



**1.5 Million Natural Gas Connections
Project in 11 Governorates**

**Environmental and Social Impact
Assessment
For the New Quweisna-PRS
(Upgrade) and its new High-
Pressure Pipeline**

**Monofeya Governorate
Final Report**

March, 2022



**EGAS
Egyptian Natural Gas Holding Company**

Developed by



“Petrosafe”

Petroleum Safety & Environmental Services Company

EcoConServ Environmental Solutions



List of acronyms and abbreviations

AFD	Agence Française de Développement (French Agency for Development)
ALARP	Stands for "As Low As Reasonably Practicable", and is a term often used in the milieu of safety-critical and safety-involved systems. The ALARP principle is that the residual risk shall be as low as reasonably practicable.
CAPMAS	Central Agency for Public Mobilization and Statistics
CDA	Community Development Association
EEAA	Egyptian Environmental Affairs Agency
EGAS	Egyptian Natural Gas Holding Company
EIA	Environmental Impact Assessment
EMOP	Egyptian Ministry of Petroleum
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management framework
ESMP	Environmental and Social Management Plan
FGD	Focus Group Discussion
GPS	Global Positioning System
HH	Households
HP	High pressure
HSE	Health Safety and Environment
IFC	International Finance Corporation
LGU	Local Governmental Unit
LDC	Local Distribution Companies
LPG	Liquefied Petroleum Gas
mBar	milliBar
NG	Natural Gas
NGO	Non-Governmental Organizations
PAPs	Project affected persons
P&A	Property and Appliance Survey
PE	Poly Ethylene
PRS	Pressure Reduction Station
SDO	Social Development Officer
SIA	Social Impact Assessment
Egypt Gas	Egypt Gas (LDC)
WBG	The World Bank Group
WHO	World Health Organization
\$	United States Dollars
€	Euros

Exchange Rate: US\$ = 18.34 EGP as of March, 2022

Exchange Rate: € = 20.43 EGP as of March, 2022

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0. Executive Summary

The objective of the proposed project is to construct a new Pressure Reduction Station (PRS) within Quweisna district which has already an old existing PRS owned by Egypt gas and constructed in 1998. The purpose of the new PRS is to increase the capacity of the existing PRS from 20,000 m³/h to 40,000 m³/h to connect NG to a wider segment of clients. The new PRS will not entail any new land acquisition, as it will be installed at the same location boundaries of the current existing PRS. The current land location was purchased in 1998, according to the willing buyer willing seller approach.

The objective of the current ESIA is to assess and propose mitigations measures for environmental and social impacts of the new Quweisna PRS (upgrade) and its related HP pipeline at Quweisna district, Monofeya Governorate. Impacts of NG exploration, extraction, refining, and transmission are outside the scope of this ESIA. Impacts of distribution networks for different areas are addressed in separate Environmental and Social Management Plan (ESMPs).

The distance between the off-take point at GASCO valves room and the new PRS will have an approximate length of 100 m. A new high pressure (HP) pipeline “25-70 bar system” will be installed to connect NG to the new PRS to the offtake point inside Gasco valve room. It will pass through a stat-owned lands. Therefore, no new lands are required for all project activities. Thus, the WB OP/BP 4.12, will not be applicable.

The local distribution company (LDC) responsible for project implementation in Quweisna is Egypt Gas.

EGAS and LDCs follow a set of agreed upon procedures for the process of permanent Land take for the construction of PRSs [Annex-3](#). The procedure covers cases of land acquisition of State-Owned Lands or privately-owned Lands on willing Buyer Willing Seller basis. It is the priority of EGAS as an asset holder, to acquire State Owned Lands that are free of any uses (both formal and informal EGAS never resorts to the land expropriation decrees in PRSs selection, particularly because of the flexibility of the PRSs locations.

Consultation activities are conducted through the project cycle, dissemination of project information at the early stages of the project during the frameworks preparation followed by consultation activities with the Project affected persons (e.g. LPG distributors (formal and informal), LPG storage workers, or in other situations cases of farmers whose land are temporary affected from the high pressure pipelines passing their land (which is not applicable for the current study)) and during land acquisition with land owners.

The proposed new PRS will be located inside Quweisna existing PRS on Jehan road within Quweisna district, Monofeya Governorate, about 175 m East Cairo – Alex Agricultural road, 2.2 km South El Gish road, 320 m West Astnha - Kafr Helal road, 600 m north east Kafr El Sheikh Ibrahim village, 1500 m south west Sharnais village.

The nearest residential building is located approximately 510 m North west of the proposed PRS location. The project will be regulated by both the World Bank and Egyptian regulations pertaining to environmental and occupational health and safety. Long list of laws is presented in chapter 3 of this report.

Quweisna District is affiliated to Monofeya Governorate and it is very close to Cairo (about 56 Km to the north). The average annual temperature is 20.5 °C and the average annual rainfall is 34 mm. Quweisna new PRS (upgrade) is located about 7 km West Damietta branch of the Nile River which represents the main freshwater stream, the Nile River flow northwards from Quweisna for about 179 km until emptying into the Mediterranean Sea

The air quality at the proposed site of the proposed PRS is exhibiting permissible limits of classic air pollutants in fact the levels are way below the national and international guidelines. The project site relies upon two sources of water, namely, the Nile water carried to the Governorate by a pipeline and rain water that is harvested during winter season.

With respect to flora of significance, none were encountered in the proposed project area, where PRS and its HP pipeline site are constructed. The current PRS area is free of significant vegetation. Planned offtake from national grid to the gas route shall not come into contact with flora and the uncultivated vegetation cover as the HP pipeline located along the road.

Quweisna district is a city located in Monofeya Governorate. Municipal solid waste collection points, used as open transfer systems, where waste is collected and then transferred to the Quweisna controlled-landfill, located approximately 4.7 km from the PRS location.

Quweisna district is one of the semi-urban areas in Monofeya Governorate. The district hosts many industrial activities. Consequently, the traffic tends to be from heavy to medium.

The total population of Quweisna district is estimated at 494,312 people representing about 11.5% of the total population in Monofeya Governorate in 2017, with a total area of 205 km².

According to CAPMAS data of 2017, almost all of individuals in Quweisna district use electricity for lighting. The PRS will be supplied by electricity from the National electricity grid.

The project will result in various positive impacts pertaining to job opportunities and potential supplies. However, it may result some potential negative impacts. Following is a summary table listing the impacts of relevance to the project:

Table 0-1: Impacts of relevance to the project

Potential Negative Impact	Impact significance
During Construction:	
Deterioration of soil quality	Medium
Air emissions	Minor

Potential Negative Impact	Impact significance
Noise	Medium - Minor
Occupational Health and safety	Medium
Impacts due to Covid-19 pandemic	Medium
Labor Influx	Medium
Child labor	Minor -Medium
Waste generation	Medium
Traffic	Minor
Ground water contamination	Minor
Community health and safety	Minor
Impacts related to lands	Minor
During operation:	
Occupational Health and safety	Medium
Impacts due to Covid-19 pandemic	Minor
Hazardous material and waste management	Medium
Noise	Minor

A long list of mitigation and monitoring measures was presented in this report in chapter-7. The PRS related consultation activities in Quweisna district 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 surrounding individuals/households expressed their eagerness to host the project as the natural gas will reduce their agony with the LPG cylinders. It is worth to mention that the consultation activities have covered both the PRS and all the Low pressures pipelines networks activities. Surprisingly, there was no single comment raised about the safety of the PRS or its activities. The PRS did not raise any concerns among the community in the vicinity areas.

1. Introduction

1.1 Project Objectives

The objective of proposed project is to upgrade the existing Quweisna Pressure Reduction Station - which located at Quweisna district and constructed in 1998 - by adding a new PRS inside its boundaries and installing a new HP pipeline to increase the capacity of the current existing PRS from 20,000 m³/h to 40,000 m³/h in order to connect NG to a wider segment of clients.

The upgraded PRS will be designed to reduce the inlet pressure of 25-70 Bar to an outlet pressure of 7 Bar at a flow rate of 40,000 m³/h.

1.2 Environmental and Social Impact Assessment (ESIA)

The ESIA is undertaken to assess and propose mitigations for environmental and social impacts of the new PRS and its HP pipeline. Impacts of NG exploration, extraction, refining, and transmission are outside the scope of this ESIA. Impacts of distribution networks for different areas are addressed in separate Environmental and Social Management Programs (ESMPs). It is worth mentioning that in **March 2014**, an Environmental and Social Impact Assessment Framework (ESIAF) was developed for the project's Governorates, including Monofeya Governorate. Also, in December 2017, an ESMP study has been conducted for three districts in Monofeya governorate, named (Shintina Al Hajar & Um Saleh, Tilbant Abshish, Salaka districts), followed by an ESMP study for another five districts in August 2019 named (Shoubra Bakhom (Qwesna), Alshouhada, El Qum El Akhdar/El Batanoon, Ganzor and Ashmoon districts).

The aforementioned studies were cleared by the World Bank and disclosed on EGAS and WBG websites.

A 100 m HP pipeline connects the Offtake to the PRS. HP pipeline installation works will take place and will pass through a state-owned land.

The ESIA objectives includes:

- Describing project components and activities of relevance to the environmental and social impacts assessments.
- Presenting project alternatives and the no project alternative.
- Identifying and addressing relevant national and international legal requirements and guidelines
- Describing baseline environmental and social conditions
- Assessing potential site-specific environmental, social and OHS impacts of the project

- Developing environmental & social management and monitoring plans in compliance with the relevant applicable laws
- Documenting and addressing environmental and social concerns raised by stakeholders and the Public in consultation events and activities

The local distribution company (LDC) responsible for project implementation in Quweisna district is Egypt Gas.

1.3 Contributors

The ESIA prepared by Petrosafe (Petroleum Safety & Environmental Services Company) and Ecoconserv Environmental Solutions (Cairo, Egypt) with collaboration and facilitation from EGAS, Egypt Gas HSE and Engineering Departments. The names of the Petrosafe and Ecoconserv experts who have participated in the preparation of the ESIA study listed in [Annex-1](#) attached to this report.

Table 1-1: Shortlist of Main Contributors

Shortlist of Petrosafe main Team Members				
Project Manager (Senior ESIA Expert)	Project Manager (Senior ESIA Expert)	Social consultant	Team leader	Quality Control
Chem. Mohamed Saad Abdel Moein	Chem. Mohamed Abdel Moniem Aly	Economist/ Osama Kamal	Geo. Mohamed El- Ghazaly	Dr. Zeinab Farghaly

2. Project Description

2.1 Background

Natural Gas (NG) is processed and injected into the high-pressure lines of the national Grid (70 Bar) for transmission. Upon branching from the main lines to regional distribution networks, the pressure of the NG is lowered to 7 Bar at the PRS. An odorant is added to the NG at PRSs feeding distribution networks to residential areas¹ in order to facilitate detection in the event of leaks. In addition to excavation, key activities of the construction phase also include installation of mechanical equipment. The diagram below **Figure (2-1)** presents the components of a city's distribution network. The component covered in this ESIA is lined in red. Other components are addressed in a separate ESMP:

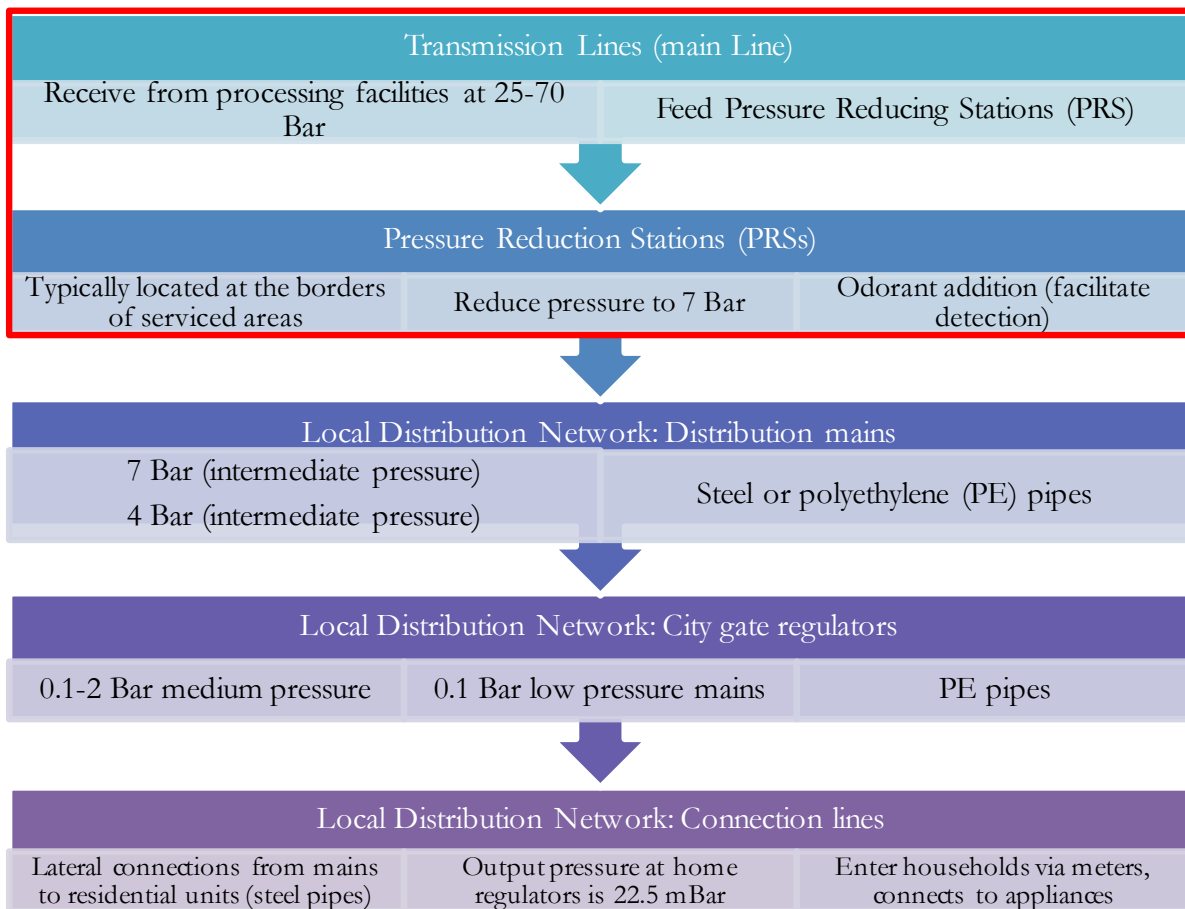


Figure 2-1: General components of the city's distribution network

¹ Because natural gas is odorless, odorants facilitate leak detection for inhabitants of residential areas.

2.2 Project Work Packages

2.2.1 Pressure Reduction Station (PRS)

A PRS consists of the following components: an inlet unit (isolated cathodic system), a liquid separation unit, a filtration unit and equipment for automatically reducing and regulating the pressure (active regulator and monitor regulator). In addition, auxiliary devices include safety valves (Slam Shut), relief valves, an odorizing unit and ventilation equipment as shown in [Figure 2-2](#).

Utilities existing in a PRS include a control room, a firefighting system (pumps [jockey, electrical, diesel pumps], firefighting water tank, firefighting valve), staff bathroom, a storage area and entrance room located adjacent to the entrance gate.

The upgraded Quweisna PRS will be designed to reduce the inlet pressure of 25-70 Bar to an outlet pressure of 7 Bar at a flow rate of 40,000 m³/h in order to feed Quweisna area.

2.2.2 Offtake and HP pipeline

The national grid pipeline network has a MOP of 70 Bar. The offtake is the point on the HP national grid pipeline where a branch of the pipeline is constructed to connect the PRS to the national grid. In Quweisna the new related HP pipeline connection between offtake and the new PRS will have an approximate length of 100 m. At the offtake location (inside Gasco valve room), valve rooms/valve ditching is constructed so as to control the flow of the natural gas through the pipeline (branch).

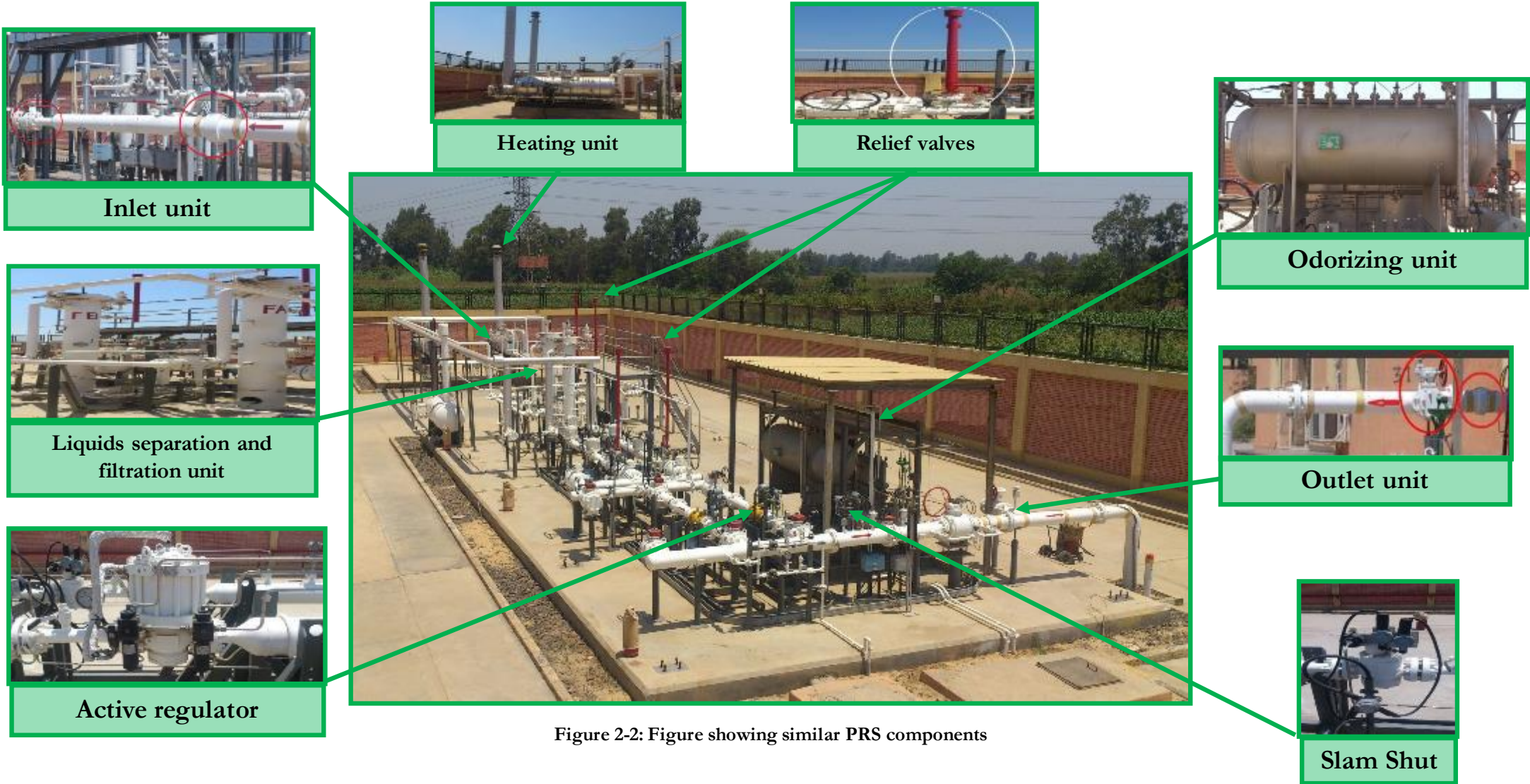


Figure 2-2: Figure showing similar PRS components

2.3 Project location

2.3.1 Pressure Reduction Station (PRS)

The proposed new PRS will be located inside Quweisna existing PRS on Jehan road within Quweisna district, Monofeya Governorate, about 175 m East Cairo – Alex Agricultural road, 2.2 km South El Gish road, 320 m West Astnha - Kafr Helal road, 600 m north east Kafr El Sheikh Ibrahim village, 1500 m south west Sharnais village. The geographical coordinates of the proposed new PRS location are (latitude 30° 32' 6.87" N, longitude: 31° 8' 55.61" E). The nearest residential building is located approximately 510 m North west of the Offtake site as shown in [Figure 2-3](#), [Figure 2-4](#) and [Figure 2-5](#)

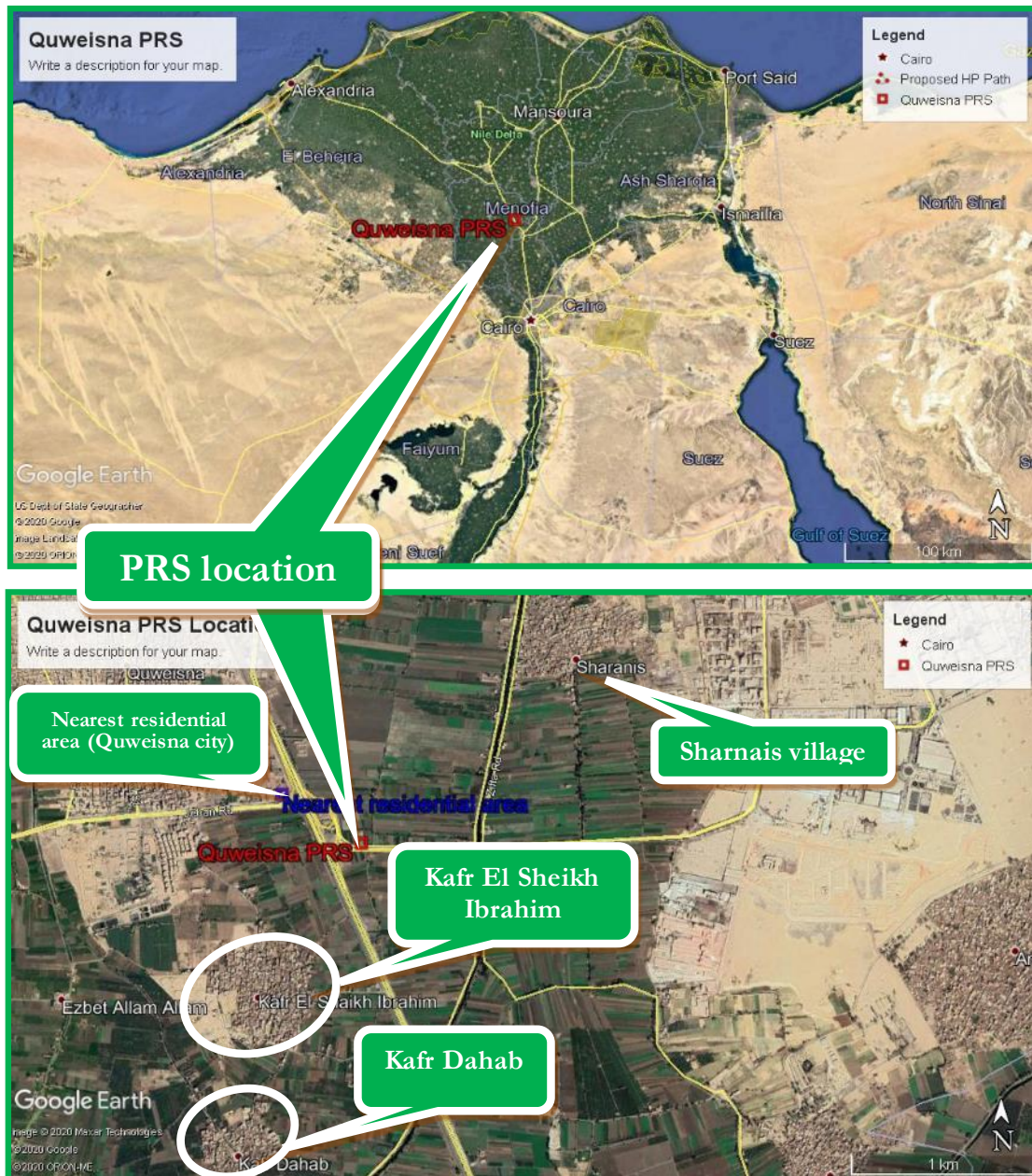


Figure 2-3: a satellite map showing the proposed Location of Quweisna new PRS and nearest residential areas.

