RESTORATION AND PRESENTATION OF BYZANTINE DEFENSE STRUCTURES IN CILICIA

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ABSTRACT

RESTORATION AND PRESENTATION OF BYZANTINE DEFENSE STRUCTURES IN CILICIA

The aim of this study is to evaluate current restorations and presentations of Byzantine defense structures in terms of sustaining and enhancement of the cultural heritage values and their success in solving conservation problems. So, better management of future interventions may be possible. Case study approach was undertaken: Three castle ruins in Cilicia, Turkey were focused on: Yılan and Feke castles and *Kızkalesi* in Korykos. The cases are located in the present-day rural areas. They are restored recently. The study consists of literature review, site survey, documentation and analysis of geographic characteristics, historic background, morphologic characteristics, construction technique and material usage and conservation activities of the case studies, identification of the cultural heritage values and conservation problems before and after interventions at the landscape, site and building scales; and discussion of the effects of the interventions on values and problems in comparison with case studies from abroad. As a result, it was determined that interventions were either unsystematic or implemented more than necessary. There is lack of a holistic approach for interventions. While some portions were intervened, others were left in-situ without any interventions. There is a tendency for reconstruction and reintegration in general. It was seen that current interventions either sustain already accumulated cultural heritage values or they have negative impact on them. Consequently, enhancement of values is not observed. Meanwhile, some of the conservation problems were ignored.

ÖZET

KİLİKYA'DAKİ BİZANS SAVUNMA YAPILARININ RESTORASYONU VE SUNUMU

Bu çalışmanın amacı, Bizans dönemi savunma yapılarının güncel restorasyon ve sunumlarını kültürel miras değerlerinin sürdürülmesi, geliştirilmesi ve koruma problemlerini çözmedeki başarısı açısından değerlendirmek ve gelecekteki benzer restorasyonların daha iyi yönetilmesine katkı sağlamaktır. Vaka çalışması yaklaşımı tercih edilmiş; Türkiye'nin Kilikya bölgesindeki üç kale kalıntısına odaklanılmıştır: Yılan ve Feke kaleleri ve Korykos'ta bulunan Kızkalesi. Kalıntılar günümüzde kırsal alanlarda yer almaktadırlar. Yakın zamanda restore edilmişlerdir. Çalışma kapsamı; yazın taraması, restorasyon müdahalelerinin yerinde incelenmesi; vaka çalışmalarının coğrafi özelliklerinin, tarihi arka planının, morfolojik özelliklerinin, yapım tekniği ve malzeme kullanımının ve koruma faaliyetlerinin belgelenmesi ve analiz edilmesi; müdahale öncesi ile sonrası kültürel miras değerlerinin ve koruma problemlerinin peyzaj, arazi ve yapı ölçeklerinde belirlenmesinden ve müdahalelerin değerler ve problemler üzerindeki etkilerinin yurt dışından seçilen örneklerle karşılaştırmalı olarak tartışılmasından oluşmaktadır. Sonuç olarak, müdahaleler ya sistematik değildir ya da gereğinden fazla müdahale edilmektedir. Müdahaleler için bütünsel bir yaklaşım eksikliği vardır. Bazı kısımlara müdahale edilirken, diğerleri müdahale edilmeden bırakılmıştır. Genel olarak yeniden yapım ve bütünleme eğilimi vardır. Güncel müdahalelerin kültürel miras değerlerini sürdürdüğü veya olumsuz etkilediği görülmüştür. Dolayısıyla mevcut değerlere değer katılamamıştır. Diğer yandan, koruma sorunlarının bir kısmı göz ardı edilmiştir.

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ABBREVIATIONS

ANACED: National Association of Art and Creativity for People with Disabilities (*Associação Nacional de Arte e Criatividade de e para Pessoas com Deficiência*)

Ayto: City Council in Spain *(Ayuntamiento)*

BIC: Asset of Cultural Interest *(Bien de Interés Cultural)*

CEN: European Committee for Standardization (*Avrupa Standardizasyon Komitesi*)

CMM: Castles and Defensive Walls of Mondego (*Castelos e Muralhas do Mondego*)

COE: Council of Europe (*Avrupa Konseyi*)

DAI: German Archaeological Institute (*Deutsches Archäologisches Institut*)

DFG: German Research Foundation (*Deutsche Forschungsgemeinschaft*)

DGAMS: Syrian General Directorate of Antiquities and Museums (*Direction Générale des Antiquités et des Musées de la Syrie*)

DGEMN: General Directorate of National Buildings and Monuments (*Direção Geral de Edifícios e Monumentos Nacionais*)

DGPC: General Directorate of Cultural Heritage (*Direção Geral do Património Cultural*)

DIMCs (*YİKOB*): Department of Investment Monitoring and Coordination (*Yatırım İzleme ve Koordinasyon Başkanlığı*)

DMI: The Danish Meteorological Institute (*Danmarks Meteorologiske Institut*)

DÖSİMM: Central Directorate of Rotary Capital Management (*Döner Sermaye İşletmesi Merkez Müdürlüğü*)

GEGMR: General Establishment of Geology and Mineral Resources

IBI: International Castles Institute (*Internationales Burgenforschungs Institut*)

ICC: International Conference on Conservation

ICCROM: International Centre for the Study of the Preservation and Restoration of Cultural Property

ICOFORT: International Scientific Committee on Fortifications and Military Heritage

ICOMOS: International Council on Monuments and Sites (*Uluslararası Anıtlar ve Sitler Konseyi*)

IGESPAR: Institute for the Management of Architectural and Archaeological Heritage (*Instituto de Gestão do Patrimònio Arquitectònico e Arquelògico*)

IGME (formerly named as ITGE): Geological and Mining Institute of Spain (*Instituto Geológico y Minero de España / lnstituto Tecnológico GeoMinero de España*)

IGN: National Geographic Institute (*Instituto Geográfico Nacional*)

IPPAR: Portuguese Institute for Architectural Heritage (*Instituto Português do Património Arquitectónico*)

KMKD: Association for the Protection of Cultural Heritage (*Kültürel Mirası Koruma Derneği*)

KTB, Ministry: Ministry of Culture and Tourism (*Kültür ve Turizm Bakanlığı*)

KVMGM: General Directorate of Cultural Assets and Museums (*Kültür Varlıkları ve Müzeler Genel Müdürlüğü*)

MEN (now MEFP): Ministry of National Education (*Ministerio de Educación Nacional / Ministerio de Educación y Formación Profesional*)

MEU: Ministry of Environment and Urbanisation (*Çevre ve Şehircilik Bakanlığı*)

MTA: General Directorate of Mineral Research and Exploration (*Maden Tetkik ve Arama Genel Müdürlüğü*)

Regional Council for Conservation: Regional Council for Conservation of Cultural Property (*Kültür Varlıklarını Koruma Bölge Kurulu*)

SAR: Syrian Arab Republic

SEPA: Special Environmental Protection Area (*Özel Çevre Koruma Bölgesi*)

SIPA: Information System for the Architectural Heritage (*Sistema de Informação para o Patrimònio Arquitectònico*)

SPA: Special Provincial Administration (*İl Özel İdaresi*)

TÜBİTAK: The Scientific and Technological Research Council of Turkey (*Türkiye Bilimsel ve Teknolojik Araştırma Kurumu*)

TÜRSAB: Association of Turkish Travel Agencies (*Türkiye Seyahat Acentaları Birliği*)

UNESCO: United Nations Educational, Scientific and Cultural Organization (*Birleşmiş Milletler Eğitim, Bilim ve Kültür Kurumu*)

UTMK: Turkish National Commission for Unesco (*Unesco Türkiye Millî Komisyonu*)

WHC: World Heritage Centre

CHAPTER 1

INTRODUCTION

Cultural assets are primary sources that enable the history of humanity to be understood by future generations. For this reason, it is important to determine appropriate intervention decisions through understanding of cultural heritage values properly for preservation of cultural assets. Cultural assets have been intervened with different restoration approaches throughout their historic evolution and each intervention has affected cultural heritage values. However, methodologic approaches on the evaluation of the effects of restoration interventions on cultural heritage values are limited. Kuban (1969) discussed the criteria for restoration interventions through evaluating their impacts on historical and aesthetic values and technical characteristics of cultural assets within the scope of relation of the building with its surrounding, the building itself and its details. Some scholars such as Yüceer (2005), Şimşek (2009) and Koşun (2018) developed methods regarding this subject. Yüceer (2005) proposed a method for evaluation of new exterior additions to historical public buildings through analyzing the characteristics of buildings such as architectural characteristics (environmental relation, building-lot relation, mass relation, facades) and values before and after the interventions. Cultural heritage values are evaluated in terms of architectural (style/type, construction technique and material, designer/builder), cultural (historical association, pattern and time line), contextual (site and setting, environmental role, visual/symbolic role), authentic (tangible and intangible aspects) and contemporary importance (functional, economic, documentary/educational). A grading system including four grades (excellent, very good, good, and fair/poor) was used to objectively evaluate the effects of interventions. Şimşek (2009) proposed a method for evaluation of interventions on archaeological remains through determining and evaluating changes in the physical and functional characteristics in terms of reliability, consistency and legibility, and cultural heritage values in terms of change types such as transfer, transformation, gain and loss, etc. Changes in values were analyzed in terms of prior to excavation, after excavation, after conservation interventions, and after interpretation

and presentation interventions. Koşun (2018) proposed an assessment method that evaluated through grading interventions in historical mosques at site, lot and building scales, and changes in values at site and building scales before and after interventions. Interventions were evaluated at site scale in terms of sufficiency and compatibility of design, and at lot and building scales in terms of restoration approach, material, detail, workmanship, reversibility, authenticity, reliability and harmony. Cultural heritage values were evaluated according to six value accumulation levels (full, high, medium, low, very low and no accumulation).

Some scholars focused on the evaluation of the effects of a single intervention type in their studies, such as Yüceer (2005) who focused new additions and Yaka Çetin et al. (2012) who focused reconstruction. Yaka Çetin et al. (2012) evaluated reconstruction at archaeological remain scale in terms of accuracy of intervention, avoidance of causing damage, compatibility, distinguishability, reversibility and allowing further interventions; at site scale in terms of limitation of intervention, sustaining the authentic characteristics of the site and interpretation.

Some scholars such as Tamer Türer (2020), Sevgi (2020) and Samadzadehyazdi et al. (2020) focused on the evaluation of the effects of adaptive reuse interventions. Tamer Türer (2020) evaluated the compatibility of interventions through assessing changes in values of historical apartment buildings according to degree of change in physical characteristics and social inputs. Sevgi (2020) and Samadzadehyazdi et al. (2020) evaluated the interventions in terms of their effects on authenticity. Sevgi (2020) studied on the interventions of three khans at site and building scales through assessing authenticity, architectural and aesthetical, and environmental characteristics, use, economic, social and cultural values with a grading system. Samadzadehyazdi et al. (2020) studied on the effects of interventions on authenticity (natural, exceptional, influential, technical, artistic, etc.) of industrial heritage buildings with a grading system.

Turkey possesses a rich archaeological heritage. Following the increased interest in archaeological sites in the 19th century, various national laws and international documents were adopted for the conservation of archaeological sites in the 20th century (Ahunbay, 2010, pp. 103-105). However, the fact that many archaeological sites continue to be damaged and destroyed shows that the adopted conservation principles cannot be applied successfully in practice. Some scholars such as Madran (1991),

Ahunbay (2010) and Tuna (2019), etc. studied conservation problems of archaeological sites in Turkey.

Unexcavated archaeological remains represent documentary and monumental at the highest level. Excavation and restoration interventions change these state irreversibly (Hueber, 1991, p. 38). So, minimum intervention that has minimum impact on cultural heritage values while ensuring safety and durability of remains was suggested. However, close relation of archaeological sites with tourism and economy has given way to wrong interventions in some sites in Turkey. For this reason, studies on the evaluation of the effects of restoration interventions in archaeological sites become important in terms of guiding future interventions. Some scholars such as Yaka (2006), Bakacak (2007), Kaymak Heinz (2008), Şimşek (2009), Kazma Çetiner (2017) and Kafa Duran (2019) contributed to this subject with their studies. Also, Yurtsevenler (2013), Taciroğlu (2019) and Gökcü (2020) evaluated interpretation and presentation interventions in archaeological sites. Türkoğlu (2021) evaluated the effects of conservation interventions on site interpretation.

In countries abroad, some institutions such as IBI in 1949 and ICOFORT in 2005 were established in order to raise awareness in terms of significance of defense structures and promote scientific researches, conservation and maintenance of them (ICOFORT, 2005a; Steriotou, n.d.). IBI (International Castles Institute) defined an independent discipline with regards to this subject named as castellology. Together with Europa Nostra, the institute publishes bulletins on the subjects of scientific researches, documentation, terminology, regulations, restoration approaches and proposals of defense structures; organizes conferences and workshops; and contributes to conservation works with awards and fund (Steriotou, n.d.). ICOFORT that is advisor of ICOMOS contributes to conservation of defense structures through preparing guidelines on fortifications and military heritage. The committee provides international cooperation and consists of members from different countries, including Turkey (ICOFORT, 2005a; ICOFORT, 2005b).

The book named as Conserving Fortified Heritage: The Proceedings of the 1st International Conference on Fortifications and World Heritage, New Delhi, 2015 (Jain & Hooja, 2016), and twelve volumes of Defensive Architecture of the Mediterranean XV to XVIII Centuries, which are proceedings of the International Conference on Modern Age Fortifications of the Mediterranean Coast and continue to be published since 2015 (FORTMED, n.d.), are comprehensive resources with a great variety of

topics about defense structures. Beside these, some scholars studied on defense structures in subjects such as material analysis by Antonelli et al. (2016); architectural characteristics by Cesur (2009), Halifeoğlu (2013) and Yavuzatmaca (2016); conservation state by Gutierrez-Carrillo et al. (2021); conservation problems by Şahin Güçhan et al. (2005), Cesur (2009), Dalkılıç and Nabikoğlu (2012) and Sökmen Kök and Kahya Sayar (2021); restoration proposals by Yasmine (2008), Joudifar and Olgaç Türker (2020); interventions by Mira Rico and Ortega Pérez (2015), Povilaityte (2016) and Mussari et al. (2017), etc.

In Turkey, there are some studies on restoration of defense structures in terms of restoration proposals prepared by Karadağ (2003), Işık (2004), Özeke Tökmeci (2008), Uslu (2010), Yaşa (2012), Semiz (2014), Toğanaş (2014), Karagöl (2015) and Abacı (2019), etc., and interventions prepared by M. Ahunbay and Z. Ahunbay (2000), and Sayan (2019), etc. Also, Yüceses (2019) evaluated conservation process of defense structures in terms of their registration, surveying, restitution, restoration projects and environmental design projects, implementations and current states.

Studies on the evaluation of the effects of interventions carried out in defense structures are limited. Some scholars from abroad such as Weclawowicz-Gyurkovich (2019) focused on adaptive reuse interventions, and Wilczek (2021) focused on new additions to castle ruins. In Turkey, Özçetin (2016) and Öztürk (2019) evaluated the compatibility of refunctioning castle ruins located at urban settings as museum through analyzing the effects of interventions in terms of authenticity, conservation problems caused by interventions, and adequacy of castle ruins to fulfill the requirements of the museum function. Also, Güngör (2021) focused on the evaluation of interventions for illumination. However, related studies on the evaluation of interventions in defense structures located in rural settings are limited.

1.1. Problem Definition

It is seen that the attempts of Ministry of Culture and Tourism for the preservation of defense structures have increased in recent years. Despite the increase in

funds and restoration projects carried out since 2005[1], qualification of interventions is open to debate. Although principles for the preservation of the archaeological heritage determined in the international documents were accepted in Turkey, inconsistency between the principles and interventions damages cultural heritage values of defense structures.

Studies on the evaluation of the effects of interventions of defense structures are important to improve the restoration approach of future interventions of similar building types. However, the importance and priority given to defense structures in the selection

[1] In 2005, bidding of surveying, restitution and restoration projects or environmental design projects of 17 defense structures was made. The projects of 5 of these defense structures were started to be carry out (KTB, 2005, pp. 19-24). In 2006, fund was provided by T.R. Ministry of Culture and Tourism for surveying, restitution and restoration projects of 10 defense structures. Implementation works of 5 defense structures were started (KTB, 2007a, pp. 48, 261-264). In 2007, restoration projects of 3 defense structures, and implementation works of 8 defense structures were started to carry out (KTB, 2007b, pp. 12-13, 17). In 2008, fund for restoration project of 1 defense structure, and implementation works of 10 defense structures was provided (KTB, 2008). Implementation works of 3 structures had continued, and 6 structures were started to be restored (KTB, 2009, pp. 75-77). In 2009, restoration projects of 6 defense structures were prepared. Implementation works of 24 defense structures had been continued (KTB, 2010, pp. 76-79). In 2010, restoration projects of 5 defense structures continued to be prepared. Implementation works of 10 defense structures had continued (KTB, 2011, pp. 105-107). In 2011, restoration projects of 5 structures, and implementation works of 11 structures were continued or completed (KTB, 2012, pp. 69-72). In 2012, restoration projects of 5 structures, and implementation works of 8 structures were carried out (KTB, 2013a, pp. 75-77). In 2013, restoration projects of 6 structures, and implementation works of 11 structures were carried out (KTB, 2014a, pp. 74-76). In 2014, fund was provided for preparation of restoration or environmental design projects of 11 defense structures, and 6 of these projects were carried out. Fund was also provided for implementation works of 20 defense structures. Implementation works of 14 structures were carried out (KTB, 2014b, pp. 1-4, 8-16; KTB, 2015a, pp. 75-78). In 2015, 7 restoration and environmental design projects, and implementation works of 20 defense structures were funded (KTB, 2015b, pp. 1-5, 8-13). Restoration projects of 3 defense structures were completed, and those of 10 defense structures had continued. Implementation works of 14 defense structures were completed, and those of 10 defense structures had continued (KTB, 2016a, pp. 88-95). In 2016, 11 restoration and environmental design projects, and implementation works of 11 defense structures were funded (KTB, 2016b, pp. 1-6, 11-14). Restoration projects of 13 structures had continued to be prepared. Implementation works of 4 structures were completed, and those of 12 structures had continued to be carried out (KTB, 2017a, pp. 64-70). In 2017, fund was provided for restoration projects of 17 defense structures, and implementation works of 17 defense structures (KTB, 2017b, pp. 2-8, 13-18). Restoration projects of 4 defense structures, and implementation works of 8 defense structures were completed. Restoration projects of 19 defense structures, and implementation works of 18 defense structures had continued to be carried out (KTB, 2018, pp. 50-57). In 2018, restoration projects of 6 defense structures were completed, and those of 11 defense structures had continued. Implementation works of 3 structures were completed, and those of 14 structures had continued (KTB, 2019a, pp. 64-68). In 2019, restoration projects of 10 structures were completed, and those of 3 structures had continued. Implementation works of 11 structures were completed, and those of 6 structures had continued (KTB, 2020, pp. 55-60). In 2020, restoration projects of 3 structures were completed, and those of 1 structure had continued. Implementation works of 10 structures were completed, and those of 11 structures had continued (KTB, 2021a, pp. 126-134).

of research subject related to conservation of cultural heritage is less compared to other historical structures in Turkey[2].

Defense structures are mostly studied by archaeologists and historians / art historians rather than architects[3]. They evaluate the structures in a retrospective perspective, but these studies are insufficient to provide information in terms of the architectural characteristics and conservation issues. For these reasons, this study focused on the evaluation of interventions of the defense structures located in the present-day rural areas of Anatolia.

1.2. Aim and Objectives of the Study

The aim is to understand the effect of current interventions on cultural heritage values and conservation problems of defense structures located in Turkey and dating to Byzantine period so that future restorations can be better managed. In order to fulfill this aim, three case studies were selected. Parameters for selecting the case studies are as in the below:

1) Being located in the present-day rural areas of Turkey.

2) Being subject to recent restoration, which is almost completed (at least 80 percent is finished), restoration starting with 2000 or later.

3) Being constructed in Byzantine period or representing Byzantine period with majority of its preserved portions.

4) Being constructed with mostly the technique of mortared rubble stone core and cut stone facing.

Identifying the Byzantine defense structures that fulfill the above mentioned parameters; and understanding why they should be preserved, what are the threats

[2] Theses completed between 2000-2021 in Turkey were searched in the national thesis database with the keywords of restoration, intervention and conservation. 15 of 862 theses in which these keywords are used are related to defense structures, except redoubts and barracks. 211 of them are related to residential buildings; 111 of them are related to religious buildings; 49 of them are related to education buildings; 44 of them are related to industrial buildings; 40 of them are related to commercial buildings; and 31 of them are related to baths (Ulusal Tez Merkezi, 2021).

[3] Theses on defense structures completed between 2000-2021 in Turkey were searched with the keywords of castle, castle town, tower, fortification, city wall and classified according to the departments. 27 of 134 theses on defense structures were from departments of architecture and restoration. 43 theses were from department of archaeology, and 64 theses were from departments of history and art history (Ulusal Tez Merkezi, 2021).

against their sustainability, and what are the current interventions realized regarding these structures; and presenting a process for evaluating how much the values are preserved and threats are taken under control are the objectives.

1.3. Methodology

The method of this study consisted of literature review, preliminary analysis, site survey, documentation, analysis and evaluation of the case studies, and discussion.

Preliminary literature review contributed to listing of the defense structures of Anatolia. The defense structures that are located in the present-day rural context of Anatolia and restored after 2000 were listed. Then, these cases were classified according to their construction date, and construction technique and material usage of the majority of their remains. As can be seen in the table below, different sets of defense structures with common construction date, and construction technique and material usage were determined (Table D.1). The first group consists of Feke and Yılan castles, *Kızkalesi,* and East Byzantine Gate and fortifications in Laodicea which are from Byzantine period, and were constructed with the technique of mortared rubble stone core and cut stone facing. The second group consists of Ciha Castle, *Kız Kulesi*, *Zilkale*, *Kale-i Bala* and Kov Castle which were constructed by Genoeses or Trebizond Empire between 13th - 15th century with rubble stone masonry technique. Considering the difficulties of the second group in terms of its limited resources, accessibility problems and uncertainty about the extent to which restoration implementations have been completed, the first group was selected to be focused on.

Then, these cases were re-grouped according to their geographic context and scale (Figure 1.1). Here, two groups were formed. Feke and Yılan castles, and *Kızkalesi* are castle ruins located on a hilltop or an island that are strategic places in terms of military control of their regions. They cover an area between 3000 - 15000 m^2, which is a moderate size for placement of defense structures and indispensable services; e.g. cistern, storage, etc. The second group includes the defense structures of ancient cities on planes. Here, East Byzantine Gate and fortifications are defense structures constructed to protect Laodicea ancient city that covers an area around 5 km^2.

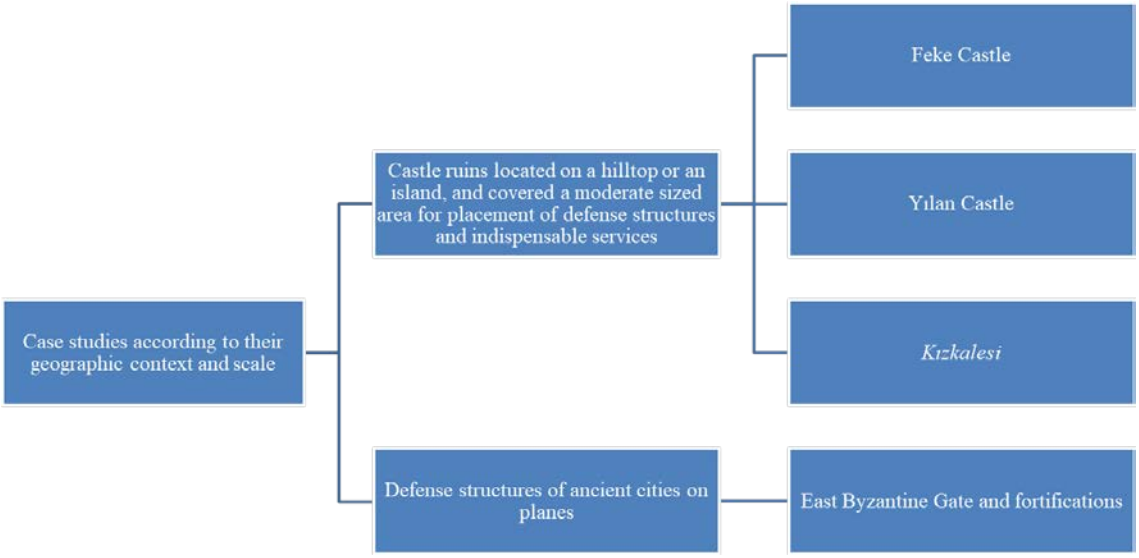

Figure 1.1. Diagram showing grouping of case studies in Turkey

Preliminary analysis contains the classification of defense structures in the present-day rural context of Anatolia in terms of their scale, location, first construction period, construction technique of observed remains and restoration date, and identification of a relevant set of defense structures to be taken as case studies.

During the site surveys, visual analyses (observation and photographic documentation) are realized. Then, conventional drawings and revisions of the existing drawings (detail drawings, sketches, and measurement of basic / typical dimensions for wall profiles and architectural elements) are realized. Some drawings (Figure E.130 & Figure 3.53) were revised or generated according to information gathered from drawings or photographs of different resources.

Then, detailed literature review was realized to identify the characteristics of case studies, determine their conservation activities, and cultural heritage values and conservation problems.

The case of East Byzantine Gate and fortifications in Laodicea (Table D.11, Table D.12 & Table D.13) was eliminated due to the inconsistency with the related castle ruins in terms of location, scale and scope of the effects of implementations. In its historic state, East Byzantine Gate was located in a city on plane surrounded by city walls. Although the ruin of Laodicea city is today a rural site, its scale and content was evaluated as completely different from the other ruins which are all in special positions

such as summits or islands, and are smaller in size. These were rural sites in the history as well. So, the cases were determined as three.

This was followed by literature review for determining similar defense structures, which are located in the present-day rural settings outside the borders of Turkey (Figure 1.2). The parameters considered in the selection of comparative examples were as follows: similarity in positioning and scale, being subject to recent restoration, examplyfying contemporary presentation strategies. As a result, Kalø Castle (*Kalø Slotsruin*), Denmark (Appendix E.1) positioned on an island close to the coast of Kalø Bay, Pombal Castle (*Castelo de Pombal*), Portugal (Appendix E.2) on the summit of a hill and with full vista of the valley of the Arunca River, and Matrera Castle (*Castillo de Matrera / Pajarete*), Spain (Appendix E.3) on the summit of Pajarete hill and with full vista of the Guadalete valley and the Grazalema mountain range were selected. The areas of the castles are between 5000 and 17000 m^2, just like the areas of the case studies which are between 3000 and 15000 m^2. They were all restored recently and possess qualified presentations. Another parameter considered in the selection was similarity in construction technique and material usage. So, Northern Gate of Resafa (Rusafa / Sergiopolis), Syria (Appendix E.4) from Byzantine period and restored recently was selected. Since the case studies neighbour Syria and they are also from Byzantine period structural and material interventions were considered as to be compared easily.

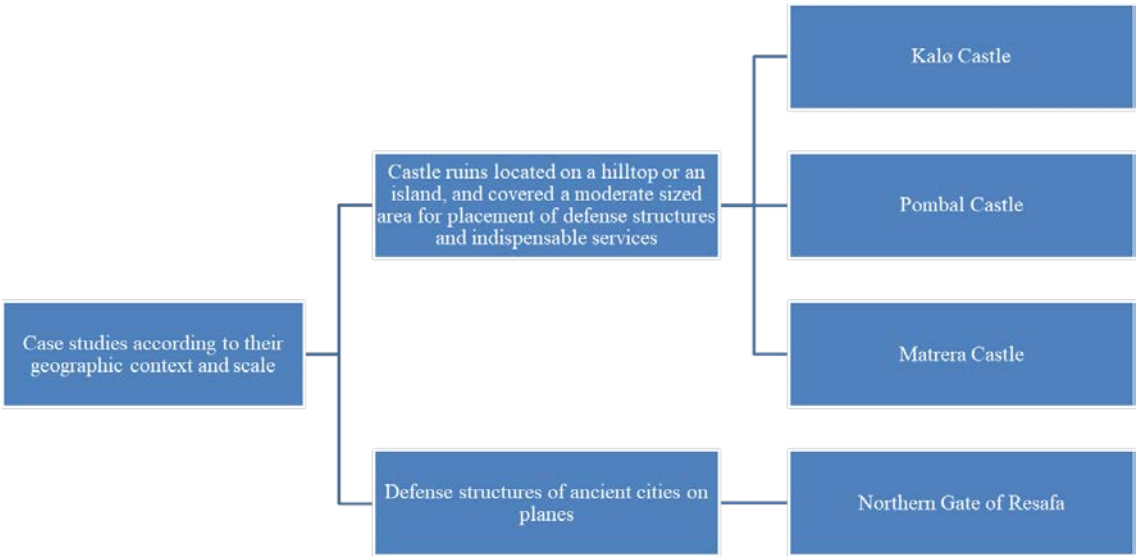

Figure 1.2. Diagram showing grouping of comparative studies abroad

Concepts relevant for evaluation of interventions were determined with reference to international documents; with reference to historic research on defense structures with emphasis on the Middle Age Anatolia; and with reference to values and conservation techniques. So; analysis of geographic characteristics (location, topography, geology, hydrology, landscape quality), historic background (original function, construction date, donor/architect/constructor, previous repairs, periods of the building), morphologic characteristics (dimensions, number of floors, current morphologic characteristics, original morphologic characteristics, conservation state prior to current intervention), construction technique and material usage (wall profile, wall material, spanning elements, architectural elements, material of inscriptions), and conservation activities (research, projects, implementation, awards) were considered relevant for understanding each case from abroad and Turkey. Name of the project, project responsible, collaborators, client, area, budget, responsible institution, funding supplier and public participation were introduced under the title of projects. Determination of cultural heritage values and conservation problems before and after current interventions at the landscape, site and building scales was considered for evaluating the interventions in a theoretical framework. The landscape scale includes the studied castle and the historic ruins, paths, brooks, mounts, etc. around it. This cultural landscape may be a part of a natural environment that includes other historic defense structures and archaeological sites. The site scale includes the castle and the natural element on which it is situated, e.g. an island or a hill, or the ancient city. The building scale includes the studied castle ruin, or defense structure within the selected ancient city.

Documentation, analysis and evaluation of the selected case studies were presented on tables (see Appendix D).

This is followed by discussion of the effects of the current interventions of related cases in Turkey at the landscape, site and building scales in comparison with cases from abroad and with reference to principles of international documents in terms of two main subjects: sustaining and enhancement of values, and success in solving conservation problems. Integrity value of each case from abroad and Turkey at landscape scale, age (oldness) value at all three scales, documentary value at all three scales, authenticity value at site and building scales, artistic value at site and building scales, rarity value at all three scales, and memory value at all three scales; and accessibility problems at all three scales, safety problems at all three scales, functional

problems at site scale, structural and material problems at all three scales, and presentation problems at all three scales were evaluated. Positive and negative impacts of the current interventions on values and problems were distinguished.

It is beyond the scope of the study whether the repair materials selected were chemically compatible with historical building materials or not.

1.4. Terminology

Terms used in the scope of this thesis regarding interventions, cultural heritage values and elements of defense structures are defined below.

1.4.1. Terms for Interventions

Addition: Introducing new materials, elements or masses to cultural assets.

Renewal: Changing of deteriorated authentic elements with new elements that are out of similar or same materials in exactly same or relatively simple form.

Reintegration: Completing missing portions and reinstatement of the form of the cultural asset.

Removal: Taking unqualified additions that damage authentic characteristics of cultural assets away.

Reconstruction: Complete or partial rebuilding of a demolished structure as close as possible to its authentic form, but using new materials.

Consolidation: Physical interventions that are carried out to prevent or slow down further damage and ensure structural durability.

Cleaning: Removing of harmful accumulations on material surfaces in order to reduce decay and aesthetic problems, and removing vegetation, earth and debris in order to enhance accessibility and perception of integrity of sites.

Presentation: Interpretive interventions that display cultural assets.

1.4.2. Terms for Values

Integrity value: Continuation of the physical and aesthetic wholeness of the castle's cultural landscape and continuation of the historic and functional relationship with other historic defense structures and archaeological sites in the nearby environment, and definition of conservation borders for assuring the sustainability of this wholeness, and prevention of excessive new development, vandalism and armed conflict, and implementation of environmental protection measures.

Age (oldness) value: Presenting the characteristics of its period and the changes of a historic building, site or landscape through reflecting the effects of passage of time via patina and remains.

Documentary value: Presence of qualities providing information about social, cultural, economic, technical, religious, military and political aspects of a historic building, site or landscape, and natural characteristics of the region in which they are located.

Authenticity value: Credibility and truthfulness of characteristics of a historic site such as site - building relation and plan layout, and characteristics of a historic building such as size, facade form, space organization, design mentality, plan layout, access style, architectural elements, construction technique and material, etc.

Artistic value: Presence of a qualified architectural component such as a mosaic, carving, relief, decorated inscription and vault, ornamented window, Corinthian capital, and an ornament element on the walls (corbel, cornice, moulded profile, pilaster), etc. within a castle or an ancient city presenting qualified design, ornamentation and workmanship.

Rarity value: Being a rare example of a building, site or landscape of its kind in a place in terms of some features such as building type, style, period, morphologic characteristics and defense strategies, etc.

Memory value: Meaning, emotion or mystery attributed to a historic building, site or landscape due to myths and legends regarding the place, and being important for beliefs and rituals of a religious group.

1.4.3. Terms for Conservation Problems

Accessibility problem: Difficulty in accessing the landscape and site of the case study and circulating within the studied defense structure.

Safety problem: Lack of precautions ensuring the life safety of visitors or inadequate interventions threatening life safety in landscape, site and building scales.

Functional problem: Abandonment or incompatible usage and/or insufficiency of the architectural utilities necessary for the presentation at site scale.

Structural and material problem: Lack of maintenance or unqualified intervention threatening the structural or material integrity of the historic structures in landscape, site and building scales.

Presentation problem: Insufficient promotion activities to contribute to the cultural tourism potential, inadequate or aesthetically incompatible presentation and services for fulfilling visitor needs, or lack of interpretive interventions displaying cultural assets in landscape, site and building scales.

1.4.4. Terms for Elements of Defense Structures

Barbican: An outer defense structure, which generally consists of a gateway flanked by towers, constructed in front of the castle and separated from it usually by a moat to control main gateway and drawbridge.

Castle (fortress): A large fortified place, which can involve various building types such as religious buildings, cisterns, limited residential buildings and storages, etc. besides defense structures such as fortification walls, towers and gatehouses, etc., located at strategic points to ensure the protection of its region.

Ancient city: A city surrounded by fortification walls including towers and gates.

Crenel: Openings between merlons along the crenellated walls.

Crenellation: A notched battlement, which is composed of alternating crenels and merlons, crowning the fortification walls, and some towers with capability of secure shooting.

Drawbridge: A bridge composed of a wooden deck, crossing over a moat in front of the main gate, and lifted up to block entrance and prevent access of enemies to a castle.

Embrasure: An opening on the walls consisting of a small loophole at the exterior side and a larger recess on the wall at the interior side, and expanding throughout the wall with 45 degree angles (V-shaped) in order to provide a wider field of view and range for shooting, while making it possible for archers to shoot invisibly and safely behind the wall.

Fortification walls: Massive and durable walls with towers, gates, crenellations, embrasures, wall-walks, etc. surrounding cities and castles to protect them from enemy attacks.

Gatehouse: Main entrance complex of a castle or a city fortified by towers, drawbridges or slot machicolations, etc.

Keep: The strongest main tower, which is the last defense structure of a castle when it is besieged by enemies, constructed independently from the other structures of a castle and located at the highest point of its courtyard in order to continue to resist against attacks.

Loophole: A narrow vertical gap at the outer surface of the embrasure, providing vision, shooting opportunity, day light and air circulation.

Merlon: Walled portions between crenels along the crenellated walls.

Moat: A deep ditch, either dry or water-filled, surrounding the castle walls from their exteriors and preventing access to the castle.

Palisade: A wooden fence used for enclosing a site against possible attacks and constructed through driving stakes into the ground.

Postern gate: A secondary gate located at an inconspicuous place of fortification walls or towers and preventing direct vision of enemies and making possible unexpected attack on enemies in war time.

Slot machicolation: A hole between inner and outer arches of a tripartite gate, which allows pouring hot oil, throwing heavy stones and shooting arrows on enemies from above.

Talus (batter, *alambor*): Inclined wall portions surrounding the lower level of towers and walls to ensure greater stability, prevent attacks close to the walls, keep siege engines away, give way to rebounding of bullets of enemies, and eliminate dead angles.

Tower: A tall structure; rectangular, circular or polygonal, etc. in plan, serving for defense and observation functions, flanking fortification walls or standing independently in the courtyard or at another strategic place.

Turret: Small tower.

Wall-walk (*seyirdim yeri*): A walkway, which can be out of timber or stone, located along the top of the fortification walls, and accessed by ramps or stairs flanking the walls, and protected by crenellated parapet walls, with or without a roof. It can be one or two storied.

1.5. Thesis structure

This study consists of five chapters. First chapter is the introduction section of this study, and includes literature review, problem definition, aim and objectives of the study, methodology, terminology that consists of terms for interventions, values and elements of defense structures, and thesis structure.

In the second chapter, theoretical and historical framework of the study is explained. International documents, overview of defense structures with emphasis on Middle Age, concepts consisted of values and conservation techniques, and comparative studies consisted of three castle ruins that are Kalø Castle (*Kalø Slotsruin*) in Denmark, Pombal Castle (*Castelo de Pombal*) in Portugal and Matrera Castle (*Castillo de Matrera / Pajarete*) in Spain, and a defense structure of an ancient city that is Northern Gate of Resafa (Rusafa / Sergiopolis) in Syria. Each case abroad are introduced in terms of geographic characteristics, historic background, morphologic characteristics, construction technique and material usage, conservation activities consisted of research, projects, implementation and awards, and evaluated their values and problems before and after interventions in order to provide comparative information.

Third chapter is on identification of the case studies that are three castle ruins: Yılan Castle (*Yılankale*, Shahmaran Castle), Feke (Vahga) Castle and *Kızkalesi* (Maiden's Castle / Sea Castle) in Korykos. These cases are documented and evaluated with the same approach as in comparative studies section: geographic characteristics, historic background, morphologic characteristics, construction technique and material usage, conservation activities consisted of research, projects, implementation and awards, and evaluation through values and problems before and after interventions.

In the fourth chapter, results are presented and discussed. Effects of the current interventions on values and problems at the landscape, site and building scales are discussed with reference to principles of international documents through comparing with cases abroad in terms of sustaining and enhancement of values, and success in solving conservation problems. Within the scope of sustaining and enhancement of values, integrity, age (oldness), documentary, authenticity, artistic, rarity, and memory values; and within the scope of success in solving conservation problems, accessibility, safety, functional, structural and material, and presentation problems are evaluated.

In the last chapter, conclusion of the study is presented.

CHAPTER 2

THEORETICAL AND HISTORICAL FRAMEWORK

In this chapter, international documents, overview of defense structures with emphasis on Middle Age, concepts related to values and conservation techniques, and comparative studies are presented.

2.1. International Documents

The destructions caused by the First and Second World Wars increased public consciousness for preservation in Europe. With the increasing importance given to cultural heritage; international charters, recommendations, declarations and norms were published as a result of conferences and meetings held by national, and international organizations such as ICCROM, ICOMOS and UNESCO, etc (Jokilehto, 1986, pp. 8, 399-400, 419-420). These documents set conservation principles, which helped establishment of a similar language among conservation experts throughout the world, and their scopes have evolved in time and adapted to different cultures (Jokilehto, 1986, pp. 419-423; Matero, 2008, pp. 3-4; Orbaşlı, 2008, p. 21-25).

The Athens Charter for the Restoration of Historic Monuments was published in 1931. It is the first document including principles of conservation and restoration of historic sites and monuments. According to the charter, the historic monument should be considered together with its surroundings and the picturesque value should be maintained during implementations (Article III). As regards to consolidation of the monuments, modern techniques and materials, e.g., reinforced concrete are were declared as acceptable in reintegration work (Article IV). Anastylosis was declared as an appropriate intervention type for ruins. The new materials had to be distinguishable. If the preservation of the excavated ruins was impossible, their reburying was recommended (ICOMOS, 1931, Article VI).

Superior Council for Antiquities and Fine Arts (*Consiglio Superiore Per Le Antichità e Belle Arti*) published *Carta Italiana del Restauro* in 1932. According to this charter, completion of the monuments was not be carried out in archaeological sites since they were not used anymore. Instead of the completion, only anastylosis was suggested (Article 3). Radical alterations in the monument were not be realized (Article 4). Indispensable new additions to the monuments were to be in minimum size and out of new materials. They were not to stand out with their design or decoration (Article 7). The new materials were to be distinguishable, and so initials or epigraphs could be applied for not misleading the observers (Article 8). For reinforcing the structures, modern techniques could be used when similar techniques to ancient ones were unsatisfactory (Article 9). Documentation had to be done regularly in the excavation and restoration works (*Consiglio Superiore Per Le Antichità e Belle Arti*, 1932, Article 11).

Recommendation on International Principles Applicable to Archaeological Excavations was published in 1957. With regards to preservation of archaeological remains, the document recommended that maintenance and conservation should be carried out during and after the restoration process (Article 21). In terms of presentation of an archaeological site and related remains, a small exhibition area was suggested for to arouse the interest of the visitors and educate them (Article 11). In addition to the documentation of the works; publications, guided tours, exhibitions, lectures and clear display of the site were suggested (UNESCO, 1957, Article 12).

International Charter for the Conservation and Restoration of Monuments and Sites (The Venice Charter) was published by ICOMOS in 1964. The term historic monument was defined as an evidence of a particular civilization, an important development or historic event in an urban or rural setting (Article 1). Alterations that were required by a new function to be installed in a monument were permitted as long as they did not change the plan or decorations of the monument (Article 5). Together with the monument, its surrounding had to be conserved (Article 6, 7). In terms of restoration of the monuments, preserving the aesthetic and historic value of the monuments was underlined. The restoration work had to be carried out with original material and reliable documents. New techniques and material had to be distinguishable (Article 9). All periods of the monument had to be respected (Article 11). In terms of archaeologic ruins, importance of maintenance and preservation was emphasized. Instead of reconstruction, anastylosis was signified (Article 15). Documentation of all

the process of preservation, restoration and excavation should be made in form of reports with drawings and photographs. The reports had to be kept by a public institution and be available by researchers (ICOMOS, 1964, Article 16).

The Norms of Quito dated 1967 was the Final Report of the Meeting on the Preservation and Utilization of Monuments and Sites of Artistic and Historical Value. According to the report, the archaeological, historic and artistic monuments were defined as the economic assets (Article V, 1). The priority in preservation of a monument was given to its economic and authentic values. So, usability was underlined (Article VI, 4). This document also emphasized the integrity of a monument with its setting (Article VI, 5). The monuments had to be thought as touristic objects. In parallel to restoration, access roads and visitor centers had to be designed (ICOMOS, 1967, Article VII, 6).

Recommendation Concerning the Preservation of Cultural Property Endangered by Public or Private Works was published in 1969. This document emphasized the priority of the cultural assets in danger (Article 9). A monument in danger could be moved from its environment to prevent destruction but the new site or setting had to be similar to the former environment (Article 11). The cultural assets could be repaired, restored and reconstructed (UNESCO, 1969, Article 28).

The European Convention on the Protection of the Archaeological Heritage (European Treaty Series - No. 66) was adopted in 1969. It aimed to preserve the archaeological heritage and its historical significance by using scientific methods for research, giving importance to educate people for promoting awareness, and preventing illegal excavations (COE, 1969).

The Italian Restoration Charter was published in 1972. It stated that relocation of a monument could only be accepted under exceptional circumstances. Patina was to be preserved (Article 6). Additions or reintegrations had to be distinguishable especially at the connection points between the original and new, and be dated and marked. With regards to anastylosis, it could be practiced only when it was documented, and distinguishable, but reconstruction or alteration of missing details were not approved for archaeological monuments. Necessary alterations regarding structural consolidation could be applied, as long as chromatic characteristic of the historic facade was sustained (Article 7). Measures against weathering, air pollution, etc. had to be undertaken to sustain authentic characteristics (Article 10). While restoring archaeological monuments, reintegration of masonry had to be compatible in terms of chromatic

qualities and roughness. Reintegration had to be marked by placing plates with dates or initials. Capping of ruins had to be compatible with original material (Appendix A). During restoration of historic monuments, new additions or reconstructions had to be avoided. Compatible usage was considered important. For preserving authenticity, interventions had to be minimum, and respectful to the surrounding of the monument as well as the monument itself. Interventions had to be distinguishable. A line of tile fragments could be used between old and new surfaces. The patina was to be preserved for historical, technical, aesthetic and protective reasons (Ministry of Education, 1972, Appendix B).

Resolution interim measures for the protection of the cultural heritage of monuments and sites (72/20) was published in 1972. It pointed out the picturesque value of historic urban and rural areas (COE, 1972).

The Convention Concerning the Protection of the World Cultural and Natural Heritage was adopted by UNESCO in 1972. It underlined importance of usage of historic buildings (UNESCO, 1972, Article 5).

The European Charter of the Architectural Heritage was published in 1975. It emphasized importance of restoration of monuments together with improvement of their surroundings. Economic value of the assets and importance of their usage were pointed out. (COE, 1975a).

The Declaration of Amsterdam was published in 1975. Conservation of the architectural heritage had to be thought in a wide perspective including all historic building and site types, and periods (Article b). Importance of regular maintenance was underlined. Participation of the citizens to every stage of conservation was considered as essential. For this purpose; public meetings, exhibitions, etc. had to be practiced (COE, 1975b).

The charter for the Preservation of Quebec's Heritage was published in 1982. The charter recommended regular maintenance (Article V-A). Original characteristics of the assets had to be preserved and reconstruction based on hypothesis had to be avoided (Article V-C). The alterations had to be integrated and harmonized with the building and its surrounding in terms of tonality, texture, proportions and pattern (Article VI-D). They had to be reversible. The restoration works had to sustain authentic characteristics, integrity and cultural values of the historic buildings. Continuous and compatible use that integrated with the economic and social activities of the surrounding of the historic buildings was recommended (Article VIII). Instead of

creating many museums or tourist centres, the historic buildings had to be included in daily life (Article IX-A). In addition, the public had to be given an opportunity to access related conservation documents, which were prepared in a level appropriate for understanding of non-specialists. For the public participation, public hearings, informing meetings and exhibitions were suggested (ICOMOS Canada, 1982, Article VII-B).

The Declaration of Dresden was published in 1982. It was on reconstruction of historic monuments damaged by war. In this document, reconstruction was presented as a mean of preserving the spiritual value of a monument (Article 1). The authenticity of the monuments and their historic evolution was signified in terms of preserving the memory value of the monuments and their cultural contribution to the countries (Article 4). Complete reconstruction could be carried out with modern techniques and materials in only extensively damaged monuments that had great significance. Reliable documents had to be provided for these reconstructions (Article 8). Pre-disaster documentation was an advantage for such reconstructions (ICOMOS, 1982, Article 5).

The charter for the Protection and Management of the Archaeological Heritage was approved in Lausanne in 1990. Non-destructive techniques, aerial and ground surveys and sampling had to be carried out instead of excavation of whole area (Article 5). Preservation of monuments and sites in situ was recommended. Also, if there was no guarantee for appropriate preservation after the excavation, the site was not to be excavated, or it had to be re-buried. Regular maintenance, and active participation by citizens were other important factors for sustaining heritage (Article 6). Presentation and information of the site had to be often renewed and kept up to date. Reconstructions were approved as experimental research and interpretation tools. They had to be managed carefully in terms of authenticity, and distinguishability (ICOMOS / ICAHM, 1990, Article 7).

The Nara Document on Authenticity was published in 1994. Authenticity included case specific characteristics of cultural assets. Its preservation was necessary for sustaining cultural diversity. (ICOMOS, 1994, Article 9).

The International Cultural Tourism Charter Managing Tourism at Places of Heritage Significance was adopted in Mexico in 1999. In this charter, the potentials and threats of tourism for natural and cultural heritage were discussed. Tourism contributed to the protection of cultural assets by benefiting them economically, educating the public and influencing policy. However, tourism which was not managed properly

could damage authenticity, integrity and other values. The conservation and presentation of the physical and intangible characteristics and modern expressions of the cultural assets was important for understanding them and raising awareness for protecting them (Article 1). Understanding the heritage could be possible by presenting and interpreting the authenticity of sites and cultural experiences (Article 2.4). Prior to implementation related with tourism oriented development; the possible effects, and acceptable limits of the number and actions of visitors had to be foreseen (Article 2.6). In order to experience the site, visitors had to be provided routes and these routes that were compatible with the physical texture, not threatening the integrity and authenticity of the site (ICOMOS, 1999, Article 3.2).

The Burra Charter was first adopted in 1979, and revised in 1981, 1988, 1999 and 2013. The document, revised in 1999, included the basic principles and terminology of conservation and management of places of cultural significance. According to the charter, while restoration was defined as transforming the structure into its earlier state without any additions and new materials (Article 1.7), reconstruction was defined as transforming the structure with new materials (Article 1.8). Reconstruction was to be carried out when reintegration was not possible and if there was enough information for it (Article 20.1). Traditional techniques and materials had to be used for conservation, but also modern techniques and materials could be used (Article 4.2). For preserving the cultural significance of a heritage, its existing fabric, use, associations and meanings had to be preserved. So, alterations had to be reversible, as little as possible and not based on conjecture (Article 3). Compatible use that has no, or minimal impacts on the cultural assets should be preferred (Article 7.2). Sustaining the authentic use is the other option (Article 23). In addition, all historic periods of the structures should be respected, instead of emphasizing and interpreting of one period which thought as more significant (Article 15.4). New works can be placed if they are distinguishable and not decrease values of the heritage. They should be compatible with existing fabric in terms of siting, bulk, form, scale, character, colour, texture and material, and not be imitation (Article 22). The cultural assets should not be moved from their historic locations unless this is the only way for providing their survival (Article 9.1). Records about conservation of the heritage should be kept in a permanent archive and be available by public (Article 32). Also, participation of local people during the conservation, interpretation and management process should be provided (Australia ICOMOS, 1999, Article 12).

In the Charter of Krakow dated 2000; types of conservation interventions were classified as environmental control, maintenance, repair, restoration, renovation and rehabilitation (Article 1). Sustaining the authenticity and integrity of the historic monuments with their authentic interiors, furnishings and decoration was stated as the aim of the conservation. It underlined the importance of respecting all periods of monuments, and compatible usage (Article 6). In terms of the vulnerability of the archaeological heritage, interventions had to consider the surroundings, territory and landscape, and had to be at minimum level. For the conservation and presentation of the archaeological sites, modern techniques, databanks, information systems and virtual reality techniques had to be used (Article 5). Any interventions had to be compatible and reversible. (Article 10). Reconstruction of the whole structure had to be avoided, but reconstruction of small parts was acceptable as long as it was based on documents. In exceptional cases such as armed conflict and natural disasters, reconstruction of the entire monument could be accepted. (ICC, 2000, Article 4).

The concept of reconstruction was further discussed in the Riga Charter. Reconstruction was defined as interpretive restoration or replication of an earlier historical period. Reconstruction could be acceptable when the cultural heritage suffered from disasters, and it was important for its people with its artistic, symbolic and environmental value. It had to be reversible and carried out without conjecture. (ICCROM / UNESCO, 2000, Article 6).

Principles for the Analysis, Conservation and Structural Restoration of Architectural Heritage that was adopted in Zimbabwe in 2003. According to this charter, architectural heritage had to be thought as a whole in conservation activities. Preservation of only the appearance (Article 1.3) of a structure was criticized (Article 1.5). Before determining the content of structural interventions, the causes of damage had to be found. Then, the safety level of the structure had to be evaluated (Article 2.6), and preventive maintenance was to be the major concern (Article 3.2). The durability of the structure had to be ensured with minimum interventions (Article 3.5). In the preference of traditional or modern techniques; a case-by-case analysis was recommended. Safety and durability necessities, and most compatible options had to be considered (Article 3.7). Interventions had to be reversible (Article 3.9) and respectful to the authentic construction technique and values of the structure (Article 3.12). When selecting new materials to be used in restoration, compatibility with the original material and their long-term effects had to be investigated (Article 3.10). During the

restoration works, the removal or alteration of historic material or architectural element (Article 3.14), and replacement rather repair of deteriorated structures (Article 3.15), and the removal of alterations that have historical significance had to be avoided (Article 3.16). Dismantling and reassembly had to be carried out; if it was impossible to preserve the structure with other conservation methods (3.17). The interventions had to contribute to the integrity of the architecture, structure, installation system and function (Article 3.13). All processes had to be documented (ICOMOS, 2003, Article 3.22).

