Restoration Study and Re-Use of the Listed 'Olympios Tower' and Its Accompanying Buildings in Ano Lechonia, Western Pelion, Magnesia Prefecture, Greece

Fotini Chalvantzi*[1], Ifigenia Dimitriou[2], Konstantinos Toumpakaris[3] and Maria Mageirou[4]

*[1]Architect Engineer NTUA, MSc "Protection of Monuments and Sites" NTUA 3b Platonos str, 19009, Rafina, Athens, Greece
halfotini@hotmail.com
[2] Architect Engineer NTUA, MSc Museology UPC Barcelona 34 Kleomenous str, 10676, Athens, Greece
ifitaz@gmail.com
[3]Civil Engineer NTUA, MSc "Protection of Monuments and Sites" NTUA, 10A Agion Anargyron str, 11147, Galatsi, Athens, Greece
kitoump@yahoo.gr
[4]Mechanical Engineer Upatras 5 Deinokratous str, 10675 Athens, Greece
mmageirou@gmail.com

Abstract. This project concerns the restoration of the listed monument known as the 'Olympios Tower' and its accompanying buildings at Ano Lechonia, a lowland fertile village in Magnesia Prefecture in Greece. The original core of the Tower dates back to the 17th -18th centuries and consists of an almost rectangular plan of 6,91 x 7,05 m, with a fortified base. In 1860, there was an addition made to the Tower's north face, thereby creating a final L-shape plan and causing major alterations to the original building. Next to the Tower, there are two, two-storey accompanying buildings with auxiliary uses related to the storage and pre-industrial processing of agricultural products. The complex has suffered from lack of repair and maintenance and needs immediate restoration in order to be saved as a noteworthy architectural ensemble.

The purpose of this study is the restoration and re-use of the 'Olympios Tower' complex in order for it to be re-used and maintained as a traditional guest house and restaurant with emphasis on local gastronomy and wine tasting. The restoration is based on respect for authenticity with an interdisciplinary approach. This paper aims to present not only the structural interventions, but also the challenges that derive from such a re-use, where the experts involved are consulted, on the one hand, to design all necessary interventions with care by minimising the impact on the original canvas, while, on the other hand, adding another layer to the complex that is contemporary and yet corresponds to its values.

Keywords: 'Olympios Tower', ottoman Pelioreite vernacular architecture, early tower house, fortified residence of the mid-19th century

1 Geographical Location of the Monument Assembly – Historical Elements

The complex under study is located in Ano Lechonia, Magnesia Prefecture, a village of western Pelion, southeast of Volos at a distance of 11 km, at an altitude of 150 m. and at a distance of approximately 1 km from the sea. During the Ottoman period, together with Kato Lechonia they constituted two robust settlements due to their fertile plain, where fruits, olives and vegetables were produced.

The complex consists of the preserved tower house [1], known in the literature as 'Olympios Tower', and its accompanying houses. These are two independent buildings, the Tower with a L-shaped plan, and the adjacent buildings, with a functional but yet not structural connection to the Tower.

The original core of the Tower dates back to the 17th-18th century and was built by Alatza or Atlatza, a consul of Russia in Greece. The Tower and the rest of the buildings, became the property of the Olympios family in 1956 for the price of 1.000 golden pounds, from where it derived its current name. Today, it belongs to the property of Pantazis Tsousis and Vasiliki Kolovos [2]. During the Ottoman period, Lechonia had "more than 60 houses, all three-storey and two-storey towers, all whitewashed, two mosques, two cafes... "[3], Today, of the aforementioned towers in Ano Lechonia, only the 'Olympios' and 'Kokosli' tower houses are preserved in a relatively good state of preservation, while the 'Suleiman' tower house remains in a dilapidated state, having lost a significant part of its superstructure. In Kato Lechonia, an old fortified tower from the Byzantine period is also ruinous, and is early example of the tower house we are studying.