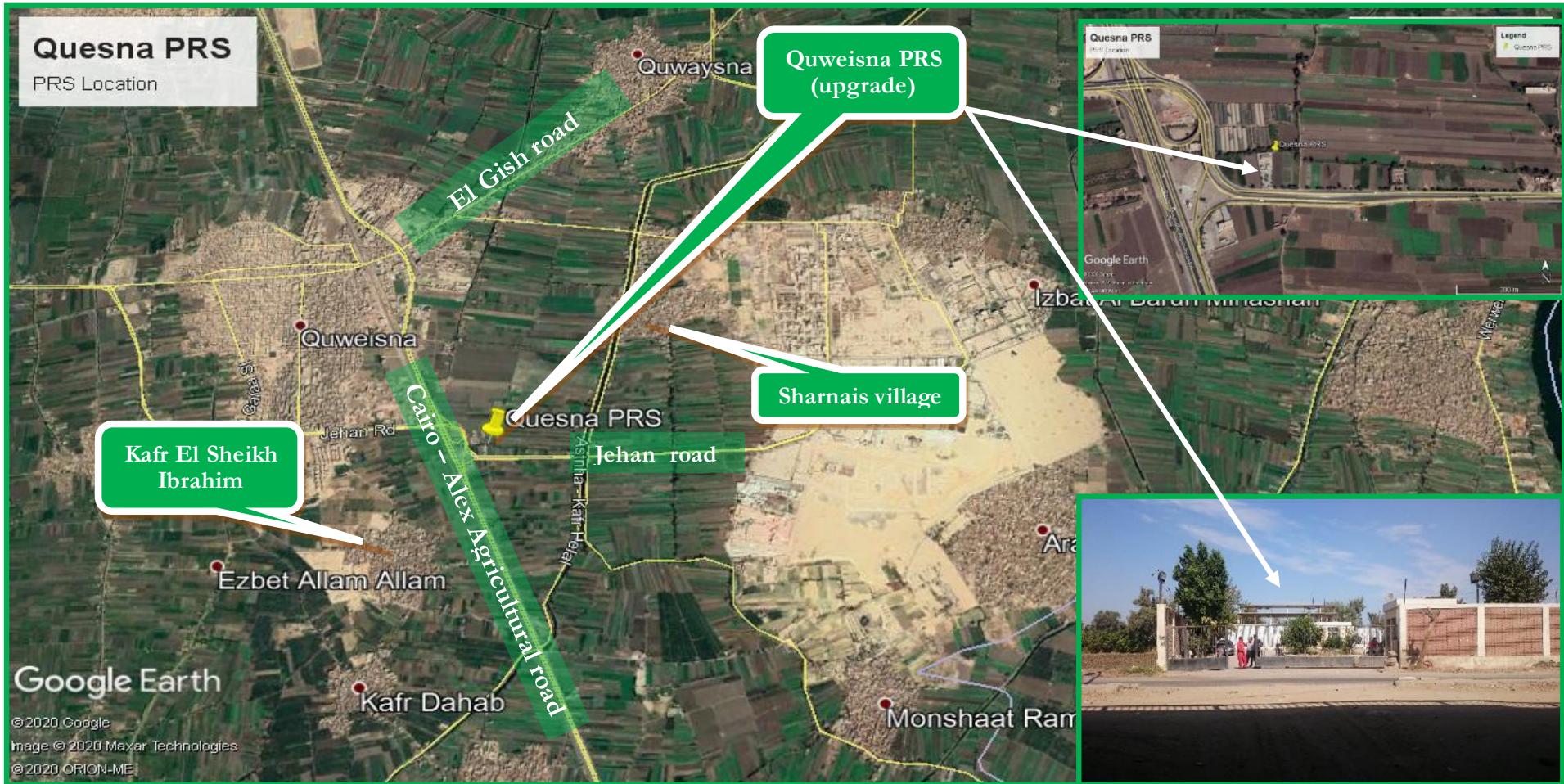


Figure 2-4: The proposed Location of Quweisna new PRS feeding Quweisna area



Figure 2-5: Pictures showing the proposed PRS and its surroundings

2.3.2 Offtake Location

The Offtake point will be located inside Gasco valve room, which is located about 20 m from Jehan road, about 260 m East Cairo – Alex Agricultural road, 310 m West Astnha - Kafr Helal road, 590 m north east Kafr El Sheikh Ibrahim village. The geographical coordinates of the proposed offtake location are (latitude 30° 32' 4.22" N, longitude: 31° 8' 56.70" E). [Figure 2-6](#) and [Figure 2-7](#)



Figure 2-6: The proposed Location of the proposed Offtake point, which will be located inside Gasco valve room



Figure 2-7: Pictures showing the proposed Location of the proposed Offtake point, which will be located inside Gasco valve room

2.3.3 HP Pipeline Route

The total length of the proposed pipeline route is about 100 meters. The proposed pipeline route will start from the Proposed Offtake point, which located inside Gasco valve room then will extend to the north east for about 30 meters then cut Jehan road for about 40 m then enter the old existing Quweisna PRS border for about 30 m to reach its destination inside the parking area of the Old existing PRS at the geographical coordinates of (latitude 30° 32' 6.87" N, longitude: 31° 8' 55.61" E). **Figure 2-8 and Figure 2-9.**

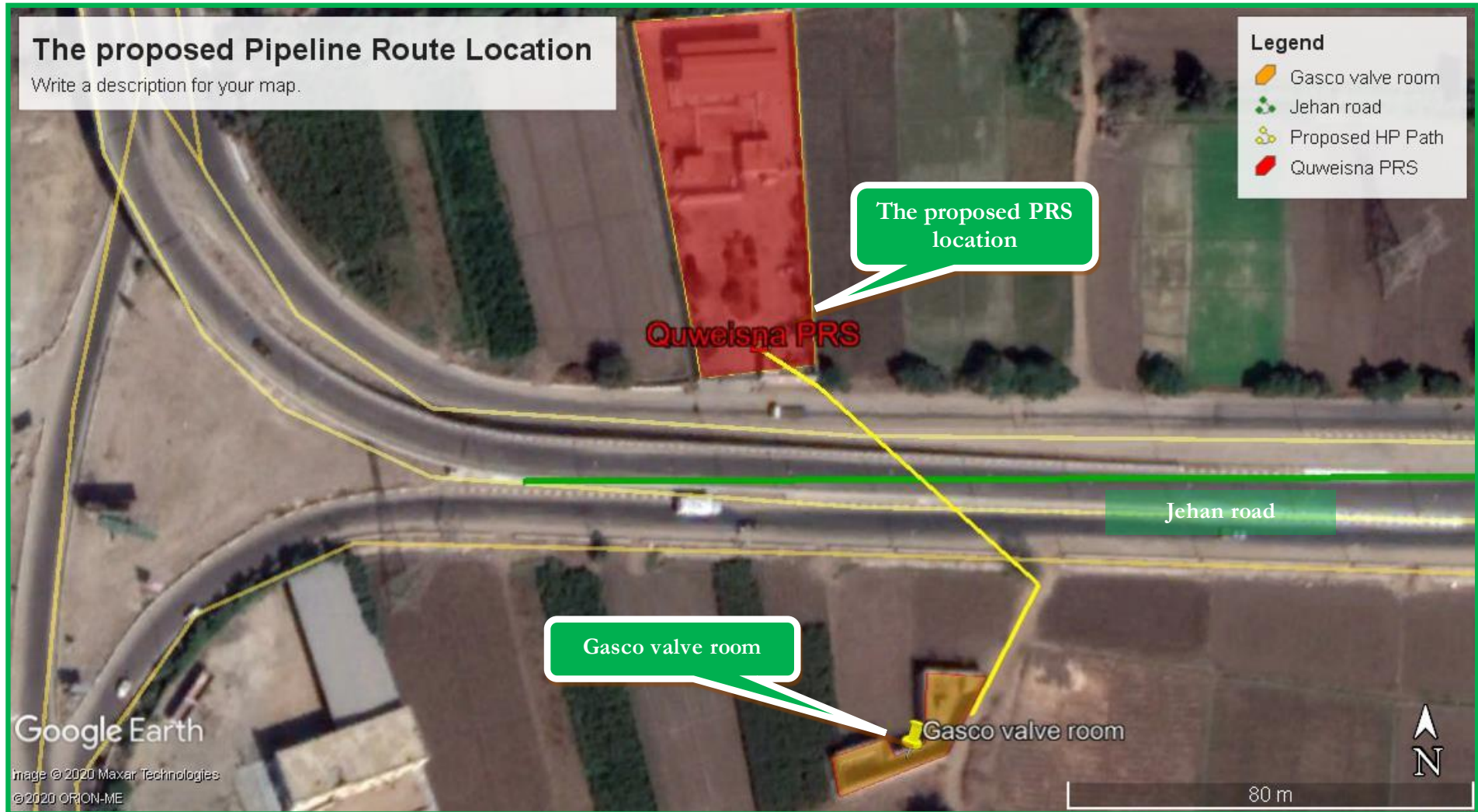


Figure 2-8: The proposed Pipeline Route

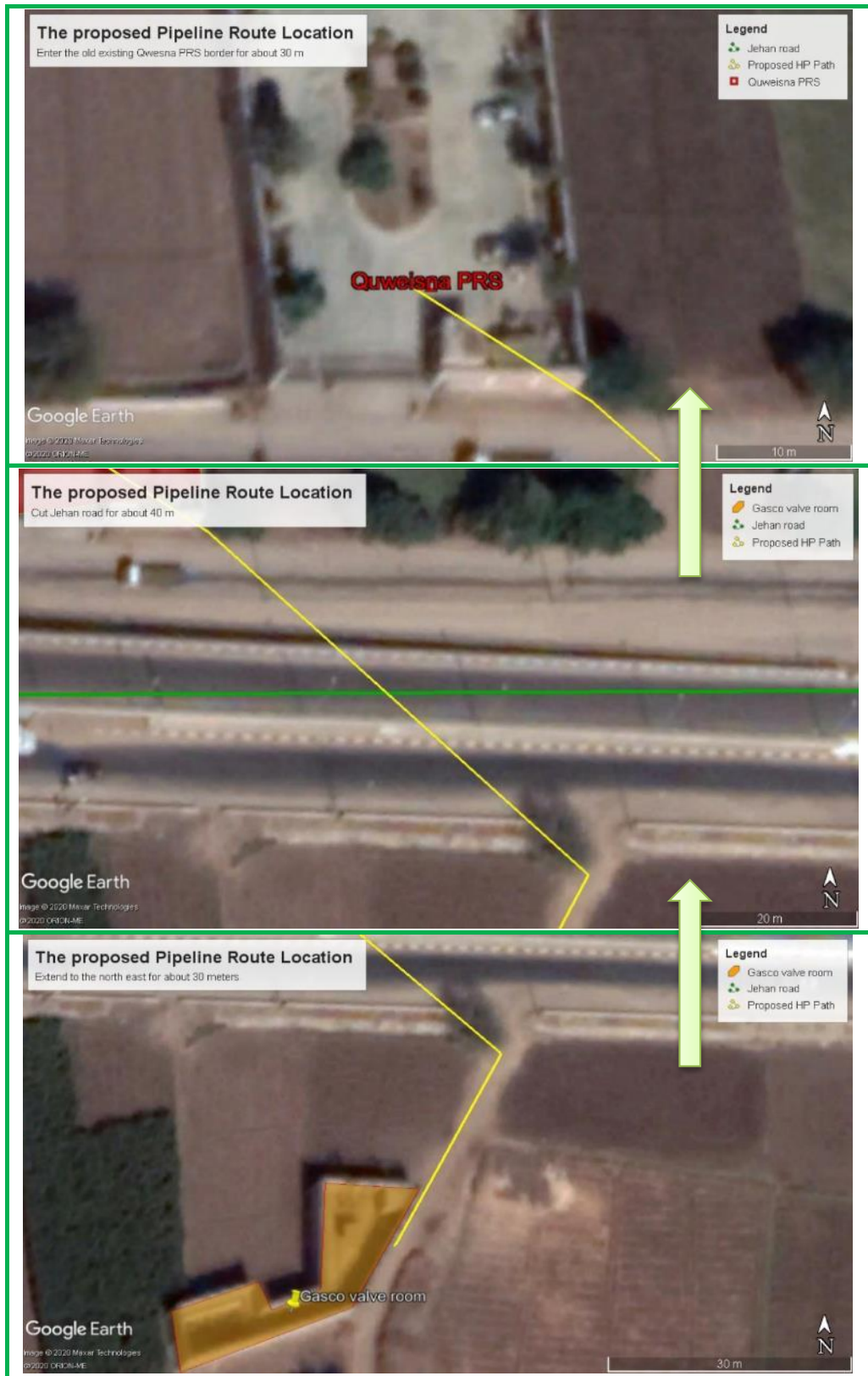


Figure 2-9: Pictures showing the proposed Pipeline route

2.4 Project Execution Methodology

2.4.1 General survey

- Identifying availability of overhead and underground utilities in the area and their conditions (electricity, water, telephone lines, and sanitary pipelines) through data and maps from the relevant authorities.
- Identifying the location of the nearest national grid pipelines, gas networks.
- Identifying the location of the new PRS location and new offtake location.
- Identify the route of inlet connection “25-70 Bar system”

2.4.2 Land acquisition for The Project Activities

The new PRS will not entail any new land acquisition, as it will be constructed at the same location of the current existing PRS. The current land location was purchased on 10/5/1998 ([Annex-2](#) land document), according to the Willing buyer Willing seller approach applied by EGAS and Egypt Gas (For further elaboration on EGAS procedures for land acquisition see [Annex-3](#)).

The Off-takes from the national network and high pressure (HP) pipeline “25-70 bar system” is about 100 meters from the PRS location (within GASCO Valve Room) and it will pass-through state-owned lands (adjacent rural road and cross the main road (Jehan Road)).

In addition, during the conducted field survey, no vendors were observed along the HP pipeline route. Thus OP 4.12 is not applicable to Quweisna new PRS, Hence, no RAPs will be required.

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

Once the final location of project components is finalized, a final design of the Offtake and PRS is utilized to estimate the materials and equipment needed to implement the project. Procurement of the materials includes local and international components. The main international purchases may include critical components and PRSs, regulators, and metering stations.

2.4.4 Construction works

2.4.4.1 Construction works of PRS

PRS area:

PRS siting was performed according to international best-practice and guided by minimizing the possible negative impacts on the project’s surroundings; the safety of neighboring areas from possible

gas release accidents; and noise associated with the operation of reducers. The PRS will be inside the existing Quweisna PRS boundaries which surrounded by a wall for safety and security purposes (including reducing noise impacts of the PRS reducers on the surrounding receptors). Currently, there are scattered buildings in the agricultural land surrounding the PRS. The closest buildings are around 510 m North west of the proposed PRS location (**Figure 2-5**). In the event that buildings are constructed in the area surrounding the PRS, the Institute of Gas Engineers Safety Recommendations requires buffer zones which have free areas from each side of PRS to allow for emergency vehicle access.

The PRS is to be accessible by an existing road (Jehan road) to ensure quick response in event of repairs and/or emergencies.

Pressure Reduction Station Civil Works:

About a 4 months construction schedule is planned for the Quweisna new PRS (upgrade) with site preparation expected to commence in the second quarter of 2022.

The main construction activities will include:

- Site preparation, acceptance and placement of major fabricated equipment items, construction of buildings, testing and commissioning.
- Initial construction activities involve clearing and grading of the site.
- Following site preparation, individual excavations will be made for fire-fighting tanks and pipe racks.
- Concrete foundations for buildings and footings for mechanical equipment will be laid down;
- Facility piping (inlet, outlet and 4-inch firefighting line) both above and below ground, are installed.

Pressure Reduction Station Mechanical Works:

Quweisna new PRS (upgrade) comprises of two pressures streams, the upstream (inlet) high pressure 25-70 Bar and the downstream (outlet) low pressure 7 Bar. The PRS design is in accordance with the Institute of Gas Engineers/ Safety Recommendations IGE/SR/9, 10, 16, 18, 22, 23, 24, 25; Institute of Gas Engineers/ Transmission Distribution IGE/TD/13; and National Fire Protection Association NFPA 15.

Following the construction of the foundation and fences, construction will continue with the installation of mechanical components. Mechanical components include the following:

- Inlet ball valve
- Solid filtration

-
- Liquid filtration
 - Water bath heater
 - Reduction regulator
 - Active regulator
 - Monitor regulator
 - Slam shut /Safety valve
 - Relief valve
 - Measuring unit
 - Odorizing unit
 - Outlet unit

Please refer to [\(Figure 2-2\)](#) and [\(Figure 2-10\)](#)

Testing:

Following mechanical completion, testing of the facility components will be performed in accordance with applicable standards.

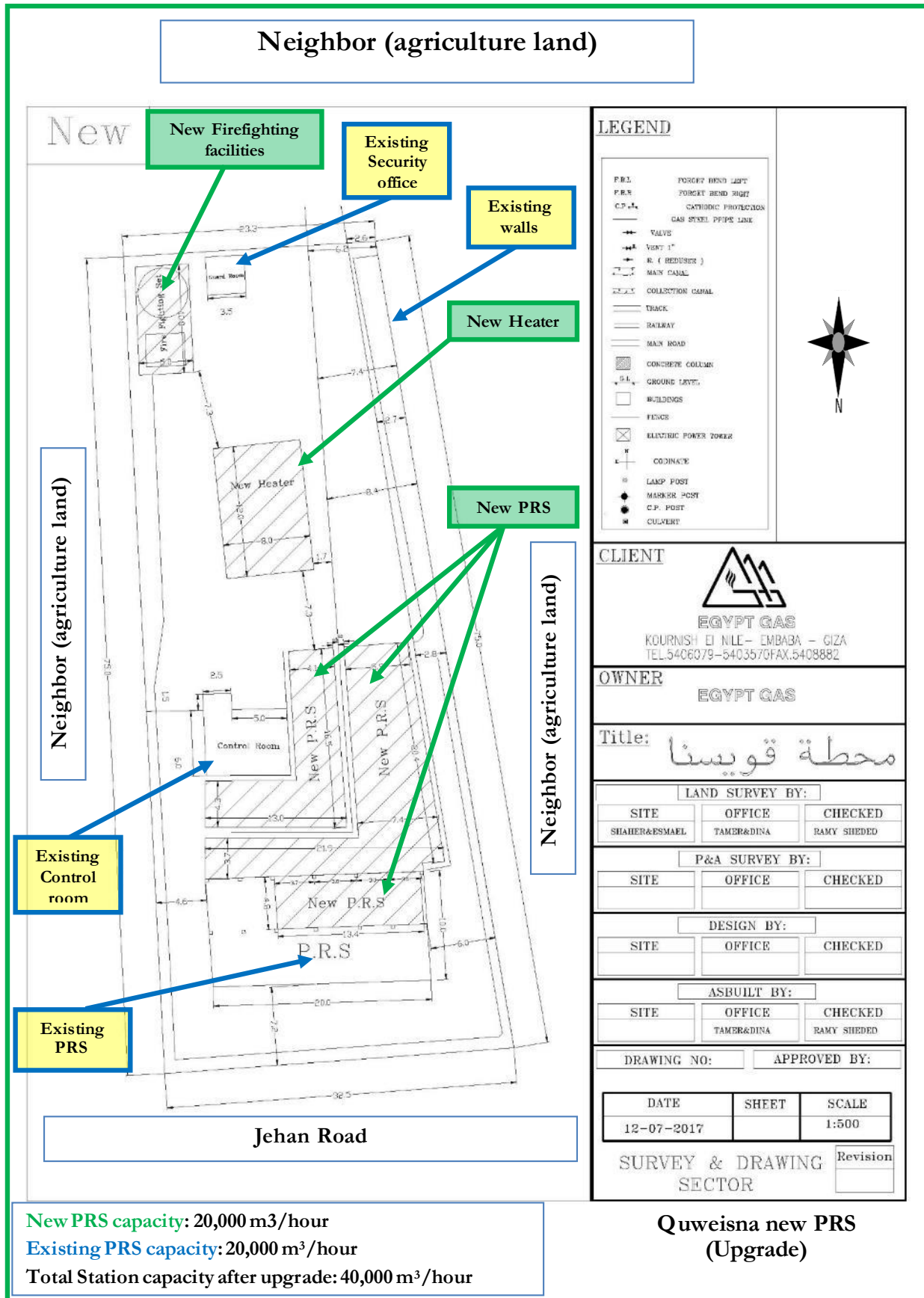


Figure 2-10: The proposed layout of Quweisna new PRS (upgrade).

