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# Environmental Assessment
of the
# Karte Se Water Supply System

A part of the Rehabilitation of Economic Facilities and Services (REFS) Program

Contract 306-C-00-02-00500-00

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## EXHIBIT 3-1 EXISTING CONDITIONS, POTENTIAL IMPACTS AND MITIGATION

| ENVIRONMENTAL CRITERIA | EXISTING CONDITIONS | POTENTIAL IMPACTS | AVOIDANCE / MITIGATION ACTION | ADDITIONAL RECOMMENDATIONS |
|---|---|---|---|---|
| **1.0 PHYSICAL RESOURCES** | | | | |
| ***1.1 Topography & Land Forms*** | *The site of the water supply system is central Kabul (see **Exhibit 2-2**), which itself is located in the north eastern area of Afghanistan (see **Exhibit 2-1**) at approximately 1800 meters above msl. The topography of the wedge shaped project area is flat. No unusual topographic conditions in the area have been identified.* | *Quarry Operations* | *No significant issues identified requiring mitigation* | *None warranted.* |
| | | *Cut and Fill Requirements* | *No cut and fill activities are likely to occur on the Project Road* | |
| | | *Borrow Pit Excavations* | *No significant issues identified requiring mitigation* | |
| | | *Erosion* | *Provisions for the control of erosion are discussed as a part of the discussions for soils and hydrology below.* | |
| ***1.2 Soils*** | *Soils in and around Kabul generally comprise clay.* | *Contamination Due to Spills* | *Fuel and chemical storage will be sited on an impervious base within a bund and secured by fencing. The storage area shall be located away from any watercourse or wetlands.*<br>*All valves and trigger guns shall be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use.*<br>*The contents of any tank or drum shall be clearly marked. Measures shall be taken to ensure that no contaminated discharges enter any drain or watercourses.* | *None warranted. Provisions incorporated in the design, contracting process and provisions for contract supervision are such that the potential for adverse impacts to topography is obviated.* |
| | | *Loss of soil for agricultural production* | *No significant issues identified requiring mitigation* | |
| | | *Erosion* | *No significant erosion impacts are anticipated. No mitigation actions required.* | |
| ***1.3 Seismic & Geological Characteristics*** | *There is a history of damaging earthquakes that are most frequent in the northeast of Afghanistan. Kabul is potentially prone to earthquakes varying from 6.5 to 7.3 on the Richter scale.* | *Seismic Vulnerability* | *No significant issues identified requiring mitigation* | *None warranted.* |
| ***1.4 Hydrology*** | *The Kabul River bisects the Project Area. No other surface water courses or wetlands have been identified that may be subject to adverse impacts.* | *Surface Hydrology* | *Potential adverse impacts to surface hydrology during the construction phase of the Project will be avoided through the enforcement of contract provisions and oversight by the USAID/GC.*<br><br>*Construction activities are not expected to alter the current status of natural water bodies or irrigation structures in the vicinity of the roadway. In addition to adherence to good engineering and construction practices and the enforcement of contract provisions related to drainage during both the construction and operational stages of the Project, Sub-Contractors will be obligated to coordinate with local land use planning* | *None warranted.* |