Fig. 1: Southeast aspect of the complex of the listed 'Olympios Tower' (current state)

Fig. 2: Examples of the family heirlooms and other valuable exhibits that document the history of the complex, stone-carved inscription of the second construction phase of the Tower, interior aspects of the Tower's rooms and roof, interior partition timber walls and enclosed balcony of the top floor

Fig. 3: Southeast elevation/longitudinal section /ground floor plan of the complex of the listed ‘Olympios Tower’ (current state)

2 Building Phases

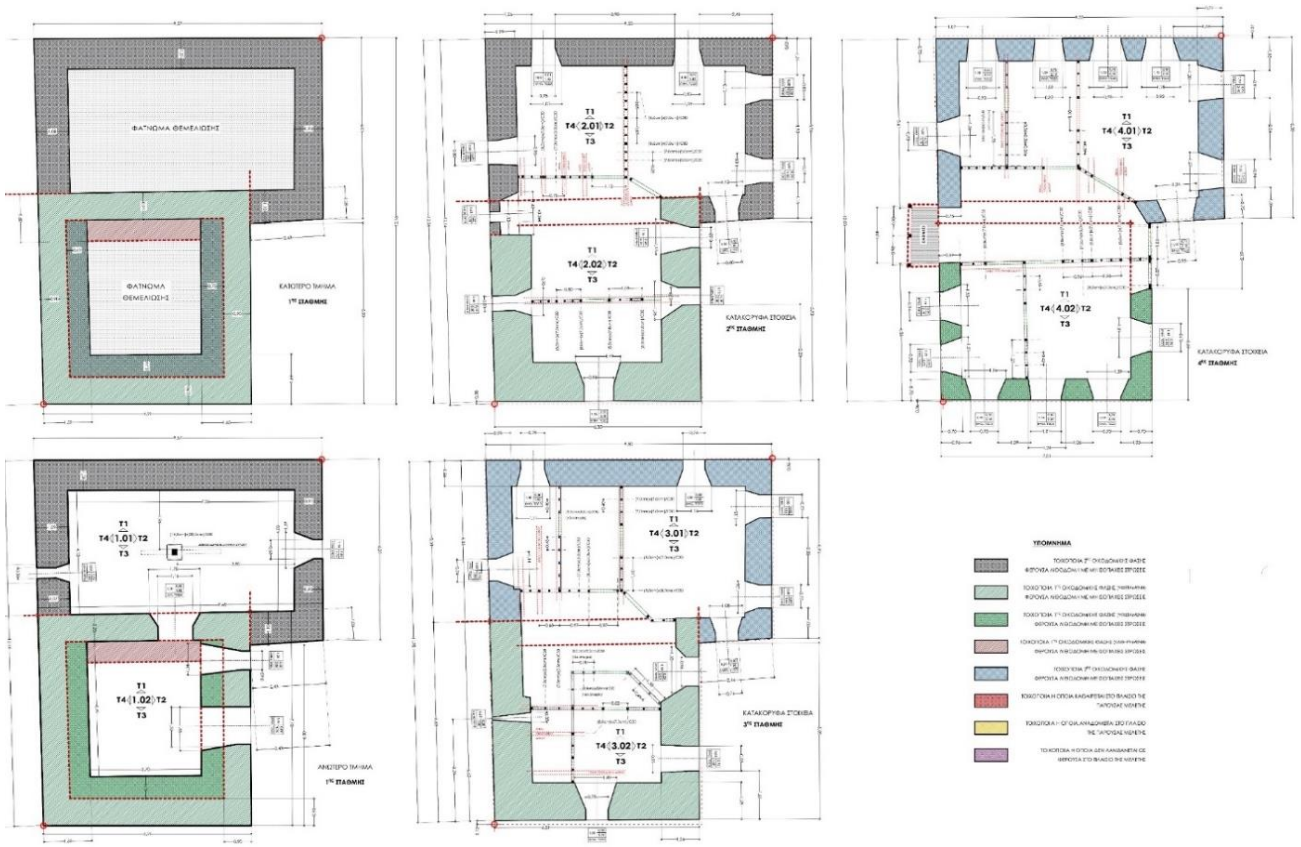

Fig. 4: 'Olympios Tower'- construction phases

2.1 Tower

The Tower has an L-shaped floor plan, and according to the scholar of Pelioreite buildings Kizis, is typologically a combination of an early tower house with a L-shaped fortified residence of the mid-19th century [4]. The Tower is developed in on four main levels, in the first of which the transition from the first building phase to the second is perceived. The total height with the roof is about 15m.

First phase: The original core of the Tower which, according to Kizis, is the first southern antenna of L, is an almost square stone-built fortified tower, with overall dimensions of 6.91 x 7.05 m and a wall thickness of 1.30 to 1.60 m. [5]. Its base is fortified, tower-shaped, with a solid prismatic trunk, which is closed, without a loggia. It consists of four levels with a simple one-room interior arrangement, with niches and small lighting windows or slit-shaped battlements [6]. The entrance is installed at an elevated level, from the natural ground, so its approach was probably made by means of a portable ladder. The fourth level was probably rebuilt together with the north antenna.