The Xi'an Declaration on the Conservation of the Setting of Heritage Structures, Sites and Areas was adopted in 2005. The setting contributed to the significance of cultural heritage of monuments and sites (Article 1). Its understanding, documentation, conservation and interpretation; monitoring and management was important (ICOMOS, 2005).

The ICOMOS Charter for the Interpretation and Presentation of Cultural Heritage Sites was published in Québec in 2008. This charter emphasized that interpretation and presentation activities had to support physical and intellectual access of public by promoting interest, learning, experience and exploration (Article 1). Interpretation and presentation had to be based on reliable sources, which could be accessed by public (Article 2). Tangible and intangible values of the sites had to be explored (Article 3). The social, cultural, historical, natural, political, spiritual and artistic contexts and settings had to sustain their authenticity. Related interventions had to be reversible, distinguishable, and sustainable (Article 4, 5). This meant accurate evaluation of potential effects of interpretation on the cultural heritage sites, visitor numbers, etc. (Article 5). Collaboration between all stakeholders such as heritage professionals, associated communities, etc. was signified and other stakeholders as well as open for public participation (ICOMOS, 2008a, Article 6, 7).

The English Heritage Conservation Principles Policies and Guidance for the Sustainable Management of the Historic Environment was published in 2008. Interventions had to be distinguishable (Article 93), and reversible due to the fact that the long-term impacts of the interventions could not be as expected and future generations may want to change them (Article 100). If the interventions could damage the aesthetic value, they were not be carried out (Article 101). Interventions had to be carried out by using non-destructive methods (Article 125). The use that gave minimum damage to the heritage was recommended (Article 87). Monuments could be moved from their historic location but this decreased their values and significance (Article 95).

Repair works had to be realized with sufficient information about the heritage, and considering their long-term impacts (Article 117). Traditional materials and techniques were signified due to their low possibility to cause harm in the future compared to new materials and techniques (Article 119). In some cases, using the traditional materials or techniques could damage the monument, so considering long-term impacts was important for conservation (Article 120). The values added by restoration works to the monument had to be more important than the ones lost (Article 126). Speculative reconstruction presented as an authentic monument had to be avoided (Article 132). For the monuments that had witnessed historic events, presentation of the ruined state was emphasized so that the visual and spiritual evidences were sustained. Therefore, a restoration that had potential to damage this ruin image was not recommended (Historic England, 2008, Article 133).

The ICOMOS New Zealand Charter for the Conservation of Places of Cultural Heritage Value was revised in 2010 based on the 1993 and 1995 versions. The authenticity and integrity were underlined as the most important values (Article 4) and so the related interventions had to be minimum (Article 6). Re-creation, replication or the construction of the general typical features of the structures were not recommended (Article 17). Preservation works had not to harm or remove the patina of the structure. Stabilisation was suggested to slow down deterioration. Maintenance had to be done regularly and in a planned way. Traditional techniques and materials were to be preferred in conservation work, but new materials could also be used if it was necessary. They had to be compatible and distinguishable (Article 18). Restoration process had not be based on conjectures. Reassembly could be carried out with existing materials and on parts of a structure rather than the whole. Removals or alterations had to be avoided, unless there were valid reasons such as deterioration, loss of structural integrity, and decrease of cultural heritage value (Article 19). Reconstruction differed from restoration in the sense that it included usage of new material. If it was necessary for sustaining of the cultural assets and there was sufficient source, reconstruction could be carried out. Reconstructed structures could not comprise the majority of the site (Article 20). For the adaptation of the cultural asset, the existing use could be maintained or changed with a compatible use. Alterations had to be minimum, reversible, and compatible with the authentic form, scale, mass, color and material (Article 21). During these conservation processes, the structure had to be preserved together with its setting (Article 9). If the

structure was in danger in its original site, it could be moved to a compatible site (ICOMOS New Zealand, 2010, Article 10).

The last Burra Charter was adopted in 2013. It underlined the importance of preservation of the setting for conservation of a single structure. Reconstruction of the cultural assets which have high social or spiritual value could be realized, if there was sufficient and reliable source (Australia ICOMOS, 2013).

Salalah Recommendation was adopted by ICOMOS in the first international conference on archaeological parks and sites in 2015. According to the recommendation, archaeological parks, which are defined as an entry controlled bordered area with archaeological remains above and below the ground in a designed landscape, are very important resources for public education about history of humanity. So, the authenticity and integrity of the remains had to be sustained. Non-destructive techniques had to be used for the researches and excavation in the site had to be minimum. The scientific documentation of the studies had to be accessible to visitors in the site. Security measures had to be taken for both the archaeological remains and the visitors. Conservation activities had to be reversible and based upon scientific researches. Reconstruction based on hypothesis had to be forbidden. However, if a resumptive reconstruction accurately represent the authentic structure and is well documented, it could be carried out ouside the site. For providing public education, the interventions of anastylosis, consolidation and interpretative stabilization could be carried out. Site management had to be comprised in the surrounding of the park in order to provide an educational and enjoyable experience. An archaeological research plan had to be performed for fulfilling the site preservation needs and providing informations that attract attention. Landscape design including viewing platforms, visitor tours and resting areas had to be provided (ICOMOS, 2015).

Salalah Guidelines was adopted by ICOMOS in 2017. This document emphasized the importance of the archaeological sites as representatives of nature - human relation of different cultures. So, they had to be accessible by many people as much as possible, provided that this situation does not risk or damage the remains. Preservation and maintenance of the remains, accessibility of public to the site and sustainable management had to be realized. Inclusion of an archaeological site in the World Heritage List promote visits to the site and raise economic development of the region. The sites in the List must be a role model with their sustainable management to other archaeological sites. Management plan had to be comprised for the site together

with its surrounding. It was stated that if there is lack of regional planning, than development around the site could damage the site irreversibly (ICOMOS, 2017).

ICOMOS Guidelines on Fortifications and Military Heritage was adopted in 2021. This document emphasized the importance of defense structures and their conservation activities. It stated that defense structures have typical values and problems different from other types of cultural assets. So, it was aimed to recommend principles for research methods and conservation of all attributes of defense structures with their cultural landscapes. Objectives and methodology for theoretical and methodological approach to conservation of defense structures were determined. The complexity of defense structures in terms of their stratigraphic, structural, spatial, etc. had to be preserved and presented with a holistic approach (Article 3.1). Interpretation had to include panoramas, views, cultural landscapes, etc. besides archaeological remains, built fabric, design mentality, etc (Article 3.2). Sustainable interventions and adaptive reuse had to be realized. The necessity of preservation of authenticity and integrity values was emphasized. For this reason, all arbitrary interventions such as reconstruction, removal, etc. had to be prevented and a Conservation Master Plan had to be implemented. Reuse interventions had to present the military heritage of defense structures in terms of history, technology, etc. and transformed them to a symbol of reconciliation. Also, in order to provide accessibility, the use of technology had to be promoted (Article 3.5 & Article 5.1). Awareness of the understanding defense structures as a part of international or transnational defense systems, territories, settlements, etc. rather than interpreting as isolated structures had to be encouraged. So, a holistic approach for research, conservation and management had to be adopted (Article 3.6). Also, Conservation Management Plans had to be implemented (Article 3.7). This document emphasized that identification of values affected the conservation decisions, and defined the values of defense structures that are architectural and technical, territorial and geographical, cultural landscape, strategic, human and anthropological, memory, identity and educational, historic, and social / economic values (Article 4). Interventions had to be minimum. Conservation rather than restoration had to be encouraged due to presenting the destructive impacts of conflicts on structures. Interventions also had to be compatible in terms of material, function and aesthetic (Article 5.3) (ICOFORT / ICOMOS, 2021).

The above stated international documents provide recommendations for the conservation, maintenance and presentation of the monuments and archaeological sites.

They draw attention to the need to preserve the authenticity and integrity of the cultural heritage. It is stated that the structures should be considered as a whole with their surroundings. They advocate that the interventions should be distinguishable and minimum without any damage to the structure, as long as they are based on sufficient and reliable sources. Anastylosis with a minimum of new material is approved instead of reconstruction in archaeological sites. If reconstruction is indispensable, it should be based on reliable sources and carried out in only a small part of the asset. For reconstruction of the entire structure, it must be ruined because of human or natural disasters, and had outstanding value. Traditional material and techniques should be used in the restoration process, but modern materials and techniques can also be used as long as they are reversible and distinguishable. Other important aspects are sustainable management of the site, public participation in the conservation process and documentation of the whole process.

2.2. Overview of Defense Structures with Emphasis on Middle Age

Castles are defense structures. They are different than city walls that surround an ancient city or a town; e.g. Ankara Castle (Eyice, 2001, p. 234). City walls became widespread during the Dark Ages of Byzantine period that started in 7th century and caused by Sasanian and Arab attacks. Cities turned into villages and citadels (Foss, 1977, pp. 469, 485-486). Similarly, castles are different from fortified residences; e.g. Hoşap Castle in Van. They are also different from monasteries which were built in similar characteristics with castles; e.g. Young Simeon Monastery close to Syrian border (Eyice, 2001, pp. 234, 238).

Castles were generally constructed in strategically important places such as intersections of important roads, mountain passes, isthmuses, islands a little far from the coast, bridgeheads, etc. The natural characteristics of sites were utilized in the most appropriate way to defend the castles easily with a small number of soldiers. Sites that could fulfill water demand of the castle in long-term sieges were preferred. Positions that made exist possible, when necessary were considered (Akarca, 1987, pp. 24, 118, 190; Eyice, 2001, pp. 234, 236; Ödekan, 2008, p. 809). Cilicia was a strategic region

where important roads connecting Central Anatolia and Aegean region to the Eastern Mediterranean coasts, Cyprus, Egypt, Northern Syria and Mesopotamia passed. The region was protected by natural borders. So, while transportation was important for all regions, roads crossing Taurus mountain range through narrow valleys have special importance in Cilicia due to the scarcity of roads in the region and difficulty of transportation. The most important and critical pass of the region was the Gülek Pass, also known as the Cilician Gates. The old civilizations maintained their dominance in Cilicia with the castles which they built along these valleys (Ramsay, 1903, pp. 358, 366; İ. Kobaner & M. Kobaner, 2000, pp. 169-177; Ünal, 2000, p. 25). For example, Lampron Castle located near Çamlıyayla district in Mersin was one of the castles constructed to control and protect the Gülek Pass (Robinson & Hughes, 1969, p. 183).

The basic components of castles were walls and towers. The walls were thick and mostly continuous, and they were out of stone or brick. The resistance of castles against sieges depended on the durability of the fortification walls. So, the construction or repair of the walls with durable materials and usage of the most advanced construction techniques of the period had always been prioritized. Aristo stated that fortification walls had to be both defensive and ornamented in order to impress visitors and threaten enemies with their splendor. These walls were designed in accordance with the topography of sites. They surrounded cities with defensive purposes, but they did not affect their plans. On the steep hills, the walls were integrated with the natural bedrock. So, the necessity of wall construction in these parts was eliminated. Their top portions were flat so that the defenders were able to reach different viewpoints quickly. So, defense on the fortification walls was ensured by wall-walks. The battlements with square-shaped openings made shooting possible and served as a parapet at the wall tops. The towers were rhythmically positioned along the walls. They were able to view and protect each other. Towers were attached at both strategic and weak points of fortification walls, e.g., next to the gates, etc. They also served to strengthen the walls. In addition, independent observation towers were provided at strategic places. There were square, rectangular, horseshoe, circular, polygonal, etc. planned towers. Circular planned towers had advantages such as being more resistant to impacts, and having no corners and blind spots; but their construction was more laborious and expensive. They were usually preferred at the corners of the castles. The development of ballista which was a siege machine gave way to the construction of higher towers. The number of floors of towers increased to three and four, and their height reached 14 - 15 m (Akarca,

1987, pp. 28, 118, 125-136, 141-148, 190). In order to increase durability against attacks, the ground floors of most of the towers were filled with earth and rubble. The ground floor was used as storage when it was not filled (Akarca, 1987, p. 145; Nossov, 2009, pp. 21-23). Unless the castle crowned a rocky crest, moats surrounded the exterior of the walls to increase defense precautions. They could be filled in with water. The gate of a castle was further reinforced with drawbridges, double gates, and specific wall portions. A series of lower walls could circumscribe the castle walls from the exterior to increase security. Cisterns, sheltering units and food storage were indispensable spatial components of castles (Eyice, 2001, pp. 234-236; Ödekan, 2008, p. 809).

Apart from these castles described in the above, single towers could be constructed on crests of hills. They could view each other and communicate with each other for defense purpose. Some examples may be traced on Taurus Mountains; e.g. Haçtırın, Kuzucubelen, Alafakılar and Hasanbeyli observation towers. They were square planned and simply designed against the threats coming from the Mediterranean (Özmen, 2000, p. 205; Eyice, 2001, p. 237).

Yümüktepe in the vicinity of Mersin (4500 BC) was one of the earliest castles in Cilicia region (Ödekan, 2008, p. 809). Cilicia has advantages in terms of defense since its mountains with deep valleys in-between ensure its natural protection. The castles and towers were planned as a network in Cilicia region since they had to communicate with each other (Edwards, 1983, pp. 24-30). Byzantine Empire considered it significant to construct castles[4] against Arabic attacks coming from the south and Sasanian attacks coming from the east, and later Turkish attacks. These castles did not present a definite plan organization, but they suited the natural borders of their hills. They used to protect a natural harbour and sea commerce (*Kızkalesi*, Korykos), or an important passage (e.g. Yılan Castle on Taurus Mountains), or they provided the security of a region and housed a feudal ruler (Eyice, 2001, pp. 237-238).

In the Byzantine period, local construction materials were selected. Main construction materials were stone, brick and hydraulic lime mortar. Brick pieces and brick dust were commonly used in mortar. Although new construction material continued to be quarried, reused materials were commonly used. Reused blocks were used as they were found, or they were reshaped for their new usage. The widespread use of reused materials complicates the dating of Byzantine architecture (Ousterhout,

[4] Byzantine castles of Anatolia, including Lycia, Pamphylia, Lydia, and Malagina and the lower Sangarius (east of Nicaea) were researched by Clive Foss in 1970s, 1980s and 1990s (Foss, 1996).

1999/2008, pp. 128-169; Nossov, 2012, pp. 39-40). It was thought that Byzantine castles were similar to Greek and Roman castles in terms of construction technique and style. Besides related techniques and styles, Byzantines developed their own construction technique which is known as opus mixtum (Nossov, 2012, p. 39). The construction technique is mortared rubble stone core and cut stone facing. The walls were usually constructed with alternating rows of brick and stone blocks (Ousterhout, 1999/2008, pp. 128-169; Nossov, 2012, p. 39). Construction with this technique started in the 1st century AD, and it was commonly used in the construction of castles. In addition to this technique, castles were also constructed with entirely stone or brick (Nossov, 2012, p. 39). In Cilicia, the wall material of defense structures is mainly stone. The construction technique is generally mortared rubble stone core and cut stone facing. Stone blocks are generally cut stones or roughly rectangular. Besides these blocks, small rubble stones were also used. They have smooth or rough faces, and were used in both regular and irregular courses. Brick is seen in the construction of cisterns and chapels of defense structures in Cilicia (Edwards, 1983, pp. 70-78).

In the period of European Crusaders, castle construction was given further significance since the Crusaders were looking for secure places in Lebanon, Syria, Anatolia, Cyprus and Rhodes. Sayda Castle in Lebanon and Sahyun Castle at the south of Antioch are two examples (Eyice, 2001, p. 238; Ödekan, 2008, p. 809). John Rosser studied Crusader castles in 1980s. Like Byzantine castles, Crusader castles were constructed on crests of hills or near the natural harbours; e.g. Tyre and Sidon castles. Crusaders aimed to represent their domination over Holy Land. They constructed simple keeps or donjons, and concentric (ringed) castles which were more developed and complicated castle type than keeps. Crusaders used keeps for passive defense and concentric castles for aggressive defense. Concentric castles had an open courtyard surrounded by two fortification walls and a moat surrounding the fortification walls from their exteriors. Access of enemies was prevented with drawbridges, portcullises that are iron grilles attached to the gates and were could be lowered to block the entrance, L planned entrances of the gatehouses, slot machicolations and murder holes. These castles were equipped with wells, cisterns and food storages to withstand the long-term sieges. It was thought that Crusader castles took the Byzantine castles as an example and developed from them (Rosser, 1986, pp. 41-45).

Byzantine castles in Cilicia were repaired, reconstructed or renewed by Arabs, Crusaders, Armenians and Turks (Edwards, 1983, pp. 12-18; Özmen, 2000, p. 205; Eyice, 2001, p. 240).

R. William Edwards (1983) attributed the construction of most of the castles in Cilicia to Armenians in his work named as "The Fortifications of Medieval Cilicia". Feke Castle close to Adana is one of the examples used by the small principality of Cilician Armenians and later Armenian Kingdom of Cilicia (Kalloshyan, 2014, p. 3; Dunbar & Boal, 1964, p. 175). Edwards determined the typical features of Armenian castles: irregular plan layout due to being designed in accordance with the topography of sites; decreasing the necessity of wall construction through taking advantage of being integrated with the natural bedrock; avoiding protruding angles and corners on the fortification walls; being constructed with the technique of mortared rubble stone core and cut stone facing; fortification walls constructed with a talus; consisting of two (e.g., Çem, Savranda and Geben castles) or three courtyards (e.g., Yılan and Anavarza castles); absence of donjons, keeps or isolated towers in the castles; tendency for the construction of semi-circular and horseshoe planned towers instead of square or polygonal planned towers; use of wall-walks and crenellations with rectangular merlons; designing the path led to the entrance in such a way as to expose an enemy to prolonged fire from the castle; absence of moats due to positioning on a rocky crest; entrances, including postern gates, flanked by towers or protrusions; main access to the castle by a gatehouse with L planned entrance; use of slot machicolations and embrasures; tendency to use pointed arches and vaults; undercrofts constructed as vaulted structures; and more than one cistern in the castle. Bossed stone blocks are attributed to Armenians (Edwards, 1983, pp. 12, 56-72).

Some examples built or repaired in the vicinity of Cilicia during Turkish period were Harput, Diyarbakır and Alanya castles (Ödekan, 2008, p. 810). Brick was generally used as a repair material and pieces of it were used within the mortar (Edwards, 1983, pp. 70-78). After the widespread use of firearms in 15th century (especially cannons), castles began to lose their effectiveness (İlgürel, 1979, p. 301). In the 19th century, Medieval castles lost their defensive function to a great extend (Gruszecki, n.d.). When above mentioned characteristics of the castles constructed by different cultures are examined, it is seen that these cultures affected each other in terms of military strategies and architectural characteristics of castles.

2.3. Concepts

Heritage values and conservation techniques relevant within the scope of the study are introduced in this section.

2.3.1. Values

Value can be defined as the importance that individuals, groups or societies assign to an object or site (Feilden & Jokilehto, 1998, p. 14; CEN, 2012). The perspective on values has been shaped by being influenced by important historic events and movements of thought. The definition and scope of the heritage values may change over time, and from culture to culture and even within the same culture (ICOMOS, 1994; CEN, 2012). Heritage values were systematically classified for the first time in Alois Riegl's study dated 1903: *Modern Cult of Monuments: Its Character and Its Origin*. This approach has been a pioneer of value-based preservation (Jokilehto, 1986). Riegl stated two main values: historic and artistic (Jokilehto, 1986; Díaz-Andreu, 2017). Contemporary understanding of values comprehends intangible aspects as well as tangible ones, but there is no fixed terminology for the values attributed to an immovable cultural asset (Feilden & Jokilehto, 1998; Australia ICOMOS, 1999). The values that are relevant for describing the significance of historic castles and their related components are as in the following.

Documentary value: Ahunbay (2007, p. 28) emphasizes two parameters for documentary value: the immovable cultural asset's relation with a historical event or person; and representation of a historical process. An old civilisation's social, cultural, environmental, economic, technical, religious and political aspects, aesthetic approaches, lifestyles and rituals can be understood by analyzing the construction techniques and design approaches of its historic structures (Asatekin, 2004; ICOMOS, 2013).

Brandi sets a theory of restoration which argues that a building to be restored should be considered as a work of art, and its aesthetic and historical values should be

preserved. Historical value can be sustained through preservation of uniqueness and authenticity of a cultural asset. Although not underestimating the documentary value, aesthetic value rather than documentary value come into prominence in the interventions (Basile, 2015, pp. 16-19).

In the article 6 of the basic law of conservation in Turkey (T.R. Official Gazette, 1983), the buildings dated earlier than 1900 are evaluated as cultural asset. In order to be taken under protection of structures built after the mentioned date, they must be the work of a well-known architect or a representative of an architectural movement. However, the cultural properties that have importance for national history of Republic of Turkey are taken under protection without being subject to time (Ahunbay, 2007, pp. 30-31; T.R. Official Gazette, 1983). It is not right to set precise age limits like the cultural properties must be built until the end of the 19th century to the scope of conservation, because a cultural property should not be considered more important than a newer cultural property than it (Asatekin, 2004). However, from this point of view, an absurdity as necessity of preserving everything arises. But, this is impossible economically (Kuban, 1969, p. 342). So, for example, Kuban (1969) limited the concept of values to documentary, age and aesthetic values. However, each cultural property should be evaluated through examining their intrinsic characteristics (Asatekin, 2004).

Age (oldness) value: Ruskin (1849, pp. 148, 155) interpreted architecture as a way to remember, connect the past to the future and constitute identity of nations. For this reason, he stated that the glory of a structure is in its age and bearing witness to history of humanity. Transmitting these cultural assets to next generation was seen as a moral duty. The signs of aging on an immovable cultural asset are named as patina, and deserve preservation (Jokilehto, 1986; Basile, 2015, p. 27). A beauty is seen in patina, and it contributes to picturesqueness. However, according to Ruskin, it is not possible to restore a cultural asset without decreasing its age value, because all interventions reflect the spirit of their own time. So, he recommended regular maintenance (Ruskin, 1849, pp. 156, 161-163).

Since this value is related to the appearance of the cultural property, it is a subjective value, and also its scope varies from country to country (Madran, 1978, p. 276; Ahunbay, 2007, pp. 30-31). Passage of time inevitably gives way to damage the historical structures. So, it is thought that the older a structure are, the more valuable it is due to its rarity (Ahunbay, 2007, pp. 30-31; Orbaşlı, 2008, p. 40). However, if radical changes in technique and social life take place, and a structure is completely changed;

then relatively new structures which did not change gain age value (Kuban, 1969, pp. 342-343). Also, more value is attached to remains of ancient structures by comparison with structures from more recent periods due to lack of documented evidences in archaeological sites, except the remains themselves. Structures from more recent periods may have been documented with drawings, photographs, etc (Orbaşlı, 2008, p. 40).

Authenticity value: Credibility and truthfulness of a cultural asset is significant (ICCROM / UNESCO, 2000; Historic England, 2008; ICOMOS New Zealand, 2010; ICOMOS, 2013). Respect for all cultures requires culture specific evaluation of credibility and truthfulness (ICOMOS, 1994; ICOMOS New Zealand, 2010). In the *Venice Charter*, authentic material and authentic documents are underlined (ICOMOS, 1964). However, with the later developments, material authenticity is complemented with authenticity of function, location, setting, tradition, management system, and spirit and feelings (Feilden & Jokilehto, 1998; ICCROM / UNESCO, 2000; ICOMOS New Zealand, 2010; ICOMOS, 2013; UNESCO, 2019). Authenticity value also includes the historic alterations that have formed the identity of the structure from its initial construction up to current state (Feilden & Jokilehto, 1998; ICC, 2000; Jokilehto, 2007; ICOMOS, 2013). In the interpretation and presentation of an asset, preservation of authenticity should be given primary importance (ICOMOS, 2008a; ICOMOS, 2013). In archaeological sites, buried archaeological remains are attributed the highest degree of authenticity. Authenticity of the archaeological site can be damaged with over-excavation, unsatisfactory documentation and disrespectful approach for multi-layered characteristics of the site. In archaeological sites, anastylosis, consolidation, construction of protective shelters or re-burial are the credited intervention types (ICOMOS, 1996; ICOMOS / ICAHM, 1990).

Artistic value: Brandi and Riegl attached great importance to artistic value as one of the main justifications for preservation of cultural properties (Basile, 2015, p. 16; Jokilehto, 1986, p. 379). However, later, Dehio criticised their aesthetic based conservation approach, and he stated that a historical monument should be preserved not because it is beautiful, but because it is part of the national heritage (Jokilehto, 1986, p. 381).

The quality and workmanship of a historic building or a work of art are important parameters in identification of artistic value (Madran, 1978, p. 276; Orbaşlı, 2008, p. 41). This value is also based on the significance of the design of the immovable

cultural asset in comparison to other examples dated to the same period (Feilden & Jokilehto, 1998, p. 19). Being an outstanding representative of an immovable cultural asset type in terms of design and ornamentation program is credited within the scope of artistic value (Madran, 1978, p. 276; ICOMOS, 2013).

Rarity value: If a building is a rare surviving example of its kind in terms of building type, style, builder, period, region, construction technique, material, function or some combination of these, it has rarity value. Cultural properties that have high rarity value may be more likely to be included in the World Heritage List (Feilden & Jokilehto, 1998, p. 19; ICOMOS, 2013).

Memory value: The importance of preserving the qualities that attribute meaning, emotion or mystery to a cultural heritage for its society is emphasized most in the *Quèbec Declaration* (ICOMOS, 2008b). These qualities which define the spirit of a place may be tangible or intangible: buildings, sites, landscapes and routes; memories, narratives, written documents, rituals, festivals, traditional knowledge, values, textures, colors and odors are some examples of the two types, respectively. These are culture specific: the meaning, emotion or mystery attributed to a quality may differ from culture to culture. A place can have multiple meanings and can be shared by various groups (ICOMOS, 2008b; ICOMOS, 2013). Cultural heritage and related memories are an inseparable from each other; so, attention should be given to understand, preserve, and transmit memories of cultural assets to future generations (ICOMOS, 2008b). At the same time, memory value is less dependent on changes in cultural assets than other values (Historic England, 2008, Article 58).

Integrity value: The preservation of an immovable cultural asset as a whole with all of its authentic elements and historic context is emphasized in international documents. This wholeness may have visual, structural, functional, historic, economic or conceptual aspects (Jokilehto, 2007, p. 8; ICOMOS New Zealand, 2010; CEN, 2012; ICOMOS, 2013). Sustaining of the aesthetic quality of the cultural landscape is important for physical integrity. The presence of similar period immovable cultural assets with defense function in the region further strengthens the integrity value. The authentic elements of the landscape such as roads and natural setting should be preserved as well.

2.3.2. Conservation Techniques

While in the past conservation was a necessity in order to sustain the functionality of cultural assets through preserving their formal integrity via reconstruction of damaged portions, and providing new additions related to changing demands, today it becomes a cultural duty (Gazzola, 1972, p. 16; Ahunbay, 2007, p. 8). Although conservation techniques have long-established history, scientific methods were used since the 19th century (Ahunbay, 2007, p. 8). After the World Wars, the importance given to the preservation of cultural heritage has increased with the motivation of sustaining of national identity and promoting tourism (Orbaşlı, 2008, pp. 3, 20, 37). Since then conservation techniques have evolved in parallel with the principles of international documents and developing technology (Ahunbay, 2007, p. 8). The fundamental conservation approach is that each cultural asset requires solutions that are specific to itself (Asatekin, 2004, p. 55; Orbaşlı, 2008, pp. 37, 51).

In archaeological sites, conservation techniques can range from minimum (e.g., leaving unexcavated, reburial, preserving ruins as found, etc.) to maximum intervention (e.g., relocation, reconstruction, etc.) (Stubbs, 1995, pp. 75, 78-79; Matero, 2008, pp. 2-5; ICOMOS New Zealand, 2010). Each intervention affects values of cultural assets, and represents an interpretation of its time (Mertens, 1995, p. 115; ICCROM / UNESCO, 2000; Matero, 2008, pp. 1-3). So, international documents recommend that minimum intervention should be preferred to ensure safety and durability of archaeological remains which are fragile and non-renewable historical evidences (ICOMOS / ICAHM, 1990; ICCROM / UNESCO, 2000). Besides that, it should be emphasized that preventive maintenance is the best method of conservation (ICOMOS, 2003). The interventions that are relevant for the scope of this thesis are introduced below:

Addition: The quality of design, material and application of new works at all extents (material, element and mass addition) is important for sustaining the values of cultural assets (Historic England, 2008, Article 141 & 142). If material or element additions are carried out to complete missing authentic portions, the implementation should sustain authenticity through being based on reliable documents and providing distinguishability (Australia ICOMOS, 1999, Article 22.2). Additions also can be

implemented to fulfill the requirements of function (ICOMOS New Zealand, 2010) such as adding circulation elements to provide accessibility. They should be creative works of their time, and in harmony with structures and their settings in terms of siting, form, scale, composition, material, colour, etc (ICOMOS Canada, 1982; Australia ICOMOS, 1999; ICOMOS New Zealand, 2010). The implementations should respect to significance of cultural heritage instead of hindering legibility of structures and competing with them (Australia ICOMOS, 1999, Article 22.1; Historic England, 2008, Article 138 & 143). Selection of new materials and workmanship is important in terms of structural and material impacts on authentic elements (Historic England, 2008, Article 144). For example, iron and steel are incompatible material for masonry because they are subject to corrosion as a result of weathering. So, stainless steel is used in interventions (How, 2007, p. 38). Energy efficiency and sustainability in terms of supplying and using material should be achieved (Historic England, 2008, Article 148).

Renewal: Deteriorated elements which have lost their physical integrity and structural stability, and are insufficient in terms of fulfilling their functions may need to be replaced with new ones. However, repair should be preferred as much as possible instead of renewal that reduces age value due to loss of patina, and documentary value due to loss of historical evidences such as masons' marks, etc (Petzet, 1999, pp. 13, 28; Orbaşlı, 2008, p. 155; ICOMOS, 2003, Article 3.15). But, there is tendency to renewal in restoration projects due to expense of interventions and desire for perfection (Petzet, 1999, p. 28; Orbaşlı, 2008, p. 155). Material of new elements should be carefully chosen. In masonry structures, usage of new stones from same quarry where the authentic stones were mined is recommended. For example, Parthenon at the Acropolis of Athens in Greece was restored with marble blocks obtained from old marble quarries (Ahunbay, 2007, p. 111; Orbaşlı, 2008, p. 155). If this is not possible, new stones should be similar with authentic stones in terms of geologic characteristics, and physical characteristics such as colour, texture, grain size, form and size (Orbaşlı, 2008, p. 155; Ashurst & Burns, 2007, p. 121). However, new stones should be distinguishable to sustain authenticity. Also, deteriorated authentic stones should be documented and preserved (Ashurst & Burns, 2007, pp. 121, 125).

Reintegration: In archaeological sites, any completion is forbidden, only anastylosis that is reinstatement with dismembered authentic material is allowed (ICOMOS, 1931, Article VI; *Consiglio Superiore Per Le Antichità e Belle Arti*, 1932). But, completion of a cultural asset may be carried out to ensure structural conservation

or provide formal integrity through total or partial reintegration of its missing portions (ICOMOS, 1964, Article 15; Ministry of Education, 1972). Reintegration work should be based on historic evidences and reliable sources (Ministry of Education, 1972; Historic England, 2008, Article 132). Imitative new portions gives way to damage cultural heritage values, reducing harmony of the whole and misleading observers about authenticity of cultural assets (Sanpaolesi, 1972a, pp. 151-152; Petzet, 1999, p. 29). So, reintegrated portions should be harmonious with the authentic portions, but also distinguishable from them (ICOMOS, 1964; Article 12). This can be accomplished by using same or similar materials that have different colour, texture and simpler or same form, etc. and marking along the connection line between the authentic and new by using metal strips, tile fragments or recessing of mortar; or using different type of material (Ministry of Education, 1972; Ahunbay, 2010, p. 112). While trying to provide distinguishability, creating a strong contrast in terms of colour and texture should be avoided (Petzet, 1999, p. 29). For example, reintegration of marble columns by using concrete in Ephesus and bricks in Pompeii gives way to loss of visual integrity. The temple of Hadrian in Ephesus and temple of Trajan in Pergamon are good examples in terms of providing new portions that have neutral color and simpler form. They show that reintegration can be considered aesthetically successful, when it contributes to perception of formal integrity. It is inconspicuous in general view, but distinguishable at close range (Ahunbay, 2007, pp. 109-110). So, usage of same material and differentiation of them with contemporary markings such as dates, initials, signs, etc. can be preferred (ICOMOS, 1964, Article 9; Ministry of Education, 1972; Petzet, 1999, p. 30). For example, in terms of reintegration of masonry walls, new stones that are not mined from the quarry of authentic stones or artificial stones can be compatible, but they are weathered differently from authentic stones. So, visual integrity cannot be preserved (Orbaşlı, 2008, p. 157). For this reason, the rate of reintegration should be minimum and carefully implemented (Ahunbay, 2010, p. 112).

If a monument was damaged as a result of historical events, its ruined state presents the visual and spiritual evidences of these important events, and emphasizes the significance of place, e.g. defense structures damaged by wars. Reintegration with the desire of perfection damage this ruin image and the values of the monument (Historic England, 2008, Article 133).

Removal: Unqualified additions which do not have aesthetic and historical value, damage cultural assets and their values, and relation with their surroundings

should be removed. Removal of these additions enriches the cultural heritage values of monuments (ICOMOS, 1964, Article 13; Ahunbay, 2007, p. 100). However, removal of patina or authentic elements from any period of monuments cannot be allowed. These implementations must be clearly justified (Ministry of Education, 1972; Article 6; ICOMOS New Zealand, 2010, Article 5). Also, removal should be carried out if this process do not further damage authentic structure and past interventions that need to be removed are reversible. For example, cement mortar gives way to damage masonry structures as well as its removal causes damages (Orbaşlı, 2008, p. 58).

Reconstruction: In the Venice Charter, reconstruction works are strictly forbidden, and only anastylosis is allowed (ICOMOS, 1964, Article 15). However, the international documents show more tolerance to the issue in the later years. Instead of reconstruction of whole structure (except in exceptional cases such as destruction by a war), partial reconstruction is allowed if it is necessary to sustain the function, integrity, memory value and significance and understanding of the site. Also, it is essential to provide reliable historical documentation of the condition prior to demolition to prevent damage the authenticity (ICOMOS, 1982; ICOMOS / ICAHM, 1990; ICC, 2000; ICCROM / UNESCO, 2000; ICOMOS New Zealand, 2010). However, there is an explicit difference between the principles of international documents and implementations (Stanley-Price, 2009, p. 43)

It is very important to decide whether a monument should be reconstructed due to its extensive interventions. There must be valid justifications for reconstruction: e.g., sustaining national symbolic values of cultural assets that had been demolished or seriously damaged by wars or natural disasters (Old Town of Warsaw in Poland, Ypres in Belgium, Old Town of Münster in Germany, etc.), continuation of the function or re-functioning (ancient theatres in archaeological sites, Stoa of Attalos at the Agora of Athens in Greece used as museum, shop and workspace, etc.), being didactical for researchers and observers regarding to historical background and characteristics of monuments and reconstruction process itself (Shakespeare's Globe Theatre in London, etc.), promoting tourism and earning income from it (town and Fortress of Louisbourg at Nova Scotia in Canada, etc.), and preventing development pressures on the site through showing that it is in active use and stabilization of ruined structures. Besides all these, reconstruction can be carried out to develop interpretation and understanding of monuments and enhance visitors' experience (Palace of Knossos at Crete in Greece), desire to create a symbol of reconciliation (Mostar Bridge in Bosnia and Herzegovina,

Frauenkirche at Dresden in Germany), and to sustain picturesqueness and visual integrity of surroundings of monuments and cities through rebuilding the landmarks (Campanile of San Marco at Venice in Italy) (Woolfitt, 2007, pp. 149-150; Ahunbay, 2007, pp. 99-100; Orbaşlı, 2008, pp. 20-21, 48; Stanley-Price, 2009, pp. 33, 36-37; Yaka Çetin et al., 2012, pp. 579-580).

Although there are several reasons to rebuilt cultural assets, none of them are justified in an archaeological site (Schmidt, 1997, pp. 47-50). Even if reconstruction based on reliable documents and is carried out through preserving the authentic form on the original location of monuments, reconstructions are new structures and reflect the interpretation of their own time. It gives way to loss of authenticity and age value (Sanpaolesi, 1972b, p. 110; Mertens, 1995, pp. 115-116; Stanley-Price, 2009, p. 42). Also, contrary to monuments damaged by war, archaeological remains have less documentary evidence, so their reconstruction involves some degree of conjecture (Woolfitt, 2007, p. 150; Stanley-Price, 2009, p. 33). So, reconstruction can be considered as a tool for experimental research and interpretation that is implemented outside the archaeological site (ICOMOS / ICAHM, 1990; Article 7; ICOMOS, 2015). Otherwise, inaccurate implementations give way to loss of historical evidences and mislead observers (Stanley-Price, 2009, p. 38). Although a reconstructed monument has no historical value, it may contribute to sustain and present authentic construction technique (Ahunbay, 2007, p. 100). For example, it is recommended that previously used antique tools and methods (e.g., hoisting method, anathyrosis, etc.) can be exactly reused for reconstruction works (Mertens, 1995, p. 121). Reconstruction works may destroy the authentic remains because of its extensive physical interventions, and hinder future researches, e.g., due to rebuilding on the archaeological remains of the Saalburg Roman Fort in Germany and Fortress of Louisbourg in Canada, etc. (Schmidt, 1999, p. 65; Woolfitt, 2007, pp. 149-150; Stanley-Price, 2009, pp. 38-39). Also, ruined state of monuments can be more reminiscent of the past than reconstructed state. In site scale, reconstructions may cause loss of ruined image, harmony of ruins, and integrity of archaeological sites. The visual and spatial characteristics of sites may be damaged, and the character of sites may be changed. Due to its scale and entireness of its architecture, reconstructed monuments attract the attention and become dominant among the ruins. For example, if only one or two monuments are reconstructed in the site, visitors tend to create their routes around these monuments. Reconstruction of Stoa of Attalos, Gymnasium of Baths at Sardis and Library of Celsus in Ephesus are misleadingly

dominant structures, so visitors may consider that these monuments are much more important than low level ruins (Schmidt, 1997, pp. 42, 47-50; Schmidt, 1999, p. 65; Stanley-Price, 2009, pp. 37, 39). Also, reconstruction of a single period of a monument by sacrificing other periods in a multi-period site gives way to distortion of interpretation of site. Political pressures may cause this (Stanley-Price, 2009, p. 40).

When considering all these problems, reconstruction can be realized with the help of virtual reality and multimedia tools without any intervention to archaeological remains. If it is decided to carry out physical interventions in the site, another approach is emphasizing visibility of intervention through using contemporary materials or implementing volumetric reconstruction, e.g., house of Benjamin Franklin in Philadelphia and Temple of Apollo at Veii in Italy (Figure 2.1 & Figure 2.2) (Stanley-Price, 2009; pp. 42-43).

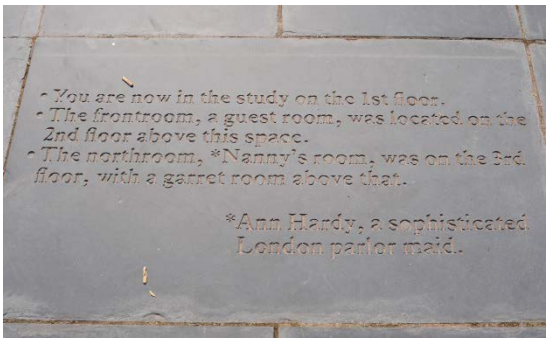

Figure 2.1. General view of Franklin Court (left), carved stones of floor covering that give information about the structures (right)
(Source: Matero, 2010, p. 1 (left); Markos, 2017 (right))

Figure 2.2. Temple of Apollo at Veii (Source: Wikipedia, 2014b)

Consolidation: New techniques and materials are constantly being developed for conservation of cultural assets. However, repair works should be specific to each site, so there is no single accurate method (Orbaşlı, 2008, p. 137). Before the implementations, it is essential to understand construction technique and material of monuments, cultural heritage values, causes of decay, long-term impacts of interventions and evaluating risk assessment and possible conservation measures. Otherwise, cultural assets may be irreversibly damaged and safety problems may occur for those working in restoration of structures in site (Ashurst & Burns, 2007, p. 89; Historic England, 2008, Article 117, 118 & 120; ICOMOS, 2003, Article 2.6). Except the urgent conservation measures, no intervention should be carried out without analyzing its impacts (ICOMOS, 2003, Article 1.7). New techniques and materials should be scientifically tested and compared with field experiments, and continuously monitored in order to examine their success in compatibility and reversibility (Stubbs, 1995, p. 76; ICC, 2000, Article 10; ICOMOS, 2003, Article 3.10). However, they are tested in laboratories through rapid methods, but this cannot reveal long-term impacts of them. Also, belief in development gives way to usage of new techniques and materials without examining (Kaymak Heinz, 2008, pp. 461, 463). For example, use of reinforced concrete is allowed in the Athens Charter (ICOMOS, 1931, Article IV), but it was later realized that this material caused irreversible damage.

Consolidation works should be minimal interventions performed as needed. Because the principle of absolute reversibility that is recommended by many

international documents is not possible in most cases. For example, interventions that are carried out with adhesives, epoxy resins, water-repellent coatings, steel cramps, etc. are not reversible and may cause further deterioration. Consolidation that ensure structural stabilization with more reversible techniques step forward (Petzet, 1999, pp. 13, 15; How, 2007, p. 40; Historic England, 2008, Article 117 & 118; Orbaşlı, 2008, pp. 57-58, 157-158). So, precedence can be given to use of traditional techniques and materials due to their predictable behavior and lifespan, and low risk of future damage, if their usage is sufficient for structural conservation. Also, new techniques and materials can be used if efficiency of these interventions is proven via reliable sources and field experiments, and they do not damage cultural heritage values of monuments. But, the intervention decision should be determined on a case by case basis. Among these options, it is essential to choose the least invasive and most compatible technique (ICOMOS, 2003, Article 3.7; Historic England, 2008, Article 119; Orbaşlı, 2008, pp. 57-58). However, technical concerns should not overshadow the purpose of sustaining visual and structural integrity, e.g., capping of walls of ruins in an archaeological site through flattening their jagged line, they should be carried out in the least conspicuous way (Sanpaolesi, 1972b, pp. 109-110; Ministry of Education, 1972, Article 10).

Capping, grouting of joint discharges, injection to cracks, stabilization with cramps and adhesives, temporary or permanent scaffolding and coating or surfaces against weathering are some consolidation works. Implementations should be carried out taking into account the maintenance requirements of these interventions (Orbaşlı, 2008, p. 158).

Cleaning: Cleaning of plant colonization on structures prevents further damage, and removal of vegetation in the sites enhances the accessibility and perceptibility. However, cleaning works should be carefully considered due to the contribution of plant growth to the picturesque value of sites (Petzet, 1999, p. 20). Interventions regarding cleaning of material surfaces should not include making structures like new, and disrupting their natural aging process. The objectives are improving the appearance of structures due to aesthetic concerns, preventing deterioration on surfaces and enhancing values of structures (Orbaşlı, 2008, pp. 60, 181). There are several cleaning techniques such as water based, mechanical, chemical, laser cleaning, etc. It is important to make trials and choose the most appropriate technique among them by specialists according to the characteristics of material, type of deposit, state of deterioration and the characteristics of the environment in which structure is located before the

implementation (Westminster City Council, 1995; Ahunbay, 2007, pp. 102-104). However, due to lack of supervision and implementing wrong cleaning technique that is not based on preliminary researches and trials, cleaning may cause loss of patina and valuable historic evidences, e.g., masons' marks, tooling, etc. Also, it causes the material surface to become more vulnerable to weathering because of removal of top protective layer (patina can have a protective function) (Ministry of Education, 1972; Ahunbay, 2007, pp. 102-104; Orbaşlı, 2008, pp. 60, 181).

Presentation: Understanding of significance and meaning of a site matters, because individuals take a more active and participatory approach to preservation of cultural heritage that means something to them (Serin, 2017, p. 76). So, interpretation and presentation should increase public awareness through preserving and presenting the authenticity and integrity of site (Sivan, 1997, pp. 52, 59; ICOMOS, 1999, Article 1.3 & Article 2.4; White, 2007, p. 249). It is essential that presentation of archaeological sites should be understandable and accessible to every segment of society, instead of being for only academic community (Serin, 2017, p. 75). However, a presentation approach that take into consideration only visitor impact and understanding, and tourism income rather than preservation of ruins gives way to damage cultural heritage values, and visual selectivity or exclusion determined solely according to aesthetic values, e.g. reconstruction and reintegration of monumental structures or re-erecting of columns in archaeological sites, etc (Sivan, 1997, pp. 51-52; Serin, 2017, p. 71).

Each site has unique characteristics, so presentation methods should be site specific. First of all, the message of the site to be transmitted, and the target audience should be determined before choosing presentation methods (Feilden & Jokilehto, 1998, p. 100; White, 2007, p. 249). An appropriate method should be respect and enhance of significance and values of sites, provide informational, enjoyable and attractive experience to visitors (Sivan, 1997, p. 52; ICOMOS, 1999, Article 3.1; White, 2007, p. 249, 255). This can be realized via web sites, brochures, audio guides, orientation and information boards with technical drawings, 3D models, visitor paths, trash cans, tourist facilities such as visitor centers, cafe, souvenir shop, toilet, parking lot, resting areas, etc., light and sound equipment, virtual reality, holograms, costumed animation, workshops in sites, etc. Authentic access should be preserved, when entering the sites and monuments, and walking around the site in order to enhance understandability of site (White, 2007, p. 256). Visitor tours that have minimum impact on values of sites should be offered so that visitors can experience the sites at their own pace (ICOMOS,

1999, Article 3.2). Effective presentation methods should encourage visitors to focus solely on the remains, so they should be easily identifiable and minimum as necessary (Sivan, 1997, pp. 53, 55; ICOMOS, 2008a). Tourist facilities should be contemporarily well-designed and in harmony with ruins in terms of design, scale, material and location. They should not cause visual pollution and loss of integrity. In order to provide least impact, these facilities should be placed as far away from archaeological remains as possible. If any touristic facility becomes new function of a historic monument, the interventions should be minimum, compatible and reversible (White, 2007, p. 257; Ahunbay, 2010, p. 108). Visitor centers should provide sufficient information about site via multimedia equipment such as animated films, holograms, etc., and proposed visitor tours. Orientation and information boards should be unobtrusive, attractive and well-designed in terms of design, size, number and location. Information boards should have concise content. Placement of presentation tools that show restitution of ruins such as 3D models, dioramas, and virtual reality equipment, etc. close to the ruins where visitors can see them directly help visitors to easily associate their original state with existing state. Due to comprising text in a small extent, visitors can concentrate on the site itself. Materials of all physical presentation tools should be sustainable and durable (Sivan, 1997, pp. 54-55; White, 2007, pp. 257, 260). Also, presentation should be revised frequently as new information about ruins are revealed (ICOMOS / ICAHM, 1990, Article 7).

Incorporating archaeological sites into contemporary life with the help of its presentation and organizing events in sites is a desirable approach. All these techniques may increase the recognition of sites and make them tourist attraction (Ahunbay, 2010, p. 112). However, excessive use of presentation techniques hinders sprit of place. Creating living sites through reconstruction of archaeological ruins and enacting by historical costumed characters, etc. is the most invasive presentation method which creates a history for mass consumption. These become dominant in the site and give way to throw archaeological remains out of focus, loss of integrity and meaning of real past for visitors. For example, Fortress of Louisbourg National Historic Site in Canada reconstructs both ruins and the history (Woolfitt, 2007, pp. 149-150; White, 2007, p. 255). Some techniques that have a stronger visual impact than remains may give way to focus on new additions instead of authentic remains, e.g., volumetric reconstruction in original dimensions of structures with contemporary materials (Sivan, 1997, p. 53). Presentation of Ferrara walls through afforestation along the direction of the walls, and

demolished portions of the Berlin Wall through differentiating the pavements can be considered as good examples in terms of creating effective and compatible impact with the help of landscape elements, instead of reconstruction or reintegration works (Figure 2.3 & Figure 2.4).

Figure 2.3. View of Ferrara walls
(Source: Corazza, n.d.)

Figure 2.4. Paving stones along the Berlin Wall
(Source: Pinterest, n.d.)

2.4. Evaluation of Comparative Studies

The four comparative studies are evaluated in the below: Kalø Castle (*Kalø Slotsruin*) in Denmark, Pombal Castle *(Castelo de Pombal)* in Portugal, Matrera Castle (*Castillo de Matrera / Pajarete*) in Spain, and Northern Gate of Resafa (Rusafa/Sergiopolis) in Syria.

2.4.1. Evaluation of Kalø Castle (*Kalø Slotsruin*), Denmark

Values and conservation problems of Kalø Castle before and after the current interventions are determined in this section.

2.4.1.1. Values and Problems, Before Interventions

Kalø Castle had integrity in terms of its natural, man-made and intangible characteristics. The peninsula was part of Mols Bjerge National Park which was a picturesque countryside. The ruins were in harmony with the natural setting. Kalø Castle was a witness of how mankind has taken full advantage of the landscape for defense purpose. The longest Medieval road in Denmark, which was constructed at the same time with the castle (Danmarks Nationalparker, n.d.), was a component of the case study. It attributes rarity to the site. Also, there were remains of farm buildings from about 1500s outside of the castle. These remains documented the social life of their time. The castle was one of the four similar fortresses in Jutland that was constructed to counter the ongoing rebellions of the Jutlandic nobility and peasantry against the Crown. The others were Bygholm at Horsens, Borgvold at Viborg and Ulstrup at Struer (Engberg et al., 2008, p. 188). So, the case study together with the other castles represented the defense strategies of the Medieval Age as a whole. The site had been a gathering place for many years. For example, in the 1930s, large public festivals were held at and near the castle ruin each summer with the aim of collecting fund for the excavation and restoration of the castle (Hansen, 2012b). In 2000s, it was a favorite touristic attraction point.

The case study had age value since the ruin is among the oldest Medieval cultural assets in Denmark. It documented the social, economic, technical and military aspects of several periods. The ruin was authentic in terms of castle spatial layout of several construction periods. It was the first castle in Denmark with a flanking tower, so the castle had rarity value (Danmarks Nationalparker, n.d.).

Kalø Tower had preserved its authentic characteristics as a 14th century defense. The tower was authentic in terms of its facade form, space organization, design approach, plan layout, architectural elements, construction technique and material. There were limited cultural assets in Denmark as old as the Kalø Tower: so, it had age value. There were several legends associated with the tower, so it had memory value (DF: DKF, 2001/2020).

There were accessibility problems in the site. The Medieval path to the castle had a rough surface: walking on it was difficult. Also, water level affected by high tide, flooding and global warming was a potential threat for the path. There was lack of presentation and service facilities fulfilling visitor needs.

The remains of the castle were abandoned since the 17th century. Access to the castle had problems because of the structural and material aging of the drawbridge that was placed at the entrance of the castle. The castle had damages caused by the waterfront, rough weather, possible coastal erosion especially in the southwestern side and vandalism such as the effects of the weight of visitors on the walls which were statically unstable. Also, grazing of the animals in the site, and the excrement of the birds could have damaged the ruins. Because of limited presentation with just a map of the landscape and geographical information about how the landscape was formed, the site could not be fully conceived by the visitors.

There was no circulation within the tower, and the entrance was blocked with an iron fence. The tower had structural and material problems stemming from rising damp (Figure E.23 & Figure E.32), previous restorations and vandalism: unstable wall portions (Figure 2.5), salt crystallization, plant colonization, graffiti on the bricks (Figure E.21), and trash thrown on the basement of the tower. The tower was not presented before the restoration project.

