ARAB REPUBLIC OF EGYPT
Pyramids Plateau Groundwater Lowering Activity

Environmental and Social Impact Assessment

Scoping Statement

Supreme Council of Antiquities (SCA),
National Organization for Potable Water and Sanitary Drainage (NOPWASD)

US Agency for International Development (USAID)
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AECOM
In association with
ECG and **EDG**

USAID
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Acronyms and Abbreviations

BOD_5	5-day biochemical oxygen demand
CAPMAS	Central Agency for Public Mobilisation and Statistics
COD	Chemical Oxygen Demand
EA	Environmental Assessment
ED/CM	Engineering Design and Construction Management
EIS	Environmental Impact Statement
FM	Force Main
GOE	Government of Egypt
MH	Manhole
NOPWASD	National Organization for Potable Water and Sanitary Drainage
PS	Pump Station
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development

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INTRODUCTION

The Giza Pyramids Plateau is widely recognized as one of the most unique archaeological sites in the world. It is the site of the three great pyramids and the Sphinx, tombs, seven smaller pyramids, and other monuments. Over the centuries the plateau has been instrumental in introducing Egyptian civilization to the world, and was recently declared as one of the most iconic travel spots on the planet, and was declared as Category One World Cultural Heritage Site (WCHS) by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1979. This invaluable site is now threatened by urban expansion and development, pollution, mass tourism and rising groundwater table.

The rising groundwater has become a common problem throughout Egypt during the past few decades and has been posing a significant threat to ancient monuments throughout the country. In the Giza Plateau, the Great Sphinx as well as low lying areas of Khafre Valley Temples and the Workers Area are most affected by the rising water table.

The object of the Pyramids Plateau Groundwater Lowering Activity is to establish the main causes of the groundwater rise and develop means to counter them. The project is undertaken for the Supreme Council of Antiquities (SCA) of the Government of Egypt (GoE) through its joint implementing agencies, the Cairo Authority for Potable and Wastewater Projects (CAPW) and the National Organization for Potable Water and Sanitary Drainage (NOPWASD), and is financed by the United States Agency for International Development (USAID).

This report presents the outcome of the environmental and social scoping activities carried out in preparation for the Environmental and Social Impact Assessment (EA) of the Pyramids' Plateau Groundwater Lowering Activity. The scoping process was based upon extensive compilation and reviews of available secondary data on the area, extensive field reconnaissance, as well as several, in depth interviews and focus group meetings with key stakeholders. An initial impact screening process was carried out to identify key environmental and social elements and project components and activities that may impact these elements. Identified areas of potentially significant impact will be subjected to a detailed impact analysis through the following tasks of the study. Both positive and negative impacts, whether social or environmental will be considered. This Scoping Statement should set the direction for the full EA report.

The Giza Pyramids Plateau is located in the Giza Governorate, in the southwestern part of the Greater Cairo Region (GCR). The Plateau actually defines the eastern fringe of the Western Desert, and overlooks the densely populated areas of the main Giza urban agglomeration, which extend eastward across the Nile Valley for approximately 10 km to the Nile River and Cairo city center.

The geographical scope of this study covers the Pyramids Plateau proper, which contains the archaeological site of the Giza Necropolis; some empty desert land southwest of the plateau; and part of the urban and cultivated areas of Giza, particularly the village of Nazlet el Sammaan, which is situated immediately to the east and northeast of the plateau. The areas south of the plateau are eitherempty desert, extending all the way to Fayoum Depression, or cultivated land in the Nile Valley. To the west and northwest are the new urban communities of 6th of October City and New Giza, the latter being directly adjacent to the study area, along the Fayoum Road. The project study area is shown in Figure1.

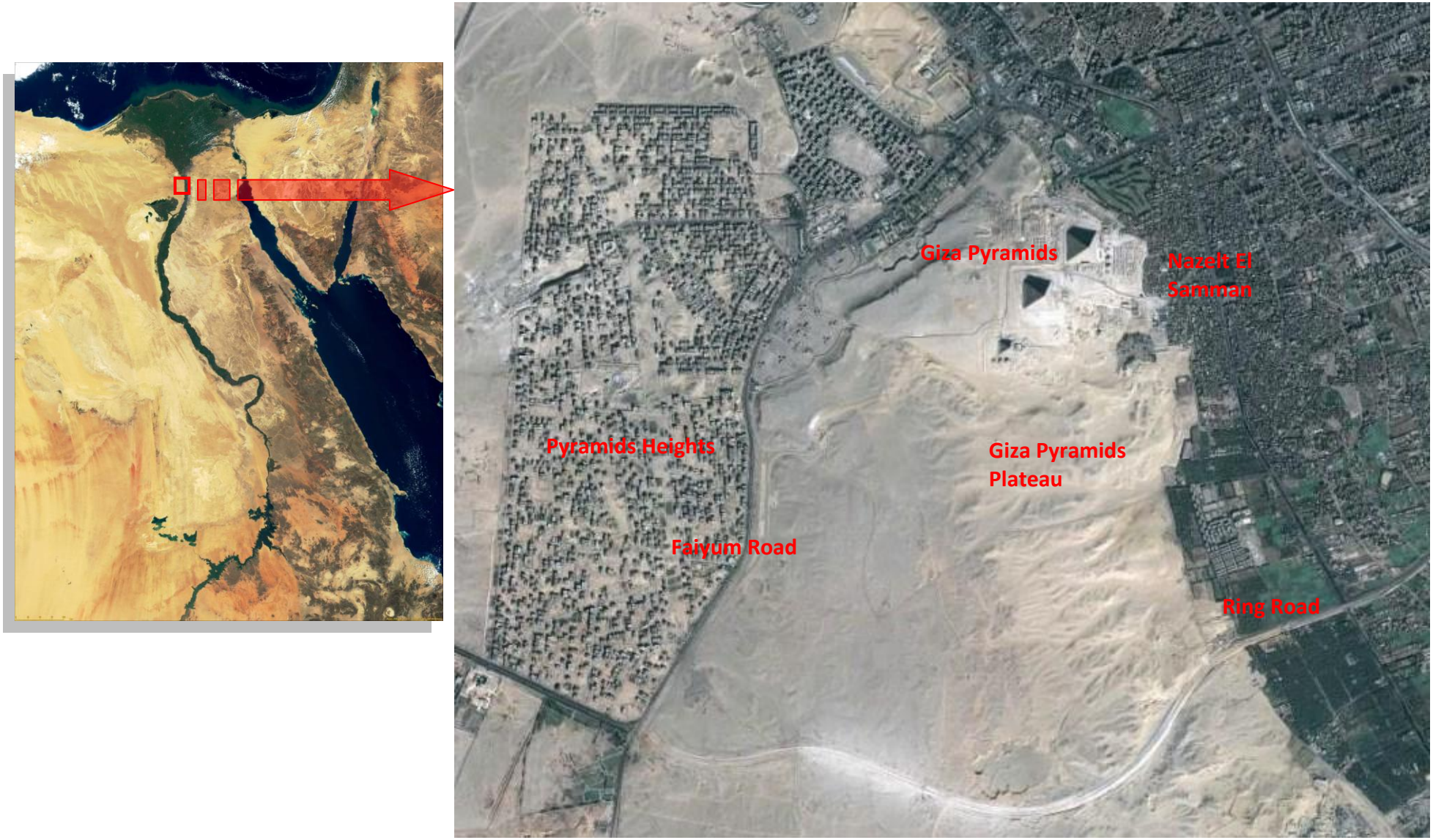


Figure 1 Location of the Giza Plateau and the EA study area.

EXISTING CONDITIONS

Environmental Setting

The Giza Plateau is located at the western edge of the Nile's flood plain just south of city of Giza and about 10 km west of the Nile. The Greater Cairo area, which encompasses the large urban centers of Cairo and Giza, occupies the entire stretch of the Nile's flood plain, just south of the Nile Delta, stretching out east and west into the adjacent desert. Unplanned urbanization of rural areas north and south of Greater Cairo is turning numerous small villages at the outskirts of the city into large, informal urban areas. This informal urban growth is now crowding the world famous Giza – Saqqara archeological zone, including the Giza Pyramids Plateau, from all directions.

To the east of the plateau, the Nile's flood plain is a patchwork of urban areas and cultivated fields, which extends for about 10 km to the western bank of the Nile River (Fig. 2). To the west, lies the new urban community of 6th of October which occupies the desert area to the west of the plateau for some thirty kilometers. To the west of the 6th of October City lies the uninhabited Western Desert which extends, uninterrupted to the Egyptian Libyan border more than 600 kilometers away.

The area is climatically hyper-arid with rainfall averaging only 10 mm/year. The Nile River is therefore the only source of water for all human activities including agriculture. The remaining cultivated areas in the vicinity of the plateau are irrigated with water from the Mansouriya Canal which runs less than 0.5 km to the east of the Plateau.

Water in the Mansouriya Canal appears to be highly polluted (Fig. 3). Sources of pollution are pesticides and chemical fertilizers from adjacent agricultural fields, illegal domestic wastewater drainage from villages, and the dumping of domestic and agriculture solid waste. Despite the obvious pollution of the canal water, some local fishermen regularly fish the canal, catching Tilapias and catfish to be sold mostly at local villages.

With thousands of years of intensive human activities, the modern Nile Valley in the Greater Cairo area is essentially a man-made ecosystem. The biodiversity of the peri-urban environment in and around the Giza Plateau is consequently comprised for the most part of species that are either commensal, or at the very least tolerant to human activity. The area is not inhabited by species of plants or animals that are listed as threatened at the local, regional or international levels.

Social & Economic Setting

1. Demographic characteristics

Nazlet El Samman (Figs 4 & 5) like many villages in the Governorate of Giza has over the years, become part of the haphazard urban sprawl that characterizes Greater Cairo. Nazlet el Samman is the neighborhood or administrative unit (shiakha) with the second largest population in El Ahram district (Markaz) which comprises 6 shiakhas. According to the last district census, by January 2010, Nazlet El Samman had 52,259 inhabitants representing 18% of the total population of the district, only preceded by Mansheat El Bakary with 31% of the total district population. It is mostly a young population with approximately 60% (31.827)

aged 25 years or less, more or less equally distributed between males and females, which indicates that it is a stable and not transient population. The 2006 Central Agency for Public Mobilization and Statistics (CAPMAS) census reports that more than half of the inhabitants own their homes (melk, tamleek, heba). The rest of the population is living in different forms of rentals, mostly old, which indicates that that they have been living there for a long time; however, there are also a few (2029) that are living in new and furnished rentals. Half of the inhabitants of Nazlet el Semman are educated, holding intermediate and university degrees. Approximately 20% are illiterate, with women as expected, constituting the majority. There are lawyers and other white collar professions among the population of Nazlet El Samman, as well as tour guides, construction and factory workers, shop keepers, street vendors, and clerical employees. Many of the residents leave the area during the day to go to work, while others work in the tourist-centered businesses of the area.

2. Public Facilities

Water and waste water coverage is quite comprehensive, and according to residents only a few dispersed houses in some areas are deprived. There are no complaints about the quality of the water. Electricity is also available

Medical services though available to people through a number of private clinics, a private hospital, and the family health clinic, are not well regarded by residents who resort to facilities outside the area when serious treatment is needed. Educational and recreational facilities are scarce. There are only three public primary schools in the area, one of which is closed. There are no preparatory and secondary schools in the area. Abou El Hol Club was the recreational facility available to youth; however, as of 2005 the Supreme Council of Antiquities (SCA), restricted some of the activities that were previously allowed there, saying that there were antiquities on site. To date no alternative to that club has been provided for youth related activities.

There are a number of community development associations (CDAs) in the area, some of which have religious affiliations like El Gamea El Shareya and others that have been established by prominent individuals or families to provide among other services, various charities to pensioners and orphans. Not all CDAs are perceived by residents as effective, however, El Gameya El Shareya's branch in Nazlet El Samman headed by Sayed Manaa, is considered to be the most active. In addition, a number of key leaders have their office door open to receiving complaints from the public (Maktab Shakawa El Moatteneen).

Nazlet El Samman has a post office, and it has prayer facilities. There are a number of mosques and zawwiyas (small prayer areas) and a church.

Both public and private transport is available. The toc toc a private and cheap means of transport that has become very popular in certain low income areas is not allowed in the tourist area; however, it is one of the means of transport that the people of Nazlet El Samman use quite extensively.

In addition to the Al Ahram district police station, there is a traffic control unit in Abu El Hol el Siyahi Street to regulate the flow of traffic, and ensure the safe passage of tourist buses. Police presence is very noticeable in the area, to ensure the security of tourists.

3. The Social and Economic Structure

There are no social divisions among the population in Nazlet El Samman. There are a number of big families (Khattab, El Gabry, El Shaer, Abu Fayed, El Kamatty, Ghoneim). Tracing their ancestry to the Arabian Peninsula, these families have been living and conducting business in the neighborhood for generations. Interviews conducted for the purpose of this EA confirmed that most respondents (men &women) had been born in the area to parents, and grandparents who had also been born in Nazlet El Samman.

