

Description of Services and Works: Fountain 1

Original Use: Drinking fountain

Historical Period(s)/Chronology: Ottoman period

Materials: Ashlar stone, lime mortar, concrete mortar and metal taps

Dimensions of structure: Approx. area 9m² (rectangular) and approx.height 3,10 m

Cadastral Information: Kyrenia, Sheet 12, Plan 210102, Plot 85

GPS information: Y: 35.340750, X: 33.321667 (35°20'26.7"N 33°19'18.0"E)

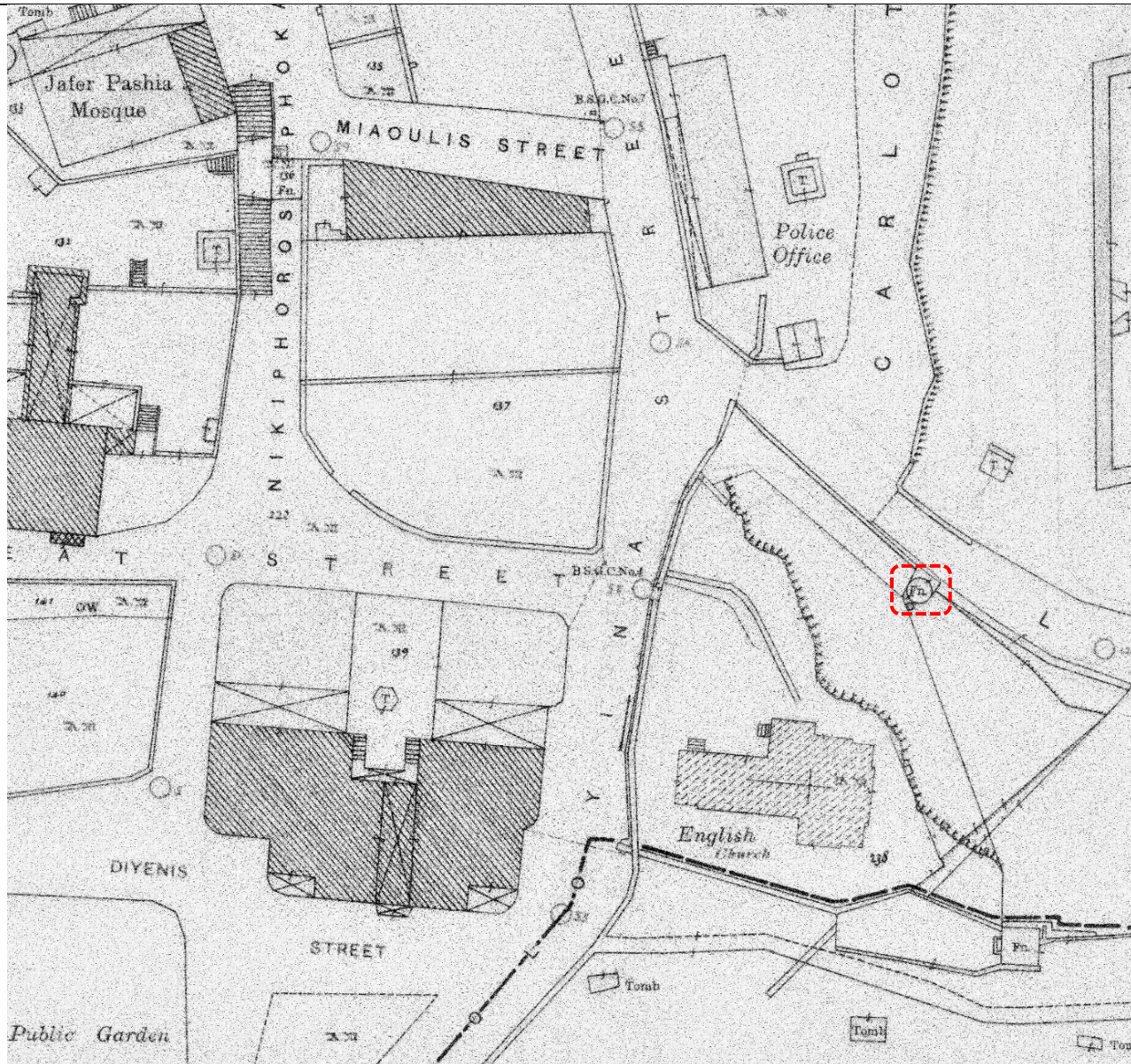


Figure 1 Cadastral map

Photographic documentation	Description of Services required
 Photo 1. The north façade of the fountain from the street @ UNDP, February 2020  Photo 2. The east façade of the fountain @ UNDP, February 2020	1. General cleaning of the fountain (removal of waste) 2. Cleaning of the fountain's stone body and apply biocide 3. Proper treatment of vegetation on and around fountain (remove of weeds and woody and non-woody plants also pruning of adjacent trees if needed). 4. Restoring stone body of the fountain and the adjacent wall to their original form (as it evident from its current state) 5. Treatment of cracks 6. Treatment of the roof



Photo 3. The west facade of the fountain; deteriorated stones, humidity stains and moss and vegetation growth @ UNDP, February 2020

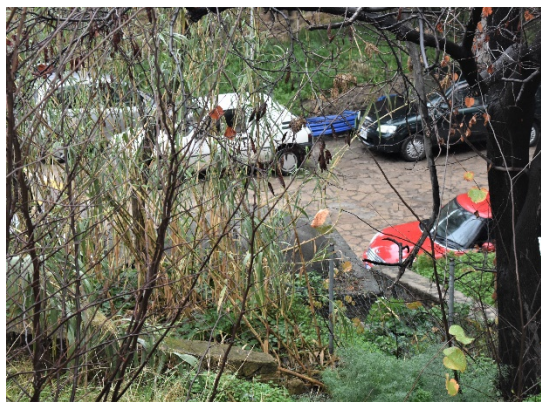


Photo 5. The fountain from the yard of St Andrew church @ UNDP, February 2020