Figure 2.5. Unstable wall parts caused by previous restorations
(Source: Castro, 2019)

2.4.1.2. Values and Problems, After Interventions

The castle ruin sustains its harmony with the natural setting. The project has increased visitor experience: the number of visitors have doubled (Nationalpark Mols Bjerge, 2016; Castro, 2019). This pioneering project has added value to the site: a second project, revitalisation of the National Park and design of the Welcome Centre by Arkitema Architects, which is complementary with Kalø Castle project, has been initiated (Reese-Petersen, n.d.). The castle continues to be one of the examples of the fortresses in Jutland, constructed to counter rebellions. The qualities of the cultural landscape are sustained. The consolidated Medieval road continues to provide access between the mainland and the peninsula. The remains of farm buildings have preserved their characteristics and continue to represent the social life.

Due to preserving the authentic qualities of a 14th century defense structure, the site is still the oldest medieval surviving site in Denmark. The social, economic and technical aspects of several cultures are legible at the site. The characteristics of authentic royal palace such as the spatial layout and the remains of different construction periods are preserved. The castle continues to be the first castle with a flanking tower in Denmark.

The tower sustains the qualities of a 14th century ruin. All of its authentic architectural and constructional characteristics are preserved except its function. The legends associated with the tower are learned by the young generations.

Access to the site is provided with public transportation. Although the road is consolidated, the path is still rough, but this is part of the authentic accessibility. The potential threat of fluctuations in the water level continues. After arriving at the peninsula, a new path that leads directly towards the castle is constructed. Visitor center, parking lot, cafe, toilet, information boards, and benches etc. are provided. Informing of public is still limited: the boards are a few in number, and comprehend little information about the site and the project (Figure E.33 & Figure E.34).

The accessibility of the ruin of the castle by the visitors has increased after the implementation. Consolidation of the drawbridge has solved the structural problems. There is no protection against possible vandalism and coastal erosion. Grazing of animals may continue in the site. This contributes to picturesque view. Also, there is no precaution against the excrement of the birds. The castle is presented with a virtual reality app: this is considered valid for well understanding of the place (Figure E.36). The visitors direct their focus on the physical experience.

The tower ruin is presented fully with the help of the staircase. It provides visitors' access, and makes them perceive the archaeological layers and the beauty of the landscape. It is also a social platform that forces people to be communicate and interact. There is limited precaution for increasing security. The fenced area next to the tower provides a full secure zone against possible splits from the walls. But, it blocks access to a information board (Figure 2.6). Nevertheless, its design is unaesthetic.

Figure 2.6. An information board within the fenced area next to the tower
(Source: Reese-Petersen, n.d.)

2.4.2. Evaluation of Pombal Castle (*Castelo de Pombal*), Portugal

In this section, values and conservation problems of Pombal Castle before and after the current interventions are determined.

2.4.2.1. Values and Problems, Before Interventions

The cultural landscape of Pombal presented an integral unity with its cultural assets such as the castle, Church of São Martinho (*Igreja de São Martinho*), Marquês House (*Casa do Marquês*) and Old Clock Tower (*Torre do Relógio Velho*), etc.; and natural assets such as rivers, valleys, the site of Sicó / Alvaiázere, which has rich biodiversity (Município de Pombal, 2020d). The site dates back to the Neolithic Period. So, it had age value. The Pombal Castle crowned this landscape as a symbolic

monument. It documented the relation of defense and transportation systems of the Portuguese kingdom in Fernando Magno, King of León, period together with a group of castles in the line of defense of the Mondego (Município de Pombal, 2020c). The castle also contributed to castle building type in the south of the country.

Pombal Castle had preserved its authentic characteristics as an example of the Portuguese military architecture from 12th century. The castle documented the social, economic, technical, religious and military aspects of past civilizations and orders that were initially Roman, and later Muslim and Christian. Remains of residential units in the courtyard and alterations dating to the 16th century documented the life span of the monument. Interventions dating to the early 20th century documented the restoration approach of their time. The castle was authentic in terms of site - castle relation, castle spatial layout, facade form, design scope, architectural elements, construction technique and material with qualified contributions of different periods. The defensive structures such as gates, towers, keep, fortification walls; and foundations of the former Roman fortress had sustained their authenticity. The castle's carvings and inscriptions from different periods, ornamented windows with Manueline style from 16th century, and decorated vault of the Santa Maria's Church had sustained their artistic values. There are several legends associated with Pombal Castle, so it had memory value (Município de Pombal, 2020g).

The keep with authentic characteristics of a 12th century defense structure had age value. Its layout together with the talus documented the innovations brought by Gualdim Pais to Portuguese military architecture. The keep was authentic in terms of facade form, space organization, design scope, plan layout, architectural elements, construction technique and material.

Before the current conservation implementation, there were accessibility problems within the site. There was no contact between the castle and the town because of the poor conservation state of the road (*Rua do Castelo*) between them, and dense vegetation of the hill (Pires, 2017, p. 95; Architizer, 2016). The site was under potential threat of soil erosion and earthquake.

The castle ruin was abandoned starting with the 19th century. There were accessibility problems due to lack of guidance and visitor paths leading to the castle. The castle walls had damages caused by the plant colonization and rain penetration. The castle was also damaged after the interventions in the early 20th century. The church had structural and material problems stemming from weathering and rising damp. There

were no presentation of the ruins, and service facilities for visitors such as cafe, toilet, parking lot, etc.

There was only a metal ladder to reach the keep and no circulation element within the keep. The keep had structural and material problems due to the past implementations practiced with unscientific methods and incompatible material such as cement.

2.4.2.2. Values and Problems, After Interventions

Pombal cultural landscape sustains its integrity with its natural and cultural areas. The restoration of the castle arouses curiosity for exploration of the site. The castle preserves its symbolic significance in the landscape. It preserves its strategic position due to its location, and characteristics of the fortresses in the line of defense of the Mondego and in the south of the country.

The castle presents limited the characteristics of a 12th century defense structure due to the former implementations. The social, economic, technical, religious and military aspects of the past can be observed via remains and traces in the castle, but because of former extensive intervention, there is some loss of historic value. The castle continues to document both the military and royal lifestyles with its historic additions. Traces of restoration works in the 20th century are also preserved. The authentic site - castle relation, castle spatial layout, facade form, design scope with qualified alterations of different periods; and defensive characteristics of gates, towers, etc. are sustained except architectural elements, construction technique and materials because of the former restoration. The current restoration project sustains all of these characteristics except architectural elements. The carvings, inscriptions, ornamented windows and decorated vault sustain their artistic values. The legends associated with the castle continue to be disseminated and learned.

The keep as a 12th century defense structure has age value. However, its documentary value is hindered with the losses in its facade form, plan layout, architectural elements are lost.

The accessibility problems in the site are solved with designing the roads and the visitor paths between the castle, and the urban areas at the foothill. Also, dense vegetation in the hill was cleaned. The site continues to be under threat of earthquake and soil erosion.

The castle site continued to be isolated from the urban areas until the recent project (Almeida, 2012, p. 147). Surrounding area of the Santa Maria's Church is functioned as a public space for cultural activities, and the keep is functioned as a museum and exhibition space with the restoration project. The pathways with resting areas, platforms, and staircases with railings are provided to access the castle. Cleaning of the plant colonization and consolidation of the walls was carried out, but there is no protection against rain penetration. There is no protection against structural and material problems of the church. Presentation of the castle site is designed in three areas with different design approaches such as using different materials in the pavements and structures for each area. Visitor center, parking lot, resting areas, benches, a cafe, toilet, trash cans, information boards with texts in Braille, virtual reality equipment, lighting and sound equipment are provided (ANACED, 2017, p. 51). Audio guides are also provided for the visitors.

The corten steel staircase and metal floor of the keep are evaluated as reversible interventions. However, the cement used in the consolidation of the walls in the current restoration is incompatible material. Presentation of the keep with a new addition, the exterior staircase leading to a balcony, helps understanding the structure, while the addition is distinguishable with its form and material, and harmonious with its void and lightness, contradicting the historic solid and heavy structure.

2.4.3. Evaluation of Matrera Castle (*Castillo de Matrera / Pajarete*), Spain

In this section, values and problems of Matrera Castle before and after the current interventions are determined.

2.4.3.1. Values and Problems, Before Interventions

Villamartín is located at the cross point of the important roads, and on fertile lands which is suitable for agriculture and livestock. So, it possessed the ruins of the civilizations since prehistoric ages. These cultural assets; e.g., Dolmen de Alberite archaeological site, Hermitage of Our Lady of the Mountains (*Ermita de Nuestra Señora de Las Montañas*), ancient roads, the castle, etc., are in integrity with the natural environment that has unique flora and fauna; e.g., *Sierra de* Grazalema National Park, Guadalete and Guadalquivir valleys, etc (Figure E.92). The hermitage near the castle is a pilgrimage center where people gather every year in September, and give spiritual attention to the winegrowers of the Pajarete hill (Ayto. de Villamartín, 2016a; Ayto. de Villamartín, 2016c). It documents the natural characteristics of the hill and also attributes the memory value to the region. Matrera Castle is the emblem of Villamartín and a symbolic monument crowning its hilltop in a picturesque Mediterranean rural site. Also, the castle ruins were in harmony with this rural site. So, they arouse curiosity for exploring the landscape. The castle together with a group of the defense structures constituted the Nasrid border[5], but it stands forward with its position which is beyond the Guadalete river. They document the relation between the two kingdom: Crown of Castile and Nasrid Kingdom.

Matrera Castle site was inhabited by Tartessians and Iberians in the first millennium BC. Also, the remains of the structures from the 9th century to 15th century have been preserved. So, the castle had age value. The castle documents the social, economic, technical and military aspects of past civilizations and orders of Muslims and Christians. Due to the reconstructions by Christians, the castle represented the characteristics of Christian rule more than that of the Muslims. Its architectural characteristics showed the power and control of the Christian commanders or governors over the region and population (Gutiérrez López & Martínez Enamorado, 2003, p. 108). The remains of the different construction periods and repair works were preserved. However, due to the lack of the scientific researches and archaeological excavations, the evolution of the monument was not known clearly. The castle was authentic in terms of

[5] Beside the defense structures, there are different types of structures such as Benaocaz minaret which is refunctioned as the bell tower of the San Pedro church, the aqueduct of Villaluenga del Rosario and a wide network of historic roads (Pérez Ordóñez, 2009, p. 24).

site - castle relation, castle spatial layout, design mentality, castle size and facade form, architectural elements, construction technique and material with contributions of different cultures. The isolated location of the castle in a rural site helped sustaining these authentic elements. The castle is a rare example among the other Andalusian defense structures in the region due to its gates without *mocheta* (Pérez Ordóñez, 2005, p. 89).

The keep had preserved its authentic characteristics as a defense structure dated to 13th - 14th centuries, so it had age value. Different construction techniques and material documented the repairs and evolution of the keep. It was authentic in terms of keep - castle and keep - inner walls relation, facade form, space organization, design mentality, plan layout, architectural elements, construction technique and material. But, due to the serious structural problems of the keep and partial collapses, it was under threat of losing its authenticity and architectural unity. The frescos on the walls have partially sustained the artistic value due to damages stemming from weathering.

There were accessibility problems stemming from the rough path leading to the castle. It was hard to follow the path due to dense vegetation of the hill and lack of orientation boards (Pavos Trotones Blog, 2012). There was lack of service facilities for fulfilling visitor needs. The castle ruins were under threat of landslide, especially the northern part of the site due to its high slope.

The castle ruin had been abandoned since the 16th century. There were accessibility and safety problems around the castle due to the collapsed stone blocks that gave way to slippery ground and unstable wall portions. Also, due to private ownership, there could have been difficulties in terms of public access. The castle had structural problems stemming from weathering, landslides, plant growth on the walls and lack of the maintenance: collapse or partial loss of some wall portions, displacement and cracks on the walls. Before the restoration project, the helicopters of Spanish army landed on the site and took-off regularly (Más Jerez, 2014). This military intrusion could have damaged the castle ruins. Also, grazing animals in the site could have caused structural problems on the unstable wall portions of the castle. There were material deteriorations stemming from weathering, rising damp and rain penetration: loss of material, joint discharge, cracks, detachment on the stones and plaster, discoloration, encrustation and plant colonization. The remains of the structures in the courtyard were completely under debris and earth. Only a few stones could be seen on

the ground. This showed that there were traces of a structure below the ground. So, the castle and its remains were not presented and service facilities were not provided.

The keep had serious structural problems that could cause the whole structure to collapse, and threaten the visitors' safety. These problems which stemmed from heavy rains, landslides, plant growth on the walls and lack of conservation works were collapse, loss of material, displacement and cracks on the walls. The keep had also material deterioration caused by weathering, rising damp and rain penetration: loss of material, joint discharge, cracks, detachment on the stones and plaster, discoloration, encrustation and plant colonization. It was not presented before the current restoration project.

2.4.3.2. Values and Problems, After Interventions

Villamartín continues to be a strategic place due to becoming a transition point and the center of the public services, such as health and administrative establishments, among the towns in the region (Ayto. de Villamartín, 2016c). The cultural landscape of Villamartín sustains its integrity with its cultural assets and natural environment (Figure E.98). The Pajarete hill preserves its memory value, so it continues to be a gathering place. Beside this, unperished natural landscape of the hill with its richness in terms of flora and fauna, and the castle as a landmark with its picturesque view and architectural characterictics continue to arouse interest to the site. Also, due to reintegration work only in the keep, the ruin image of the castle and its harmony with the rural site is sustained. So, the castle and its surroundings have constituted a popular hiking and trekking route. Matrera Castle preserves its importance due to its location, and the characteristics of castle type in the Nasrid border. Due to preserving the remains of both the Nasrid Kingdom and Crown of Castile, the castle continues to document their military strategies.

Matrera Castle preserves all the remains of the authentic elements which give age value to the site. The isolated location of the castle sustains the spirit of the site, but the restoration project that was carried out only for the keep gave way to loosening of integrity between the keep and the rest of the castle. However, the project was realized

only for the keep, because it required urgent interventions for conservation. In this way, impact of the project and the historical importance of the keep is emphasized. The castle continues to document the social, economic, technical and military aspects of past civilizations and both Muslim and Christian rules. The remains of different construction periods and repair works are legible. However, there is still lack of systematic archaeological excavations, so obscurity regarding the historical background of the castle continue. The authentic site - castle relation, castle spatial layout, design mentality, castle size and facade form, architectural elements, construction technique and material are sustained. In addition to the contributions of several Muslim rules such as Almohad dynasty, Nasrid Kingdom, etc., the impact of the power of the Christians stands forward. The characteristics that make the castle rare in the region are sustained in the castle.

Although the restoration project gave a new image to the keep, it sustains its characteristics as a 13th - 14th century defense structure. The keep continues to document the repairs and construction periods by preserving the different construction techniques and material. The authentic keep - castle and keep - inner walls relation, space organization, design mentality, plan layout, architectural elements, construction technique and material are sustained. With the current interventions, the facade form was changed by reintegration with plastered walls. The project allows perception of the architectural unit by re-establishing the original volume of the keep. Also, usage of lime plaster on the new wall portions as in the authentic state of the keep contrasts with naked stone walls, and provides distinguishability[6]. The artistic value of frescos has been preserved by the interventions of cleaning and consolidation works.

As the restoration project did not comprise the rest of the castle, except the keep, nothing was proposed for solving the accessibility and presentation problems. The site continues to be under threat of landslides. While reinforcement and consolidation works were carried out in the keep, no precautions were taken for the fortification walls of the castle.

The restoration project was very controversial. It gave way to international discussions that received both negative and positive criticism, and got the public

[6] The project was designed in accordance with the Law 14/2007 on the Historical Heritage of Andalusia (*Ley 14/2007, de 26 de noviembre, del Patrimonio Histórico de Andalucía*) which prohibits imitative reintegration or reconstruction, and requires the compatible materials with reversible techniques (Comunidad Autónoma de Andalucía, 2007, Artículo 20). By this way, the project aimed to sustain the authenticity value of the keep.

thinking about the restoration of the cultural assets. Thus, the recognition of the castle and the project has increased, and the site has become a tourist attraction. Debris around the fortification walls and its unstable wall portions continue to be a risk for visitors' safety. There is no intervention for the structural problems and material deteriorations of the fortification walls. Grazing of animals contributes to sustain the rural characteristics of the site. Due to the lack of the archaeological researches in the courtyard, the remains under ground are not revealed, but their traces can be observed on the ground. Except the keep, the rest of the castle are not presented. Service facilities were not provided.

Consolidation of the remaining walls of the keep that were under threat of collapse was carried out. Reintegration was carried out to complete missing portions of the walls and prevent them from further destruction. These interventions were realized with reversible and distinguishable techniques with compatible materials. However, usage of the lime plaster on the walls may give way to necessity of short maintenance periods compared to authentic state. Cleaning of the authentic stone facades was carried out. Also, debris and vegetation in the courtyard was cleaned. During the cleaning of debris around the keep, some remains of structures were revealed and presented. The keep is presented by realizing reintegration works with the plastered walls.

2.4.4. Evaluation of Northern Gate of Resafa (Rusafa / Sergiopolis), Syria

In this section, values and conservation problems of Northern Gate of Resafa before and after the current interventions are determined.

2.4.4.1. Values and Problems, Before Interventions

The cultural landscape of Resafa has integrity with the necropolis at the northern side of the city, and the settlements from the Islamic periods around the ancient city in harmony with the vast desert landscape (Figure C.2). The city was the ancient military,

pilgrimage, and trading centre that was located at the intersection of major trade routes and on an important military road. So, Resafa was part of the defensive border (*Strata Diocletiana*) consisted of a series of defense structures. There were ancient gypsum and limestone quarries that documented the geologic heritage of antiquity in the vicinity of Resafa. Beside them, the region had economic importance and attracted attention for the geological researches due to being rich in terms of hydrocarbon resources.

The site was inhabited by Assyrians in the 9th century BC. The remains at Resafa were mostly from the 5th - 6th centuries. So, the ancient city had age value. The ruins of the ancient city documented the relation between Byzantine and Sasanian empires, and military strategy of the Byzantine Empire against Sasanian attacks. They represented the social, economic, technical, religious aspects of Byzantine military culture. Different construction techniques, forms of the towers, and alterations documented the evolution of the fortification walls and gates, and the construction sequence during the five construction periods. Also, the techniques of water harvesting system used in the city, and the related hydraulic structures documented the methods of residents for supplying water in an arid environment. The movable assets, e.g., oil lamps, pottery, jewelry, coins, etc., revealed in the site documented the social and economic life (Karnapp, 1977, p. 26). As an advantage of being locating in an isolated place, the authentic plan layout of the city, site - defense structures relation (gates, towers, turrets, city walls with galleried wall-walks), form of the towers and the gates had been preserved. Due to possessing the martyrdom of St. Sergius and becoming a pilgrimage center for Christians since the 5th century, Resafa had memory value.

The Northern Gate of Resafa together with the fortification wall portions attached to it had preserved their characteristics as a 6th century defense structure from Early Byzantine period. So, it had age value. The ornamentation style of the walls, carvings of the cross symbols and the construction technique developed from the techniques of the Limestone Massif region documented the social, technical and religious aspects. The authentic facade form, space organization, design mentality, plan layout, architectural elements, construction technique and material, ornaments had been sustained. However, due to the thick sand and debris layer (5 m) on the ground, the lower level of the northern gate could not have been perceived. The Corinthian capitals, ornament elements on the walls, e.g., corbels, cornices, moulded profiles, pilasters, carvings and frescos, had sustained their artistic value. Only the corbels in the shape of

lion heads on the northern facade of the gate were in a poor condition due to weathering, and the ornamentations on the southern facade were lost.

The cultural landscape of Resafa was under threat of earthquakes due to its location that has dense fault lines. There is minor risk of flooding. Also, the desertification, wind and water erosion, and dust storms were threats to the site due to the climate change, the climate of the region and the lack of the vegetation. The site had security problem due to the Syrian Civil War.

Resafa ancient city had been abandoned since the 13th century. The war in Syria, and well pits and holes on the ground of the city caused by the illegal excavations have threatened visitors' safety (Tapete & Cigna, 2019, p. 13; Mollenhauer et al., 2007, p. 23). The ruins of the city had structural and material problems stemming from the construction technique of the walls as three separate wall layers without bonding, weathering and plant colonization: collapse or partial loss of some wall portions, displacement, cracks, joint discharge and detachment on the stone blocks. Vandalism (e.g., illegal excavations, looting, robbery of the excavation house and stealing of the restoration equipments) stemming from the uncontrolled access to the site, and the war in Syria has damaged the ruins in the city. Especially the fortification walls have been damaged during the war (Danti et al., 2015, pp. 1-2, 19-20; Danti et al., 2017, pp. 91, 189). Also, the archaeological researches and restoration works could not be carried out in the site since the outbreak of these conflicts (Hof, 2016, p. 409). The wrong conservation measures carried out in 1950s and 1960s have given way to problems: placing decorated architectural elements in the basement floors of buildings and burrying of other elements to protect from weathering, and losing them forever (Downey, 2004, p. 157). Debris on the ground caused presentation problems, and service facilities were not provided in the city.

The northern gate had structural problems stemming from weathering and vandalism: collapse of some wall portions such as upper wall parts and northern wall of the forecourt, etc., loss of material, out of plumbness, displacement, cracks on the walls. There were also material deterioration stemming from weathering and vandalism such as loss of material, joint discharge, detachment, erosion on the stone surfaces, plant colonization. Due to the usage of the gypsum stone that is delicate to weathering as construction material, the structures in the city were under threat of disintegration under the climatic conditions of the region. The ground level of the gate was covered with earth and debris, so it could not be fully perceived.

2.4.4.2. Values and Problems, After Interventions

The integrity of the cultural landscape of Resafa with the cultural assets such as necropolis, antique quarries, the settlements around the city, and the natural characteristics of the desert landscape has been sustained in terms of the location of the city. However, the integrity with these cultural assets is under threat due to the disruption of the conservation activities because of the war, vandalism and weathering: e.g., residential buildings of the caliph whose only foundations remained in the southern of the city were revealed and left by exposing to weathering. Also, although harmony with the natural environment is mostly preserved, the current interventions of the northern gate decreased this harmony. The ancient city preserves its significance and characteristics as the ancient military, pilgrimage and trading centre. It sustains the characteristics of the defense structures on the military road, which used to constitute a defensive border. The region has sustained its geological importance since ancient times.

The remains of the Resafa ancient city have preserved their characteristics since the 1st century. So, age value is sustained. The city continues to document the relation between Byzantine and Sasanian empires, and their military strategies by contributing to multiple series of forts protecting the eastern border from invasion of the Sasanian Empire. The social, economic, technical and religious aspects of the Byzantine military culture have been preserved by sustaining the movable and immovable cultural assets in the city. The evolution of the fortification walls and gates and their construction sequence during the five different construction periods are documented by preserving the construction techniques and alterations. Water harvesting system techniques document the residents' effort to supply water in an arid climate. The authentic plan layout of the city, site-defense structures relation, form of the towers and the gates are preserved, but some parts of the city walls and upper parts of the towers have collapsed, and their ground floors are still under debris. The city continues to attract people due to sustaining the martyrdom of St. Sergius, and be an important place for Christians. So, memory value is sustained.

The Northern Gate of Resafa partially sustains its authentic characteristics as a 6th century defense structure from Early Byzantine period due to the imitative reintegration on the southern facade. The social, technical and religious aspects of past

civilizations can be observed via the ornamentations, carvings, and the construction technique of the structures in the city originated from the Limestone Massif region. The authentic facade form, space organization, design mentality, plan layout, architectural elements, construction technique and ornaments are sustained. The implementation that was carried out with new imitative stones and the authentic construction technique to integrate the facade form as in its authentic state is distinguishable now. However, over time, the difference between the authentic structure and the current intervention may not be distinguished, and may cause to mislead the observers. Also, debris was removed from only around the entrances of the gate, but the authenticity of its towers and the northern fortification walls flanking them cannot be perceived completely due to debris on the ground (Figure E.141). All of the authentic ornamentations on the walls sustain their artistic value, and the ornamentations on the southern facade were reintegrated as in their authentic forms in the restoration project.

The potential threat of earthquakes, flooding, desertification, wind and water erosion, and dust storms continue to put the region at risk. The security problems also continue in the site due to the Syrian Civil War.

It is aimed to function Resafa as an open-air museum. However, the war causes to damage the ruins, hinder the archaeological researches and restoration works, put visitors' life in danger. So, the city still remains as an abandoned place. Beside the war, well pits and holes on the ground give way to safety problems for visitors. It was stated that the conservation activities were aimed to ensure the minimum interventions and prohibit further deterioration (Al Saeed, 2009, p. 44). However, consolidation and reinforcement was carried out unsystematically in the city: e.g. some wall portions of the fortification wall, Basilica A, etc. There are no conservation activities for many structures in the city, so the structural and material problems threaten the wholeness of the ruins. Due to the uncontrolled access to the city, vandalism continues to damage the ruins. Debris and sand was removed from some places in the city. Nothing has been done for the presentation issues: a visitor center, a cafeteria, information and orientation boards, short and long tours, etc. were designed, but they are not realized.

Reintegration on the southern facade, consolidation against joint discharges and cracks, and cleaning works were carried out. However, there are no conservation measures for serious structural and material problems of the northern gate. The gate is presented by removing debris by the gate and revealing its ground floor, and reintegrating the southern facade and its ornamentation.

CHAPTER 3

IDENTIFICATION OF THE CASE STUDIES

The three case studies are identified in this chapter: Yılan Castle (*Yılankale*, Shahmaran Castle), Feke (Vahga) Castle and *Kızkalesi* (Maiden's Castle / Sea Castle) in Korykos.

3.1. Yılan Castle (*Yılankale*, Shahmaran Castle)

Yılan Castle (*Yılankale*, Shahmaran Castle), the first of the case studies, is identified in the below.

3.1.1. Geographic Characteristics

Yılan Castle is located in Yılankale village, Ceyhan, Adana. It is 40 km in distance to Adana, 13 km in distance to Ceyhan and 3 km in distance the current Adana-Ceyhan E-5 highway (Boran Şen, n.d., p. 30; Özmen, 2000, p. 207). Misis ancient city is at the southwest of the castle, 16 km in distance. Yılankale village is located in the northeast of the castle, Küçükburhaniye village and Sirkeli Mound are in the southwest, and Kokartepe Necropolis is in the west (Figure 3.1, Figure B.6 & B.7). The castle is located on the historic caravan route that comes from Central Anatolia and passes through Gülek Pass, Adana, Misis, Payas and Antakya (Figure A.1) (Sevgen, 1959, p. 338; Buyruk, 2011, p. 101).

Figure 3.1. Satellite images of the site of Yılan Castle
(Base map source: Google Earth; date of image: 05.02.2019, access date: 11.11.2020)

The castle is situated on a very steep limestone outcrop known as Yılankale Hill on the banks of the Ceyhan river in Çukurova and completely dominating the plain (Figure 3.3) (Buyruk, 2011, p. 101). The hill is the most northern outcrop of the Cebel-i Nur mountains and is separated from the main range by the River Ceyhan (Figure 3.2) (Youngs, 1965, p. 125; Edwards, 1983, p. 628). Murattepe and Kokartepe are located in west of the castle (Figure 3.4). The plain is 32 m above the sea level and its highest point is 210 m above the sea level (Buyruk, 2011, p. 102).

Figure 3.2. View of Yılan Castle and Murattepe with Ceyhan river from the south (Source: Flickr, 2015)

Figure 3.3. View of Yılan Castle from the path (2020, October 20th)

Figure 3.4. View of Murattepe and Kokartepe from the castle (2020, October 20th)

Yılankale Hill is located in Bulgurkaya formation of Misis-Andırın unit that was deposited in Upper Cretaceous period of Mesozoic Era (Akın, 2007, pp. 1-2, 9, 24-25; Şen, 2018). Sedimentary rocks were formed the site (Şen, 2018)[7]. There are Quaternary alluvial deposits that spread widely around the hill (Figure 3.5) (Şinik, 2016, pp. 29-30;

[7] The soil consists of Upper Eocene - Oligocene clastic rocks with blocks and Middle Triassic - Cretaceous neritic limestone (MTA, 2002).

Şen, 2018). The limestone blocks in the region are very deformed and fractured since there are fault lines in the vicinity (Yurdakul, 2010, p. 27). The site is in a tectonically active area. It is by the triple junction zone of the Anatolian, African and Arabian Plates. It is located in the second degree earthquake zone (Akın, 2007, pp. 10-12; Ünlügenç & Akıncı, 2017, pp. 86-88). The deposits that have a high water level in the Ceyhan Basin also affect the movement on the ground (Figure 3.6) (Şinik, 2016, pp. 38-42; Biricik & Kurt, 1998, p. 95). The limestone in the site is of good quality and have high mechanical resistance (Kılıç & Keskin, 2003, p. 305; Yurdakul, 2010, pp. 71-73). So, there are many active and abandoned limestone quarries (Figure B.4). Kokartepe, located 600 m at the west of the Yılan Castle, is also used as a quarry (Figure 3.4).

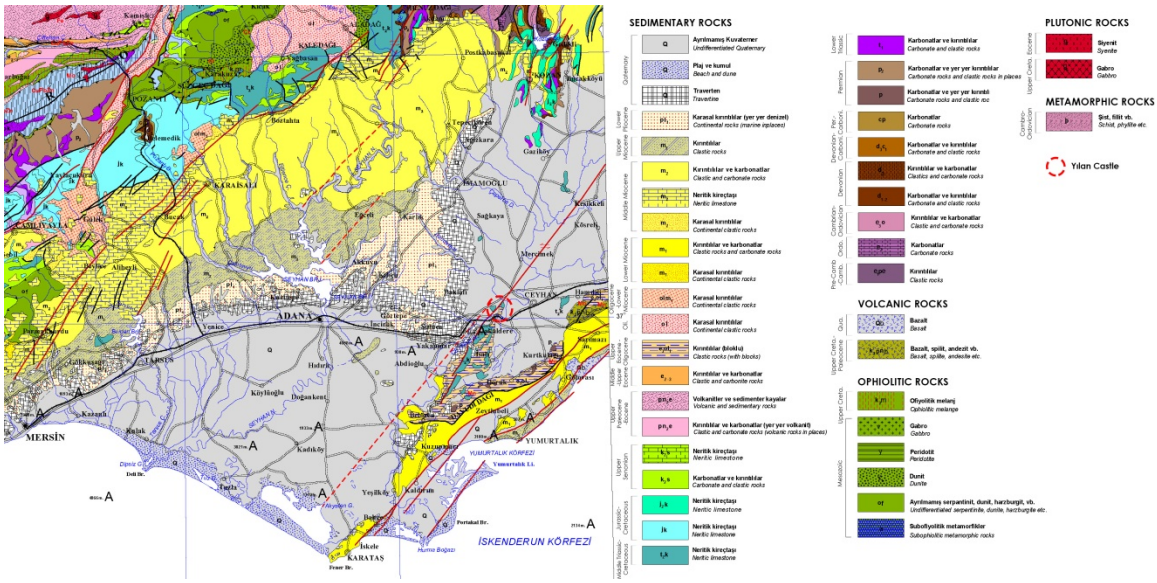

Figure 3.5. Geological map of Adana-Ceyhan (Base map source: MTA, 2002)

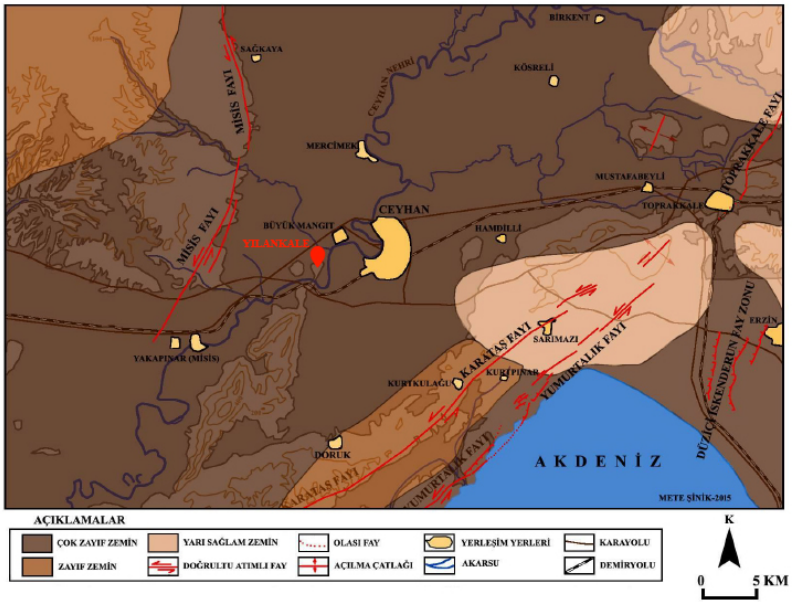

Figure 3.6. Ground resistance and fault lines of Ceyhan (Source: Şinik, 2016, p. 40)

Ceyhan and Seyhan rivers, and Tarsus stream formed Çukurova. Yılan Castle is located in Ceyhan river basin and surrounded by the river and Cingöz stream that is a branch of it. There is also Kokar spring water about 1 km northwest of Küçükburhaniye village. It is rich in H_2S (Salman, 2008, p. 10; Akın, 2007, p. 1). It is used as a spring bath, but it is not suitable for drinking or agricultural irrigation (Regional Council for Conservation, 2020; Akın, 2007, pp. 43, 46).

Mediterranean climate is seen in Ceyhan[8]. Due to the Ceyhan river flooding, the plain was marshy and bush land until the construction of a dam in 19th century. Then, marshy lands had dried and were started to be used for agriculture (Salman, 2008, p. 138; Biricik & Kurt, 1998, p. 99). Due to fertile alluvial plain and suitable climate, majority of land is cultivated (Biricik & Kurt, 1998, p.101). Agricultural products are cotton, tobacco, wheat, corn, sesame, etc (Salman, 2008, p. 138). Maquis and garrigue which are very short thorn bushes constitute the flora of Yılankale Hill[9] (Figure 3.7) (Eken et al., 2006, p. 428). Also, the pine trees were planted on the hillside during its afforestation (Figure 3.4) (Buyruk, 2011, p. 101). Agricultural lands are all around the hill. The steep slopes of the hill are important breeding sites for some bird and bat

[8] Summers are dry and hot, winters are warm and rainy. Average temperature is 18.7° C and it does not fall below 0° C in winter (Ceyhan D. G., n.d.).
[9] Yılankale Hill has two endangered endemic plant species: *Heptaptera cilicica (Mersin çakşırı)* and *Hyacinthella lazulina (Gök sümbül).*

species[10]. The hill is also important for *Gomphus davidi* which is an odonata (*kızböceği*) species unique to the Mediterranean biome (Eken et al., 2006, p. 428).

Figure 3.7. View from the castle (2020, October 20th)

3.1.2. Historic Background

The original function of Yılan Castle was observation and defense together with the other mountain castles along the historic caravan routes. These castles from south to north are Yılan, Tumlu, Anavarza and Kozan (Sis) (Figure A.1) (Edwards, 1983, p. 629; Sevgen, 1959, p. 338). All of the castles are in position to communicate with each other (Edwards, 1983, pp. 26, 30). Yılan Castle is within the sight of Anavarza and Tumlu castles (Youngs, 1965, p. 125). Their aim was to control both Çukurova and the strategic roads (Edwards, 1983, pp. 26; Özmen, 2000, p. 205). Yılan Castle is built to prevent attacks from the north and northwest (Edwards, 1983, p. 629).

[10] The endangered bird and bat species are little swift (*küçük ababil*), European roller (*gökkuzgun*); and Geoffroy's bat (*kirpikli yarasa*) (Eken et al., 2006, p. 428).

Yılan Castle is dated to Medieval period, but it is not known exactly by whom and when the castle was built (Edwards, 1983, p. 629). Some researchers claimed that the castle was constructed by the Crusaders or Byzantines during the First Crusade in 11th century (Texier, 1862/2002, p. 486; KTB, 2013c). Sevgen also claimed that the castle was from Byzantine period (Sevgen, 1959, p. 338). Four reliefs on the gatehouse of the castle were associated with the construction date of the castle by some historians such as Youngs, Müller-Wiener and Hellenkemper. They claimed that these reliefs and the castle was from the King Levon I period (1198/99-1219) (Levon II, 1187-1198/99 as the Prince of Cilicia) of the Armenian Kingdom of Cilicia (Youngs, 1965, p. 130; Buyruk, 2011, p. 102). Due to the poor conservation state of the reliefs, accuracy of this argument is uncertain (Edwards, 1982, p. 170). Lawrence stated that the castle was too advanced for the reign of King Levon I, so it was dated to the reign of Levon III (1270-1289) (Boase et al., 1978, p. 168). Edwards accepted that the gatehouse was repaired by the Armenian king (King Het'um I, King Het'um II or Levon III) whose portrait is on one of the reliefs between 13th - 14th century. According to him, the castle was constructed during the reign of Baron Toros I (1102-1129) (Edwards, 1983, pp. 637-638).

The historical chronology of Cilicia region where Yılan Castle is located since the Middle Ages is as follows:

Byzantine Empire (395 - 653 AD), Umayyads (7th c. AD), Abbasid Caliphate (8th c. AD - 965 AD), Byzantine Empire (965 AD - 11th c. AD), Seljuks (11th c. AD, after 1071 battle of Manzikert), Armenian Kingdom of Cilicia (1080 - 1375), Crusaders during the First Crusade (1097), the huge Cilicia earthquake and economic downfall of the Armenian Kingdom (1268), the Memluks (14th c.), Ramadanid Principality (1353-1517), Ottoman Empire (after 1517) (Gökhan, 2012; Özmen, 2000, pp. 204-205; Keshishian et al., 2018). Yılan Castle was abandoned in 1357 during the reign of Ramadanids (Boran Şen, n.d., p. 30). The castle was named as Kovara (Govara) until 17th century when Eliya Çelebi named it as Shahmaran Castle (KTB, 2013c). There are traces of Byzantine, Crusader and Armenian repairs on the castle walls. Armenian repairs can be distinguished in the sills, windows and vaults above doors (Özmen, 2000, p. 208). Some historians claimed that the castle was completely restored during the reign of the Memluks, so today, it represents architectural characteristics of this period (Sözlü & Boran, 2013, pp. 142, 144; Buyruk, 2011, p. 104).

Figure 3.8. View of the gatehouse in 1874 (Source: ETFA, n.d.)

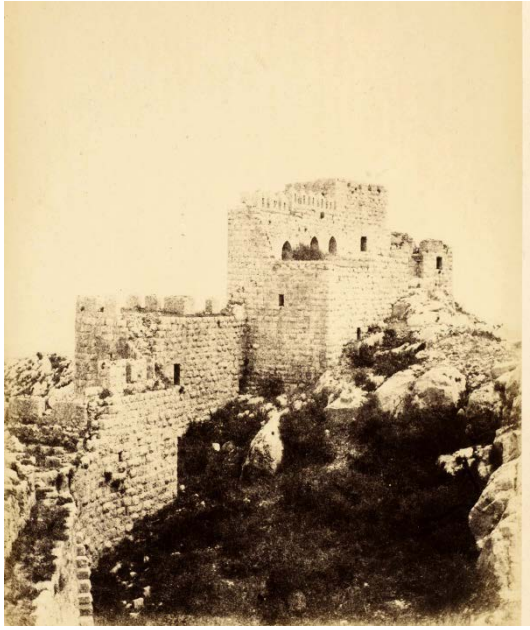

Figure 3.9. View from the upper courtyard in 1874 (Source: ETFA, n.d.)

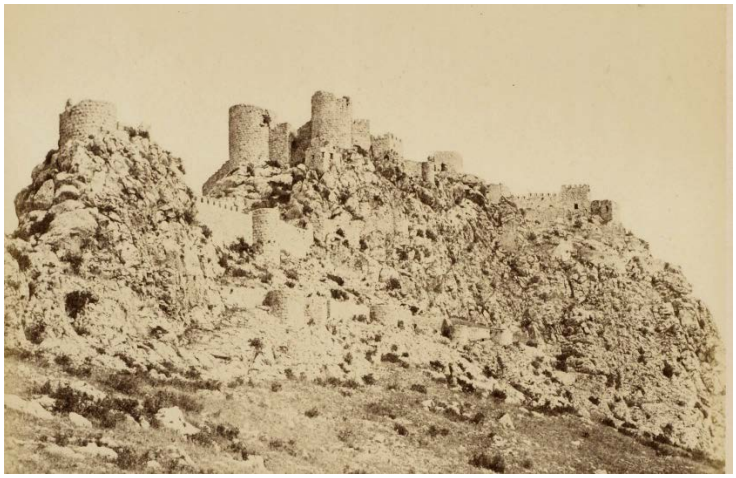

Figure 3.10. View of Yılan Castle from the east, 1874 (Source: ETFA, n.d.)

3.1.3. Morphologic Characteristics

Yılan Castle has irregular spatial layout with a long longitudinal axis in northeast-southwest direction circumscribed by walls. These walls are not continuous

since natural bedrock with steep inclination is present at some portions (Figure 3.13). The castle covers an area around 15 000 m^2 and its circumference is 700 m (KTB, 2019c; Sevgen, 1959, p. 339). It has three courtyards whose of each elevation is accordance with the landscape: lower, middle and upper courtyards (Youngs, 1965, p. 125). Each courtyard has a single entrance juxtaposed by one or two towers. Portable ladders were probably used to cope with the level difference in between the courtyards (Edwards, 1983, p. 634).

The lower and middle courtyards were designed to protect the southeastern side from which access to the castle is easier (Edwards, 1983, pp. 629-630). The lower courtyard is enclosed by two parallel fortification walls (A, C walls) along this side of the hill. The southeastern (A) wall consists of four towers with horseshoe plan and a gateway. Except the gateway, the wall portions above the ground level of the lower courtyard are missing (Edwards, 1983, p. 631).

The middle courtyard is enclosed by the walls C, D and E. These walls have wall-walks and crowned with rectangular crenellations. There are one circular (D1), and five horseshoe planned towers. D1 and E1 towers have timber roof. C1 tower, which was used as a cistern, has plastered walls (Youngs, 1965, p. 127). Between E and C walls, there is a thin wall remain that used to protect the western walls by directing the enemy to a different location. Room H1 has pentagonal layout and timber roof. There is a small circular cistern that has plastered walls in the north of the room H1 (Edwards, 1983, p. 633).

The upper courtyard protected the castle against attacks from the north and northeast. It is the largest and most protected part, and was used as the residence of the Baron and the military post (Edwards, 1983, p. 630). It is enclosed high curtain walls defended by eight horseshoe planned towers that have two stories and flat roofs. It has a postern gate in the northeast (Youngs, 1965, p. 127). Unlike other towers, G1 and F3 towers have rectangular rooms. The walls are surrounded by a wall-walk reached by stairs attached to the south and northwest walls. In the upper courtyard, there are two cisterns (F2, main cistern and I4), a chapel (I3), and rooms (F5, I1, I2). The cisterns were adapted to the bedrock on the hill. Cistern I4 was built over a natural rock pit (Youngs, 1965, p. 133). The rocks constitute the lower parts of the walls. Cistern F2 has rectangular plan, while cistern I4 has polygonal plan. The chapel was positioned at the edge of the cliff and the curves of the bedrock, so the south side of the apse is round, while the north side is flat (Edwards, 1983, pp. 639-640). There are wall remains in the

west and east of the chapel. Room F5 is a partially underground chamber with a flat roof (Edwards, 1983, pp. 642-643). The walls of the room were adapted to a natural rock pit. G wall and room F5 was isolated from the other parts of the upper courtyard due to the discontinuity of wall-walk of F wall, and the higher position of the G wall (Edwards, 1983, p. 641). G1 tower has two stories and a flat roof. The ground floor was used as cistern (Youngs, 1965, p. 132).

The gatehouse consists of a L planned entrance juxtaposed by two horseshoe planned towers (Figure 3.14) (Edwards, 1983, p. 634). The western tower (H2) has two stories and a flat roof (Youngs, 1965, p. 128). The eastern tower (H3) has a single high room, but it may have two floors (Edwards, 1983, p. 639). Before the current interventions, Yılan Castle was partially in need of repair and in ruin: e.g., some wall portions, room I1 and I2, southwest of the chapel, and west of the room H1.

Figure 3.11. Interior view of the room F5 (2020, October 20th)

Figure 3.12. Interior view of the cistern I4 (2020, October 20th)

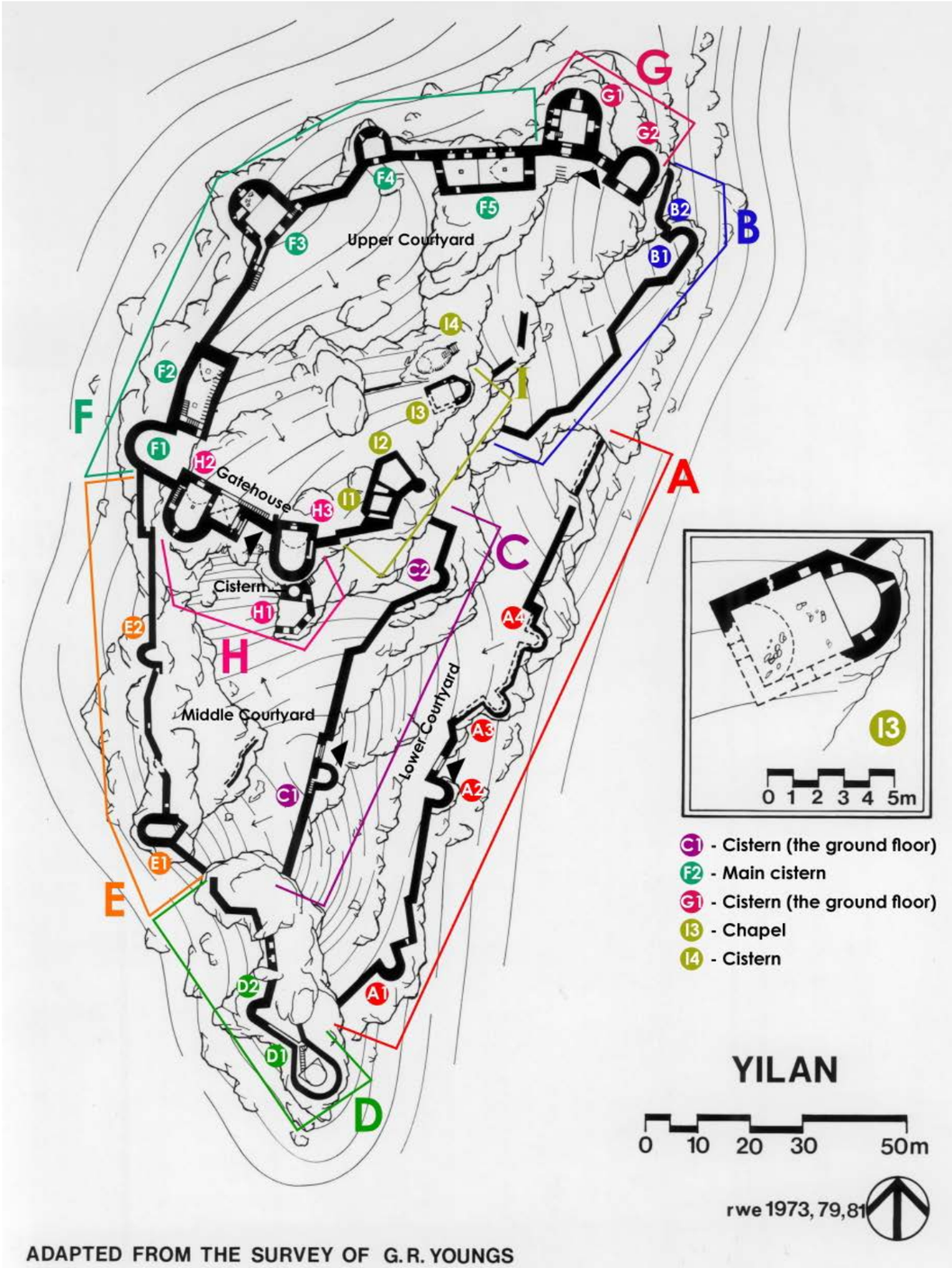

Figure 3.13. Plan of Yılan Castle (Base drawing source: Edwards, 1983, p. 627)

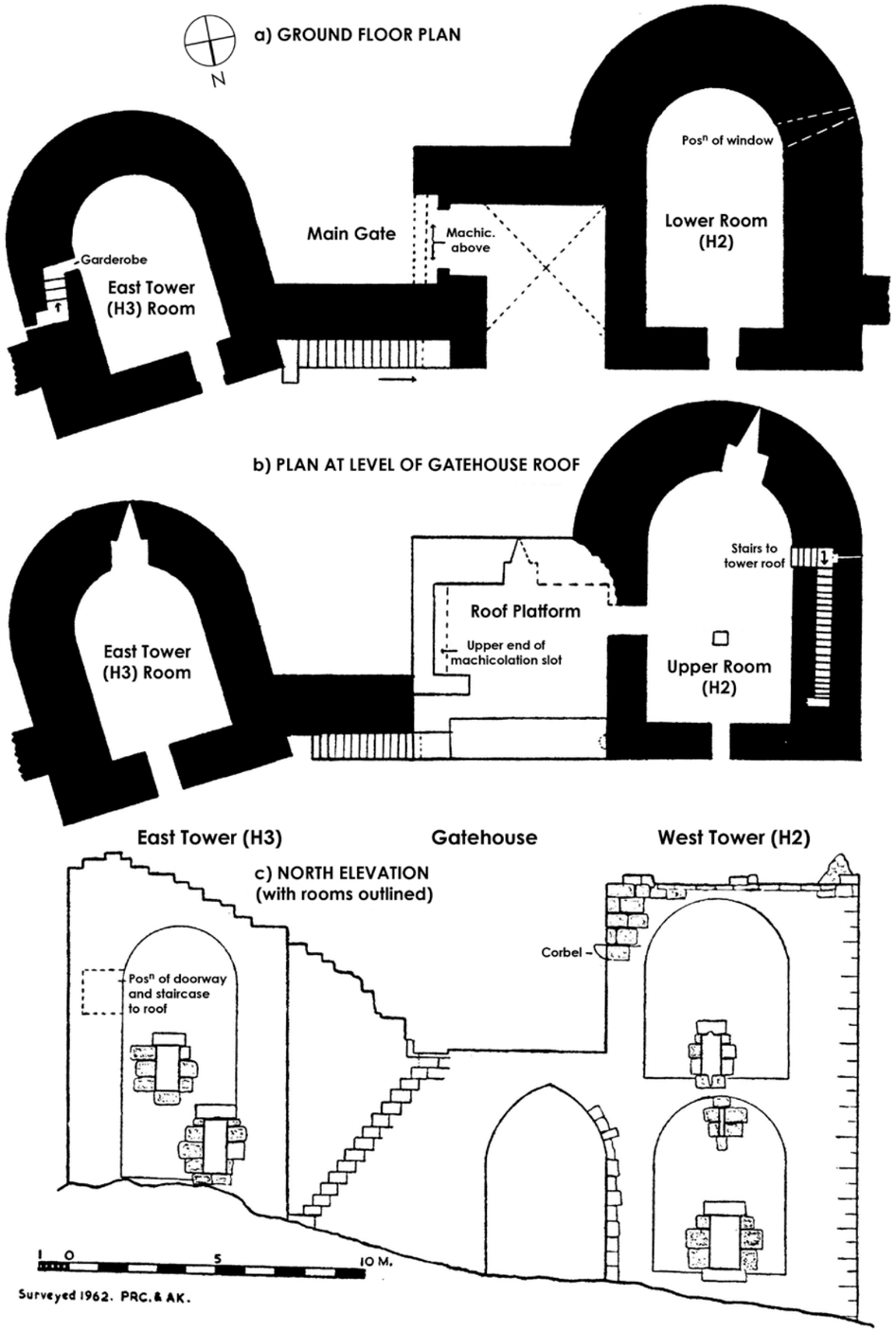

Figure 3.14. Plans and north elevation of the gatehouse (Source: Youngs, 1965, p. 129)

3.1.4. Construction Technique and Material Usage

The walls were constructed with the technique of mortared rubble stone core and cut stone facing. Style of masonry in the castle is generally isodomic coursed cut stones (Nossov, 2009, p. 14). The wall material is limestone and brick (only in the cistern I4) with mortar. The mortar has brick pieces at some portions (Figure 3.18). Limestone blocks are generally rectangular and have rough faces or bossage on the outer faces. In the lower courtyard, thickness of the walls is between 1.30-1.35 m (Kenar, 2020). The walls were constructed with large rough faced and bossed stone blocks. The walls of the middle courtyard were built stronger than the lower courtyard walls (Youngs, 1965, p. 127). The exterior facade of the walls were constructed with large rough faced and bossed stone blocks. The interior walls consist of small rubble stones and roughly rectangular stones in both regular and irregular courses (Figure 3.15). The cisterns in this courtyard (C1 tower and the cistern in the north of the room H1) have plastered inner walls (Youngs, 1965, pp. 127-128; Edwards, 1983, pp. 632-633). The upper courtyard walls are generally constructed with large rough faced and bossed blocks (Figure 3.16). The two different masonry types in the rectangular space of the gatehouse; bossed blocks and smooth cut stone blocks; point out two construction periods (Figure 3.17) (Edwards, 1983, p. 638). Small rubble stones were used together with these stones on the B fortification wall. The wall thickness is around 1.31 m in the H2 tower, between 1.34-1.36 m in the H3 tower, and around 2.25 m (1.50 m wall-walk and 0.75 m crenellations) in the F1 tower (Kenar, 2020). The chapel has different masonry types. Large rough-faced blocks in regular courses were used on the apse, small rubble stones with large rough-faced blocks on the nave, and roughly rectangular stones in regular courses on the inner walls (Figure 3.19). There are plaster remains on the inner walls. Cistern F2 and I4 have plastered inner walls. Cistern I4 has different construction technique and wall material than the other structures of the castle, so it is thought to be the only Byzantine structure in the castle (Edwards, 1983, p. 641). Brick was used in regular courses with mortar to complete and cover the bedrock (Figure 3.12). Smooth cut stones were used to construct the door jambs, niches, windows, embrasures.