2.4.5 Construction works for the Offtake and HP pipeline

The 100-meter HP pipeline will pass through a state-owned land to connect the offtake with the proposed new PRS (upgrade of the existing PRS). The offtake location is remotely located, away from any residential areas and close to a road. Therefore, no lands were needed for the access to high pressure pipeline. Thus OP 4.12 is not be applicable to Quweisna new HP pipeline. Hence, no RAPs needed.

Construction activities of the HP pipeline include excavation, pipeline placement, pipeline connection welding and then surfacing. The construction activities will be located within the allocated site. The duration of the construction of the pipeline will be about 1 week.

All safety precaution will be applied as per the updated EGAS HSE guidelines ([Annex-5](#)) including:

- Clearing and grading activities and pipe transportation and storage
- Site preparation
- Excavation
- Pipe laying
- Welding
- Backfilling and road repair
- Leakage testing

The construction of the PRS and the HP pipeline will temporarily involve using main roads to transport personnel, equipment and material to the project site. Crossing of Jehan Road (main road) will take place to connect the proposed upgrade of the PRS to the offtake.

Clearing and grading activities and pipe transportation and storage

The first step of construction includes flagging the locations of the approved access route of the pipeline; installing a temporary workshop for the crew within the current Quweisna PRS barrier; erecting fences surrounding the working areas; and land clearing. Grading is conducted where necessary to provide a reasonably leveled work surface. Additionally, equipment and piping will be transported to the site and stored at a temporary storage area along the pipeline route and will not be left more than one day in the construction location. 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.

Site preparation

Before any excavation activities, Egypt Gas shall coordinate with the different authorities to determine the existing infrastructure in the project's area (e.g. water lines, sewage lines, electrical cables, telecommunication lines and overhead utilities) so as to avoid any undue damage. In case of lacking

sufficient information on the available infrastructure, inspections on the presence of underground utilities will be carried out by drilling exploratory drills and/or using utility detection devices. Pipeline routes are then identified and marked in the field.

Excavation

Pipe laying of the high-pressure line in Quweisna will not involve main crossings (e.g., railways or water bodies), therefore, the excavation technique applied will be open cut. Trenches for steel high pressure pipes will be excavated at depths of 1.2 m. The diameter of the steel-HP pipelines is 8 inches.

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 an 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. In some cases, where the ground water is shallow, the trench should be dewatered before pipe laying. Dewatering pumps typically discharge into a drain or sewer manhole, according to arrangements with local authorities. To conserve water, if dewatered water is free of perceivable pollution, it will be- to the extent possible- used on- or around the work site or discharged into the nearest canal to be used for irrigation.

Welding

Arc welding is used with HP steel pipes. Steel pipes are protected from corrosion by isolating coats, and by fixing an anode for cathodic protection. For long segments of the steel-HP pipelines, the impressed current protection system is employed with the aid of electrical components such as transformers. Once the trench is excavated and cleared, the pipe stretch shall be laid down.

Backfill and road repair:

After laying and welding works, the trench containing the HP 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 either by a front loader or manually to protect the

pipeline. The backfill will be then compacted by wet sand layers of 15 cm thickness in order to avoid road settlements and subsequent cracks. Natural gas pipes are surrounded by sand in order to absorb loads from the road.

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 fulfill the proximity required in standards for safety to sustain pressure, an inverted U-shaped reinforced concrete slab is constructed around the pipeline after laying in order to improve shock resistance.

Upon completing the backfilling works, the contractor will proceed to restore the road surface to its original status.

Hydrostatic leakage testing

Following construction activities, the piping will be tested to locate possible leaks using hydrostatic testing, which consists of filling pipes with water and then pressurizing to 1.5 times the operating pressure and measuring the pressure at different locations. Pressure drop indicates leakage. The water is then drained. This drainage takes place by the "pigging process", which includes forcing an object, the "pig", through the pipe by liquid or air pressure to totally drain the line before NG is fed.

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).

2.5 Operation phase

2.5.1 Operation of the PRS

Operation of the PRS involves operation of the various components outlined in the construction phase after connecting the new PRS with the existing one as shown in **(Figure 2-2)**. Risks associated with those activities are further addressed separately in a Quantitative Risk Assessment (QRA) **(Annex-4)** and all its outputs will be adhered, and the Emergency Response Plan (ERP) will be updated if necessary.

Inlet ball Valves

The inlet valve includes an insulation joint to completely isolate the PRS inlet from the cathodic system applied to the feeding steel. Insulation joints isolate the PRS as measure of protection during strikes and current.

Filtration unit

The filtration unit consists of two main stages, a liquid filtration stage and a solid filtration stage. The aim of the filtration unit is to remove dust, rust, solid contaminants and liquid traces before entering into the reduction stage. Two filters and two separators are installed in parallel; each filter-separator operates with the full capacity of the PRS to separate condensates and liquid traces. The solid filtration unit is designed to separate particulate matter larger than 5 microns. Filter-separator lines are equipped with safety devices such as differential pressure gauges, relief valves, liquid indicators, etc.

Heating unit/Water Bath Heater

This unit ensures that inlet gas to the reduction unit enters with a suitable temperature (the temperature of gas flow entering the station should be 15 °C; and to avoid the formation of natural gas water hydrates in the line downstream of the choke or regulator (due to Joule Thompson effect). Temperature increases by heat exchange between gas pipeline pass through the heating unit filled with hot water. The unit was designed to be heated to 60 °C; while the heating temperatures for the outlet flow gas ranges between 35 °C and 45 °C.

The heating unit comprise of the following components:

- Heater body/shell
- Process gas inlet/outlet
- Water Expansion tank
- Burner, Gas Train & BMS Panel
- Removable Fire tube
- Exhaust stack
- Heating medium (Water Bath)

The PRS is equipped with two heaters in parallel (one of them being on standby in case of emergencies).

Reduction

The PRS includes two reduction lines in parallel (one of them being on standby in case of emergencies). The lines are equipped with safety gauges, indicators and transmitters to maintain safe operating conditions. According to the IGEM standards, the reduction unit should be installed in a well-ventilated closed area or, alternatively, in an open protected area.

Active and Monitor Regulator

The active regulator controls the outlet pressure while the monitor regulator assume control in the event of failure of the active device.

Slam Shut Valve

The purpose of Slam shut is to totally, automatically and rapidly cut off gas flow when the outlet pressure exceeds or drops below the setting pressure. The valve has to be installed to protect the system. The safety valve has to be sized for the maximum gas flow with the highest pressure that could be provided to the pressure reducing valve.

Measuring Unit

After adjusting the outlet pressure, gas flow and cumulative consumption are then measured to monitor NG consumption from the PRS and to adjust the dosing of the odorant indicated in the subsection below.

Odorizing Unit

Natural gas is generally odorless. The objective of odorizing is to enable the detection of gas leaks at low concentration, before gas concentrations become hazardous. The odorant is composed of Tertiobutylmercaptin (80%) and Methylsulphide (20%). The normal dosing rate of the odorant is 10-20 mg/cm³. The odorant system consists of a stainless-steel storage tank, which receives the odorant from 200-liter drums, injection pumps, and associated safety devices.

Outlet unit

The outlet unit includes an outlet valve gauge, temperature indicators, pressure and temperature transmitters and non-return valves. The outlet pipes are also, like inlet pipes, isolated from the cathodic protection by an isolating joint. Please refer to [Figure 2-2](#)

2.5.2 Operation for the Offtake and HP pipeline

The main activities during the operation phase are the monitoring of the main offtake valve and the routine checking for the occurrence of gas leaks.

SCADA (Supervisory Control and Data Acquisition System):

GASCO is working with SCADA, a highly sophisticated integrated system used to control the national natural gas pipeline network. The SCADA system performs remote controlling of the valve rooms to adjust the operating pressure, and if necessary change the flow of natural gas by bypassing the main route. The SCADA system can also detect natural gas leakage if a pressure drop was observed in a certain pipeline. The SCADA system is connected to a fiber optics system installed in the pipelines.

2.6 Resources consumption

2.6.1 During Construction

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

Water is mainly used during the construction phase in concrete preparation and domestic uses by the workers and engineers. Water for construction is sourced from trucks. Bottled water will be used for drinking purposes. The expected amount of water to be used during the construction phase of this project is:

- Domestic uses by the workers and engineers: about 3.6 m³/day
- Construction activities including hydrostatic testing: about 63.2 m³

Fuel:

Diesel fuel will be mainly used for:

- Diesel generators that supply electricity to the construction activities including welding.
- Trucks and excavators' fuel
- The expected amount of diesel fuel to be used in the construction phase of the new PRS (upgrade), Offtake and its new related HP pipeline is about 60 liters per day. The fuel will be delivered to the construction site via trucks when needed

2.6.2 During operation

Water:

Water is mainly used during the operation phase in the firefighting storage tank as well as for domestic use by workers in the PRS and drinking water.

The water source will be connected to the public water network.

Electricity

Electricity consumption during the operation phase is expected to be minimal which will be mainly consumed at the control room. The new PRS (upgrade) will be supplied by electricity from the National electricity grid network existing in the area.

2.7 Waste Generation

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 ([Table 7-2](#)).

2.7.1 During construction

Solid wastes

Solid waste generated during the construction phase will comprise of construction wastes, domestic wastes as following:

- 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.
- Domestic waste will be generated by approximately 16 workers per day over a period of 4 months during the project construction activities. Workers will utilize public facilities provided by the village or city and use public resources (bins) to dispose of food waste, packaging materials etc.
- Excavated soil is used for backfilling. Small amounts of leftover soil may remain and are disposed of in legal dumpsites as per contract between the Contractor and the supplier

Hazardous wastes

Some hazardous wastes will comprise of construction wastes as paint containers, batteries, chemicals containers (solvents, lubricants, etc.) and used oils.

Liquid waste

Liquid waste will comprise mainly of domestic wastewater, vehicle/equipment wash down water and the hydrostatic test water. Domestic water is the only continuous source during construction. Workers during the construction phase will use the existing PRS' s one bathroom, the hydrostatic test water will be sampled and analysed before selecting appropriate disposal method, if the results within the limits it will be discharged into a drain or sewer manhole with arrangements with local authorities and if not meet with the limits it will be collected in tanks and transported via a certified contractor to the nearest wastewater treatment station.

2.7.2 During operation

Solid waste

Solid waste generated from the new PRS (upgrade) is expected to be minimal and limited to domestic waste and it will be collected regularly by trucks belonging to Quweisna local units.

Hazardous waste

Mainly empty odorant containers and filters will be treated on-site, transported (using certified hazardous waste vehicles and personnel) to the Egypt Gas storage facility in Abu Rawash (Giza) for final disposal at the UNICO hazardous waste facility near Alexandria.

Wastewater

The only wastewater source is domestic wastewater which is connected to the municipal sanitary network.

3. Legislative and Regulatory Framework

In this chapter, the applicable laws, regulations and standards which contractors are obligated with will be presented.

Detailed discussion and comparison between National legislations and WB policies are presented in the updated Environmental and Social Impact Assessment Framework (ESIAF)² and Resettlement Policy Framework (RPF)³.

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 and its Executive Regulation(ER) No 338 for Year 1995 and the amended regulation No 1741 for Year 2005, amended with Prime Ministerial Decree No 1095/2011, prime ministerial decree No 710/2012, Prime Ministerial Decree No 964/2015, Prime Ministerial Decree No 26/2016 and Prime Ministerial Decree No 618 & 1963/2017
 - EEAA guidelines on ESIA's preparation
 - EGAS updated HSE guidelines, LDCs will comply with EGAS updated HSE guidelines which work as regulation on PRS construction and operation (provided in [Annex-5](#) from the report)
- Law 38/1967 for General Cleanliness
- Law 93/1962 for Wastewater
- Traffic planning and diversions
 - Traffic Law 66/1973, amended by Law 121/2008 and Law 142/2014.
 - 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 including Egyptian Safety Measures and Precautions (Decree 211-2003) and Workforce Safety

3.2 World Bank Safeguard Policies⁴

Three policies are triggered for the project as a whole: Environmental Assessment (OP/BP 4.01), Physical Cultural Resources (OP/BP 4.11), and Involuntary Resettlement (OP/BP 4.12). However, OP/BP 4.11 will not be applicable to this ESIA as there is no cultural resources located in the project

²<https://www.egas.com.eg/sites/default/files/2019-06/updated%20environmental%20and%20social%20impact%20assessment%20framework%20for%2020%20governorate.pdf>

³<https://www.egas.com.eg/sites/default/files/2019-06/updated%20Resettlement%20policy%20framework%20for%20HH%20connection%20project%20in%2020%20governorate.pdf>

⁴ <https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=3694>

area. With regards to OP/BP 4.12, it will not be applicable also, to the lands required for the project activities. Where the land for the new PRS construction is already existing and was purchased on 10/5/1998 ([Annex-2](#) land document), according to the willing buyer willing seller approach applied by EGAS and Egypt Gas. Additionally, the HP pipeline (100 m) will pass-through state-owned lands, with no damages for any private assets

3.2.1 World Bank Group General Environmental, Health, and Safety Guidelines⁵ & WBG Environmental, Health and Safety Guidelines for Gas Distribution Systems⁶

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. Gaps between requirements outlined by WBG guidelines and the Egyptian Law 4/1994 for Environment protection and the LDCs EHS guidelines 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 Information⁷ will be followed by the Project.

3.3 Permits Required

- _ Approval from the ministry of Agriculture to construct the new PRS on agriculture land in accordance with the presidential decree number 615 of year 2016.
- _ Army forces permit to construct the new PRS.
- _ Constructions permit to be obtained from the local Governmental unit (LGU) in Quweisna – Monofeya Governorate.
- _ 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.
- _ Utility installation permission to the new PRS (after construction phase)

⁵<https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

⁶<https://www.ifc.org/wps/wcm/connect/9c6e3d0048855ade8754d76a6515bb18/Final%2B-%2BGas%2BDistribution%2BSystems.pdf?MOD=AJPERES&id=1323162128496>

⁷ <https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=3694>

4. Environmental and Social Baseline

4.1 Description of the Environment

Quweisna city is located in Quweisna Markaz and affiliated to Monofeya Governorate, which is located south the Nile delta in Egypt, about 56 km from Cairo, bordered from north by Ibnahs village and from west by Shamandil village and from south by Kafr El Sheikh Ibrahim village and from east by Sharanis village. (Figure 4-1)

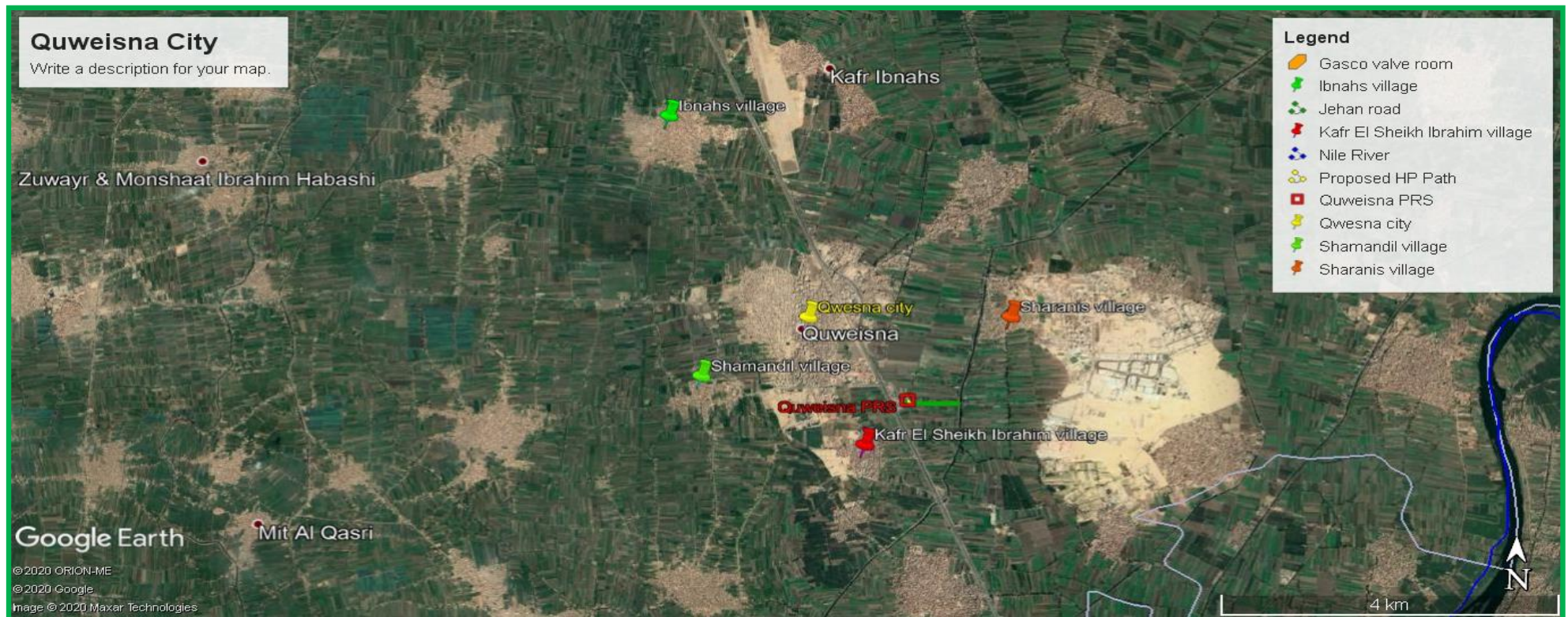


Figure 4-1: Distribution of cities in Monofeya governorate

The proposed project aiming to upgrade the existing Quweisna Pressure Reduction Station by adding a new PRS inside its boundaries and installing a new 100 m HP pipeline in Quweisna district (Markaz Quweisna) within Monofeya Governorate.

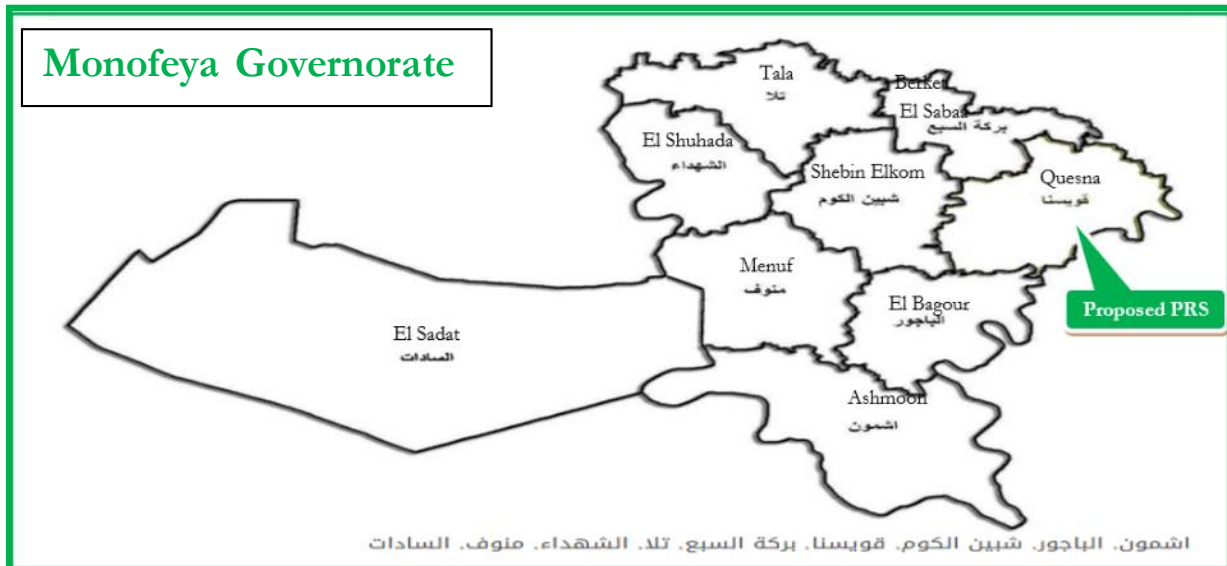


Figure 4-2: A layout showing the location of Quweisna new PRS (upgrade).