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| | | | authorities. Contract provisions will ensure that construction camps and other potential sources of secondary impacts are properly sited and provided with drainage and wastewater facilities. | |
| | | Wetlands | No wetlands of significant biological importance are within 5 km of the potentially affected area. No mitigation actions are warranted. | |
| | | Subsurface Hydrology | No impacts to groundwater resources are anticipated as a result of the proposed actions in either the construction or operational phases of the Project. | |
| | | Flood characteristics | No impacts resulting from flood conditions are anticipated. No mitigation actions required. | |
| **1.5 Air Quality and Climate** | Winter in Kabul is cold. Normal temperatures are 2-5°C in the daytime with light frosts down to -5°C or below at nighttime. Precipitation generally falls as drizzle. Snow cover usually persists for only 10-15 days per annum. Spring lasts from March through April, the weather can be unstable and wet. Summer in Kabul is hot. The weather is mostly clear and dry with prevailing temperatures in the hottest months (June through August) ranging from 25-30°C in the daytime and 18-22°C at night. Precipitation in the summer is vary rare (1-2 rainy days June through September). Fall lasts from October through till November. The season begins dry, then turns relatively wet.<br><br>Winds are predominantly southerly and southeasterly during the year with a mean speed of 1-4 meters per second (m/s). The area is characterized by local mountain-valley winds. | Rehabilitation Impacts, e.g. Impacts during construction can be anticipated due to fugitive dust generation in and around construction activities and related activities such as asphalt plants. | The Sub-Contractor will be required to spray road surfaces, excavation and construction sites.<br>Trucks carrying earth, sand or stone will be covered with tarps.<br>Contract provisions allow suspension of work in unfavorable condition.<br>Machinery and equipment will be fitted with pollution control devices and checked at regular intervals.<br>Open burning will be prohibited in populated areas. | Other than verification of provisions noted within the contract documents, none warranted. |
| | | Operational Impacts | No significant issues identified requiring mitigation | |
| **2.0 NATURAL/BIOLOGICAL RESOURCES** | | | | |
| **2.1 Flora** | A number of trees are located within the Project Area, however, they will not be removed as part of the Project. Apart from these trees little fauna exists within the vicinity of the Project Area. No protected species have been identified that maybe adversely affected by Project works. | Destruction of Habitat | The project is not anticipated to have significant negative impacts to flora within the vicinity of the road. | None warranted. |
| **2.2 Fauna** | Due to the urban nature of the Project Area little in the way of fauna is present. | Destruction of Habitat | The project is not anticipated to have significant negative impacts to fauna within the vicinity of the Project. | None warranted. |
| **2.3 Protected Areas** | The nearest protected area is Kole Hashmat Khan Waterfowl Sanctuary approximately 5km from the Project Road. | Rehabilitation Impacts | There are no protected areas within 5 kilometers of the Project site. | None warranted. |
| **3.0 OTHER ENVIRONMENTAL CONCERNS NOTED BY 22 CFR 216** | | | | |

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| **3.1 Land Use / Controls** | Land uses within the vicinity of the Project Road are exclusively urban. The assessment indicates that there is likely to be little if any impact to residences along the ROW as a result of the Proposed Action | PAP Impacts | No impacts to project-affected persons (PAPs) as that term is generally defined by the international assistance community (i.e., persons whose livelihood is directly or indirectly affected by a project) have been identified | None warranted. |
| | | Rehabilitation Impacts | Coordination with local land use planning authorities is required. Construction camps/equipment/materials storage and other potential sources of secondary impacts must be properly sited and provided with drainage and wastewater facilities. | |
| | | Operational Impacts | Impacts are expected to be minimal. No mitigation actions warranted. | |
| **3.2 Energy & Conservation** | Afghanistan's power grid has been severely damaged by years of war, and less than 10 percent of its population currently has access to electricity, with Kabul suffering power shortages. Prior to the early 1990s, Kabul also had two gas-fired power plants located on the outskirts of the city. ABB recently refurbished one of the plants, which has a 45-MW capacity. In addition to commercial energy, Afghanistan utilizes such traditional, "non-commercial" energy sources as wood. According to a study by the ADB, more than 85% of Afghanistan's energy needs are met by such traditional fuels. | Exploitation of Energy Resources | Impacts are expected to be minimal. No mitigation actions warranted. | None warranted. |
| **3.3 Use of Natural / Depletable Resources** | Construction works will require the use of certain natural resources such as rock, sand and other quarried construction materials as required for the proposed rehabilitation activities. Such materials are in plentiful supply within Afghanistan. | Exploitation of Natural Resources | Impacts are expected to be minimal. No mitigation actions warranted. | None warranted. |
| | | Demand for Construction Materials | Impacts are expected to be minimal. No mitigation actions warranted. | |
| **3.4 Urban Quality / Design of the Built Environment** | The Project is located within the central urban area of Kabul City. Details of land uses and potential impacts in immediate proximity to the road are discussed in **3.1** above. | Impacts to Roadside Structures and Activities | Impacts are expected to be minimal. No mitigation actions warranted. | None warranted. |
| **3.5 Historic & Cultural Resources** | No cultural and historic resources of note have been identified in the Project Area that may be subject to significant adverse impacts. | Demolition or Damage Due to Construction | In the event of unanticipated discoveries of cultural or historic artifacts, the Sub-Contractor is obligated to shall take all necessary measures to protect the findings and shall notify the Contractor and provincial-level representatives of the Archaeological Committee and the Ministry of Information and Culture. If continuation of the work would endanger the finding, project work shall be suspended until a solution for preservation of the artifacts is agreed upon. | None warranted. |
| **4.0 ADDITIONAL ENVIRONMENTAL CONCERNS RAISED BY SIMILAR PROJECTS** | | | | |
| **4.1 Socio-Economic Considerations** | Kabul (pop. 2,206,300) is the capital of Afghanistan and the capital of Kabul Province. The city is the countries largest industrial, business, finance and | Impacts are Deemed Beneficial | o mitigation actions warranted. | None warranted. |