Figure 3.15. Inner side of the C wall (2020, October 20th)

Figure 3.16. View of the walls of the gatehouse (2020, October 20th)

Figure 3.17. Southwestern wall of the rectangular space of the gatehouse (2020, October 20th)

Figure 3.18. Mortar decorated with brick pieces on the gatehouse wall (2020, October 20th)

Figure 3.19. View of the walls of the chapel (2020, October 20th)

The spanning elements of the castle consist of arch, vault and dome types out of limestone. Smooth cut stones were used in the arches. There are two types of arch: relieving arch with a segmented lintel and pointed arch. Relieving arches are located at the H gate (main gate), and C gate (collapsed outer arch). Pointed arches are located at the main gate as an outer arch, the north side of rectangular space of the gatehouse, and the interior side of embrasures. Smooth and rough cut stones were used in the vaults. The vault types existing in the castle are barrel vault with depressed, semi-circular and pointed profiles, and groin vault. The barrel vaults with depressed profile are located at the A gate (collapsed arch), interior side of the C gate, the main gate, and the doorways of the towers, cistern F2, and room F5. The barrel vault at the cistern I4 has semi-circular profile (Figure 3.12). The vaults with pointed profile are located at the main cistern (F2), F4, G1, H2 and H3 towers, room F5 (Figure 3.11), and the chapel. The vault at the chapel has collapsed. C1, F3 and G2 towers also have vaults, but their profile could not be observed. The groined vault is located at the rectangular space of the gatehouse (Figure 3.20). There are square shaped openings above some vaults: e.g., in cistern F2, room F5 and first floor of H2 tower. A partially collapsed dome is seen at the cistern at the north of the room H1 (Edwards, 1983, p. 634). Apse of the chapel has a semi-dome with a cornice that has a cavetto string-course on the springing level (Figure 3.22) (Youngs, 1965, p. 133; Edwards, 1982, p. 171).

Figure 3.20. View of the groined vault in the gatehouse (2020, October 20th)

Figure 3.21. View of the apse of the chapel (2020, October 20th)

Gates, slot machicolations, door openings, embrasures, windows, wall-walks, stairs, niches, a corbel, water pipes and carvings are architectural elements of the castle. There are three entrance gates (A, C and H) and a postern gate (G) in the castle. A, C and H gates are double leafed (Edwards, 1983, p. 631, 634). The gate C and H is a tripartite unit that consists of an outer arch, a slot machicolation and an inner arch, unlike gate A (Figure 3.23 & Figure 3.24) (Youngs, 1965, pp. 127, 129; Edwards, 1983, pp. 631, 634). The postern gate, crowned with a monolithic lintel, is juxtaposed by G1 and G2 towers. The exit from this gate was provided with a ladder (Edwards, 1983, p. 642). The gates were secured by cross-bars at the inner sides, except gate A (Figure 3.22). The entrances of the towers, cistern F2 and room F5 are provided by door openings that have rectangular profile externally and depressed profile internally. Cistern I4 has rectangular door opening with no jambs. Room H1 has a door opening crowned with a monolithic lintel whose lower surface is rounded. The doorways of the F3, H2 and H3 towers, room F5 have remains of doors that were double leafed and out of timber (Edwards, 1983, pp. 639, 642, 644). There are two types of embrasure: V shaped, and embrasures that have pointed profile internally and semicircular crowned loophole externally. V shaped embrasures are located in F4 tower and the fortification wall between F4 and F5. The other type of embrasure is located in the tower rooms at the upper coutyard and the fortification walls (Figure 3.26) (D and F walls). There are three types of window: rectangular, round-headed, and with depressed profile at the interior and rectangular profile at the exterior. Rectangular windows are located in room F5, H1, and F3, H2 towers. The chapel has a round-headed window (Figure 3.21). H3

tower has a window that has depressed profile internally and rectangular profile externally. Wall-walks are located along the C, D and F walls of the castle (Figure 3.25). They crowned with two types of crenellation: with rectangular merlons, and with pyramidal-topped merlons that have holes for shooting (Figure 3.26). Due to the loss of upper parts of the A, B and E walls, the existence of the wall-walks is uncertain. Stairs are used to access to wall-walks, tower rooms and cisterns. Some of them flank the wall-walks (next to the F3 tower) and castle walls (at the gatehouse) (Figure 3.25). The others are located in front of and in the G1 tower; in the C1, D1, E1, H2 and H3 towers and cistern F2 and I4. There are three types of niche. The first that has a rectangular hole with a chute in the floor was used as a toilet or to pour hot oil (Youngs, 1965, p. 127; Buyruk, 2011, p. 109). They are located on the D and E walls, in the southwest of the F3 tower, and in the G1 and H3 towers. The second type is round-headed niches that are located in the chapel (Figure 3.21). The other is a square niche on the fortification wall in the east of the H3 tower. A corbel is located on the eastern wall of the H2 tower. The rooms H1 and I2 have the remains of water pipes. There are four carvings out of limestone: one of them (cross figure) on the center block of the segmented lintel, the others (figure of a king between lions) on the three central voussoirs of the relieving arch of the main gate (H) (Figure 3.24) (Edwards, 1983, pp. 634-635; Youngs, 1965, p. 130).

Figure 3.22. View of gate A from the east (2020, October 20th)

Figure 3.23. View of gate C from the east (2020, October 20th)

Figure 3.24. View of tripartite units and carvings of the main gate (2020, October 20th)

Figure 3.25. View of the F fortification wall with wall-walk and stairs attached to it (2020, October 20th)

Figure 3.26. View of the embrasures and crenellations with pyramidal-topped merlons of the northern part of the castle (G1, G2 towers and room F5) (2020, October 20th)

3.1.5. Conservation Activities

In this section, the conservation activities regarding the Yılan Castle are presented under the titles of research, projects and implementation.

3.1.5.1. Research

Yılan Castle has been subject to scientific research since the late 1930s, leading to information in form of drawings and photos (Edwards, 1983, p. 628)[11]. In 1988, April 15, the site was listed as 1st degree archaeological site by Adana Regional Council for Conservation with the decision numbered 6 (Figure B.1 & Figure B.2). Archaeological excavation of the castle was carried out within the scope of the restoration project between 2014, May 18 and 2015, January. This study was under the control of Adana Archaeology Museum and Adana Directorate of Surveying and Monuments (Regional Council for Conservation, 2020).

3.1.5.2. Projects

There are two projects for the castle site. The first is Adana Ceyhan Yılankale restoration and environmental design project[12]. The project was prepared by Sayka Architecture & Construction Ltd. with its team[13]. The second is Yılan Castle environmental design project. It was prepared by Dor Restoration Ind. Trade. Co. Ltd in 2018, but the project has not been implemented yet[14].

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[11] There are six important researchers: J. Gottwald, J. Thomson, G. R. Youngs (1965), W. Müller-Wiener, H. Hellenkemper, and R. W. Edwards (1983) (Edwards, 1983, p. 628).

[12] The project was approved by Adana Regional Council for Conservation on October 31, 2007. It's contract was signed on December 30, 2013. The construction date was between January 2, 2014 and February 22, 2016. Provisional admission was on September 27, 2016 (KTB, 2019c).

[13] The team consisted of architect Saadet Sayın as project manager, architects Özgür Genca, Gürem F. Özbayar, Zeynep Kutlu, and restoration technician Evren Atlı. The collaborators were P-Delta Construction and Design led by civil engineer Hasan Ziya Çetin, and Kuzey Endüstriyel Dağcılık for the consolidation of I3 chapel. Atilla Eser Engineering & Consulting Co. Ltd. for the structural engineering, and Ali Çetin İdil for the examination of building materials were the other collaborators. The contractor was Delta Construction & Consultancy Ind. Trade. Co. Ltd. and the site manager was architect Mehmet Ali Cinoğlu. The client was Adana Special Provincial Administration. The responsible institutions were Adana Directorate of Surveying and Monuments, KVMGM, Adana Regional Council for Conservation (Regional Council for Conservation, 2020). Funding supplier was T.R. Ministry of Culture and Tourism. The budget was 1,709,545.49 TL (KTB, 2019c).

[14] The project team consisted of architect Kadri Cemiloğlu as project manager, architect Çağrı Öztürk, landscape architect Filiz Savatlı, civil engineer Adem Kütük, city planner Cüneyt K. Erginkaya, and archaeologist Adem Yıldız. The consultant was Kent İmar Consulting & Engineering Ind. Trade. Co. Ltd. The client was Adana Special Provincial Administration. The responsible institutions were Adana Directorate of Surveying and Monuments, KVMGM, Adana

3.1.5.3. Implementation

The interventions of addition, reintegration, reconstruction, consolidation, cleaning, and presentation were realized in the Yılankale restoration and environmental design project.

Addition: Element additions are observed in the castle. They are frames out of timber above the openings; e.g., the frames of the H3 tower, and the vaults of cistern F2 and room F5 (Figure 3.27).

Reintegration was carried out with construction technique and material with the authentic parts: at the upper parts of the fortification walls and crenellations, southwestern wall of the cistern I4, northern wall of the G2 tower (Regional Council for Conservation, 2020), parts of the arches and vaults such as pointed arch at the north side of the rectangular space of the gatehouse, inner vault of the main gate and gate C. Reintegration is also observed with the authentic construction technique, but with imitation stones in beige color, e.g., bossed stone blocks at the north of the H3 tower on the first floor, interior portions of the H2 and H3 towers, sourthern and western walls of the room F5, and southern wall of the G1 tower (Figure 3.28).

Figure 3.27. A cover above the opening on the vault of the cistern F2 (2020, October 20th)

Figure 3.28. Reintegration with imitation stones in the G1 tower (2020, October 20th)

Regional Council for Conservation (Regional Council for Conservation, 2020). Funding supplier was T.R. Ministry of Culture and Tourism (KTB, 2015b).

Reconstruction: The stones that have deteriorated and lost their load bearing capacity were dismantled and reconstructed with new material and the same construction technique: the outer arch of the main gate, and stones of the eastern first floor wall of the H2 tower (Regional Council for Conservation, 2020).

Consolidation: Cracks in the walls were filled with hydraulic lime mortar reinforced with araldite (Regional Council for Conservation, 2020). Chrome steel cramps were applied with araldite to the center block of the segmented lintel of the gate C and they were covered with beige colored mortar (Figure 3.29). Joints on the walls were cleaned and hydraulic lime mortar was used for grouting of joint discharge (Regional Council for Conservation, 2020). A temporary timber post was used to support the vault of the cistern I4 (Figure 3.12). For the consolidation of the chapel, a scaffolding that intended to be temporary was implemented (Figure B.5) (Regional Council for Conservation, 2020). The outer walls of the chapel were covered with steel mesh and steel cables, and the load was transmitted to the ground by two posts and steel cables (Figure 3.30). There are no intervention on the chapel walls. Hard capping that consisted of small irregular stones and mortar were applied on the top of the walls.

Figure 3.29. Usage of steel cramps on the stones of the gate C (2020, October 20th)

Figure 3.30. Consolidation of the chapel (2020, October 20th)

Cleaning of plant colonization on the walls, and the vegetation in the castle courtyards were carried out. Graffiti and black crust on the stone blocks were cleaned with micro sandblasting technique. Carbon deposit on the walls caused by vandalism (making a fire inside the castle rooms) were cleaned by scrubbing with dry (rubber) sponge (Regional Council for Conservation, 2020).

Presentation: Tourist facilities such as cafe/restaurant (*Yılankale Kale Park*), toilet and car park are provided at the entrance of the castle site (Figure 3.32). There is also a security building, but no security guard, so it is unserviceable (Figure 3.31). At this point, there is one trash can and information board in the castle. The board does not provide any information about the castle, but it gives information on the Conservation Law numbered 2863. The site can be accessed by car from an asphalt road. There is no public transportation. The ground of the entrance and a part of the visitor path are covered with slate stones (Figure 3.32 & Figure 3.33). After this part, the path consists of loose gravel and massive rocks, so the visitor path cannot be followed easily (Figure 3.34). Along the path, an electric transformer and electric poles violate the aesthetic requirements (Figure 3.35). There is no lighting equipment inside the castle. Visitor paths paved with basalt stone, timber viewing platforms with timber railings overlooking the Ceyhan plain positioned along the path, timber benches, and metal lighting poles were designed in the Yılan Castle environmental design project. Steel stairs covered with timber alternating with basalt stone were designed for reaching the gates A and C, but all of these have not been realized yet.

Figure 3.31. View of the entrance to the site and security point (2020, October 20th)

Figure 3.32. View of the cafe and parking area (2020, October 20th)

Figure 3.33. View of the path to the castle (2020, October 20th)

Figure 3.34. View of the unpaved path (2020, October 20th)

Figure 3.35. The electric transformer and poles along the path (2020, October 20th)

3.1.6. Evaluation

Values and conservation problems before and after the current interventions are analyzed in this section.

3.1.6.1. Values and Problems, Before Interventions

The cultural landscape of Ceyhan - Yılankale region has integrity with its natural elements and cultural assets. The natural elements are Yılankale Hill with unique flora and fauna, Kokar spring water, Ceyhan river and the limestone outcrops in the plain. The cultural assets are the castle, Kokartepe Necropolis, Sirkeli Mound, Misis ancient city, and ruins of earlier settlements in the Yılankale village including a Byzantine church (Figure B.6 & Figure B.7) (Seton-Williams, 1954, p. 173). The castle is a symbolic monument crowning its hilltop in a picturesque site with views of these cultural and natural assets, but the quarries threaten its silhouette. The castle site was located on the strategic roads that connect the Central Anatolia with south and east (Figure A.1). So, Yılankale is part of the mountain castles network in Çukurova region. It is connection with Anavarza and Tumlu Castles. Its conspicuous location and architectural design arouse curiosity for exploration.

The castle site documents the social, economic and technical aspects of Byzantine Empire, Armenian Kingdom of Cilicia and Crusaders military culture. Due to the location of the castle in an isolated place, authentic characteristics such as site - castle relation and castle spatial layout have been preserved.

Yılan Castle has preserved its characteristics as a Medieval defense structure. As one of the representatives of this period, it has age value. Different construction techniques and material, and the reliefs on the gatehouse document the repairs of the castle in different periods. The castle is authentic in terms of its size and form, space organization, design mentality, plan layout, accessibility, architectural elements, construction technique and material. The reliefs of the figure of a king between lions and the cross figure have sustained their artistic value considerably, but they are in a poor condition due to weathering. The castle has been associated with several legends; e.g., Shahmaran myth (Şimşek, 2019, pp. 28-30). So, it has memory value.

Location of the site in the tectonically active area, presence of active faults by the site, fractured bedrock of the Yılankale Hill and erosion have given way to structural problems in the site whole. The active quarries in Kokartepe have caused structural failures in the Yılan Castle and Kokartepe Necropolis. There are also accessibility

problems in the site due to the lack of public transportation. The narrow road on the hillside was also a limitation in its accessibility.

The castle ruin was abandoned since the 14th century. There were accessibility and safety problems for climbing up and walking around the castle due to the lack of a visitor path, dense vegetation on the hillside, and statically unstable bedrock and the wall parts of the castle. Prior to the current restoration, service facilities for the visitors such as a cafe and toilet were provided, but they are incompatible aesthetically with the castle ruin. Also, the electric poles and an electric transformer that were located along the path were not suitable for the presentation of the castle. There was lack of lighting equipment, security point, trash cans and information boards.

The accessibility and safety problems continued in the castle due to dense vegetation in the courtyards, unstable massive rocks which blocked the entrances and unstable wall portions. The castle had structural problems stemming from the movements on the ground, cracks on the bedrock, soil erosion and weathering: collapse or partial loss of some wall portions, out of plumbness, displacement, cracks on the walls and vaults. It also had material deterioration caused by weathering, rain penetration, rising damp and vandalism: loss of material, joint discharge, detachment (delamination, bursting, fragmentation), cracks on the limestone blocks, plant colonization, discoloration and encrustation, black crust, carbon deposit and graffiti on the walls (Regional Council for Conservation, 2020). The castle was not presented before the implementation of its restoration project. There was no visitor path, lighting equipment, information board and trash cans in the castle.

3.1.6.2. Values and Problems, After Interventions

The integrity of the cultural landscape of the site with cultural and natural assets is under threat and has started to damage in time due to the lack of scientific researches and conservation activities, quarries, vandalism such as illegal excavations, and exposure to weathering conditions (Figure B.6 & Figure B.7). For these reasons, Yılan Castle should be thought as a whole with its surrounding cultural assets and the archaeological site borders should be extended. The castle continues to crown the

hilltop, but surrounding quarries have negative effect on the picturesque view. Also, the current interventions in the castle gave way to loss of harmony of the ruins with their natural setting. The castle preserves its strategic position due to its location and is still on the important roads such as the current Adana-Ceyhan highway that was constructed in the mid-1960s, following the Medieval road that was controlled by Yılan Castle (Edwards, 1983, p. 629). The castle preserves the characteristics of the castle building type in the mountain castles network in Çukurova region. Also, after the restoration project, cultural tourism potential of these mountain castles may lead up to a cultural castle route. The castle sustains its symbolic importance in the landscape, and the project increases curiosity for exploration of the site.

The castle site continues to document the social, economic and technical aspects of the past military cultures. The authentic site - castle relation and castle spatial layout are sustained in the site.

Yılan Castle sustains limited characteristics as a Medieval defense structure due to the current implementations such as the imitative reintegration and reconstruction of some parts of the castle. Remains and traces of the past repairs of the castle in different periods can be observed in the castle via different construction technique and material, and the reliefs. The authentic castle size and form, space organization, design mentality, plan layout, access style to the castle are sustained except facade form, architectural elements, construction technique and spanning elements due to the reintegration and reconstruction of some parts of the castle with undistinguishable material. The reliefs sustain their artistic values. The legends associated to the castle continue to be told and arouse curiosity about the castle.

The potential threats of earthquake, fractured bedrock, soil erosion, and damages caused by the quarry in Kokartepe continue in the site. Regional Council for Conservation recommended that the quarry should be shut down and this situation should be done under the supervision of the Ministry (Figure B.3), but this decision could not be performed (Regional Council for Conservation, 2020). In the restoration, no implementation was made to solve the accessibility problem of the castle site.

The castle site is open to public and it is used as like an open-air museum, but the current restoration project is inadequate for this. The accessibility and safety problems continue. Access to the castle is dangerous due to its location on a very steep outcrop with slippery skirts. A visitor path and precautions for life safety such as railings are absent, but unstable wall portions were consolidated and dense vegetation

on the hillside were cleaned. Parking area was provided at the entrance of the castle site. Service facilities such as trash cans, information boards, security point and lighting equipment are inadequate in terms of being few in number, useless and unaesthetic. A cafe, toilets and illumination were not considered during the restoration.

Dense vegetation in the courtyards were cleaned, but they are still obstacle for walking around and entering some structures in the courtyards because of the lack of regular maintenance (Figure 3.36 & Figure 3.37). Rocks and demolished stone blocks are the other obstacles for accessibility. The unstable massive rocks still threaten both life safety of visitors and the structures of the castle. Conservation activities in the castle were carried out unsystematically. For example, consolidation and reinforcement was carried out mostly in the upper courtyard, but especially the D and E walls still have important structural problems. Some structures and damaged wall portions were consolidated, but new injection materials and steel cramps may damage the authentic stones. The precautions against rising damp are useless: e.g., covers above the openings. Also, there are no conservation activities for the authentic plasters. Hard capping was applied on the top of the walls unsystematically: there is no capping on some wall portions of D and E walls. Reintegration of the walls gave way to aesthetic problems stemming from the color differences between the new mortar and stones, and the authentic ones (Figure 3.38). Cleaning activities for plant colonization, black crust, graffiti and carbon deposit were carried out, but the usage of the micro blasting technique may damage the authentic stones (Westminster City Council, 1995, pp. 17-18; Alves & Sanjurjo-Sànchez, 2015, pp. 417-418). As a result of insufficient monitoring, people continue to write on the walls, make fire in the courtyards and throw trash around (Figure 3.39). The castle is not presented.

Figure 3.36. View of the middle courtyard (2020, October 20th)

Figure 3.37. View of the upper courtyard and the gatehouse from the north (2020, October 20th)

Figure 3.38. Color differences on the wall of H3 tower (2020, October 20th)

Figure 3.39. Burning of vegetation in the upper courtyard (2020, October 20th)

3.2. Feke (Vahga) Castle

Feke (Vahga) Castle, which is the second of the case studies, is presented in this section.

3.2.1. Geographic Characteristics

Feke Castle is located in Sülemişli neighbourhood known as old Feke village of Feke district, Adana (Salman, 2007, p. 132). Old Feke village is located on the hillside in the southwest of the castle, and has remains of Byzantine settlement and a Byzantine church named as *Kara Kilise* (Figure 3.40) (Edwards, 1983, pp. 602, 604, 606; Dunbar & Boal, 1964, p. 176). The castle is 6 km northeast of Feke, 29 km southwest of Saimbeyli, 56 km northeast of Kozan and 122 km northeast of Adana (Akpolat, 2008, pp. 1, 4; Buyruk, 2011, p. 247). Also, Feke is covered with Yahyalı and Develi districts of Kayseri in the northwest. It is located in the mountainous Cilicia (*Kilikia Trakheia*) and on a strategic position on Kozan-Kayseri-Cappadocia caravan route that connects the north and south (Buyruk, 2011, pp. 247, 248). The castle is within the sight of Maran Castle which is 22 km in its west (Edwards, 1983, p. 602; Buyruk, 2013, p. 48). Feke Castle may also be in connection with Andıl Castle which is in the southwest (Edwards, 1983, p. 602).

Figure 3.40. Satellite images of the site of Feke Castle
(Base map source: Google Earth; date of image: 14.07.2018, access date:14.12.2020)

Feke is located on a rough terrain in the Central Taurus mountain range. It is 620 m above the sea level (Feke D. G., 2019a). Hacılar, Tahtafırlatan and Feke mountains cover the district (Figure 3.41) (Eken et al., 2006, p. 457). The high slope of the land causes landslides. It contains the Göksu river that is one of the main branches of the Seyhan river, and its branch, Asmaca stream with the deep valleys they formed (Eken et al., 2006, pp. 456-457; Feke D. G., 2019a). The castle is situated on a very steep limestone outcrop between Sürüngeç and Harlıkçal hills (Figure 3.43). The hill rises in the north-south direction, and overlooks the Göksu river on the east and south, and the valleys (Figure 3.42). The highest point of it is 1170 m above the sea level (Buyruk, 2011, p. 247).

Figure 3.41. Physical map of Feke
(Source: Eken et al., 2006, p. 457)

Figure 3.42. View of the surrounding with old Feke village from the castle (2020, October 21st)

Figure 3.43. View of Feke Castle from the west (2020, October 21st)

Feke is located on the *Geyik Dağı* unit that was deposited between Paleozoic Era (Cambrian epoch) and Senozoic Era (Eocene epoch, Paleogene period) (Özgül, 1976, pp. 67, 69). Sedimentary rocks were formed at the site (Figure 3.44)[15]. Feke is one of the important centers where the ore mining activities has been operated since ancient times (Salman, 2007, p. 130)[16]. The site is located in the fourth degree earthquake zone (Akın, 2007, p. 12).

[15] The soil around the castle site consists of clastics and carbonate rocks from Devonian and Permian periods of Paleozoic Era, and neritic limestone from Middle Jurassic-Cretaceous periods of Mesozoic Era (MTA, 2002; Özgül, 1976, pp. 69, 70, 73).

[16] For example, there are iron, glass, lignite and barite mines, etc. in this region (Eken et al., 2006, p. 456; Taş, 2009, pp.52-53; MEU, 2020, p. 128; Feke D. G., 2019b).

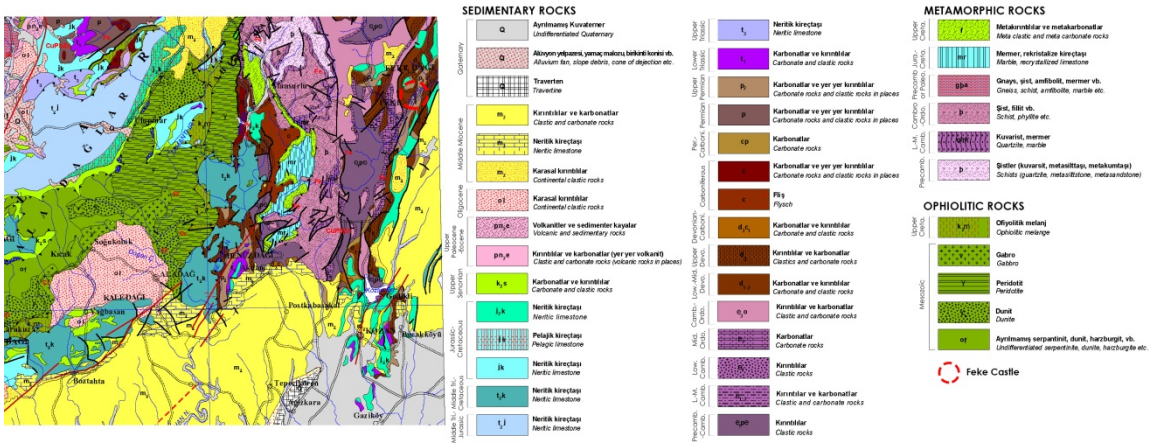

Figure 3.44. Geological map of Adana-Feke (Base map source: MTA, 2002)

Feke is located in the Göksu river basin, which is a sub-basin of Seyhan river basin (Karaosmanoğlu & Günek, 2018, p. 602). It is located between the banks of the Göksu river and Asmaca stream. A number of dams, regulators, hydroelectric power plants (*HES*) and ponds have been designed and constructed (Karaosmanoğlu & Günek, 2018, pp. 602-604; MEU, 2020, pp. 54-55)[17]. Göksu river is famous for whitewater tourism: rafting and canoe drifting (KTB, 2013b).

Although the site is located in the Mediterranean region, continental climate dominates Feke due to the mountains stretching parallel to the sea (Feke D. G., 2019a)[18]. The flora of the hill where the castle is located consists of coniferous trees, maquis and bushes except the rocky zones (Figure 3.43 & Figure 3.46)[19]. There are rarely agricultural lands in the west of the castle (Figure 3.45). Feke has also rich and diverse fauna, especially in terms of bird species (MEU, 2020, pp. 108-109, 112).

[17] The flow rate of the Göksu river is high in all seasons (Feke D. G., 2019a). The fractured and faulted tectonic structure of land with high inclination comprehends rivers with hydraulic energy potential.

[18] Summers are semi-arid and cool, winters are cold, snowy and rainy. For this reason, Feke is an important location for tableland tourism. Suitable temperature and high rainfall give way to growth of rich and dense vegetation (Feke D. G., 2019a).

[19] The flora of Feke and surrounding of the site consists of coniferous trees such as calabrian pine, black pine, juniper and cedar; broad-leaved trees such as kermes oak, hornbeam and plane trees; and maquis (Feke D. G., 2019a; Eken et al., 2006, p. 456). There are also seven endangered endemic plant species (Eken et al., 2006, pp. 456-457).

Figure 3.45. View of the western side of the castle from the lower courtyard (2020, October 21st)

Figure 3.46. Southern view from the castle (2020, October 21st)

3.2.2. Historic Background

The original function of Feke Castle was observation and defense along Kozan-Kayseri-Cappadocia caravan route together with a number of defense structures[20] (Figure A.1) (Edwards, 1983, p. 602; Salman, 2007, pp. 130-131). Feke Castle was constructed to control the caravan route and the valley below during the Byzantine period (965 AD - 11th c. AD) (Boase et al., 1978, p. 20; Edwards, 1983, p. 607).

Feke Castle is located in Cilicia like Yılan Castle[21]. Until 1098, the castle was ruled by the Byzantine Empire. Then, Constantine I who is the son of Roupen I conquered the castle (Edwards, 1983, p. 602). Feke was the residence of the princes and capital of Roupenian dynasty until the reign of King Levon I (1198/99-1219). Then onwards, the principality evolved into the Armenian Kingdom of Cilicia (Kalloshyan, 2014, p. 3; Dunbar & Boal, 1964, p. 175). The castle was the earliest defense structure of the Armenians in Cilicia and played role in the establishment of the kingdom (Dunbar & Boal, 1964, p. 175; Edwards, 1983, p. 602). In 1137, the castle was besieged by the Byzantine Emperor John II Comnenus, but as a result of the siege, they could not take the castle. The best warriors of the Armenians and Byzantines fought and as a result of the victory of the Roman warrior, the castle was given to the Byzantine Empire. Construction and repair works were carried out during this reign (Regional

[20] These are such as Kozan (Sis), Andıl, Maran, etc Castles.
[21] See section 3.2.2

Council for Conservation, 2020). In 1139, the castle was taken by Muhammed ibn Gazi, the Danishmend emir. At the beginning of 1145, Feke Castle was taken back by Thoros II, son of Levon I (1129/1130-1137), and he used the castle as an epicenter in the conquest of lower Cilicia (Boase et al., 1978, pp. 11, 12, 20, 184; Edwards, 1983, pp. 602-603; Dunbar & Boal, 1964, p. 175). The castle was restored and reconstructed during his reign, and it is thought that the present buildings in the castle are mostly from his reign (Boase et al., 1978, p. 20; Dunbar & Boal, 1964, p. 184). The Memluk attacks continued in the site in between 1262 and 1375. Feke came under the domination of Memluk Empire (Gökhan, 2012, pp. 103-105; Sağır, 2014, p. 202; Kalloshyan, 2014, p. 5-6). It came under the domination of Ramadanid Principality which was in connection with the Memluks, in 1378 (Özmen, 2000, p. 204; Buyruk, 2013, p. 48). Feke came under the domination of Ottoman Empire in 1517, during the reign of Yavuz Sultan Selim (Özmen, 2000, p. 205). During the domination of Memluk and Ottoman Empires, repair works were carried out (Regional Council for Conservation, 2020). Old Feke village housed Armenians until 1927 (Boase et al., 1978, p. 184; Dunbar & Boal, 1964, p. 176). In 1943, the castle and village were abandoned and the population moved to a new settlement on the plane: Feke district (Buyruk, 2011, p. 249). At the beginning of the 21st century, repair works were carried out at the points which were evaluated as dangerous for visitors' safety, some by the Ministry and some by the residents of Feke (Regional Council for Conservation, 2020).

The old Feke village has a population of 357 according to the 2019 general census of population data (TÜİK, 2019). It has remains of the Byzantine Empire (Edwards, 1983, pp. 602, 604, 606; Dunbar & Boal, 1964, p. 176). Its church (*Kara Kilise*) was constructed between 5th - 6th century in the early years of the Byzantine Empire (Figure B.9). It was known as the monastery of Kastaławn (or *Gasdaghôn*) in 11th - 12th centuries during the reign of Armenians (Feke D. G., 2015; Dunbar & Boal, 1964, p. 176).

Figure 3.47. Old Feke village and the castle in the 1910s
(Source: Feke D. G., 2016)

Figure 3.48. View of Feke Castle from the west in 1974 (Source: Christianian, 2019a)

3.2.3. Morphologic Characteristics

Feke Castle has an irregular spatial layout with a long longitudinal axis along north-south direction. It covers an area around 4000 m^2, and is 187 m long and 30 m wide (Dunbar & Boal, 1964, p. 176). The northern and southern parts of the castle are narrow, and the middle part is wider. Its organic walls used to enclose the northern, western and southern sides of the castle continuously. The wall remains integrate with the natural bedrock in the eastern side. Steep cliff surrounds the eastern and northern facade and the altitude decreases progressively from the north to the south. The only access to the castle is provided from the entrance in the southwest, due to its accessible location (Dunbar & Boal, 1964, p. 176; Edwards, 1983, p. 607). The castle consists of two courtyards with square and semi-circular planned towers, two gatehouses, two cisterns, vaulted chambers whose function is not known and one toilet (Figure 3.53).

The lower courtyard is enclosed by a fortification wall and outer gatehouse (B) at the west, an entrance platform (A) and a cistern (C) at the southwest, an entrance passage attached to a fortification wall at the south, a semi-circular tower (D) at the southeast, bedrock below a transition space (E) at the east, and the walls of room F at the north (Figure 3.53). The outer gatehouse was constructed as a L planned entrance for defensive purpose. The entrance was made more complex by attaching the entrance passage to the gatehouse in the castle. The gatehouse is rectangular in plan; it narrows towards the south (Figure 3.54). It had two stories originally (Dunbar & Boal, 1964, p.

177). The entrance platform is flanked by a fortification wall in the west, which is 1.47-1.48 m wide (Kenar, 2020). The cistern C is a partly underground structure constructed by carving into the bedrock (Edwards, 1983, p. 609; Dunbar & Boal, 1964, p. 177). The entrance passage that is irregular in plan provides access to the castle by directing it towards the east from the gatehouse. Its width is between 2.10-2.40 m (Kenar, 2020). The E and F (the wider) are transition spaces providing access to the upper courtyard. There are wall remains in the western and eastern sides of the room E (Dunbar & Boal, 1964, p. 179).

The upper courtyard has the principal structures of the castle (Dunbar & Boal, 1964, p. 176). These are the inner gatehouse (G), cistern H, structures adjacent to the west fortification wall (I, R, S and T towers; rooms J, L, M, N, O and P) and room K (Figure 3.53). The massive and tall fortification wall in the west has about 14 m of height (Dunbar & Boal, 1964, p. 181). The inner gatehouse has two stories with a mezzanine floor and a flat roof. It is pentagonal shaped in plan (Figure 3.55) (Dunbar & Boal, 1964, p. 179; Buyruk, 2011, p. 257). The eastern wall of the building is completely demolished (Figure 3.50). The ground floor was used as a transition space leading towards the east from the south. The first floor was used for different purposes. The room at the north of the first floor was used as a bathroom. It is assumed that the entrance to the first floor was provided through stairs from the northeast corner, but there are no traces (Buyruk, 2011, pp. 256-257; Dunbar & Boal, 1964, p. 180). Cistern H is partly rock-cut structure that is multi-angular planned with a square shaped pier in the center. There are remains of rock-cut channels in the west of the cistern (Dunbar & Boal, 1964, p. 182). Tower I is square in plan, while towers R, S and T are semi-circular planned. The rooms J, L, M, N, O and P juxtapose each other along the south-north direction. Between room M and N, there are remains of a toilet and a stairway, as observed on the western wall (Dunbar & Boal, 1964, p. 182; Edwards, 1983, p. 614). The room P was divided into two parts by a wall that is 0.80-0.81 m in width (Kenar, 2020). The room K is located at the highest portion of the castle that is approximately 1270 m above the sea level (Edwards, 1983, p. 607). It is almost rectangular shaped at the exterior and circular shaped in plan at the interior. It is mostly demolished, but it must have had at least two stories in the original. The function of this room is unknown. In the north of the room K, there are remains of a semi-circular tower (Dunbar & Boal, 1964, p. 182; Edwards, 1983, p. 613). Before the current interventions, Feke Castle was partially in need of repair and in ruin. While the western wall of the upper courtyard

was in a good condition compared to the other parts of the castle, most of the structures were partially or completely under the earth and debris (Figure 3.47 & Figure 3.48). So, their perception in the third dimension has become difficult, especially in the middle and upper parts of the site (Figure 3.49, 3.50, 3.51 & Figure 3.52).

Figure 3.49. South facade of the inner gatehouse, 1981
(Source: Christianian, 2019b)

Figure 3.50. East facade of the inner gatehouse, 1981
(Source: Christianian, 2019b)

Figure 3.51. View of tower I and adjacent spaces from the south, 1974
(Source: Christianian, 2019a)

Figure 3.52. View of the room P from the southeast, 1981
(Source: Christianian, 2019b)

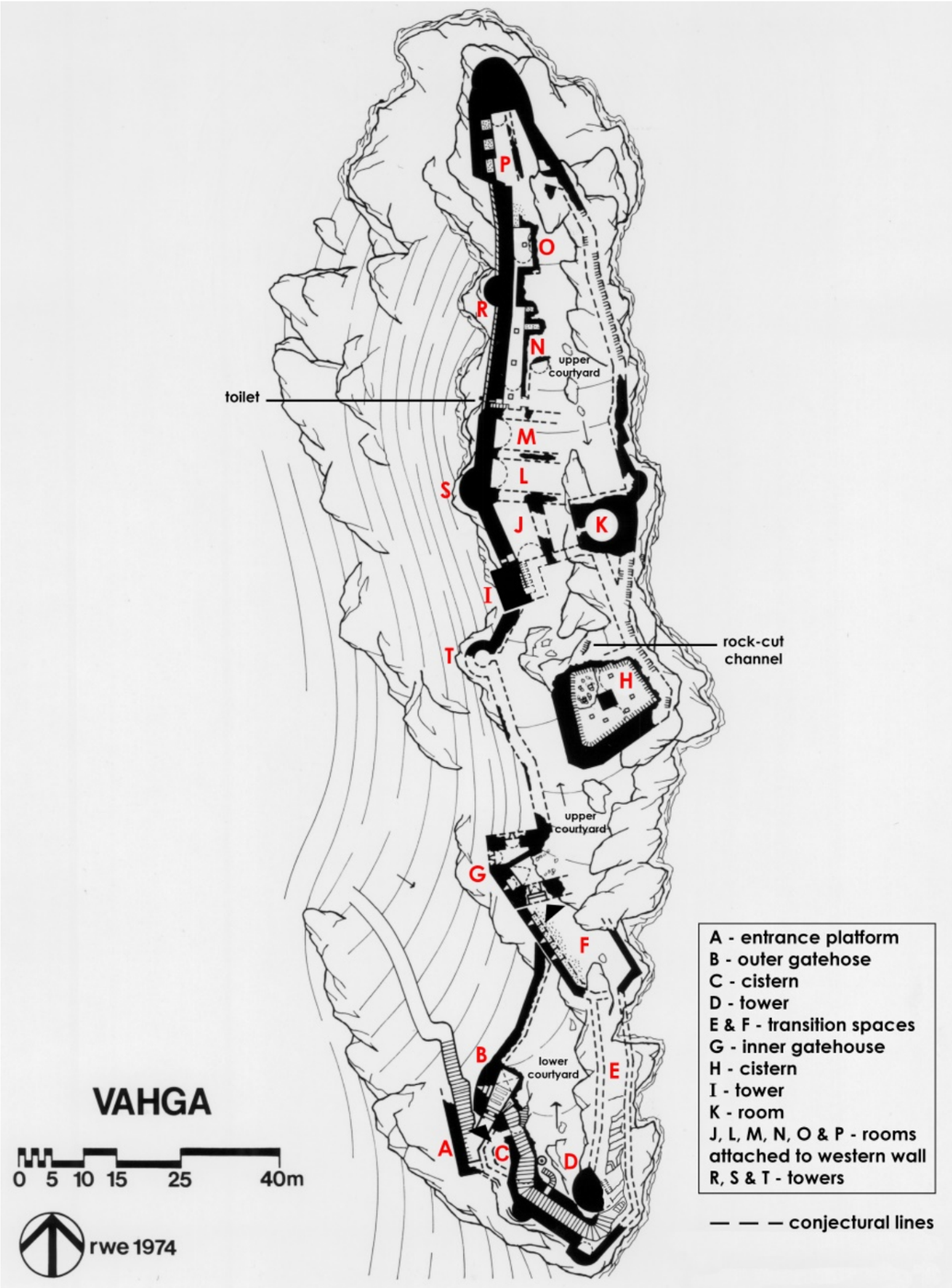

Figure 3.53. Plan of Feke Castle
(revised from Edwards, 1983, p. 601, and Dunbar & Boal, 1964, see Figure 3.62)

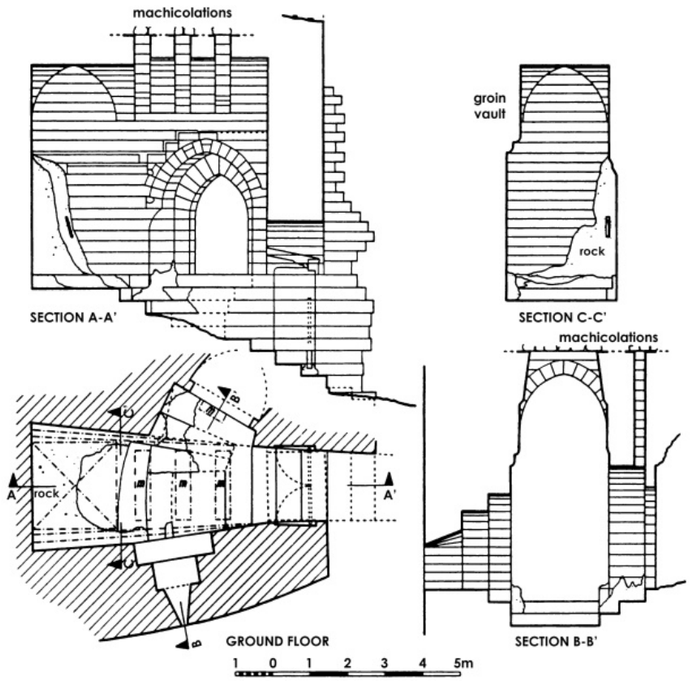

Figure 3.54. Drawings of the outer gatehose (Source: Dunbar & Boal, 1964, p. 178)

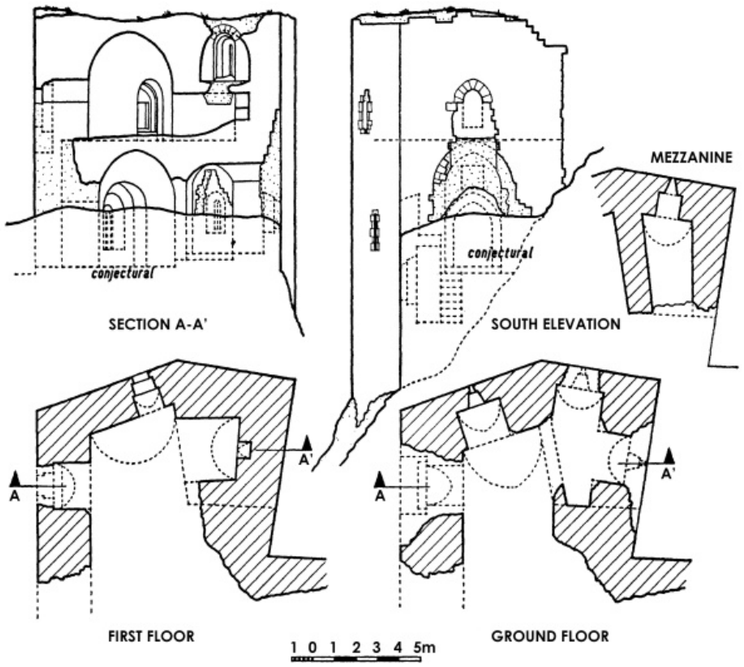

Figure 3.55. Drawings of the inner gatehose (Source: Dunbar & Boal, 1964, p. 180)

3.2.4. Construction Technique and Material Usage

The walls were constructed with the technique of mortared rubble stone core and cut stone facing (Figure 3.60). The style is generally isodomic coursed cut stones (Nossov, 2009, p. 14). Smooth rectangular cut stones and bossed stone blocks were used together disorderly. There are mason's marks on the some stones (Dunbar & Boal, 1964, p. 177). The wall material is mainly limestone, but travertine (in the inner gatehouse, room M and P) and sandstone (in room N) are also observed in the castle. While limestones present the rock characteristics of the surrounding of Tekedağ, travertines are from the northwest of Ceyhan. Hydraulic lime mortar with rubble stone and brick pieces was used in the castle (Regional Council for Conservation, 2020). The castle is supported by buttresses and the towers that act like buttresses: e.g., R, S, T and I towers (Dunbar & Boal, 1964, pp. 181-182). While the wall thickness of the lower courtyard is between 2.25-2.30 m, the thickness is between 1.87-1.89 m in the upper courtyard, except the eastern wall of the room F that is 1.00 m in width (Kenar, 2020). The wall thickness of the west fortification wall between room M and P decreases by 0.75 m at the upper levels (Figure 3.61) (Regional Council for Conservation, 2020). Style of masonry of the tower D is uncoursed smooth cut stones (Figure 3.56) (Nossov, 2009, p. 14). The inner gatehouse is the only building in the castle that was fully constructed with porous and brown colored limestone of the quoins (Figure 3.57 & Figure 3.70) (Dunbar & Boal, 1964, p. 179). This type of stone was used at the gate, windows, embrasures and some portions of the vault of the building. The deliberate use of these different colored stones is seen also in the voussoirs of the main gate in the outer gatehouse (Figure 3.69). The interior walls of the inner gatehouse consist of both small and large cut stones and roughly rectangular stones in regular courses. The west fortification wall between the inner gatehouse and the tower T, which is mostly in ruins today, consists of small roughly rectangular stones reinforced with horizontal timber tie beams (Figure 3.58) (Dunbar & Boal, 1964, p. 181). This masonry is also seen at the north part of the eastern wall of the room N, and the eastern wall of the passage between room N and O (Figure 3.68). The exterior walls of the cistern H consist of smooth cut stones and bossed stones in regular courses with large square stone blocks which are two courses in height and placed irregularly (Figure 3.59). There are plaster remains with brick pieces on the inner walls and the vault. Brick pieces were also used to fill the

cracks of the bedrock which was used as a wall in the cistern to provide impermeability (Regional Council for Conservation, 2020). Like cistern H, cistern C and room K have plastered inner walls.

Based upon different construction techniques, materials, and joint alignments, some historians such as Dunbar, Boal and Edwars determined the periods of the buildings in the castle. According to them, tower D, the west fortification wall between the inner gatehouse and tower T, some part of the eastern wall of the room N, and the eastern wall of the passage between the rooms N and O were constructed during the first settlement of the Byzantines in the castle before the mid-12th century (Figure 3.62) (Dunbar & Boal, 1964, pp. 179, 181-183; Edwards, 1983, pp. 610, 612, 616). The inner gatehouse was completely reconstructed during the reign of the Byzantine Emperor John II Comnenus in the 12th century (Regional Council for Conservation, 2020). Edwards claimed that this building was reconstructed by Armenians, and the transition space (F) was built shortly after the inner gatehouse (Edwards, 1983, p. 611). During the reign of Thoros II, the castle was enlarged, and the southern part of the castle that consists of the entrance platform, outer gatehouse, entrance passage and the lower courtyard were constructed in this period (Edwards, 1983, pp. 608, 610-611). Edwards claimed that the west fortification wall from the room P through tower I was constructed in this period (Edwards, 1983, p. 611). Some parts of the walls were repaired during the periods of Memluks and Ottomans (Regional Council for Conservation, 2020).

Figure 3.56. Tower D from the lower courtyard (2020, October 21st)

Figure 3.57. Western facades of the inner gatehouse and room F (2020, October 21st)

Figure 3.58. Tower T and the wall between it and tower I
(2020, October 21st)

Figure 3.59. Cistern H from the south
(2020, October 21st)

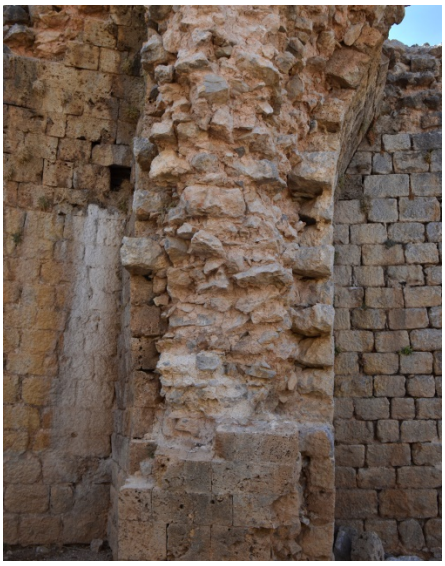

Figure 3.60. View of the construction technique of a wall (2020, October 21st)

Figure 3.61. View of the western wall with towers R and S, 1981
(Source: Christianian, 2019b)

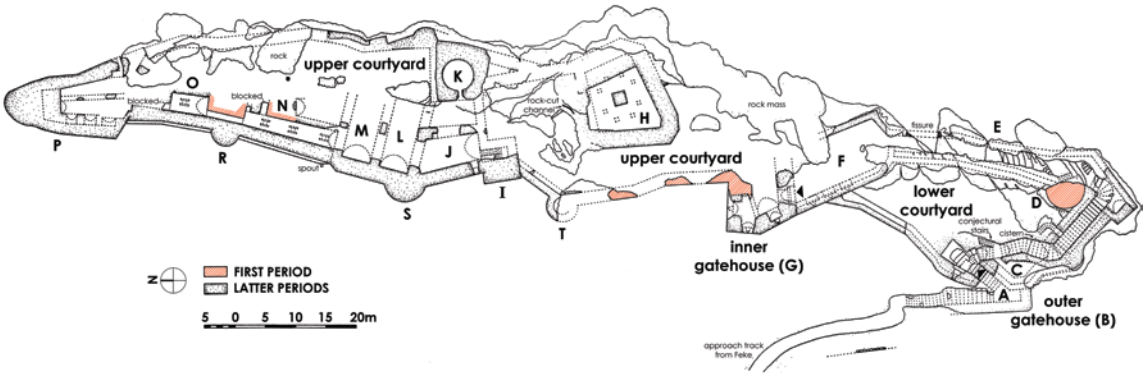

Figure 3.62. Ground floor plan of the castle (Base map source: Dunbar & Boal, 1964)

The spanning elements of Feke Castle consist of arch and vault types out of limestone. Cut stones were used to construct these elements. There are semi-circular and pointed arches in the castle. The semi-circular arches are located at the interior side of the embrasures of the outer gatehouse, the room F and the inner gatehouse, and in the first floor of the inner gatehouse. The pointed arch that spans 2.75-2.76 m is located on the opening between the outer gatehouse and the entrance passage (Figure 3.64) (Kenar, 2020). There are also remains of arches located above the gate and the window of the inner gatehouse and at the interior side of window next to the tower I. They were probably pointed arches (Dunbar & Boal, 1964, pp. 179-181). There are two types of vaults in the castle: barrel vault with pointed, semi-circular and segmental profiles, and groin vault. The barrel vaults with pointed profile are located in the southern part and above the gate of the outer gatehouse, at the inner gatehouse, above the blocked entrance at the end of the room O as half-vault, and above the niches of the room P (Figure 3.63 & Figure 3.65). The barrel vaults with semi-circular profile are located at the cistern C, along the entrance passage continuously, in partially demolished state; at the passage (0.85 m in width) between the rooms N and O as a half-vault, at room O (Figure 3.68) (Kenar, 2020). The barrel vaults with segmental profile are located around the central pier continuously in the cistern H (partly demolished), and at the room N (Figure 3.66 & Figure 3.68). The groin vault is located in the northern part of the outer gatehouse (Figure 3.63). There are also remains of vaults at the southeast of the entrance passage, on the walls (1.35 m in width) between the rooms J and K, at the rooms J, L, M and P, and next to the room N (Figure 3.67) (Dunbar & Boal, 1964, pp. 179, 181, 183; Edwards, 1983, pp. 610, 613-615; Kenar, 2020). Some of the vaults have square shaped

openings above them: e.g., at the cisterns C and H, the entrance passage, and rooms N, O and P (Edwards, 1983, pp. 609-610). Most of the vaults were supported with timber joists at the springing level and joist holes can be observed in the cistern C, the entrance passage, the first floor of the inner gatehouse, rooms J, L, M, N and O (Dunbar & Boal, 1964, p. 177).