DESCRIPTION OF WORKS**1. General cleaning of the fountain:** removal of waste from above and around the fountain**2. Cleaning of the fountain's stone body and apply biocide:**

- Dry cleaning of loose surface deposits on the stone surfaces to is performed using soft flat brushes, natural fibre brooms and vacuum cleaners. First level of cleaning aimed at removing loose deposits to be performed as follows;
 - Removal of iron elements (if any) scattered over the walls (nails, iron items, hooks).
 - Use of mild mechanical systems (cloth, natural fibre brooms) in order to remove traces of dirt, bird deposits and easily removable residues.
 - Use of low pressure compressed air aspirator for the complete removal of residues.
 - Localized use of scalpels, spatulas, small nylon or metal brushes, natural fibre brooms and vacuum cleaners, whenever it is deemed necessary.
 - In case of soft stone material, work must be done with maximum care in order to prevent crumbling of the stone surface. Special attention must be given to sculptured stone items so as not to cause any damage.
- Cleaning of biological growth by applying a wide-spectrum, water-based and anti-mildew biocide solution with a brush, roller or spray (Kimistone Biocide or equivalent and approved). The material should be biocide suitable for wide-ranging use in eliminating autotrophic and heterotrophic microflora from the surface of stone

3. Proper treatment of vegetation on and around fountain (remove of weeds and woody and non-woody plants also pruning of adjacent trees if needed.