In each of these big families, there is one or more individual who is politically active, and is a member of the People's Assembly or the Shura Council. The families are large and like all extended families in Egypt, they include both prosperous and less prosperous members. The general condition of buildings in the area is misleading. While residents may have adequate resources to undertake renovation to structures, the residents indicate that the government has made the decision to not allow them to undertake any construction or renovation work. Therefore no permits are issued, a fact contributing to the explanation of why there are so many dilapidated houses.

It is important to note that Nazlet El Samman extends both east, west and south of the area adjacent to the Pyramids and the Sphinx, which represents only a small section of the shiakha. However, this is the area where most businesses (bazaars and horse stables) are located and Abu El Hol El Siyahi Street is its artery. It is the largest street lined on both sides by one or two story buildings, and it is the main commercial hub where various groceries, bakeries and other shops are located. There are 72 bazaars in Nazlet El Samman selling artifacts, carpets, jewelry and incense, about 50 tourist agencies, and close to 100 horse and camel stables for tourists who wish to go horse back riding or on a camel tour in the desert around the Giza Pyramids Plateau. Focus groups with bazaar and stable owners revealed that a stable employs on average 3-6 persons, while a bazaar or tourist agency can provide permanent and part-time employment to up to 30 persons.

Many of the business owners live in apartments above their business, or nearby. It is not unusual to find some owning residences outside of the area; however, they continue to live in the shiakha where their businesses are located.

Some of the business people own more than one enterprise centered on tourism. Bazaar owners can also own stables and tourist agencies. Business interests often extend outside the area of the neighborhood, but Nazlet El Samman is where it all begins.

4. Cultural heritage

The general area from the Giza Plateau to Dahshour some 20 kilometers to the south, holds a wealth of Ancient Egyptian funerary monuments, and was declared a UNESCO World Heritage Site in 1979. The site is officially known as Memphis and its Necropolis – the Pyramids Field from Giza to Dahshur.

The Giza Plateau includes the Giza Necropolis, which is especially famous for its 4th Dynasty (2575 - 2467 BC) pyramids, Khufu, Khafre, and Menkaure, and the Great Sphinx. The pyramids and Sphinx are not, however, the only vestiges from the past in the plateau. In reality, each lies within a group of related architectural components, including subsidiary

pyramids, solar-boat pits, workshops, and a harbor, funerary temples connected by causeways to valley temples, quarries, and mastaba fields/cemeteries (Figures 6 & 7).

Recent excavations near the Valley Temple of Menkaure and tomb of Khentkawes uncovered the remains of adjacent settlements, and a larger town, further south, that was inhabited by the workers who built and maintained the pyramids for generations after their construction. This general area is located about 300 meters south of the Sphinx, where stands a 200 m long and 10 m tall structure known as the Wall of the Crow (Figure 8). The area is low-lying, mostly between 15 and 17 m above sea level, at the interface between the desert and floodplain. The area north of the Wall, which lays at the bottom of the main wadi separating the Moqattam and Maadi limestone formations at Giza, is now covered by a Muslim cemetery. This cemetery covers part of the Khentkawes/ Menkaure settlements and fills a deeper part of the wadi channel, about 125 meters wide. An area southwest of the Wall of the Crow is now covered by a Coptic cemetery.

Discoveries in the town south of the Wall include worker's houses, various storage areas, and part of a vast royal complex, comprising an administrative building and huge galleries separated by a paved street, which may have lead to a royal palace. Much of these low lying areas, however, are now concealed beneath the modern town of Nazlet el Samman, its cemeteries, and a sports field further south. These low lying areas were periodically flooded by Nile floodwater until the construction of the Aswan High Dam. They are now particularly at risk of being damaged by the rising groundwater.

Figure 2 Agricultural fields southeast of the Giza Pyramids Plateau.

Figure 3 Solid waste in the Mansoriya Canal just east of the Giza Pyramids Plateau.

Figure 4 Nazlet El Samman. Note the horses and camels.

Figure 5 Nazlet El Samman. Note the tourist buses.

Figure 6 The Great Sphinx and the pyramid of Khafre in the background.

Figure 7 The Great sphinx. Note the effect of the differential wind erosion on the hard limestone of the head, and the soft limestone of the rest of the statue.

Figure 8 Wall of the Crow.

Project Objectives

Many of Egypt's ancient monuments in the Nile Valley have recently been subjected to the erosive effect of rising groundwater, which is absorbed by the porous stone of the monuments. Degradation takes place as this water evaporates from the stone, leading the corrosive salts it contains to accumulate in such high concentrations that they damage the stone over time.

Several reasons contribute to the rising water table. The primary reason is the nation-wide shifting of irrigation from seasonal, basin system to perennial irrigation system, which implies that all Egyptian farmlands are irrigated throughout the year. This increased irrigation water form a subsurface water table, which through capillary rise would greatly contribute to soil salinisation and even water-logging in low-lying areas. In urban areas, derelict water/drainage infrastructure can also contribute to a rising water table.

Since the year 2000, the Government of Egypt has developed and implemented several successful large-scale engineering projects to protect archaeological monuments from rising groundwater in Old Cairo, East Luxor, and West Luxor.

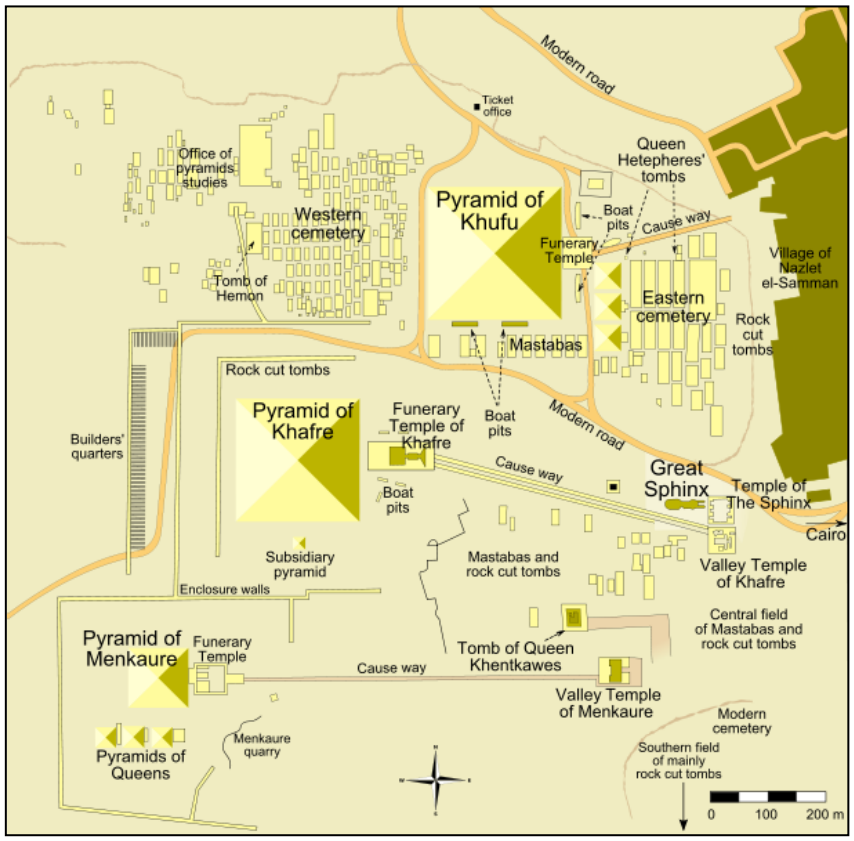
In the Giza Plateau area (Fig. 9), the problem has developed so rapidly in recent years that some low-lying areas of the Giza Necropolis have repeatedly been inundated with groundwater appearing on the surface. Groundwater has appeared on the surface near the Sphinx Temple, the Great Sphinx (Figs. 10 & 11)., the Valley Temple, and has almost completely covered the recently discovered City of the Pyramids' Builders.

To control the rising groundwater table in the area and protect the Great Sphinx and other Giza Necropolis monuments, including those that are yet to be discovered from the destructive effect of the rising groundwater, the Supreme Council of Antiquities, in collaboration with Cairo University implemented an emergency groundwater lowering program in 2009. This quick action program, with its small number of wells in the vicinity of the Sphinx and the City of the Pyramid Builders, pumped groundwater into the nearby sewage system. This temporary program resulted in the lowering of the groundwater table in area and the disappearance of standing surface water.

The main objective of the present project is to develop a long term solution to control the rise of water table in the pyramids Plateau and keep groundwater at a level that would not threaten the monuments. A number of alternative engineering approaches are being considered. Selecting the final alternative for implementation will be based upon several factors including environmental and social impact.

The aim of the Giza Pyramids Plateau dewatering project is therefore to:

1. Identify possible causes of rising groundwater in the vicinity of the Pyramids' Plateau and Giza Necropolis.
2. Develop and implement an environmentally and socially sound engineering solution to lower the groundwater table and protect monuments in the area.



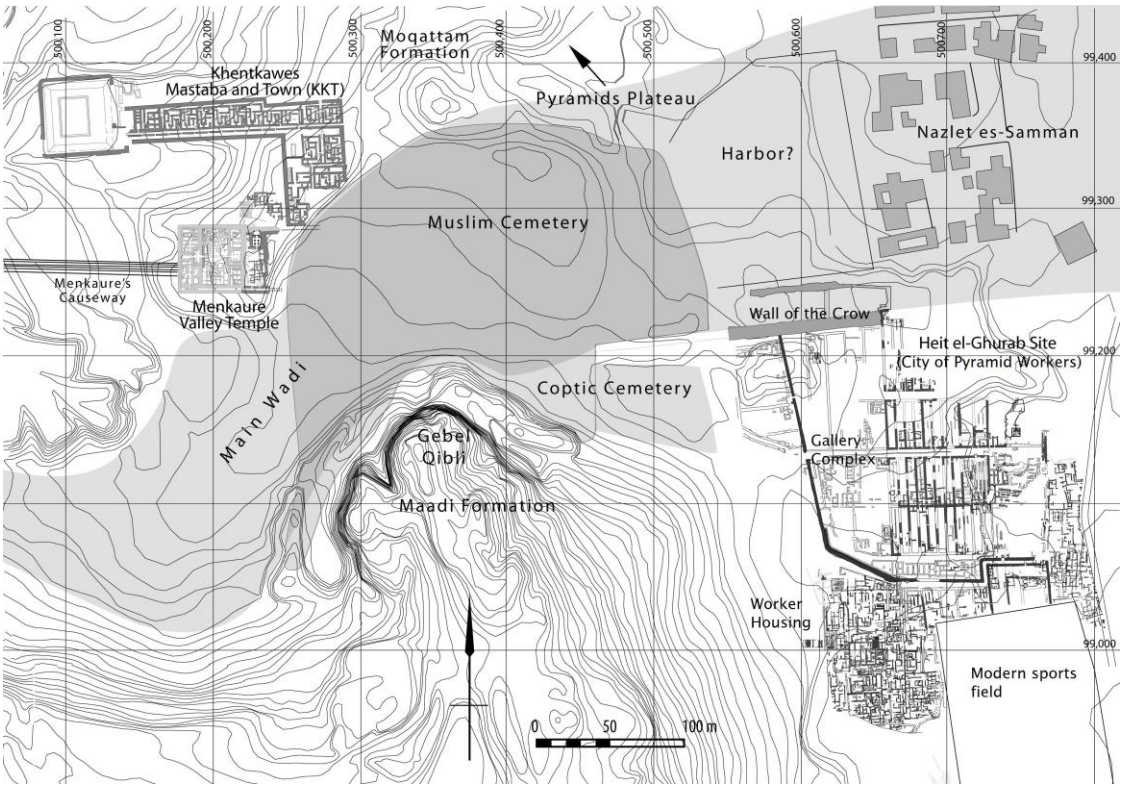


Figure 9 The Giza Plateau (above) and Necropolis in the southwest (below).

Figure 10 Capillary water rise in the outer casing of the lower part of the Sphinx.

Figure 11 Decay of the outer casing of the sphinx as a result of chemical erosion caused by the capillary rise of groundwater.

Engineering alternatives

Alternative approaches for lowering groundwater levels in the Pyramids Plateau area are described below. These approaches are developed on the basis on detailed analysis of data on existing dewatering activities in the area, review of previous studies on groundwater conditions at the site, and on the groundwater modelling and geotechnical investigations that were carried out by the study team. Based on these data, the groundwater surface target level (12.5 m to 13.5 m), that would lower the capillary fringe below the foundations of the monuments was determined. The drawdown levels necessary to reach the targets was established, and the most effective drain alignment/well locations defined.

Other basic requirements of the proposed dewatering system are to involve

- minimum visual impact to preserve the aesthetic quality of the archaeological sites;
- minimal risk of damage to archaeological resources, whether known or unknown;
- minimum need for maintenance and human supervision, so passive systems, if feasible would be preferred;
- construction within the walled Giza Plateau Archaeological Zone, which is owned by the SCA; and
- extracted groundwater disposal of by discharge to the Mansouriya Canal.