4.1.1 Air Quality

4.1.1.1 Site Specific Ambient Air Quality:

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

The measurement location was chosen on the basis that it is beside a main road and close to the new PRS location.

One-hour average results for 8 hours' continuous measurements were conducted for pollutants of primary concerns, namely, carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO₂), Total Suspended Particulates (T.S.P) and particulate matter (PM10).

Methodology, instrumentation and results of Ambient Air Quality are detailed in Annex-6 attached to this report

Results of ambient air quality measurements:

The concentrations of measured air pollutants in the studied areas are below national and WBG guidelines. All the measurements for the gaseous pollutants are complying with the maximum allowable limits according to law 4/1994 for Environment protection and its amendments by law No.9/2009 and the executive regulation issued in 1995 and its amendments no. 710 in 2012 and

618 in April 2017". Accordingly, the ambient air quality in the project areas is one of the tolerable areas in Egypt in terms of ambient air quality, which can be attributed to the absence of any major industrial sources.

Construction engines are certified, i.e., exhaust is below permissible levels. Ambient concentrations of gaseous pollutants, NO_x, SO_x and CO are unlikely to surpass permissible levels due to operation of construction equipment. Management and mitigation plans for ambient air pollution are further addressed in chapters 6 and 7. During the construction phase, excavation and construction activities will likely cause dust levels to surpass permissible levels at the construction areas. The duration of permissible levels being surpassed will be intermittent for the duration of the workday i.e., 8-10 hours. Management and mitigation plans for dust concentration beyond permissible levels are further addressed in chapter 7.

4.1.2 Noise

4.1.2.1 Site specific noise measurements

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

Methodology, instrumentation and results of Noise measurements detailed in [Annex-6](#)

Results of noise measurements

The noise measurements in the studied areas are below national and WBG guidelines. They are complying with the maximum allowable limits according to law 4/1994 for Environment protection and its amendments. The excavation and construction activities may cause noise levels to surpass permissible levels at the site. The duration of permissible levels being surpassed will be intermittent for the duration of the workday i.e., 8-10 hours. Management and mitigation plans for noise levels beyond permissible levels are further addressed in chapter 7.

4.1.3 Climate

The average annual temperature is 20.5 °C and the average annual rainfall is 34 mm

4.1.4 Water resources

Groundwater

There is no accurate data about the estimate volume of the groundwater water in Monofeya but it is constantly renewable by the Nile River and irrigation water. The groundwater aquifers are the Nile delta and Moghra aquifers which located in a very far depths from the soil surface.

Surface water:

Quweisna PRS is located about 7 km West Damietta branch of the Nile River which represents the main freshwater stream, the Nile River flow northwards from Quweisna for about 179 km until emptying into the Mediterranean Sea.

The surface water resources of Monofeya Governorate are limited to the Nile River Branches (Rosetta and Damietta) where it supplies about 1.6 billion cubic liters annually for agriculture, industrial and domestic uses. There are three main Canals within the governorate as following:

1. **Alrayah Al Monofy**; supplies about 1345.800 Million cubic liters annually.
2. **Alnagil**; supplies about 186.500 Million cubic liters annually.
3. **Dowrah**; supplies about 75.500 Million cubic liters annually.

4.1.5 Terrestrial Biological Environment:

The new Quweisna PRS will be inside the existing Quweisna boundaries. Therefore, there is no existing habitat and has no ecological importance, the project area is eventually free from any endangered species as shown in **Figures 4-4 and 4-5**.

Overview inside the proposed location for the new PRS

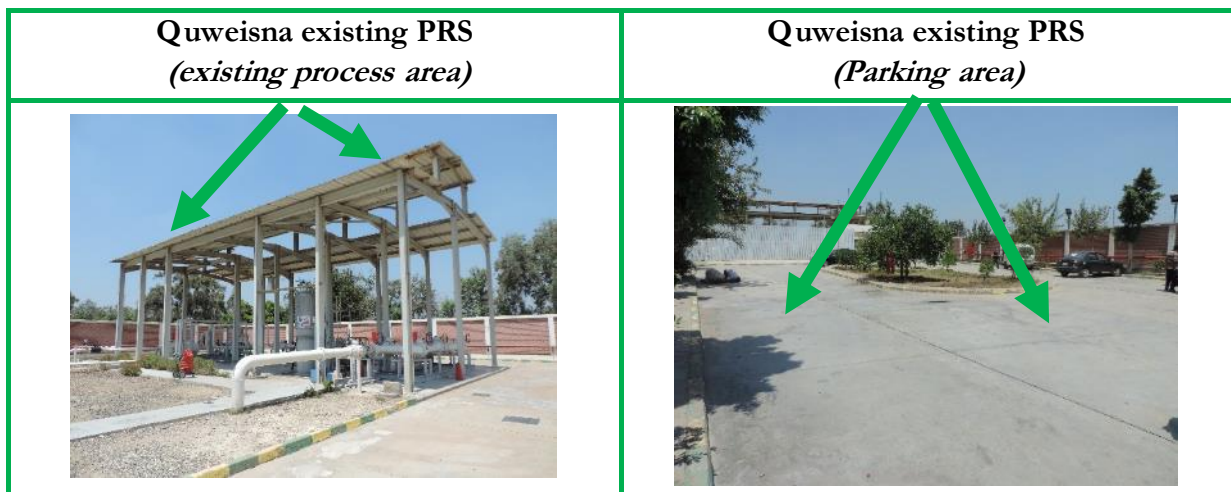


Figure 4-3: Shows Overview inside the proposed location for the new PRS.

Overview outside the proposed location for the new PRS



Figure 4-4: Shows Overview outside the proposed location for the new PRS

In conclusion, the project area is free from any flora or fauna of ecological importance and it is not going to intervene with any green cover. In addition, the activities will take place away from any protected areas or area of any ecological importance.

4.1.6 Waste Management:

Solid Waste:

The responsibility of service planning, delivery and monitoring in Monofeya Governorate is delegated to Cleansing and beatification Agency managed by Presidency of the City Council.

In most cases, the proportion of waste collected in a transfer station by small trucks then transferred to dump site (Quweisna dumpsite).



Figure 4-5: Shows Quweisna dumpsite.

Liquid Waste:

The project location within Quweisna district is well covered by public sanitation network which take all the municipal sewage to be treated in Quweisna sewage treatment plant.

People in the streets can use available public sanitary facilities which can be located within the existing mosques, restaurants or any public coffee shops.

Hazardous Waste:

There are no hazardous wastes site within Quweisna district, any hazardous Waste generated within Quweisna will be Temporarily stored in isolated area (in the generated site) and will be transported- by licensed hazardous waste handling vehicles and personnel for final disposal at a licensed hazardous waste facility (Nassreya or UNICO in Alexandria).

4.1.7 Traffic Profile

The traffic in Quweisna district is relatively of moderate density. The rush hours can be divided into two major periods. The first is between 7-10 a.m., and the second one is between 2-4 p.m.

There are many types of vehicles moving inside and outside Quweisna district including private cars, minibuses, motorcycle and tricycle (Tuk Tuk). Main streets were defined in this study. They were Jehan St., Al Gish St., Cairo – Alex Agricultural road. The traffic is relatively of high density in Cairo – Alex Agricultural road particularly, as of its main transportation nature and moderate in rest of main streets. The traffic around the PRS and along the HP pipeline route is moderate.

Types of roads close to the new PRS

Urban Road

The main road closest to the new PRS area Jehan road.



Figure 4-6: Shows Jehan road

4.2 Socioeconomic Baseline

The Social Impact Assessment (SIA) study is carried out through a combination of desktop and field survey in order to fully describe the social baseline of the Project area. The main methodology for the SIA is semi-quantitative assessment to convey accurate and relevant information for the project area. There has been substantial data gathering on socioeconomic conditions in the area. A number of visits to the project site were conducted during August 2018 and February 2019. SIA tools were employed during the field trip including observation and interviews with local officials, community leaders, local administrative units, LPG warehouse, local health units, and NGOs. Quweisna Markaz located in Monofeya governorate, with a total area of 205 km². The total population of Quweisna Markaz is 494,312 people, representing about 11.5% of the total population in Monofeya Governorate.

4.2.1 Administrative affiliation

Quweisna Markaz is administratively affiliated to Monofeya governorate. According to the Information Center of Quweisna, there are only one city (Quweisna city) and (40) villages falling under the jurisdiction of Quweisna Markaz.

4.2.2 Urbanization Trends

Quweisna Markaz occupies an area of 205 km². The urbanization rate in Quweisna is about 12%. Agriculture lands account for 83.5 % of the total land area of Quweisna Markaz. Based on the observations during the site visits, Quweisna City is considered an urban area. The new PRS will be installed inside the premises of the current existing PRS. The local streets in Quweisna city are mostly paved with asphalt in a moderate condition. Commercial activities available include small restaurants, local groceries, local cafes, small workshops. Buildings heights are 5-6 stories. According to field observation, building density can be considered high.

4.2.3 Demographic Characteristics

4.2.3.1 Total Population

According to the CAPMAS data for 2017, the total population of Quweisna Markaz is about 494,312, the majority of residents live in rural areas (88%), while only about 12% live in urban areas. The table below shows the total population of Quweisna Markaz.

Table 4-1: Population of Quweisna Markaz⁸

	Female	Male	Total population
Rural Areas	211,708	223,858	435,566
Urban Areas	28,964	29,782	58,746
Total	240,672	253,640	494,312
Percentage	48.7%	51.3%	

4.2.3.2 Rate of Natural Increase:

The birth rate at Quweisna Markaz is 31.6 per 1000 of population, the death rate is 6.2 per 1000 of population and the rate of natural increase is 25.4 per 1000 of population.

4.2.4 Living Condition

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 family size in Quweisna is 4.1 individuals.

4.2.4.1 Dwelling characteristics

Quweisna Markaz is considered as a rural area where around 88% of the total land area is agriculture land. The predominant majority of the people of Quweisna district live in modern houses (apartments). The houses in the project areas are usually built of red brick and white stone, they are joined to one another in a continuous row. Concrete is used more in the construction of ceilings of houses, particularly in new houses.

4.2.4.2 Access to the Basic Services

Access to basic services, electricity, water supply, and sanitation is one of the main pillars that determine the economic well-being of the community. According to the frequent site visits to the project area and the data collected, Quweisna city (where the project will be implement), found to have access to basic services, such as; electricity, potable water and sanitation, where nearly 93%

⁸ Source: CAPMAS 2017

of the households at Quweisna city are connected to the public sanitation network. Thus, it will be possible to connect NG to more households' clients compared to the LDC' plan.

4.2.5 Human development profile

Educational, human activities, poverty index, and income & expenditure should be highlighted in order to determine the current socioeconomic conditions of Quweisna Markaz.

4.2.5.1 Education

The population education level is very important to determine the suitable channels of communication to share the information with different stakeholders. According to the statistical data collected by the study team, the intermediate education is common among all Quweisna Markaz, where nearly 37% have finished their intermediate education level. While the percentage of individuals who having university degrees is about 13%. On the other hand, the illiteracy rate varies significantly between rural and urban areas and between males and females. The illiteracy rate in urban is only 11% comparing to about 22% in rural areas. The illiteracy rate for females is about 26% comparing to only 16% for males.

4.2.5.2 Human activities in the Project Areas

According to the data supported by the LGU, Quweisna city is considered as a main commercial and industrial area. It has many industries such as textiles and weaving, food and beverages, wood, papers industries. In addition to the agriculture activity which is the main economic activity in Quweisna Markaz, which absorbs a high percentage of the labor force.

4.2.5.3 Poverty, Income and Expenditure

According to the CAPMAS Poverty Mapping, 2013, the percentage of poor people in Monofeya governorate is relatively very low, only seven villages (affiliated to El Sadat District) are considered as poor villages. The percentage of poor people in those villages ranges between 53% - 63%. According to the Focus group discussions revealed that the average family expenditures range between 3000 to 3500 EGP per month. Most of the families are suffering of the high price of energy bills (both of electricity and LPG).

Male and female participants of the focus group discussions grumbled about the recent bulge in electricity bills which range between 200 to 250 EGP. More importantly, the cost of their consumption of LPG cylinders has increased after the latest jump of the LPG price last July, 2019. The current formal price of LPG is 65 EGP, and the average LPG consumption is (1-2) cylinder/month for each household.

4.2.6 Unemployment Rate

In Quweisna, the percentage of manpower that joined labor force at the age of 15 years old and above is 37%. The unemployment rate stands at about 11%. In the same respect, female employment figures show female unemployment rate at 22 %.

The formal Statistics obtained from the CAPMAS regarding manpower reflected that the age of starting work is 15 years old.⁹ Both the Child Law and the Labor Law state that children shall not be employed before they complete 14 years old, nor shall they be provided with training before they reach 12 years old; however children between 12 and 14 years old are permitted to work as trainees. Furthermore, the governor concerned in each governorate, in agreement with the Minister of Education may permit the employment of minors aged 12-14 years in seasonal work which is not harmful to their health and growth, and which does not conflict with regular school attendance. Consequently, there is always a risk 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, a big number of underage laborers were noticed. As a conclusion, there is a risk that the contractors might employ young people below 18 years old. In the meantime, due to the technicality of the work in NG project, LDCs always seeks for technical workers that are highly trained and experienced, so the risk of contracting children under 18 years is medium to minor. **Therefore, rigid restrictions to employ this category must be added to the contractor's obligations.**

4.2.7 Health Facilities

Quweisna has one public and central hospital; also, there are 32 medical and health units at the surrounding villages, in addition to 36 family and childcare medical units and many private clinics. The health facilities are very close to the project site, Quweisna public hospital is only 1.5 km from the project location. Providing health facilities is very important to save the workers during accidents and emergency cases. All contractors and sub-contractors are obliged (according to the signed agreements with LDC) to provide the necessary medical services to the workers. Also Egypt Gas in the emergency cases provides the worker with all the required medical services.

4.2.8 Physical Cultural Resources

The proposed new PRS will be located inside the existing PRS within Qweisna city which is characterized as urban area. These areas have been excavated before for agricultural purpose or installing other public utilities such as water, sanitary, sewage and electricity networks. For this reason, it is presumably less likely to chance find any artifacts or antiquities in the construction areas. Additionally, there are no identified archeological sites or sites with cultural or historical value, located within the project area, shall be affected by the new PRS construction works, only 100 m excavation work will take place to install the new HP pipeline and installing the new PRS. However in case of any unanticipated archeological discoveries within the project areas; [Annex-7](#),

⁹ Based on Labor law number 12 of year 2003 and The Child Law (No. 12, 1996). There are certain critical obligations to recruit children below 15 years old. Article 98-103 of Labor law put limitations related to age, type of occupation, hazards work...etc

entitled 'Chance Find Procedure,' details the set of measures and procedures to be followed in such cases.

5. Environmental and Social Impacts

The environmental and social impact assessment (ESIA) is a process used to identify and evaluate the significance of potential impacts on various environmental and social receptors as a result of planned activities during (construction and operation) phases of the Project. Furthermore, the analysis of environmental and social impacts is important to detail an effective management and monitoring plan, which will minimize negative impacts and maximize positives. The evaluation of the potential impacts on various receptors is based on a significance ranking process described in the following subsection. Details presented in [Annex-8](#), attached to this report

5.1 Impact Assessment Methodology

To determine and assess the impacts of the project phases on environmental and social receptors, a semi-quantitative approach based on Leopold was first adopted. The impact of each activity on each receptor was assessed according to magnitude on a scale of -10 to 10, where negative values indicate a negative influence on the receptor, and importance on a scale of 0 to 10, which encompasses the probability of occurrence, frequency of the impact etc. 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 and addressed if both magnitude and importance are of minor severity. The impact assessment methodology adopted for this ESIA is a “cause-effect” matrix modified from Leopold; and Buroz’s Relevant Integrated Criteria to evaluate the impacts. The environmental impact assessment methodology encompasses a semi-quantitative assessment that considers the following:

- Probability of the impacts
- Spatial and temporal scale
- Intensity of the impacts (which also considers the sensitivity of receptors, and the reversibility nature of the impact)

Each impact was identified considering:

- Type of impact: The negative or positive influence on the receptor.
- Magnitude: The extent of the impact within a scale (0-10)
- Significance: That includes the probability of occurrence, frequency, intensity of the impact, etc., within a scale (0-10)

The “cause-effect” matrix identifies the impacts during the mentioned phases, considering the elements of the environment and social context (receptor of the impact).

Table 5-1 Impact Assessment Methodology

Importance of Impact	Impact Rating	Color Code
0-25	None or irrelevant (no impact);	
26-50	Minor severity (minimal impact; restricted to the work site and immediate surroundings);	Yellow
51-75	Medium severity (larger scale impacts: local or regional; appropriate mitigation measures readily available);	Orange
76-300	Major severity (Severe/long-term local/regional/global impacts; for negative impacts mitigation significant).	Red

Detailed impact assessments results presented in two tables in Annex-8.

5.2 Impacts during Construction

5.2.1 Positive impacts

5.2.1.1 Impacts related to employment

The project will result in positive impacts through the provision of job opportunities.

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

The construction of the Quweisna new PRS (upgrade) and its new related HP pipeline expected to result in the creation of job opportunities, both directly and indirectly. Based on similar projects implemented recently by EGAS and Egypt Gas, the daily average number of workers during the peak time will be about 16 workers, being 14 Laborers and 2 supervisors. The workers can also include drivers, digging staff, technicians and welders. About half of them can be recruited from the local community.

- **Indirect benefits**

As part of the construction stage, many indirect benefits 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 Monofeya districts to Quweisna will work for the benefit of car lease offices.

5.2.2 Negative Impacts

The process of environmental impact assessment during construction phase indicate that some receptors have irrelevant impacts in Quweisna; those receptors include surface water, Ecological (fauna or flora), vulnerable structures and cultural vulnerable sites. The receptors which might be affected during the construction phase will be as follows:



5.2.2.1 Deterioration of soil quality

The excavation activities will result in the disturbance of soil characteristics and cause soil erosion and soil compaction as a result of heavy equipment take place. In addition, potential soil contamination may occur as a result of oil spills and leaks.

The new Quweisna PRS will be inside the existing Quweisna boundaries and its related HP pipeline will be extended along with the main roads in a relatively short distance (100 m).

The duration of the impact is expected to be short-term, with its spatial extent being limited to the boundaries of the Project site.

The impact on soil considered **Medium**.

5.2.2.2 Air Emissions

Construction of the new PRS and its new related HP pipeline will include several activities such as excavation, concrete foundations, transportation of construction material and equipment, burial of cables and pipes, etc. Those activities in consequence are expected to emit air pollutants to the ambient air, however it will be conducted for short periods of time. The following air pollutants are foreseeable for most of the construction activities:

- Fugitive dust emissions (PM10, PM2.5)
- Exhaust from excavation equipment and heavy machinery (excavators, loaders, trucks) containing SO_x, NO_x, CO, VOCs, etc.

Dust emissions will slightly negatively impact ambient air quality, particularly during the initial phases of construction. The nearest residential area is about 510 m North west of the new PRS site and no residential building was noticed on the HP pipeline route. Therefore, it is expected that the dust impact will be moderate slightly impact the surrounding area (agriculture land). Soil at new PRS site is covered by a concrete layer. In addition, Jehan road already paved.

Emissions of CO₂, CO and PM will result from the operation of the construction machinery and road vehicles during construction of the new PRS and its new related HP pipeline. Air pollutants emitted from construction machinery are generally temporary (during the working activities). The intensity of work activities and the number of vehicles traveling onsite would be relatively low for all tasks. The emissions will be mostly limited to the construction phase and therefore are temporary.

Therefore the impact is assessed as **Minor**

5.2.2.3 Noise

Construction of the new PRS and its new related HP pipeline will require using various construction equipment, vehicle, etc. in addition to the other activities that generate noise. These tools signify potential major sources of noise emissions that will have an impact on receptors.

The potential people groups who are susceptible to the construction noise during the construction of the Quweisna new PRS (upgrade) and its new related HP pipeline are the following:

- Onsite workers and neighbor farmers
- The residences

It is worth mentioning that the proposed new PRS site and its new related HP pipeline located on Jehan road (about 510 m from the nearest residential area within Quweisna City), where the noise baseline is relatively high but does not exceed the national and international standards. Construction activities may increase the already existing baseline ambient noise. However, increased noise emissions are anticipated to be for a short duration of time.

The main sources of noise and vibration during the new PRS and its new related HP pipeline construction are the operation of the construction equipment and machinery such as diggers, cranes, loaders; farmers in the nearby agriculture land and worker are the main receptor.

Regarding the Construction of the new PRS and its new related HP pipeline it is expected that the generated noise will mainly have an impact on workers and Neighbor farmers.

The impact of construction on workers and neighbor farmers is assessed as **Medium**

The impact of construction on the residences is assessed as **Minor**

5.2.2.4 Impact on worker health and safety

Potential health and safety impacts are expected to workers during construction of the Quweisna PRS and its HP pipeline, in general, are the same as those associated with any construction project involving earthmoving, use of large equipment, transportation of overweight and oversized materials, working in trenches, and construction and installation of facilities.

The occupational health and safety impacts is assessed as **Medium**

5.2.2.5 Impacts due to COVID-19 pandemic

Coronavirus Disease 2019 (COVID-19) is a respiratory disease caused by the SARS-CoV-2 virus. It has spread from China to many other countries around the world. Depending on the severity of COVID-19's international impacts, outbreak conditions—including those rising to the level of a pandemic—can affect all aspects of daily life, including travel, trade, tourism, food supplies, industrial and financial markets.

During construction of the Quweisna PRS, movement of staff inside and outside the project borders can increase the risk of transmission of COVID-19 to the workers and community.