Figure 3.63. The ceiling of the outer gatehouse (2020, October 21st)

Figure 3.64. View of the entrance passage (2020, October 21st)

Figure 3.65. View of the inner gatehouse from the east (2020, October 21st)

Figure 3.66. View of the vault of the cistern H (2020, October 21st)

Figure 3.67. Vault remains along the western wall in the upper courtyard (2020, October 21st)

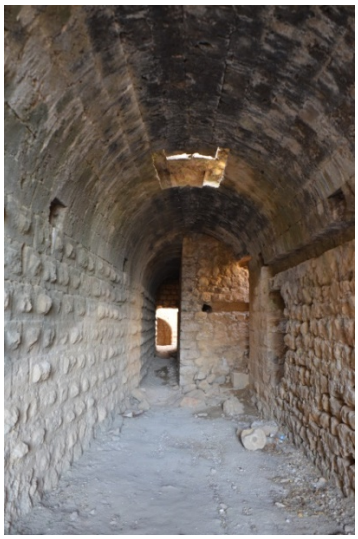

Figure 3.68. View from inside of the room N through room O (2020, October 21st)

Gates, machicolations, door openings, embrasures, windows, wall-walks, stairs and niches are architectural elements of the castle. There are two entrance gates: main gate in the outer gatehouse, and the inner gatehouse. The main gate, which is reached by stairs from the entrance platform, is L planned and 1.82 m in width (Figure 3.69) (Kenar, 2020). It was double leafed and out of timber (Dunbar & Boal, 1964, p. 177; Edwards, 1983, p. 609). The other gate that is 2.09 m in width was a tripartite unit with slot machicolation between outer and inner arches, but the gate is mostly ruined and only its remains can be observed (Figure 3.70) (Dunbar & Boal, 1964, p. 180; Edwards, 1983, pp. 610-611; Kenar, 2020). The barrel vault of the outer gatehouse and the arch at the entrance of the passage were pierced by machicolations (Figure 3.63 & Figure 3.71) (Dunbar & Boal, 1964, p. 178). Today, debris blocks the machicolations in the outer gatehouse due to the ruined the upper floor. In the southestern wall of the cistern H, there is a rectangular door opening, which is 0.64 m in width and continues through the wall thickness (2.67 m), with no jambs. Another rectangular door opening that is 1.12 m in width is located on the northern wall of the room O (Kenar, 2020). Other door openings were mostly damaged and blocked by debris. There are remains in the entrance passage that provide access to the lower courtyard (0.80 m in width), on the western wall of room K (0.61 m in width), on the walls between the rooms (J, K, L, M and N) in the upper courtyard, on the eastern wall of the room N, at the north end of the

room O, and on the wall that divides the room P into two part (Dunbar & Boal, 1964, pp. 178-179, 181-182; Kenar, 2020). There are two types of embrasures: the first that is graded into two semi-circular arches in the interior and has semi-circular crowned loophole in the exterior, and the second that has semi-circular profile in the interior and semi-circular crowned loophole in the exterior. The first type is located in the western wall of the outer gatehouse (Figure 3.72). The second type is located on the western wall of the room F and in the inner gatehouse. The embrasures in the room F and the ground floor of the inner gatehouse were mostly demolished. There are two types of windows: pointed-arched, and windows that have pointed profile internally and rectangular profile externally. The pointed-arched window above the entrance gate of the inner gatehouse is mostly ruined (Figure 3.70). The other windows are located in the first floor of the inner gatehouse and in the southwest of the room J (Figure 3.65). The inner side of the window in room J is demolished, but traces of the arch, and grille on the lower lintel can be observed. There is also a window remains in the eastern wall of the room P (Dunbar & Boal, 1964, p. 183). Wall-walks and crenellations are ruined in the castle. There are remains of wall-walks in the southwestern part of the castle (outer gatehouse and cistern C), on the western wall of the lower courtyard, and along the rooms from J to O in the upper courtyard (Dunbar & Boal, 1964, p. 179; Edwards, 1983, p. 613; Regional Council for Conservation, 2020). Stone stairs are located in the southwest of the castle that provide access to the entrance platform, in the outer gatehouse and the passage, from the inner gatehouse towards cistern H, in the northeast corner of room N (0.70 m in width), and between the rooms O and P (Kenar, 2020). There are also stone stair remains in the passage, in the eastern facade of tower I that provide access to the wall-walk of the western wall, in the western wall of room N, and in the eastern part of room P (Figure 3.74) (Dunbar & Boal, 1964, pp. 177-179, 181; Edwards, 1983, pp. 607-609, 613-614; Regional Council for Conservation, 2020). Beside the stone stairs, there are rock-cut steps. They are located in the transition space (E), and in the west of the room K (Figure 3.73). It is thought that there could have been wooden steps on the bedrock in E (Dunbar & Boal, 1964, p. 179). There are four types of niches: rectangular, round-headed, pointed vaulted, and L planned. The rectangular niche is located on the eastern wall of room J, as a remain (Dunbar & Boal, 1964, p. 181). The round-headed niche is located on the northern wall of the first floor of the inner gatehouse. The pointed vaulted niches are located on the western wall of the room P (Figure 3.75). L planned niches that have a rectangular hole in the floor were used as

toilets (Figure 3.76). They are located on the eastern wall of the room P (Regional Council for Conservation, 2020). There are remains of a niche that was used as a toilet in the southwest of the room N (Dunbar & Boal, 1964, p. 182; Edwards, 1983, p. 614).

Figure 3.69. Main gate of the castle (2020, October 21st)

Figure 3.70. South facade of the inner gatehouse (2020, October 21st)

Figure 3.71. View of the machicolation at the entrance of passage from bottom (left), and top (right) of the arch (2020, October 21st)

Figure 3.72. Embrasure in the outer gatehouse (2020, October 21st)

Figure 3.73. View of the transition space (E) from the north (2020, October 21st)

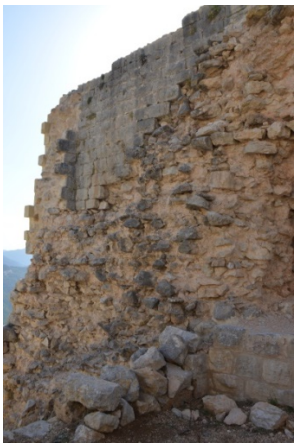

Figure 3.74. Remains of the stair by the tower I (2020, October 21st)

Figure 3.75. Western part of room P (2020, October 21st)

Figure 3.76. L planned niche from the eastern part of room P (2020, October 21st)

3.2.5. Conservation Activities

Conservation activities regarding the Feke Castle are analyzed in the below under the titles of research, projects and implementation.

3.2.5.1. Research

Feke Castle was listed as 1st degree archaeological site by Adana Regional Council for Conservation with the decision numbered 31, on May 6th, 1988 (Figure B.8 & Figure B.10). The conservation site borders were revised with the decision numbered 3164, on September 24th, 1998, and the decision numbered 5136, on June 30th, 2009 (Figure B.11). Some implementations were realized by the Ministry and the residents of Feke at the beginning of the 21st century: covering of the portion of the visitor path in front of the entrance platform in the southwest of the castle with slate stones, addition of an iron leaf to the main gate, repair of some wall portions of the outer gatehouse and the entrance platform, construction of parapet walls with the authentic stone blocks in the castle and cement between the cistern C and the entrance passage, at the eastern part of the transition spaces E and F, blocking of the gate of the inner gatehouse with construction of a wall in its opening by using authentic stone blocks and cement, and construction of stone stairs in the southeast corner of the inner gatehouse (Figure 3.77 & Figure 3.78) (Regional Council for Conservation, 2020). The archaeological excavation in the castle was carried out within the scope of the restoration project by Adana Archaeology Museum (KTB, 2019b; Regional Council for Conservation, 2020). KVMGM and Adana Directorate of Surveying and Monuments were responsible institutions for the excavation (Regional Council for Conservation, 2020).

Figure 3.77. The visitor path at the southwest of the castle (2020, October 21st)

Figure 3.78. The inner gatehouse before the current interventions (Source: Buyruk, 2011, p. 520)

3.2.5.2. Projects

In 2006, Adana-Feke Castle Surveying, Restitution and Restoration Project was prepared by BOAZ *Eski Eserler Koruma ve Mimarlık*[22].

3.2.5.3. Implementation

The interventions of addition, reintegration, removal, reconstruction, consolidation, cleaning, and presentation were realized in the restoration project of the castle.

Addition: There are element additions in the castle: I-shaped iron profiles assembled around the openings of the cistern C and room K; iron grilles in the opening of the cistern C, between the vault of the outer gatehouse and its iron door, in the window openings of the first floor of the inner gatehouse and room J; timber frames above the openings of vaults of the rooms N and O; and a lightning conductor that was placed in the northern part of the castle.

Reintegration was generally done to complete cut stone facings of the buildings in the castle. It was carried out with beige colored imitation stones and the authentic construction technique: at the upper parts of the outer gatehouse; interior and exterior facades of the entrance passage and the room K; exterior facades of the cistern C, the inner gatehouse, the cistern H, the towers I and S, some portions of the western

[22] The team of the project consisted of the architect restorer Bora Işık as project manager, architects Burhan Çiçek, Sezer Kaya, Tuğba Yazıcıoğlu, Dilge Aka and Çiğdem Yan, the technician Hüseyin Kavak, and the photogrammetry specialist Kemal Gülcen. The consultants were Assistant Professor Bekir Eskici for conservation and restoration, Assoc. Prof. Dr. Mustafa S. Akpolat as art historian, Murtaza Tan for statics, Assoc. Prof. Dr. Ali Akın Akyol, Assoc. Prof. Dr. Yusuf K. Kadıoğlu, Kürşat Demirel and Hilal Şen for the examination of building materials (Regional Council for Conservation, 2020). The contractor was Dirlik Construction and Advertisement Co. Ltd. and the site manager was archaeologist Adem Yıldız (Dirlik İnşaat, 2018). Bidding date was December 16th, 2013 (Dirlik İnşaat, n.d.). The construction date was between January 7th, 2014 and August 25th, 2016 (provisional admission) (Dirlik İnşaat, 2018). The clients were Adana Special Provincial Administration (the project in 2006) and Adana Directorate of Surveying and Monuments. The responsible institutions were KVMGM, Adana Regional Council for Conservation and Adana Directorate of Surveying and Monuments (Regional Council for Conservation, 2020). Funding supplier was the Ministry (KTB, 2015b). The budget was 1,593,789.03 TL (KTB, 2019b).

fortification wall; and the wall between the rooms J and K (Figure 3.79, 3.80 & Figure 3.84). Reintegration was carried out at the western facade of the tower D with the authentic large stone blocks together with small rubble stones (Figure 3.56).

Figure 3.79. West facade of the cistern C (2020, October 21st)

Figure 3.80. Upper level of the entrance passage (2020, October 21st)

Removal of the implementations belonging to the early 21st century was considered necessary because there were incompatible material usage, e.g. cement; and structural failures. In turn, visitors' safety was under risk (Regional Council for Conservation, 2020). They were completely removed at some places: walls between the cistern C and the entrance passage, in the eastern facade of the transition space (E), in the southern facade of the inner gatehouse, and stairs in the southeastern corner of the inner gatehouse. It was stated that only cement mortar would be removed at some points: on the walls of the entrance platform, outer gatehouse and entrance passage (Regional Council for Conservation, 2020). However, this intervention decision was not realized and the mortar can be still observed in related places.

Reconstruction was carried out with the authentic construction technique, but with new stones in beige color that imitated authentic stones: at the eastern walls of the transition space (E), embrasures in the ground floor of the inner gatehouse, and vaults and the wall between the rooms J and K that was attached to the northwestern corner of the room K (Figure 3.81, 3.82, 3.83 & Figure 3.84).

Figure 3.81. Eastern wall of the transition space (E) (2020, October 21st)

Figure 3.82. An embrasure of the inner gatehouse (2020, October 21st)

Figure 3.83. Reconstruction of a vault between the rooms J and K (Source: KMKD, n.d.)

Figure 3.84. Vaulted openings on the walls between the rooms J and K (2020, October 21st)

Consolidation: The joints of the walls were cleaned. Grouting with hydraulic lime mortar through which to provide strengthening of the discharged joints was considered. It was stated that minor cracks would be filled with ethyl silicate resin, and chrome steel cramps with araldite would be applied in the structural cracks (Regional Council for Conservation, 2020). However, there is no consistency in realization of this decision throughout the ruin: e.g., in the tower T, and walls between the tower T and the inner gatehouse that have serious structural problems, there is no intervention. Some flaking plasters on the inner walls of the cistern H were consolidated by attaching them to the wall with hydraulic lime mortar (Figure 3.86) (Regional Council for Conservation, 2020). Hard capping that consists of small rubble stones and hydraulic

lime mortar was applied on the top of the walls and some of the vertical surfaces, e.g., at the entrance of the outer gatehouse, upper parts of the entrance passage and the wall remains between the rooms L and M. It was also applied on the partly unearthed stairs at the east of the room P to protect it until latter excavations (Figure 3.85) (Regional Council for Conservation, 2020).

Cleaning of vegetation in the castle courtyards and the plant colonization on the walls was carried out. However, graffiti, black crust and carbon deposit on the walls were not cleaned. Debris and earth were removed, and some elements were revealed: wall, vault, door opening, embrasure remains in the upper courtyard; stairs in the inner gatehouse that leads to the cistern H, the room N, between the rooms O and P, and in the eastern part of the room P; vaulted niches and toilets in the room P; and openings on the vaults of the rooms N, O and P (Figure 3.85 & Figure 3.87).

Presentation: The castle is functioned as an open-air museum, but there is no intervention to present the castle. The board pointing to the path leading to the castle is certainly provided by an amateur with good will (Figure 3.88).

Figure 3.85. Unearthed stairs and an opening in room P (2020, October 21st)

Figure 3.86. Consolidation of plasters in the cistern H (2020, October 21st)

Figure 3.87. Unearthed stairs at the inner gatehouse (2020, October 21st)

Figure 3.88. The board that shows the path leads to the castle (2020, October 21st)

3.2.6. Evaluation

Values and conservation problems before and after the current interventions are determined in this section.

3.2.6.1. Values and Problems, Before Interventions

Feke district is located on the strategic roads that connect the north and south of Taurus, and has been used since 2000s BC (Figure A.1). So, Feke district and its environs have integrity with its movable and immovable cultural assets from different periods: e.g., ceramic pottery from Roman and Byzantine periods, mosaics; necropolises, Uğurlubağ (Hefkereyebakan), Maran, Güzpınarı (Kisenit) and Köleli Castles, Kaleyüzü Watch-tower, chapels and churches (Salman, 2007, pp. 130-154; Feke D. G., 2019b). Beside these cultural assets, Feke is an important place for the tableland and whitewater tourism. Feke Castle has integrity with the rural church (*Kara Kilise*) on its skirt in terms of historic usage (Figure B.9). Also, the castle ruins were in

harmony with the natural setting. Feke Castle is one of the members of the castle building group in Çukuova region. The castle is a symbolic monument crowning a focal hill which itself is a distinctive element within its natural setting. The hill provides a picturesque view of Göksu river and its valleys. So, the castle and its environs arouse interest and curiosity for exploration.

The castle site documents the social, economic and technical aspects of Byzantine, Armenian, Danishmend, Memluk, Ramadanid and Ottoman military cultures. Authentic site - castle relation and castle spatial layout are sustained. The isolated positioning of the castle helps sustaining of the spirit of the place.

Feke Castle has preserved its authentic characteristics as an example of the Byzantine military architecture between 10th - 11th centuries, so it has age value. The castle documents the alterations that were carried out by different civilizations through preservation of different construction techniques and material. Also, restoration approach of the early 21st century has been documented with the interventions in the castle. The castle is authentic in terms of facade form, space organization, design approach, plan layout, architectural elements, construction technique and material. However, the earth and debris hiding most of the structures of the castle hinder the perception of its authenticity. The castle is rare among the other castles in its region with its two distinctive characteristics: the existence of a vaulted passage with a staircase at the entrance[23], and unexistence of a chapel[24] (Akpolat, 2008, pp. 11, 13).

Accessibility problems in the site stem from the lack of public transportation and guidance.

The castle ruin has been abandoned since 1943. It was under threat of soil erosion. It suffered from strokes of lightning in almost every rain[25] (Regional Council for Conservation, 2020). There were accessibility and safety problems while climbing and touring due to the lack of a visitor path until reaching to the path that was covered with slate stones. So, climbing from a path consisting of loose gravel, collapsed stone blocks and rocks was a problem. Also, unstable wall parts and the lack of railings along with the path in the western of the castle were the other problems for visitors' safety.

[23] A similar example is present in Çandır Castle located in the north of Çandır neighbourhood in Mersin.
[24] Probably due to the existence of the church near the castle.
[25] This information was given by Feke district governorship, department of forestry and local people.

Before the current restoration, the castle was not presented, and service facilities for fulfilling visitor needs such as parking lot, cafe, toilet, etc. were not provided.

Feke Castle had accessibility and safety problems stemming from missing wall portions near the edges of the hill, unstable wall portions and covering with debris that gave way to slippery floors of the structures and courtyards (Figure 3.90). The castle had structural problems stemming from soil erosion and weathering: collapse or partial loss of some wall portions, out of plumbness and continuous vertical and diagonal cracks on the walls (Figure 3.89). There were also material deteriorations stemming from weathering, rising damp, rain penetration, the past implementations carried out with incompatible material such as cement, and vandalism[26]. The structures of the castle were covered partially or completely with debris, so the castle could not be completely conceived.

Figure 3.89. Tower T before the current restoration project
(Source: Buyruk, 2011, p. 523)

Figure 3.90. Tower S from the west, before the current restoration project
(Source: Buyruk, 2011, p. 527)

[26] The material deterioration may be listed as in the following: loss of material, erosion on the stone surfaces, joint discharge, cracks on the stone blocks, detachment on the stones and plasters, discoloration, encrustation, black crust, plant colonization, salt crystallization and graffiti on the walls.

3.2.6.2. Values and Problems, After Interventions

Feke sustains limited integrity with movable and immovable cultural assets due to the lack of the ground survey or archaeological excavations, conservation activities, and vandalism such as illegal excavations (Salman, 2007, p. 131). These cultural assets were started to be recorded and registered by Adana Governorship and Regional Council for Conservation within the scope of Adana province and its districts cultural inventory project (KTB, n.d.)[27]. Feke continues to be a tourist attraction with the tableland and whitewater tourism. Feke Castle sustains its integrity with *Kara Kilise* in terms of their positioning, and restoration approaches[28]. After the extensive reintegration during the current restoration project in the castle, harmony of the ruins with the natural setting was lost. The monument preserves the characteristics of the castle building type in Çukuova region. Since its cultural tourism potential has increased after the current restoration, it may become part of a cultural route including a series of castles in Çukurova. It continues to crown the hilltop in a picturesque site. Curiosity for exploring the landscape has increased after the restoration.

The castle site preserves the social, economic, technical and military aspects of the past civilizations and the remains of the different construction periods. Site - castle relation and castle spatial layout are sustained.

Feke Castle sustains the limited qualities of a 10th - 11th century structure from Byzantine period despite the extensive interventions of reintegration and reconstruction in the castle. It continues to represent different construction techniques and material from different periods. Some of the interventions from the early 21st century can be still observed in the castle[29]. The authentic castle size and form, space organization, design mentality and plan layout are preserved. However, authentic facade form, architectural elements, spanning elements, construction technique and material are lost due to the current interventions: extensive reintegration with new materials expecially at cistern C and H, entrance passage, room J and K, and tower S; with undistinguishable and imitative material such as in tower D; with unscientific methods that are not based upon historical research and traces at the buildings such as west facade of room K (Figure

[27] Inventories were published as books in 2007, 2008 and 2012.
[28] The same contractor was responsible of both restorations (Dirlik İnşaat, 2018, p. 5).
[29] These are non-reversible interventions made with incompatible material.

3.91 & Figure 3.92) (Buyruk, 2011, p. 259; Dunbar & Boal, 1964, p. 182; Regional Council for Conservation, 2020); and reconstruction using stone similar to the original at the some parts of the castle such as between the rooms J and K. Beside these interventions, most of the ruins that had lost their third dimension have been made legible by removing the earth and debris. The characteristics that possess the rarity value are sustained in the castle.

Figure 3.91. Room K before the current interventions
(Source: Buyruk, 2011, p. 524)

Figure 3.92. West facade of room K after the current interventions (2020, October 21st)

In the restoration, nothing is proposed for guiding public access to the site, and visitors can access the site only with their private vehicles.

The castle site is functioned as an open-air museum. However, related managerial measures are insufficient. For example, regular maintenance is not carried out: the visitor path that leads to the entrance platform has been already filled with stone pieces falling from the hill. This becomes a risk for visitors' safety, in addition to the potential structural problems in the castle. Service facilities such as parking lot, security point, toilet and trash cans, and presentation facilities such as information boards and illumination elements are not provided (Figure 3.88).

The restoration project did not focus on accessibility and safety problems. Consolidation, reinforcement and reintegration were implemented unsystematically in the castle. Therefore, missing and unstable wall portions, slippery floors caused by not completely cleaning debris continue to be threat for the structures and visitors' safety, especially at the lower and middle parts of the castle (Figure 3.94). Some structures that

have partial loss of material, and cracks on the walls were consolidated with the injection material, and reintegrated with new materials. However, there is no intervention at some points where consolidation is required: e.g. the walls between the inner gatehouse and tower I. Hard capping was applied on the top of the walls, some of the vertical surfaces, and even on the partly revealed stairs in the room P. Instead of covering with hard capping, stairs could be preserved by reburying. Due to the partly or completely demolished ceilings, the buildings are exposed to weathering, rising damp and rain penetration. Some of the past interventions with cement were removed to prevent damage to the authentic stones, but this was not done systematically. Also, iron additions that were applied during the current restoration may damage the authentic stones (Figure 3.93). Vegetation in the courtyards and plant colonization were cleaned, but due to the lack of regular maintenance, plant colonization continues to give way to material deteriorations. There are no cleaning activities for encrustation, black crust and graffiti (Figure 3.95 & Figure 3.96). The wholeness of the architectural unit is presented with removal of debris, structural consolidation, reintegration and reconstruction of missing parts. But, revealed stone blocks are not presented, they are accumulated in some places of the courtyards and rooms, becoming obstacles for circulation (Figure 3.97). Still presence of the equipment in the castle that were used during the restoration give way to an aesthetic problem for the presentation of the castle (Figure 3.95 & Figure 3.98).

Figure 3.93. Main gate from the interior of the outer gatehouse (2020, October 21st)

Figure 3.94. Missing wall portions of the west fortification wall (2020, October 21st)

Figure 3.95. Interior view of room O (2020, October 21st)

Figure 3.96. Vault of the room O (2020, October 21st)

Figure 3.97. View towards tower I and room K (2020, October 21st)

Figure 3.98. View from room P towards the south (2020, October 21st)

3.3. *Kızkalesi* (Maiden's Castle / Sea Castle), Korykos

Kızkalesi (Maiden's Castle / Sea Castle), the third of the case studies, is identified in this section.

3.3.1. Geographic Characteristics

*Kızkales*i is located in Kızkalesi neighbourhood of Erdemli district, Mersin. It is in the borders of the ancient city Korykos (*Corycus*) (Figure 3.99)[30]. The ancient city was located on the strategic coastal road and around a natural harbour that was important for Mediterranean trade (Edwards, 1983, p. 358; Ünal, 2000, p. 25). *Kızkalesi* is located on an island in the bay of the neighbourhood and the distance to the shore varies according to location, approximately 300-600 m (Aşkın & Durugönül, 2015, p. 130).

Figure 3.99. Satellite images of the site of Kızkalesi
(Base map source: Google Earth; date of image: 31.12.2016 (left), 1.3.2020 (right); access date: 25.01.2021)

Korykos is located in the mountainous Cilicia (*Kilikia Trakheia*) and at the foothills of Central Taurus mountain range where Karyağdı stream (*Şeytan deresi*) flows into the Mediterranean sea (Figure 3.99 & Figure 3.100). The city is between Göksu (*Kalykadnos*) river and Limonlu (*Lamos*) stream where this area constitutes Olba

[30] The city was located along the Mersin - Antalya highway, and 60 km in distance to Mersin, 25 km in distance to Silifke and 23 km in distance to Erdemli. Its borders extend to Ayaş (*Elaiussa Sebaste*) at the east, Heaven - Hell Caves (*Korykion Antron*) at the west, Hüseyinler at the north and Kızkalesi settlement with the coastline at the south (WHC, 2019; Aşkın & Durugönül, 2015, pp. 129-130).

Territorium (Aşkın & Durugönül, 2015, pp. 129-131). The access between the north and south was provided from the deep valleys of these three rivers. The coastline of the city is very narrow and is formed by small bays (Vandekerckhove, 2014, p. 39; Ünal, 2000, p. 29). The land castle is located next to the Mersin - Antalya highway and in the east of a bay that was ancient harbour of the city (Figure 3.101) (Vann, 1996, pp. 261, 264-265; Aşkın & Durugönül, 2015, pp. 129-130). *Kızkalesi* is located on a small rocky island floating off shore in the Mediterranean (Figure 3.102 & Figure 3.103).

Figure 3.100. View of the coastline of Kızkalesi settlement from the south (2020, October 23rd)

Figure 3.101. View of the land castle and ancient harbour from the west (2020, October 23rd)

Figure 3.102. View of *Kızkalesi* from the coastline (2020, October 23rd)

Figure 3.103. View of *Kızkalesi* from the north (2020, October 23rd)

Kızkalesi neighbourhood is located in the Miocene Mut Basin that covers an area extended to Karaman in the north, Gülnar and Silifke with the coastline in the south, Ermenek in the west and Gözne in the east (Gürler & Derman, 2017; İnan & İnan, n.d.). Mut Basin is a proposed geological heritage site and geopark (Gürler & Derman, 2017; UTMK, 2015)[31]. There are no tectonic movements that affect the site (Gürler & Derman, 2017).

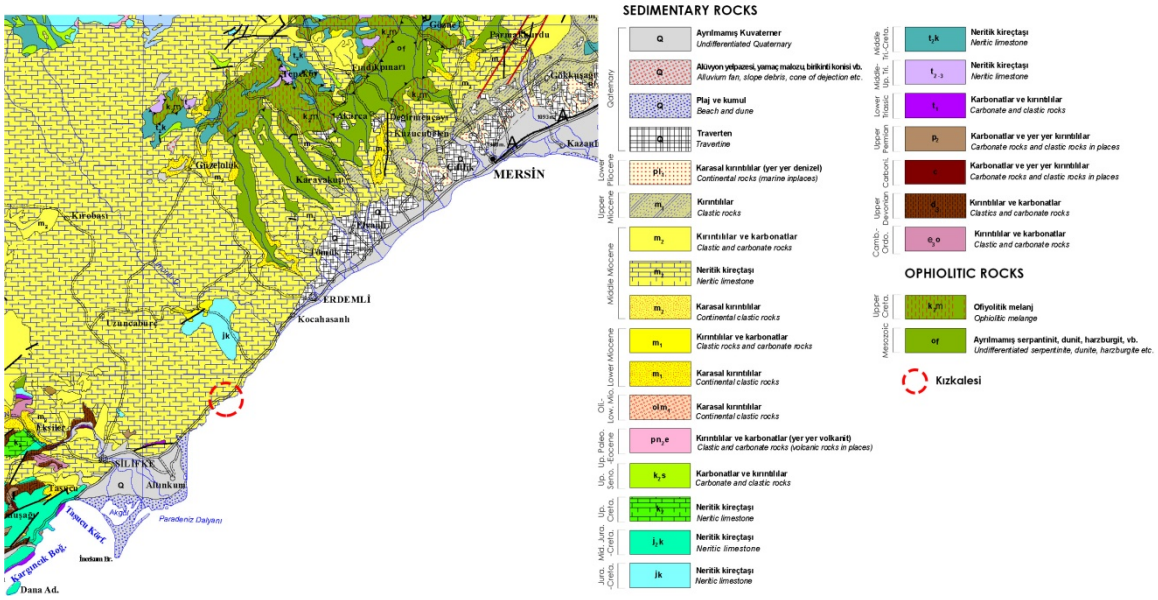

Figure 3.104. Geological map of Kızkalesi (Base map source: MTA, 2002)

Kızkalesi neighbourhood is located in Kızkalesi river basin that was formed by Karyağdı stream (Figure 3.105). In terms of basin size, Kızkalesi river basin is the fourth largest basin among the surrounding basins[32]. The deepest point of the valley of Karyağdı stream is *Şeytan deresi* canyon. Karyağdı stream is low branched, so its

[31] It comprises all kinds of geological formations such as fossil beds, sinkholes, caves, waterfalls, canyons, etc., and has geotourism potential due to also being rich in terms of historical and archaeological values, and biodiversity (İnan & İnan, n.d.; Gürler & Derman, 2017). The neighbourhood is located in Karaisalı (Mut) formation that was deposited in Middle Miocene period of Senozoic Era. The soil consists of neritic limestone from Middle Miocene period, and alluvial deposits from Quaternary period (Figure 3.104) (MTA, 2002; Yamiş, 2010, pp. 13-16, 27-28). The limestones are rigid, durable, off white or beige colored, and very fossiliferous with algae, coral, etc. due to having reefal characteristics (Yamiş, 2010, pp. 16-17, 26, 28).

[32] The other river basins are Limonlu, Alata, Kabızlı and Ayaş. The rivers in these basins run parallel to each other in narrow and deep valleys (Topuz, 2014). The water regimes of the streams are generally irregular (MEU, 2019, p. 18).

abrasive power is high (Topuz, 2014). Two beaches have the blue flag in the site: Kızkalesi beach and Kızkalesi Kilikya Hotel that are across the sea castle (MEU, 2019, p. 27).

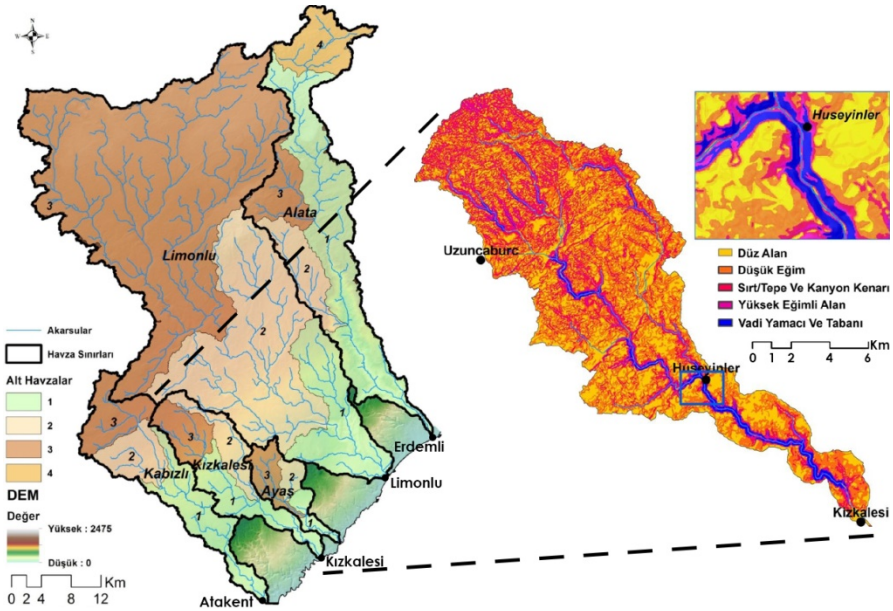

Figure 3.105. River basins with sub-basins between Silifke-Erdemli
(Source: Topuz, 2014, pp. 63, 90)

Subtropical climate that is characterized by hot and very humid summers, and warm and very rainy winters is seen in Kızkalesi (Erdemli Municipality, n.d.)[33]. There has been lack of land for agriculture due to the high slope and being under severe erosion since ancient times (Topuz, 2014, pp. 38-40). So, people constructed terraces out of limestone to get under control erosion and use the land for agriculture (Kapur et al., 2019, pp. 66, 73; Öcal et al., 1999, p. 10). In antiquity, olive, grape and grain cultivation contributed the economy of the city (Aşkın & Durugönül, 2015, p. 135; Öcal et al., 1999, pp. 9-10). It became an important center of olive oil and wine export especially during the Roman period (WHC, 2019). Strabo and Plinius mentioned that the best saffron (crocus) grows in Heaven - Hell Caves (Corycian cave) (Strabo, 7 BC/1929, p. 337; Pliny, 77/1856, p. 320). It is estimated that the name of the city derived from the name of Gorkos which means saffron in Greek (Sevgen, 1959, p. 224;

[33] Annual average temperature is between 20-23° C (Erdemli Municipality, n.d.).

Langlois, 1861, p. 197). Besides agriculture, fishing and other activities related to the sea were important in the city (Aşkın & Durugönül, 2015, p. 136). Terra rossa (red Mediterranean soil) constitutes the soil type of the region (Topuz, 2014, pp. 29, 31). Korykos has diverse flora[34]. Citrus orchards (especially lemon) and greenhouses are common today (Erdemli Municipality, n.d.). Palm trees exist along the coastline and there are few maquis in the courtyard of the sea castle (Figure 3.106) (Kenar, 2020). The fauna is also rich[35].

Figure 3.106. View of the courtyard of *Kızkalesi* from the southeast (2020, October 23rd)

[34] The flora consists of maquis such as olive, wild olive, kermes oak, sandalwood, mastic tree, myrtle, etc.; garrigue; and calabrian pine forests in the northern part of the city (Eken et al., 2006, p. 398; Öcal et al., 1999, pp. 8, 11). There are three endemic plant species: *Phlomis monocephala* (*topuz şalba*), *Scrophularia tricopoda* (*üç sıracaotu*) and *Alkanna aucherana* (Öcal et al., 1999, p. 11).

[35] It includes *acomys cilicicus (Silifke dikenli faresi)* which is an endangered mammal species, a significant number of bat species in Heaven - Hell and Asthma caves, *Eirenis aurolineatus (Bolkar yılanı)* which is unique to the Mediterranean biome, *Glaucopsyche alexis (Karagözlü mavi kelebek)* and *Melanargia titea (Akdeniz melikesi)* which are endangered butterfly species, and *Onychogomphus assimilis*, *Gomphus davidi* and *Coenagrion syriacum* which are endangered dragonfly species (Eken et al., 2006, p. 398-399).

3.3.2. Historic Background

The original function of *Kızkalesi* was pre-defense and observation in order to prevent attacks from the sea, protect the ancient city, and support the land castle in terms of defense. These two castles constituted a single defense system together (Figure 3.109) (Gürkan & Ünlü, 2003a, p. 69; WHC, 2019). Both of these castle were constructed at the beginning of the 12th century during the Byzantine period against possible attacks by the Crusader Bohemond I (Edwards, 1983, p. 358).

Korykos was founded in the Hellenistic period (4th century BC). According to Heredot, the city was founded by a Cypriot prince named as Gorkos (Aşkın & Durugönül, 2015, p. 131; Sevgen, 1959, p. 224). The city remained under dominance of several civilizations[36]. The city was enlarged during the Roman (2nd - 3rd century, and later in 4th century: the golden age) and Byzantine periods. It became an important harbour and trade center due to provide a trade network between Cyprus, Egypt and Rome (Figure 3.107) (Sevgen, 1959, p. 224; Vann, 1996, p. 260; Aşkın & Durugönül, 2015, pp. 136, 139; WHC, 2019).

Strabo mentioned that the island, where *Kızkalesi* is located, was used as a shelter by pirates during the Roman period (Strabo, 7 BC/1929, p. 241). Also, Texier and Strabo stated that King Archélaüs had constructed a royal palace on the island named as Elaussa (Strabo, 7 BC/1929, p. 337; Texier, 1862/2002, p. 479). According to Anna Comnena, who was the daughter of the emperor, the admiral Eustathius Kymineianos was sent to re-fortify Korykos on the orders of the Byzantine Emperor Alexios I Komnenos. It is thought that both the land and sea castles were constructed during this period (Edwards, 1983, p. 358). In 1099, the land castle was constructed by the architect Megas Drungarios Eustatias with the command of Emperor Alexion I. It was also used as an accommodation place by the pilgrims who had been travelling to the holy lands from İstanbul by sea (KTB, 2021b). Herzfeld and Guyer stated that *Kızkalesi* was constructed in 1104 (Herzfeld & Guyer, 1930, p. 92). The inscriptions in *Kızkalesi* shows that the castle was repaired in 1206 during the reign of King Levon I

[36] Seleucids (197 BC, during the reign of III. Antiochus - 79 BC), Romans (79 - 20 BC), Kingdom of Cappadocia (20 BC, during the reign of Arkhelaos - 72 AD), Romans (72 - 395 AD), Byzantines (395 AD - 6th century), Isaurians (479 AD - 7th century), Sasanians and later Arabs (7th century), Byzantines (9th - 12th century), Armenians (12th century - 1361), Kingdom of Cyprus (Lusignans) (1361 - 1448), Karamanids (1448, during the reign of İbrahim II - 1482), Ottomans (after 1482) (Langlois, 1861, pp. 198-213; KTB, 2021b; Herzfeld & Guyer, 1930, pp. 92-93).

(1198/99-1219), and in 1251, during the reign of King Hethum I (1227-1271) of the Armenian Kingdom of Cilicia (Herzfeld & Guyer, 1930, pp. 92, 164; Langlois, 1861, p. 215). During the Lusignan and Karamanid periods, the repair works were carried out in the castle (Lawrence, 1983, p. 180; Edwards, 1983, pp. 362-363; Sevgen, 1959, p. 225). After the conquest of Korykos by Ottomans in 1482, the city and the castles begun to lose their importance and became abandoned (Figure 3.108) (Herzfeld & Guyer, 1930, p. 93). Edwards mentioned that the northwest facade of the tower F was restored in the late 1950s (Edwards, 1983, p. 361). In 1966, repair works were carried out in the castle. In 1992, lighting elements were installed, and a transformer substation was constructed in the courtyard (Regional Council for Conservation, 2020).

Figure 3.107. Ancient harbours between Alanya and Mersin
(Base map source: Google Earth; date of image: 31.12.2016, access date: 25.01.2021; and generated from Vann, 1996, p. 266; Bilir, 2014)

Figure 3.108. View of the northeast fortification walls of *Kızkalesi*, 1973-1974
(Source: Christianian, 2019c)

3.3.3. Morphologic Characteristics

Kızkalesi was connected to the mainland by a breakwater that extended from the southwest corner of the land castle, but now it is on an island (Figure 3.109) (Langlois, 1861, p. 211). Only an 85 m long portion of the breakwater has been preserved; the rest is underwater (Vann, 1996, pp. 261-262). Beaufort claimed that there was a lighthouse on the breakwater (Beaufort, 1817, p. 233).

Figure 3.109. Engraving of the land and sea castles drawn by Langlois
(Source: Langlois, 1861, p. 206)

The castle integrates with the bedrock of the island. Some rocky areas had been left intact. The castle has polygonal plan. The southern (around 75 m long) and western walls (around 40 m long) are perpendicular to each other. The northern and eastern walls are irregular (Figure 3.110) (Herzfeld & Guyer, 1930, p. 161). The outer peripheral length of the castle is 192 m (KTB, 2021b). It has eight towers that are triangular (as buttress), square, semi-circular and circular planned. They represent the historic evolution of the monument. According to Edwards, while square towers were constructed by the Byzantines, semi-circular and circular towers were constructed by the Armenians. Each facade has a single entrance. The main entrance that is juxtaposed by the tower H is provided from the north through the tower I. The ground of the tower I consists of two platforms that have 0.48 m height difference between each other (Kenar, 2020). Due to the traces on the inner wall of the tower, it is claimed that there was probably a stone flooring at a higher level (Gürkan & Ünlü, 2003a, p. 77). The

tower F has three stories, and the others have two stories and flat roofs. During the Armenian Kingdom and in the late 1950s, the tower F was intervened (Edwards, 1983, pp. 359-361). There are two rooms attached to the northern wall of the tower F. The room remains flanking the southern and northeastern walls could have been used as rooms of servants or military post. The rectangular room remain that is located in the south of the tower G could had been used as a storage of weapons or food. A portico is located along the western wall, and partly along the northern and southern fortification walls. It is supported by the square piers (around 1.50 x 1.53 m). The width of the corridor between the piers and the western fortification wall is around 3.60-3.64 m (Kenar, 2020). In addition to these structures, the courtyard of the castle contains two chapels, six cisterns and reservoirs for collecting rainwater, workshops and a building complex that was probably used as a summer palace (Figure 3.111) (Regional Council for Conservation, 2020; Gürkan & Ünlü, 2003a). The chapels are located side by side in the east-west direction. They have a single rectangular nave terminated with semi-circular apse. Only foundation of the northern chapel that is located in the building complex is preserved. The chapel C at the south has plastered inner walls. Under the apse of this chapel, there is a crypt where privileged people were buried. Besides this tomb, there are many graves and skeletons dating to the late 19th - early 20th century in the castle courtyard. Cisterns and reservoirs have plastered walls. The cistern B, which is a rock-cut structure, has a rectangular plan. The building complex (around 25x42 m) and its chapel are dated to the Early Byzantine period: 5th and 6th century AD. The rooms are interconnected and most of them open to the central hall. The rooms around the central hall were used for administrative, residential and religious purposes. Mosaics and smooth cut limestones were used for floor coverings of the rooms. Compacted earth and gravel are the materials of the floor covering of the courtyard (Gürkan & Ünlü, 2003a). Before the current interventions, *Kızkalesi* was generally in need of repair, except most of the buildings in the courtyard.

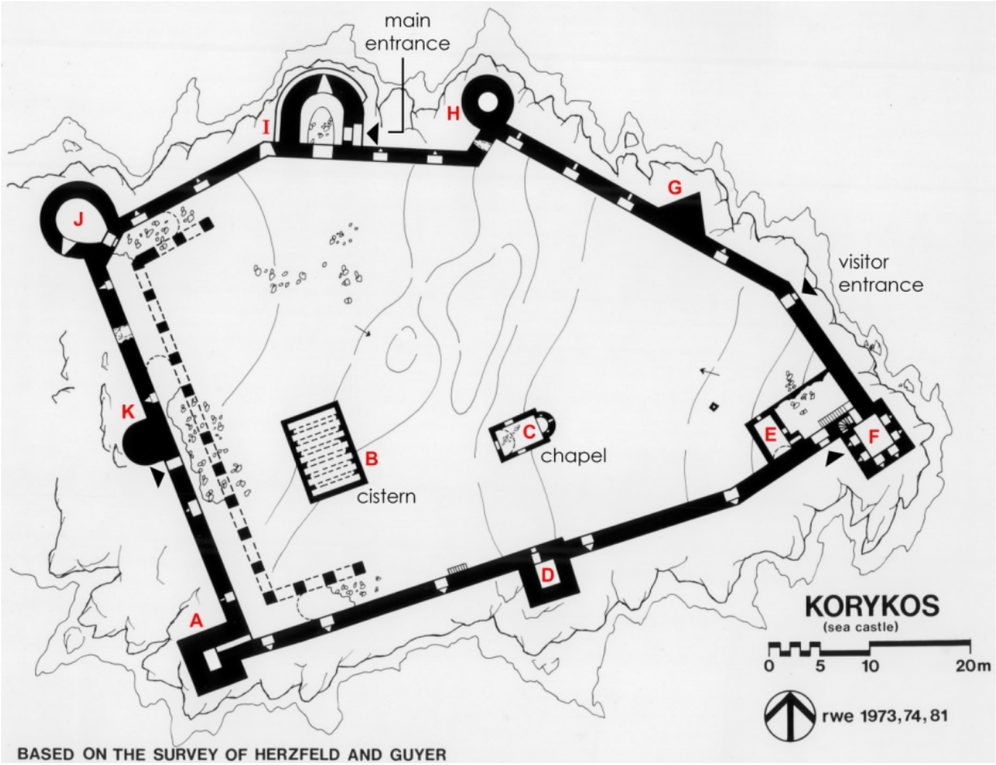

Figure 3.110. Ground floor plan of the castle drawn by Edwards
(Base drawing source: Edwards, 1983, p. 357)

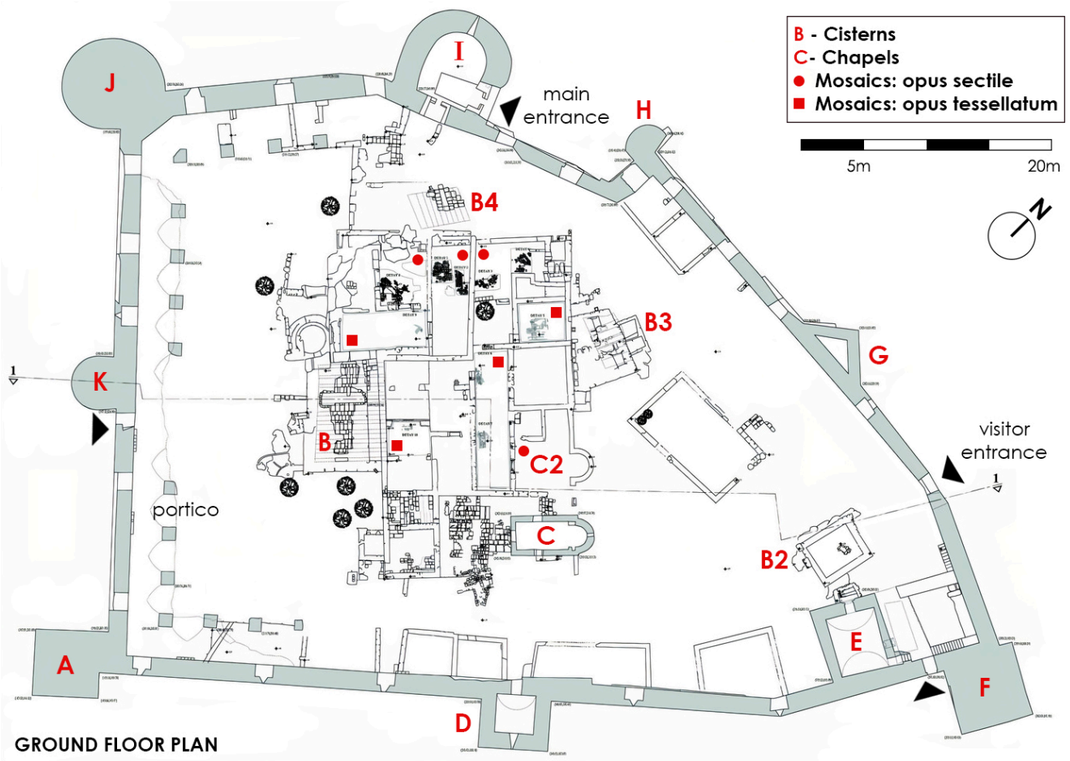

Figure 3.111. Ground floor plan of the castle (Source: Miyar Mimarlık Mühendislik, 2020)

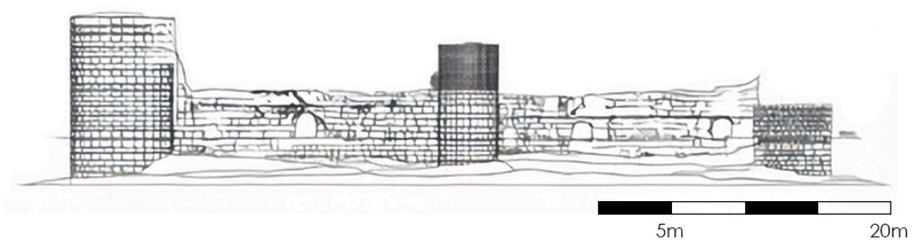

Figure 3.112. West elevation of the castle (Source: Miyar Mimarlık Mühendislik, 2020)

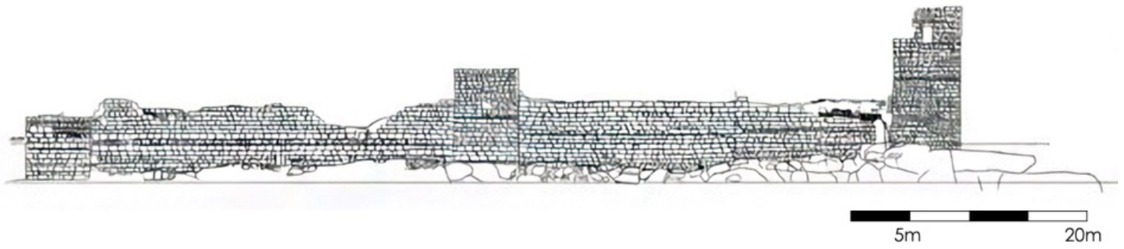

Figure 3.113. South elevation of the castle (Source: Miyar Mimarlık Mühendislik, 2020)

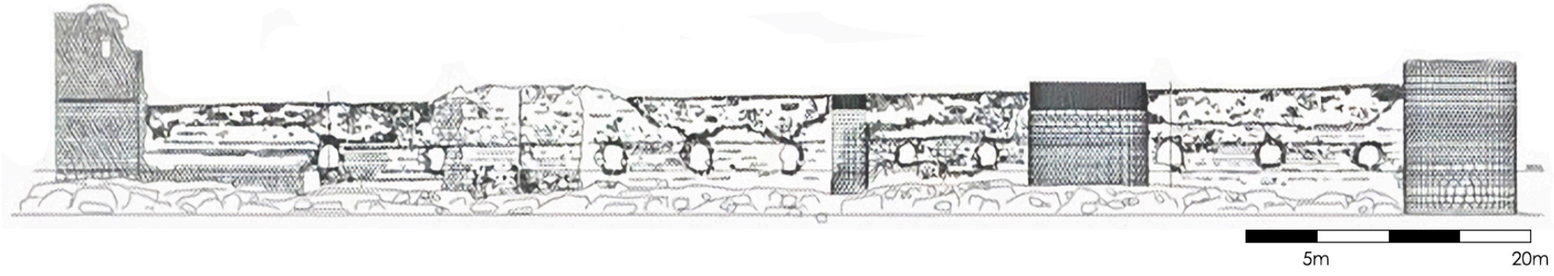

Figure 3.114. North elevation of the castle (Source: Miyar Mimarlık Mühendislik, 2020)

3.3.4. Construction Technique and Material Usage

The walls of the castle were constructed with the technique of mortared rubble stone core and cut stone facing. Hydraulic lime mortar was used with rubble stones and brick pieces. Style of masonry is generally isodomic coursed cut stones with header and stretcher courses (Nossov, 2009, p. 14). The wall material is limestone that was provided from the environs and island of the castle (Gürkan & Ünlü, 2003a, p. 76). Reused materials; smooth cut stone blocks, taken from the abandoned buildings of the Korykos ancient city were often used in the castle (Herzfeld & Guyer, 1930, pp. 92, 165; Edwards, 1983, p. 360). Besides these, limestone and marble column pieces were found during the excavations in 2001 (Gürkan & Ünlü, 2003a, p. 76). Limestone blocks are generally large and rectangular stones, and have both smooth and bossed faces (Figure 3.115 & Figure 3.116). Bossed stone blocks that are located especially in the northern and western walls were either quarried as new blocks or reshaped from the authentic blocks by the Armenians (Figure 3.117) (Edwards, 1983, p. 360). Besides these blocks, small rubble stones and roughly rectangular stones were used in both regular and irregular courses in the castle: at the some parts of the fortification walls and towers (D, H, I, J, K) (Figure 3.118). The places where these stones were used probably belong to the Lusignan period (Edwards, 1983, p. 360; KTB, 2021b). Walls of the building complex in the courtyard consist of the larger roughly rectangular stones in regular courses. The wall thickness is around 1.95 m in the tower F and the northern walls, 0.95 m in the tower D, between 2.13-2.19 m (0.95-0.98 m wall-walk and 1.15-1.24 m parapet wall) in the fortification wall between tower A and D, between 2.09-2.11 m in the western walls, and around 2.30 m in the tower J (Kenar, 2020).

