taking place from a contaminated trench, or contains hydrocarbons that could be observed or smelled, contaminated water should be collected in barrels and transported to a wastewater treatment facility.</li> <li>To the extent practical, seek to combine leftovers or residuals of the same liquid material/waste in order to minimize the number of containers containing hazardous residuals</li> <li>Ensure hazardous liquid material/waste containers are always sealed properly and secured from tipping/falling/damage/direct sunlight during transportation and storage</li> <li>In case of spillage:               <ul style="list-style-type: none"> <li>avoid inhalation and sources of ignition</li> <li>cover and mix with sufficient amounts of sand using PPE</li> <li>collect contaminated sand in clearly marked secure containers/bags</li> <li>Add sand to inventory of hazardous waste</li> </ul> </li> </ul>	Minor	<ul style="list-style-type: none"> <li>LDC</li> <li>Contractor</li> <li>Water Authority</li> </ul>	LDC HSE department	Field supervision and review of certified waste handling, transportation, and disposal chain of custody	<ul style="list-style-type: none"> <li>Indicative cost items included in contractor bid:</li> <li>Chemical analysis of hazardous waste</li> <li>Trucks from licensed handler</li> <li>Pre-treatment (if needed)</li> <li>Disposal cost at Nasreya</li> <li>Approximate cost of the above (to be revised upon project execution): 8,000-10,000 LE per ton</li> </ul>
	Non Hazardous waste accumulation	<ol style="list-style-type: none"> <li>Allocating certain areas, in each Sector, for stockpiling waste soil and construction waste, in coordination with the local authority.</li> <li>No soil stockpiling is allowed on banks of waterways.</li> <li>Segregate waste streams to the extent possible to facilitate re-use/recycling, if applicable</li> <li>Maximize re-use of excavation waste as backfill for natural gas pipeline trenches.</li> <li>Normally asphalt waste could be disposed of with other excavation waste/aggregates in the local non-hazardous waste site.</li> <li>Solid waste from unlikely scenarios such as domestic site activities (such as temporary offices or rest areas) should be addressed in specific waste management plans, as appropriate</li> </ol> <p><b><u>If septic tanks are used in case of temporary toilet facilities, make contractual arrangements with a wastewater removal contractor (in coordination with the local unit) to purge and dispose of possible septic tanks in the case they are utilized in work sites</u></b></p>	Minor	Excavation Contractor	LDC HSE department	Official coordination proceedings signed by representatives of utility authorities <ul style="list-style-type: none"> <li>Examination of site-specific reports and records</li> <li>Field supervision</li> </ul>	<ul style="list-style-type: none"> <li>Contractor management costs</li> <li>LDC management costs</li> </ul>
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	Minor	<ul style="list-style-type: none"> <li>Excavation contractors</li> </ul>	<ul style="list-style-type: none"> <li>LDC + Traffic department</li> <li>LDC HSE</li> </ul>	Contractor has valid conditional permit + Field supervision	Contractor costs  LDC management costs



Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
		Announcements + Signage indicating location/duration of works prior to commencement of work		<ul style="list-style-type: none"> <li>LDC</li> <li>Excavation contractors</li> </ul>	<ul style="list-style-type: none"> <li>Local Unit</li> <li>Traffic department</li> </ul>	Ensure inclusion in contract + Field supervision	
		Traffic detours and diversion		Contractor	<ul style="list-style-type: none"> <li>LDC HSE</li> </ul>	Field supervision	
		Road restructuring and closing of lanes		Traffic Department	Traffic Department	<ul style="list-style-type: none"> <li>Field supervision for detouring efficiency</li> <li>Complaints received from traffic department</li> </ul>	Additional budget not required
						Fluidity of traffic flow	
Local streets	Street deterioration	<ul style="list-style-type: none"> <li>The implementing entity (LDC) agrees a restoration fee with the local administration unit in charge of the area.</li> <li>The fee is used by the local unit to include the restoration in their re-pavement plans.</li> <li>In some cases, the restoration and re-pavement job is carried out by the Roads and bridges directorate who, in turn, schedule the re-pavements in their own plans.</li> <li>A key to minimize public discontentment and socioeconomic impacts of excavated streets is quick restoration and effective communication with regarding work and restoration schedules.</li> </ul>	Minor	<ul style="list-style-type: none"> <li>LDC in full cooperation with the LGU</li> </ul>	<ul style="list-style-type: none"> <li>LGU</li> </ul>	<ul style="list-style-type: none"> <li>Site visits</li> <li>Complaints raised by community</li> </ul>	<ul style="list-style-type: none"> <li>Part of construction activities</li> </ul>
Occupational health and safety	Health and Safety	<ul style="list-style-type: none"> <li>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 ESMP will provide the provision of the health, safety and precaution of the environmental impacts and its mitigation measures to be followed during construction.</li> <li>Standard protection by placing clear project signs.</li> <li>Time management for vehicles movement; especially avoiding the peak hours</li> <li>Standard protection for the workers especially working at elevated heights or trench.</li> <li>Regular inspection to compelling worker to used their PPE</li> <li>Training and licensing industrial vehicle operators of specialized vehicles.</li> <li>The contractor also should keep attendance worksheet and laborers ID in order to verify the age of workers</li> <li>Health insurance should be applicable to the contractor workers and workers contracted by a sub-contractor</li> </ul>	Minor	<ul style="list-style-type: none"> <li>LDC</li> <li>Excavation Contractor</li> </ul>	LDC-HSE department	Field supervision and review of HSE report+ Field supervision (audits)	<ul style="list-style-type: none"> <li>Contractor costs</li> <li>LDC management costs</li> </ul>
	Risk pertaining to child labor	<ul style="list-style-type: none"> <li>The ToR to be prepared for both contractor and subcontractors will prohibit any kind of hiring child labor in the project</li> <li>Rigid obligations and penalties will be added to the contractor/subcontractors' ToR in order to warrantee no child labor is occurred in the project</li> <li>The ToR also will oblige the contractor/subcontractor to keep a copy of IDs of laborers in order to monitor the hired staff below 18 years old</li> <li>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</li> </ul>	Minor	<ul style="list-style-type: none"> <li>LDC</li> <li>Excavation Contractor/s subcontractor</li> </ul>	LDC-HSE department	Field supervision and review of HSE report+ Field supervision (audits)	<ul style="list-style-type: none"> <li>Contractor costs</li> <li>LDC management costs</li> </ul>



Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Risk on Infrastructure and underground utilities	Damage to underground utilities resulting in water/wastewater leaks, telecommunication and electricity interruptions	<p>If maps/data are unavailable:</p> <ul style="list-style-type: none"> <li>Perform limited trial pits or boreholes to explore and identify underground utility lines using non-intrusive equipment</li> <li>In case of breaking underground utility and infrastructure line, the company supervisor stops work in the affected area, calls the Police Department and emergency department in the relevant utilities company for immediate repair of the damage, which the contractor is invoiced for.</li> </ul> <p>The mitigation measures on preventive measures and documentation:</p> <ul style="list-style-type: none"> <li>Preparation and analysis of accidental damage reports</li> <li>Arrange Restoration and re-pavement (ردالشي لأصله) with local unit</li> <li>Communication with local community on excavation and restoration schedules.</li> </ul> <p>Standard protocols adhering to national/local administrative requirements are to be followed:</p> <ul style="list-style-type: none"> <li>Close and early coordination between the LDC (and the excavation contractor, if applicable), the local unit, and any other relevant authorities (in the case of public roads, the Roads and Bridges Directorate may become the counterpart to the LDC)</li> <li>Agreement on the restoration arrangements, schedules, fees, and payment schedules</li> <li>Coordination with the General Utilities before starting work especially the Traffic Department, sewerage, water, telephones and electricity departments.</li> <li>Payment of restoration fees by the LDC before works commencement</li> <li>Documentation of the agreement and adoption by all involved parties</li> <li>Communication with the Public and relevant authorities (such as the security and the traffic departments) regarding excavation and restoration plans</li> </ul>	Minor	<ul style="list-style-type: none"> <li>LDC</li> <li>Local Governmental unit</li> </ul>	LDC	Field supervision and review of complaints Coordination minutes of meeting with the local governmental unit	LDC management costs
Local communities and businesses	Lack of accessibility to businesses due to delay in street rehabilitation	<p>Access to business due to digging out the streets will be mitigated through enabling alternative entrances to the business. Also special wooden bars will be used to enable the shoppers to get into the markets. Additionally, the duration of work will not exceed one working day. In case of digging main streets in the commercial areas, this can be only done during night after business closing</p> <p>Follow up the procedure of Grievance Redress Mechanism (please see <b>Annex 6</b>)</p> <ul style="list-style-type: none"> <li>Ensure transparent information sharing</li> <li>The telephone numbers of the social development officer responsible for grievances should be shared with the community people</li> </ul>		<ul style="list-style-type: none"> <li>LDC</li> <li>The sub-contractors</li> </ul>	LDC and EGAS SDO	<ul style="list-style-type: none"> <li>Ensure the implementation of GRM</li> <li>Supervision on Contractors performance</li> </ul>	No cost
Local community Health and safety	Threat to Safety of users and houses (due to limited level of awareness and 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> <ul style="list-style-type: none"> <li>Using caution tapes that help to keep people away of the site,</li> <li>Informing residents and shopkeepers about the timeline of the project (street by street) in order for the residents to know when to avoid certain streets</li> <li>Install wooden bars or decks over trenches to allow safe crossing</li> <li>A worker should support old people to cross the digging areas, especially, on the wooden bars</li> </ul>	Negligible	<ul style="list-style-type: none"> <li>During the construction</li> <li>LDC</li> </ul>	LDC and EGAS SDO	<ul style="list-style-type: none"> <li>List of awareness activities applied</li> <li>Lists of participants</li> <li>Documentation with photos</li> <li>Awareness reports</li> </ul>	<ul style="list-style-type: none"> <li>2250 \$ per awareness raising campaign</li> <li>2250 \$ for brochure and leaflets to be distributed (material available by EGAS-\$ spent)</li> </ul>