Infection with COVID-19, can cause illness ranging from mild to severe and, in some cases, can be fatal. Symptoms typically include fever, cough, and shortness of breath. Some people infected with the virus have reported experiencing other non-respiratory symptoms. Other people, referred

to as asymptomatic cases, have experienced no symptoms at all. Symptoms of COVID-19 may appear in as few as 2 days or as long as 14 days after exposure.

The occupational health and safety impacts is assessed as **Medium**

5.2.2.6 Temporary Labor Influx

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). It may also result in inconvenience to the local communities, particularly in the areas where communities are conservative or not accustomed to having outsiders. Given the fact that only limited number of workers exist in each of the location during working hours, portion of those workers are local workers and that the LDCs are imposing rules and code of conduct on the contractors to ensure good behaviors and limit any potential conflict with the communities.

The impacts related to Labor Influx will be **Medium**.

5.2.2.7 Child Labor

As mentioned in the baseline, child Labor is a common practice in the project communities in the project areas. Children below 18 works almost in all projects as they receive low salaries and they are less demanding. Due to the technicality of the work in NG project, LDCs always seeks for technical workers that are highly trained and experienced, so the risk of contracting children under 18 years is medium to minor. This risk should be carefully handled in the ESMP.

Child Labor risk is assessed as **Medium -Minor**

5.2.2.8 Inappropriate waste management

Normal construction non-hazardous solid wastes include scrap concrete, steel, bricks, packaging waste, used drums, wood, scrap metal, welding belt, building rubble and HP pipeline hydrostatic test water will be generated. Domestic wastes by construction Labors, including sewage and garbage collected from the Labors onsite will be also generated. if those wastes not disposed to adequate sites, it will lead to a negative environmental impact.

Solid hazardous waste generated is likely to include empty containers, spent welding materials, solvents, paints or adhesives, and other hazardous waste resulting from operation and maintenance of the equipment and vehicles, i.e. spent oils, spent lube, waste oil filters, batteries, etc. Among the hazardous wastes also are the wasted or faulted materials.

Adverse impacts on the environment from the possible improper disposal of the solid wastes and hazardous waste.

Therefore, impact is assessed **Medium**

5.2.2.9 Traffic impact

The greatest potential for traffic impacts to occur arises during the short period where construction works peak (transportation of raw materials, equipment including heavy equipment and foundation materials). The traffic flow that will be created during the construction period will to some extent depend on which type and number of trips to and from the proposed site. Additional activities, such as entering and exiting the site or open cut excavation (which will only take few hours causing re-routing or reducing the number of Jehan road lanes) will not have significant impacts on the road (Jehan road) which has a medium traffic.

Based on observation during the site visits, it is predicted that during transportation of the equipment and raw materials, only one lane will be used by the trailers and the movement of one trip will not last more than 8 hours (during the midnight – morning).

Therefore, impact on traffic in the project site is assessed **Minor**

5.2.2.10 Impact on ground water

Ground water may be impacted in case of improper disposal of sanitary wastewater, construction wastes or debris (generated from activities like ditching, and excavation). Generated sanitary wastewater, as well as water resulting from the HP pipeline hydrostatic test (if not meet with the limits to be discharged into a drain or sewer manhole) or dewatering activities (if existing) during excavation, will be collected in tanks, analyzed and transported via a certified contractor to the nearest wastewater treatment station.

Therefore, the impact is assessed **Minor**

5.2.2.11 Community health and safety

Impacts on community health and safety can result from emissions of gaseous pollutants, dust, increased background noise levels, uncontrolled dumping of construction waste, accidental falls in temporary excavated trenches and accidental contact with equipment etc.

Taking into consideration that the new PRS (upgrade) planned to be located inside the boundaries of the existing Quweisna PRS and about 510 meters of the nearest residential area (Quweisna city) and no residential building was noticed on the HP pipeline route which is planned to be along existing roads in the project area, we will find that the above-mentioned impacts will be greatly minimized.

Therefore, the impact is assessed **Minor**

5.2.2.12 Land related impact

The new PRS (upgrade) will be installed inside the boundaries of the existing PRS. No new land acquisition will be required, as it will be constructed at the same location of the current existing PRS. The current existing land was purchased on 10/5/1998 ([Annex-2](#) land document), according to the Willing buyer Willing seller approach applied by EGAS and Egypt Gas (For further elaboration on EGAS procedures for land acquisition see [Annex-3](#)).

HP pipeline with a total length of 100 meter will pass through the main road (state owned lands). No tenants, encroachers, or other with customary claims or other of land use.

The excavation work will continue only for a very short time (a coordination with the traffic authority will take place before any construction work), where a traffic permit will be issued and an alternative route will be specified if needed. Therefore, no private lands will be needed for access to the new HP pipeline or for the new PRS construction.

Therefore, the impact is assessed **Minor**

5.3 Impacts during Operation

5.3.1 Positive impacts

5.3.1.1 Impacts related to employment

The project may not create extra job opportunities during the operation phase but it will help in keeping the existing jobs, as the average number of existing workers in the existing PRS is about 12 workers in two shifts (6 workers/ shift) from the permanent workers of the LDC; 4 technicians, 2 engineers and 6 security staff.

5.3.2 Negative impacts

Various impacts assessed in accordance to the impact assessment methodology. The project relevant impacts will be as follows:

5.3.2.1 Impact on worker health and safety

Possible impacts to health and safety during operations include exposures to odorant release, gas leak, fire, noise, accidental injury to workers. In addition; health and safety issues, working around energized equipment, and possible contact with natural hazards. However, during the operation and maintenance phase, if there is any incident or emergency situation after applying all the control measures and safety precautions in the EGAS updated HSE guidelines ([Annex-5](#)), the impact will negatively endanger the surrounding community and establishment.

Odorant handling is part of the operation of the PRS and is addressed in the Quantitative Risk Assessment "QRA" ([Annex-4](#)) as a separate study. An odorant is added to the NG in order to enable detection upon leakage. The odorant containing Tertiobutylmercaptin (80%) and Methylsulphide (20%) is classified as a hazardous substance.

Odorant leak can result from improper handling of the odorant includes: Storage in unsafe conditions, in terms of occupational health and safety. In case of emergency, the risk resulting from odorant release or gas leak will be managed by Quweisna new PRS (updated)'s emergency response plan.

Therefore the impact is assessed as **Medium**

5.3.2.2 Impacts due to COVID-19 pandemic

During the operation of the Quweisna PRS, Movement of staff inside and outside the project borders may increase the risk of transmission of COVID-19 to the workers and Community health. Given the fact that the average number of workers during operation of the Quweisna PRS will be about 6 workers/ shift from the permanent workers (well trained and took awareness for COVID-19 precautions) of the LDC.

The Infection with COVID-19 between workers or from workers to the community is relatively minor but still more precaution can be applied.

Therefore, the impact is assessed as **Minor**

5.3.2.3 Hazardous and non- hazardous waste management

During operation and maintenance of the new PRS, hazardous (odorant containers), non-hazardous waste and small quantities of domestic waste (solid and liquid waste) will be generated. Hazardous waste is likely to be generated during routine operations (e.g., lubricating oils, odorant containers, chemical containers). These wastes are typically stored temporarily, and transported by a licensed contractor to an appropriate permitted off-site disposal facility as a standard practice, according to EEAA regulations for hazardous waste management.

Therefore the impact is assessed as **Medium**

5.3.2.4 Noise impact

The pressure reducers normally cause noise generated from the reducers' pipes. Maximum noise level expected from the reducers is 80 db. The generated noise is constant (not intermittent). Assuming ambient noise levels are complying with WB/IFC requirements and Law 4/1994-9/2009- 105/2015 standards for low noise residential areas, a 20-meter buffer distance kept between the reducers and the PRS fences should lead to minimal impact outside the PRS borders. Additionally, the PRS is located 20 m far from the main road.

Therefore, the impact is assessed as **Minor**

5.4 Impacts during Accidental Events (Operation Phase)

Regarding to the Quantitative Risk Assessment Study (QRA), which demonstrate on the following hazards:

- Gas Release
- Fires (Heat Radiation)
- Explosion (Overpressure Waves)
- Suffocation (Odorant Leak)

And referring to the risk calculations determined in Quweisna QRA study, the individual risk level to the exposed workers / public based on the risk tolerability criterion have been identified in ALARP / Acceptable regions (Below the Upper Tolerability Limit⁽⁷⁾ / Lower Tolerability Limit⁽¹⁰⁾) region respectively. So there are some points (Study Recommendations) need to be considered to keep the risk tolerability, and this will be describe under item (7.4) (for more details refer to the QRA Study under [Annex-4](#))

⁷ ***Below the Upper Tolerability Limit***

The risk is only tolerable if it is ALARP. This means that all practicable risk reduction measures must be identified and those that are reasonably practicable implemented. The term reasonably practicable indicates a narrower range than all physically possible risk reduction measures. If the cost of a risk reduction measure, whether in terms of money, time or trouble, can be demonstrated to be grossly disproportionate to the risk reduction gained from the measure, taking account of the likelihood and degree of harm presented by the hazard, then implementation of the measure may not be required.

¹⁰ ***Lower Tolerability Limit***

Which the risks are broadly tolerable to society and comparable to everyday risks faced by the public. If the overall risk is below the Lower Tolerability Limit, the ALARP Assessment is likely to be straightforward and limited to ensuring compliance with Good Practice. Below the Lower Tolerability Limit, the principal risk management concern is the maintenance of existing risk reduction measures to avoid degradation.

Table 5-2 Impact Assessment

 Detailed impact assessments results are presented in two tables in [Annex-8](#).

Impact	Description	Type	Significance
During Construction			
Deterioration of soil quality	The new related HP pipeline construction will lead to degradation of soil quality, Excavation and movement of heavy machinery on unpaved surface soils during site preparation and foundation-laying could cause a physical breakdown of soil particles potentially causing destabilization of the soil structure.	Negative	Medium
Air emissions	WBG requirements and Law 4/1994 (modified by laws 9/2009 & 105/2015) stipulates strict air quality standards. Air emissions (gases and particulates) during construction (from transportation and machine operation) shall arise from: <ul style="list-style-type: none"> - Particulate matter and suspended solids from excavation/backfilling operations - Possible dispersion from stockpiles of waste or sand used for filling excavations. - Exhaust from excavation equipment and heavy machinery (excavators, trenchers, loaders, trucks) containing SO_x, NO_x, CO, VOCs, etc. - Traffic congestions resulting from road closure or slowing down of traffic due to excavation works. <u>Dust</u> The impact of dust generation (particulate matter) will be limited to the working hours as excavation and other construction activities. Which lead to temporary reduction of air quality, however is unlikely to cause major air emissions impacts as the nearest receptors are around 510 m from the new PRS construction site and no residential buildings was noticed on the HP pipeline route.	Negative	Minor
	<u>Gaseous pollutants emissions</u> 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 WBG permissible levels.	Negative	Minor

Impact	Description	Type	Significance
Noise	<u>Noise impact on worker</u> Noise impacts on construction workers, technicians and engineers in direct vicinity of the excavation works and heavy machinery are considered more significant than those on residents.	Negative	Medium
	<u>Noise impact on nearby farmers</u> Noise impacts on farmers in nearby agriculture land will be affected by the increased noise levels during the construction phase.	Negative	Medium
	No major noise impacts on the nearest receptors expected during construction of the new PRS and its new related HP pipeline as they are about 510 m away and the construction period is limited.	Negative	Minor
Risks on Occupational health and safety	Inhalation of air pollutants, high noise levels, injuries and potential death as a result of operating heavy equipment, and handling hazardous materials.	Negative	Medium
Impacts due to Covid-19 pandemic	During construction of the Quweisna PRS, Movement of staff inside and outside the project borders can increase the risk of transmission of COVID-19 to the workers and Community health.	Negative	Medium
Impacts related to Labor Influx	If not properly managed, there is a risk that labor inappropriate behaviors or misconduct might pose negative impacts on the community groups, particularly on women, children and other vulnerable groups (including inconvenience and impacts on the work site).	Negative	Medium

Impact	Description	Type	Significance
Child Labor	As mentioned in the baseline, child Labor is a common practice in the project communities in the project areas. Children below 18 works almost in all projects as they receive low salaries and they are less demanding. Due to the technicality of the work in NG project, LDCs always seeks for technical workers that are highly trained and experienced, so the risk of contracting children under 18 years is medium to minor. This risk should be carefully handled in the ESMP.	Negative	Medium - Minor
Waste generation	Inappropriate waste disposal and improper management of construction waste materials which could lead to spillages that will cause soil contamination. 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. Hazardous and non-hazardous materials available onsite during construction activities are likely to include fuel, engine oil, paints, Poor handling of those materials and their inappropriate storage may result in poor containment of induced leaks.	Negative	Medium
Reduction of Traffic Flow	The traffic flow that will be created during the construction period will to some extent depend on which type and number of trips to and from the proposed site. Additional activities, such as entering and exiting the site or open cut excavation (which will only take few hours causing re-routing or reducing the number of Jehan road lanes) will not have significant impacts on the road (Jehan road) which has a medium traffic.	Negative	Minor
Ground water pollution	Ground water that might exist in area may be affected by inappropriate liquid and hazardous waste during construction.	Negative	Minor

Impact	Description	Type	Significance
Risk on Community health and safety	Negligent workers may cause accidents harmful to the community members, particularly children and old people, especially close to the digging site. Impacts associated with Community Health and Safety are limited to the inside the fence of the PRS and no residential buildings was noticed on the HP pipeline route. Therefore, there are minor impacts related to community health and safety during construction.	Negative	Minor
Impacts related to lands	The proposed new PRS will not require a new land, since it will be constructed at the same current location of the existing PRS. The current location was purchased on 10/5/1998 (Annex-2 land document), according to the Willing buyer Willing seller approach applied by EGAS and Egypt Gas Additionally the HP pipeline 25-70 Bar with a length of 100 m will pass through the main road (a state-owned land) with no encroachment.	Negative	Minor
Operation			
Risks on Occupational health and safety	<p>At PRS site, inhalation of air pollutants (odorant or natural gas leak), exposure to noise levels, injuries and potential death as a result of operating equipment with high pressure tools and equipment and handling hazardous materials.</p> <p>In case of emergency / accidents, resultant risks are studied in details in the attached Quantitative Risk Assessment, that show that the required mitigation measures are already in place and no further measures are needed.</p> <p>In cases, where further mitigation measures are required, action plans are set for implementation and follow up by the concerned departments</p>	Negative	Medium
Impacts due to Covid-19 pandemic	<p>During the operation of the Quweisna PRS, Movement of staff inside and outside the project borders may increase the risk of transmission of COVID-19 to the workers and Community health.</p> <p>Given the fact that the average number of workers during operation of the Quweisna PRS will be about 6 workers/ shift from the permanent workers (well trained) of the LDC and maintain social distancing.</p>	Negative	Minor

Impact	Description	Type	Significance
Hazardous material and waste	<p><u>Hazardous material</u></p> <p>Odorant handling will be according to Odorant Material Safety Data Sheet (MSDS) and Egypt Gas procedures. Odorant leak can result from improper handling of the odorant and storage in unsafe conditions, in terms of occupational health and safety. According to Quweisna QRA study, modeling the vapor release will be limited inside the PRMS boundary reaching control room crosswind, and Egypt Gas Quweisna new PRS (upgrade) ERP will cover this point.</p> <p><u>Hazardous waste</u></p> <p>During operation and maintenance of the new PRS, industrial hazardous wastes will be generated (e.g., lubricating oils, odorant containers, chemical containers). Poor waste management practices may have a significant impact on environment (soil, ground water, visual, and health and safety).</p>	Negative	Medium
Noise	The pressure reducers normally cause noise. Maximum noise level expected from the reducers is 80 db/shift (12 hours per shift). the generated noise is constant (not intermittent).	Negative	Minor

6. Analysis of Alternatives

6.1 No Project Alternative

The main target of the proposed project is to supply natural gas to households in Quweisna District and other surrounding areas in the future. This Natural Gas Connections to Households Project expected to yield many economic and social benefits in terms of providing a more stable, energy source, achieve savings in LPG consumption and enhancing 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.

6.2 Technology Alternatives

6.2.1 Outlet Pressure

The PRS will reduce the Natural Gas pressure from 25-70 Bar in the HP pipeline to 7 Bar to be suitable for distribution or use in domestic or industrial applications.

Quweisna new PRS (upgrade) will produce 7 Bar outlet pressure for the local distribution network (intermediate pressure). The LDC choose to produce 7 Bars instead of 4 Bar due to high consumption rate expected in Quweisna city. It is designed to accommodate future extensions in order to feed other cities and/or villages surrounding Quweisna district.

6.2.2 Odorant Handling

Environmental and safety control considerations and measures are integrated into the selected technology design. For example, in order to reduce emissions from the odorant unit, the odorant will be automatically added or by using a plunger pump. Automatic and sophisticated unit management systems ensure safe and easy operation and can encompass complete remote operation of the units.

6.3 Location Alternative

As mentioned in item 2.4 (Project Execution Methodology) and item 5.2.2.12 (land related impact), the main criteria for PRS siting are:

- Proximity to High-pressure gas main lines to minimize Off-take length
- Availability of space with adequate dimensions and affordability of the land for PRS construction and possible expansion
- Presence of standard buffer zones between PRS and nearest buildings or receptors
- The new PRS will be installed inside the same location of the current existing PRS with no need for new land. The existing land location was purchased on 10/5/1998 (Annex-2 land document), according to the Willing buyer Willing seller approach applied by EGAS and Egypt Gas. With regard to the HP pipeline, it will pass through the main road owned by the state. Consequently, no land related impact will be in place for the new PRS and its new related HP pipeline.

7. Environmental and Social Management & Monitoring Plan

7.1 ESMMP Objectives

The Environmental and Social Management and Monitoring Plan (ESMMP) consists of a set of mitigation, management and monitoring measures to be taken during implementation of the project to avoid, reduce, mitigate, or compensate or offset any adverse social and environmental impacts analyzed in the previous chapter. The ESMMP distinguishes between mitigation measures and monitoring that should be implemented during the construction and operation of the project. The ESMMP identifies certain roles and responsibilities for different stakeholders for implementing, supervising and monitoring the environmental and social performance of the project as well as some of their estimate costs during its life cycle. Roles and responsibilities for implementing the ESMMP during the construction and operation phases have been proposed. During construction EGAS/LDC will assign supervision staff who will undertake supervision over the contractor to make sure that the mitigation measures specified in the design/tender document are implemented on field. Additionally EGAS will mobilize a supervision-consulting firm to strengthen EGAS supervision capacity to make sure that all mitigation measures are applicable. During the operation phase, the PRS shall have at least one permanent staff member for health, environment and safety.

