

Repair Works at Martinengo Bastion Courtyard in Famagusta

Site Identification

- **GPS identification:** 35° 7'38.90"N 33°56'10.66"E

Satellite Photo



Figure 1, Satellite Photo

Technical Description

Repair Works at Martinengo Bastion Courtyard

Work Description

1. Geotechnical investigation using 5 boreholes
2. Excavation of the collapsed area
3. Filling of the excavated area
4. Removal and filling of the existing evaporation pits
5. Construction of open channels
6. Construction of the new pathway
7. Removal of the existing safety fences
8. Installation of the safety fences
9. Site cleaning

Specifications for the Works

1. Geotechnical investigation test on 5 boreholes

The objective is to investigate the conditions and the geotechnical properties of the ground of the Martinengo Bastion courtyard.

- There will be 5 boreholes.
- The point of boreholes will be confirmed by UNDP.
- Undisturbed samples shall be obtained.

- Boreholes will be up to 12 meters.

The laboratory should take all measures to protect existing structures, fittings and fixtures on site.

The laboratory will prepare method statement for the tests to be carried out with health safety measures described and obtain the approval of UNDP, as well as the timelines of the activities taking into account the following aspects;

- The laboratory is to start boreholes activity within 72 hours after commencement of the work,
- The report of the geotechnical investigation will be submitted within 10 days of completion of sampling .

Payment will be made upon completion of tests, reporting and acceptance of the report by UNDP.

The scope of the geotechnical investigation will be:

- Boreholes
- In-situ testing
- Sampling
- Laboratory testing
 - Standard Penetration Test (SPT)/Depth
 - Quick triaxial test
 - Moisture content
 - Atterberg limits
 - Particle size distribution
 - Unconfined compressive tests
 - Direct shear box strength test
 - Consolidation and swelling pressure test
- Assessment of the results of the field work and laboratory tests and collation of a report with conclusions on the geotechnical properties of the soil strata underlying the site in relation to the usage of the site/courtyard and any recommendations for further action if needed

The report is to include the following headings but not limited to;

A. Site description

- Description of the site/location (Area morphology and site geology)

B. Ground investigations-work carried out

- Description of the field works/ tests
- Water tables and water levels

C. Ground conditions

- Geotechnical characteristics/sections (Description of the soil stratigraphy based on the boreholes).
- Hydrological conditions.

D. Geotechnical considerations

- Determine bearing capacity
- Determine the soil bulk modulus (Es).
- Determine the Modulus of sub-grade reaction (Ks).
- Table/s with all the Mechanical Characteristics.

The following items must be submitted in the appendix:

- Standard Penetration Test (SPT)/Depth
- Quick triaxial test
- Moisture content
- Atterberg limits
- Particle size distribution
- Unconfined compressive tests
- Direct shear box strength test
- Consolidation and swelling pressure test
- Photographic documentation

E. Data evaluation report

2. Excavation of the collapsed area

The excavation of the collapsed area should be done carefully by following the drawings (ref: drawing1) and using mini-excavators, small tractor, mini-mechanical shovels also for samples of any length materials of any kind and consistency, dry or wet, also in the presence of water. The Contractor is advised to survey each work site and acquaint himself with the existing surface conditions of the area so as to carry out an individual assessment as regards the implementation of the Drawings in relation to the excavation to be performed. All the excavation works will be under the supervision of the archaeologist. The archaeologist will provide reports as initial report, during the work report (interim) and final report.

All excavation, earth moving, landfills, levelling, grading, trench digging and other such operations shall be properly performed and set out true to the required lines, curves, section, grades and/or inclinations. All trenches, ditches, foundation pits etc. shall be excavated correctly in reference to widths, depths and dimensions as indicated in the Drawings/Plans and as ordered by the Engineer. In his Tender the contractor is to include excavation in all types of soil, including those containing rocks and boulders. No extra payment/claim is admissible on account of the variable hardness of the soils, including rocks and boulders. The contractor shall bear full responsibility for the manufacture, provision and removal, once no longer needed, of all necessary types of support having adequate strength, in order to resist bearing pressure /the bearing capacity of the soil and safeguard the project's execution as well as accidents and injuries to the workers.

The bottom of the trenches shall be dug up and well rammed and tamped down to a depth not less than is required. If the bottom surface of the excavation is deeper than the depth shown on the Drawings or as per instructed, by error of the Contractor, the condition must be corrected by backfilling to the proper grade with concrete, conforming to the foundation requirements. All costs shall be borne by the Contractor and no claim/compensation shall be admissible.