**Table 7-2 Solid Waste during Construction**

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



**Table 7-3: Environmental and Social Monitoring Matrix during CONSTRUCTION**

Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
Ambient air quality	Increased air emissions	HC, CO% and opacity	LDC HSE	Once before construction + once every six months for each equipment	Construction site	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
Physical state of street, soil, canal	Waste generation	Observation of accumulated waste piles	LDC HSE	Daily During construction. Monthly reports	Construction site	Observation and documentation	LDC management costs
		Observation of water accumulations resulting from dewatering (if encountered)	LDC HSE	Daily During construction. Monthly reports	Around construction site	Observation and documentation	LDC management costs
		Chain-of-custody and implementation of waste management plans	LDC HSE	Area 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 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 environmental monthly reports Complaints log	No cost
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
Local community	Damage to the streets	1. Streets quality after finishing digging 2. Number of complaints due to street damage	LDC, EGAS	Four times per year, each three 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)	1. Number of awareness raising campaigns implemented 2. Number of participants in information dissemination	LDC, EGAS	Quarterly monitoring	Office	Reports Photos Lists of participants	No cost
Labor conditions	Occupational Health and Safety	1. Total number of complaints raised by workers 2. Periodic Health report 3. Periodic safety inspection report	LDC HSE	Biannual	Construction site	Documentation in H&S monthly reports Complaints log	No cost
Labor conditions	Child labor	1. Attendees lists with workers IDs 2. Complaints and accidents reports	LDC HSE	Biannual	Construction site	Documentation in H&S monthly reports Complaints log	No cost