Several alternatives were originally considered. Three of these alternatives are retained for further analysis while the others have been discarded for various reasons. The three selected alternatives would achieve program goals and are described below.

Alternative 1 - Vertical wells

Vertical wells (Fig.12) are a common approach to dewatering, and are very effective when the area needs to have its groundwater lowered for another activity, such as construction, or here to protect archaeological resources. The wells will be distributed at the periphery of the area where groundwater needs to be lowered as shown in Figure 12. A system of 8 wells was set up as an emergency measure by Cairo University around the Khafre Valley and Sphinx temple. Another 5 wells were also installed near the City of the Pyramids' workers, but these are not operating yet. The system in place discharges to the sewer and is effective in lowering groundwater, but this is only a short-term solution, which cannot achieve the target drawdown on its own. In order to achieve the dewatering target, additional wells are proposed in this project. The estimated flow extraction is about 2 times the flow being extracted at present, and therefore the number of wells may need to be increased from 8 to 15 in the Sphinx area. Additionalwells may not be needed for the workers area.

The current well system has above ground well heads. An entirely underground system would be possible. This system would require submersible pumps in each well with power, and control located below the ground surface inside a chamber and a discharge piping system to the appropriate facilities.

As the volume of water extracted would be greater than currently generated, it would be discharged to the Mansouriya Canal, rather than the sewers.

Alternative 2 – Linear drains in trenches

Linear drains are another common approach to dewatering. They would be constructed by placing drains in trenches excavated from the surface. The trenches are typically lined with a porous geotextile and filled with uniformly graded coarse material, such as gravel, around a perforated pipe, as shown in Figure 13. The perforated pipe would slope towards a sump where groundwater would be extracted with a pump. The planned trench layout and pump location are shown in Figure 13. The drain is laid primarily along the fence, since this is where the ground level is lower. Two branches extending towards the west will be required to lower the groundwater in the Khafre Valley and Sphinx Temples area. A trench depth of about 9.5 m is calculated, which is considered to be relatively deep for a trench.

A single pumping station would be sufficient to service both the temples' trench leg and the workers area trench leg. Extracted water would be discharged via a force main to the Mansouriya Canal.

Alternative 3 – Linear drains in trenches with vertical Passive wells

Vertical Passive wells can be combined with linear drains to increase their capacity. The vertical wells are passive in that they do not have pumps, but they access deeper strata and can bring significant flows to the drains, especially when the hydraulic conductivity of the formation in which the drain is located is low and higher conductivity material exists at greater depths (see Figure 14). However, the drains still have to be below the desired groundwater level to provide a low head line towards which groundwater will flow. This same lowered head in the drain drives the flow from the lower strata up the wells and into the drain.

The main advantage of vertical passive wells combined with drains is the increased extraction flow without the need for pumps in each well. This advantage however can only be realized in particular circumstances. For the subject project, this configuration is considered advantageous to some extent. Therefore, this configuration is retained as a viable alternative.

The No-action alternative

This alternative implies that groundwater table will be allowed to continue to rise. Damage to monuments is expected to occur. Groundwater will also appear on the surface at several low-lying areas, greatly degrading the attractiveness of this very important touristic site. Taking no action to lower the groundwater table would be globally perceived as a major failure of the government of Egypt to fulfill its national and international obligations to protect and preserve these important elements of the world cultural heritage.

Initial comparison of alternatives

The fact that the dewatering project has been developed and is being currently executed implies that the no-action alternative is no longer an option. The selection of the most appropriate of the above engineering alternative for implementation is currently underway by the implanting agencies in collaboration with the project technical team.

Vertical wells and linear drain trench options are most economical and require technologies and construction methods that are common in Egypt. Capital costs are less for vertical wells. However, the linear drain trench option requires little to no maintenance in the touristic/antiquities area. Therefore, the Linear Drains alternative constructed by open trench method appears to provide the best cost benefit of the alternatives considered. However, as the final selection of the alternative to be implemented has not been made yet, all the alternatives will be evaluated in this EA.

Excess water discharge

Extracted groundwater will be pumped out of the selected system of wells and/or tunnels at a rate of about 1200 m^3/hour (rate of extraction) into a force main, which will discharge the water into the Mansouriya Canal. A force main will be installed under and along Abu Hol Street, from the archaeological enclosure to the Canal (Fig. 15). Abu Fayed Street may be considered as well, but construction would be easier along the wider Abol Hol Street. The location of discharge pump station will be within the SCA enclosure, at the western end of either Abol Hol or Abu Fayed Street.

Comparison and selection of alternatives

The Supreme Council of Antiquities (SCA) is responsible for making the final selection of the "most appropriate" engineering solution to the groundwater problem under the Pyramids Plateau. The fact that the dewatering project has been developed and is being currently executed implies that the no-action alternative is no longer an option. The SCA has been directly involved in the critical evaluation of different engineering solutions based on extensive data generated by the project team, and covering all aspects of the projects including its socioeconomic and environmental consequences. Based on archeological, engineering, economic, social and environmental considerations, the SCA selected the Vertical Wells option for implementation.

In response to the findings of the scoping activities, including public consultation (see next section) and preliminary socio-environmental evaluations carried out by the study team, the SCA decided vertical wells alone would provide sufficient dewatering in the study area, given the current availability of funds, and existence of CU's network of wells. The SCA has also taken the decision to install the discharge force main along Abu Fayed Street, rather than the more easily accessible Abol Hol street, as many of the stakeholders involved in the consultation process expressed concern over the blockage of such an economically significant street for several month. SCA's preferred layout for implementation is shown on Fig. 16.

However, for the sake of transparency and for a full analysis of the alternatives considered initially, all the alternatives will be evaluated in the EA Report.

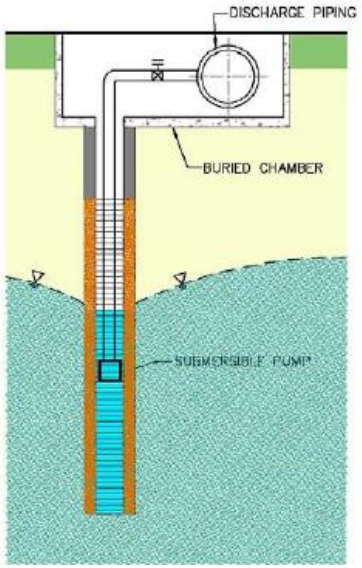


Figure 12 Vertical wells in the study area.

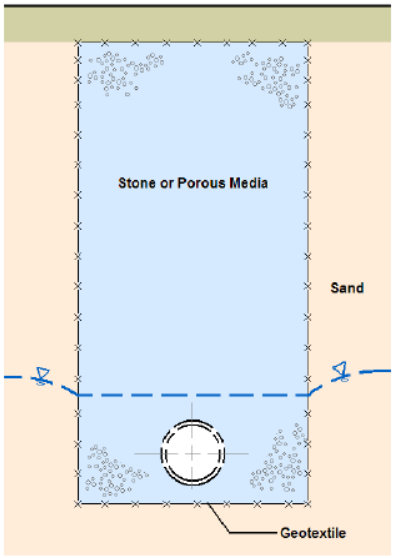


Figure 13 Linear drain in trenches.

Figure 14 Linear drains in trenches with vertical wells.

Figure 15 Discharge force main alternative routings to the Mansouriya Canal (along Abol Hol Street or Abu Fayed Street).

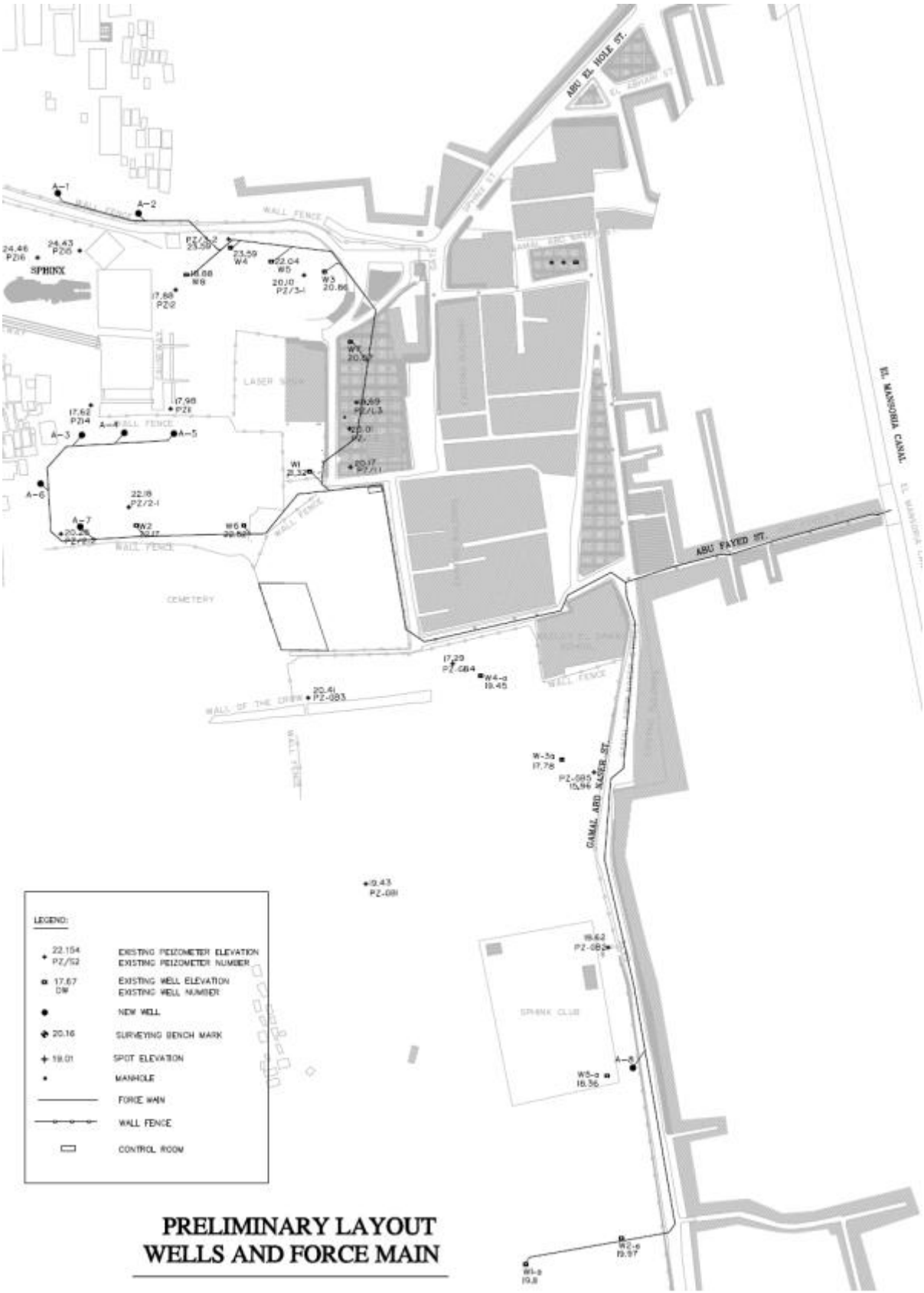


Figure 16 Preferred layout of wells and force main along Abu Fayed Street.

Scoping activities

During impact scoping activities stakeholders were consulted to identify those attributes of the environment and society for which there are concerns. During the scoping sessions, the project team informs the public on what they intend to design and build, including several alternatives, for whom, and where. The team also listed the anticipated positive and negative socio-environmental impacts, and how these may be dealt with. All stakeholders are invited to add their own concerns and observations, and so bring them to the attention of the government, the funding agency, and project team.

Scoping activities for potential environmental impacts were carried out on the basis of a thorough review of literature available on the area (see list of references) and several site visits to assess the present environmental setting at the area. Base measurements for air and water quality, and noise levels were also taken to further document the existing environmental conditions in the area, compare how some of the project activities might affect the local environment, and to allow for monitoring during project implementation. Potential impacts were presented and discussed with the stakeholders during the public scoping meeting described below.

Scoping potential socioeconomic impacts of the project required extensive field work with the local community of Nazlet El Samman. The force main for discharging extracted groundwater into the Mansoriya canal is expected to run along its main street. The community's mind set and issues that they perceive as critical to their wellbeing and livelihood are central to any discussion of impact areas of the proposed project. Accordingly, the EA team undertook an investigation of the social setting and economic activities in the area using a methodology that combined observational methods (transect walks), as well as focus group sessions with stakeholders and in depth interviews with key community members. These field scoping activities, along with a public scoping session involving all key stakeholders constituted the main public scoping activities and are described below.

Field scoping activities

Five focus group sessions were conducted; two with residents (which turned out to be men), one with women, one with bazaar owners, and one with horse stable owners. Key community leaders were identified through the focus groups and were interviewed to confirm the findings from the focus groups and to get their opinion as to the issues to be taken in consideration in the environmental assessment and during the implementation of the project. Ten such interviews were administered.