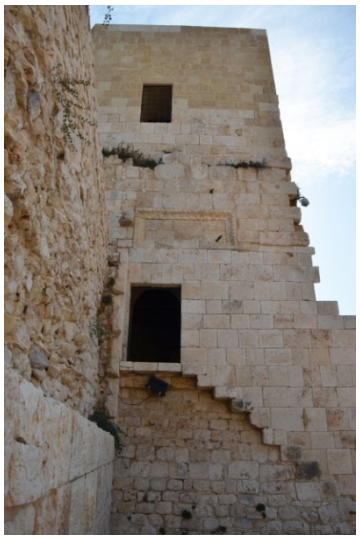

Figure 3.115. Northwest facade of the tower F (2020, October 23rd)

Figure 3.116. View of the northeast fortification walls from the courtyard (2020, October 23rd)

Figure 3.117. Western facade of the tower H (2020, October 23rd)

Figure 3.118. Southern facade of the tower K (2020, October 23rd)

The spanning elements of *Kızkalesi* consist of arch and vault types out of limestone. Smooth cut stones were used to construct arch and vault types. Roughly rectangular stones and rubble stones were also used in the vaults of the portico and the tower J. The arch types of the castle consist of pointed, flat and segmental arches. Pointed arches are located at the southern gate as an outer arch, and in the tower D and

K. Flat arch is located at the first floor entrance of the tower F (Figure 3.115). Segmental arches are located at the entrance of the room E and the western gate of the castle as an outer arch. The voussoirs of the arch at the room E interlock with each other (Figure 3.120). The vaults of the castle are with pointed, segmental, semi-circular profiles. The vaults with pointed profile are located above the southern and eastern gates of the castle; the windows of the western and eastern fortification walls; at the interior side of embrasures of the towers A, F, J and northern, southern and western fortification walls; at the tower D and F; and along the portico continuously (Figure 3.119 & Figure 3.121). The vault of the portico is partially plastered (Figure 3.122). The vaults with segmental profiles are located at the interior side of windows of the tower F and above the western gate of the castle. The vaults with semi-circular profiles are located at the cistern B, room E, tower I and J, above the crypt of the chapel C, above the windows of the western and northern fortification walls, the embrasures of the tower J and the gates of the tower I (including the main gate). There are also barrel vault remains at the intersection zone of the room E and tower F. Some of the vaults were supported with timber joists at the springing level in the tower F and I (Kenar, 2020).

Figure 3.119. Interior view of the first floor of the tower F (2020, October 23rd)

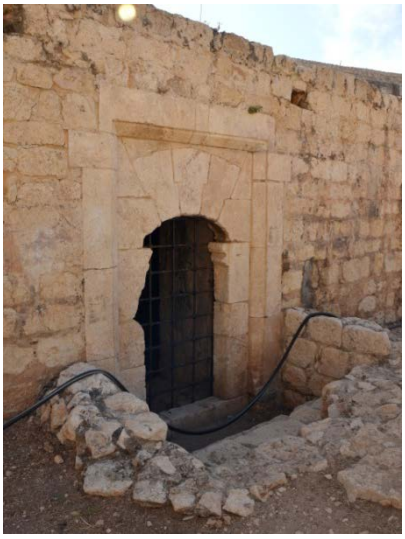

Figure 3.120. Door opening at the north facade of the room E (2020, October 23rd)

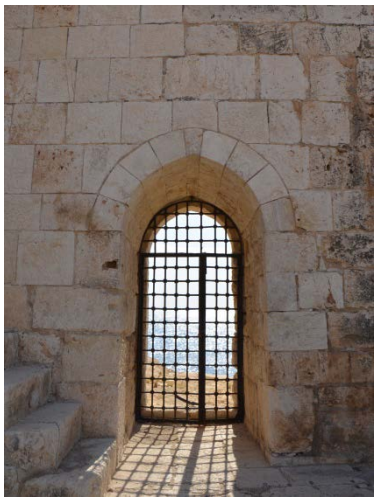

Figure 3.121. Southern gate of the castle (2020, October 23rd)

Figure 3.122. View of the portico from the corridor between western wall and the piers (2020, October 23rd)

The architectural elements of the castle consist of gates, door openings, door frame, embrasures, windows, stairs, wall-walks, niches, corbels, mosaics, inscriptions and carvings. There are four gates on each facade of the castle: one of them is the main gate and the others are postern gates. The main gate, which is located on the east facade of the tower I, is L planned and 1.76 m in width (Figure 3.124). Eastern gate that is used as the visitor entrance is 1.98 m, western gate is 1.51 m and southern gate is 1.37 m in width (Kenar, 2020). Cross-bars were used at the inner sides of the main gate and the postern gate in the south for defensive purpose. Door openings of the buildings in the castle are rectangular, except the entrance of the tower I that is crowned with a barrel vault, and the entrance of the room E that is crowned with a segmental arch (Figure 3.124 & Figure 3.125). Door opening of the room E is differentiated with the corbeling stones at the two sides of the springing line and the door frame out of limestone (Figure 3.120). There are three types of embrasures (Figure 3.123). The first type is V shaped. It has pointed or semi-circular vaulted niches at the interior and semi-circular crowned loophole at the exterior. They are located on the fortification walls except the eastern wall and in the towers A, F and J. The second type is V shaped embrasure that has semi-circular profile at the interior and exterior. These are in the towers A, D, F and K. Edwards claimed that the embrasures in the tower K were added during the Lusignan period (Edwards, 1983, p. 362). The third type is V shaped embrasure that has rectangular profile at the interior and exterior. These are in the towers D and I. There are

three types of windows: rectangular, pointed or semi-circular profiled, and with segmental profile at the interior and rectangular profile at the exterior. The rectangular window is in the chapel C (Figure 3.127). Windows with pointed or semi-circular profiles are on the fortification walls, except the southern wall. The last type is in the tower F. Stone stairs flank the inner sides of the fortification walls in the southeast and south, and the northwest facade of the tower F. There are stair remains juxtaposing the western and northern walls (Figure 3.125). The stone stairs were for accessing the floors of the towers A, F, J and K, and the room E. Wall-walks are along the southern fortification wall (Figure 3.126). Vaulted niches are at the interior sides of the embrasures and windows of the castle. Also, there are two square niches on the north and south walls of the apse of the chapel C. There are corbels at the entrance of the room E and on the western wall, and partly northern and southern walls along the portico (Figure 3.122). Floor mosaics were implemented with two different techniques: *opus sectile* and *opus tessellatum* (Figure 3.128 & Figure 3.129). The technique of *opus vermiculatum* were used for some figures. The material of the mosaics is mostly marble pieces with different colors and shapes. Geometric patterns, floral and animal figures were used in the mosaics (Küçük, 2012, p. 21; Gürkan & Ünlü, 2003a, pp. 71, 73-76). These floor coverings are dated to the Early Byzantine period: 5th and 6th century AD (Köroğlu, 2012, p. 13). There were two inscriptions in the tower F. The inscription dating to the reign of King Levon I in 1206 is out of limestone. It is above the door of the tower (Figure 3.130). The other dating to the reign of King Hethum I in 1251 was next to the door opening, but now it is missing (Langlois, 1861, pp. 214-215; Herzfeld & Guyer, 1930, p. 164). There are inscriptions with the Greek letters on the mosaics of some rooms of the building complex (Figure 3.131). An inscription is located on the portico in the western corner of the castle (KTB, 2021b). However, there were more inscriptions in the castle that were out of reused blocks taken from the Roman buildings of Korykos (Beaufort, 1817, p. 237; Gürkan & Ünlü, 2003a, p. 71). A cross figure was carved on a stone block below the window of the chapel C. In the courtyard, several inscriptions and carvings of cross figures were revealed during the excavation in 2001 (Gürkan & Ünlü, 2003a, pp. 70-71, 76).

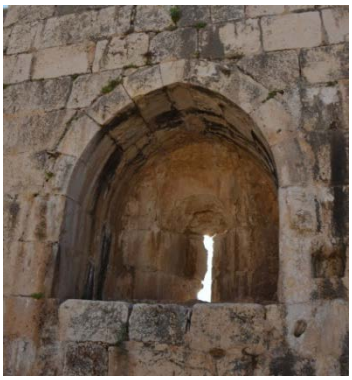

Figure 3.123. Embrasure types in the castle (2020, October 23rd)

Figure 3.124. Interior of the tower I and the main gate of the castle in the left (2020, October 23rd)

Figure 3.125. A part of the western wall between tower A and K (2020, October 23rd)

Figure 3.126. Southern walls between the tower D and portico from the building complex (2020, October 23rd)

Figure 3.127. The apse of the chapel C from the west (2020, October 23rd)

Figure 3.128. Mosaics with the technique of *opus sectile* (2020, October 23rd)

Figure 3.129. Mosaics with the technique of *opus tessellatum* (2020, October 23rd)

Figure 3.130. The inscription from 1206 on the northwest facade of the tower F (2020, October 23rd)

Figure 3.131. The inscription on the mosaics of the building complex (2020, October 23rd)

3.3.5. Conservation Activities

In this section, conservation activities of *Kızkalesi* are presented under the titles of research, projects and implementation.

3.3.5.1. Research

The first researches in and around Korykos ancient city started in the 19th century. There are important researchers who studied in the site in the 19th and 20th century[37]. The first systematic study on the ancient city was carried out by Herzfeld and Guyer (Kaplan, 2006, p. 90). The first comprehensive archaeological inventory studies were conducted by Prof. Dr. Halet Çambel between 1973 and 1976 (Öcal et al., 1999, p. 9). In 1995, a survey was carried out to research the coastal remains of Korykos by Robert L. Vann (Vann, 1996).

In 1985, November 15, Korykos ancient city was listed as 1st and 3rd degree archaeological site by Adana Regional Council for Conservation with the decision numbered 1560. The ancient harbour, sea and land castles are within the borders of 1st degree archaeological site (Regional Council for Conservation, 2020). Archaeological excavation of the sea castle was carried out in 2001 and 2002[38] (Figure 3.132 & Figure 3.133) (Gürkan & Ünlü, 2003a, p. 69; Regional Council for Conservation, 2020). In 2014, April 15th, the site was included in the UNESCO World Heritage Tentative List with 5909 reference number (WHC, 2019).

[37] F. Beaufort (1817), Pliny (1856), V. Langlois (1861), R. Heberdey and A. Wilhelm (1896), Strabo (1929), Herzfeld and Guyer (1930), G. H. Forsyth (1957), W. Müller-Wiener (1966), A. Machatschek (1967), T. S. R. Boase (1978), R. W. Edwards (1983), F. Hild and H. Hellenkemper (1990), Hill (1996) (Boase et al., 1978, p. 161; Gürkan & Ünlü, 2003a, p. 78; Vann, 1996, pp. 260-261; Kaplan, 2006, p. 90).

[38] The archaeologist F. Güler Gürkan guided the excavation with the participation of researcher Yaşar Ünlü in 2001 (October 5 - November 3) and 2002, May (Gürkan & Ünlü, 2003a, p. 69; Regional Council for Conservation, 2020). The excavation was under the control of Mersin Museum Directorate and KVMGM, and the DÖSİMM was the funding supplier. The building complex and mosaics were revealed during this study (Gürkan & Ünlü, 2003a). Ground surveys and archaeological excavations in Korykos have been carried out periodically by Prof. Dr. Serra Durugönül as site director with a team between 2004 - 2010 (KVMGM, 2021a; Durugönül et al., 2006). In addition, 3D model of the castle were generated by using terrestrial laser scanning technique in 2014 by Ali Ulvi and Murat Yakar (Ulvi & Yakar, 2014). It contributes to the documentation of the castle.

Figure 3.132. Aerial view of Kızkalesi before excavations
(Source: Gürkan & Ünlü, 2003b, p. 57)

Figure 3.133. The courtyard of Kızkalesi before excavations
(Source: Erim, 2007, p. 59)

3.3.5.2. Projects

There are three restoration projects that were prepared for the sea castle. The first project is the restoration of the church floor mosaics in *Kızkalesi* that started as a restoration project of mosaics and later became an archaeological site conservation project[39]. The second; Mersin Erdemli *Kız Kalesi* (Sea Castle) Surveying, Restitution and Restoration Project; was prepared in 2000[40]. The third is *Kızkalesi (Denizkalesi)* Restoration and Environmental Design Project[41].

[39] It was prepared by Art *Restorasyon Kültür Sanat ve Araştırmacılık* with its team. The team consisted of conservators Celaleddin Küçük and N. Mine Yar as project managers; architect restorer Emine Karaman and anthropologist Coşkun Köysu as field supervisors; architect restorers Fatih Bölükler, Elif Topaç, Seren Aydınalp, Hülya Nilgün, Rahime Çalışkan, Emre Tunçdemir and Emrah Pamuk; and technician Rıfat Güllüce. The implementation date was between 2006 - 2007. The responsible institution was Adana Regional Council for Conservation (Küçük, 2012, pp. 19-21).

[40] The project was approved by Adana Regional Council for Conservation in January 2001. After the excavations in the courtyard of the castle, the project was revised in August 2002. The revised project was approved on October 18th, 2002 with the decision numbered 4929. It was prepared by Miyar Architecture & Engineering with its team. The team consisted of master architect Kemal Nalbant as project manager, architects Evrim Pekaslan and Oya Bakacak. The consultant was chemistry technician Ali Çetin İdil. The collaborator was Tuba Construction Co. Ltd. The client was Mersin Governorship. The responsible institutions were Adana Directorate of Surveying and Monuments and Adana Regional Council for Conservation. Funding supplier was T.R. Ministry of Culture and Tourism (Regional Council for Conservation, 2020).

[41] The bidding was made by Mersin Governorship DIMCs on October 9th, 2014. The contract was signed on November 10th, 2014. The construction process was between November 14th, 2014 - 2015 (KVMGM, 2021b).

3.3.5.3. Implementation

The interventions of addition, reintegration, removal, reconstruction, consolidation, cleaning, renewal and presentation were realized in the restoration projects of the *Kızkalesi*.

Addition: Mass, element and material additions are observed in the castle. Mass additions are the new building flanking the room E and used as toilet, and a transformer substation juxtaposing the tower J (Figure 3.134 & Figure 3.135). Element additions are iron grilles with iron profiles in the door and window openings of the castle; a modern timber door frame in the opening of the tower D (Figure 3.136); timber ceilings in the towers A, D, F and K (Figure 3.137); timber joists at the springing level of the vault in the tower F; an iron cover above the gap between the ground and first floor of the tower F to provide visitors safety; steel frame staircases with handrails at each facade of the portico where the remains of stairs are located, and at the entrance of the tower J with the stone landing (Figure 3.138); a lightning conductor on the top of the tower K; and a flag on the top of the tower I. Material additions are the steel mesh above the gap on the cistern B to provide visitors safety, and stone floor coverings on the ground floor of the tower D, I and on the second floor of the tower F[42] (Figure 3.139).

Figure 3.134. The new building (WC) attached to the room E (2020, October 23rd)

Figure 3.135. Transformer substation attached to tower J (2020, October 23rd)

[42] The authenticity of the stone floor covering of the tower F is in doubt. Such floor covering is not observed in any other spaces in the castle. In addition, extensive reintegration was carried out in this floor of the tower F. However, it is neither as old as the tower nor as new as the current interventions. It was probably implemented before the current restoration.

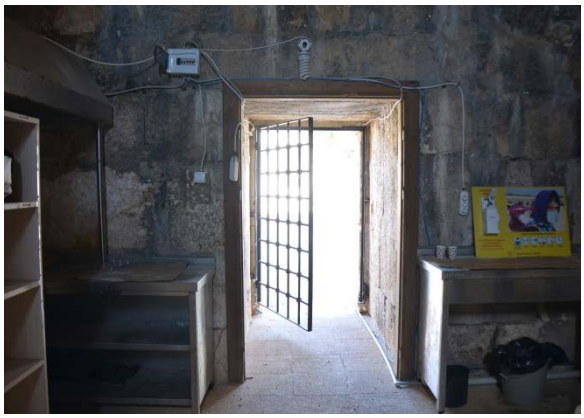

Figure 3.136. Inside of the ground floor of tower D (2020, October 23rd)

Figure 3.137. Timber ceiling of tower K (2020, October 23rd)

Figure 3.138. A staircase flanking the portico wall (2020, October 23rd)

Figure 3.139. Floor covering of tower I (2020, October 23rd)

Reintegration is observed in most of the structures and walls, especially in the southern and western part of the castle (Figure 3.126). It was generally carried out to complete cut stone facings with imitation stones that are cladding stones. Different construction technique and coursing were practiced in the walls (Figure 3.140). It is observed at the piers and arches of the portico, embrasures, windows, stone stairs attached to the southern wall, vault of the tower I, upper wall parts of the towers except the tower G and H, etc. Reintegration was also carried out to complete wall parts constructed with rubble stone and roughly rectangular stones: at the vaults of the portico

and the tower J (Figure 3.141). The mosaics were partially completed with the stones in the courtyard whose original positions were figured out (Küçük, 2012, pp. 25, 27).

Figure 3.140. Wall detail after the restoration of the portico (2020, October 23rd)

Figure 3.141. Vault of the portico after the restoration (2020, October 23rd)

Removal of the transformer substation which was constructed in the courtyard, and the lighting elements which were installed in 1992 were carried out.

Reconstruction was carried out with new cladding stones and with a different construction technique at the embrasures and door opening of the tower A, and in some portions of the tower F.

Consolidation: Joints were cleaned, and joint discharges and cracks in the walls were filled with hydraulic lime mortar such as at the eastern wall of the chapel C. Liquid hydraulic lime mortar was injected to the cracks and gaps of the mortar below and between the mosaics. Malta 6001 mortar was implemented to the hair cracks. The water channels below the ground of the courtyard and graves in the courtyard have given way to a non-resistant ground formation under the mosaics. They were consolidated by removing the soft soil layer and then filling with gravel and hydraulic lime mortar under the mosaics in the order of the authentic layers[43] (Küçük, 2012, pp.

[43] The preparatory layers of the mosaics consist of statumen (drainage layer without mortar); rudus (coarse), nucleus (fine) and bedding mortar layers from bottom to top (Kaplan et al., 2017, pp. 238-239).

24-27). The upper surfaces of the mosaics were consolidated against weathering conditions by coating their surfaces with paraloid B72 which is an acrylic polymer (Küçük, 2012, pp. 27-28). The vault in the first floor of the tower F was consolidated with timber posts at the springing level. Hard capping was applied on the top of the walls except the tower G, and most of the vertical surfaces that have lost their cut stone facings: e.g. the northern and northeastern walls. However, this intervention is not consistent: There is no hard capping at some parts of these walls and the structures in the castle courtyard.

Cleaning of the vegetation in the courtyard, and plant colonization on the walls and floor coverings of the building complex were carried out. After the cleaning of the plant colonization on the mosaics, mosaics were disinfected, and copper nails were driven on the ground to prevent the re-growth of the plants. The surfaces of the mosaics were cleaned with poultice: AB 57 paper pulp. Then, soft plastic brush with water was used and lastly the surfaces were cleaned by a sponge. Partly rock-cut water channels were cleaned (Küçük, 2012, pp. 26-27).

Renewal of the partly rock-cut water channels were carried out by changing the broken stone blocks (Küçük, 2012, p. 27).

Presentation: Today, the sea castle functions as an open-air museum[44]. There are orientation and information boards in the courtyard[45] (Figure 3.144 & Figure 3.145). There are also trash cans and lighting equipments[46] in the courtyard, on and outside of the castle walls. The cisterns except the cistern B and the room attached to the room E is surrounded by stainless steel railings to provide visitors' safety. A viewing platform that is steel construction with glass covered floor was constructed on the wall remains of the building complex to view its rooms and mosaics (Figure 3.146). The mosaics are presented by in situ conservation and neutral colored lacuna. Access to the sea castle is provided by small boats that sail off every 30 minutes (Figure 3.142). The pier was

[44] In 1979, the castle was arranged as an entertainment and resting area (Figure B.12). In 2001, the toilet was constructed in the courtyard. The General Directorate of Investments and Enterprises requested re-functioning of the sea castle as a restaurant on February 23rd, 2006, with the document numbered 24771 (Regional Council for Conservation, 2020). Although this request was declined by Adana Regional Council for Conservation, the castle was functioned as a cafe.

[45] They give information about the historical background and architectural characteristics of the castle, and the legend associated with the castle.

[46] The lighting elements from 1992 were removed and new equipments were designed. Also, the electric cables were repaired and were positioned underground along the fortification walls (Regional Council for Conservation, 2020).

organized by constructing a platform in front of the visitor entrance in 2014 (Figure 3.143) (KVMGM, 2021b).

Tourist facilities such as cafe (*Müze* Beach Cafe)**,** portable souvenir shop, toilet and parking lot are provided at the beach (ancient harbour) next to the land castle. Viewing platforms with observation binoculars and timber benches are placed at the coastline across the sea castle (Figure 3.142). Information boards are also placed at the coastline and the entrance of the land castle.

In the current restoration project, the sea castle is proposed to be used as a multi-space in which concerts, wedding ceremonies and special invitations are held. Within the scope of the restoration project, a stage with a capacity of 300-350 people at the east, a removable dock connected to the tower I, and a cafeteria at the southwestern corner of the portico were designed (Figure 3.147, 3.148 & Figure 3.149). While the ground floor of the tower I was re-functined as an entrance hall, the tower D was re-functioned as a service room. In the courtyard, visitor paths whose floor coverings were constructed with granite cubes and gravel were designed. In addition, Kızkalesi is one of the sites presented and promoted by virtual tour project of Mersin Municipality named as VR Mersin (Mersin Municipality, n.d.).

Figure 3.142. The coastline across the sea castle (2020, October 23rd)

Figure 3.143. Visitor entrance of the castle (2020, October 23rd)

Figure 3.144. An example of the direction board and trash can in the castle (2020, October 23rd)

Figure 3.145. Some of the information boards in the castle courtyard (2020, October 23rd)

Figure 3.146. View of the courtyard of the castle from the northwest (2020, October 23rd)

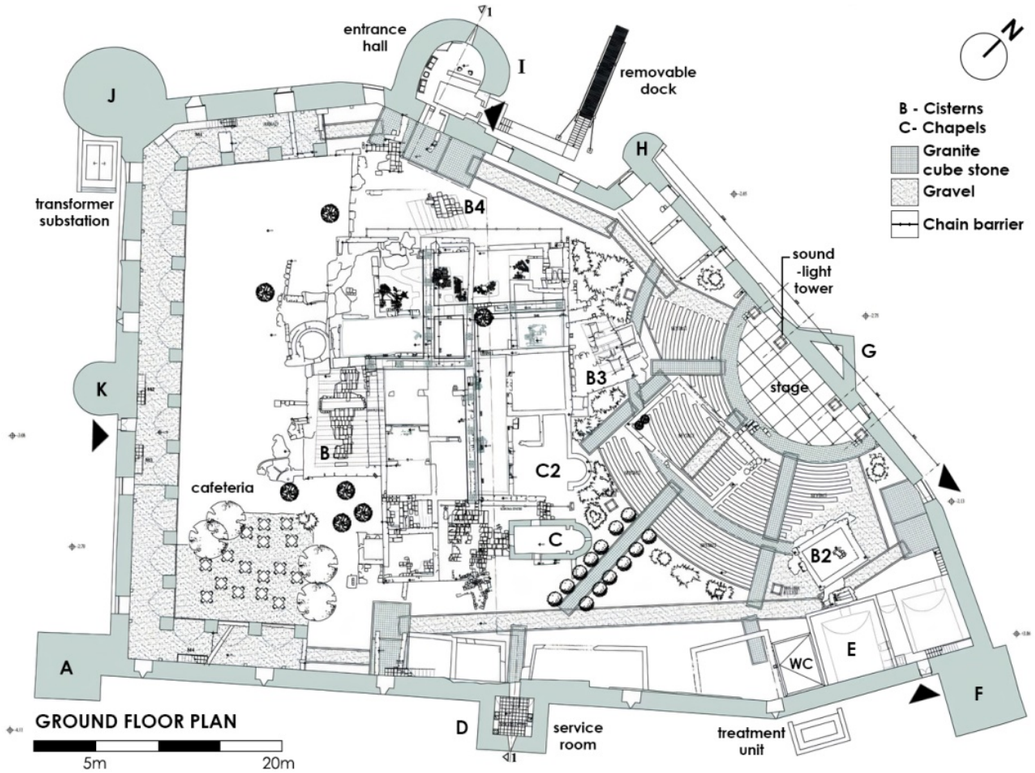

Figure 3.147. Ground floor plan of the castle, restoration drawing (Source: Miyar Mimarlık Mühendislik, 2020)

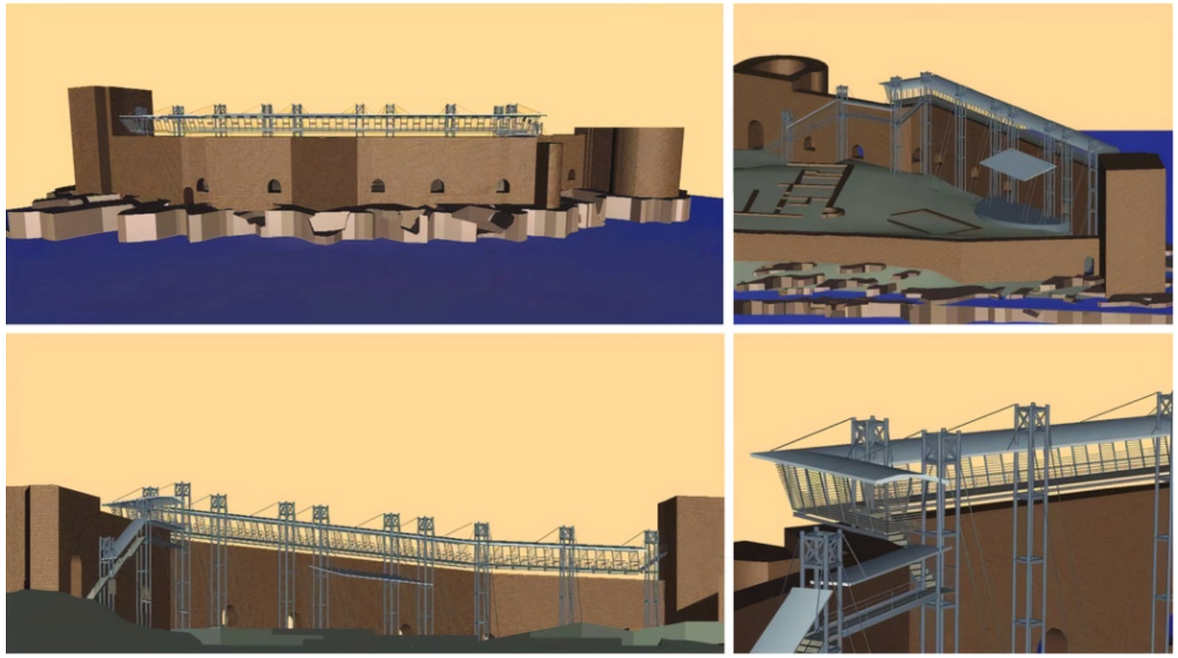

Figure 3.148. Images of the stage in the restoration project (Source: Miyar Mimarlık Mühendislik, 2020)

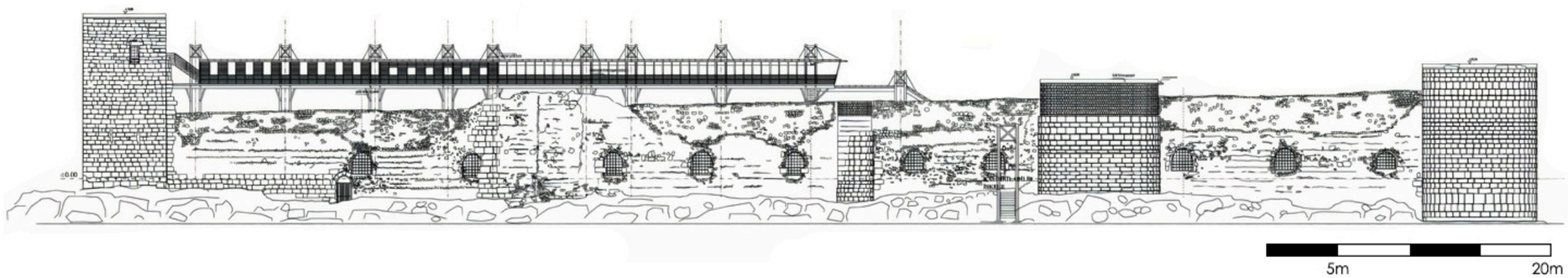

Figure 3.149. North elevation of the castle, restoration drawing (Source: Miyar Mimarlık Mühendislik, 2020)

3.3.6. Evaluation

In this section, values and conservation problems before and after the current interventions are analyzed.

3.3.6.1. Values and Problems, Before Interventions

Erdemli district has integrity with its rich cultural assets such as Korykos, Kanlıdivane (*Kanytelleis*), Ayaş (*Elaiussa Sebaste*), Öküzlü, Akkale (*Tırtar*) archaeological sites, Adamkayalar reliefs, necropolises, defense structures, churches, etc.; natural and geological elements which have rich biodiversity such as Heaven - Hell and Asthma caves, deep canyons, etc. Adamkayalar reliefs that were carved on the rocky slopes of the *Şeytan deresi* canyon have artistic and documentary value since they represent the aesthetic understanding of their period, and provide information about the related significant personalities. Heaven - Hell Caves have been associated with a Greek myth, so they have memory value. These cultural and natural elements contribute the value of the site. Korykos ancient city has preserved its integrity since the remains of many of its monuments[47] have reached today. The site was settled by several cultures since the Hellenistic period. So, it represents the social, economic, technical and military aspects of past civilizations. Due to its strategic location, it was an important trade center and one of the two important harbours of the eastern mountainous Cilicia[48] (Özbay, 2001, pp. 145, 147; Vann, 1996, p. 260). It is one of the rare examples of the coastal cities in the region with a defense structure in the sea. *Kızkalesi* is a symbolic monument on an island in a picturesque site, and arouses gripping curiosity for exploration together with the land castle.

The land and sea castles that are connected to each other with the breakwater, and the ancient harbour have integrity in terms of their defense characteristics and

[47] These immovable cultural assets are the sea and land castles, ancient harbour, towers, remains of the fortification walls around the city, necropolis, religious buildings, cisterns, aqueducts, farmhouses, ancient roads, etc (KTB, 2021b).
[48] The other was Elaiussa Sebaste.

historic usage. The castles' site documents the social, economic, technical and military aspects of the past civilizations. The relation of the sea castle with the mainland (the land castle) and the island on which it is located, and the castle's spatial layout have preserved their authenticity.

Kızkalesi has sustained its authentic characteristics as a 12th century defense structure from Byzantine period, so it has age value. Different construction techniques, material and inscriptions document the repairs that have been carried out by different cultures. While the building complex, room remains flanking the fortification walls, carvings, ceramic pottery, amphoras, graves and skeletons with their belongings, e.g. jewelry, document the social and economic life; mosaics document antique flora and fauna of the region. The castle was authentic in terms of facade form, space organization, design mentality, plan layout, architectural elements, construction technique and material. The inscriptions, carvings and mosaics have sustained their artistic value partially as a result of weathering, lack of maintenance, vandalism and unscientific methods of the past implementations. The castle has been associated with the Kızkalesi myth, so it has memory value (KTB, 2021b).

Although the site is rich in cultural and natural values, Mersin province is not an outstanding touristic place. Kızkalesi neighbourhood is first recalled as a sea-sand-sun destination. The majority of its tourists are natives (Duman & Öztürk, 2005, pp. 9, 22; Çetin, 2014). There is a negative impression of the neighbourhood with the insufficiency of the coastline cleaning, infrastructure, and safety necessities[49] (Buzlu et al., 2019, pp. 216-224; Çetin, 2014, pp. 87-88). These reduce interest of tourists for the site. The new buildings and highway reduce the perceptibility of the archaeological site. Insufficiency of presentation and service facilities are other factors playing negative role on perceptibility. Lack of regular cleaning and maintenance of the ruins has given way to the structural and material problems in the whole ancient city. Beside these, Korykos is under potential threat of the soil erosion.

The uncontrolled physical access to the castle site has given way to vandalism. There was lack of presentation and service facilities[50].

The castle ruin was abandoned since 15th century, but some Christians were buried in the courtyard between the late 19th - early 20th century. There were accessibility problems stemming from the inadequacy of the pier that provides visitor

[49] Negative events related with women security have been recorded.
[50] Parking lot, cafe, toilet, information boards, etc. were not provided.

access to the castle. Also, the ruined stairs in the castle walls have limited access to the upper floor of the fortifications. The unstable ground in front of the visitor access, the gaps in the superstructures of the cisterns in the courtyard and the ceiling of the ground floor of the tower F were structural problems creating safety risk[51]. The mosaics had damages caused by the lighting cables made before the excavations, inadequate and unsuitable conservation precautions after the excavations[52]. The past implementations have given way to structural and material problems[53]. The castle was not presented before the current restoration project. There were only lighting equipment outside the castle walls, but they became unusable stemming from rough weather conditions caused by waterfront, and vandalism (Güngör, 2021, p. 216).

3.3.6.2. Values and Problems, After Interventions

Erdemli district has long summers and beaches with blue flags. Especially after 2000, the surface area of Kızkalesi settlement has increased excessively and multi-story residential buildings, hotels or summer houses have been constructed (Figure 3.100). The cultural landscape of the Korykos ancient city, natural elements of the region and biodiversity of the flora and fauna are threatened by this unplanned urbanization (Özüpekçe, 2019; Yılmaz et al., 2019). Beside these new buildings along the coastline, Mersin - Antalya highway running parallel to the coast, urban waste, waste disposal facilities of the hotels at the coast, lack of the wastewater infrastructure in the settlement and wastes stemming from the cargo boats cause coastal and sea pollution in Kızkalesi (Yalçın & İlhan, 2008, p. 67; Eken et al., 2006, p. 398). Adamkayalar reliefs have

[51] The castle had structural problems and material deteriorations stemming from the possible coastal erosion, rough weather caused by waterfront and subtropical climate (very hot summers and very rainy winters), rain penetration, rising damp, excrement of the birds and vandalism: collapse, loss of material, out of plumbness, cracks on the walls and mosaics, joint discharge, erosion on the stone surfaces, detachment on the stones, plasters and mosaics, discoloration, encrustation, black crust, carbon deposit, salt crystallization, plant colonization, graffiti on the walls, breaking, dismantling and taking the mosaics as a treasure, and illegal excavations in the courtyard (Gürkan & Ünlü, 2003a, p. 73).

[52] They were covered with plastic and sand. This had caused condensation on the surface. In addition, non-resistant ground stemming from the graves and water channels had weakened the mortar layers below the mosaics.

[53] Incompatible material such as cement, and unscientific methods such as using the mosaics as an infill material in the cement mortar on the walls (Küçük, 2012, pp. 21-23, 25) were inappropriate interventions.

sustained their artistic and documentary value, but they are under threat by weathering and vandalism. The Greek myth associated to the Heaven - Hell Caves continues to attract attention of the tourists to the site. The integrity of the Korykos ancient city with its cultural assets is under threat due to the lack of the conservation activities of the ruins except the land and sea castles, exposure to weathering conditions and vandalism such as illegal excavations, and regarding of the ruins as a quarry and moving the stone blocks by local people. The site partially preserves the social, economic, technical and military aspects of past civilizations due to uncontrolled tourism development. It preserves the characteristics of an important trade center and harbour of the Ancient Cilicia. Its location along the Mersin - Antalya highway is a factor attracting tourists. The city continues to be one of the rare examples of the coastal cities in the region with a sea castle. *Kızkalesi* continues to be a symbolic monument on an island in a picturesque site, and interest of the tourists increase after the current restoration project.

Although the land and sea castles were separated from each other due to the partial loss of the breakwater, the sea castle sustains its integrity with the land castle and ancient harbour. The site continues to document the social, economic, technical and military aspects of the past civilizations. The authentic sea castle - land castle and sea castle - the island relations, and the castle spatial layout are sustained.

The authentic characteristics of *Kızkalesi* as a 12th century defense structure have been negatively affected from the extensive interventions such as addition of new buildings, floor coverings and timber door frame, etc., imitative reintegration and reconstruction. The castle continues to document the previous repairs since the inscriptions, different construction techniques and material are preserved. The immovable and movable assets in the courtyard such as the building complex, ceramic pottery, mosaics, etc. continue to document the social and economic life, and natural characteristics of the region. The authentic castle size and form, space organization, design mentality and plan layout are sustained, but the authentic facade form, architectural elements, spanning elements, construction technique and material are lost due to the extensive reintegration and reconstruction. The artistic value of the inscriptions, carvings and mosaics is sustained. Kızkalesi myth continues to be told and derives tourists to the castle.

The International Kızkalesi Tourism Festival has been organized every year since 2006 in Erdemli district. The related sea sports activities aim promoting tourism through the increase of the international recognition of Kızkalesi (Özüpekçe, 2019, p.

958). Beside this organization, a number of contemporary projects have been developed by the local administration, the university and NGOs[54]. Korykos ancient city is not preserved and presented, except the land and sea castles. So, the structures are under potential threat of the new constructions, structural and material problems, and even they may become ruin in time. The site also continues to be threatened by the possible soil erosion.

Safety problems in the castle site such as graffiti, illegal excavations, etc. stemming from the uncontrolled physical access continue to cause damages to the ruins. Tourist facilities such as cafe, souvenir shop, toilet, parking lot, information boards, etc. are provided. The coastline across the sea castle includes viewing platforms, observation binoculars and timber benches.

The castle is functioned as an open-air museum and a cultural space with the designs of a stage and a cafeteria. Construction of a stage, usage of the tower D as a service room of the cafe, and making organizations in the courtyard such as concerts, wedding ceremonies are not compatible usages. They may damage the castle site. For example, before the current restoration, the ground floor of the tower D was functioned as the kitchen of the cafe. So, there is intensive material deterioration caused by the carbon deposit (Figure 3.150). The access to the castle is provided by boats, and a platform was constructed to organize the pier. Steel frame staircases at each facade of the portico are constructed, and stone stairs on the southern facade are reintegrated to provide accessibility. The railings surrounding the cisterns and the iron cover above the gap in the tower F are provided for visitors' safety. The site continues to be under possible threat of the coastal erosion, but reintegration and consolidation of the castle walls and mosaics were carried out. Reintegration of the walls gave way to aesthetic problems stemming from the color differences of the mortars and stones. Also, reconstruction and reintegration with the imitative stones using a different construction technique may give wrong information about the construction to visitors. Hard capping was implemented on the most of the horizontal and vertical surfaces, but there is no hard capping on some wall parts such as the northeastern walls, and the walls of the

[54] VR Mersin project of Mersin Municipality has advertised many places in Mersin including the cultural and natural assets. An alternative tourism project named as Kıyılardan Dağlara: Olba Kültür Yolları has been performed by Mersin University, Mersin Provincial Directorate of Culture and Tourism, Mersin Museum and Erdemli Chamber of Commerce and Industry. This project aims to present the culture of the region and make tourist attraction the archaeological, historical, natural and rural values of Erdemli as a whole by practicing the nature, tableland and rural tourism (Olba Kültür Yolu, 2018).

structures in the courtyard. The coating of paraloid B72 was applied on the mosaic surfaces for the consolidation against weathering. It is efficient for the protection of the stone surfaces against water. However, after long exposure to weathering conditions, it loses its efficiency and removability, and gives way to discoloration on the stone surfaces (Kaplan, 2019). Vegetation in the courtyard and plant colonization on the walls and mosaics were cleaned, but there are no cleaning activities on the walls for encrustation, black crust, carbon deposit, salt crystallization and graffiti. Vandalism is prevented by providing security point at the visitor entrance and constructing iron grilles in the openings of the castle, but iron grilles may damage the authentic stones. The past implementations that were carried out with cement are not removed, so they continue to cause deteriorations on the authentic stone blocks. The toilet building was constructed before the restoration project, but it is still in the courtyard. It is unaesthetic and incompatible with the ruin image of the castle. This building and the transformer substation have given way to deterioration on the authentic stones due to being attached to the castle walls. Information and orientation boards, trash cans, lighting elements and viewing platforms are provided in the castle. Due to the weathering of some information boards, there are difficulties in understanding the visual and written data on the boards (Figure 3.151). The position of the lighting elements on the poles against damages caused by waves, the excess number of these poles and their positioning around the castle walls give way aesthetic problems. Also, the elements and their electric cables that are attached on the walls are unaesthetic (Figure 3.152). The lighting elements that are attached to the walls by driving iron nails on the authentic stone blocks have caused material deterioration.

Figure 3.150. Interior views of the ground floor of tower D (2020, October 23rd)

Figure 3.151. An information board in front of the chapel C (2020, October 23rd)

Figure 3.152. The lighting equipments attached on the walls (2020, October 23rd)

CHAPTER 4

RESULTS AND DISCUSSION

In this chapter, three case studies from Turkey are compared with the four examples from abroad in terms of sustaining and enhancement of values, and success in solving conservation problems.

4.1. Sustaining and Enhancement of Values

Integrity value: In all three cases in Turkey, archaeological site borders were not formed with a holistic approach by considering the cultural and natural assets in the site as a whole. So, integrity has been damaged by these common causes: lack of the scientific researches and conservation activities of cultural assets in the vicinity, vandalism (Yılan and Feke castles, *Kızkalesi*); quarries operated near the structure (Yılan Castle); new constructions in the region, highway passing through the site, and coastal and sea pollution caused by unplanned urbanization as a result of tourism (*Kızkalesi*). Coastal and sea pollution point out the necessity of measures for better preservation of the natural qualities of the site. Picturesqueness has been sustained in two of three cases. In Yılankale region, it is lost due to the quarries. In Kızkalesi settlement, although new constructions seriously reduced the picturesqueness of the Korykos ancient city, the case study has sustained its picturesque view due to its location on an island. In all examples, the ruin image is lost due to the extensive reintegration and reconstruction works. All of the cases have sustained their historic and functional integrity with defense structures or different types of structures in their surroundings.

International documents of conservation recommend provision of an adequately sized protection area with buffer zone for preserving the integrity of the site (ICOMOS, 2005, Article 6). However, when the cases are examined, it is seen that these principles

of the charters are not followed fully in Turkey. Also, only these site borders do not protect the archaeological sites from natural and man-made hazards, and developments: Management plan and continuous monitoring are essential as well (ICOMOS, 1999; ICOMOS, 2005). The Law dated 2004 has pointed out the importance of the mentioned concepts, but there are few examples fulfilling the requirements (T.R. Official Gazette, 2004; Ahunbay, 2010, pp. 112-113). Kızkalesi is on the UNESCO World Heritage Tentative List, but it lacks management plans and sufficient monitoring.

In three of four comparative studies from abroad (Kalø Tower, Pombal and Matrera castles), integrity is sustained to a great extent by preserving the picturesqueness of the rural site with rich flora and fauna, sprit of the site, and the remains of different cultural properties in the vicinity of these three examples. However, there are threats for the natural characteristics stemming from agricultural and human activities e.g., water pollution (near Matrera Castle), uncontrolled hunting and overgrazing (near Resafa). Lack of the conservation and maintenance activities and weathering give way to problems for sustaining the integrity of all examples in cultural landscape scale. However, in Resafa, beside these problems, damages caused by war and vandalism further reduce integrity. Landscape restoration may be required at some places. The economic value of the site due to possessing important geological resources may affect the integrity in a bad way by causing damages to the cultural assets and natural environment in the future. In two of four examples (Kalø Tower and Pombal Castle), the ruin image is fully maintained by the interventions such as consolidation, etc., instead of reintegration and reconstruction. Although reintegration in building scale changes the ruin image, it helps understanding the formal integrity (Matrera Castle), and if it is a local implementation, the visual integrity of the whole ancient city is not affected intensively (Northern Gate of Resafa). In all cases, the integrity with other defense structures in their regions is sustained historically and functionally through preservation of the castle building type. As a result, in terms of preservation of the cultural landscape, European examples (3 of 3) are more successful, where as Syrian (1 of 1) and Turkish cases present more problems (3 of 3). Also, due to the fact that reconstruction and reintegration were carried out extensively in Turkey (3 of 3), the ruin image of the defense structures have been preserved (0 of 3) less than the examples from abroad (4 of 4) (Figure 4.1).

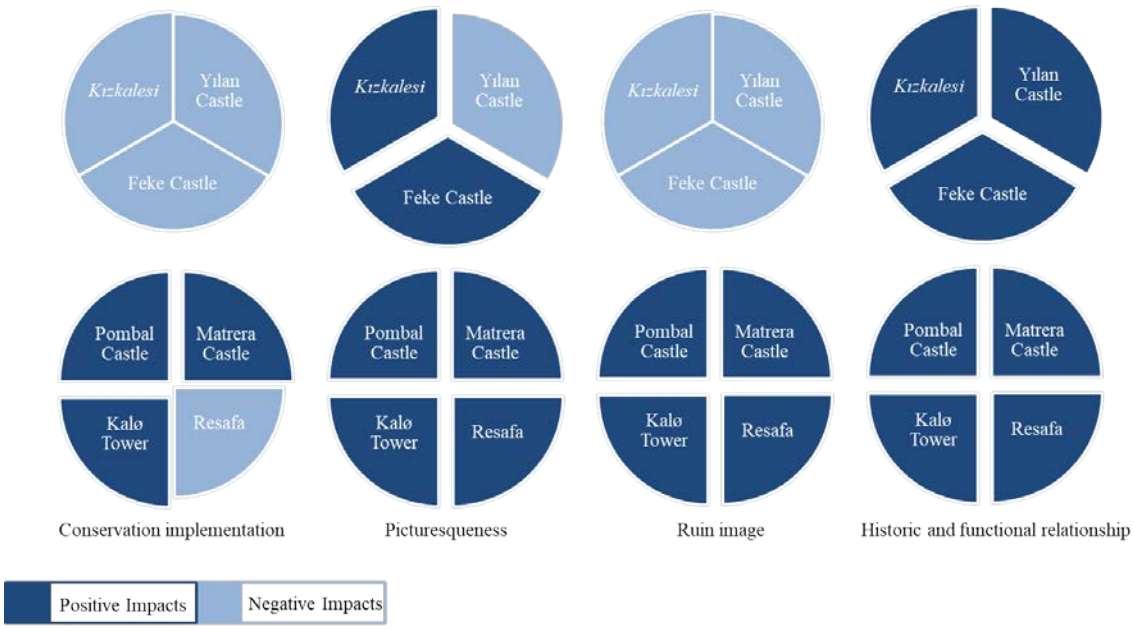

Figure 4.1. Impacts of current implementations on integrity value

Age (oldness) value: In all three cases in Turkey, age value was mostly sustained in the landscape and site scales by preserving some remains of past civilizations in the vicinity of the cases. However, age value of cultural landscapes has been threatened in all cases due to lack of the conservation activities, vandalism, serious structural problems leading to collapse or partial loss of cultural assets.

In building scale, none of the cases have sustained this value due to extensive reintegration and reconstruction with new materials (Yılan and Feke castles, *Kızkalesi*), mass, element and material additions (*Kızkalesi*), cleaning of facades with destructive techniques (Yılan Castle), and new workmanship. Conservation decisions are considered valid to prevent further damage, even they limit the age value in terms of new material and workmanship. However, cultural assets should be thought as untouchable documents of their times. So, interventions should be minimum (Petzet, 1999, pp. 26-30, 55). When the three cases in Turkey are analyzed, it is seen that related radical interventions that damage age value are at a high level.

All of the cases from abroad sustain their age value in landscape scale. In three of four of them sustain this value in site scale: the former implementations have damaged the age value of Pombal Castle, but the current restoration sustains the authentic characteristics from its period. As a result, in terms of preservation of age

value in landscape and site scales, all seven cases from abroad and Turkey can be considered as successful (Figure 4.2).

In building scale, three of four cases sustain their age value. The Northern Gate of Resafa has not fully retained its age value due to the imitative reintegration. In Matrera Castle, reintegration works with new material were carried out to prevent its keep from further destruction. So, this intervention decision is evaluated as appropriate. As a result, unsystematic and/or extensive interventions in Turkey (3 of 3) have had negative effect on age value of defense structures. The cases from abroad (3 of 4, excluding Resafa) have sustained their age value relatively better (Figure 4.2).

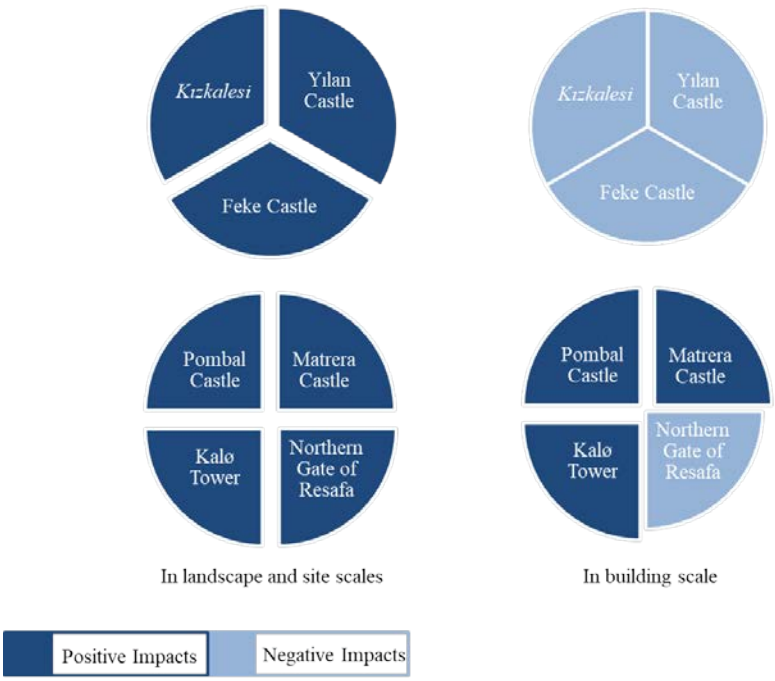

Figure 4.2. Impacts of current implementations on age (oldness) value

Documentary value: In two of three case studies from Turkey (excluding *Kızkalesi*), documentary value has been sustained in general in the landscape scale through sustaining of cultural, natural and geological characteristics of the sites since antiquity. In *Kızkalesi*, the documentary value of the natural elements, biodiversity and cultural heritage have been partially preserved due to uncontrolled tourism development. Also, vandalism, weathering and lack of the scientific researches and conservation activities threaten the cultural heritage in the vicinity of all cases.

In site scale, documentary value of all three cases has been mostly sustained by preserving the social, economic, technical, religious and military aspects of past civilizations and the remains of the different construction periods.

In building scale, all examples have sustained their documentary values to a great extent through preservation of inscriptions, carvings, different construction techniques and material, movable assets, etc. Reintegration and reconstruction works are common problems reducing this value. In Feke Castle, reintegration of room K that is not based on research and traces have damaged the documentary value.

While the charters defined the historical monuments as the primary evidence of past civilizations, historical events or developments (ICOMOS, 1964), it is seen that the interventions of the case studies in Turkey have put the use value in front of the documentary value due to the desire to earn income (Kaymak Heinz, 2008, pp. 463, 469). Considering the cultural heritage as a touristic object and economic resource has given way to presentation of historic monuments with reintegrations or reconstructions. Thus, authenticity is lost in order to attract tourists' attention to the archaeological sites.

In three of the four cases from abroad, documentary value of cultural landscape was mostly sustained. In Resafa, this value is reduced because of conservation problems of natural, geological and cultural heritage. As a result, documentary value is mostly maintained in the examples in Turkey (2 of 3) and abroad (3 of 4) at landscape scale, but natural and man-made hazards, development and lack of the conservation activities pose a threat (Figure 4.3).