7.4 Management of Mitigation and Monitoring activities During Operation Phase

Table 7-4: 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	<ul style="list-style-type: none"> <li>Detailed review of the geotechnical and geological history of the project area</li> <li>Random inspections and awareness campaigns to ensure that NG piping and components (both inside the household and outside) are not be altered, violated, or intruded upon in any way without written approval from, or implementation of the alteration by, the LDC.</li> <li>Availability of 24-7 hotline service (129) to all beneficiaries and the public for reporting possible leaks, damages or emergencies</li> <li>evacuation of the affected area</li> <li>Repair or replacement of failed component</li> </ul>	Minor	LDC	LDC HSE.	<ul style="list-style-type: none"> <li>Map and local geotechnical report review</li> <li>Site inspections</li> <li>Awareness actions</li> <li>Periodical trainings and drills</li> </ul>	LDC management costs
Economically disadvantaged Community members	Financial burden on economically disadvantaged due to the installments	<ul style="list-style-type: none"> <li>Petro Trade should collect the installment immediately after the installation of NG</li> <li>The installments should be collected on monthly basis in order not to add burden to the poor, as it will be easier for them to pay on monthly basis</li> <li>The installment should not be high</li> </ul>	Minor	Petro trade (Company responsible for collecting the consumption fees and the installments)	EGAS	<ul style="list-style-type: none"> <li>Banks loans log</li> <li>Complaints raised by poor people due to the frequency of collecting the installments</li> </ul>	LDC management costs
Community health and safety	Possibility of Gas leakage	<ul style="list-style-type: none"> <li>Information should be provided to people in order to be fully aware about safety procedures</li> <li>The hotline should be operating appropriately</li> <li>People should be informed of the Emergency Numbers</li> <li>People should be also informed about GRM telephone numbers (please see Annex 6)</li> <li>The Egyptian Emergency Response Procedure (in English and Arabic) has been included in the report as annex (8A and 8B). In addition, reference to the ERP is made in different sections of the report such as: 2.4.3, Table 7.1, Table 7.4.</li> </ul>	Minor	LDC	LDC	<ul style="list-style-type: none"> <li>Complaints raised due to Gas leakage</li> </ul>	LDC management costs
Labor conditions	Occupational Health and Safety	<ul style="list-style-type: none"> <li>Total number of complaints raised by workers</li> <li>Periodic Health report</li> <li>Periodic safety inspection report</li> </ul>	Irrelevant	LDC HSE	LDC	<ul style="list-style-type: none"> <li>Safety supervisor should follow the commitment of workers to use the protective equipment</li> <li>Inspection and recording of the performance</li> <li>1. -Reports about the workers and complaints</li> </ul>	LDC management costs



**Table 7-5: Environmental and Social Monitoring Matrix during OPERATION**

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



## **7.5 Reporting of Mitigation and Monitoring Activities**

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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 his relevant mitigation measures
- Any accidents or 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

### **During Operation phase monthly reports should include as a minimum:**

- Undertaken treatment and temporary storage and/or disposal activities of empty odorant containers
- Evaluation of the adherence of staff to safety measures
- Pipeline leakage or damage incidents
- The number of complaints received and how they were dealt with



## 7.6 Institutional Framework for ESM&MP Implementation

### 7.6.1 Environmental Management Structures

EGAS is the supervisory body. ReGas is the implementing body. Below is the H&S management structure of ReGas.

Being the implementing body of the natural gas network in project areas, ReGas has a direct involvement with the environmental management and monitoring of the natural gas network. ReGas has limited environmental and social background. They will be in need to upgrade their capacity regarding the environmental and social aspects. EGAS will provide ReGas staff with the needed information.

One of the standard tasks of the HSE Departments of ReGas, 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, through establishing an Environmental Register with frequent auditing of this register.