Second phase: In 1860, as can be seen from the date inscribed on a stone-carved architectural inscription on the corner structure of the SE face of the tower house, the northern wing of the Tower was added, giving the shape C to the plan and causing alterations to the original building. The new masonry is more elaborate with a thickness of 75-90 cm and differs, in construction technique, from that of the original core. The ground floor acquires, in addition to the spacious entrance, a product storage area with the possibility of isolation with a door. In the intervening mezzanines, there is a repeated arrangement of spaces with enlarged day-night spaces, usually for the family's winter accommodation.

The top floor, possibly rebuilt with thinner masonry, has continuous windows with wooden shutters and an airy 'hall', around which spacious rooms are formed, for pleasant accommodation during the summer months at a safe height. It also features an open and an enclosed balcony 'sachnisi', while there is also a slight protrusion of the masonry for defensive reasons.

General observations on the construction technology of the Tower:

- From the sample checks carried out, the buildings that have been used for the construction of the tower come from typical limestone or, more rarely, gneiss, i.e. rocks of high compressive strength.

- The masonry has a reinforcement system with a hidden grid of wooden frames every 1 – 1.40m. The grating consists of three hewn beams of square cross-section, side approximately 7 cm., placed in a recess of 10 cm. from the outer face of the masonry, connected by horizontal flaps nailed every 1.80 m. This system shear-strengthens the masonry and was installed in inside the masonry to protect it from the biological effect of the natural environment.
- The floors are shaped by roughly hewn beams **[7],** with cross-sections that vary by level. Between the joists, in many floor partitions, joists of smaller cross-section are inserted between the passes to thicken the cross-beam, in order to support the wooden floor boards. For the trussing of larger spaces where there is no underlying stonework to support the beams, i.e. on the floors of the 2nd mezzanine and the top floor, there is an intermediate support beam. The timber used in the partitions is generally hard, from deciduous trees. The presence of chestnut beams was noted.
- The roof is isocline, L-shaped and formed by a grid of beams and eaves with many intermediate support points. This is followed by the covering with thick boards with small intermediate joints to anchor the mud with the heavy overlay of locally sourced roof tiles.
- On the top floor of the Tower is preserved an enclosed balcony with external walls made of 'tsatma'. These are thin, solid timber walls, where cross struts are wedged between the rectangular frames and the gaps are filled with stone blocks.
- The internal walls of the Tower are made out of timber frames **[8]**. Flexible twigs are woven into the timber frames and coated with clay and lime mortar.