The EA team went on two transect walks along Abu El Hol El Seyahi Street (the Hazlet El Samman main street) along which the water discharge force main is proposed to run, and along the streets of Abu Fayed and its extension in El Torab (El Hefnawi) where the cemetery is located, as well as the funeral hall and some horse stables. The purpose was to observe tourist movement during these hours and also to get a feel for how the people of the area live and conduct their business during peak days and hours.

The overlap in the implementation of the focus groups, transect walks and in depth interviews was intentional so that information obtained through one method could be cross checked by information obtained through the other methods.

Profiles of participants of the focus group discussions and stakeholders in depth interviews are shown in Annex 1.

The Public Impact Scoping Session

A public scoping session was held to which representatives of the various stakeholder concerns within the community were invited. The meeting was advertized in the widely circulated Egyptian newspaper, *Al Ahram*, with an open invitation to all concerned parties and the public at large (see Annex 2).

The public scoping session was held on 11 April 2010 at 11:00 am in the Conference Hall of the Mena House Hotel located just at the foot of the Giza Pyramids Plateau (Fig. 16). Copies of the meeting agenda and a fact sheet describing the project objectives, components and activities were distributed (Annex 2).

Figure 17 The public scoping meeting, 11 April, 2010.

The meeting was opened by Dr. Sabry Abdel Aziz, Head of Egyptian Antiquities Sector, SCA who welcomed the participants and introduced the SCA dewatering scheme for the Egyptian antiquities and the purpose of the Environmental Assessment. AECOM/EDG Environmental Assessment Team Leader Dr. Mostafa Saleh then gave a Power Point presentation

describing the Pyramids Plateau Groundwater Lowering project, the EA process and its objectives (Annex 3). The results of the preliminary scoping exercise that was conducted to assess the current situation and the negative environmental, social and economic impacts that could potentially occur during the construction and operation phases of the project were presented. Participants were encouraged during a lengthy discussion session to provide their input and to ask for clarifications concerning the engineering solutions/options that were outlined. Verbal and written comments were received and recorded. Mr. Yosuf Khatab Head of the Tourism Council of the Local Popular Council of Giza and Dr. Sabry Abdel Aziz of SCA coordinated the discussion, and Mr. Said Abdel Maqsod and Dr. Ahmed El Ginidy of AECOM/ECG and Dr. Mostafa Saleh of AECOM/EDG responded to the technical questions and comments. From the project Technical team the following persons attended the meeting and were available to respond to technical issues if needed:

- Shripad Gokhale, AECOM Project Manager
- Hosam Ouf, Deputy Project Manager
- Betsy Shreve-Gibb, AECOM Senior Environmental Scientist
- Nemat Guenena, EA team leader, sociology.

community, relevant governmental agencies, local politicians, and civil society groups (Annex 4). Key stakeholders that were represented at the scoping meetings include, but are not limited to (see Annex 5):

- The owner of the project, in this case the SCA.
- The implementing agency, CAPW/NOPWASD.
- The funding agency (USAID).
- The Giza Governorate.
- Archaeological experts (including members of American Research Centre, ARCE).
- Relevant national ministries (e.g. Ministry of Irrigation and Water Resources).
- Cairo University, which has conducted preliminary work and studies in the vicinity of the Giza Necropolis.
- Citizens from the village of Hazlet el Samman.
- Interested local farmers, landowners, and businesspeople (tour operators, shopkeepers, etc...).
- Several Local Council members.
- Representative of the area in the People's Assembly (The Egyptian Parliament).
- Local NGOs.

Out of the 86 stakeholders from the community who turned up to the public hearing, 14 were women.

Environmental and Social Issues Raised

A transcription of the public scoping discussion is shown in Annex 6. A number of positive and negative impacts have been identified as a result of the scoping activities described above. In general, the results of the public scoping session confirmed the findings of the initial field scoping exercise.

Several, significantly positive impacts of the project are identified and seem to be appreciated by most of the stakeholders, including the Nazlet El Samman community. These positive impacts should be emphasized to allow a realistic, socio-environmental cost-benefit

analysis of this important project. Identified positive impacts of the dewatering activities are as follows:

- Preventing further deterioration of the world celebrated monuments of the Giza Plateau.
- Fulfilling Egypt's role and international commitment to protect and preserve the Giza Pyramids Plateau as a World Cultural Heritage Sites of a very special global significance.
- Improving tourism services in the area by enhancing tidiness and the general aesthetic qualities of the monuments as a result of removing the pools of stagnant water often appearing in low–lying spots.
- Drying the stagnant surface water will also prevent the breeding of mosquitoes which constitute a major nuisance and a public health hazard for the local community.
- A temporary enhancement of the local economy during construction as a result of the presence of the construction crews, and the increased demand for some construction supplies.

Issues affecting neighboring communities, particularly the village of Nazlet El Samman dominated all the scoping discussions, while potential impacts of the project on the physical, biotic or cultural environment did not come up in such discussions with the local inhabitants or during the public scoping meeting. Even issues related to noise and dust pollution that is expected to result during construction work did not seem to be of any concern.

Scoping interviews and focus group meetings with stakeholders from Nazlet el Samman, as well as the outcome of the public scoping session revealed that the local community is generally skeptical as to the government's intentions, and therefore doubtful that the dewatering intervention will be of much benefit to them. There appears to be much misinformation in the community, and the issue of groundwater affecting some of the antiquities is seen as a tactic that will allow the government to seize greater control in the informal Nazlet El Samman area. This is clear as many of the interventions during the scoping session were not related to the dewatering activities per se. The people from Nazlet el Samman claim that the rising groundwater is caused by the Mena House Hotel golf course and other factors that have little, if anything, to do with their presence in their village and its continuing growth and expansion.

Issues raised by the community are significant in terms of their importance to the project. People in general seem ready to put up with project-related inconvenience as long as it does not interfere with their livelihood, the well being of their children or threaten their "rightful claim" as residents of Nazlet El Samman. However, being fully informed of the scope of the project and its duration, and being offered the requisite guarantees, are requirements that are conditional to enlisting the support of community leaders and accordingly the community's cooperation.

The Nazlet El Samman community's concerns are the following:

- Construction work in the Abu Al Hol Street is seen as a potentially major problem for shop owners and the residents of Nazlet Al Samman at large. Blocking entrances to

shop, traffic congestion and the unsightly accumulation of construction waste and material are expected to impact touristic services in the area. Selecting an alternative route for the force main, through a minor street was suggested.

- Abu Fayed Street was mentioned as an alternative but a sensitive one because it leads to the cemetery of Nazlet El Samman and to the funeral hall. However, if need be, then the construction works could be effected in the area adjacent to the wall of the primary school of El Samman, beginning after the Nasser mosque, and the funeral hall.
- The ability of the houses especially the more dilapidated ones to withstand the pumping of ground water is at the forefront of issues stressed by household residents, not so much because of the cost of the damage, but because the very existence of the structure signifies their legitimate claim to residing in the area.
- The duration of project, the nature and size of the equipments that will be used are critical issues especially for bazaar and stable owners who worry that the access of tourists to their shops and stables will be restricted as a result of the works especially if these are to take place in the main street of Abu El Hol El Seyahi and in Gamal Abdel Nasser Street where the majority of stables are found.
- The unfettered access of the area around Abu El Hol El Seyahi Street to emergency and rescue services (ambulance, fire engines) was mentioned by community leaders and focus group participants, especially the residents among them, as being critical.
- Focus group with women revealed their concern about their children. Children walk to school and often play in the street in front of the houses. They should not be endangered by construction activities and equipment that is left unattended.

The community's suggestions are the following:

- If construction activities are to happen in Abu El Hol El Seyahi Street which is the option least acceptable to the community, they should be implemented in stages. Attention must be paid to keeping the parking spaces of the tourist buses and the entrance to the bazaars accessible. For stable owners, similar consideration should be applied to the streets leading to their stables.
- El Thalaga Street was mentioned as being an acceptable option that should be considered by the engineers because it is large enough to accommodate construction activities without being as sensitive as Abu El Hol El Seyahi Street.
- Working during weekends, holidays and at the hours when tourists come to the bazaars and Sound and Light should be avoided as much as possible. Weekdays are more suitable than weekends.
- SCA should give people the proper assurances that any damages to their property that occur as a result of pumping will be fixed, or at least they will be adequately compensated.

SPECIFIC COMMENTS MADE DURING THE PUBLIC SCOPING MEETING

The following questions/comments were made during the public scoping meeting and were responded to by a panel of the project team and representatives of the SCA.

1. **The alignment of the water discharge force main along Abu El Hol Street.**

This issue came up several times during the discussion and seemed to be the most pressing issue for the Hazlet El Samman business representatives, residents and local political leaders.

Question: On what basis did you select the proposed alignment of the force main through the Abu El Hol Street? Other, less busy streets are available and can actually allow a shorter route to the Mansoriya Canal.

Response: Abu El Hol Street was thought to be more suitable because it offers a direct route to the canal and its width allows the construction work to be carried out without the need of block the street to traffic. Other streets have been considered. However, all available streets that can directly lead to the canal are narrow and digging the force main trenches will unavoidably result in the total blockage of the street and will make access to homes in these streets very difficult or even impossible during construction work. Nevertheless, the team will continue searching for an alternative route to minimize the impact to the local community even if entails a longer pipeline.

Comment: Abu El Hol Street has been recently upgraded and paved at a cost of millions of pounds. It does not make any sense to have all these expenses go to waste by the construction of the force main that could be placed elsewhere where it will cause less damage.

Response: The project team will continue searing for alternative routes for the force main.

2. **Potential impact of dewatering on Nazlet El Samman buildings**

Comment: The high groundwater table in the area has been there for thousands of years and has not affected the monuments.

Response: The rising ground water table and its impact on the ancient monuments has been investigated by many scientists throughout the country and is a very well documented fact that cannot be ignored.

Comment: Extraction of groundwater that has been under Nazlet El Samman for many years may result in structural damage to buildings, which will threaten the lives of many people in the village.

Response: The proposed system is designed to lower groundwater only around selected monuments within the Giza Pyramids Plateau archaeological area. It will have no significant effect on the level of the water table under Nazlet El Samman and will not affect the stability of the soil or foundations of buildings even in the immediate vicinity of the fence of the archaeological area.

Comment: Would the dewatering be implemented in the Nazlet El Samman village too?

Response: No. The objective of the project is to lower groundwater under the Sphinx and other Pyramids Plateau monuments in its general vicinity, not the village of Nazlet El Samman.

3. **Extracted groundwater discharge and possible use.**

Comment: Large quantities of groundwater will be extracted as a result of this dewatering scheme. Are there any plans for using this water to reclaim some of the desert land in the area?

Response: The water will be discharged into the Mansoriya canal and will be eventually used for irrigation. Diverting the extracted groundwater to a desert area for use in land reclamation activities will require costly infrastructure and is outside the scope of this project.

Comment: Would the extracted groundwater be treated before its discharge into the Mansoriya Canal?

Response: Extracted groundwater will be discharged into the Mansoriya Canal only if its quality meets the legal standards for discharging into the irrigation network. Periodical analysis of the discharged water will be carried out as required by law to ensure meeting applicable standards.

4. **Technical aspects of the dewatering system**

Comment: How was the targeted lowering of the water table determined? Did you use any modelling studies?

Response: The project team carried out a detailed hydrological modelling study of the groundwater regime of the area. The model was field calibrated using existing dewatering system. The model provided the foundation for the development of the present alternative dewatering approaches and systems.

Comment: Have you considered controlling the sources of groundwater table as an alternative to the costly and complicated engineering solutions.

Response: Yes. Source curtailment as an alternative solution for controlling the rising water table has been considered in detail. However, since several sources contribute to the groundwater of the plateau, with Nile's lateral seepage being the main source of groundwater, controlling such sources will only reduce the problem but not solve it.

Comment: What is the implementation time table for the project?

Response: The project is planned for immediate implementation once proper approvals from relevant authorities are granted. The construction schedule will be developed once the final engineering alternative is selected and approved.

OUTCOME OF THE SCOPING ACTIVITIES

Impact areas that should be addressed by the study

Based upon field scoping activities (interviews, focus groups, transect walks, etc…), technical judgment of the EA team and engineering consultant, and the public scooping session, the following issues merit further analysis during the impact assessment:

- Planning the layout of the project components and their spatial relationships to the monuments is of utmost importance to avoid degradation of the magnificent aesthetic qualities of the area. Furthermore the architectural style and the visual profile of any building or other structure that will be erected on the plateau as part of this project (e.g. the pump station building) can potentially, greatly affect the visual qualities of the site. These issues should be given the most careful consideration.
- Implementation of construction activities either on the plateau or in Nazlet Al Samman is expected to be the main source of potential impacts. Construction planning, management and supervision, with environmental and social impacts in mind are essential to avoid or minimize most of the significant impacts of that project. Issues such as traffic management, construction site management, health and safety are of key importance and should be taken into consideration when planning construction activities.
- Potential impact of construction activities on the air quality and noise levels in the area should be considered.
- Certain traffic congestion and/or interruptions during force main construction should be taken into account. The traffic on the Mansoriya Street, which connects the Al Ahram district to the entire Giza Pyramids – Saqqara Pyramid area, at its intersection with El Hol or Abu Fayed Streets will be interrupted. Although this traffic interruption is expected to be relatively brief, occurring only during the connection of the force main to its discharge outlet in the Mansoriya Canal, it is expected to create a significant congestion of the heavy traffic flow of that busy street.
- Traffic problems may also occur on the plateau as a result of construction work and the presence of heavy construction equipment. Careful planning of traffic flow on the plateau during construction is required.
- Transportation of construction material and waste to and from construction sites on the plateau and in Nazlet El Samman is expected to potentially impact local traffic flow. If not properly done, the transportation process as well as the storage of such materials can create a pollution problem as a result of the spillage of transported material or its dispersion by wind.
- Construction activities in the crowded Nazlet El Samman area and even on the plateau where thousands of tourists will be moving on foot in the immediate vicinity of construction sites, poses a potential risk of accidents and would have to be addressed during the impact assessment.
- Potential interruptions of water or electric utility services as a result of construction activities should be evaluated.