In site scale, social, economic, technical, religious and military aspects of past civilizations continue to be represented in all cases abroad. In Matrera Castle, knowledge about the documentary value of the remains is limited because of lack of archaeological research and excavations. As a result, all the cases from Turkey and abroad (7 of 7) can be evaluated as successful in terms of preservation of documentary value at site scale through preservation of the remains and traces of different periods (Figure 4.3).

In four of four cases abroad, documentary value at building scale has been sustained in great extent. Repairs and evolution of the monuments, and the restoration approaches of past times before the current restoration are legible via different construction techniques and material. However, past implementations before the current restoration (Pombal Castle), and partial reintegration (Northern Gate of Resafa) have partially damaged this value. But, all three cases in Turkey are unsuccessful compared

to the cases abroad due to extensive implementations. As a result, documentary value at building scale is sustained relatively more abroad (4 of 4). The examples in Turkey involve extensive reintegration and reconstruction works (3 of 3) (Figure 4.3).

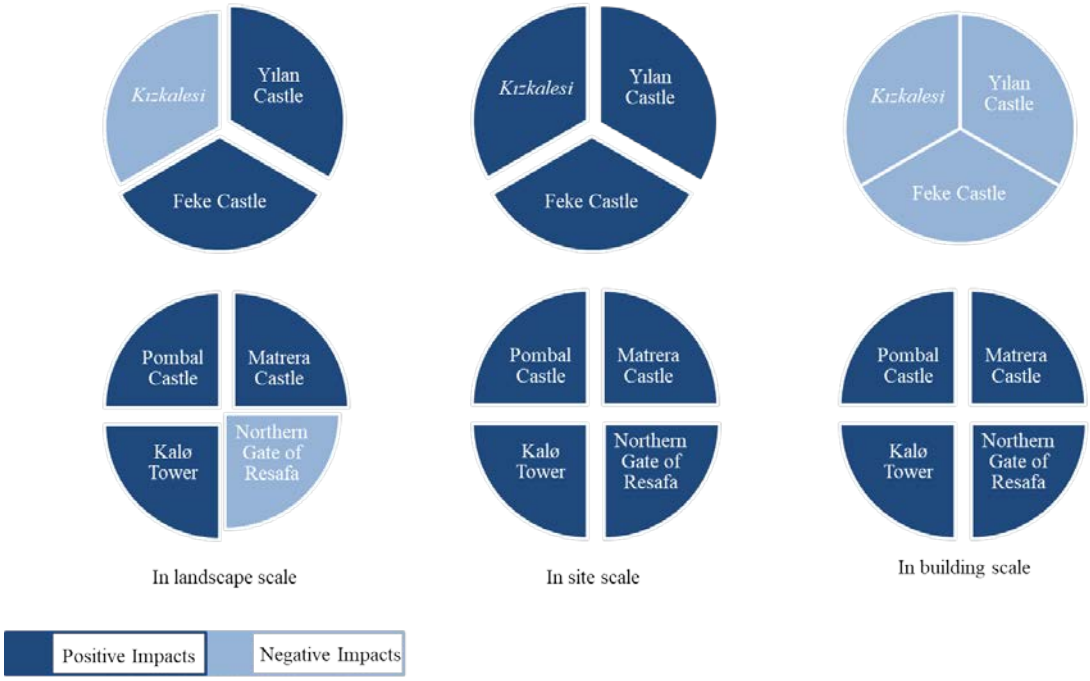

Figure 4.3. Impacts of current implementations on documentary value

Authenticity value: In all case studies in Turkey, authenticity has been sustained in site scale in terms of site-castle relation and castle spatial layout.

In building scale, some problems are observed in three of the three cases regarding the sustaining the authenticity in terms of construction technique and material. Also, in all studies, authenticity of the architectural and spanning elements has been damaged. The common causes of these problems are extensive reintegration, reconstruction with imitative or authentic material and incompatible contemporary additions. Due to absence of any marking or date on new stone blocks and the lack of demarcation at the junction points between new and authentic stones, the implementations give way to falsify authentic characteristics and mislead visitors (ICOMOS, 1964; Ministry of Education, 1972). In one of three examples (Feke Castle),

there are some problems for sustaining authenticity of form due to reintegration that is not based on historical research and traces on the monument.

In the international documents, anastylosis, consolidation, stabilization and maintenance were recommended in the archaeological sites to sustain the authenticity, instead of reintegration, reconstruction and radical additions which damage the values of the monuments. Also, studies based on reliable documents and their availability by public are of great importance (ICOMOS, 1964; ICOMOS New Zealand, 2010; ICOMOS, 2015). Before the restoration projects, it is seen that the isolated location of the structures in a rural site contributed to sustain their authentic characteristics. It is seen that more attention is paid to realisation of these criteria in the cases abroad. So, authenticity is maintained at a higher level. There is a general tendency for the reconstruction and reintegration in the restorations in Turkey. However, documentation of the restoration projects stated that anastylosis was carried out. So, they are not reliable. While charters allowed reconstruction (without conjecture) in the archaeological sites as an experimental research tool outside the site, if it is well-documented (ICOMOS / ICAHM, 1990; ICOMOS, 2015), implementations based on hypothesis in Turkey give way to authenticity problems.

In site scale, authenticity of all four cases abroad have been substantially sustained in terms of site-castle relation, castle spatial layout, design mentality, castle size and facade form, architectural elements, construction technique and material. The authenticity in Pombal Castle is less than that in the other three cases because of former interventions such as reconstruction, reintegration, renewal of architectural elements, and reinforcement of some wall portions with incompatible material e.g. cement. However, the current restoration project sustains all authentic characteristics, and alterations of former restorations. As a result, authenticity value in site scale has been sustained in great extent both in Turkey (3 of 3) and abroad (4 of 4) (Figure 4.4).

In building scale, one of four studies (Kalø Tower) preserves all authentic characteristics in terms of facade form, space organization, design approach, plan layout, architectural elements, construction technique and material. Element addition with distinguishable and new material contributes to sustain authenticity. In two of four cases (Pombal and Matrera castles), facade form was changed, but additions (Pombal Castle) and reintegration (Matrera Castle) with distinguishable material have not damaged the authenticity. However, in Resafa, the authentic facade form, ornaments and material are lost due to the reintegration of the southern facade of the Northern Gate

with new imitative stones by copying the authentic form of facade and ornaments. As a result, the cases abroad (3 of 4) are more successful at building scale. It is seen that building scale implementations in Turkey include details that reduce authenticity more (3 of 3) (Figure 4.4).

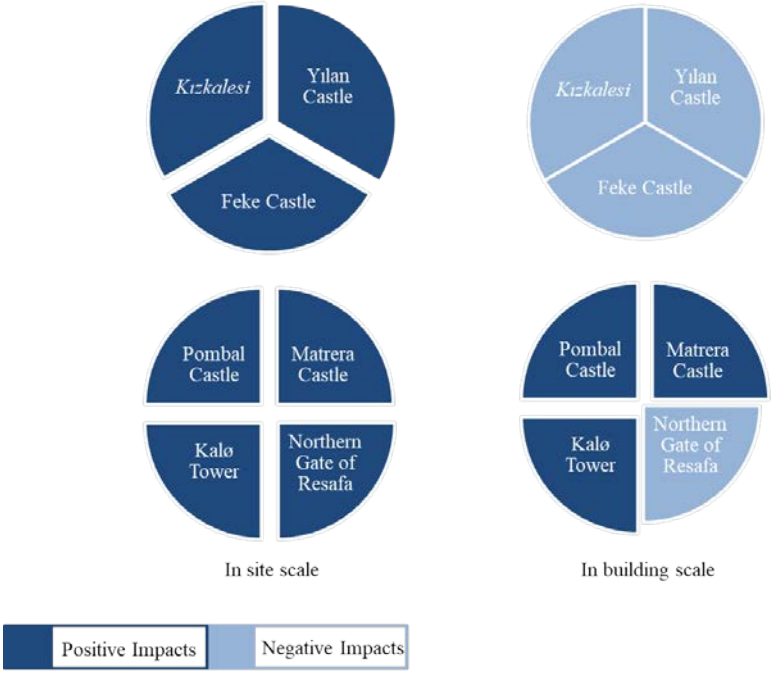

Figure 4.4. Impacts of current implementations on authenticity value

Artistic value: The two case studies in Turkey had artistic value prior to restoration implementation: Yılan Castle and *Kızkalesi* (building scale). They have sustained their artistic values partially because of damages stemming from weathering. Earthquakes, lack of maintenance, vandalism and damages caused by the past implementations (*Kızkalesi*) were other causes threatening this value. Cleaning and consolidation were carried out in the sites, but material and presentation problems as a consequence of paraloid B72 usage on mosaic surfaces (*Kızkalesi*) may be faced with. So, the artistic value may be damaged in one of two studies.

Three of the cases abroad had artistic value in site (Pombal Castle) and building scale (Matrera Castle and Northern Gate of Resafa) prior to restoration implementation. Although all three studies have some physical problems stemming from weathering, this value has been largely preserved. However, the reintegration of the ornamentations on

the southern facade of the Northern Gate of Resafa with imitative stones without any contemporary marking on them by copying the authentic form gives way to damage the artistic value due to the loss of the material and workmanship authenticity. As a result, although there were physical problems in examples in Turkey and abroad, their artistic value had been largely preserved (5 of 5). However, due to the current implementations, artistic value was reduced in the cases of Turkey (1 of 2) and Syria (1 of 1) (Figure 4.5).

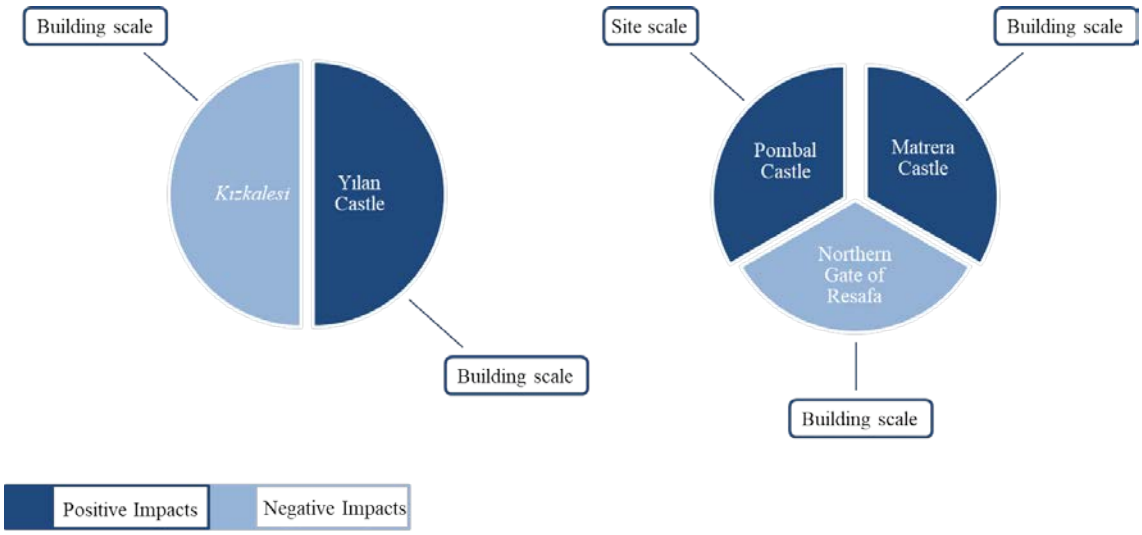

Figure 4.5. Impacts of current implementations on artistic value

Rarity value: Two of three cases in Turkey had rarity value prior to restoration implementation. Feke Castle was a rare example in building scale due to the vaulted passage and absence of a chapel. Being a coastal city possessing a sea castle on an island attributed rarity to Korykos ancient city in landscape scale. This rare characteristic in Korykos contributed to the inclusion of this ancient city on the UNESCO World Heritage Tentative List. After the restoration implementations, all these rare qualities have been preserved.

Two of four cases abroad were rare examples in terms of building type, style, period and defense strategies. This value had been preserved in landscape scale due to possessing the longest Medieval road in Denmark, and in site scale due to being the first castle in Denmark with a flanking tower (Kalø Tower); in site scale due to the gates of the castle without *mocheta* (Matrera Castle). After the restoration implementations,

these rare qualities have been all preserved. As a result, restoration implementation do not have a negative impact on preservation of rarity value in any of the examples in Turkey (2 of 2) and abroad (2 of 2) (Figure 4.6).

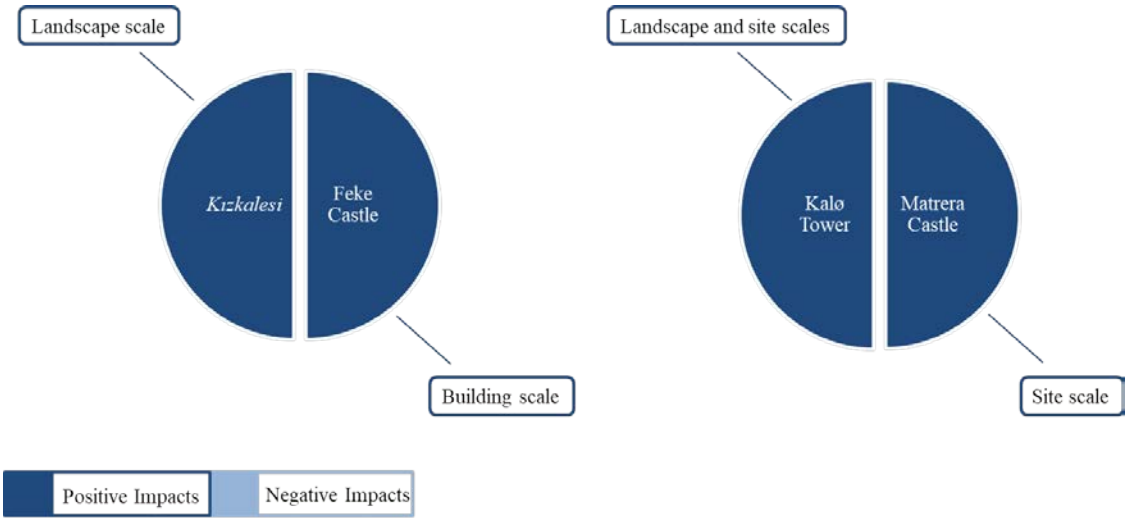

Figure 4.6. Impacts of current implementations on rarity value

Memory value: Two of three case studies in Turkey had memory value prior to restoration implementations: due to Shahmaran myth associated with Yılan Castle (building scale); Heaven - Hell Caves associated with a Greek myth near the Korykos archaeological site (landscape scale), and Kızkalesi myth associated with the sea castle (building scale).

In four of the four examples from abroad, memory value had been sustained prior to restoration implementations. The reasons behind this preservation state were tangible, e.g., the martyrdom of St. Sergius in Resafa (site scale) and the hermitage near the Matrera Castle (landscape scale), and intangible qualities, e.g., several legends associated with Kalø Tower (building scale) and Pombal Castle (site scale). As a result, memory value of all the cases from Turkey (2 of 2) and abroad (4 of 4) has been transmitted to future generations (Figure 4.7). So, restoration implementations do not have any physical effect on the memory value.

Against the cultural decay and homogenization of societies due to threats of conflicts, mass tourism and urban development, etc., interactive communication with local people and sustaining their customs by benefiting from non-formal (e.g.

narratives, rituals, etc.) and formal techniques (e.g. multimedia equipments, digital technologies, etc.) should be encouraged in all sites (ICOMOS, 2008b).

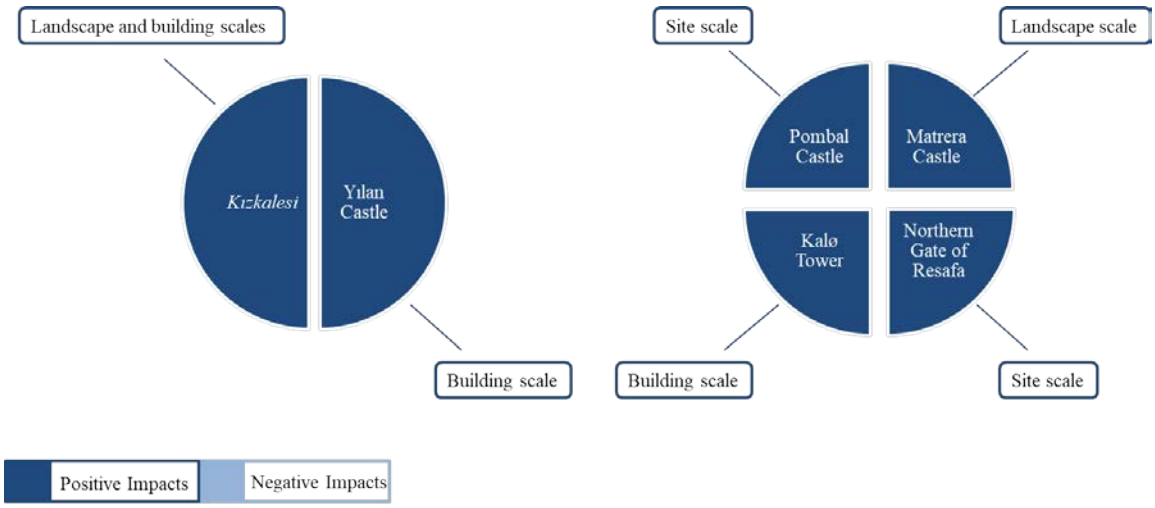

Figure 4.7. Impacts of current implementations on memory value

4.2. Success in Solving Conservation Problems

Accessibility problems: Two of three cases in Turkey had accessibility problems in landscape scale prior to restoration implementations. The reasons behind these problems were lack of public transportation and guidance (Yılan and Feke castles), and narrowness of road that leads to the castle on hillside (Yılan Castle). None of these problems are solved in the project and implementations.

In site scale, there were accessibility problems, while climbing up and touring around two of three defense structures in Turkey (Yılan and Feke castles) prior to restoration implementations: e.g., lack of a visitor path, dense vegetation on hillside, slippery ground due to debris, etc. During the restoration, dense vegetation was cleaned in both sites. However, due to lack of regular maintenance, the accessibility problems have reoccured.

All three case studies had accessibility problems at building scale prior to restoration implementations. The reasons behind these problems were massive rocks that blocked entrances (Yılan Castle), dense vegetation in courtyards (Yılan and Feke

castles), slippery ground due to unstable rocks and debris (Yılan and Feke castles), inadequacy of a pier that provided visitor access to castle and ruined stairs that provided access to upper floors of castle (*Kızkalesi*). In order to raise public awareness about cultural heritages and their values, accessibility of sites should be considered (UNESCO, 1957; ICOMOS, 2017). However, in one of three case studies, visitors' access to the site and upper floors of the castle is provided via organizing the pier, construction of steel frame staircases and reintegration of authentic stone stairs (*Kızkalesi*). In restoration project of the other two castles (Yılan and Feke castles), nothing is proposed for solving accessibility problems, except partial cleaning dense vegetation and debris in the courtyards. However, due to the lack of regular maintenance, these continue to be problems for accessibility. Also, in Feke Castle, inappropriate position of accumulation of revealed stone blocks during the restoration in some places of the courtyards and buildings act as obstacles for accessibility.

There were accessibility problems in three of four cases abroad (excluding Resafa) at landscape scale prior to restoration implementations. In two of three cases, these problems were solved by providing public transportation to the site and consolidation of the existing Medieval path (Kalø Tower), designing roads and visitor paths (Kalø Tower and Pombal Castle), and cleaning dense vegetation of the hill (Pombal Castle). However, in Matrera Castle, the accessibility problems stemming from rough path leading to the castle, lack of orientation boards and dense vegetation on hillside continue. Also, the fluctuations in water level continue to threaten authentic accessibility via the path in Kalø Tower. As a result, while accessibility problems were solved to some extent in European examples (2 of 3), this subject was ignored in restoration projects in Turkey (0 of 2) (Figure 4.8).

In site scale, restoration projects of the two of three cases put an end to the accessibility problems via consolidation of a drawbridge at the entrance of Kalø Castle, and cleaning of vegetation around the castle and providing visitor paths with resting areas and platforms in three different areas of Pombal Castle that were designed with different approaches. However, although Matrera Castle is a place located on a popular hiking and trekking route, the accessibility problems continue in the site. The implementations abroad compared to cases in Turkey consider accessibility issue in the restoration projects more. For example, while the implementations in Pombal Castle both provided accessibility and transformed the hill to living social spaces via reorganization of it, in the restoration project of Yılan and Feke castles, the surrounding

of castles and access to them were not considered sufficiently. As a result, in terms of solving accessibility problems, European cases (2 of 3) are more successful than Turkish cases (0 of 2) (Figure 4.8).

In building scale, circulation elements provide both accessibility between floors of towers, and contribute to their presentation as contemporary, reversible and distinguishable additions (Kalø Tower and the keep of Pombal Castle). In Northern Gate of Resafa, the usage of the circulation elements is dangerous due to lack of structurally durable walls of towers and wall-walks. As a result, while the restoration implementations in Europe (2 of 2) involve some good solutions in terms of circulation, the implementations in Turkey (1 of 3) and Syria (0 of 1) are relatively weak (Figure 4.8).

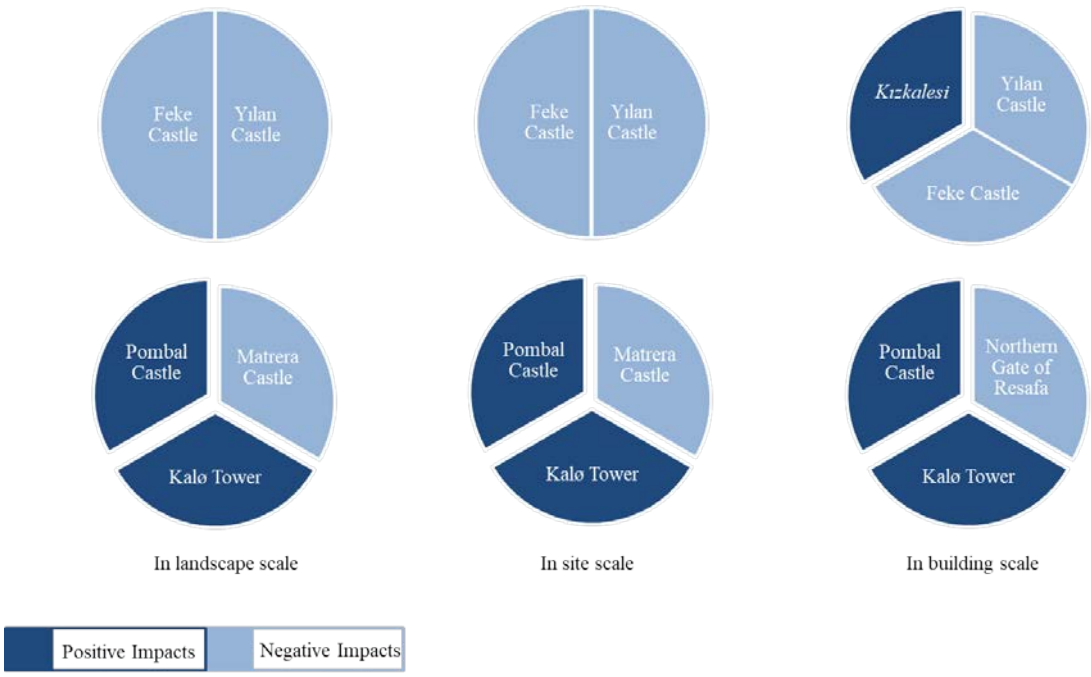

Figure 4.8. Impacts of current implementations on accessibility problems

Safety problems: In landscape scale, one of three case studies in Turkey (*Kızkalesi*) was notorious in terms of women security in the site. The undesired events threatening women were tried to be eliminated by increasing the security measures.

In site scale, two of three cases (Yılan and Feke castles) had security problems prior to restoration. The reasons were lack of visitor path and railings along it, unstable

bedrock and wall portions, steep slope and slippery skirts of hill. In restoration implementations, nothing was done for these problems, except consolidation of some wall portions. So, visitor access to castles continue to be dangerous.

In all three cases, safety problems existed at building scale prior to restoration. In one of three examples (*Kızkalesi*), visitors' safety has been ensured by consolidation of statically unstable wall portions, constructing a platform in front of the visitor entrance and placing railings around the cisterns and iron covers above the gaps in the towers and on the courtyard. However, safety problems stemming from unstable massive rocks, unstable or missing wall portions near the edges of hill and slippery ground of structures and courtyards due to debris continue in Yılan and Feke castles. In both castles, consolidation works were not planned systematically, but carried out only on some unstable wall portions.

In landscape scale, the socio-economic problems of Syria due to the Syrian Civil War have threatened both the remains and visitors' safety in Resafa. As a result, both in Turkey (1 of 1) and Syria (1 of 1), safety problems continue to threat the tourism potential of the sites (Figure 4.9).

In site scale, two of four cases abroad had safety problems due to slippery ground around the fortification walls caused by collapsed stone blocks (Matrera Castle), serious structural problems of some wall portions (Matrera Castle and Resafa), well pits and holes on the ground caused by vandalism (Resafa) prior to restoration. In Matrera Castle, due to carrying out consolidation works only in its keep, structural problems of fortification walls continue to be safety risk for visitors. Also, in Resafa, nothing was implemented to solve these problems. As a result, the examples neither in Turkey (0 of 2) nor abroad (0 of 2) have been successful in terms of solving safety problems, which were dedected prior to restoration interventions at site scale (Figure 4.9).

Safety problems existed in three of four cases abroad (Kalø Tower, Matrera Castle and Resafa) at building scale prior to restoration implementations since there were no conservation measures for the structures. Safety necessities were fulfilled in the restorations to some extend by enclosing structures with a fence (its design and position is aesthetically arguable) (Kalø Tower) and consolidation of structures (Matrera Castle). However, safety problems continue due to structural problems of structures in Resafa. As a result, the examples in Turkey (2 of 3) are relatively more dangerous for visitors at single building scale compared to the cases abroad (1 of 3) (Figure 4.9).

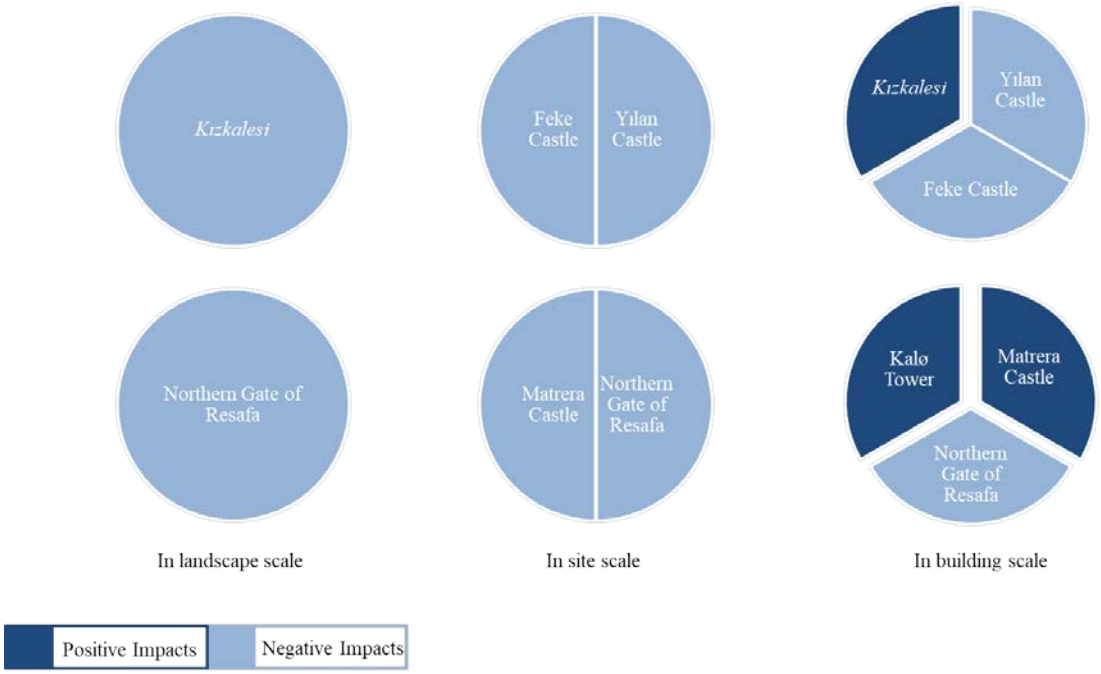

Figure 4.9. Impacts of current implementations on safety problems

Functional problems: All three case studies were abandoned before the current implementations. They have been reused as open-air museums. However, none of them fulfill the requirements of this function: unscientific implementations in the site that damage the authenticity (Feke Castle), insufficient measures for solving accessibility, safety, structural and presentation problems (Yılan and Feke castles), lack of regular maintenance (Yılan and Feke castles, *Kızkalesi*) and lack of environmental management plan (Yılan and Feke castles, *Kızkalesi*). Compatible use that respects and enriches cultural heritage values, and corresponds the social and economic characteristics of local people should be encouraged (ICOMOS, 1967; ICOMOS Canada, 1982). However, beside the open-air museum function, *Kızkalesi* is also proposed to be used as a cultural space. But, this is not a compatible use due to construction of a stage in the courtyard, usage of a tower room as a service room of the cafe and making organizations in the courtyard such as concerts, wedding ceremonies and special invitations. These implementations may damage the castle.

All four cases abroad were abandoned before the current implementations. Three of four examples have compatible use. Kalø Tower has been refunctioned as visitor access that provides to perceive the archaeological remains in the site and picturesque landscape, and become a social platform for visitors. Also, this project become pioneer

for revitalization of the National Park and designing the visitor center project near the tower. Pombal Castle and its hill was designed with various uses in different places: the slopes of the hill as a resting area with a cafeteria, surrounding area of the Santa Maria's Church as a public space for performances and cultural activities, and the keep as a museum and exhibition space. Matrera Castle has been functioned as a landscape landmark that is an attraction point on a hiking and trekking route. Although it is aimed to reuse Resafa as an open-air museum, due to the war and its impacts on the researches in the site and security of both the remains and visitors, the archaeological site is still like an abandoned place. As a result, while European examples have different compatible uses (3 of 3), defense structures in Turkey (3 of 3) are re-functioned only as open-air museums. But none of the cases in Turkey can perform the museum function fully. However, among all examples, Syrian case fails (1 of 7), because it is still in an abandoned state (Figure 4.10).

For all seven examples, continuous use of cultural assets should be encouraged (ICOMOS Canada, 1982). However, carrying capacity of the sites in terms of vehicle and visitor numbers should be considered in accordance with a management plan.

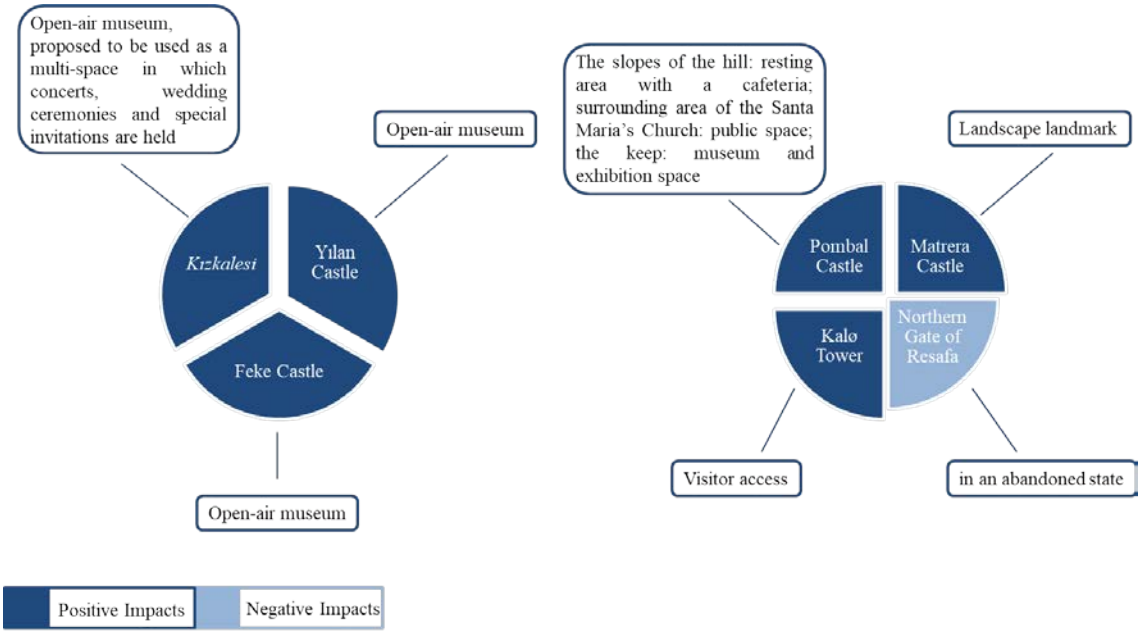

Figure 4.10. Impacts of current implementations on functional problems

Structural and material problems: The cultural landscapes of all case studies are under threat of earthquake (Yılan Castle), soil erosion (Yılan and Feke castles, Korykos), fractured bedrock, active quarries near structures (Yılan Castle).

In site and building scales, the remains of all cases in Turkey had structural and material problems due to weathering, vandalism, rain penetration, rising damp, etc. before the restoration. Also, past implementations carried out with unscientific methods and incompatible material e.g. cement (Feke Castle and *Kızkalesi*), and incompatible use of some structures before the current restoration (*Kızkalesi*) have damaged the ruins. So, conservation works are required for the ruins. However, conservation activities were carried out unsystematically in all case studies. While some wall portions are preserved, there is no intervention at some wall portions that have structural and material problems. The implementations in all three cases are irreversible with incompatible material (new injection materials, metals, coating of paraloid B72 (*Kızkalesi*), etc.), destructive techniques (cleaning with micro-blasting technique in Yılan Castle), and wrong conservation measures (covering partly unearthed stairs with hard capping in Feke Castle instead of presenting or reburying), so they may damage the authentic stone blocks. Reintegration, reconstruction and addition have given way to aesthetic problems in all cases. In two of three cases (Yılan and Feke castles), vandalism continues to damage the ruins due to insufficient monitoring and lack of controlled access to the sites. Regular maintenance is not achieved fully in any of the cases.

Natural disasters such as earthquakes (Pombal Castle and Resafa), soil erosion (Pombal Castle), landslide (Matrera Castle), high tide (Kalø Castle), flooding (Kalø Castle and Resafa), wind and water erosion, and dust storms (Resafa) threaten the cultural landscapes of the case studies abroad. As a result, it is necessary to consider preservation of cultural assets at landscape scale in all cases from Turkey and abroad (7 of 7) (Figure 4.11).

All four examples (especially Matrera Castle) had structural and material problems stemming from weathering, rising damp, vandalism, etc. Three of four examples have been damaged due to the wrong conservation measures and past implementations that were carried out in 20th century with unscientific methods and incompatible material e.g. cement. However, in Matrera Castle, beside the other causes, lack of maintenance also damaged the remains. Also, the war in Syria gave way to damages especially the fortification walls of Resafa. Except Pombal Castle, while defense structures of other three studies have been considerably preserved in building

scale, the fortification walls have been in a poor conservation state or were demolished. However, the fortification walls of Kalø Castle were consolidated before the current implementations. Especially in Matrera Castle, the implementations that were carried out with reversible techniques and compatible material saved its keep from destruction. But, structural and material problems continue in the fortification walls of Matrera Castle, and both in fortification walls and Northern Gate of Resafa due to absence or unsystematic consolidation and reinforcement works. The implementations of all four examples are generally reversible and compatible. However, there is no protection in three of four examples (except Pombal Castle) against possible vandalism due to lack of the controlled access. As a result, while the implementations are generally irreversible and incompatible in Turkey (3 of 3), it can be evaluated that the cases abroad (3 of 4) are conserved with reversible techniques with compatible material (Figure 4.11). Also, the conservation of fortification walls has not been given sufficient importance in some cases abroad (2 of 4).

The charters recommended that interventions should be minimum and reversible, and contemporary additions and reintegrated wall portions should be in harmony with the structure and its surrounding (ICOMOS, 1964; ICOMOS Canada, 1982; ICCROM / UNESCO, 2000). When the case studies in Turkey and abroad are compared, it is seen that the implementations in Turkey take the charters less into consideration. Contrary to the recommendations of the charters, the efficiency and long-term effects of the new materials were not examined before the restoration works (ICC, 2000; ICOMOS, 2003). For all seven case studies, regular maintenance is important for sustaining preservation of the structures (ICOMOS Canada, 1982; ICOMOS New Zealand, 2010).

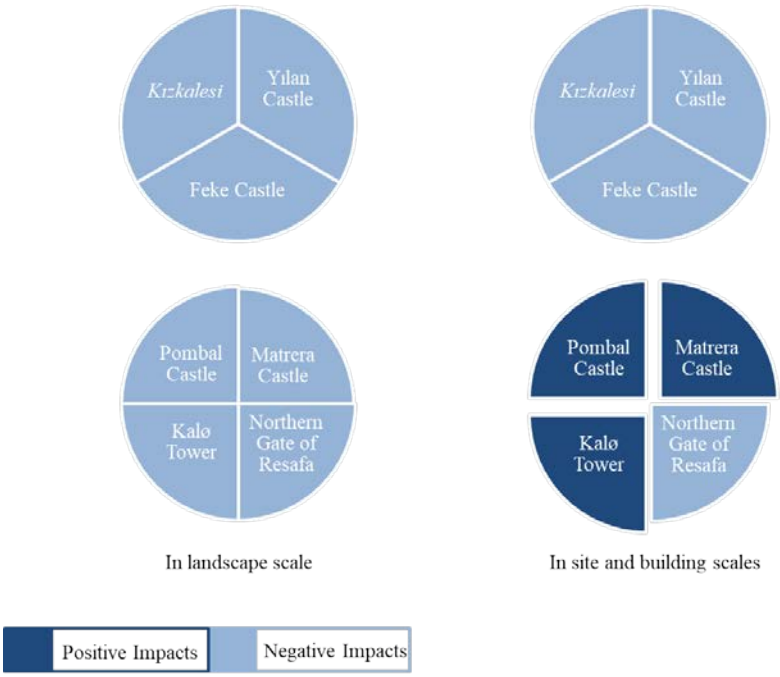

Figure 4.11. Impacts of current implementations on structural and material problems

Presentation problems: All three cases are located in places that have important tourism potential in terms of tableland and whitewater tourism (Feke Castle) and sea-sand-sun tourism (*Kızkalesi*). However, none of them can contribute enough to the cultural tourism potential due to lack of preservation, presentation and recognition of the cultural assets, service facilities, infrastructure and safety. In *Kızkalesi*, while projects have been developed to increase its international recognition, uncontrolled development of sea-sand-sun tourism has put pressure on the cultural assets in the site.

In site and building scales, before the current restoration projects, all three cases in Turkey were not presented, and due to being covered partially or completely with debris, they could not be completely conceived. Debris and earth was removed in large extent from all sites. However, some structures revealed are not presented, and accumulation of revealed stone blocks in the castle gives way to accessibility problems in Feke Castle. Also, service facilities were not provided before the projects. In Yılan Castle, a cafe, toilet, electric poles along the path leads to the castle and an electric transformer for illumination were provided, but they are aesthetically incompatible with the castle. Also, in *Kızkalesi*, there were lighting equipment outside the castle walls that were no longer unusable. In one of three studies (*Kızkalesi*), visitors' interest to the site has increased after the current restoration project. Presentation and service facilities

were provided to a large extent in two of three studies (except Feke Castle), but they are inappropriate in terms of being inadequate in number and useless (Yılan Castle), being too much and non-durable materials against weathering (*Kızkalesi*), and unaesthetic. In two of three examples, some presentation works have given damages on authentic structures: e.g. covering some revealed structures with hard capping (Feke Castle), the impacts of construction material of new structures (toilet and transformer substation) due to being attached to the remains, usage iron nails on authentic stone blocks to assemble lighting elements (*Kızkalesi*), etc.

The implementations in three of four cases abroad (except Resafa) contribute to promotion of their cultural landscape and make them tourist attractions. As a result, while the cases abroad (3 of 4) are good examples in terms of contributions of their restoration projects to tourism, the cultural landscapes cannot be utilized efficiently in terms of tourism in Turkey (3 of 3) (Figure 4.12).

Before the current restoration projects, there was lack of presentation and service facilities for fulfilling visitor needs in all four cases abroad at site and building scales. In three of four studies (except Resafa), these projects have provided to increase visitor experience and number of visitors, so the sites have become tourist attractions. In two of four examples (Kalø Castle and Pombal Castle), visitor center, parking lot, visitor paths, cafe, toilet, information boards, trash cans, resting areas, benches and virtual reality equipments, etc. are provided. In Kalø Castle, the physical experiences of visitors are enriched with the help of virtual reality app, and the visitor access of the tower that enables visitors to perceive archaeological layers of the site and the beauty of the landscape, and socialize with other people. Presentation of Pombal Castle is considered together with its hill with different design approaches in different places: e.g., different material usage in pavements and new constructions, different structures and their functions, etc. The hill has become a living social place with the help of resting areas, cafeteria, public spaces for performances and cultural activities around the church, etc. The castle is not only functioned as an open-air museum, it also provides an enjoyable and informative experience via audiovisual equipment in visitor center, interactive games and different cultural activities that compatible with the authentic structures in the courtyard, and virtual reality and multimedia equipment in the keep. In three of four examples (except Resafa), presentation of structures in site and building scale is provided with contemporary and distinguishable additions, but also harmonious with the authentic structures: e.g., the staircase in Kalø Tower, visitor center in the courtyard and

the staircase with a balcony attached to the keep in Pombal Castle, and reintegration with the plastered walls in the keep of Matrera Castle. The lack of archaeological researches, debris and earth above some remains (Matrera Castle and Resafa), and security problems caused by the war (Resafa) give way to presentation problems. Especially in Resafa, the restoration project of the Northern Gate has no impact on the presentation of the site. As a result, presentation approach in Turkey is to introduce formal integrity of remains via reintegration and reconstruction of missing portions, removing debris and revealing structures (3 of 3), and providing some service facilities without aesthetic concern (2 of 3). However, the presentation works of restoration projects abroad (3 of 4) add value to the sites (Figure 4.12).

The implementations abroad compared to studies in Turkey are mostly more creative and enjoyable, in harmony with authentic structures and its setting, and effective due to usage of modern technologies such as virtual reality and multimedia equipments. For example, while new structures (toilet and transformer substation) in *Kızkalesi* are not compatible with the authentic structures and also damage the spirit of the castle, visitor center in Pombal Castle is in harmony with the authentic structures by contrasting with old and new material. However, only in *Kızkalesi* from the case studies in Turkey, VR Mersin project has been developed. With a sustainable management plan, impact of tourism on natural and cultural characteristics of sites, preservation of cultural assets and providing enjoyable and educational site experience should be considered for all seven examples (ICOMOS, 1999; ICOMOS, 2015).

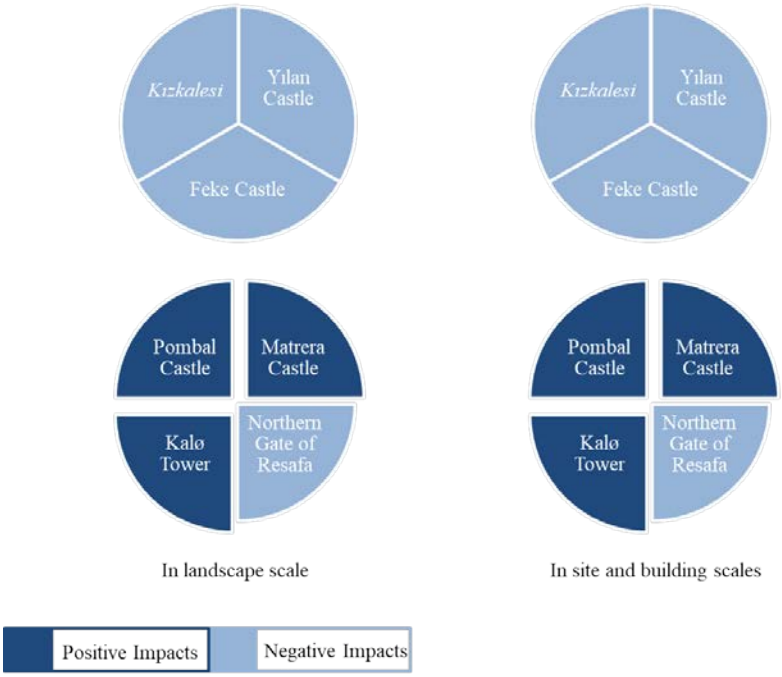

Figure 4.12. Impacts of current implementations on presentation problems

CHAPTER 5

CONCLUSION

In this study, it was aimed to evaluate current restorations and presentations in terms of their effect on cultural heritage values and conservation problems of defense structures. Three castle ruins, which are located in the present-day rural areas of Turkey, dated to Byzantine period and restored recently, were selected as case studies: Yılan and Feke castles and *Kızkalesi* in Korykos. Each case study was identified and analyzed with a holistic approach in order to understand cultural heritage values and conservation problems before and after current interventions. Effects of interventions were discussed in terms of sustaining and enhancement of the cultural heritage values, and their success in solving conservation problems at the landscape, site and building scales. Within the scope of this approach, integrity value at landscape scale, age (oldness), documentary, rarity and memory values at all three scales, authenticity and artistic values at site and building scales; and accessibility, safety, structural and material, and presentation problems at all three scales, and functional problems at site scale were evaluated. Positive and negative impacts of interventions were determined.

Integrity value is negatively affected at landscape scale by lack of a holistic approach for conservation of cultural landscape and natural environment, lack of scientific researches and conservation activities of cultural assets in the vicinity, adequately sized protection areas with buffer zones, and management plan and continuous monitoring. It was seen that picturesqueness has been mostly sustained, but extensive interventions have had a negative impact on the ruin image of defense structures. Thus, while historical and functional integrity have been sustained, physical integrity was damaged. Age (oldness) value at landscape and site scales has been mostly threatened by lack of the conservation activities that may give way to collapse or partial loss of cultural assets, and vandalism. Unsystematic interventions and over restorations have had a negative impact on age value at building scale. Although documentary value has been mostly sustained at landscape scale, natural and man-made hazards, development and lack of the conservation activities become a threat. This value has

been mostly sustained at site scale as well. Due to the perspective that sees cultural assets as a touristic object and economic resource in Turkey, there is a tendency for carrying out reintegration and reconstruction works which limit documentary value at building scale. Interventions have reduced authenticity value at site scale due to lack of documentation of restoration implementations and reliable documents, and extensive interventions. In building scale, extensive and non-reversible interventions that were carried out with undistinguishable and incompatible material, and were based on conjecture and fiction have negatively affected authenticity. Artistic value was reduced by interventions that have given way to material and presentation problems at site and building scales. In landscape, site and building scales, interventions did not affect rarity value. Memory value was not affected by interventions as well.

Accessibility problems in landscape and site scales were ignored in restoration projects. In building scale, it was seen that interventions in most of the cases did not solve accessibility problems. Although some interventions were carried out to solve these problems such as partial cleaning of dense vegetation and debris, these interventions were insufficient, and some of the interventions created obstacles for accessibility. Also, lack of regular maintenance continued these problems. It was determined that nothing was done to solve safety problems in landscape and site scales. In building scale, some interventions were carried out, but they were mostly insufficient and carried out unsystematically. So, most of the cases continue to be dangerous for visitors. Defense structures have functional problems due to limited options for their adaptive reuse. These structures were refunctioned as open-air museums. However, it was seen that there was no intervention that fulfill the requirements of this function. Structural and material problems were not considered in landscape scale. In site and building scales, the interventions were carried out unsystematically. While some wall portions were conserved, structural and material problems have continued to pose a threat to some other wall portions. Interventions were mostly irreversible due to wrong conservation measures, extensive structural consolidation, or being carried out with incompatible material and destructive techniques. There is lack of regular maintenance in all cases. The interventions did not contribute to cultural tourism potential of the cases in landscape scale. Presentation and service facilities were provided in site and building scales to some extent in most of the cases, but they are inappropriate. So, these interventions have had a negative impact on presentation of the cases. It was seen that

the presentation approach in Turkey aims to realize formal integrity of remains and provide some service facilities without considering aesthetical qualities sufficiently.

As a result, it was seen that the current interventions sustained or affected negatively the accumulated cultural heritage values. They did not enhance the values. Also, these interventions were not sufficient to eliminate conservation problems.

Current interventions carried out in defense structures reveal that Turkey is not totally faithful to the principles of international documents which it has accepted. For this reason, researches on defense structures have importance. This study contributed to the limited number of researches on conservation of defense structures. The evaluations are important as they provide guidance for future interventions in defense structures. This study also proposed a layout for evaluating interventions and their impact on values. The analytical and the comparative evaluation approach proposed in this study may be adapted for the evaluation of other historic defense structures in Turkey. Similarly, the conceptual framework including various scales, conservation techniques, components of defense structures, values and problems and the comparative approach including their before and after intervention phases and discussion with reference to abroad implementations may be utilized in conservation aimed evaluation of similar cases.