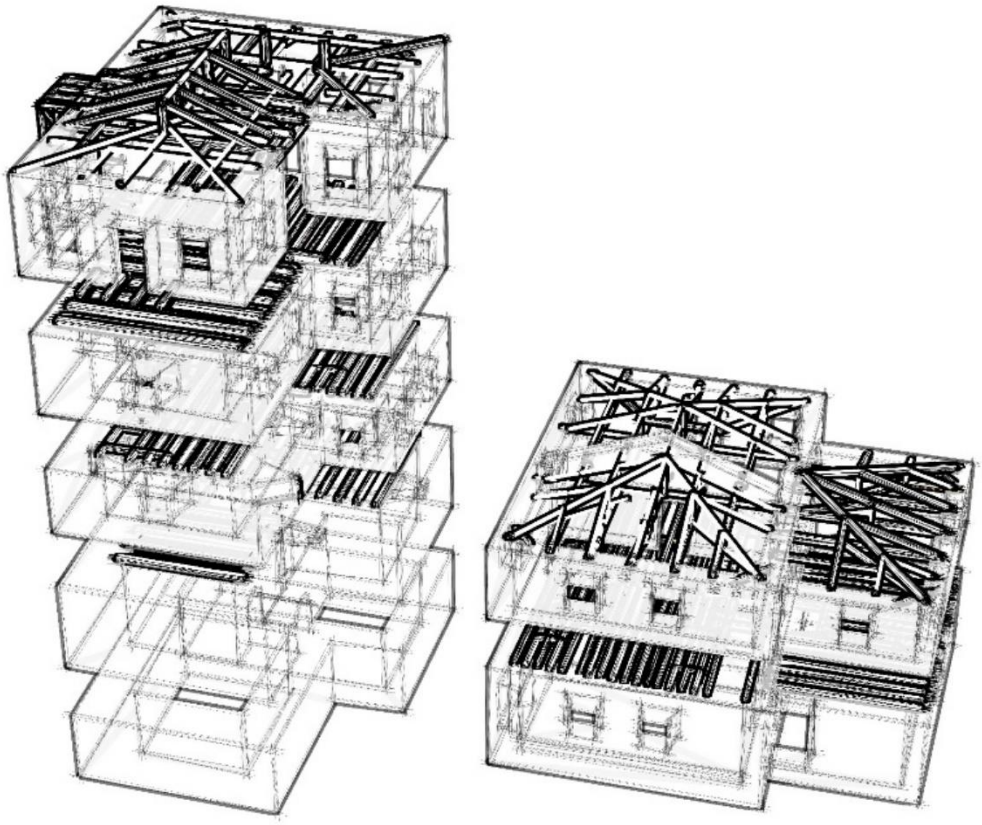

Fig. 5: Analysis of the bearing structure of the complex

2.2 Accompanying buildings

Next to the Tower, to the east, there are two two-storey side houses in contact with an independent entrance from the courtyard and auxiliary uses related to the storage and pre-industrial processing of the products of the plain, together with the ground floor accompanying building comprising two woodfire ovens. Between the Tower and the accompanying buildings, two stone-built fountains are preserved with the system of traditional water pipes connecting them.

The first, and larger of the two, side houses has an almost rectangular floor plan with general dimensions of 11.67 x 9.20m and wall thickness ~8o cm and height ~8.60m, including the roof. The ground floor comprises two-room and in-

cludes, in the first area of the entrance, a large corner hearth and recesses in the masonry which are probably related to pre-industrial processing of products, and retains traces of a scale for access to the building's floor. The second area of the ground floor is a storage area and maintains two storage jars for goods. The floor also comprises two-room with many windows, hearths and niches.

The second side house to the east is in contact with the first, and has two independent entrances from the courtyard. It has a rectangular floor plan with general external dimensions of 5x 9m, wall thickness ~65cm. and common partition with the first side house. Due to the collapse of the roof, its interior is inaccessible.

The third side building is in contact with the above and is a ground-floor semi-open-air building that includes two wood-fired ovens.