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| | cultural center with the countries only international airport. The industrial factories within the city include machine building and metal working, light industry, woodworking, and food production. However, the majority of the population continues to suffer from insufficient food, clothing, housing, and medical care, problems exacerbated by military operations and political uncertainties. Inflation remains a serious problem.<br><br>Within the vicinity of the project road activities are predominantly commercial and are unlikely to be affected significantly by project works. | | | |
| **4.2 Public Health and Safety** | Access to adequate and safe water and sanitation facilities is limited within Afghanistan as a whole and within Kabul itself. The newer areas of the city (Wasim Akbar Khan and within the vicinity of the Project road) have running water and sewers. Currently, there is a concentration of health facilities in urban areas such as Kabul, which for example, has 12% of the population but nearly half of all the hospital beds in the country. Additionally in Kabul, there is one doctor per 1,000 people compared with the central province of Bamyan where there is just one doctor per 100,000 people. | Work Related Injuries | The Sub-Contractor is required to provide basic emergency heath facilities for workers. | None warranted. |
| | | Access to Heath Facilities | Access to health facilities will not be affected by Project activities. No mitigation actions required. | |
| | | Contamination Due to Spills | See **1.4** above. | |
| | | Air and Noise Impacts | See **1.5 & 4.4**. | |
| **4.3 Other Infrastructure Networks** | Waste water and electricity supply systems are present in the vicinity of the Project Area. Some systems are poorly maintained and in need of rehabilitation. No irrigation systems are present within the vicinity of the Project. | WW Collection Networks | Construction activities could impact other infrastructure systems such as electrical lines, etc. Sub-Contractors are required to coordinate with all relevant officials to avoid significant adverse impact to other infrastructure systems. | None warranted. |
| | | Electrical Systems | | |
| **4.4 Noise** | Ambient noise levels in the Project Area are relatively low. Due to the urban location of the Project area "sensitive receptors", i.e., recipients of sound for whom exposures to excessive sound levels are detrimental (schools and hospitals, for example) are present. | Rehabilitation Phase | Contracts will contain provisions to mitigate potential noise and vibration impacts during construction | None warranted. |
| | | Operational Phase | No mitigation actions warranted. | |

# 4.0 ENVIRONMENTAL GUIDELINES

For projects such as the Karte Se Water Supply System the REFS TOR states that *"the Contractor shall prepare **environmental guidelines** that will be used to minimize and mitigate potential environmental impacts. Included in the guidelines will be an **environmental mitigation checklist** to be completed as a part of final design for each project. Where the analysis indicates that negative environmental effects could occur, the project will be designed to avoid or mitigate those effects. The guidelines will also describe procedures for **monitoring rehabilitation activities** to assure that identified mitigation measures have been implemented as planned"* (Emphasis added). Accordingly, the following presents the examination's findings in regard to the environmental mitigation final design checklist (**Item 4.1**) and monitoring (**Item 4.2**). Additional recommendations for environmental actions beyond the scope of the Project, but within the scope of REFS, are presented in **Item 4.3**.