- Construction activities on the plateau, particularly in the Sphinx area is a key issue that should be carefully examined. The construction process with the construction waste it generates and the construction material that will be brought to the site will greatly degrade the quality of the experience sought by the visiting tourists. Construction activities, as well as the presence of heavy construction equipment will not only impact the aesthetics of the area, but will hinder viewing opportunity and will interfere with activities and enjoyment of tourist coming to see and enjoy these sites from faraway places. Very careful planning and management of construction activities will be absolutely necessary to minimize the construction duration and avoid impacting the flow of tourism to area and to Egypt in general.
- Potential impact of construction activities, including the use of heavy equipment on existing and the yet undiscovered antiquities should be examined.
- Effects of discharging the extracted groundwater on water quality in the Mansouriya Canal are an issue of key importance. Despite the highly degraded quality of the canal water, the impact of discharging such a large volume of water on its aquatic ecosystems, however, needs to be considered. The quality of the water that will be discharged into the canal is particularly important, and should be carefully examined. Samples of groundwater pumped from operational wells in the Sphinx area and possibly in other areas to be dewatered, should be analyzed. Water quality should be evaluated against the permissible standards set by the law (Annex 7). Water not meeting these standards cannot be discharged into the irrigation network.
- The operation of the pump stations may result in unacceptable levels of noise during the operation of the project, as they may be located close to residential areas. Potential noise impacts will be investigated.
- Above ground installations of the dewatering system, such as the pump station building, if not carefully designed and placed, can degrade the visual qualities of this unique human heritage site. The visual and aesthetic impact of any above ground element of the project will have to be carefully assessed.
- Impact of dewatering on the stability of the foundations of the ancient monuments, and of other structures nearby should be investigated.

Issues that should be eliminated from further analysis

Impact screening showed that one impact area, namely biodiversity, is not likely to be of significance for this particular project and can be safely dropped from further analysis. This highly urbanized and densely populated area supports no significant natural habitats and only a low diversity of organisms that are normally associated with human habitations. No threatened habitats or species of animals and plants occur in the area or depend for their survival on its resources. It is also highly unlikely that any of the project activities will adversely affect the habitat or the wildlife of the area.

Next steps in the Environmental Assessment

Implementation of the EA will continue on the basis of the scope defined in this scoping statement. Issues of environmental and social significance will be addressed and thoroughly investigated. Special emphasis will be placed on developing appropriate measures to mitigate adverse impacts of the project and identify and assess the significance of the residual impacts that cannot be eliminated and would represent the environmental and social cost of the project. The EA team will continue to work with the project engineers and key stakeholders to maximize the benefit of the project and minimize its environmental and social cost. The Draft EA will be submitted two weaks after recieving USAID's approval of the Scoping Statement.

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PROPOSED OUTLINE FOR THE EA

1. Summary

2. Introduction & purpose

3. Affected environment

3.1 Physical environment

3.1.1 Geographical scope

3.1.2 Geomorphology, Geology, Hydrogeology

3.1.3 Climate.

3.1.4 Air & water quality

3.1.5 Noise measurements.

3.2 Biological environment

3.2.1 Background, biodiversity status.

3.2.2 Terrestrial & aquatic habitats, flora & fauna

3.3 Socio-economic environment

3.3.1 Background and approach

3.3.2 Demographics and socio-economic setting.

3.4 Cultural heritage

4. Project description

4.1 Groundwater and dewatering target

4.2 Dewatering system components, activities & alternatives

4.3 Source curtailment & no-action alternative

5. Environmental consequences

5.1 Impact identification & analysis

5.2 Analysis of alternatives

6. Environmental and social management plan

6.1 Environmental & social mitigation plan

6.2 Monitoring Plan

Annex

Annex A: Legal framework & relevant laws (environment, water, labour…)

Annex B: Scoping session & statement

Annex C: References

ANNEX 1 FIELD, FOCUS GROUP SCOPING MEETINGS AND INTERVIEWS

(Interviewed local community leaders)

تم عمل عشرة لقاءات مع القيادات الطبيعية بالمنطقة وهم :

1. الحاج / مجدى خطاب
العمل التطوعى :عضو مجلس الشعب مرشح فئات من سنة 1990 الى الان
العمل الاساسى : رجل اعمال فهو رئيس مجلس ادارة شركة الطارق وشركة الهرم الاكبر للسياحة وشركة ممقاولات لمشروعات القرى السياحية وصاحب بازارات (بازار فيلة) ولديه مزرعة بطريق مصر اسكندرية
عنوان المنزل : شارع ترعة المنصورية (ابو الهول السياحى)فوق بازار فيله
موبايل : 0129001387

2. الشيخ / سيد مناع
العمل التطوعى :رئيس الجمعية الشرعية بنزلة السمان _ ورجل داعية
العمل الاساسى : صاحب محلات سياحية بالغردقة
تليفون الجمعية : 37719695
موبايل : 0105255681

3. الاستاذ / نبيل سعداوى خطاب
العمل التطوعى : قيادة طبيعية يخدم المنطقة بالمساعدة فى استخراج قرارات علاج على نفقة الدولة باللجوء لاولاد عمومته من اعضاء مجلس الشعب والشورى
يخدم الشباب باقامة دورات كرة القدم (سابقا)
العمل الاساسى : مرشد سياحى
عنوان المنزل : شارع امون بنزلة السمان
موبايل : 0185255383

4. سحر خطاب
العمل التطوعى :
   - امين وحدة بالحزب الوطنى
   - امينة المرأة على مستوى دائرة الهرم
   - عضو مجلس محلى محافظة (الجيزة)
   - صاحبة جمعية الغد والمستقبل

العمل الاساسى : كانت مدرسة ثم استقالت
تليفون المنزل : 33852546
تليفون الجمعية : 33889324
موبايل : 0101711193

5. الحاج / عبد الناصر الجبرى
العمل التطوعى : عضو مجلس شعب (مرشح عمال) وله خدمة مواطنين
عنوان المنزل : 18 ش ابو الهول السياحى امام كبابجى الاهرام (براغيتو)
تليفون المنزل : 33858396
موبايل : 0112625111

مكتب خدمة المواطنين : 37420747 المواعيد من 8 – 10 مساء

6. علام عاشور
العمل التطوعى :
- يجمع امضاءات اصحاب الاسطبلات او البازارات لتقديم الشكاوى لجميع المستويات وارسال تلغرافات , ويتم بحث وحل اغلب المشاكل
- عضو برابطة الخيالة

عنوان المنزل : 32 ش جمال عبد الناصر
موبايل : 0121672187

7. أ / يوسف هنداوى خطاب
العمل التطوعى :
- عضو مجلس محلى محافظة الجيزة منذ 1990 الى الآن
- رئيس لجنة السياحة بالمجلس المحلى منذ 2001 الى الآن
- مرشح الحزب الوطنى لمجلس الشورى للدورة الجديدة
- كان رئيس لجنة العشوائيات بالمجلس المحلى على مستوى محافظة الجيزة

تليفون المنزل : 38505532
موبايل : 0123276932

8. أ / عبدالله رحومة حطاب
العمل التطوعى : عضو مجلس الشورى وله مكتب خدمه مواطنين
العمل الاساسى : كان صاحب محلات وبازارات
عنوان المنزل : شارع زغلول متفرع من شارع الهرم مشعل – الهرم (شرق ترعة المنصورية)
موبايل : 0122220343

9. الحاج / محمد يوسف فايد
العمل التطوعى : عضو مجلس شعبى محلى مدينة الجيزة
رئيس لجنة السياحة بالمجلس على مستوى المدينة
العمل الاساسى : صاحب محلات لبيع الروائح الشرقية والبردى واسطبلات خيل
عنوان المنزل : 22 ش سيد جابر مع زين العابدين
موبايل : 0141484276

10. أ / على جودة الشاعر
العمل التطوعى :
- رئيس لجنة السياحة بالحزب الوطنى من 2004 – 2006
- مستشار المجلس المحلى لمحافظة الجيزة (مستشار سياحى وعضو هيئة تنشيط السياحة بالجيزة)
- رئيس جمعية مستقبل شباب الجيزة بنزلة السمان

العمل الاساسى : محامى على المعاش
كان محاضرا بكلية السياحة والفنادق جامعة حلوان لمدة 25 سنة

يملك الان مجموعات شركات بلو سكاى وهى شركة رقم (2) فى السجل التجارى على مستوى مصر وشركة اى كان بميدان التحرير امام المتحف المصرى

عنوان المنزل : ا ش السمان الوسطانى بميدان الحقية

تليفون المنزل : 33850649

موبايل : 0105701800

(Participants in a sample focus group meeting)

حلقة نقاشـية لأهالي نزلة السمان

التاريخ : يوم الأحد 2010/2/21 الساعة 8,30 إلى الساعة 10,45 مساءً
المكان : دوار عائلة خطاب (دوار مغبون) أمام دكان الحاج خُبزه ، وعمرو الرفا بشارع نزلة السمان الوسطاني

م	الاســـم	السن	النوع	التعليم	مدة الإقامة بالمنطقة	العنوان	المهنـة
1	محسن محمد السعدي	53	ذكر	معهد اتحاد الموسيقي	أبا عن جد	5 ش سراج الدين من ش سيدي حمد السمان	أمين نشاطات التجارية والصناعية
2	نبيل مهدي أحمد المنجيلفي	35	ذكر	دبلوم تجارة	أبا عن جد	16 ش أمون	عضو في الحزب الوطني بدون عمل
3	إسلام أبو العلا خطاب	29	ذكر	دبلوم زراعة	أبا عن جد	ش عماد الدين من ش أبو الهول السياحي	أمين شباب السمان عضو هيئة مكتب جمال مبارك وأمين تنظيم المهندس أحمد عز سابقا
4	محمد ناصرة حمدي	23	ذكر	بكالوريوس نظم معلومات	أبا عن جد	23 ش نزلة السمان	مساعد أمين الشباب بالحزب الوطني

5	جهلان محمد حسين	62	ذكر	أمي	32 سنة	29، 31 ش عمر بن الخطاب وشارع الهرم الرئيسي	غفير عمارة
6	صبري غنيم	45	ذكر	دبلوم تجارة	أبا عن جد	ش نزلة السمان	أمن عمال
7	عمرو أحمد سيد	27	ذكر	دبلوم تجارة	مولد بالمنطقة	ش نزلة السمان	رفـا
8	رأفت محمد إسماعيل	41	ذكر	يقرأ ويكتب	مولود بالمنطقة	ش جوهر القائد	عامل في المركز الصحي

ANNEX 2 PUBLIC SCOPING MEETING ADVERTISEMENT, AGENDA AND PROJECT FACT SHEET

Public Scoping meeting advertisement

Ahram Daily Newspaper on April 7, 2010

دعوة عامة

لجلسة المناقشة العلنية لدراسة تقييم الاثر البيئى
لمشروع خفض منسوب المياه الجوفية بهضبة الهرم

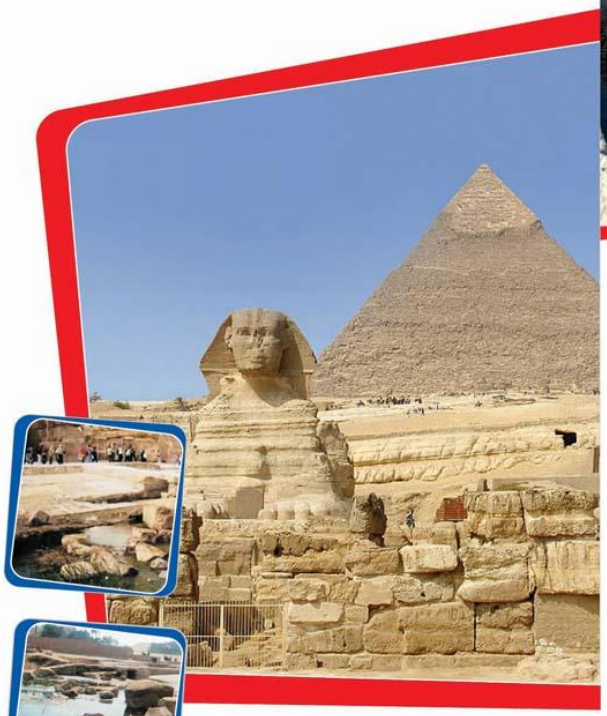
تدعو شركة مجموعة البيئة والتنمية السادة المواطنين المعنيين لحضور ندوة
لمناقشة دراسة تقييم الاثر البيئى لمشروع خفض منسوب المياه الجوفية بهضبة
الاهرام الممول من الوكالة الامريكية للتنمية الدولية بمنحة رقم ٢٦٣-٠٢٧٠

وذلك بقاعة الخليفة بفندق ميناهاوس بالهرم فى الساعة
الحادية عشرة صباح الأحد ١١ ابريل ٢٠١٠

Scoping session Agenda

From 11: 00 – 11:15	Opening remarks by Dr. S.A El Aziz Head of Ancient Egyptian Antiquities Sector Supreme Council of Antiquities
From 11:15 – 11:45	Scoping Presentation by Dr. M. Saleh, EA Team Leader AECOM/EDG
From 11:45 – 13:00	Discussion
From 13:00 – 13:30	Conclusion and Recommendations
From 13:30 – 14:00	Tea Break

USAID | EGYPT Pyramids Plateau Groundwater Lowering Activity



منطقة أبو الهول وما حولها بحوالي متر واختفاء المياه السطحية من كل المناطق المتأثرة حول ابو الهول .