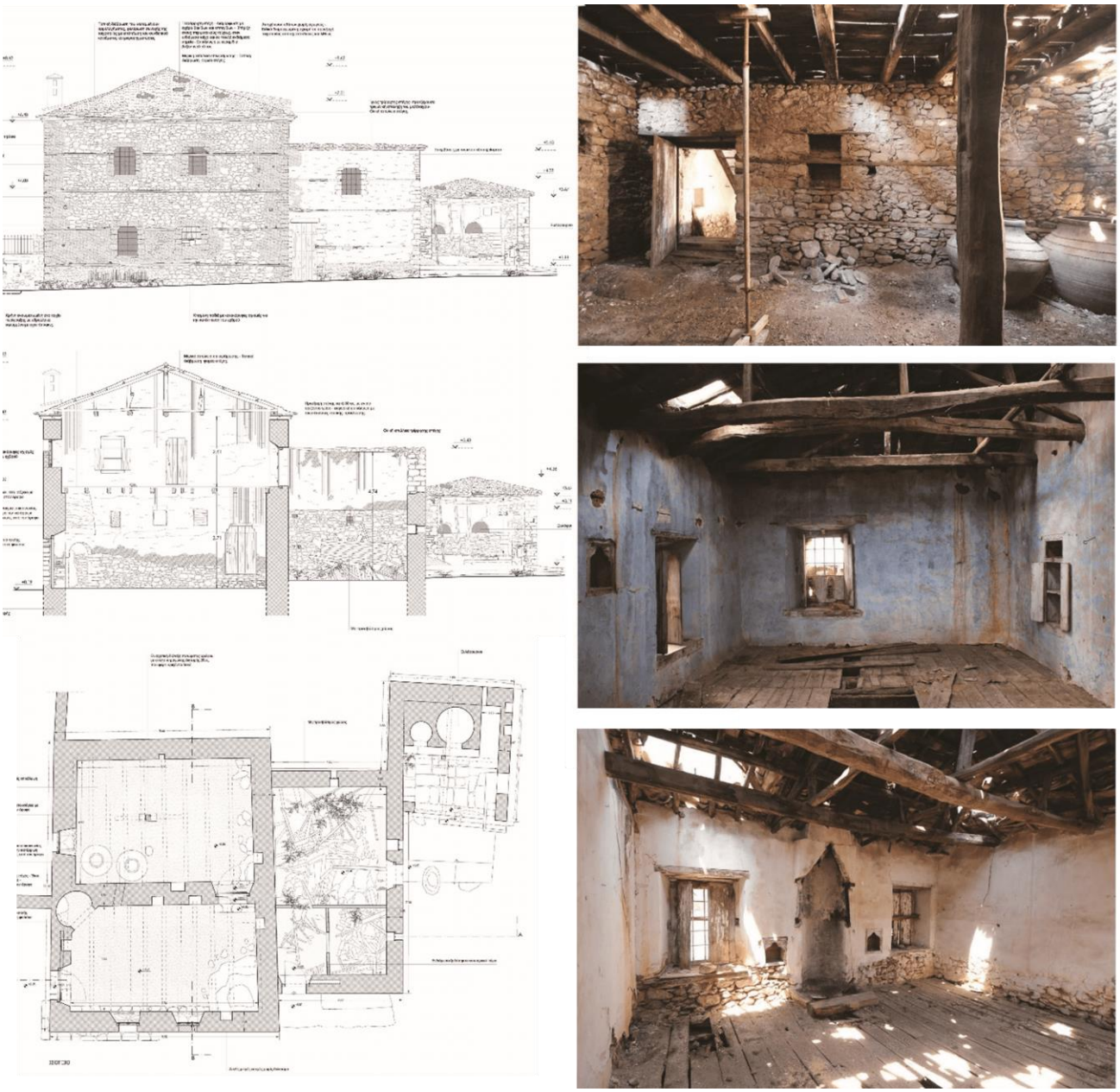

Fig. 6: Southeast elevation/ longitudinal section/ ground floor plan and interior photos of the accompanying buildings (current state)

3 Condition of Preservation-Pathology

The Tower complex has been abandoned since the 1970s due to a lightning strike in 1967 on the northern part of the Tower. The Tower has adequately coped with the dynamic stresses, and apart from minor structural damages, the stone load-bearing elements of the building show a very good state of preservation. The accompanying buildings are in the

same state of conservation, one of which presents serious structural problems, having completely lost its roof and part of its superstructure.
The structural problems we have identified are summarized below:

- Local disorganisation of joints - leaching of binding mortar - micro-cracks
- Cracks mainly due to lateral thrusts from the roof to the side walls and the Tower
- Corroded and cracked coatings
- Interventions with cement mortars
- Corrosion in masonry reinforcement systems
- Upper-level rafter and eaves have collapsed while the second level central beam and the newer section of the ground floor ceiling have mechanical failure
- Damage to the roof of the Tower and the first wing as well as the total loss of the roof of the second wing.
- Lack of maintenance and partial loss of frames as well as sealing of openings with masonry.
- Total loss of internal scale of the first accompanying building.

Fig. 7: Examples of structural problems of the complex

4 Restoration – Re-use – Philosophy of Intervention

It is obvious that the complex has deteriorated due to its lack of maintenance and needs immediate restoration in order to be able to be preserved as a remarkable architectural ensemble. The purpose of the study is the restoration and re-use of the 'Olympios Tower' complex in order to consolidate, maintain and re-use it as a traditional guest house and restaurant with an emphasis on local gastronomy and wine.

The restoration is based on the idea of a complete restoration of the complex with respect for authenticity and with an emphasis on preserving the typology of the floor plans and all the historical layers. Basic principles for restoration are also the reversibility of interventions and the use of traditional building techniques and compatible materials.