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. [Annex-5](#) attached to this report

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

7.2 Environmental and Social Management Measures

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

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Physical receptor	Impact on soil	<ul style="list-style-type: none"> - Decrease erosion by minimizing disturbances and scarification of the surface - Best practices for soil management should be followed - Good housekeeping to minimize spills/leaks - Proper handling and management of wastes 	Minor	Contractor	LDC –HSE department	Field supervision (audits)	<ul style="list-style-type: none"> - Contractor costs - LDC management costs
	Air emission	<ul style="list-style-type: none"> - Monitoring of wind speed and direction to manage dust-generating activities during undesirable conditions. - Management of number of vehicles and equipment in the site. - Appropriate maintenance, engine tuning and servicing of construction equipment to minimize exhaust emissions - Minimize unnecessary journeys or equipment use - Adopt a policy of switching off machinery and equipment when not in use (idle mode). - Minimizing drop heights for material transfer activities such as unloading of friable materials. - Transportation of construction waste by a licensed contractor. - Sheeting of Lorries transporting friable construction materials. - Appropriate sitting and covering of stockpiles of friable materials with adequate cover in addition to regular water spraying so as to minimize dust blow. 	Negligible	Contractor	LDC –HSE department	Contractual causes + Field supervision (audits)	<ul style="list-style-type: none"> - Contractor costs - LDC management costs

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
	Noise	<p>Worker and nearby farmers</p> <ul style="list-style-type: none"> - Application of the normal precautions normally taken by construction workers. <p>Residence</p> <ul style="list-style-type: none"> - Notification to the surrounding establishment prior to the construction phase. - Time management and construction schedule according to the WBG regulation provided by the contractor prior to the construction phase 	Minor - Negligible	<ul style="list-style-type: none"> - LDC - Excavation Contractor 	LDC-HSE department	Contractual clauses + Field supervision (audits) Field supervision Complaints receipt from local administration	<ul style="list-style-type: none"> - Contractor costs - LDC management costs

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Physical receptor	waste generation	<ul style="list-style-type: none"> - Temporary storage in areas with impervious floor - Safe handling using PPE and safety precautions - Empty cans of oil-based paint resulting from painting the steel connection pipes of the PRS project are to be collected and sent back to nearest LDC depots (Abo Rawash) for temporary storage until disposal at a hazardous waste facility (Nassreya or UNICO in Alexandria). - If hazardous waste quantities generated are too small for isolated transport to the Nassreya landfill, a temporary storage site can be created. Coordination with waste authority will be imperative to secure a location and implement adequate procedures for storage depending on quantities and type of wastes until collection and shipping to Nassreya landfill. - Hand-over selected oils and lubricants and their containers to Petrotrade Co. for recycling <p><u>Table 7-2 present more details about waste management</u></p>	Minor	LDC Excavation Contractor	LDC HSE department	Field supervision and review of certified waste handling, transportation, and disposal chain of custody	<ul style="list-style-type: none"> - Indicative cost items included in contractor bid: - Chemical analysis of hazardous waste - Trucks from licensed handler - Pre-treatment (if needed) - Disposal cost at Nassreya - Approximate cost of the above (to be revised upon project execution): 8000 EGP - 10000 EGP per ton

Social receptor (health and safety)	Occupational health and safety	<ul style="list-style-type: none"> - 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. - Standard protection by placing clear project signs. - Time management for vehicles movement; especially avoiding the peak hours - Standard protection for the workers especially working at elevated heights or trench. - Regular inspection to compelling worker to used their PPE - Training and licensing industrial vehicle operators of specialized vehicles. - The contractor also should keep attendance worksheet and Laborers ID in order to verify the age of workers - Health insurance should be applicable to the contractor workers and workers contracted by a sub-contractor - Full compliance to EGAS and LDC HSE requirements, manuals, and actions as per detailed manuals adopted by EGAS - The safety work Permits in general will be issued before each activity on site by the LDC safety team according to the EGAS updated HSE guidelines (Annex-5) - Ensure the provision of the appropriate personal protective Equipment and other equipment needed to ensure compliance to HSE manuals <ul style="list-style-type: none"> - The new contracts with contactors/subcontractors will include an annex with mitigation measures to address labor management issues through having in place labor management procedures. The annex will include all the social requirements in the worker ' contract such as: <ul style="list-style-type: none"> - The right of workers to report their thoughts. - The right of the worker to know all the terms and conditions of his contract. (Salary, business hours, insurance, etc.. - Ensuring that there are adequate facilities for workers (cafeteria, health care facilities, toilet) - Worker GRM, that allows the worker to submit his complaint. 	Minor	LDC Excavation Contractor	LDC HSE Department	Field supervision inspection and review of HSE report+ Field supervision (audits)	<ul style="list-style-type: none"> - Contractor costs - LDC management costs
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Impacts due to COVID-19 pandemic	<p>Assessing Workforce Characteristics</p> <ul style="list-style-type: none"> - Minimize contact and keep a distance not less than 1 meter with community people <p>Entry/Exit to the Work Site and Checks on Commencement of Work</p> <ul style="list-style-type: none"> - Confirm that workers are fit for work - Check and record temperatures of workers - Update daily personnel count log (in/out) in each area/working site - Provide briefings to workers prior to commencing work, focusing on COVID-19 specific considerations, and reminding workers to self-monitor for possible symptoms and to report to their supervisor or the COVID-19 focal point if they have symptoms or are feeling unwell - Prevent a worker from an affected area or who has been in contact with an infected person from returning to the site for 14 days or isolating such worker for 14 days. - Prevent sick workers from entering the site, referring them to local health <p>General Hygiene</p> <ul style="list-style-type: none"> - Train workers and staff on site on the signs and symptoms of COVID-19, how it is spread, how to protect themselves (including regular hand washing and social distancing) and what to do if they or other people have symptoms - Place informative, illustrative posters and signs around the site, - Ensure hand washing facilities supplied with soap, disposable paper towels and closed waste bins exist at key places throughout the site, if such facilities aren't available then Alcohol based sanitizers should be supplied <p>Cleaning and Waste Disposal</p> <ul style="list-style-type: none"> - Provide adequate cleaning equipment, materials, and appropriate PPE (face masks, gloves,...) as necessary 	Minor	- LDC	- LDC Patrolling committee EGAS HSE department	Field supervision and review of HSE report+ Field supervision (audits)	- Contractor costs - LDC management costs

- Train on appropriate cleaning procedures and appropriate frequency in high use or high-risk areas
- Train on proper hygiene, how to use PPE and waste control
- Adjusting Work Practices**
- Adapting work processes to enable social distancing and training workers on these processes
- Continuing with usual safety trainings include use of PPE, adding COVID-19 specific considerations
- Review overall work schedule and assess whether adjustments are needed, considering Government advice and instructions
- Project Medical Services**
- Local Medical and Other Services**
- Any suspected case should leave site immediately and referred to the nearest hospital / local medical facility for medical examination
- any suspected cases should self-quarantine for 14 days
- Instances or Spread of the Virus**
- If a worker has symptoms of COVID-19, the worker should be removed immediately from work activities
- The worker should be referred to the local health facilities to be tested.
- Implement sanitization practices in affected sites
- Inform fellow workers of possible exposure to the virus if a worker is confirmed to have Covid-19 infection but maintain confidentiality
- Training and Communication with Workers**
- Workers are made aware of the procedures that have been put in place by the project, and their own responsibilities in implementing them
- Training are conducted regularly, providing workers with a clear understanding of how they are expected to behave and carry out their work duties
- **in addition to EMOP and WBG Guidelines related to COVID-19 infection (Annex-9).**

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
	Child Labor	<ul style="list-style-type: none"> - The project will hire a qualified contractor/sub-contractor with the high health and safety standards. In addition, the ToR for the contractor and the ESIA will provide the provision of the health, safety and precaution of the environmental impacts and its mitigation measures to be followed during construction. - Rigid obligations and penalties will be added to the contractor ToR in order to warrantee no child Labor is occurred in the project - The ToR also will oblige the contractor to keep a copy of IDs of Laborers in order to monitor the hired staff below 18 years old <p>The contractor also will be obliged to maintain daily attendance sheets in order to verify the attendance of workers to ensure first, that workers below 18 years old are not induded on site, second, in case of accidents the injured persons will be provided with proper health requirements according to the health insurance supported by contractor/subcontractor.</p>	Minor	<ul style="list-style-type: none"> - LDC - Excavation Contractor/s subcontractor 	<ul style="list-style-type: none"> - LDC– HSE departme nt 	<ul style="list-style-type: none"> - Field supervision and review of HSE report+ Field supervision (audits) 	<ul style="list-style-type: none"> - Contractor costs - LDC management costs

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
	Disturbance to Community due to Labor Influx	<p>In order to minimize impacts pertaining to labor influx the following should be thoroughly implemented:</p> <ul style="list-style-type: none"> - Preparation of appropriate code of conduct that stipulates the different commitment of labor towards community groups and the different behavior that should be avoided (please see Annex-10 of this report). - All workers should be trained on the Code of Conduct. - Code of conduct to be signed by sub-contractor. - Code of conduct induction to be done every 2 weeks for the recurrent workers and the new comers before starting work. - ESIA will provide the provision of the health, safety and precaution of the environmental impacts and its mitigation measures to be followed during operation, in addition to EMOP and WBG Guidelines related to COVID-19 infection (Annex-9). - According to availability, try to rent all apartments in the same building. - Apply the full requirements related to operating the grievance mechanism including anonymous channels - Raising awareness of the local populations about the project commitment towards communities' and the measures taken for that through public consultation and focus group discussions - Apply Penalties to workers violating the code of conduct. 	Minor	Contractors and subcontractors	LDC HSE for guidance supervision	-Field supervision by LDC and EGAS. Received grievances	- Contractor costs - LDC management costs

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Community	Traffic	<ul style="list-style-type: none"> - Time management for transporting the materials, equipment, debris, etc - Clear sign surrounding construction site and the exit gate. - Coordination with traffic department (ministry of interior) for vehicles route and movement and road open cut crossing. - Vehicle speed restrictions should be applied across the project site, - Flag man will be considered whenever needed. - Safety precautions taken during night driving will be according to EGAS updated HSE guidelines (Annex-5) - Immediate rehabilitation of the HP pipeline route (40 m in Jehan street by the LGU, 60 m of dusty road by the LDC) 	Negligible	Contractors	LDC + Traffic department	Contractor has valid conditional permit + Field supervision	<ul style="list-style-type: none"> - Contractor costs - LDC management costs
	Land related impact	<ul style="list-style-type: none"> - No new land will be required. The new PRS (upgrade) will be installed inside the boundaries of the existing PRS. The new related HP pipeline will pass through a state-owned land. No tenants, encroachers, residential laborers or other with customary daims or other of land use. - Enable grievance mechanism and disdose it to community 	Negligible	LDC HSE department	EGAS SDO	Field Supervision	<ul style="list-style-type: none"> - LDC - EGAS management costs

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
	Concerns of Community	<ul style="list-style-type: none"> - The detailed grievance mechanism (GRM) is presented in Annex-11 attached to this report is to be shared with the community beneficiaries. Posters will be prepared and made available to the beneficiaries in the contracting office¹¹. Additionally, they will be availed in the customer services office. Thus, sufficient and appropriate information about the GRM will be disseminated to the communities prior to the construction phase. Information dissemination about the GRM should be shared with the beneficiaries during the process of contracting and disclosed in the contracting office and other publicly accessible venues. - Using caution tapes that help to keep people away of the site, - Informing neighboring farmers about the timeline of the project as well as the working hours in order to know when to avoid certain street - Informing neighboring farmers through posters about the project details, location signing up to the network and receiving the service, project-level GRM - Install wooden bars or decks over pipeline trenches to allow safe crossing - A worker should support old people to cross the digging areas, especially, on the wooden bars 	Negligible	Contractors	- LDC – HSE department	Contractual causes + Field supervision	<ul style="list-style-type: none"> - Contractor costs - LDC management costs
				LDC –HSE department	EGAS SDO	Field supervision	<ul style="list-style-type: none"> - LDC management costs

¹¹ Falls under the budget of the LDCs

Table 7-2: Waste management During Construction Phase

Waste Type	Hazardous/ Non-Hazardous	Treatment and Disposal
Cement and Concrete Wastes (Including Cement Contaminated Soil)	Non-Hazardous	- Will be sent to Quweisna Dumping site (located in Bera Road)
Domestic Waste (food waste, packing,)		
Wood – Scrap	Non-Hazardous	- Temporarily stored in isolated area on-site, then transported to Abu Rawash storage site (Egypt Gas facility) to be sold as scrap.
Tires		
Cardboards		
Containers		
Paints containers	Hazardous	- Temporarily stored in isolated area on-site, then transported to Abu Rawash storage site. final Disposal will be UNICO.
Batteries		
Chemicals (solvent, lubricants,...) containers	Hazardous	- Temporarily stored in isolated area of the site, the transported- by licensed hazardous waste handling vehicles and personnel- to Abu Rawash storage site (Egypt Gas facility) for final disposal at Nassreya hazardous waste facility.
Used Oils	Hazardous	- Temporarily stored in isolated area on-site, then transported to Abu Rawash storage site. Final disposal will be by Petrotrade Co.

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

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Social –Health	Occupational health and safety	<ul style="list-style-type: none"> - ESMP will provide the provision of the health, safety and precaution of the environmental impacts and its mitigation measures to be followed during operation. - Produce Hazardous Area Classification drawings - Preventive maintenance policy and station manual - Provision of self-contained breathing apparatus (2 pieces for each station) for handling odorant leaks - Place signs in Arabic and English "Do Not Dig" and "High Pressure Pipeline Underneath" - Install an elevated wind sock and provision of portable gas detectors - The design should fully comply with IGE TD/3 code requirements 	Minor	<ul style="list-style-type: none"> - LDC project Department Designer 	<ul style="list-style-type: none"> - LDC project department - Engineering dep. - HSE dept. EGAS 	<ul style="list-style-type: none"> - Drawing and design Document Review - Policy and manual review - Inspection by operators Signage inspection and site visits 	<ul style="list-style-type: none"> - Project cost LDC management costs

Impacts due to COVID-19 pandemic	<p>Assessing Workforce Characteristics</p> <ul style="list-style-type: none"> - minimize contact and keep a distance not less than 1 meter with community people <p>Entry/Exit to the Work Site and Checks on Commencement of Work</p> <ul style="list-style-type: none"> - Confirm that workers are fit for work - Check and record temperatures of workers - Update daily personnel count log(in/out) in each area/ working site - Provide briefings to workers prior to commencing work, focusing on COVID-19 specific considerations, and reminding workers to self-monitor for possible symptoms and to report to their supervisor or the COVID-19 focal point if they have symptoms or are feeling unwell - Prevent a worker from an affected area or who has been in contact with an infected person from returning to the site for 14 days or isolating such worker for 14 days. - Prevent sick workers from entering the site, referring them to local health <p>General Hygiene</p> <ul style="list-style-type: none"> - Train workers and staff on site on the signs and symptoms of COVID-19, how it is spread, how to protect themselves (including regular hand washing and social distancing) and what to do if they or other people have symptoms - Place informative, illustrative posters and signs around the site, - Ensure hand washing facilities supplied with soap, disposable paper towels and dosed waste bins exist at key places throughout the site, if such facilities aren't available then Alcohol based sanitizers should be supplied <p>Cleaning and Waste Disposal</p> <ul style="list-style-type: none"> - Provide adequate deaning equipment, materials, and appropriate PPE (face masks, gloves,...) as necessary - Train on appropriate deaning procedures and appropriate frequency in high use or high-risk areas 	Negligible	- LDC	<ul style="list-style-type: none"> - LDC Patrolling committees - EGAS HSE department 	<ul style="list-style-type: none"> - Field supervision and review of HSE report+ Field supervision (audits) 	<ul style="list-style-type: none"> - Contractor costs - LDC management costs

- Train on proper hygiene, how to use PPE and waste control
- Adjusting Work Practices**
- Adapting work processes to enable social distancing and training workers on these processes
 - Continuing with usual safety trainings include use of PPE, adding COVID-19 specific considerations
- Project Medical Services**
- Local Medical and Other Services**
- Any suspected case should leave site immediately and referred to the nearest hospital / local medical facility for medical examination
 - any suspected cases should self-quarantine for 14 days
- Instances or Spread of the Virus**
- If a worker has symptoms of COVID-19, the worker should be removed immediately from work activities
 - The worker should be referred to the local health facilities to be tested.
 - Implement sanitization practices in affected sites
 - Inform fellow workers of possible exposure to the virus if a worker is confirmed to have Covid-19 infection but maintain confidentiality
- Training and Communication with Workers**
- Workers are made aware of the procedures that have been put in place by the project, and their own responsibilities in implementing them
 - Training are conducted regularly, providing workers with a clear understanding of how they are expected to behave and carry out their work duties
 - **in addition to EMOP and WBG Guidelines related to COVID-19 infection (Annex-9).**

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Physical receptor	waste generation	<ul style="list-style-type: none"> - Strict use of chemical-resistant suits and PPE when handling odorant barrels, tanks, or spills - Evacuation of odorant from barrels into holding tank with utmost care and full PPE - Covering possible odorant spills immediately with sand and treatment with sodium hypochlorite as per EGAS and LDC practices - On-site treatment of empty containers with sodium hypochlorite and detergent as Per EGAS and LDC practice - Ship empty containers to a certified hazardous waste facility via company depot using certified handling and transportation contractors - Ensure full and empty (treated) odorant containers are accompanied by a trained HSE specialist during transportation to and from the depot and to/from the hazardous waste disposal facility (UNICO and/or Nassreya) - Others measures as per item 7.4: Quweisna Quantitative Risk Assessment study recommendations. <p>In order to minimize risk of spillage of hazardous odorant, the following general precautions should be taken:</p> <ul style="list-style-type: none"> - Pre-Plan the anticipated amounts of odorants to be used in order to minimize leftovers and residuals. - Handle with extreme care and always perform visual checks on the integrity of the odorant container - Avoid rough handling rolling or dropping of odorant containers - Avoid exposure to direct sunlight during storage or transportation - Ensure odorant containers are always sealed properly and secured from tipping/falling/damage during transportation and storage (temporary and long-term) - Always have sufficient amounts of sand, sodium hypochlorite and detergent on standby during usage of odorant - ALWAYS handle containers or spills with care and full PPE compliance - Never release or empty residual odorant from its container to any 	Minor	PRS staff	LDC HSE Dpt.	Quaternary auditing	- Project cost LDC management costs

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
		receptor or for any reason other than filling the odorant tank at the PRS - NEVER use empty odorant containers for any other purpose - In case of odorant spillage: - avoid inhalation and sources of ignition - immediately cover and mix with sufficient amounts of sand and sodium hypochlorite using necessary PPE and tools - collect contaminated sand in clearly marked secure containers/bags - Add sand to inventory of hazardous waste					

7.3 Monitoring and Review

Procedures to monitor and measure the effectiveness of the management program, as well as compliance with any related legal and/or contractual obligations and regulatory requirements will be established. In addition to recording information to track performance and establishing relevant operational controls, dynamic mechanisms, such as internal inspections and audits (at least once during construction phase), where relevant, to verify compliance and progress toward the desired outcomes will be utilized.

Monitoring will normally include recording information to track performance and comparing this against requirements in the management program. The monitoring results shall be documented and the necessary corrective and preventive actions in the amended management program and plans shall be identified consequently.

7.3.1 Monitoring procedures

In order to fulfil the monitoring requirements and to ensure that any non-compliances are corrected, the following tasks should be followed:

- LDC HSE staff is responsible to carry out periodic audits to follow up on ESMP implementation.
- Any observed non-compliance is recorded and corrective actions requested.
- LDC report these non-compliances and the corrective actions taken to EGAS in their monthly reports.

EGAS also conduct supervisory visits through external consultant to ensure that all mitigation measures are appropriately adhered to, non-compliances are reported to the LDC and an action plan to correct the situation is requested and followed within the LDC monthly reports to EGAS.

Table 7-4: 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 and dust	<ul style="list-style-type: none"> - Inspection of vehicle and machinery maintenance schedule - Inspection of the construction activities - Exhaust emissions concentrations from diesel generators 	LDC HSE	Monthly during construction + before construction and each three month for machines	Vehicles licensing Department	Measurements and reporting of exhaust emissions of construction activities machinery Complaints log	LDC management costs
Ambient noise levels	Increased noise levels	<ul style="list-style-type: none"> - Noise intensity, exposure durations and noise impacts - Use of earmuffs by Construction workers 	LDC HSE	Regularly during site inspections	Construction site	Measurements of noise levels Complaints log	LDC management costs
		Complaints from Farmers	LDC HSE	Weekly during construction.	Construction site	Documentation in HSE monthly reports	LDC management costs
Physical receptor (soil, ground water, visual)	Waste generation	Observation of accumulated waste piles	LDC HSE	During construction. Monthly reports	Construction site	Observation and documentation	LDC management costs
		Observation of water accumulations resulting from dewatering (if encountered)	LDC HSE	During construction. Weekly 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

Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
Labor conditions	Occupational Health and safety	Total number of complaints raised by workers Periodic Health report Periodic safety inspection report Incident register Insurance policy and Attendees lists with workers IDs The insurance expiry dates	LDC HSE	Two times per year for the PRS (at least once during construction phase)	Construction site	Safety supervisor should follow commitment of workers to use the protective equipment -Inspection & recording of the performance -Reports about the workers and complaints	LDC management costs
		Provide a suitable tool for wind direction (Windsok) to be installed in a suitable place to determine the wind direction.	LDC HSE and Projects Dpt.	Daily during construction	Construction site	Supervision & reporting	LDC management costs
		Cooperation should be done with the concerned parties before planning for housing projects around the PRS area.	LDC Projects Dpt.	Daily during construction	Construction site	Supervision & reporting	LDC management costs
	COVID-19 pandemic	- Number of Suspected or confirmed Covid-19 cases, their location, condition, and all related actions taken Periodic Health report Suing of facemasks	LDC Covid-19 Patrolling committee EGASHSE	Daily	Construction site	As per the instructions of the Ministry of Petroleum (MoP), Patrolling committees have been formed across all LDCs to ensure that mitigation measures are being implemented on all construction sites, these committees report to EGAS on daily basis whereas EGAS report to MoP on weekly basis	LDC management costs

Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
	Child Labor	Attendees lists with workers IDs Complaints and accidents reports	LDC HSE	Biannual for PRS	Construction site	Safety supervisor observe the Laborers Random checkup for Laborers IDs	LDC management costs
	Disturbance to local community due to labor influx	- Complaints raised by the local community GRM. - Conduct spot checks/ audits on the worker's behaviors during field visits.	LDC HSE	When reported and during field visits	Construction sites	Supervision & reporting	Contractor Cost
Local traffic and accessibility	Reduction of traffic flow and accessibility to local community	Comments and notifications from Traffic Department	LDC HSE	Weekly during construction.	Construction site	Documentation in HSE monthly reports Complaints log	LDC management costs
Community	Threat to Safety of users and houses (due to limited level of awareness and misconceptions)	- Number of awareness raising activities implemented - Number of participants in information dissemination)	LDC HSE	Weekly during construction.	Construction site	Documentation in HSE monthly reports	LDC management costs

Table 7-5: Environmental and Social Monitoring Matrix during Operation

Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Monitoring Frequency	Location of monitoring	Methods of monitoring	Monitoring Estimated Cost
Ambient air quality	Improper management of odorant during operation	- Log of spillage incidents - Number of treated containers - Odorant delivery forms	LDC HSE	Quarterly for each PRS	- PRSs	Compare Environmental Register with odorant delivery forms, observation of site	LDC management costs
Ambient noise levels	Noise of PRS operation	- Noise intensity	LDC HSE	Quarterly for each PRS	- PRSs	- Noise meter	LDC management costs