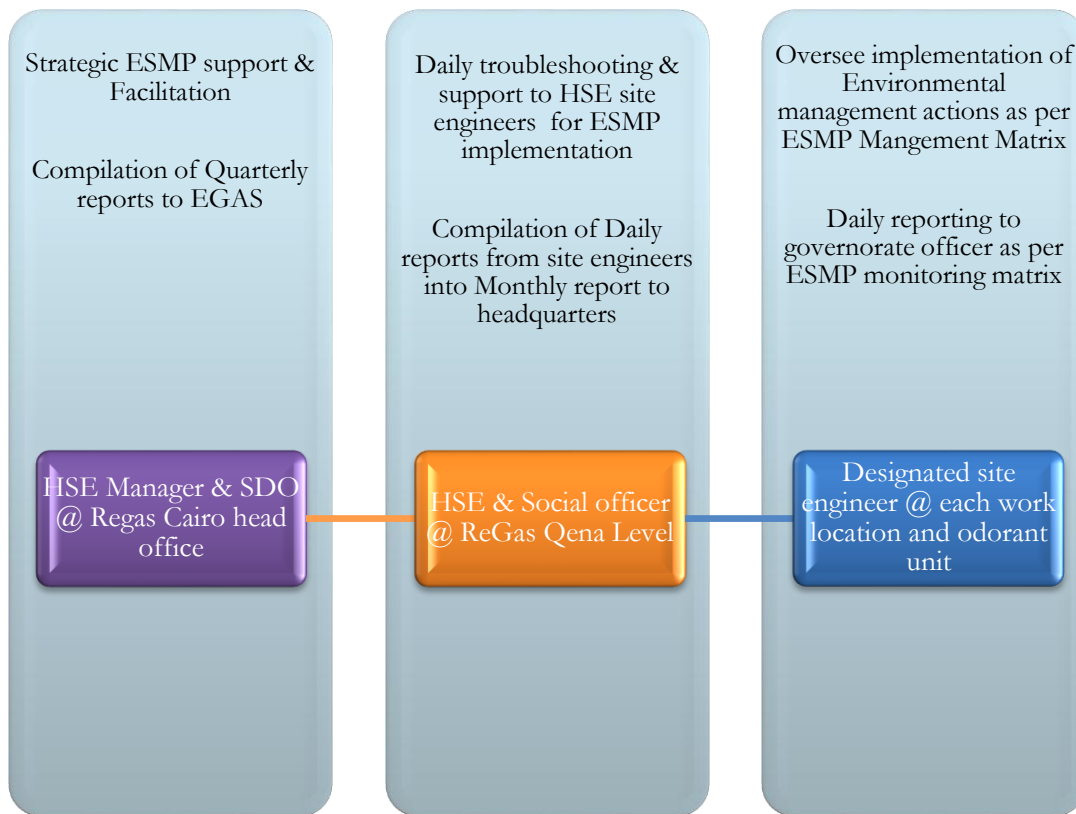


Figure 7-1: ReGas ESMP organogram



In the structure above, designated site engineers perform daily implementation, monitoring and reporting of activities as per the ESMP with special attention to:

1. Worker 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, SO<sub>2</sub>, CO, CH<sub>4</sub> and NO<sub>2</sub> in ambient air, and detect possible natural gas leaks
8. Ensure and log compliant handling of odorant/odorant containers, odorant-contaminated-soils (in case of spillage)
9. Other tasks as outlined in ESM&MP

Daily reports are to be compiled and sent to the governorate HSE officer for preparation of monthly summary reports.

Monthly reports are sent to HSE officer at ReGas head office for compilation into quarterly reports to EGAS.

### **7.6.2 Required Actions**

- 1- Involvement of environmental and social officers during the design, costing, tendering, and construction phases would be advantageous.
- 2- Detailed HSE manuals covering each activity must be developed and institutionalized in ReGas. Several versions of such manuals have been developed by Egypt Gas and should be mainstreamed to other LDCs, accompanied by the appropriate capacity-building.
- 3- An updated and detailed assessment of ReGas EHS institutional capacity and available resources for implementation of the ESMP
- 4- Specifically, ReGas 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**

This chapter aims to highlight the key consultation and community engagement activities that took place as part of the preparation of the ESMP, developed for the cities (Markazes) of el-Waqf, Naqada, Farshout and Qeft.in Qena Governorate

Policies and Legal framework for consultation

### **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,
  - o Directive and Procedure on Access to Information, and
  - o World Bank Operational Policy (OP 4.01)
- Egyptian regulations related to public consultation,
  - o Environmental law No 4/1994 modified by Law 9/2009 modified with ministerial decrees no. 1095/2011 and no. 710/2012

### **8.2 Objectives of consultations**

Objectives of various consultation activities are summarized as follows:

- 1- Define potential project stakeholders and suggest their possible roles in the project.
- 2- Disseminate comprehensive information about the project to enable stakeholders to identify their concerns, needs, and recommendations.
- 3- Document stakeholder feedback on the defined impacts as well as the social and environmental management plan and enhance the ESMP accordingly
- 4- Identify the most effective outreach channels that support continuous dialogue with the community
- 5- Discuss potential resettlement plans and impacts of involuntary resettlement (in places where this is applicable).

For the purpose of the Governorate ESMP; qualitative information and data were collected through identifying stakeholders, and recognize their views and concerns about the project. The aim of this endeavor is to ensure a well-integrated and all-inclusive public review of the project. The consultation activities used multiple tools and mechanisms including scoping, interviews, focus group discussions, public hearings/consultations

### **8.3 Defining the stakeholder**

For the purpose of the Governorate ESMP; qualitative information and data were collected through identifying stakeholders, and recognize their views and concerns about the project.





The aim of this endeavor is to ensure a well-integrated and all-inclusive public review of the project.

Key groups of relevance include: ordinary citizens, community leaderships, officials and government representatives, potential Project Affected Peoples (PAPs), local Non-Governmental Organizations (NGOs) and Community Development Associations (CDAs). In this regard, key groups of relevance in the Cities (or Marakez) el-Waft, Naqada, Farshout and Qeft- were approached and consulted using various tools (i.e. in-depth interviews, focus group meetings and public consultation). Stakeholder engagement and public consultation activities encompassed a gender aspect that women's views and concerns were taken into account, and were well documented.