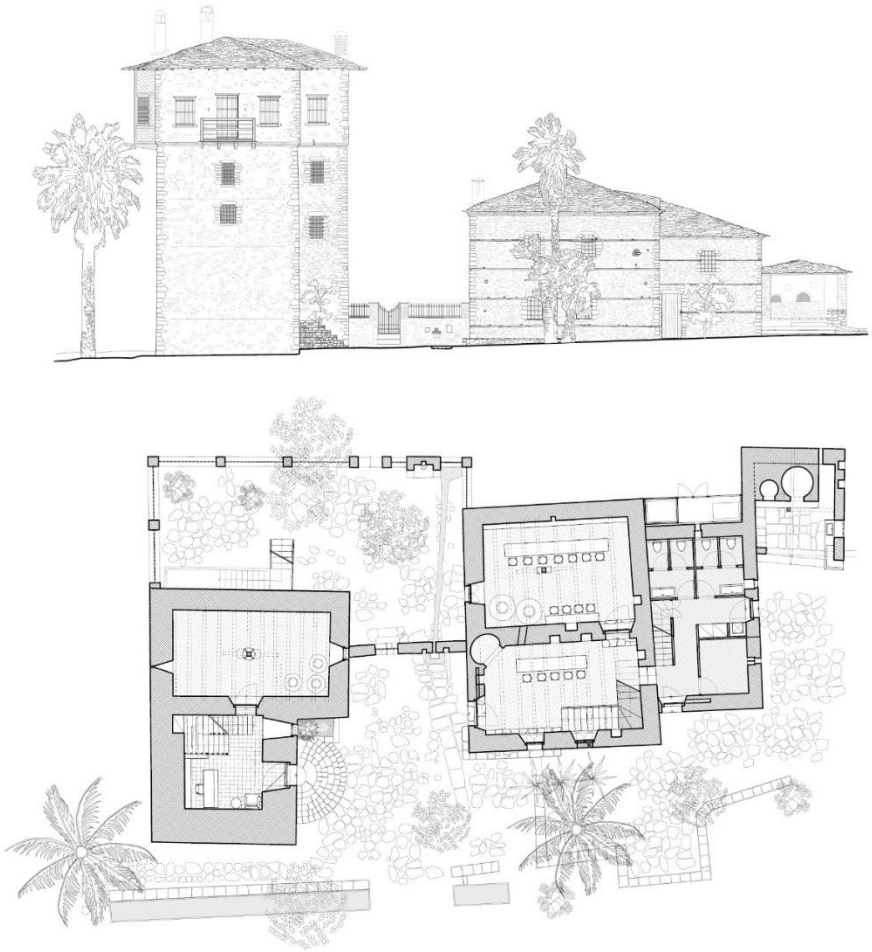

Fig. 8: Proposal Plans: Southeast view of the complex / general plan of the complex

4.1 Introduction of New Uses

The complex will be a destination for hospitality, gastronomy and wine tasting. As for the Tower, it will be transformed into a boutique guesthouse with limited rooms corresponding to the existing ones, keeping unchanged the typology of the floor plans and all the original morphological elements. The introduction of the new facilities in order to make the hotel functional will be limited to the minimum possible interventions, which will be designed to be fully reversible without altering typological and morphological characteristics. Our goal is for the visitor to experience unique hospitality within a historical and unchanged architectural 19th century setting. The re-use of the furniture of the house that has been preserved in its entirety will also contribute to this aesthetic.

More specifically, in the area of the elevated ground floor, there will be a reception hall that will introduce the visitor to the former storage area of the tower, which will function as an exhibition space for the history of the complex. Here, historical portraits of the owners, family heirlooms and other valuable exhibits that record the history of the monument will be on display.

On the first level, a small office for the reception of guests, the kitchen-preparation room and the breakfast room will operate without any intervention at the floor plan level.

On the second and third levels, guest accommodation will be provided in the four existing rooms, with the minimal additions of new reversible wooden partition walls for the configuration of the necessary bathrooms.

From the Tower, all the structural and building elements will be preserved and strengthened where necessary without any alteration of the original form with compatible materials. An exception is the construction of the external stairs going up to the reinforced concrete floor, which will be removed and redesigned with new compatible materials. For those morphological elements that have been lost, such as the construction of the balcony, comparative elements were sought in buildings with the same typology in order to reconstruct them according to traditional standards.

Accompanying buildings will host local wine tasting and gastronomy offerings and will be accessible, not only to the guests of the hotel, but also to casual from the wider region of the prefecture. In more detail, in first side house, in the

first area of the reception, the exhibition and sale of agro-tourism products of the region of Magnesia will take place, and in the former storage area there will be a cellar with local label wines, as well as tasting area for wine connoisseurs. The main area of the restaurant will function in the space above, where an attempt will be made to keep the visible load-bearing structure of the roof unchanged, but strengthened. In the second side house will be placed the auxiliary functions of the large side house, but also of the hotel, which will communicate internally with each other at the first level floor. The ground floor will include restrooms, a laundry and a linen closet, and a food storage area, while on the first floor there will be an open preparation area for the restaurant's kitchen.

In the surrounding area, emphasis will be placed on preserving the existing vegetation. In addition, the woodfire ovens, fountains, and cistern system will be maintained and restored to functionality.