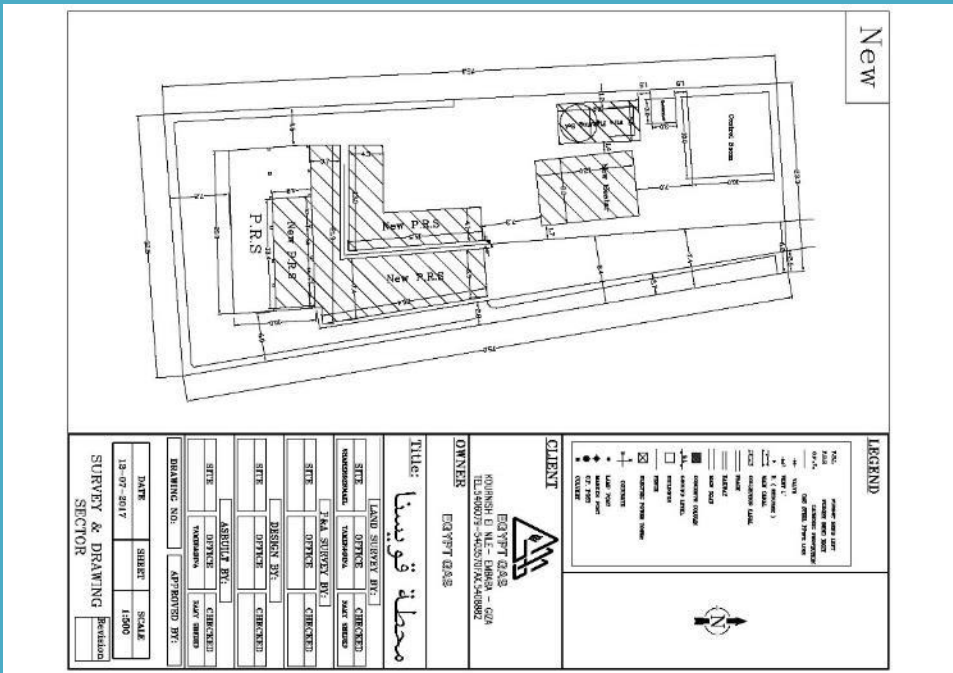
Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Monitoring Frequency	Location of monitoring	Methods of monitoring	Monitoring Estimated Cost
Physical receptor (soil, ground water, visual)	Waste generation	<ul style="list-style-type: none"> - Best practice of handling and intermediate storage - Disposal to appropriate and license land fill 	LDC HSE	Quarterly for each PRS	- PRSs	- Hazardous waste Register	LDC management costs
Labor conditions	Occupational Health& safety	<ul style="list-style-type: none"> - Total number of complaints raised by workers - Periodic Health report - Periodic safety inspection report 	LDC, EGAS	Four times per year, each three months	<ul style="list-style-type: none"> - Safety supervisor should follow the commitment of workers to use the protective equipment - Inspection and recording of the performance - Reports about the workers& complaints 	Complaints log LDC	No cost
		Review the emergency response plan and update the plan to include all scenarios in this study and other needs including:	LDC HSE (ERP document)	Yearly (ERP doc)	PRS location	HSE annual audit	LDC management costs
		Firefighting brigades, mutual aids, emergency communications and fire detection / protection systems.	LDC HSE (ERP document)	Yearly (ERP doc)	Area head office / PRS location	HSE annual audit	LDC management costs
		Dealing with the external road in case of major fires.	LDC HSE and Operation Dpt for facilities.	Weekly	PRS location	Inspection checklist	
LDC HSE (ERP document)	Yearly (ERP doc)	PRS location	HSE annual audit	LDC management costs			

Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Monitoring Frequency	Location of monitoring	Methods of monitoring	Monitoring Estimated Cost
		First aid including dealing with the odorant according to the MSDS for it, with respect of means of water supply for emergency showers, eye washers and deaning.	LDC HSE (ERP document)	Yearly (ERP doc)	Area head office / PRS location	HSE annual audit	LDC management costs
			LDC HSE and Operation Dpt. for facilities.	Weekly	PRS location	Inspection checklist	
		Safe exits in building according to the modeling in this study.	LDC HSE (ERP document)	Yearly (ERP doc)	Area head office / PRS location	HSE annual audit	LDC management costs
			LDC HSE and Operation Dpt.	Daily	PRS location	Inspection checklist	
		Inspection and maintenance plans and programs are according to the manufacturers guidelines to keep all facility parts in a good condition.	LDC Operation and maintenance Dpt.	Periodic maintenance plan according to manufacturers	Area head office / PRS location	HSE annual audit	LDC management costs
		All operation is according to standard operating procedure for the PRS operations and training programs in-place for operators.	LDC Operation Dpt.	Daily for operation Yearly for training	Area head office / PRS location	HSE annual audit	LDC management costs
Provide the site with SCBA “Self-Contained Breathing Apparatus” (at least two sets) and arrange training programs for operators.	LDC HSE and Operation Dpt.	Daily	PRS location	Inspection checklist	LDC management costs		

Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Monitoring Frequency	Location of monitoring	Methods of monitoring	Monitoring Estimated Cost
		Cooperation should be done with the concerned parties before planning for housing projects around the PRS area.	LDC Security Dpt	Daily	Around PRS location	Patrolling and recorded in logbook	LDC management costs
	COVID-19 pandemic	<ul style="list-style-type: none"> - Number of Suspected or confirmed Covid-19 cases, their location, condition, and all related actions taken - Periodic Health report - Using of Face Masks 	LDC Covid-19 Patrolling committee EGAS HSE	Daily	Construction site	As per the instructions of the Ministry of Petroleum (MoP), Patrolling committees have been formed across all LDCs to ensure that mitigation measures are being implemented on all construction sites, these committees report to EGAS on daily basis whereas EGAS report to MoP on weekly basis	LDC management costs

7.4 Quweisna Quantitative Risk Assessment Study Recommendations

Regarding to the risk calculations to workers / public which found in Acceptable region, therefore there are some points need to be considered to maintain the risk tolerability in its region and this will be describe in the following recommendations:

Recommendation	Timeline Phases
<p>According to the updated below layout received from Egypt Gas; which is proposed as the other choices are not applicable; it is recommended to take into consideration that Control Room "C.R." should be designed to be Fire Resistant as well as Explosion Proof. In addition, all edges of the C.R. building facing the PRMS should be with no openings, windows should be with minimal space and shatterproof glass.</p> 	<p>Design Phase</p>
<p>The PRMS updated planned layout received from Egypt Gas need to be re-drawn; as there are some items not determined like:</p> <ul style="list-style-type: none"> • Security office; (should be designed similar to C.R.). • Auxiliary gates; (as per discussions with Egypt Gas, the auxiliary gate will be on the southern side of the PRMS facing the new location of C.R.). • Emergency gates; (as per discussions with Egypt Gas, the emergency gate will be on the northern side of the PRMS). • Firefighting facilities (as per meeting with Civil Protection); • Outside roads and pathways; <p>Redefine the north direction. (to be at the opposite direction)</p>	<p>Design Phase</p>

Recommendation	Timeline Phases
All facility specifications referred to the national and international codes and standards.	Design Phase
Emergency shutdown detailed procedure including emergency gas isolation points at the PRMS and GASCO valves room (Ofttake Point) in place.	Design Phase
Surface drainage system is suitable for containment any odorant spillage.	Design Phase
Considering that all electrical equipment, facilities and connections are according to the hazardous area classification for natural gas facilities.	Design Phase
Provide a suitable tool for wind direction (Windsock) to be installed in a suitable place to determine the wind direction.	Construction Phase
Review the emergency response plan and update the plan to include all scenarios in this study and other needs including:	Operation Phase
<ul style="list-style-type: none"> • Firefighting brigades, mutual aids, emergency communications and fire detection / protection systems. 	Operation Phase
<ul style="list-style-type: none"> • Dealing with the external road in case of major fires. 	Operation Phase
<ul style="list-style-type: none"> • First aid including dealing with the odorant according to the MSDS for it, with respect of means of water supply for emergency showers, eye washers and cleaning. 	Operation Phase
<ul style="list-style-type: none"> • Safe exits in building according to the modeling in the QRA study. 	Operation Phase
<ul style="list-style-type: none"> • Inspection and maintenance plans and programs are according to the manufacturers guidelines to keep all facility parts in a good condition. 	Operation Phase
<ul style="list-style-type: none"> • All operations are according to standard operating procedures for the PRMS operations and training programs in-place for operators. 	Operation Phase
Provide the site with SCBA “Self-Contained Breathing Apparatus” (at least two sets) and arrange training programs for operators.	Operation Phase
Cooperation should be done with the concerned parties before planning for housing projects around the PRS area.	The Three Phases

7.5 Reporting of Mitigation and Monitoring Activities

During construction and operation, environmental performance against targets is reviewed by management on a monthly basis and reported to the contractor and LDC. The plan is designed to record incidents and to ensure investigation, root cause analysis, corrective action and follow up. Records are kept of all incidents, investigations and actions.

Regulatory and HSE reporting systems will be brought together on a monthly basis to be collated and input into the LDC's (Egypt Gas) reporting system to be submitted to EGAS' Environment Department during the construction phase.

During operation, the reporting of any occurrence and /or the result will take the following path:

- recording of the nature and scale of the occurrence;
- reporting to the necessary competent/ responsible persons; and
- Internal reporting and external regulatory notification.

7.5.1 During the Construction phase reports should include as a minimum

- Monthly report for the implementation of the ESMMP submitted by the contractor to LDC HSE staff.
- Monthly report on incident and complaint from the surrounding establishments and residents nearby the construction site.
- Unusual traffic delays or accident caused during construction or any complaints received should be reported in the monthly report prepared by the construction contractor supervisor. And /or permits and any comments or recommendations by Traffic Department
- Monthly report should include any incidents of high dust emissions or smoke during construction works including the natural dust that might be encountered.
- There should be a form prepared by LDC's HSE department for the contractor to keep records of quantities, types of wastes received and the location where it has been received from.
- The monthly report of HSE supervisor from LDC should report the evaluation of the contractor's compliance to mitigation measures and any comments noticed by the HSE site supervisor about mismanagement of construction waste during the month.
- The HSE team from LDC observer should report on the monthly basis of the accident or the worker's obedience.
- Reporting on the monthly basis, the total number and the type of heavy equipment use during the construction phase.
- Monthly report on health and safety performance. This report will include any incident and complaint regarding health and safety measures perform by the contractor.

- Monthly report on GRM. This report will include (as a minimum) number of received grievances monthly, type of grievance received, number of grievances solved and closed / unsolved (reasons for not solving them).
- Daily report to be prepared on construction work of the pressure reduction station and HP pipeline construction works.
- Daily report in a logbook to consider any outside construction works around the PRS location that related to public or industrial buildings.

7.5.2 Reporting of severe incidents

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

7.5.3 During the operation phase reports should include as a minimum

According to law 4/94 amended by law 9/2009 and its executive regulation, each facility should prepare an environmental register. Components of the environmental register are presented in annex three of the executive regulation. All environmental procedure included in the EMMP are to be recorded in the Environmental Register so that they can be communicated effectively and clearly. It will include (monitoring plan, solid waste management plan, emergency response plan).

Environmental Register shall contain:

- Any complaint related to the noise generated from the PRS
- Regular noise and air measurement reports.
- Record keeping of the admitted waste and their quantity and management (bills of waste transportation).
- Summary of the HSE monthly report.

According to Article 29-32 from law 9/2009 and its executive regulation, the PRS shall prepare a hazardous material and waste register containing the handling and storage of hazardous material and waste in the facility (types, quantities, material safety data sheets, type of storage and means of transportation). Additionally, the register should contain a contract and /or bills of hazardous waste disposal at UNICO and /or Nassreya.

7.6 Emergency Response Plan

Egypt Gas is developing an Emergency Response Plan (ERP) which relates to its operations for the PRS and for its intermediate and low-pressure distribution network. The purpose of this document is to outline emergency responsibilities, organizational arrangements and responses and procedures to be followed by personnel based in the field in the event of an emergency. For the meanwhile Egypt Gas mainly depend on EGAS's Emergency Response Plan. For full details about the emergency plan, kindly refer to [Annex-12](#) attached to this report.

Emergency Levels are classified as Levels (Level 1, Level 2 and Level 3) as following:

The first level of Emergency:

- Potential hazards to life, safety, property and the environment are limited, and do not exceed the emergency zone or the boundaries of the public site or facility.
- The personnel of the enterprise or the site possess adequate training, capacity, personal protection equipment and necessary tools to manage and control the situation, and there is no need for external assistance.
- Alarm bells are not required to warn those outside the site or facility.
- The situation does not require evacuation of the emergency zone.
- There is no possibility of losing control or escalating the situation.
- The accident management team is not used.

The Second level of Emergency:

- There is a serious risk to life, safety, property and the environment and may exceed the limits of the emergency zone, but do not exceed the limits of the public site or facility.
- There is a need to use the assistance of external parties to manage the emergency, or at least the presence of stand-by team in the presence of a potential escalation of the situation, but the situation does not extend its influence outside the facility or site.
- Members of the facility or site do not have sufficient capacity or resources to deal with the incident
- Requires evacuation and / or warnings to warn those outside the emergency zone
- Security breach or situation leading to constant threat to life and safety
- Accident management team intervenes

The Third level of Emergency:

- There is a serious risk to life, safety, property and the environment and may exceed the limits of the emergency zone and the possibility of exceeding the limits of the public site or facility.
- There is a need to use the help of external parties to fight fire, rescue, dealing with hazardous materials, large number of injuries and deaths.

- Measures must be taken to protect units, nearby areas and / or communities and the environment beyond the boundaries of the public site or facility
- There is a potential risk that the reputation of the company, its business or its revenues will be affected
- Any incident involving the exit of the operating system beyond the limits of safe operation with the possibility of escalation
- There is a danger to the public
- There is a possibility to start or run the communication system for emergency reporting
- The accident management team is used.

7.6.1 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.

7.7 Institutional Framework for ESMMP Implementation

7.7.1 Environmental Management Structures

EGAS is the supervisory body. Egypt Gas is the implementing body. To make sure that all mitigation measures are in place, EGAS has assigned a new consulting firm to implement the supervision tasks and strengthen EGAS supervision capacity. Below is the management structure of Egypt Gas team (7 HSE, 1 Environmental and 3 social persons).

Being the implementing body of the natural gas network in project areas, Egypt Gas has a direct involvement with the environmental management and monitoring of the natural gas network. Egypt Gas has good environment, occupational health and safety and social background.

One of the standard tasks of the HSE Departments of Egypt Gas, supervised by EGAS, is to ensure that the Environmental and Social Management Plan of the project is implemented in all the phases of the Project. Egypt Gas has a signed two social development officers at the head Quarter in addition to one person at at Quweisna. The main tasks of the social development officers are:

- SDOs are responsible for the implementation of the Land Acquisition procedure during the process of land selection for the construction of Pressure Reducing Station.
- Carry out social screening to determine whether the project components will result in any resettlement impact and accordingly SDOs from EGAS and LDCs will decide the need for the preparation of a resettlement action plan or an abbreviated Resettlement Action Plan.
- SDOs will address all grievances raised by community members, particularly the ones related to resettlement activities (more information will be addressed in the GRM section).
- SDOs will address all grievances raised by workers; particularly the ones related to their social and medical insurance, and will be reported to EGAS' SDO who will follow up on the complaint until a solution is reached

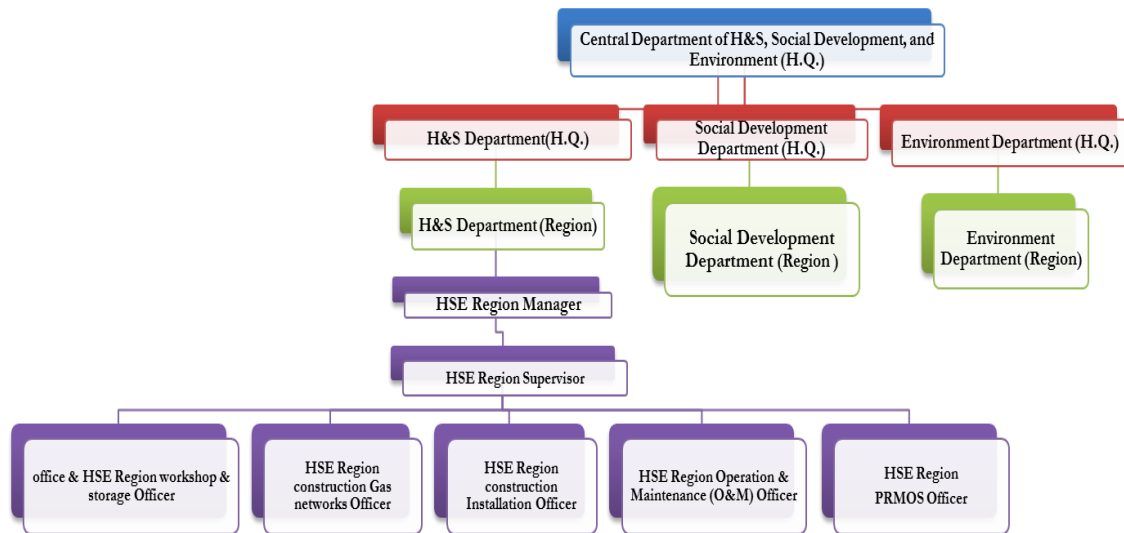


Figure 7-1: Egypt Gas ESMP organogram.

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

- Worker and contractor compliance to EGAS updated HSE manuals and ESIA procedures
- Occurrence of HSE incidents and suggestions for incident avoidance (Refer to Item 7.4)
- Management of broken asphalt (if any), unused backfill, solid waste, metal scrap
- Management of paint cans, refueling & lubrication, soil contamination
- Management of liquid waste such as leaked condensate hydrocarbons (if any) or chemicals used in heaters; and
- 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
- Using analyzers to measure noise, SO₂, CO, CH₄ and NO₂ in ambient air, and detect possible natural gas leaks
- Ensure and log compliant handling of odorant/odorant containers, odorant-contaminated-soils (in case of spillage)
- Measure noise at different locations of the PRS
- Other tasks as outlined in ESM & MP

Daily reports are to be compiled and sent to the regional HSE officer for preparation of monthly summary reports. [Annex-5](#)

Monthly reports are sent to HSE officer at Egypt Gas head office for compilation into quarterly reports to EGAS which in return will supervise the OHS, Environmental and social implementation through audits which will be executed by external consultant. [Annex-5](#).

7.7.2 Required Actions

- 1- Involvement of environmental and social officers during the design, costing, tendering, and construction phases would be advantageous.
- 2- An updated and detailed assessment of Egypt Gas EHS institutional capacity and available resources for implementation of the ESMP
- 3- Specifically, Egypt Gas should take steps to develop capacity of site engineers and HSE officers with specific courses focused on implementation of the ESMP detailed in this ESIA.

7.7.3 Management of grievances (Grievance Redress Mechanism)

EGAS and the LDCs aim to be recognized as a responsible operator exemplary in the management of the impacts of its activities. As such, EGAS and the LDCs are committed to preventing, limiting and, if necessary, remedying any adverse impacts caused by its activities on local populations and their social and physical environment.

Identifying, preventing and managing unanticipated impacts are facilitated by a grievance redress mechanism (GRM). As the World Bank's governance and anticorruption (GAC) agenda moves forward, GRMs are likely to play an increasingly prominent role in Bank-supported projects. Well-designed and implemented GRMs can help project management significantly enhance operational efficiency in a variety of ways, including generating public awareness about the project and its objectives; deterring fraud and corruption; mitigating risk; providing project staff with practical suggestions/feedback that allows them to be more accountable, transparent, and responsive to beneficiaries; assessing the effectiveness of internal organizational processes; and increasing stakeholder involvement in the project. For task teams more specifically, an effective GRM can help catch problems before they become more serious or widespread, thereby preserving the project's funds and its reputation. Also, the Egyptian worker law No. 12 for the year 2003 provides for the Formal Grievance Procedure in case a worker, who has been laid-off, discharged, dismissed, removed, or otherwise terminated from employment. The LDC has an internal division responsible of receiving, record and track resolution of grievances.

Effective grievance management helps to:

- Build trust through having a dialogue with stakeholders.
- Detect weak signal and propose solution.
- Reduce risk of conflict between the affiliate and local communities.
- Reduce risk of litigation by seeking fair solutions through mediation in the event of an established impact.
- Identify and manage unanticipated impacts of operation.
- Avoid delays to operations and additional costs.
- Avoid future impacts through analysis of weak signals.

GRM details will be shared with the community beneficiaries prior and during construction works as well as during the contracting period. Posters will be prepared and made available to the beneficiaries in the contracting office, in the neighboring area, other publicly accessible venues

and the customer services offices. It is worth mentioning that the customers services offices are the main channel to receive complaints of Egypt Gas clients all over the country, while the hotline is the main channel to receive complaints in the emergency cases. On the other hand GRM system for the current project has been tailored to handle the complaints of the project beneficiaries in a professionally manner. It is worth mentioning that **anonymous** grievances (for the project and worker GRM) could not be simply ignored, and the complainant should be taken into consideration and assures that the issue has been fully investigated. Information about the outcome and what actions have been taken to prevent a recurrence could be published on LDC website.