واستكمالا لجهود المجلس الأعلى للآثار لحماية المنشآت الأثرية والسياحية الهامة قام المجلس الأعلى للآثار بالتعاون مع الوكالة الأمريكية للتنمية الدولية USAID بتكليف شركة AECOM الأمريكية بالتعاون مع جماعة المهندسين الاستشاريين ECG بعمل دراسة عن مشكلة المياه الجوفية بمنطقة أبو الهول واقتراح الحلول المناسبة لها.

وتقوم شركة AECOM / ECG بعمل عدة اقتراحات لتخفيض منسوب المياه الجوفية بالمنطقة إلى مستوى آمن لا يؤثر على جميع الآثار بمنطقة هضبة الهرم وبما لا يؤثر على جميع المنشآت الحديثة والأثرية بالمنطقة.

ومن بين الحلول المقترحة تنفيذ مجموعة من خطوط المواسير المثقبة محاطة بفلتر من الزلط ومحاطة بنسيج يسمح بمرور المياه دون مرور حبيبات التربة (Filter Fabric) وعلى أعماق تسمح بتخفيض مستوى المياه الجوفية للمستوى المطلوب ثم تجميع المياه في بيارة تجميع ثم ضخها بواسطة طلمبات إلى ترعة المنصورية .

والجدير بالذكر أن الأعمال الإنشائية للمشروع سوف تكون جميعها داخل المنطقة الأثرية فيما عدا خط الطرد الواصل من محطة الضخ إلى ترعة المنصورية والذي سوف يكون على عمق لا يتجاوز المترين وسوف يتم تنفيذه بحيث لا يعوق الحركة السياحية للمنطقة.

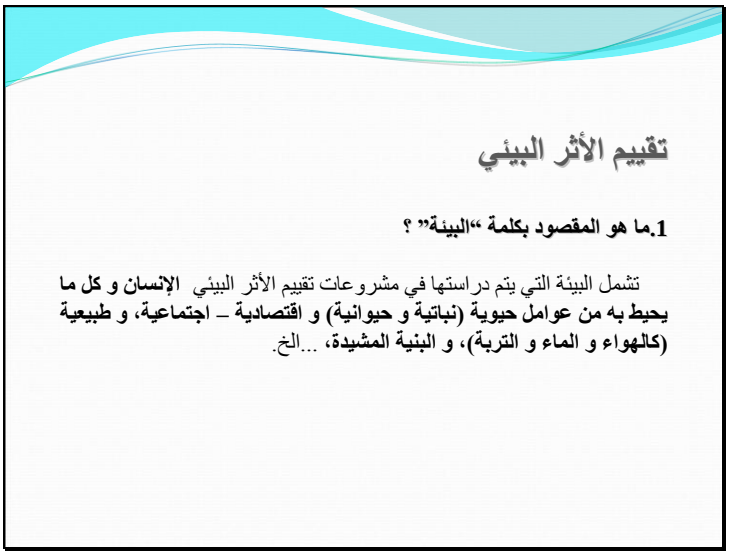
وتجدر الإشارة إلى أن المجلس الأعلى للآثار أكد على الشركة المصممة للمشروع AECOM / ECG أن تكون الحلول المقترحة آمنه تماماً على المنشآت الأثرية وجميع المباني الأخرى بالمنطقة وأن يتم التنفيذ على مراحل وبطريقة لا تؤثر على الحركة السياحية بالمنطقة وأيضاً على الحياة اليومية ومصالح المواطنين بالمناطق المجاورة للمشروع.

ANNEX 3 POWER POINT PRESENTATION

Slide 1

Slide 2

Slide 3



Slide 4

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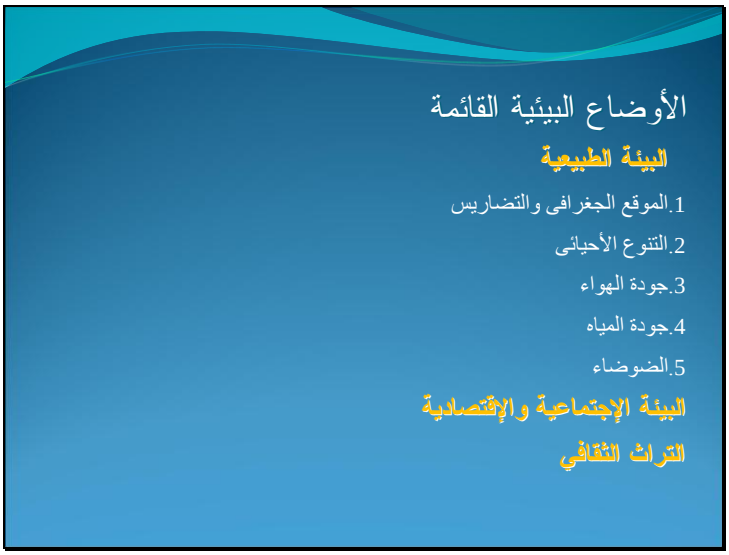

Slide 10

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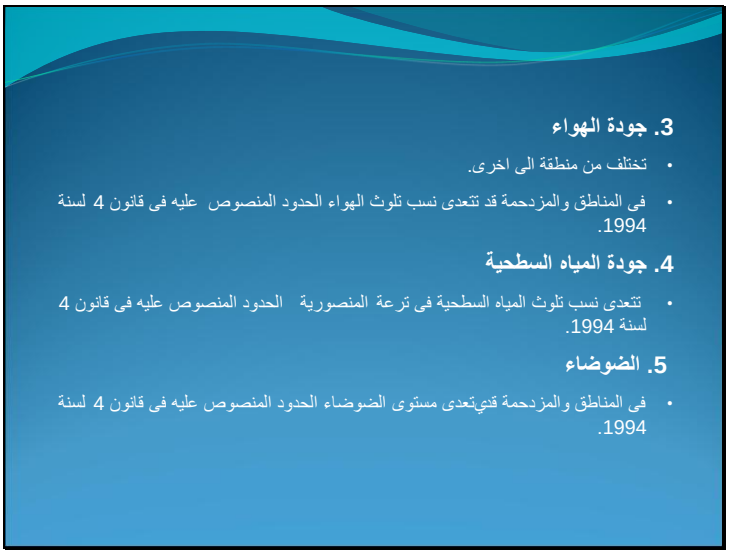


Slide 13

Slide 14

Slide 15

وصف المشروع

- تتعرض بعض المواقع الاثرية المصرية لاضرار جسيمه نتيجة لارتفاع منسوب المياه الجوفية والذى زادت حدته خلال العقود القليلة الماضية.
- من هذه المواقع **معبد الكرنك** و **معبد الأقصر** بالأقصر و **الكنيسة المعلقة** و **كنيسة مارى جرجس** و **جامع عمرو بن العاص** بمصر القديمة وأيضا المنطقة الأثرية حول أبو الهول بالجيزة.
- قامت الحكومة المصرية بالتعاون مع هيئة المعونة الامريكية منذ سنة 2000 بتنفيذ مشروعات هندسية كبيرة فى مناطق القاهرة القديمة وشرق الاقصر وغرب الاقصر بهدف حماية المنشآت الاثرية من الارتفاع المطرد للمياه الجوفيه فى تلك المناطق.

Slide 16

صور من تقرير اعدته جامعه القاهرة

- وقد وصل منسوب المياه الجوفية فى منطقه هضبه الاهرام فى السنوات الاخيرة الى مستويات خطيرة. وقد ادى ذلك الى ظهور تلك المياه بالقرب من معبد ابو الهول وكذلك اسفل تمثال ابو الهول نفسه بالاضافه الى معبد الوادى ومدافن العمال .

Slide 17

- قام **مركز هندسة الآثار والبيئة بكلية الهندسة - جامعة القاهرة** بتنفيذ المشروع العاجل لتخفيض منسوب المياه الجوفية والذي أدى إلى خفض منسوب المياه الجوفية في منطقة أبو الهول وما حولها واختفاء المياه السطحية من كل المناطق المتأثرة حول ابو الهول .

Slide 18

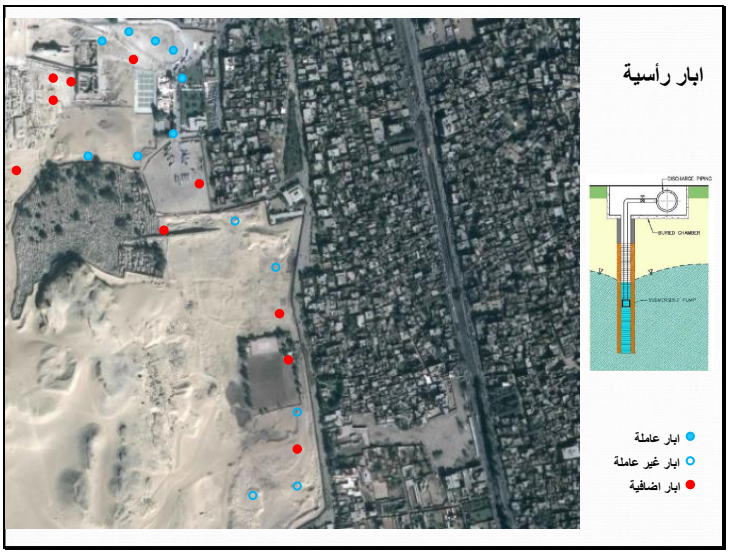
- وللسيطرة بشكل دائم على مشكلة ارتفاع المياه الجوفيه فى هضبه الاهرام , والذي يشكل خطرا مباشرا على المواقع الاثرية الهامة فى تلك المنطقة , فقد قامت جمهورية مصر العربية ممثله **بالمجلس الاعلى للآثار والهيئة القومية لمياه الشرب والصرف الصحى والجهاز التنفيذي لمياه الشرب والصرف الصحى** بالتعاون مع **هيئة المعونة الامريكية** بوضع المشروع الحالي.

- ويتعاون فى الوقت الحالى مجموعه من خبراء **المجلس الاعلى للآثار** ويبيت الخبرة العالمى "**AECOM**" و " **جماعه المهندسين الاستشارين** " و" **مجموعة البيئة والتنمية** " بالاضافه الى **جامعه القاهرة و" مجموعه باحثين مصر القديمه (AERA)** " لوضع مجموعه من الحلول الهندسية لخفض مستوى المياه الجوفيه فى منطقه هضبه الاهرام بشكل دائم مع تجنب الاضرار بالبيئة او المجتمعات المحلية.