5 Description of Structural Rehabilitation Works

As a general conclusion of our analyses, we note the excellent response of the tower walls but also the inadequacy of these ‘sidewalls’, due mainly to the poor structure rather than the geometric inadequacy of the cross-sections. The static analysis of the two buildings was carried out in the Scada-Pro static and dynamic analysis program of American Computers & Engineers - AceHellas by simulating their stone shells with surface finite elements and the beams of the ribbed floors. For the Tower, a seismic behavior coefficient q= 1 and an A-DL performance level were chosen, while for the accompanying houses 1.5 and B-SD respectively. The inspections of the walls were carried out in accordance with the provisions of Annex C' of EC8 and the draft of the K.A.D.E.T. For the compressive strength of the walls, the KADET_2019 plan was used - §6.2.4.3. With reference to the proposed interventions in the supporting body of the Tower, they are limited and concern the reinforcement, consolidation or recovery of specific provisions. The application of grouts is avoided since, due to the solidity of the core of the walls as well as the excellent condition of the internal plasters, such an intervention is estimated to be more harmful than beneficial for the building. The ‘sachnisi’ and the balcony of the upper level are recovered, while targeted interventions are proposed on the floors and the roof. The planking is to be completely removed, cleaned and arranged for re-use while the beams are purposefully restored and connected to the walls by suitable metal connectors. With the exception of the lower-level roof, floor joist replacements are minimal and dictated either by the condition found during deforestation, or by in-plane failure of the overlying brick walls. In the case of cracks of significant length, stone joints or joints with stainless steel plates are carried out while external grouting is carried out with suitable hydraulic mortars with a low content of white cement. The ceiling floor of the lower level, in the area of the 2nd phase, is essentially being replaced, with absolute preservation of the axial spaces (the joists, that is, they remain and are re-used) since, in addition to the advanced decay, they are also insufficient in terms of cross-sections. Finally, the main beam on the roof of the second level is replaced by a beam of composite cross-section in which a bending metal beam is integrated, while that of the third level is reinforced with lateral metal plates. With reference to the side door, first of all, the wall that has collapsed is to be recovered as well as the mezzanine and the roof of the spaces to which the specific wall corresponds. Two openings are made for the functional upgrade of the building and the new railings are implemented using wooden beams. The existing mezzanines are to be cleaned and strengthened by replacing some beams which are either mechanically inadequate or in an advanced stage of decay. The beams are connected to the walls by means of iron ties and new planking is installed. The two "independent" shells that make up the accompanying buildings are connected by means of steel anchors and, overall, a three-part grout with a low content of white cement is to be applied.

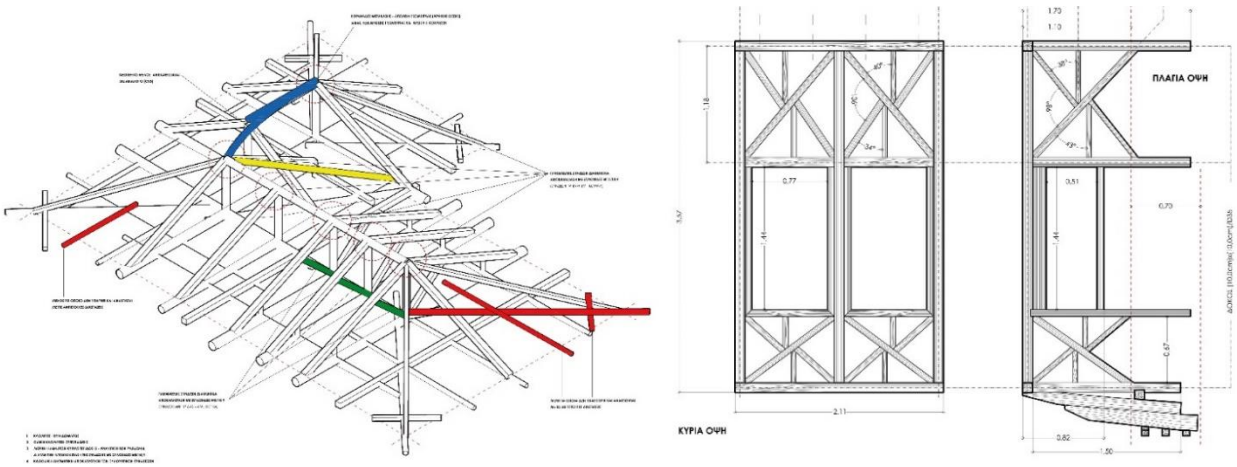

Fig. 9: Proposal Plans: interventions to the bearing structure of the roof and the enclosed balcony