- Pruning of trees
 - Check adjacent trees for dead branches and other signs of ill health; the contractor to remove dangerous limbs of nearby trees.
 - The contractor should provide to the engineer a method of statement for the pruning for approval, considering that heavy machinery should not enter the site in order not to cause any damage to the fountains.
 - Care must be taken to ensure that branches do not fall onto monuments or fellow workers.
- Removal of non-woody plants and use of biocide
 - Do not attempt to remove all the vegetation right away but, using secateurs and/or pruning saw, remove smaller branches so that the main stems can be revealed.
 - Clear all debris as it accumulates; arrange for disposal to an appropriate location. Leaving debris allows new seeds to take root.
 - In dense areas a power rake or hand raking can loosen the weeds. Rototilling is not recommended because of the potential for damage to stones and any archaeological remains. Great care should be given in removing the grass from the immediate vicinity of the fountains.
 - Where biocide needed to be apply, follow the instructions given in step 2 above.
- Removal of woody plants and application of herbicide where needed

- If woody plants are growing on or adjacent to the fountain, they can be cut back to ground level. Any cutting back should be done gradually by removing smaller growth and then larger branches.
- Chemical herbicides are not recommended for broadcast or spray application. Many contain salts and are often acidic – conditions which can be harmful to marble and stone. If herbicides must be used, select the least acidic one available and apply with great care.
- Remember that most herbicides are not target specific and the drift of spray or movement after rain can do a great deal of damage to adjacent vegetation (and stones). Application must always be done with the greatest care.
- Where herbicides are being considered for control of woody plants ('Roudup Bio' or equivalent product approved by the engineer), the best approach is to cut the branches and then paint with herbicide directly on the exposed branch. After application of herbicide the cut part should be covered with nylon and monitored for two weeks. If the plant is not dried after two weeks, the same process should be repeated. In this manner the herbicide will be transported directly to the root system, with little migration into the soil or nearby stones.

4. **Restoring stone body of the fountain and the adjacent wall to their original form** (as it evident from its current state)

- Removal of existing cement mortar joint filling or any other incompatible additions on the stone:
 - Incompatible or loose mortar:
 - Removal of loose and deteriorated mortar used for patch repairs on the stone using hand tools.
 - Only if absolutely necessary and after approval by UNDP sand blasting at low pressure will be used with care so as not to damage the stone.
 - Any inappropriate intervention/additions such as patch repairs with cementitious based materials should also be removed.
 - Damage or inappropriate pointing:
 - Removal of inappropriate pointing using suitable instruments so as not to damage the stones up to 4cm depth.
 - Deep manual cleaning of the joints and washing with potable water (PH 7 or higher)
- Repointing:
 - Repointing with ready-to-use mortar containing natural hydraulic lime base material to match existing colour. Pointing mortar will be placed 0.5 cm recessed from stone surface and applied in two layers as described below, well pressed with spatula, treated with sponge. Stones are to remain clean of any pointing overspills. Excess mortar must be cleaned before dried.
 - First layer: Kimia Limepor NHL or equivalent product applied using small brushes, carefully avoiding affecting surfaces that are not involved.
 - Finishing layer with hydraulic lime Kimia Limepor SK or equivalent product mixed with local fine grain sandstone to match in colour with the surrounding stone. Test should be done in small area for the approval of UNDP.
 - Regularization of finish using small sponges moistened with water.