The excavated areas should be kept free of water and/or mud at no extra cost. After the excavation is completed, the Contractor shall notify the Engineer to that effect and no further work, including

refilling, shall be taken up until the Engineer has checked and approved the depth and dimensions and also the nature of foundation materials. The Contractor is required to notify the Engineer upon completion of excavations. No foundation fills and refills shall be carried out before the excavations are checked and approved by the Engineer.

Excavations will be filled with Crusher run 300mm 95% compaction. Compaction shall be by the mechanical compactor. Considerable attention shall be given to the proper and correct compaction to prevent any risks associated with fill subsidence and collapse.

Excavation and removal of soil are up to a depth of 5m. The site is always to be protected and excavation to begin as per the engineer instruction. When excavating is in progress, there must always be a second person directing and monitoring the excavation. Once trench is completed the excavator must remain at minimum of 10 meters away from opening. Surface area to be excavated will be 15mx10mx15m.

1.1. Cutting off electricity before starting the work will be carried out by an authorised electrical engineer. All existing infrastructures (electricity, manhole covers, and drainage) should be removed, stored and protected, and moved back to their original location as they were at the end of the works.

1.2 Excavation, and removal of the excavated soil as per to the drawings and specifications. All removed soil to be transported to the allocated location by the relevant authorities.

3. Filling of the excavated area

Soil filling will be carried out after the excavation works are completed and approved by the Engineer. Filling will be done by clean soil (free of any stones and debris etc.) Sample of the soils for approval must be provided before transportation on site. No soil shall be stored within the site boundaries of the excavated trench. None of the excavated soil will be used for filling, all soil to be used for the filling will be transported by the contractor on site. Compaction test will be carried out to be made to achieve at least 95% and will be approved by Engineer. All precautions will be taken by the contractor to secure the trench.

3.1 Filling of the excavated area with clean soil (free of any stones and debris etc.) as per the drawings and specifications.

3.2 Compaction 95% at every 20 cm layer.

4. Removal And Filling Of The Existing Evaporation Pits

4.1 Excavation and removal of the all existing gravel from the evaporation pits highlighted on the drawings (ref: drawing 1) and transport off site as per to the Engineer instructions.

4.2 Removal of the all existing geotextile materials from the evaporation pits and cleaning of the evaporation pits from all loose materials such as stones, debris and papers Providing clean soil and filling inside the evaporation pits

4.3 Providing clean soil (free of any stones and debris etc.) and filling inside the evaporation pits

4.4 Compaction 95% at every 20 cm layer.

5. Construction of open channels

The excavation of the collapsed area should be done carefully by following the drawings (ref: drawing1) and using mini-excavators, small tractors or mini-mechanical shovels with a maximum head of 20 cm. The Contractor is advised to survey each work site and acquaint himself with the

existing surface conditions of the area so as to carry out an individual assessment as regards the implementation of the Drawings in relation to the excavation to be performed. All the excavation works will be under the supervision of the archaeologist. The archaeologist will provide reports as initial report, during the work report (interim) and final report.

All excavation, earth moving, landfills, levelling, grading, trench digging and other such operations shall be properly performed and set out true to the required lines, curves, section, grades and/or inclinations. All trenches, ditches, foundation pits etc. shall be excavated correctly in reference to widths, depths and dimensions as indicated in the Drawings/Plans and as ordered by the Engineer. In his Tender the contractor is to include excavation in all types of soil, including those containing rocks and boulders. No extra payment/claim is admissible on account of the variable hardness of the soils, including rocks and boulders. The contractor shall bear full responsibility for the manufacture, provision and removal, once no longer needed, of all necessary types of support having adequate strength, in order to resist bearing pressure /the bearing capacity of the soil and safeguard the project's execution as well as accidents and injuries to the workers.

- 5.1 Excavation of the trenches for open channels as per to the drawings and specifications.
- 5.2 Construction of the open channels as per to the drawings and specifications.

6. Construction of the new pathway

The new pathway will be constructed to provide visitors with a safe route to the entrance of the Martinengo Bastion.

- 6.1 Construction of the path way as per to the drawings and specifications.

7. Removal of the existing safety fences

- 7.1 Removal of the existing safety fences including all the concrete footings and disposed.

8. Installation of the safety fences

- 7.1 Providing and installing of the safety fences will be carried out as per the drawings.

9. Site cleaning

- 8.1 The courtyard of the church will be cleaned. Cleaning of the courtyard includes all small plants, rubbish, and debris. Before starting cleaning works it must be ensured that the archaeological and/or architectural items are secured. All the works will be carried out by small hand tools. All waste material and unwanted items must be removed and disposed off-site. All vegetation around the courtyard including small plants and shrubs must be cut and removed.

Note: All materials will be approved for quality and color by the engineer before any works proceed.

CAUTION: Martinengo Bastion is an archaeological site. If any object or structure is found during the works, all works must be stopped immediately, and the Engineer must be informed.