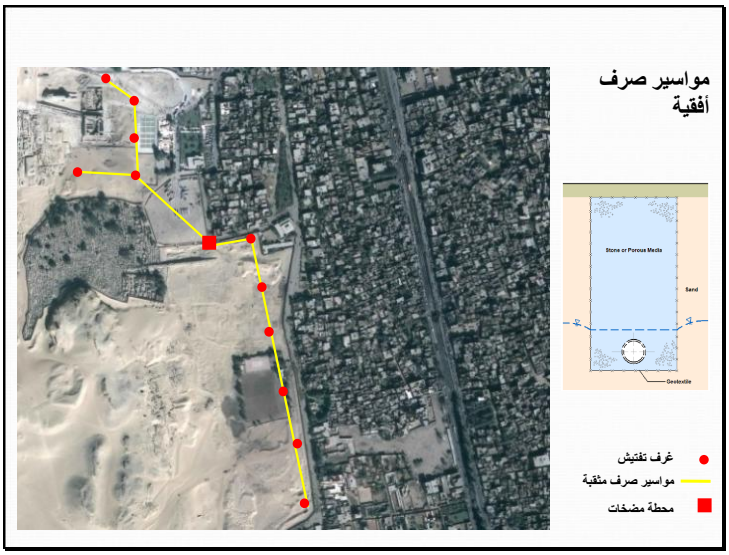
Slide 19

- وقد تم تصميم المشروع بناء على دراسات تفصيلية لنظم المياه الجوفيه في المنطقة لتحديد المنسوب المطلوب الوصول اليه ومعدلات الضخ المطلوبة.
- ويعتمد المشروع على نظام لصرف المياه الجوفيه يتم اقامته تحت سطح مستوى الارض فى المناطق الاكثر تعرضا لخطر المياه الجوفيه خاصه منطقه ابو الهول ومقابر عمال الاهرام.
- الأعمال الإنشائية للمشروع سوف تكون جميعها داخل المنطقة الأثرية فيما عدا خط الطرد الواصل من محطة الضخ إلى ترعة المنصورية والذي سوف يكون على عمق لا يتجاوز المترين وسوف يتم تنفيذه بحيث لا يعوق الحركة السياحيةبالمنطقة.
- هناك ثلاثة بدائل هندسية يجري الاختيار بينها.

Slide 20



Slide 21



Slide 22

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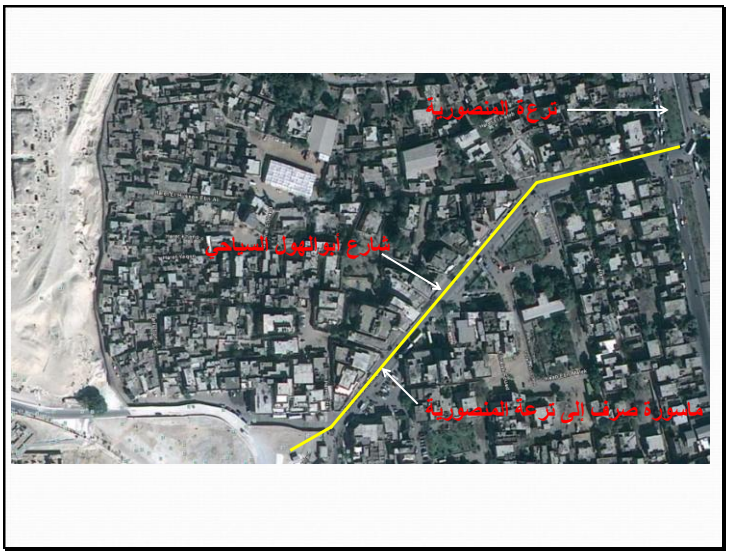

Slide 24

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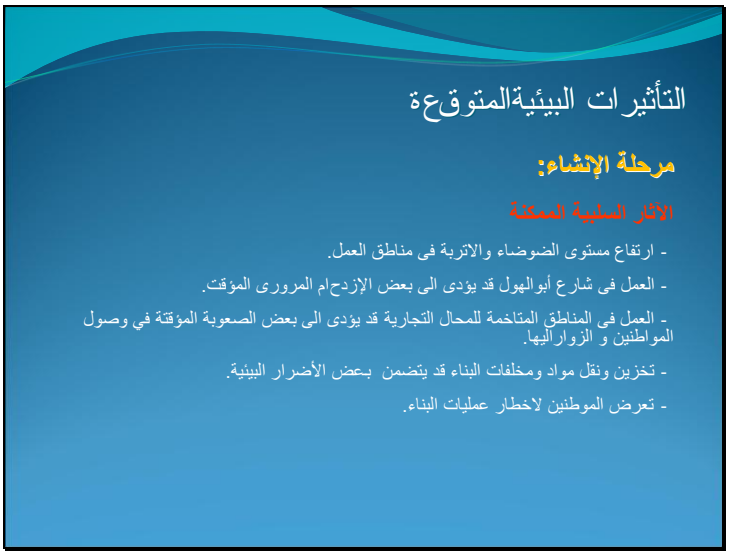

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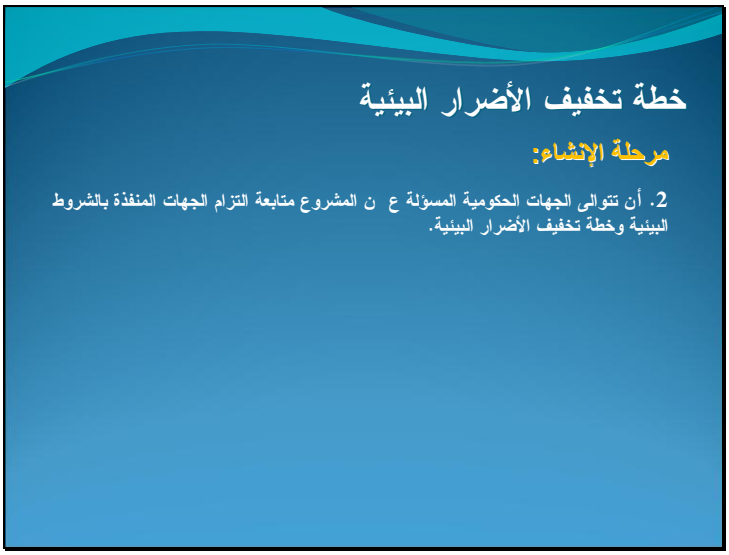
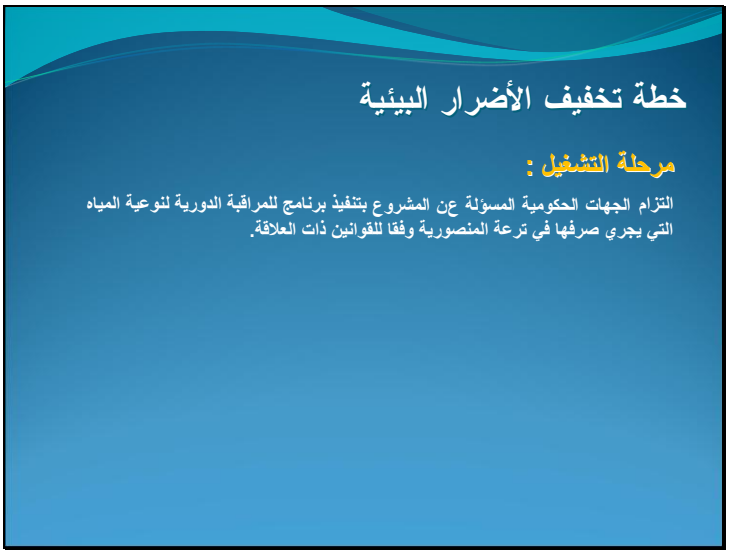
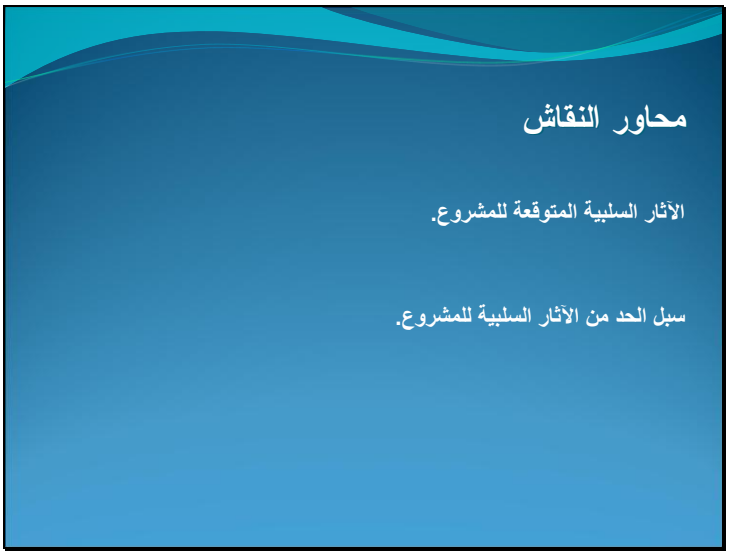


Slide 30



Slide 31


محاور النقاش
الآثار السلبية المتوقعة للمشروع.
سبل الحد من الآثار السلبية للمشروع.

ANNEX 4 LIST OF PARTICIPANTS

no.	Name	Affiliation
1	Sahar khattab	Member of Local Council, Giza
2	Sawsn Ebrahim Fahmy	Supervisor, Al Haram Development Projects, Giza Governorate
3	Reem Ahmed Abu El Saod	Ministry of water Resources
4	Mamdoh Abu Sreea Gab Allah	Ataff Manager & Magdy Khattab; People's Assembly Member
5	Amany Wiliam Uwakim	NOPWWASD
6	Noha Fouad El Maraghi	NOPWWASD, Secondary Cities
7	Shabaan Ahmed Abd el Gawad	SCA
8	Osama El Sheemy	SCA
9	Magdy Khatab	People's Assembly Member
10	Kamal Wahid Ahmed	Chief Inspector, Pyramids Antiquities District, SCA
11	Mohamed El Sayed Ismail Sheha	Inspector, Pyramids Antiquities District, SCA
12	Waad Allah Mohamed Abu El Ella	Director General , Engineering Directorate, SCA
13	Dr. Mahmod Hassan Afifi	Director General, Cairo and Giza Antiquities Sector, SCA
14	Essam Mohamed Shehab	Director of the Secretary General's technical Office, SCA
15	Safwat Mahros Mohamed Mahraan	Member of Local Council, Giza
16	Mahmod Rabea Mohamed	Ministry of water Resources & irrigation
17	Sayed Mohamed El Sayed	Director General, Al Haram Utilizes, Giza Governortate
23	Hamid El Welias	Member of Local Council, Giza
24	Kother Ismail	Housewife
25	Kamel Hassan Abdallah	Farmer
26	Zen El Abideen Ali Sayed Ali	Research Scientist, Ain Shams University
27	Rashad Anis Sabry	Ministry of Housing
28	Niveen Mohamed Mostafa El Maghraby	Ahram Engineering Directorate, SCA
29	Tarek Abu Basha	Jeweler
30	Mervat Mahmod El Sadawi	Environmental Officer, CID Pharmaceuticals
31	Farida Saleh Hafez	Housewife
32	Khiry Abd Elsalam Ali	Local labor leader
33	Magdy Ahmed Ebrahim	Teacher, local public school
34	Khaled Abdel Raoof Mohamed	Teacher, local public school
35	Ebrahim Mohamed El Sayed El Sisi	Secretary general, Local Unit of El-Sis Village
36	Dr. Hussien Mostafa	Architect
37	DR. Maher taha El nmr	Professor of architecture
38	Abd El Baki Hamed Abd Elbaki	Civil Servant
39	Reham Yossif Ahmed	Journalist
40	Dr. Mohamed Gamal	Professor, Suez Canal University
41	Dr. Akram Mohamed Fekry Ahmed	Ministry of Irrigation and Water Resources
42	Sahah Edris Radwan	Ministry of Health

43	Mohamed Abdel El nasser	Tour Guide
44	Dawlt Ahmed Abdel Moaty	Journalist
45	Abde aty Sayed Khataab	Owner of a local perfumes shop
47	Soaad Saadh	Development expert
48	Ali Ebrahim Naser Mahmod	Accountant
49	Mohamed Seadawy Naser	Local merchant
50	Mohamed Montasser Khataab	Businessman
51	Tarek Mohamed Shehta Ahmed	Businessman
52	Hazim Tawfik Khataab	Accountant
53	Mahmod Sayed El qmaty	Ministry of Education
54	Nashaat Mahmod Mohssen	Public relations
55	Mohamed El Hossieny Barakat	Journalist
56	Ali El Shaaer	Chairman, Youth Future Association, Giza
57	Ashraf Ismail Shash	Head of Haram local Council
58	Ahmed Hassan El Masry	Retired local politician
59	Bader Mahdy Anany Khataab	Oil industry expert
60	Saber Mohamed Elsayed Khataab	Hotel employee
61	Mohsen El Saadi Khataab	Owner, audio-visual studio
62	Sami Zaky Karim Khataab	Teacher
63	Zaky Karim Ali Khataab	Retired army officer
64	Yossif Khataab	Member of Local Council ,Giza
65	Alaa El Hefnawi	Engineer
66	Dr. Samir Latif	Ministry of Housing
67	Mohamed Wahid Hamed Mahmod	Student
68	Mohamed Abdel Fattah Mohamed	Student
69	Elsayed Shamatta Abdel Baki	Retired Police Officer
70	Abdel Sallam Tolba	Accountant
71	Khalifa Saleh Khalifa	Businessman
72	Mohamed Nader Abdel Wahaab	Advisor, SCA
73	Amr Gamaal Amer	Tour operator
74	Yehia Abdel Latif El Shaaer	Tour operator
75	Ramzy Kamel Farag	Journalist
76	Dr . Amira Abdo Mikeal	Journalist
77	Essam Habib Labib	Businessman
78	Eslaam Abu El Ellaa Hendawi	Businessman
79	Ahmed Mohamed Mahmod Khataab	Tour guide
82	Mabrouk Nour El Din Hendawy Khattab	Oil engineer
83	Maher Mohamed Othman	Engineer
84	Eng. Tarek Fathy Abdel Mawla	Engineer
86	Dr. Abdel Hameed	Physician