Following are the various stages for handling project level grievances. The proposed mechanism is built on three tiers of grievances:

1. The level of site engineer of Egypt Gas in the project area.
2. On the level of LDC headquarter
3. On the level of EGAS

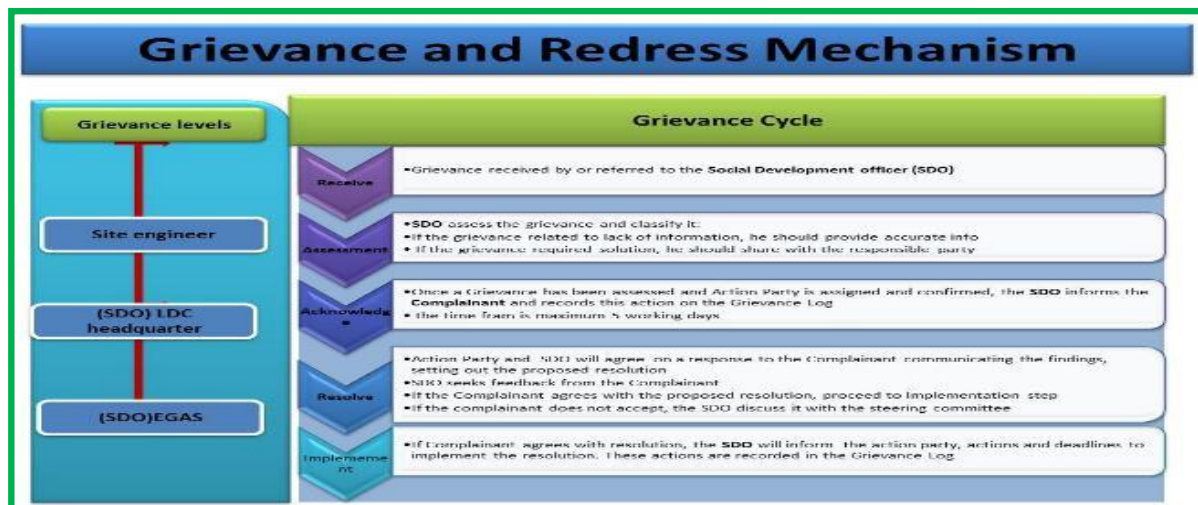


Figure 7-2 Proposed Grievance and Redress Mechanism

7.7.3.1 First tier of grievances

In order to ensure high level of responsiveness to the local communities, it is essential to ensure that a local grievance mechanism is functioning and that the communities are aware of it. Egypt Gas has assigned a Social Development Officer (SDO) (can be more than one) who will be working closely with the assigned SDO of EGAS. It is the responsibility of Egypt Gas SDO to ensure that the GRM system is widely known and well explained on the local level. Moreover, s/he will follow up on the complaint until a solution is reached. The turnaround time for the response/resolution should be 10 business days and the complainant should know that he/she should receive response by then. (a complain form is attached see [Annex-11](#))

The grievances should be presented to the following:

- The foreman working on the ground in the study area,
- The project manager in the study area,

The regional department of Egypt Gas in Monofeya Governorate, it is worth noting that most of the previous experience of EGAS is suggesting that complaints are usually handled efficiently and resolved on the local level. However, the management of the complaints including level of responsiveness, providing feedback and the documentation of the complaints needs to be significantly strengthened. In case the problem is not solved, the complainant may reach out to the second level of grievance

7.7.3.2 Second tier of grievances:

If the aggrieved person is not satisfied with the decision of the first tier, they can present the case to Egypt Gas headquarters. Complaint form is attached in [Annex-11](#). SDO where they should provide resolution within 10 business days, following is the second level of grievances:

- The Social Development Officer in Egypt Gas headquarters will handle technical, environmental and land acquisition complaints. Egypt Gas headquarters SDO should receive the unsolved problems. Thereafter, the SDO gets in contact with the petitioner for more information and forwards the complaint to the implementing entities for a solution.
- The SDO should follow the complaints and document how they were solved within 10 business days.

7.7.3.3 Third tier of grievances:

If the aggrieved person is not satisfied with the decision of the SDOs of Egypt Gas at Stage 2, they can present the case to EGAS SDO where they should provide resolution within 10 business days. The following section presents the third level of grievances:

- The Social Development Officer in EGAS will handle technical, environmental and land acquisition complaints. He should receive the unsolved problems. Thereafter, they get in contact with the petitioner for more information and forward the complaint to the implementing entities for a solution.
- The SDO should follow the complaints and document how they were solved within 10 business days.
- The SDO should update the complainant on the outcome of his/her complaint.

7.7.3.4 Grievance channels

Due to the diversity of the context in different governorates and the socioeconomic characteristics of the beneficiaries, the communication channels to receive grievances were locally tailored to address all petitioners concerns and complaints. The following are the main channels through which grievances will be received:

- Foremen act as the main channel for complaints. They are always available on the construction sites. However, complaints raised to him/her are mostly verbal. Thus, s/he should document all received grievances in writing form using a fixed serial number that the complainant should be informed about to be able to follow up on the complaint.
- Phone numbers of site engineer and SDO.
- The SDO within the LDC and EGAS
- Trustworthy people, community leaders and NGOs/CDAs will be an appropriate channel to guide petitioner about the various tiers of grievances, particularly, in rural areas.

7.7.3.5 Response to grievances

Response to grievance will be through the following channels:

- The response to grievances should be through an official recognized form to ensure proper delivery to the complainant. It is the responsibility of the SDOs to ensure that complainants were informed about the results of handling their complaints.
- Response to grievances should be handled in timely manner as mentioned above, thereby conveying a genuine interest in and understanding of the worries put forward by the community.
- EGAS and Egypt Gas should maintain record of complaints and results.
- Anonymous grievances could not be simply ignored, and the complainant should be taken into consideration and assure that the issue has been fully investigated. Information about the outcome and what actions have been taken to prevent a recurrence could be published on LDC website.

7.7.3.6 Worker Grievances

The Project Management Unit (PMU) will require the Contractor/subcontractors to develop and implement a Grievance Redress Mechanism (GRM) for their own workforce before the start of civil works. The GRM must be well circulated and written in a language understood by all. The new contracts with contactors/subcontractors will include an annex with mitigation measures to address labor management issues, through having in place of the labor management procedures. One of the main items that will be included in the annex is the Worker GRM, which allows the worker to submit his complaint

The workers GRM will include:

- Channels to receive grievances such as comment/complaint form, suggestion boxes, email, a telephone number and hotline, including reaching out to the LDC

- Stipulated timeframes to respond to grievances;
- A register to record and track the timely resolution of grievances;
- A responsible section/committee to receive, record and track resolution of grievances.

7.7.3.7 Monitoring of grievances

All grievances activities should be monitored in order to verify the process. The monitoring process should be implemented on the level of EGAS and the LDC. The following indicators will be monitored.

Table 7-6 Means of verification and indicators

Monitoring dimensions	Means of verification and indicators
GRM is fully operational	<ul style="list-style-type: none"> ○ Number of received grievances monthly (Channel, gender, age, basic economic status of the complainants should be mentioned) ○ Type of grievance received (according to the topic of the complaint) ○ Documentation efficiency
Efficiency of responses and corrective procedures	<ul style="list-style-type: none"> ○ Number of grievances solved and closed ○ Feedback offered to the grievances ○ Number of unsolved grievances and the reasons behind not solving them ○ Time consumed to solve the problem
Efficiency of information sharing about GRM	<ul style="list-style-type: none"> ○ Dissemination activities undertaken ○ Total number of brochures distributed (if any) ○ Total number of awareness meetings conducted (if any)

7.7.3.8 Institutional Responsibility for the Grievances

The entity responsible for handling grievances will mainly be the Environmental Affair Department within the implementing agency (EGAS). The Social Development Officer (SDO) working within EGAS in cooperation with the Egypt Gas will address all grievances raised by community members. The main tasks related to grievances of the SDOs on the various levels are:

- Raise awareness about channels and procedures of grievance redress mechanisms
- Collect the grievances received through different communication channels
- Document all received grievances
- Transfer the grievance to the responsible entity
- Follow up on how the problem was addressed and solved
- Document, report and disseminate the outcome of received grievances
- Ensure that each legitimate complaint and grievance is satisfactorily resolved by the responsible entity
- Identify specific community leaders, organizations and citizen groups required to enhance the dialogue and communication through a public liaison office to avoid or limit friction and respond effectively to general concerns of the community
- Monitoring grievance redress activities

8. Stakeholder Engagement and Public Consultation

The new PRS aims to connect NG to new districts in Monofeya Governorate. The new districts are extension to the current existing natural gas connection network. The natural gas connection project has witnessed a wide range of consultation activities, (especially in Monofeya Governorate) during the different phases of the project, since the early stages in December 2013 until now. ESIA's and ESMPs for other project areas were prepared, stakeholder engagement and public consultation activities were held, and studies were cleared by the Bank and disclosed on both WBG and EGAS website. It is worth to mention that the consultation activities have covered both the PRS and all the Low pressures pipelines networks activities. For the current study, a consultation meeting session was conducted on 8th October 2019, at the premises of Quweisna district. Stakeholders were clearly identified, a work plan was developed, information adequately disclosed, used different engagement instruments. Fair gender based participation and engagement of the different stakeholders and documentation of all conducted events were made. All public concerns were discussed and responded to and addressed in the ESIAF /ESIA's/ESMPs of the project.

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

8.1 Legal Framework for Consultation

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

- WB policies and directives related to disclosure and public consultation, namely,
 - o Directive and Procedure on Access to Information
 - o World Bank Operational Policy (OP 4.01)
- Egyptian regulations related to the public consultation
 - o Environmental law No 4/1994 modified by Law 9/2009 and 105/2015 and its executive regulation until the last amendment by ministerial decrees no. 1963/2017

- While WB safeguards and regulations state that a minimum of two large-scale, well-publicized public consultation sessions are a must for projects classified as category “A” projects like the one at hand, additional consultation efforts were implemented to reach the most difficult to reach community members. Additionally, in order to obtain larger scale and more quantifiable information, the consultant should assess conducting surveys in the different sites.

8.2 Consultation objectives

The objective of the Stakeholder Engagement is to ensure safe and successful Project delivery by:

- Informing stakeholders, including persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively;
- Listening to their comments, ideas and concerns and recording the same for follow up;
- Avoiding conflict by addressing impacts and issues raised by stakeholders promptly; particularly with the communities that will not be served by the project
- Ensuring that fears and anxieties about the nature, scale and impact of the operation have been properly considered in the development and management of the Project
- Accessing and making good use of existing local knowledge of the area;
- Communicating and implementing a viable community feedback mechanism.

The consultation outcomes will be used in:

- Define potential project stakeholders and suggest their possible project roles
- Identify the most effective outreach channels that support continuous dialogue with the community

Thereafter the results will provide proper documentation of stakeholder feedback and enhance the ESIA accordingly.

8.3 Defining the stakeholder

In order to ensure an inclusive and meaningful consultation process, a stakeholder’s analysis was conducted to get better understanding of the various groups and their roles, interests and influence on the project.

For the purpose of this site specific ESIA, a focused stakeholders’ identification was conducted to identify the key groups of relevance to the project in this specific location. The main identified groups are very similar to those identified on the governorate level but on a smaller scale, (elaborated details on that are include in the Governorate level ESMP). In the meantime, local

communities of both men and women of projects beneficiaries, local NGOs/CDAs were among the key stakeholders on the local level. The following table includes a list of key stakeholders of both men and women within the project areas.

Table 8-1: A list of key stakeholders of both men and women within the project areas.

Stakeholder	Role/ concern
Local Governmental entities	
Governorates	The main role of the governorates is the provision of support to the project through mobilizing people to gain information about the project.
Local Governmental units (District authorities and village authorities)	Permissions for PRS construction should be prepared by the governorate and approved by the LGU. Rehabilitation of roads, will be performed by the LGU.
Egyptian Environmental Affair Agency (HQ and RBOs)	Responsible for reviewing and approving ESIA's, and monitoring implementation of the Environmental Management Plan
Security Department	Secure the construction sites and prevent people from in- flushing into it
Ministry of Health	Providing health facilities to the project workers
Media	
Television and radio representatives	Inform the community about the project and its impacts and support dissemination of ESIA studies
Press people	
Websites editors	
NGOs working on environmental and social related aspects	
Association of Friends for Protection and Development of Environment	Play an active role in any awareness-raising related to the project
Universities and Educational institutes	
Monofeya University, Faculty of Engineering	Review and enrich the ESIA study with feedback
Secondary vocational schools	Propose needed capacity building for their students to potentially find employment with the project
Researchers/consultants	Review results of the study and provide feedback
Other	
Private companies	Mainly potential tenderers for construction works
Traders	Provide workers with food and amenities.
Contractors	From the project adjacent areas, may be affected.
Community people	
Community leaders	Main cornerstone in mobilizing the communities.
Potential beneficiaries	Potentially benefit from the project

Stakeholder	Role/ concern
Potential Project Affected Persons (PAPs)	LPG distributors (formal and informal), LPG storage workers.
Vulnerable groups within the local communities	Vulnerable groups may be likely to be adversely affected by environmental and social impacts, while also being least likely to benefit from the Project. Women, disabled, old people and children might get injured if they crossed the excavated areas in main streets and allies. Children also may fall down in the excavated areas
Natural Gas companies	
EGAS	Implementing agency overseeing activities of the Environmental and Social Management Plan
Egypt Gas	Local distribution company (LDC) who will implement, operate, and manage the ESMP
Butagasco	May be affected due to the installation of the NG
Petro Trade	They are the responsible entity for collecting the consumption fees and the bank installment

8.4 Consultation Methodology and Activities

The research team for this study has adopted multi-dimensional consultation activities that enable the marginalized, voiceless, youth and women to gain information about the project. As well as, gaining information about their concerns and worries that regarding the project during various implementation phases. It is worth to mention that the consultation activities have covered both the PRS and all the Low pressures pipelines networks activities. Surprisingly, there was no single comment raised about the safety of the PRS or its activities. All questions raised during the consultation activities were related to the connection process (Low pressures pipelines networks), where most of the people are not familiar of the PRS activities. So all questions, comments and responses were concentrated on the NG connection activities and have been addressed in the ESMP studies for the Low pressure network.

Following are the methodology and the main consultation activities adopted by the research team:

1. The study team visited the project area in order to define various stakeholders.
2. The study team divided the various engagement activities of the project to:
 - Scoping phase,
 - Data collection phase,
 - Consultation activities and final public consultation.
3. The study team has adopted many tools during the consultation process such as:
 - Conducting Focus Group Discussions (FGDs) with the local communities.

- Conducting panel meetings with the governmental officials and potential affected people.
 - Public consultation sessions.
 - Various NGOs participated actively in the preparation of the FGDs and providing data collectors to assist the team in collecting the data.
4. Consultation activities have been developed for the different communities through the following phases:
- a. Phase I: Preparation of the framework study 2013.
 - b. Phase II: Consultation activities during the preparation of ESMP study February 2017
 - c. Phase III: The Consultation session was conducted in Monofeya on 16th April 2017.
 - d. Phase IV: The Consultation session was conducted at Ashmoon district during the preparation of ESMP study in July, 2018.
 - e. Phase V: Consultation meeting session was conducted on 8th October 2019 at Quweisna Markaz.
5. Information sharing/stakeholder engagement related activities prior and during the construction works
- Place informative, illustrative posters and signs around the project sites including time plan, digging areas, and GRM.
 - Coordination with traffic authority and have time management for vehicles movement to avoid the peak hours.
 - Consultation with shops and shopping areas to enabling alternative entrances to the business.
 - Consultation with schools to secure safe access roads to children (In case of excavating close to the entrance gate).

All activities conducted were documented with photos and lists of participants in order to warrantee appropriate level of transparency.

The following table summarizes all the consultation activities in Monofeya Governorate, since December, 2013 till now.

Table 8-2: Summary of Consultation Activities in Monofeya Governorate during the ESIAF November – December, 2013

Participants	Number		Methods	Date
	Males	Females		
Various stakeholders	59	23	Scoping Session	28 th November 2013

Participants	Number		Methods	Date
	Males	Females		
	61	13	Public consultation	21 st December, 2013
Community residents	52	48	Structured questionnaire	December 2013
Potential beneficiaries and governmental officials	31	1	FGD & individual interview	
Governmental entities & NGOs	4	0	In-depth interview	
Total	207	85		

Table 8-3: Summary of Consultation Activities During the preparation of ESMP study for 4 districts in Monofeya Governorate (February - April 2017).

participants	Location	Male	Female	Methods	Date
Potential beneficiaries	Shintina El-Hajar	6	3	FGD In depth	February 2017
	Um Saleh	9	5		
	Tilbant Abshish	7	2		
	Salaka	7	4		
LPG vendors	Shintina El-Hajar	2	-	Structured questionnaire	February 2017
	Um Saleh	3	-		
	Tilbant Abshish	2	-		
	Salaka	2	-		
Governmental and NGOs	Shintina El-Hajar	6	3	In depth	February 2017
	Um Saleh	4	1		
	Tilbant Abshish	6	3		
	Salaka	5	2		
Community people	Shintina El-Hajar	15	5	FGD Structured questionnaire	February 2017
	Um Saleh	10	8		
	Tilbant Abshish	8	4		
	Salaka	12	6		
Representatives from Egypt Gas		5	2	In-depth	February 2017
Various stakeholders		81	13	Public consultation session	16 th April, 2017
TOTAL		190	61		

Table 8-4: Consultation session was conducted at Ashmoon while preparing ESMP study for 6 districts in Monofeya governorate, July 2018

Participants	Number		Methods
	Male	Female	
Governmental and NGOs	62	59	consultation meeting
LPG vendors	6	1	in-depth meetings
Community people	15	5	FGD
TOTAL	83	65	
Representatives from Egypt Gas	5		in-depth Meetings

Table 8-5: Summary of Consultation Activities at Quweisna Markaz

Participants	Number		Methods	Date
	Male	Female		
Government officials	7	5	In-depth meetings	October 2019
NGOs	3	2	In-depth	
Community people	20	9	FGD	
Potential affected people (LPG vendors)	4		FGD	
Total	34	16		
Egypt Gas Representatives	6		In-depth Meetings	



Consultation meeting with LGU representatives



Consultation meeting at Quweisna Markaz at LGU

Figure 8-1: pictures showing the Consultation meetings.

Table 8-4: Key comments and concerns raised during the different public consultation activities, and the way they were addressed in the ESMPs studies

Subject	Questions& comments	Responses	Addressed in the ESMP Study ¹²
Criteria for natural Gas connection	Why all the households and villages are not included in the NG connection plan	Connection to villages is depend on the availability of other public utilities (water, sewage, and electricity) Additionally, the village should be close to the national NG grid. The Government is giving a high priority to connect NG to all households.	Section 2.

¹² <https://www.egas.com.eg/sites/default/files/2019-10/Monofeya%20ESMP.pdf>

Subject	Questions& comments	Responses	Addressed in the ESMP Study ¹²
Street rehabilitation & land refill	-who is responsible to rehabilitate the street and land refill after the end of construction works?	Egypt Gas responded to this question, as they will be the implementing agency responsible for street rehabilitation in terms of budget. However, the LGU will implement the streets rehabilitation according to their plans for streets rehabilitation in each area.	Section 7.
Information sharing about NG	The people should be informed about NG. Group meetings will be useful	The NG project team provide information to the communities as follow: 1- During the site visits for P&A survey 2- During the preparation of the ESIA's and ESMPs 3- During contracting process.	Section 7. Section 8.
Complaint system	What if we have any complaints about the project, where we can raise our complaints	The project is adhering to a grievance mechanism. This enable anyone to submit a complaint and respond to in 10 working days. The NG project team provided information about the different channels to submit complaints. Additionally, the contracting offices give the clients all information about the project and GRM	Section 7.
Loses of income for LPG Vendors	The NG connection project will affect the source of income for LPG vendors and the distributors	NG is not going to cover all areas, the LGU will give new license in another areas.	Section 7.
Coordination	During the Construction phase many underground public utilities (electricity cables, water pipelines ...etc. may be expose to the damage.	The LDC is keen to coordinate with the LGU, to obtain all available underground public utilities maps and information to avoid any damage. In case of damage the contractor is obliged to repair the damage at once.	See Section 7

Subject	Questions& comments	Responses	Addressed in the ESMP Study ¹²
Cost of installing NG to households and options for payments	How much is the cost of NG installation, can you inform us if there is a system of monthly installments to settle the installation fee?	The cost of the installation fees is expensive but the Government of Egypt provides a huge subsidy to enable all citizens' benefit from the NG. There is an agreement with the Egyptian Banks to finance the cost of connection to the client, and he can pay the cost in installment. AFD in cooperation with EU provide a grant of 1500 EGP for poor people according to illegibility criteria. Also the Ministry of Petroleum has adopted a new initiative to reduce the burden of the cost by paying the installation cost with zero interest rate (30 EGP/month for six years).	Section 4. Section 7
Role of NGOs	NGOs can help the poor people by paying the NG installation cost or alternatively, can pay the advance payment. So the burden of the installment could be easier for them.	No one can enforce NGOs to pay the installation cost for poor. NGOs can play a vital role as a communication channel between LDC and the local community especially for information sharing and solving complaints.	Section 4

8.5 Summary of Consultation Results

The consultation outcomes revealed that:

- The interviews with the implemented companies revealed that, they are fully aware about security and safety procedures in accordance with the nature of the region.
- The AFD in cooperation with the European Union will provide the poor with a kind of grant to be able to install the NG (nearly 50% of the NG connection cost according to specific criteria). This initiative has been approved and will be applied to all project areas.
- The Ministry of Petroleum Initiative to encourage more people to connect NG by paying the cost in installment for 6 years at zero-interest rate. The study recommended the participation of the community people in sharing information about NG project with the other people especially the illiterate groups. (the recommendation is not obligated for the project)

- There are many problems related to LPG cylinders such as: (high cost, price fluctuations, unavailability, the exerted effort to hold and install the cylinder, and the risks related to the existence of LPG cylinder within the household)
- The interviews and the focus group discussions revealed some concerns raised by the community regarding the NG connection such as:
 - Actual need to provide clear information about the project and some concerns about NG security and safety.
 - The majority of the community people cannot afford to pay NG installation costs in one installment, they strongly recommended to pay in installments.
 - Some concerns about LPG security and safety.
 - Actual need to response to grievances in timely manner

**The key message from the consultation events carried out for this project is that:
The acceptance and the support of governmental officials and the local community
for the project are very strong.**

8.6 ESIA disclosure

As soon as the ESIA gets clearance from the World Bank and approval from EEAA, a final report in English language will be published on the WB, EGAS and Egypt Gas websites. A copy of the ESIA report in English and a Summary in Arabic will be available in the customer service offices. 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 ESIA study.