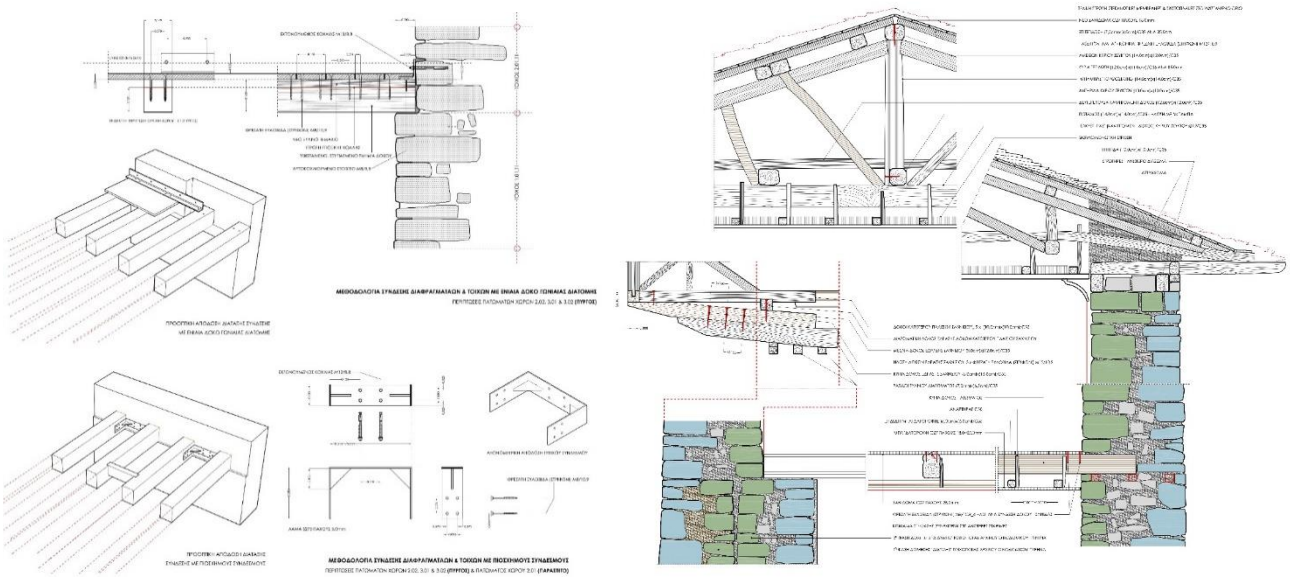

Fig. 10: Proposal Plans: interventions to the bearing structure of the floors, roof and the enclosed balcony

6 Conclusion

The restoration of this historic complex aims to preserve one of the few surviving examples of a fortified tower residence of the mid-19th century in the Pelion region. The proposed interventions will respect the integrity of the structure and will follow international standards of restoration. Furthermore, the complex's proposed re-use as a boutique hotel will enable this listed monument to retain its original character and fabric while returning to functionality.

Acknowledgements

We would like to acknowledge that our work in developing this restoration study, which is guided by the principles that govern projects of this kind, found fertile ground in the vision of the Tower's owners. We thank them for this and we hope to be present at a forthcoming conference for a presentation of the completed project.

References

1. The Tower is classified as a historical preserved monument by the decision of the Ministry of Culture with no. YPPO/ARCH/B1/Φ32/19353/329 published in Official Gazette 1029, file B' on December 18, 1999.
2. Ownership information taken from: http://anolehonia.blogspot.com/2011/05/blog-post_31.html
3. Kizis J. (1994), Pilioreitiki oikodomia, Politistiko Technologiko Idrima ETBA, Athens, 19
4. Kizis J. (1994), Pilioreitiki oikodomia, Politistiko Technologiko Idrima ETBA, Athens, 343
5. The masonry of the original part of the Tower is built to withstand the harsh winter climate, but mainly to provide protection from attack. It has a remarkable thickness of 1.60m. and is characterized by Kizis as a double-"twin" (Yiannis Kizis, Pelioreitiki building, ed. ETVA Cultural Foundation, Athens 1994, p. 179). The inner wall has a square plan with hidden wooden frames and grouted with lime mortar. Afterwards, the inner wall was probably lined with the second masonry for the development of the top floor. The above method is best suitable for a wall of this width with the available materials, as it was difficult to erect such masonry in one piece. The walls show a decrease in width per level, revealing their outer face sloping. In the thickness of the wall, there are elaborate built-in cupboards, as well as the chimneys of the stoves. The new masonry of the addition differs in construction from the original core, is more elaborate in terms of cornerstones, and is 75-90 cm thick.
6. Kizis J. (1994), Pilioreitiki oikodomia, Politistiko Technologiko Idrima ETBA, Athens, 343-344
7. Kizis J. (1994), Pilioreitiki oikodomia, Politistiko Technologiko Idrima ETBA, Athens, 191
8. The local name of the wall with the braided rods has not been preserved to this day, but a corresponding wall construction in Macedonia is called 'plokaria'. Kizis J. (1994), Pilioreitiki oikodomia, Politistiko Technologiko Idrima ETBA, Athens, 232