- Use of mortar to fill any holes on stones: Use compatible lime-based mortar to fill any holes in the stones that do not present major deterioration and do not need replacement, to avoid rainwater penetration in the stones and therefore in the fountain.
- Change all the heavily deteriorated or damaged stones as estimated:
 - Stone with severe damage and/or deterioration should be replaced with compatible stone of corresponding mechanical and physical characteristics with the existing sand stones.
 - Dry cleaning of the masonry cavity of loose surface deposits on the stone surfaces, dirt, vegetation, loose mortar, and loose debris to be performed using soft flat brushes, natural fibre brooms and vacuum cleaners.
 - The existing sandstones in bad condition and defined as above will be carefully removed with soft machinery or by hand tools from existing location.
 - Stones to be removed must be marked and approved by UNDP prior removal. The stones will be numbered, their exact location on the fountain will be noted and they will be stored.
 - The new sand stones must be of similar colour, size and texture in order to match existing sand stones characteristics.
 - Prior fixing the new sandstones in place make sure that old loose members and all old mortars are removed
 - Pre-wet adjacent surfaces with clean, potable water before initiating rebuilding of the masonry. Any missing parts of the masonry of the fountains should be rebuilt with the same type of stones and mortar and in the same character with the existing one (in similar style and workmanship, taking account of the style and shape of any coursing patterns, masonry structure, stone shapes and the like).
 - Stone should be laid in an evenly filled bed of mortar, with full mortar coverage on horizontal and vertical joints. Adjust stone units to final position while mortar is soft and plastic.
 - Repointing with ready-to-use mortar containing natural hydraulic lime base material to match existing colour. The mortar must match in colour, texture, tooling, and sand content the existing. The objective is to match the historic mortar so that the new material will not conflict visually or physically with the original materials. It must also have less compressive strength than the surrounding stone material.
 - Periodic rewetting of the newly re-pointed area should be conducted as this will also prevent premature drying. Stones are to remain clean of any pointing overspills. Excess mortar must be cleaned before dried. When mortar is thumbprint hard, tool to match original appearance of joints. Remove excess mortar from edge of joint by brushing. Maximum tolerances from plumb and level new work, not to exceed variation from plumb and level of adjacent existing work.
 - Clean the new wall surface with natural brush after mortar is dry.
 - Overall aim is to reuse the existing stone available for the reconstruction of the masonry. If replacement units are required, they should match original sandstone in colour, texture, and size, and be free from salts and other contaminants.
 - All new materials must be checked for consistency, colour, absence of salt, ingredients, texture, etc.

5. Treatment of cracks

Treatment of cracks following the steps below:

- For cracks width between 1 and 5mm:
 - The existing pointing should be removed along the crack at its total width and as deep as it can.
 - The area should be cleaned from any loose materials and dust by watering and low-pressure air jet.
 - The crack should be sealed with mortar on the facing external surface from where the slurry could seep out.
 - Holes of diameter 20-40mm should be drilled to a depth of 2/3 of the thickness of the stone structure. If the structural stone surface is thicker than 60cm is better to make holes from both sides.
 - Small tubes or injectors should be fastened in place and then mortar- grout injection should be employed. The use of Mape-Antique I or similar is recommended.
 - The day before injecting the slurry is recommended to saturate all the inside of the structure with water through the small tubes previously fastened in place. Particular care must be taken to the injection pressure which must be up to 1 bar.
 - Injection should be started from the bottom working upwards.
 - When the injection has been completed all tubes and injectors and external seal-mortar must be removed.
 - The remaining holes and gaps should be grouted with a compatible mortar from the Mapei range.
- For cracks width between 0.3 and 1mm:
 - In that case the existing pointing should be removed along the crack at its total width and as deep as it can.
 - The area should be cleaned from loose materials and dust by watering and low-pressure air jet.
 - The crack should be sealed with ready-to-use mortar containing natural hydraulic lime base material to match existing colour, until the crack is fully sealed.
 - The mortar will be well pressed with spatula and treated externally with sponge.
 - Test will be done for the approval of the engineer.

6. Treatment of the roof

- Cleaning of the roof:
 - Dry cleaning of loose surface using flat brushes, natural fibre brooms and vacuum cleaner to remove loose deposits, if any
 - Use mild mechanisms (cloths, natural fibre brooms etc.) to remove traces of dirt and easily removable residues
 - Use of low pressure compressed air aspirator for the complete removal of residues
- Application of biocide and removal of organic growth and vegetation:
 - Apply biocide to kill any vegetation/organic growth (**see step 2 above**)
 - After the application of the biocide, remove any organic growth/vegetation with care.
- Implementation of any necessary partial repairs needed:
 - Check the roof slab both at the exterior and inside the fountain (e.g. for minor cracks or for parts of the concrete slab that the surface has smoothed, and water insulation membrane cannot be applied)

- Do partial repairs if necessary and where needed
- Treatment of the cracks as per step 5 above
- Application of water insulation membrane: Apply water insulation membrane to protect the slab and the fountain from rainwater penetration
- Check the rainwater management system of the roof
 - Existing rainwater management system to be checked and restored in a working condition wherever possible