## 4.1 Environmental Mitigation Final Design Checklist

The preferred form of mitigation is avoidance of impacts through the adoption of enforceable measures and precautions rather than amelioration after the fact. This preferred form of mitigation has been incorporated in the recommended contract provisions attached hereto as **Appendix A.**

An environmental and final design checklist is provided by **Exhibit 4-1**.

## 4.2 Monitoring

Monitoring of projects such as Karte Se generally includes observational monitoring to enforce contract provisions to avoid adverse impacts and may include instrumented monitoring of environmental parameters such as air quality, when warranted.

Monitoring of environmental impacts during the rehabilitation process will be the responsibility of the USAID General Contractor (USAID/GC) as a part of contract supervision procedures. A Supervising Engineer (SE) will be assigned to the Project. Compliance procedures will include routine site visits, including the ancillary facilities associated with that package (labor camps, asphalt plants, etc.).

### EXHIBIT 4-1
### ENVIRONMENTAL MITIGATION FINAL DESIGN CHECKLIST

For Air Quality, Water, Soil, Noise and Social Impacts

**AIR QUALITY**

| Potential Impact Source | Mitigation Objective | Mitigation Checklist<br>Do designs and bid documents include the following provisions? | Implementation Mechanism & Responsibility |
|---|---|---|---|
| Material Transport | Minimization of dust during transport of construction material | Rock, sand and other dust producing material will be sprayed prior to transport. Trucks must be covered with tarps. Only approved transport routes will be used. | Required by Project Contracts. Enforced by the Supervising Engineer (SE). |
| Material Storage | Minimization of dust during storage of construction material. | Stockpiles of materials shall be sited in sheltered areas away from sensitive areas and covered with tarps if required. | Required by Project Contracts. Enforced by SE. |
| Emissions from Construction Equipment & Solvents | Avoidance of excessive emissions due to poorly maintained equipment. | Contract stipulations require all construction equipment to meet acceptable standards and to be properly maintained and located at least 500 meters from the nearest sensitive receptor. Solvents and volatile materials must be used and stored properly to the satisfaction of the SE. | Required by Project Contracts. Enforced by SE. |
| On-Site Burning | Avoidance of smoke and gases which may constitute a nuisance. | On-site burning to be banned in populated areas | Required by Project Contracts. Enforced by SE. |
| Dust Generating Operations | Avoidance of dust generating operations during periods of high wind | In periods of high winds, dust generating options shall not be permitted within 200 meters of sensitive sites given the direction of the prevailing wind. | Required by Project Contracts. Enforced by SE. |

**WATER QUALITY**

| Potential Impact Source | Mitigation Objective | Mitigation Checklist<br>Do designs and bid documents include the following provisions? | Implementation Mechanism & Responsibility |
|---|---|---|---|
| Effects of Construction Camps & Staging Areas | Avoidance of inappropriate wastewater disposal. | Provisions for the location and design standards for land use, drainage, health facilities, etc., are established by construction documents. | Required by Project Contracts. Enforced by SE. |

**NOISE**

| Potential Impact Source | Mitigation Objective | Mitigation Checklist<br>Do designs and bid documents include the following provisions? | Implementation Mechanism & Responsibility |
|---|---|---|---|
| Construction Machinery | Minimize high noise levels, vibrations at time of occurrence | Use equipment conforming to international standards and directives on noise and vibration. Maintain exhaust systems in good working order, properly design engine enclosures, use intake exhaust silencers and regularly maintain noise generating equipment. | Required by Project Contracts. Enforced by SE. |