#### **8.4 Consultation Methodology and Activities**

The consultation process was a dynamic and evolving process which adapted with the nature and expectations of the host community. As stated in the previous section, stakeholders' engagement and public consultation activities involved a broad base of community members; in order to establish a more profound understanding of the local communities' perceptions and perspectives of the project.

The first step was to collect the responses and feedbacks of the local communities through conducting Focus Group Discussions (FGDs), structured questionnaires and public consultation sessions. The second step was to analyze these qualitative data in order to reach a conclusion regarding the general stance and attitudes of the local communities towards the project. Various NGOs participated actively in the preparation of the FGDs and providing data collectors to assist the team in collecting the data.



**Figure 8-1: Public Consultation conducted in February 2017 for Qena Natural Gas Connection Project**



**Figure 8-2: Female Participation in the Public Consultation**



**Figure 8-3: Consultation with the head of Qeft Hospital February 2017**



**Figure 8-4:Female group discussion in Qeft**



**Figure 8-5: Male group discussion in Qeft**



**Figure 8-6:Female group discussion in El Waqf**



**Figure 8-7:Male group discussion in el Waqf**



**Figure 8-8: Head of LGU in El Waqf City**



Figure 8-9: El Shabat El Moslemat NGO in Naqada



Figure 8-10: Meeting in El Neil Hospital in Naqada



Figure 8-11: Head of Local Governmental unit in Naqada



Figure 8-12: Male group discussion in Naqada



Figure 8-13: Female group meeting in Naqada



Figure 8-14: Group discussion in Farshout



Figure 8-15: Group meeting with men in Farshout



Figure 8-16: Local Governmental Unit in Farshout

The following table summarizes the main groups consulted during the ESIAF and SSESIA and the engagement tools used.

Table 8-1: Summary of Consultation Activities in Qena Governorate

Participants	Number		Methods	Date
	Male	Female		
<b>During the ESIA framework preparation</b>				
Potential beneficiaries and governmental bodies	22	10	FGD	November and December 2013
Potential beneficiaries	75	67	Structured questionnaire	
Potential beneficiaries, government officials, NGO representatives,	96	57	Public consultation	
<b>Total</b>	<b>193</b>	<b>134</b>		
<b>During the site specific phase I</b>				
Government officials	5	1	In-depth	September and October 2015
NGOs	2	1	In-depth	
Community people	52	27	FGD	
Community people	475	168	Structured questionnaire	
Potential beneficiaries, government officials, NGO representatives,	68	42	Public consultation	7 <sup>th</sup> of February 2016
<b>Total</b>	<b>602</b>	<b>239</b>		
<b>During Phase II (Qeft, Farshout, Naqada, el-Waqf)</b>				



Participants		Number		Methods	Date
		Male	Female		
Potential beneficiaries	El-Waqf	7	11	FGD	End of February – First week of March 2017
	Farshout	7	12		
	Qeft	8	5		
	Naqada	8	8		
Government/public officials NGOs/CDAs representatives	El-Waqf	7	0	In-depth interview	End of February – First week of March 2017
	Farshout	5	1		
	Qeft	5	0		
	Naqada	4	0		
<b>Total</b>		<b>51</b>	<b>37</b>		

### ***Main results of consultation during the data collection phase***

The predominant majority of respondents 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 butane gas. 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. The following is a summary of the main issues raised during data collection and scoping phase is presented below:

#### **8.4.1 Summary of discussions**

Stakeholders' engagement and public consultation activities were conducted in order to ensure that the views and concerns of the local communities are integrated, and guarantee that they are taken into account by the different parties in charge of implementing the project. The views and concerns of local communities are an integral part of the project, and they are to be thoroughly taken into account throughout the different phases of the project.

The research team commissioned by EcoConServ engaged in a number of social activities. These activities include focus group discussions with potential beneficiaries; in-depth discussions with government officials, representatives of civil society, and community leaders.