ANNEX 5 LIST OF INVITED STAKEHOLDERS

List of Invitees to Scoping Session

- Egyptian Environmental Affairs Agency
- Ministry of Water Resources and Irrigation
- Ministry of Agriculture
- National Organization for Potable Water And Sanitary Drainage (NOPWASD)
- Local People Council
- Shoura and People Assembly
- Faculty of Engineering, Cairo University
- Faculty of Antiquities, Cairo University
- Ministry of Transportation
- Non Governmental Commissions Caring of Antiquities Protection
- Non Governmental Commissions Caring of Antiquities Protection
- Non Governmental Commissions in Nazlet El Samman

➢ **Public Leaders**

- Mr. Magdy Khatab, Member of People Assembly
- Mr. Abd el Naser El Gabry, Member of People Assembly
- Mr. Nabeel S. Khatab
- Mrs. Sahar Khatab, Women Secretary, El Hezb El Watany
- Mr. Allam Ashour
- Mr. Yousef I. Khatab, Member of Local People Assembly
- Mr. Mohamed Y. Fayed , Member of Giza City Council
- Mr. Sayed Manaa, Head of El Gamayia El Sharayia
- Dr. Aly G. El Shaer, Local People Council Consultant
- Dr. Hamdy el Sisey, Deputy Head of Giza City Council
- Mr. Mabrouk Hendawy Khatab
- Mr. Gamal Ahmed Amer
- Mr. Mohamed A. Fayed
- Mr. Mohamed Hassan Khatab, Counselor

➢ **Non Governmental Commissions**

- El Gamayia El Sharayia
- Gamayet Mostakabl Shbab El Giza
- Gamayet El Ghad wa El Mostakabl

ANNEX 6 TRANSCRIPTION OF PUBLIC SCOPING MEETING DISCUSSION

ان هذه المشكلة قد بدأت فى الظهور منذ 15 عام، لذا يجب دراسة مكان ظهور هذه المياه فى بادئ الامر.

يجب اتباع نظام المواسير المثقبة.

وقد بدأت تظهر مياه جوفية امام منطقة ابو الهول.

عرض ملخص (د/مصطفى صالح)

يجب وضع خطة للحد من الاضرار.

فى البداية سنعرف البيئة وهى كل مايحيط بالانسان من هواء وماء وتربة.

ان مشروع تخفيض منسوب المياه الجوفية بمنطقة الاهرام هو تمويل من المعونة الامريكية.

الخطوات:

1. تحديد مكونات المشروع.
2. تحديد الاثار المراد ترميمها و تبعيد الاثار السليمة حتى لا تتضرر.

كما يجب التشاور مع الجهات المعنية وهذا يعنى التشاور مع المحيطين بهذه المنطقة ويتم التشاورعلى مرحلتين:

1. التشاور مع المواطنين وخاصة اهالى منطقة نزلة السمان.
2. عمل جلسات تشاور لتقييم المشروع والتعامل مع هذه الاثار والحد من خطورة هذه المياه.

وينقسم المشروع الى 3 فصول:

1. الموقع الجغرافى: وخاصة منطقى ابو الهول حيث انها اكثر المناطق انخفاضا. ولكن لا يوجد حيوانات مهددة بالانقراض.
2. الخواص الطبيعية: أ) جودة الهواء فقد تم تحليل الهواء ووجدنا ان نوعية الهواء اقل من الحد المسموح للقانون ومثله مثل هواء القاهرة .

ب)المياه ووجد انها تتعدى نسب التلوث.

ج)الضوضاء.

ومن اهم المناطق هى نزلة السمان حيث انها منطقى حضرية و تجارية وسياحية.

3. وصف المشروع: ان نسبة المياه الجوفية الموجودة بالمنطقة قد ارتفعت بشكل اضر بالاثار المصرية ومن اهم المناطق التى كانت تشكل المياه الجوفية خطورة عليها هى الاقصر والهرم وابو الهول.

الحل السريع:

1. هو عمل مشروع عاجل لتقليل المياه فى منطقة ابو الهول وسحبها.
2. ان يكلف المجلس الاعلى للاثار عدة اماكن للعمل مع خبراء الهيئة.
3. فى بداية العمل يجب دراسة كمية المياه التى يجب ان يتم سحبها.
4. يجب عمل انابيب مثقبة وهذه الانابيب ستعمل على سحب المياه وضخها على منطقة ترعة المنصورية.

كما انه يوجد اكثر من حل :

1. زيادة عدد الابار الرأسية.
2. عمل مواسير افقية.
3. عمل ابار رأسية ومواسير افقية وضخ المياه لمنطقة ترعة المنصورية.

التاثيرات البيئيه المتوقعة خلال مرحلة الانشاء:

الاثار الايجابية: أ. سيحدث تنشيط بسيط للحالة الاقتصادية لمنطقة نزلة السمان.

ب.الحد من تدهور المنطقة الاثرية.

ج. تحقيق التزام مصر تجاه حماية اثارها.

د. تحسين الخدمات السياحية.

ه. تحسين الصورة الجمالية للمنطقة.

و.الحد من تكاثر الباعوض والناموس.

الاثار السلبية: أ. ارتفاع مستوى الضوضاء وازدحام شارع ابو الهول.

ب. نقل مواد البناء له خطورة على صحة الاهالى.

خطة تخفيف الاضرار:

1. خلال مرحلة الانشاء: يجب ان توقع عقود مع مهندسين انشاء ويتم الاتفاق على شروط مثل: أ. ان يقتصر العمل على ساعات النهار فقط.

   ب. الحد من انتشار الاتربة.

   ج. الامتناع عن اشغال الطريق.

   د. وضع جدول زمنى للمشروع.

   ه. وضع خطة لادارة حركة المرور.

   و. ضمان وجود ممرات امنة للعبور.

   ز. الالتزام بمعايير السلامة.

   ويجب اتباع هذه البنود والالتزام بها.

2. خلال مرحلة التشغيل: يجب التزام الجهات الحكومية بمراقبة المياه التى يتم تصريفها على ترعة المنصورية.

الاراء والمشاورات:

أ. أ/مجدى ابو طالب خطاب: ارى انه من الممكن ان يكون الحفر فى المنطقة الشرقية بدلا من شارع ابوالهول كما يجب ان نتعاون للحفاظ على اثارنا وخاصة منطقة ابوالهول والاهرامات.

ب. د/على الشاعر: انضم ايضا لراى أ/ مجدى وهو الحفر فى المنطقة الشرقية بدلا من شارع ابوالهول السياحى. كما يجب ان نعلم ان نزلة السمان هى وادى للمياه الجوفية وعمقها 4000 متر. كما يجب علينا تنمية البشر والحد من الضرر.

ت. اللواء/اشرف شاش: انضم ايضا لراى أ/مجدى ود/على وهذا للتخفيف من الاشرار التى ستنتج عن الحفر فى شارع ابوالهول.

ث. مهندس/وكيل ربيع: ما هو البديل عندما تكون نسبة الاملاح بها عالية وتؤثر على المياه الجوفية هل يجوز تجميع المياه والاستفادة منها؟ كما انه لا يجوز الحفر فى شارع ابوالهول حيث انه المخرج الوحيد.

ج. أ/محمد منتصر خطاب: نريد ان نعرف تأثير سحب المياه على العقارات ايضا وهل الشفط سيكون ف منطقة ابو الهول فقط او من منطقة نزلة السمان ايضا؟

ح. نريد ان نعرف على اى اساس تم منع البناء فى منطقة نزلة السمان فيجب ان نخاف على مصلحة اهالى نزلة السمان مثل خوفنا على الاثار.

خ. هذه المياه ليست مياه جوفية ولكنها مياه سطحية ونزلت الى الارض ولكنها ليست نابعة من الارض.

د. المياه التى سيتم سحبها بها 90% تلوث حيث انها من عدة مصادر مثل صرف صحى وغيره.

ذ. أ/يحيى الشاعر: هيئة الاثار قالت ان ذهه المياه ناتجة عن الشاليهات التى كانت موجودة فوق هضبة الهرم لذا قاموا بهدم هذه الشاليهات ومنعوا البناء فى نزلة السمان واقاموا سور فاصل بين نزلة السمان ومنطقة الاهالى فلماذا لم يقوموا بهدم المبانى الخاصة بالهيئة؟

ر. أ/محسن السعدى: ارى انه من الممكن انه بدل الحفر فى شارع ابوالهول ان نقوم بتصريف هذه المياه فى اول بلاعة قريبة من المنطقة بدل الحفر وتعطيل الطرق. حيث ان هذه المياه عندما تصرف على ترعة المنصورية ستضر بالزراعة ومياه الشرب.

ز. هناك فقد ثقة بين هيئة الاثار وبين الاهالى.

س. ما تاثير شفط المياه على المنطقة المحيطة؟ وهل المياه الجوفية الموجودة بالمنطقة عميقة ام سطحية؟ وهل الابار التى ستحفر ستكون عميقة ام سطحية؟

ش. ان المشروع سينفذ يطريقة تحمى المياه الجوفية والسكان بالاضافة لابوالهول.

ما هو مصدر المياه؟

مستوى المياه ارتفع فى مصر كلها بنسبة 15 متر خلال الـ20 سنة الاخيرة، كما ان حقل منطقة ابوالهول كان يخرج 30 الف كم من المياه الجوفية وبعد وقف الحقل اثر ذلك على زيادة نسبة المياه.

من الممكن محاولة الاستفادة من المياه فى استصلاح اراضى جديدة.

المشروع لن يؤثر على البيوت فقد عمل مشروعان فى البر الغربى والشرقى ولم يحدث شئ للبيوت.

هل سيكون هناك شغل وحفر خارج المنطقة؟

لا. كل الشغل سيكون داخل المنطقة.

<u>الخلاصة:</u>

سنجد بديل لشارع ابوالهول الرئيسى.

لا يوجد تاثير من المشروع على المبانى.

كما نريد وعد بان الغاز الطبيعى سيدخل على نزلة السمان ودخول الكهرباء ايضا للمناطق التى لا يوجد بها كهرباء.

<u>د/احمد جنيدى:</u>

كل الشغل سيكون بالمنطقة الاثرية فقط اى ان الشغل الخارجى سيكون على الطرد فقط اذن لا لايوجد تاثير سلبى على المنطقة المحيطة ونزلة السمان او الاهالى وسيكون هناك خط يسحب المياه من منطقة الشغل على ترعة المنصورية.

ما هو الحل طويل المدى لمشكلة المياه الجوفية؟

لا يوجد مصدر واحد للمياه الجوفية وعندنا مشكلة فى زيادة منسوب المياه الجوفية فى مصر، كان هناك ما يسمى بحقل الاهرام فكان هذا الحقل يسحب كمية مياه ولكن غلق هذا الحقل عن طريق انسداد الابار بالتدريج ادى الى ان مشكلة زيادة المياه الجوفية بدأت فى الظهور، كما انه لا يوجد حل طويل المدى ولكن هناك حل لخفض المياه بمنطقة ابوالهول للحد من التاثير السلبى على هذه المنطقة الاثرية ومحاولة الحفاظ عليها. كما اننا سنحاول تخفيض المياه لمسافة متران فقط وليس لمسافة 100 متر.

هل لا يوجد فكرة لنقل ابوالهول لمسافة ما حتى نبعده تماما عن خطر المياه الجوفية؟

سنفكر فى الموضوع مثلما حدث فى معبد ابوسمبل.

هل يوجد محطة معالجة للمياه الجوفية قبل ألقاؤها فى ترعة المنصورية؟

لو وجدنا ان المياه تحتاج لمعالجة ستعالج قبل وصولها للترعة.

يجب ان تحل المشكلة من اساسها وهذا عن طريق معالجة المواسير القديمة المتهالكة حيث انها تؤدى الى اضرار سلبية على الاهالى وتؤدى الى فشل كلوى.

يوجد دراسة حالية للتسريبات الاتية من الجيزة ونزلة السمان.

يجب الحفاظ عل المنطقة المحيطة بابوالهول والاهرامات.

خط الصرف: طريق جامع الناصر هو اقصر طريق ولكن عند اختيارنا للطريق الاخر للحفاظ على الاثر.

ANNEX 7 QUALITY REQUIREMENTS OF DISCHARGED WATER TO THE MANSOURIYA CANAL

Quality standards for discharge water according to Law No. 48/1982

Law 48/82: Discharge into :				
Parameters	**Underground Reservoir & Nile Branches/Canals**	**Nile (Main Stream)**	**Municipal drain**	**Industrial drain**
BOD (5day, 20 deg.) mg/l	20	30	60	60
COD mg/l	30	40	80	100
pH	6-9	6-9	6-9	6-9
Temperature (°C.)	35	35	35	35
Total Suspended Solids mg/l	30	30	50	50
Settable Solids mg/l	-	20	-	-
Total Dissolved Solids mg/l	800	1200	2000	2000