**SOCIAL**

| Potential Impact Source | Mitigation Objective | Mitigation Checklist<br>Do designs and bid documents include the following provisions? | Implementation Mechanism & Responsibility |
|---|---|---|---|
| Temporary Impacts Due to Rehabilitation Works | Minimize temporary impacts to residents and surrounding environment. | Coordinate all construction activities with neighboring land uses and respect rights of local landowners.<br>Maintain and clean up construction camps. | Construction requirements enforced by SE. |
| Health and Safety Impacts to Workers | Attend to the health and safety of Workers | Provide local, basic emergency health facilities for workers. | Construction requirements enforced by SE. |

**HISTORIC AND CULTURAL RESOURCES**

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|---|---|---|---|
| Damage to Cultural and Historic Sites during Project Works | Protect Sites of historic and cultural importance | In the event of unanticipated discoveries of historical or cultural artifacts the Contractor will notify the MIC. | GOA and SE |

Major issues to be addressed in the monitoring and compliance reports will include:

- **Air Quality Impacts.** The SE will be responsible for compliance with contract provisions that specify:
  - Controlled locations of sources of air pollution, use of quarries, etc.
  - Prohibitions against open burning in populated areas.
  - Transport of dust-generating items using tarps and other devices to minimize impacts.
  - Spraying of road surfaces, excavation and construction sites to keep them moist for dust control as determined advisable by the SE.

- **Water Quality Impacts.** Potential water quality impacts during the rehabilitation phase will also be mitigated through the proper siting and provision of facilities at construction camps as tabulated by **Exhibit 4.1** with compliance assured through the oversight of the SE.

- **Social Impacts.** Potential issues related to transport of construction materials, labor camps and other social impacts will be mitigated as a routine part of construction supervision. Compliance with the contract stipulation in regard to the use of local labor to the maximum extent feasibility will also be monitored by the SE.

- **Historical and Cultural Resources.** Contract provisions for the protection of cultural and historical sources by reporting unanticipated finds as tabulated by **Exhibit 4.1**

with compliance monitored by the SE.

- **Public Health**. Compliance with contract provisions to control potential contamination of local water supplies during rehabilitation; to control air pollution and noise levels; to provide basic emergency heath facilities for workers.

- **Impacts to Other Infrastructure Networks**. Responsibility to ensure compliance with contract provisions to coordinate with all relevant agencies and organizations to avoid disruption of other infrastructure services (water supply, irrigation systems, electricity, etc.) rests SE.

- **Noise and Vibration Impacts.** Contract provisions for the control of noise and vibration impacts during the construction phase through the use of site controls, site controls, time and activity constraints and public awareness efforts as tabulated by **Exhibit 4.1** with compliance monitored by the SE.

## 4.3 Recommended Actions Beyond the Scope of the Project

Recommendations for actions beyond the scope of the Project, but generally within the scope of the REFS Program, are as follows:

- **Integrate REFS Institutional Strengthening Initiatives.** Institutional strengthening actions will be necessary as a part of the Project to ensure that the water supply system is adequately maintained in the future, to ensure that future biding and tendering procedures are in place and to ensure that environmental issues incorporated in these activities. REFS Component 2 offers an opportunity to provide the necessary institutional initiatives.

- **Coordinate with Other Financing Organizations**. Development of Afghanistan may be supported by organizations other than USAID, including other bilateral organization and the multi-lateral development banks. The establishment of reasonably consistent technical/engineering standards for the development activities is highly recommended. A reasonable consistency in procedural standards and requirements is also highly recommended. Coordination of the technical reporting and procedures expected by the ministries by USAID, the World Bank, the Asian Development Bank and others is highly recommended so that the burden on local organizations to supply essentially the same information in different formats is minimized.