Throughout the discussions interviewees were asked about five main points:

- The type of fuels currently in use, and its associated problems
- The upsides and downsides of NG, compared to other types of fuels
- The effects of the project during constructions and operations
- The cost of NG installation to households
- The future positive/negative impact of NG connections project

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 8-2: Key comments and concerns raised during the different public consultation activities, and the way they were addressed during in the ESMP study**

Subject	Questions and comments	Responses	Addressed in the ESMP Study
Safety of NG	-How safe is NG?	The NG networks and PRS adhere to the maximum safety measures. The safety requirements are related to the prerequisites needed to install the NG. The odorization of NG to detect any leakage, Monitoring and controlled inspections, enabling hotline to report on any leakage. There is multi-levels of safety measures. The above mentioned ones are just examples	It has been addressed in both project description and the community health and safety
Requirements for connecting NG to households	-What are the prerequisites that any buildings must have in order to be eligible for NG connections?	In order to install NG to an area, there has to be basic public utilities installed beforehand (water, sewage and electricity). The buildings must be built with concrete and red bricks. The total number of beneficiaries is economically accepted. The new area should be close to the national gas grid	They were illustrated in the project description



Subject	Questions and comments	Responses	Addressed in the ESMP Study
Cost of installing NG to households and options for payments	-How much is the installation fees? Is there a system of monthly installments to settle the installation fee? -Do we bear the cost of the pipes?	The cost of the installation fees ranges between (2300-3000 EGP). And there is a monthly installment system that extends to a period of 7 years to settle the installation fee.	Stakeholder section number 8 and cost payment in installment alternative
NG connections to villages and hamlets	-Is the NG connection project only limited urbanized areas? Will it include the villages and hamlets of Qena governorate, as well?	Connection to villages and hamlets is dependent on the availability of other public utilities (water, sewage, and electricity) Additionally, the village should be close to the national NG grid. If the village is big this will fulfill the requirements of economic aspect The hamlets are not targeted due to their limited population and the high cost	Stakeholder section number 8 and project description chapter
Street rehabilitation	-Who would carry out street rehabilitations after constructions?	The Local Governmental Units (LGUs) in el-Waqf, Naqada, Farshout, and Qeft are the ones in charge for fixing the streets and any other damages resulting from construction works.	section number 7.2.9 mitigation of street deterioration



Subject	Questions and comments	Responses	Addressed in the ESMP Study
Information sharing about NG	-What is the average cost per month? -Are there options for setting up the meters?	-NGOs and CDAs in the four areas expressed their willingness to carry out awareness campaigns to share information with the local communities. The representative of the LGUs' Information Centers expressed the same willingness to carry out awareness campaigns.	Stakeholder section number 8
Water pressure	-if water pressure is low, the NG water heaters would not work. Is there a solution for that?	It is one of important prerequisite to install the NG is to have proper water supply. In case the water supply is weak, there is no solution and water heater will not be connected to the NG	Stakeholder section number 8 and in the project description. Prerequisites required to install the NG.
Compatibility with home appliances	-some of the household still use old appliances that might not be compatible with NG connection valves. Do we have to replace these old appliances?	It is important to have proper appliances that are compatible with the NG. Old stoves and water heater can't be connected to the NG. For Baladi ovens using for baking bread inside the houses, their valve is not compatible with the NG. Some negotiations took place with Industrial Factories but no agreement was reached to date	Stakeholder section number 8 and in the project description. Prerequisites required to install the NG.

A public consultation event was conducted in Qena City. The results of the public consultation is included in **Annex 7**.

### 8.5 Summary of consultation outcomes

Site-specific consultation activities in Waqf, Naqada, Farshout and Qeft included wide range of concerned stakeholders. This included but not limited to individuals/households affected





by the project activities, civil society organizations representing the interest of the community, and governmental bodies who will play a role in facilitating or regulating the implementation of site-specific project activities.

The general stance towards the project is very supportive; even after the disclosure of the negative impacts during construction. The people realize that these negative impacts are temporary and that during operations the upsides will outweigh the downsides.

The main concerns raised about street rehabilitation and the necessity to develop paying in installment schemes that is required to install the NG. Additionally, there was a high demand to share information with the local community about NG related issues i.e. safety measures and methods of payment.

## **8.6 ESMP disclosure**

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As soon as the site-specific ESMPs gets clearance from the World Bank and approval from EEAA, a final report, in English and Arabic, will be published on the WB, EGAS and ReGas 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.



## **Annex 1: Contributors to the ESMP**



## **Annex 2: HSE Guideline**



## **Annex 3: Site Air Quality & Noise Measurements**



## **Annex 4: Procedures for Chance Finds**



## **Annex 5: Impacts Assessment**



## **Annex 6: GRM & Complaint Form**



## **Annex 7: Public Consultation document**





## **Annex 8: Emergency Response Plan**