- **Encourage and Provide Leadership for a Coordinated Water Resources Program**. Piecemeal and uncoordinated water supply programs without the benefit a more complete understanding of the underlying aquifers and subsurface conditions could lead to major environmental issues. Although the Karte Se Project involves construction of one system and is unlikely to have a major impact on existing water resource conditions, the development of a coordinated water resources program in which future project exploiting ground water resources, or potentially impacting groundwater resources, is highly recommended.

# 5.0 CONCLUSIONS AND RECOMMENDATIONS

Project works are not anticipated to induce any significant impacts on the environmental or social characteristics of the Project Area. However, minor impacts will result from some rehabilitation activities as noted in **Section 3.0**. Notwithstanding the above, all of the identified impacts can be appropriately managed or mitigated by the measures outlined in **Sections 3 & 4** and provided as Recommended Contract Provisions as **Appendix A**.

# APPENDIX A
# CONDITIONS OF PARTICULAR APPLICATION
# ENVIRONMENTAL PROVISIONS

The following has been extracted from the Conditions of Particular Application (COPA) prepared for use in the Project.

## X.0 ENVIRONMENTAL

### X.1 General Provisions and Precautions

The Sub-Contractor shall take all necessary measures and precautions and otherwise ensure that the execution of the Works and all associated operations on the Work Sites or off-site are carried out in conformity with statutory and regulatory environmental requirements of Afghanistan including those established by local governments. The Sub-Contractor shall take all measures and precautions to avoid any nuisance or disturbance arising from the execution of the Work. This shall, wherever possible, be achieved by suppression of the nuisance at source rather than abatement of the nuisance once generated. In the event of any spoil or debris or silt from the Work Sites being deposited on any adjacent land, the Sub-Contractor shall immediately remove all such spoil debris or silt and restore the affected area to its original state to the satisfaction of the responsible authorities.

### X.2 Water Quality

The following conditions shall apply to avoid adverse impacts to water quality:

- Areas where water is regularly or repetitively used for dust suppression purposes (if any) shall be laid to fall to specially-constructed settlement tanks to permit sedimentation of particulate matter. After settlement, the water may be re-used for dust suppression and rinsing. All water and other liquid waste products arising on the Site shall be collected and disposed of at a location on or off the Site and in a manner that shall not cause either nuisance or pollution.
- The Sub-Contractor shall not discharge or deposit any matter arising from the execution of the Work into any waters except with the permission of the Contractor and regulatory authorities concerned.
- The Sub-Contractor shall at all times ensure that all existing stream courses and drains within and adjacent to the Site are kept safe and free from any debris and any materials arising from the Works.
- The Sub-Contractor shall protect all watercourses, waterways, ditches, canals, drains, lakes and the like from pollution, silting, flooding or erosion as a result of the execution of the Works.

### X.3 Air Quality

The following conditions shall apply to avoid adverse impacts to air quality:

- Open burning will be prohibited.
- In periods of high wind, dust-generating operations shall not be permitted within 200 meters of residential areas having regard to the prevailing direction of the wind.
- Water sprays shall be used during the delivery and handling of materials when dust is likely to be created and to dampen stored materials during dry and windy weather.

- Stockpiles of materials shall be sited in sheltered areas or within hoarding, away from sensitive areas. Stockpiles of friable material shall be covered with clean tarpaulins, with application of sprayed water during dry and windy weather. Stockpiles of material or debris shall be dampened prior to their movement whenever warranted.

- Vehicle with an open load-carrying area used for transporting potentially dust-producing material shall have properly fitting side and tailboards. Materials having the potential to produce dust shall not be loaded to a level higher than the side and tail boards, and shall be covered with a clean tarpaulin in good condition. The tarpaulin shall be properly secured and extend over the edges of the side and tailboards.

- In periods of adverse weather adverse impacts to adjacent residents or site employees during construction will be mitigated by either discontinuing until favorable conditions are restored, or, if warranted, sites may be watered to prevent dust generation, particularly at crushing plants.

- Machinery and equipment will be fitted with pollution control devices, which will be checked at regular intervals to ensure that they are in working order. Best available pollution control technologies will be required.

## X.4 Avoidance of Social Impacts

To avoid adverse social impacts, the Sub-Contractor shall:

- Coordinate all construction activities with neighboring land uses and respect the rights of local landowners. If located outside the ROW, written agreements with local landowners for temporary use of the property will be required and sites must be restored to a level acceptable to the owner within a predetermined time period.

- Maintain and cleanup campsites.

## X.5 Noise

To avoid adverse impacts due to noise, the Sub-Contractor shall:

- Use equipment conforming to international standards and directives on noise and vibration emissions.

- Take all necessary measures to ensure that the operation of all mechanical equipment and construction processes on and off the Site shall not cause any unnecessary or excessive noise, taking into account applicable environmental requirements.

- Maintain exhaust systems in good working order; properly design engine enclosures, use intake silencers where appropriate and regularly regular maintain noise-generating equipment.

- Use all necessary measures and shall maintain all plant and silencing equipment in good condition so as to minimize the noise emission during construction works.

- Schedule operations to coincide with periods when people would least likely be affected and limit work hours and work days to less noise-sensitive times. Hours-of-work will be approved by the Contractor having due regard for possible noise disturbance to the local residents or other activities. Construction activities will be strictly prohibited between 10 PM and 6 AM in the residential areas. When operating close to sensitive areas such as residential, nursery, or medical facilities, the Sub-Contractor's hours of working shall be limited to 8 AM to 6 PM.

## X.6 Fuel and Chemical Storage

The following conditions to avoid adverse impacts due to improper fuel and chemical storage:

- All fuel and chemical storage (if any) shall be sited on an impervious base within a bund and secured by fencing. The storage area shall be located away from any

watercourse or wetlands. The base and bund walls shall be impermeable and of sufficient capacity to contain 110 percent of the volume of tanks.

- Filling and refueling shall be strictly controlled and subject to formal procedures.
- All valves and trigger guns shall be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use.
- The contents of any tank or drum shall be clearly marked. Measures shall be taken to ensure that no contaminated discharges enter any drain or watercourses.

## X.7 Protection of Historic and Cultural Resources

To avoid potential adverse impacts to historic and cultural resources, the Sub-Contractor shall:

- In the event of unanticipated discoveries of cultural or historic artifacts (movable or immovable) in the course of the work, the Sub-Contractor shall take all necessary measures to protect the findings and shall notify the Contractor and provincial-level representatives of the Archaeological Committee under the Ministry of Information and Culture. If continuation of the work would endanger the finding, project work shall be suspended until a solution for preservation of the artifacts is agreed upon.

## X.8 Protection of Utilities

To avoid potential adverse impacts to utilities, the Sub-Contractor shall:

- Ascertain and take into account in his method of working the presence of utility services on and in the vicinity of the Site.
- Take into account in his program the periods required to locate, access, protect, support and divert such services, including any periods of notice required to effect such work in consultation with authorities operating such services.
- Assume all responsibility to locate or to confirm the details and location of all utility services on or in the vicinity of the Site.
- Exercise the greatest care at all times to avoid damage to or interference with services.
- Assume responsibility for any damage and/or interference caused by him or his agents, directly or indirectly, arising from actions taken or a failure to take action, and for full restoration of the damage.
- Wherever existing ground surfaces are to be disturbed for construction of the Works, carry out full and adequate preliminary investigations to locate all services in the area by means of hand-dug trial holes and trenches in combination with electronic and electro-mechanical devices, where appropriate,. Each service thus exposed shall be identified. Every such service at risk shall be fully exposed and adequately protected and supported in situ or diverted to the satisfaction of the appropriate authority prior to the commencement of such construction.