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APPENDIX A

MAPS

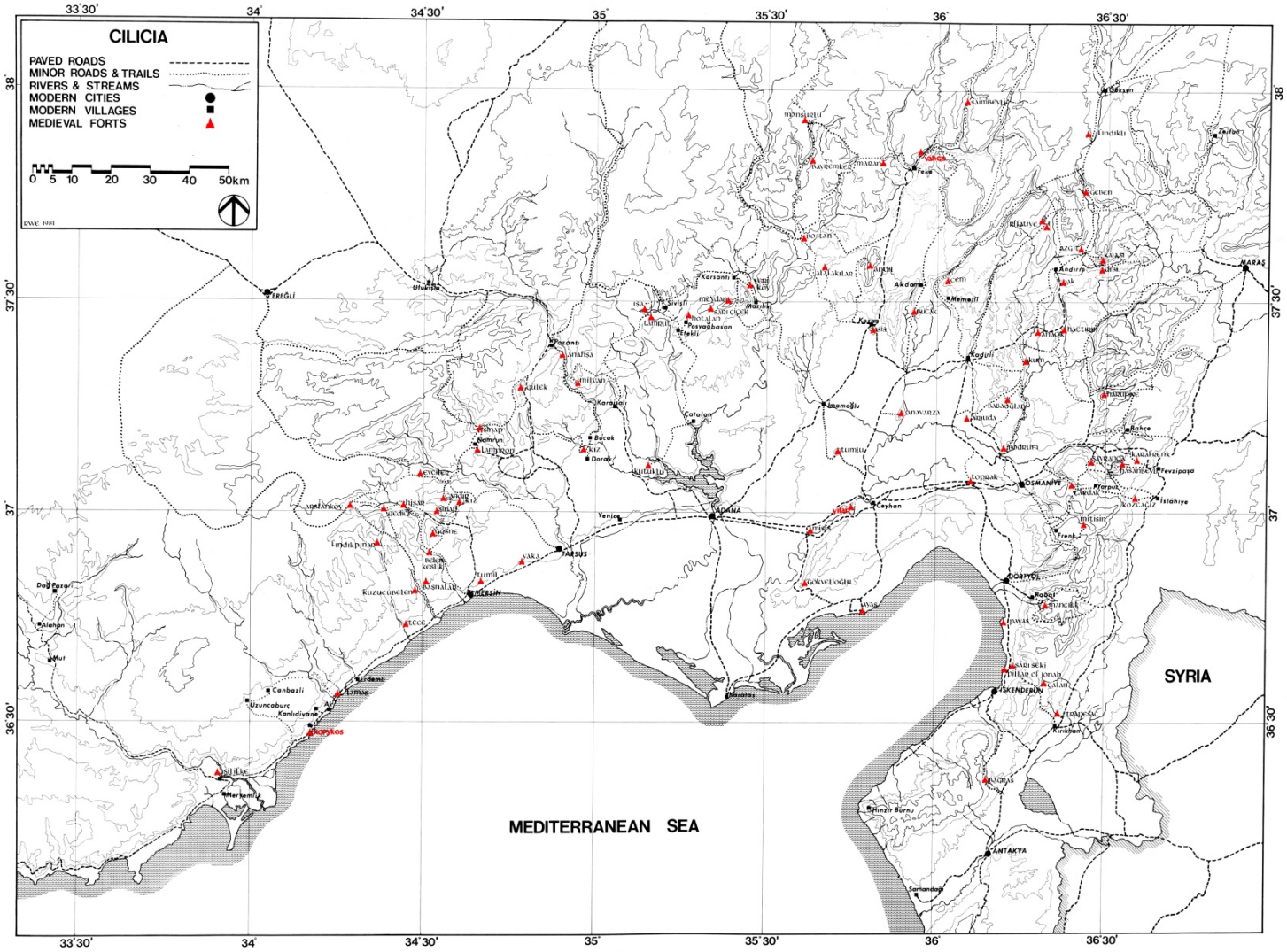
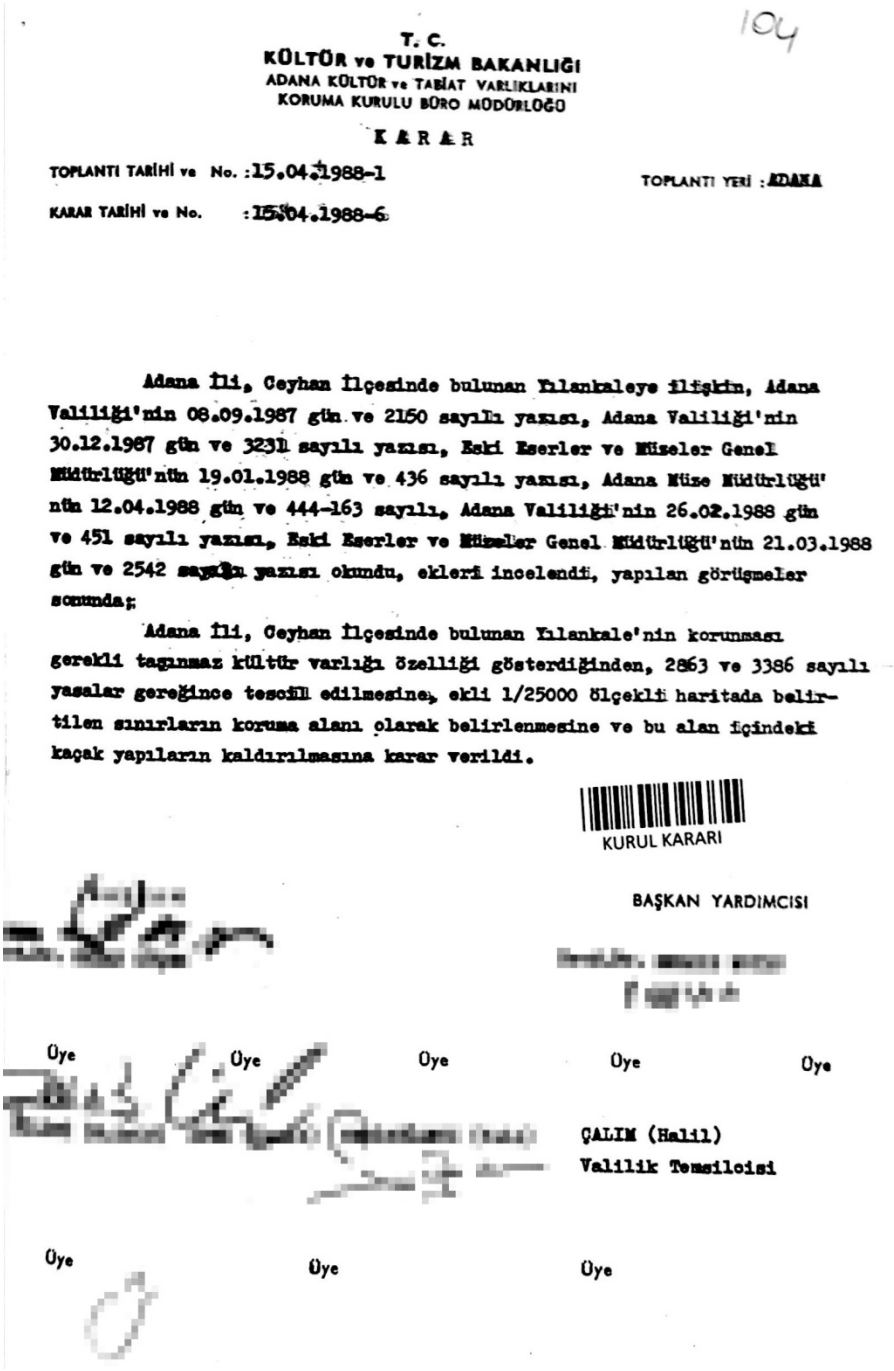


Figure A.1. Map of historic routes and Medieval fortifications in Cilicia (Source: Edwards, 1983)

APPENDIX B

ARCHIVE DOCUMENTS



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T. C.
KÜLTÜR ve TURİZM BAKANLIĞI
ADANA KÜLTÜR ve TABİAT VARLIKLARINI
KORUMA KURULU BÜRO MÜDÜRLÜĞÜ

K A R A R

TOPLANTI TARİHİ ve No. : 15.04.1988-1 TOPLANTI YERİ : ADANA

KARAR TARİHİ ve No. : 15.04.1988-6

Adana İli, Ceyhan İlçesinde bulunan Yılankaleye ilişkin, Adana Valiliği'nin 08.09.1987 gün ve 2150 sayılı yazısı, Adana Valiliği'nin 30.12.1987 gün ve 3231 sayılı yazısı, Eski Eserler ve Müzeler Genel Müdürlüğü'nün 19.01.1988 gün ve 436 sayılı yazısı, Adana Müze Müdürlüğü'nün 12.04.1988 gün ve 444-163 sayılı, Adana Valiliği'nin 26.02.1988 gün ve 451 sayılı yazısı, Eski Eserler ve Müzeler Genel Müdürlüğü'nün 21.03.1988 gün ve 2542 sayılı yazısı okundu, ekleri incelendi, yapılan görüşmeler sonunda;

Adana İli, Ceyhan İlçesinde bulunan Yılankale'nin korunması gerekli taşınmaz kültür varlığı özelliği gösterdiğinden, 2863 ve 3386 sayılı yasalar gereğince tescil edilmesine, ekli 1/25000 ölçekli haritada belirtilen sınırların koruma alanı olarak belirlenmesine ve bu alan içindeki kaçak yapıların kaldırılmasına karar verildi.

KURUL KARARI

BAŞKAN YARDIMCISI

Üye Üye Üye Üye Üye

ÇALIM (Halil)
Valilik Temsilcisi

Üye Üye Üye

Figure B.1. The decision numbered 6, dated 15.04.1988
(Source: Regional Council for Conservation, 2020)

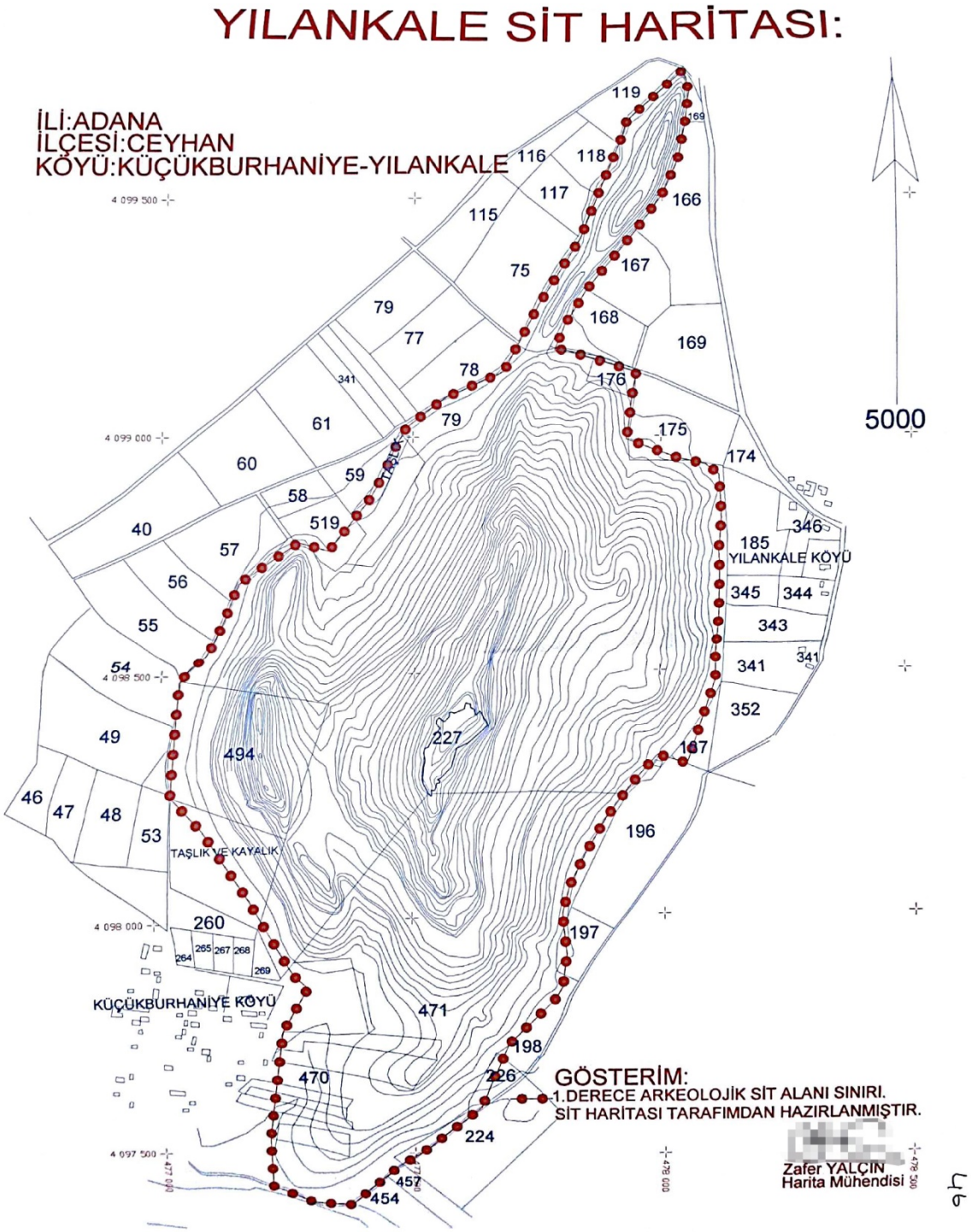

Figure B.2. Map of first degree archaeological site of Yılankale
(Source: Regional Council for Conservation, 2020)

YILANKALE

AVRUPA KONSEYİ	DOĞAL VE KÜLTÜREL VARLIKLARI KORUMA ENVANTERİ (D.K.V.K.E.)	SİT	ENVANTER NO:
TÜRKİYE	KÜLTÜR VARLIKLARI VE MÜZELER GENEL MÜDÜRLÜĞÜ		HARİTA NO:
İLİ: ADANA	İLÇESİ: CEYHAN	MAHALLE / KÖY / MEVKİİ: YILANKALE KÖYÜ	
ADI: YILANKALE		KADASTRO: PAFTA: ADA: PARSEL:	

GENEL TANIM:
Yılankalenin hayat ve tarihi Misis'le beraberdir. Fakat bu demek değildirki Yılankale Misis kadar eski değildir. Yılankale Gülek Boğazı-Adana-Misis-Ceyhan-Payas-Antakya yolu üzerindedir. Antakya yolunu emniyet almak için inşa edilmiştir. Kalenin kimler tarafındasn yapıldığı kesin olarak bilinmemekle beraber bir Ortaçağ eseri olduğu belirgindir. Yılankale halen sağlamlığını muhafaza etmektedir. Kale arazi icabı olarak şekleri tülanidir. Dört cephelidir. Muhiti 700m. kadardır. 8 burçlu tahkim edilmiştir. Burçlar ve aralan mazgallıdır. Mazgalların ortaları ateş etmek için delikli inşa edilmiştir. Kalenin içerisindeki meydandan her cepheye çıkığı saşlamak için merdivenler bulunmaktadır. Yerli halk buraya şahmaran Kalesi'de demektedir.

ŞİMDİKİ TEHLİKELER	: Şuanda faaliyetleri durdurlmuş olan taş ocaklarının tekrar faaliyete geçmesi halinde tehlike vardır.	**KORUMA DERECESİ :** 1. Derece Arkeolojik Sit Alanı
ŞİMDİKİ DURUM	: Sağlamdır.	**HAZIRLAYANLAR :** M.Akif BİLİÇ Arkeolog A.Kazım TOSUN Arkeolog
SİT POTANSİYELİ	: Kalenin çevresi nekropol sahasıdır.Kale oturumu çevresiyle birlikte korunmalıdır.	
ŞİMDİKİ KORUMA	: Kale oturum kütlesine hiç bir şekilde taş-kireç ocağı için izin verilmemesi.	**KONTROL EDEN :**
ÖNERİLEN KORUMA	: Kalenin oturum kütlesinin tabi güzelliğinin bozulmaması için kütlede hiçbir faaliyete izin verilmemesi ve kontrollerin sık aralıklarla yapılması. Nekropol alanı olan çevresinin de korunması.	
YAYIN DİZİSİ	:	**TESCİL** : A.K.T.V.K.K. **KARAR TARİHİ** : 15.04.1988 **KARAR NO** : 6
GÖZLEMLER	: Kalenin oturum kütlesi taş ocakları açımına elverişli olması ve bu yüzden taş ocakları açımına izin verilmemesi. Bu durumun Bakanlığımız denetimine alınması.	**REVİZYON :**

HARİTALAR, FOTOĞRAFLAR:

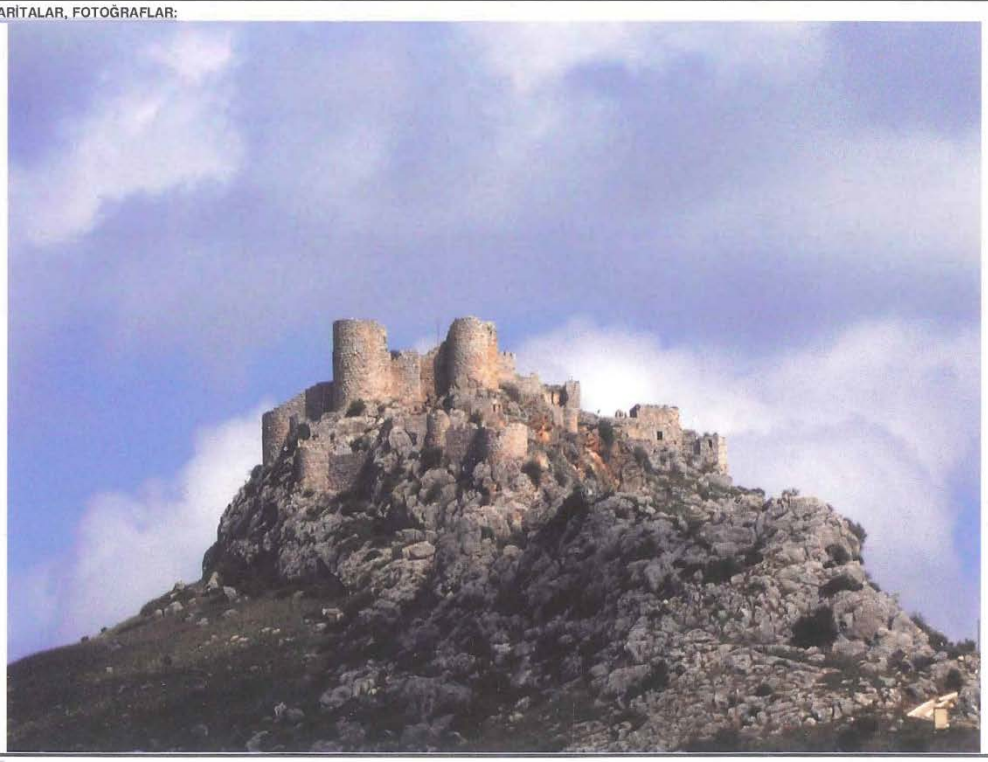

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Figure B.3. Inventory of Yılan Castle (Source: Salman, 2008, p. 182)

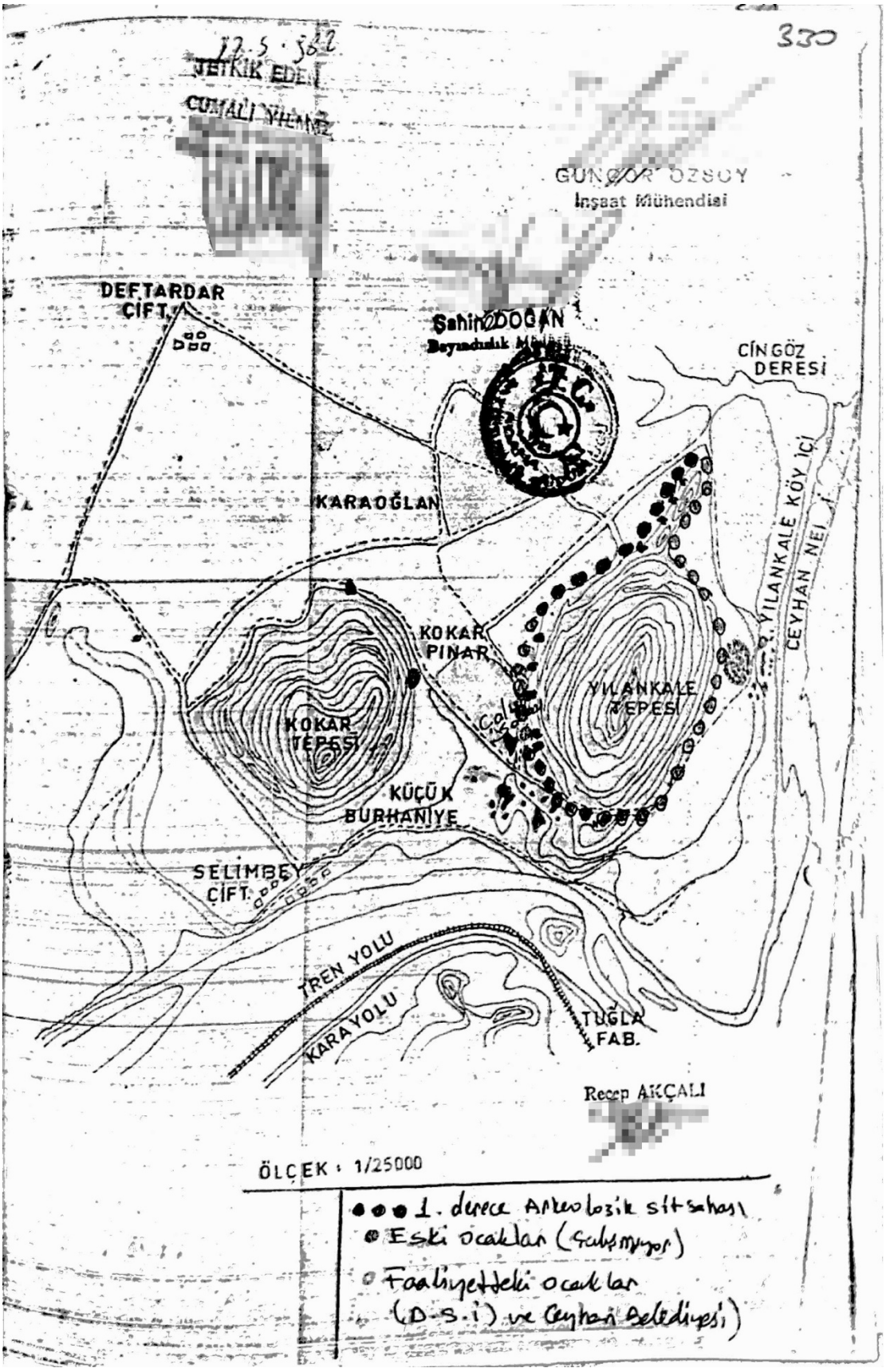

Figure B.4. Yılankale Hill and surrounding quarries
(Source: Regional Council for Conservation, 2020)

TEKNİK RAPOR

Kontrollüğü Müdürlüğümüz teknik elemanları tarafından yürütülmekte olan, Adana "Ceyhan Yılankale Restorasyonu ve Çevre Düzenlemesi (2013 – 2014 Sari) İşi" ile ilgili olarak, yapıların üzerine oturduğu kayalardaki sorunların tespiti ve müdahale yöntemlerinin belirlenmesi amacıyla Çukurova Üniversitesi, Mühendislik Mimarlık Fakültesi, Jeoloji Mühendisliği Bölümü öğretim elemanları tarafından hazırlanan "Jeolojik ve Jeoteknik Etüd Raporu" incelenmiş olup, söz konusu raporda; Yılankale'nin üzerinde bulunduğu Yılankale Tepesi'nin Andırın kireçtaşı kayaçları bindirme faylar boyunca çok uzun mesafeler hareket ettiği/taşındığı, bu esnada aşırı faylanma ve çatlak sistemleri nedeni ile dilimlendiği, aşırı bloklu bir yapı kazandığı, bu blokların derinlere doğru devamlılıklarının olmadığı, köksüz olduğu, altta bulunan serpantinleşmiş ve yer yer killeşmiş Ofiyolitli Karmaşık üzerinde yüzer konumda olduğu, bu kil tabakalarının şişme-büzülme etkisi ile erozyonlar sonucu hali hazırda aşırı faylı, çatlaklı ve değişik boyutta bloklu yapıdaki kireçtaşı temel kayası üzerindeki kaleye ait yapılarla birlikte hareket ettikleri ve hasarlara yol açtıkları belirtilmektedir. Ayrıca, Yılankale Tepesi'nin doğu yamacında kireçtaşı kayaçlarının oluşturduğu dik sarplığın başladığı yerden geçen iki ana aktif fay bulunduğu ve faylarda oluşan çok küçük hareketlerin bile rijit durumdaki üst yapıda çatlamalara neden olduğu ve yine Yılankale Tepesi'nin 600 m batısında bulunan taş ocağında yapılan patlatmaların yarattığı sarsıntıların da etkisinin olabileceği değerlendirilmiştir. Bahse konu rapordaki jeolojik değerlendirmelerin ışığında, kale yapılarındaki sorunlar değerlendirilmiş ve bu doğrultuda yapılması gerekli müdahale yöntemleri belirlenmiştir. Bu doğrultuda, şapel ve surlarda, kaya ankrajları, çelik destek uygulamaları, istinat duvarı, yük kaldırma veya hafifletme ve erozyon önleme müdahaleleri önerilmektedir. Ayrıca, H2-H3 burçları ve H kapısı önü güney giriş yönünde bulunan, stabilesi bozulmuş kaya bloklarının kaldırılması önerilmektedir. Ancak; söz konusu kaya ıslahı müdahaleleri için kapsamlı bir proje hazırlanması gerekmektedir.

Kale içerisinde bulunan şapelin ise yıkılma tehlikesi bulunmakta olup, acilen müdahale edilmediği takdirde, oluşacak bir deprem hareketi vb. sebeplerle kısa sürede yıkılması büyük bir risk olarak görülmektedir. Söz konusu raporda da belirtildiği gibi şapelin de öncelikle temel kayalarında bulunan problemlerin çözülmesi gerektiğinden, bu aşamada sadece yapının tamamen yıkılmasını önceleyecek, geçici destek (askıya alma) projesinin uygulanması gerekmektedir. Benzer şekilde, H2-H3 burçları ve H kapısı önü güney giriş yönünde bulunan, stabilesi bozulmuş kaya bloklarına müdahale edilmediği takdirde, gerek erozyon sonucu, gerekse oluşacak bir deprem hareketi vb. sebeplerle hareket etmesi, hem kaya bloklarının altında bulunan surların güvenliği hem de kale ziyaretçilerinin can güvenliği açısından büyük bir tehlike yaratmakta olduğundan, bu kaya bloklarına acilen müdahale edilmesi gerekmektedir.

Sonuç olarak; acil müdahale edilmesi gereken şapel için geçici destek (askıya alma) projesi ile yine acil müdahale edilmesi gereken, H2-H3 burçları ve H kapısı önü güney giriş yönünde bulunan, stabilesi bozulmuş kaya bloklarına yönelik müdahale raporunun, Adana Kültür Varlıklarını Koruma Bölge Kurulu'nda değerlendirilmesi gerektiği görüşündeyiz.
03.11.2015

Taylan KESKİN
İnşaat Mühendisi

006424

Restoratör

Figure B.5. Technical report dated 03.11.2015
(Source: Regional Council for Conservation, 2020)

KOKARTEPE NEKROPOLÜ

AVRUPA KONSEYİ	DOĞAL VE KÜLTÜREL VARLIKLARI KORUMA ENVANTERİ (D.K.V.K.E.)	SİT	ENVANTER NO:
TÜRKİYE	KÜLTÜR VARLIKLARI VE MÜZELER GENEL MÜDÜRLÜĞÜ		HARİTA NO:

İLİ: ADANA	İLÇESİ: CEYHAN	MAHALLE / KÖY / MEVKİİ: ALTIKARA KÖYÜ KOKARTEPE MEVKİİ	
ADI: KOKARTEPE NEKROPOLÜ		KADASTRO: PAFTA: ADA: PARSEL:	

GENEL TANIM:

Kokartepe'sinin güney yamacında yeralan mezarlar doğal kireçtaşına oyularak yapılmıştır. Mezar odalarına 1X2 m ebatlarındaki oldukça düzgün girişlerden girilmektedir. Kaya mezarlarından büyük bir bölümü kaçak kazılarla açılmış durumdadır. Bir kısmı ise toprak altındadır. Oldukça geniş bir alana yayılmakta ve sayıca fazladırlar.

ŞİMDİKİ TEHLİKELER	: Kokartepesi'nin doğu ve batı yamaçlarında yeralan kireç ve taş ocakları	KORUMA DERECESİ : I
ŞİMDİKİ DURUM	: Faaliyette bulunan malzeme ocakları ve dolgu malzemesi alınmaktadır.	HAZIRLAYANLAR : Gülnaz SAVRAN Müze Araştırma Oya ARSLAN Arkeolog
SİT POTANSİYELİ	: Sondaj çalışmaları yapılırsa yeni mezar odaları bulmak mümkündür. I. derece Arkeolojik sit	
ŞİMDİKİ KORUMA	: Yoktur.	KONTROL EDEN : Müyesser TOSUNBAŞ Müze Müdürü
ÖNERİLEN KORUMA	: Kokartepesi üzerinde hiç bir malzeme ocağına izin verilmemesi. Faaliyette bulunanların ise ruhsat süreleri bitiminde kapatılması.	
YAYIN DİZİSİ	:	TESCİL : Ad.K.T.V.K.K KARAR TARİHİ : 12.01.1995 KARAR NO : 2034
GÖZLEMLER	: Mevcut mezarlarda kaçak kazı yapılmaktadır. Bir kaç çadırdan oluşan bir yerleşim ve hayvancılık mevcuttur.	REVİZYON : Ad.K.T.V.K.B.K. 18.12.2007/3385

HARİTALAR, FOTOĞRAFLAR:

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Figure B.6. Inventory of Kokartepe Necropolis (Source: Salman, 2008, p. 206)

SİRKELİ HÖYÜĞÜ

AVRUPA KONSEYİ	DOĞAL VE KÜLTÜREL VARLIKLARI KORUMA ENVANTERİ (D.K. V.KE.)	SİT	ENVANTER NO:
TÜRKİYE	KÜLTÜR VARLIKLARI VE MÜZELER GENEL MÜDÜRLÜĞÜ		HARİTA NO:

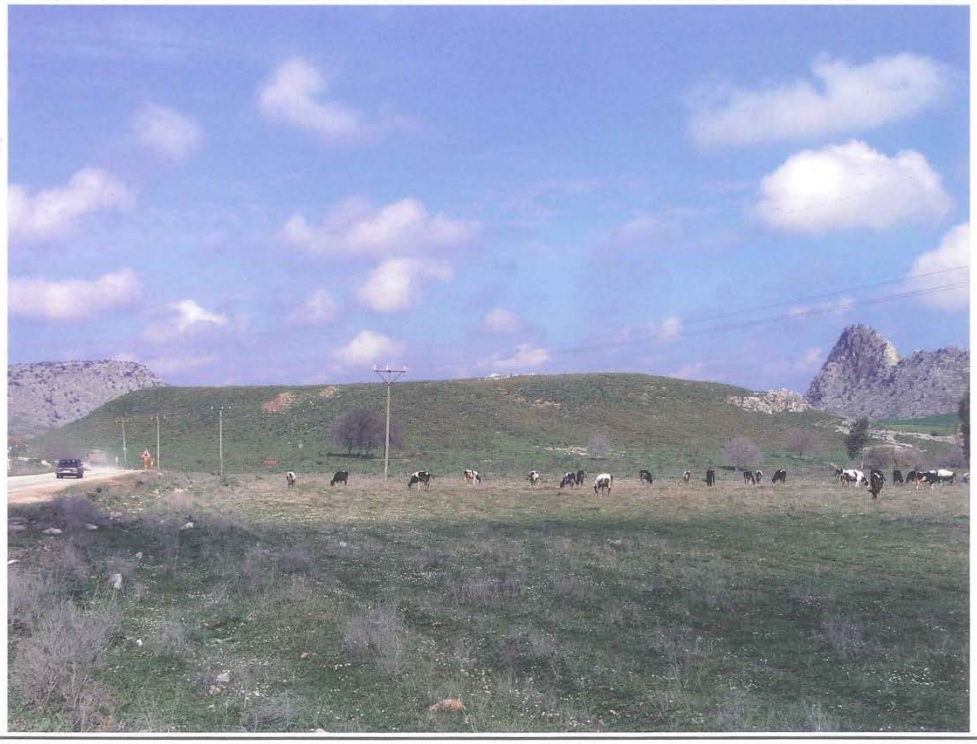
İLİ: ADANA	İLÇESİ: CEYHAN	MAHALLE / KÖY / MEVKİİ: SİRKELİ
ADI: SİRKELİ HÖYÜĞÜ		KADASTRO: PAFTA: Mer.035-d3-III-C ADA: PARSEL: 17

GENEL TANIM:

Höyük doğuda Seyhan Nehri, batısında eski Adana-İskenderun asfaltı, kuzeyinde Ceyhan nehri ve 516 nolu parsel ve güneyinde ise Sirkeli köyü drenaj kanalı ile sınırlanmaktadır. Höyük 17-A nolu parselde merkezi yükselti göstermektedir. Yükselti 17-B parsele tatlı bir meyille alçalmaktadır. 17-B Höyük uzantısıdır. 11 nolu parselde Höyük sekisi düzdür. Höyük kütlesi kalıntıları mevcuttur. Höyük üzerinde kendi devri özelliği taşıyan anıtsal yapı mevcut değildir. Höyük yükseltisi ve eteklerde yapılan incelemede ilk çağ kültür buluntuları Roma, Bizans seramik parçalarına rastlanmıştır. Höyüğün kuzeydoğusunda blok kaya yüzeyinde Hitit kralı Muvataliş'in kabartısı bulunmaktadır.

ŞİMDİKİ TEHLİKELER	: Höyüğün güney uzantısı üzerinde ter edilmiş tuğla ocakları, kaçak kazı ve yerleşim olması.	KORUMA DERECESİ : I. Arkeolojik
ŞİMDİKİ DURUM	: Höyüğün güney uzantısı üzerinde kaçak yapılaşma olması.	HAZIRLAYANLAR : Kadir YANIK Arkeolog Müze Araştır. İsmail SALMAN Antropolog Müze Araş.
SİT POTANSİYELİ	: Korunması gerekli 1. derece Arkeolojik alan.	
ŞİMDİKİ KORUMA	: Yok	KONTROL EDEN :
ÖNERİLEN KORUMA	: Höyüğün Yılankale'ye çok yakın olması nedeniyle Höyük ve Yılankale'nin bir bekçi tayini ile müze koruması altına alınması	
YAYIN DİZİSİ	: M. Hadi ALTAY - ADIM ADIM ÇUKUROVA - 1965 Anatolia Studies	TESCİL : Ad.K.T.V.K.K. KARAR TARİHİ : 15.04.1988 KARAR NO : 4
GÖZLEMLER	: Höyük genel olarak Ceyhan nehri kavis içinde kalmakta, I. derece korunması gerekli ve ileride ilmi araştırma yapılması Kilikya tarihine ışık tutacak Arkeolojik sahadır.	REVİZYON :

HARİTALAR, FOTOĞRAFLAR:



156

Figure B.7. Inventory of Sirkeli Mound (Source: Salman, 2008, p. 156)

FEKE KALESİ

AVRUPA KONSEYİ	DOĞAL VE KÜLTÜREL VARLIKLARI KORUMA ENVANTERİ (D.K.V.K.E.)	ANIT	ENVANTER NO:
T Ü R K İ Y E	KÜLTÜR VARLIKLARI VE MÜZELER GENEL MÜDÜRLÜĞÜ		HARİTA NO:

İLİ: ADANA	İLÇESİ: FEKE	MAHALLE / MEVKİİ: ESKİ FEKE KÖYÜ		KORUMA DERECESİ	ANITSAL	X	2 3
SOKAK VE KAPI NO:		KADASTRO: PAFTA: ADA: PARSEL:			ÇEVRESEL	1	2 3
ADI: KALE	YAPTIRAN:	YAPAN:	MİMARİ ÇAĞI: ORTAÇAĞ				
	YAPIM TARİHİ:	KİTABE:	VAKFFYE:				

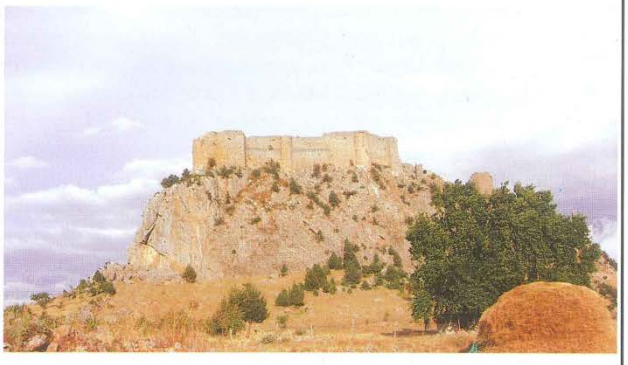
GENEL TANIM: Elips şeklindeki sert kayalık üzerine inşa edilmiş olan kalenin, dört kulesi mevcuttur. Ortaçağ kalesinin duvarları moloz taştan olup, dıştan ve içten kesme taşlarla kaplanmıştır. Güneybatı kısmında bir bölümü yıkık olan kalenin doğu kısmı ise sarp kayalıktan ibarettir.

KORUNMUŞLUK DURUMU: ORTA	TAŞIYICI YAPI: ORTA	CEPHE DURUMU: ORTA	ÖRTÜ DURUMU:	İÇ YAPI DURUMU: KÖTÜ	BEZEME DURUMU: KÖTÜ	RUTUBET DURUMU: YOK

VAZİYET PLANI

K

FOTOĞRAF:



GÖZLEMLER: Kalenin güney batı kısmında, bir bölümü yıkılmış, batı kısmında ise yuvarlak kulelerden birtanesi yıldırım düşmesi sonucunda tahrip olmuştur. Ana giriş kompleksinde yer yer tahribatlar mevcuttur. Kalenin insan tabiat olayları ile daha fazla tahrip olmamamsı için onarılarak koruma altına alınması görüşüne varılmıştır.

BUGÜNKÜ SAHİBİ: HAZİNE | **BAKIMINDAN SORUMLU OLAN:** Kültür ve Turizm Bakanlığı

YAPILAN ONARIMLAR: YOK

AYRINTILI TANIM :
Kuzey-güney istikametinde elips şeklinde yükselen tabi kayalığın savunma durumuna göre inşa edilmiş Ortaçağ kalesinin giriş kısmı güneybatısında olup, yuvarlak kemerli kapıdandır. Giriş kısmının büyük bölümü tahrip olmuş, diğer kale duvarları yeryer sağlam ve ayakta kalabilmiştir. Kalenin iç kısmında tahrip olmuş bina komplekslerinin duvarları bulunmaktadır. Kalenin orta kısmı geniş, kuzey ve güney kısımları ise dardır. Kalenin dubvarları moloztaştan olup, dıştan ve içten kesme taşlarla kaplanmıştır. Doğu kısmı sarp kayalıklarla çevrelenmiştir. Kalede ödrt edet yarım yuvarlak burç mevcuttur. çevresinde herhangi bir antik yapılanmaya rastlanılmamıştır.

TEKNİK BİLGİLER:	
ISITMA SİSTEMİ:	
KANALİZASYON:	
SU:	
ELEKTRİK:	

ÖZGÜN KULLANIMI: KALE

BUGÜNKÜ KULLANIMI: KALE

ÖNERİLEN KULLANIMI: KALE

HAZIRLAYANLAR:
A.Kazım TOSUN Arkeolog
Kadir YANIK Arkeolog

KONTROL EDEN:

YAYIN DİZİNİ:
M.Hadi ALTAY 1965

EKLER:	
RAPOR	
FOTOĞRAF	
RÖLÖVEPROJESİ	
RESTORASYON PROJESİ	
HARİTA	
KİTABE	
VAKFİYE	

TESCİL : Ad.K.T.V.K.K.Md.
KARAR NO : 31
KARAR TARİHİ : 06.05.1988

REVİZYON: Ad.K.T.V.K.K.Md. 24.09.1998-3164

132

Figure B.8. Inventory of Feke Castle (Source: Salman, 2007, p. 132)

KARA KİLİSE

AVRUPA KONSEYİ	DOĞAL VE KÜLTÜREL VARLIKLARI KORUMA ENVANTERİ (D.K.V.K.E.)	ANIT	ENVANTER NO:
T Ü R K İ Y E	KÜLTÜR VARLIKLARI VE MÜZELER GENEL MÜDÜRLÜĞÜ		HARİTA NO:

İLİ: ADANA	İLÇESİ: FEKE	MAHALLE / MEVKİİ: ESKİ FEKE			KORUMA DERECESİ	ANITSAL	X 2	3
SOKAK VE KAPI NO:		KADASTRO: PAFTA:	ADA:	PARSEL:		ÇEVRESEL	1 2	3

ADI: KARA KİLİSE (MANASTIR)	YAPTIRAN:	YAPAN:	MİMARİ ÇAĞI: GEÇ ROMA
	YAPIM TARİHİ:	KİTABE: VAR	VAKFİYE:

GENEL TANIM: Feke- Saimbeyli karayolunun solunda eski Feke yerleşim alanı içinde tescilli Feke KAlesinin güneyinde yer almaktadır.Apsisi yıkılmış duvarlar ayakta bazı müştemilatları gözlenebiliyor.

KORUNMUŞLUK DURUMU:	TAŞIYICI YAPI:	CEPHE DURUMU:	ÖRTÜ DURUMU:	İÇ YAPI DURUMU:	BEZEME DURUMU:	RUTUBET DURUMU:
Kötü	Orta	Yok	Kötü			Yok

VAZİYET PLANI

K

FOTOĞRAF:

GÖZLEMLER: Manastırın hemen kuzeyindeki düzlükte ziraat yapılıyor. Köy yerleşimi ile iç içe olması nedeniyle taşları kullanılmış, kaçak kazı nedeniyle tahrip edilmiş.

BUGÜNKÜ SAHİBİ: Hazine

BAKIMINDAN SORUMLU OLAN: Kültür ve Turizm Bakanlığı

YAPILAN ONARIMLAR: Antik çağlarda ve geç devirlerde onarım gördüğü duvar örgülerinden anlaşılmaktadır.

AYRINTILI TANIM :

Geç Roma dönemine ait manastırın dış duvarlarından kuzey yönündeki ayaktadır. Ayrıca manastır müştemilatı olduğu ve kapı üstünde kitabesi bulunan kapalı ve yer altında mekanları bulunmaktadır. Manastırın kilisesinin apsisi yıkılmış,ancak sağ ve sol duvarları ayakta durmaktadır. yapı kesme taştan, bindirme tekniğinde yapılmıştır. Ancak geç devirde onarılarak kullanıldığını belgeleyen moloz ve yer yer poligonal örgüler vardır. Kilisenin içinde manastır dış duvarında insan eliyle yapılmış büyük tahribatlar var.

TEKNİK BİLGİLER:	
ISITMA SİSTEMİ:	
KANALİZASYON:	
SU:	
ELEKTRİK:	

ÖZGÜN KULLANIMI: Manastır

BUGÜNKÜ KULLANIMI: Metruk

ÖNERİLEN KULLANIMI: Restore edilerek köy adına kullanılabilir.

HAZIRLAYANLAR:
Vedat KANTÜRK Hititolog
İsmail SALMAN Antropolog

KONTROL EDEN:

YAYIN DİZİNİ:

EKLER:	
RAPOR	
FOTOĞRAF	
RÖLÖVEPROJESİ	
RESTORASYON PROJESİ	
HARİTA	
KİTABE	
VAKFİYE	

TESCİL : Ad.K.T.V.K.K.
KARAR NO : 1420
KARAR TARİHİ : 11.03.1993

REVİZYON:

134

Figure B.9. Inventory of *Kara Kilise* (Source: Salman, 2007, p. 134)

(cont. on next page)

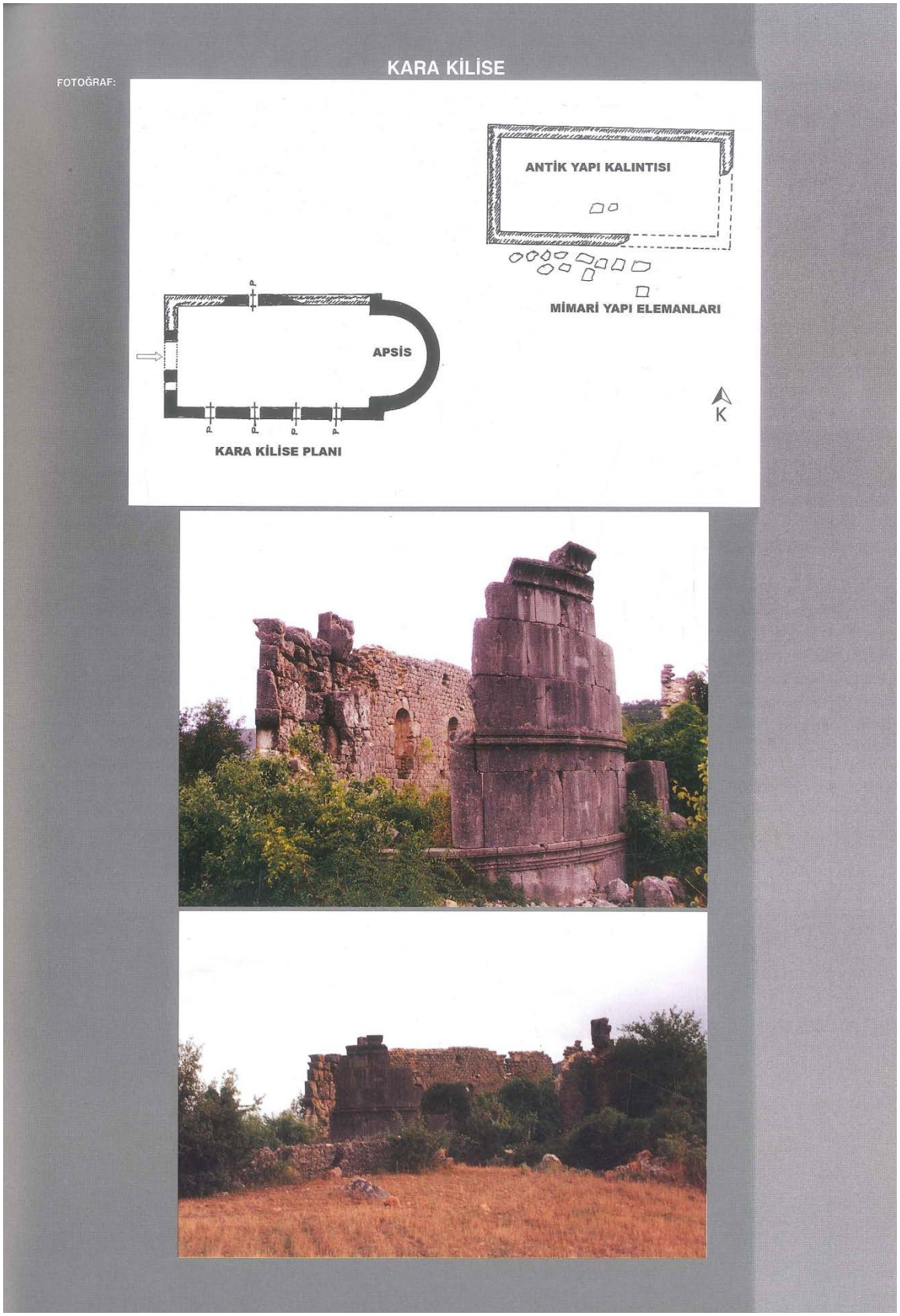


Figure B.9. (cont.)

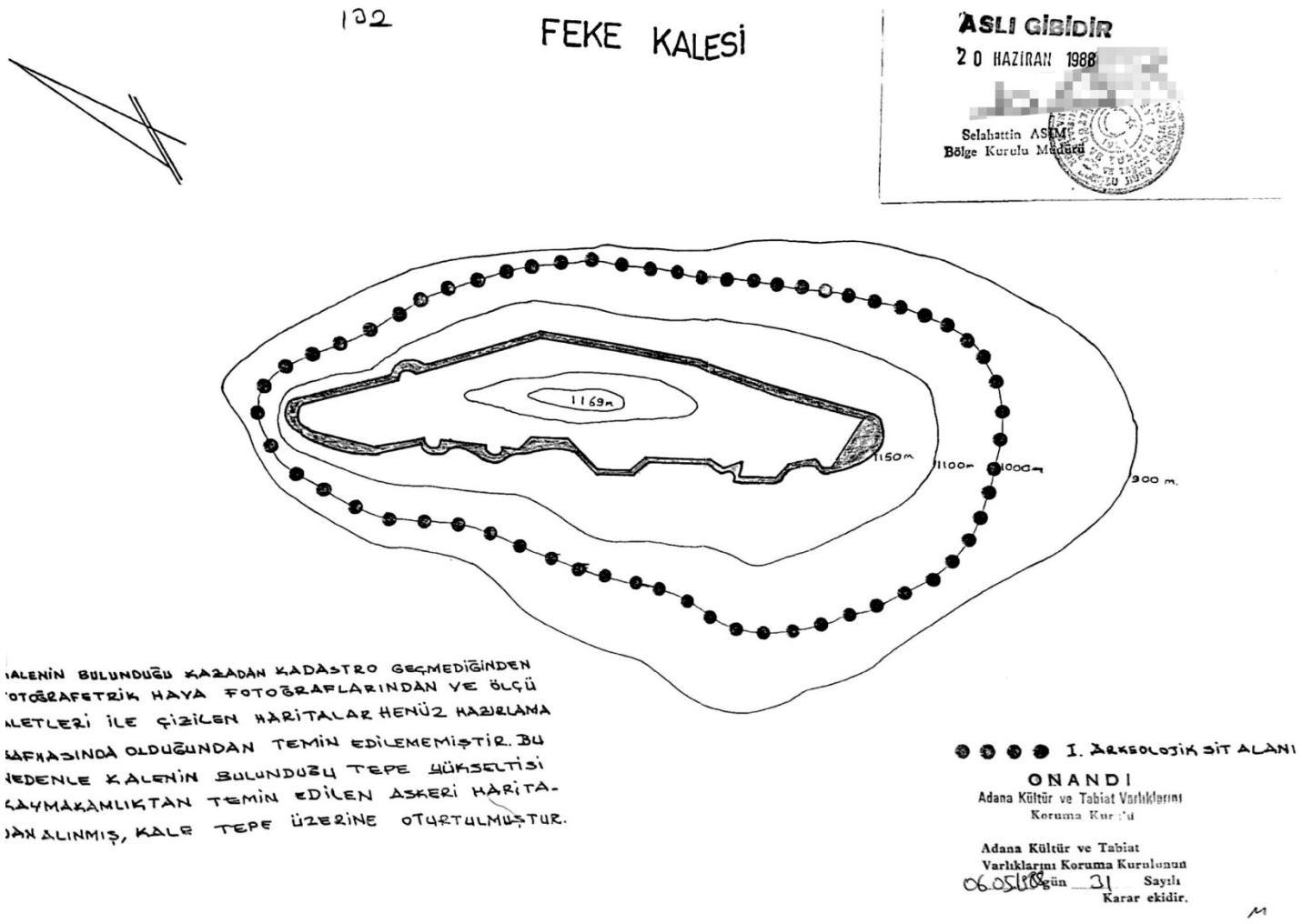


Figure B.10. Map of first degree archaeological site of Feke Castle
(Source: Regional Council for Conservation, 2020)

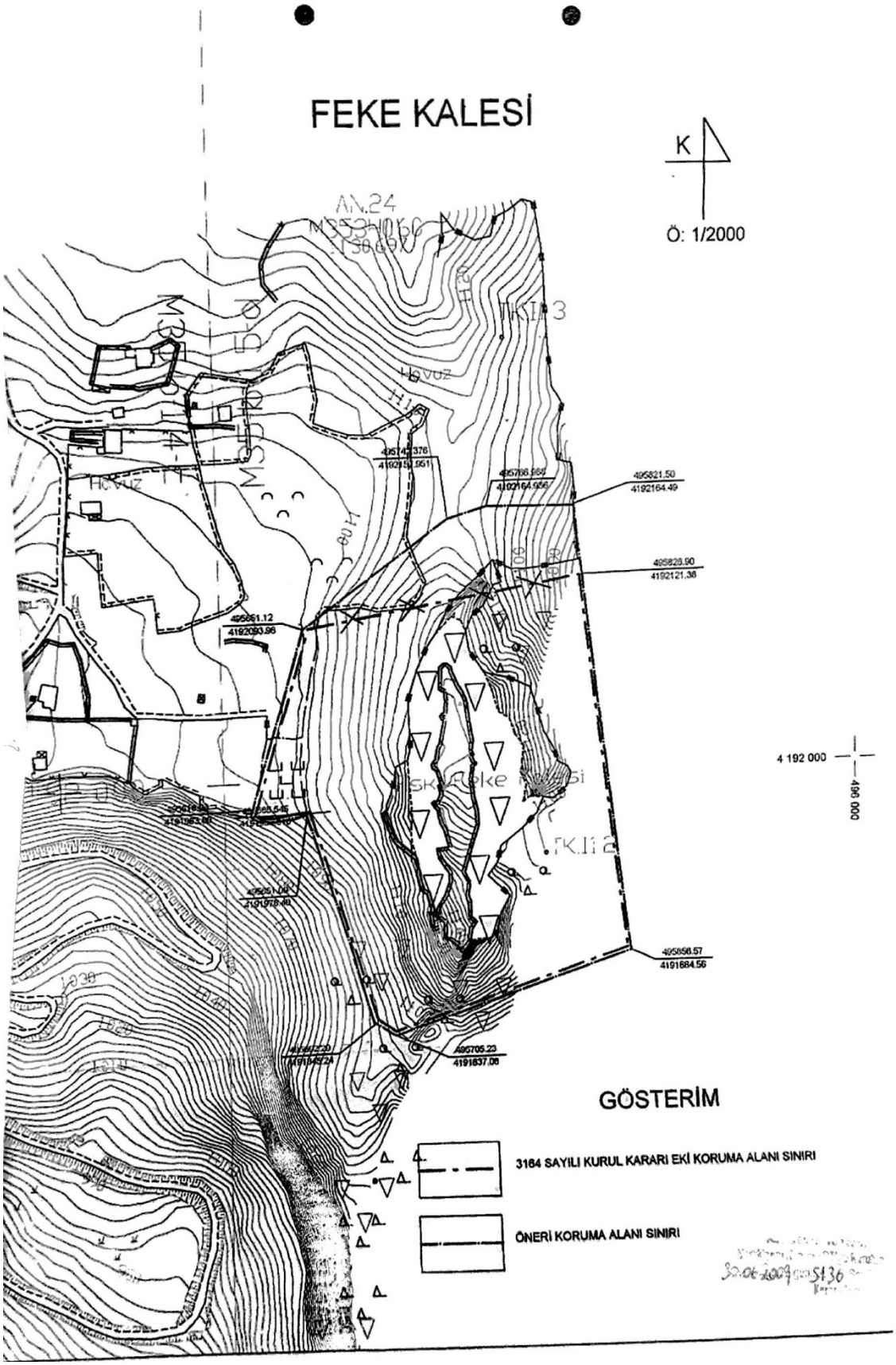


Figure B.11. Conservation site borders with the decisions numbered 3164 and 5136 (Source: Regional Council for Conservation, 2020)

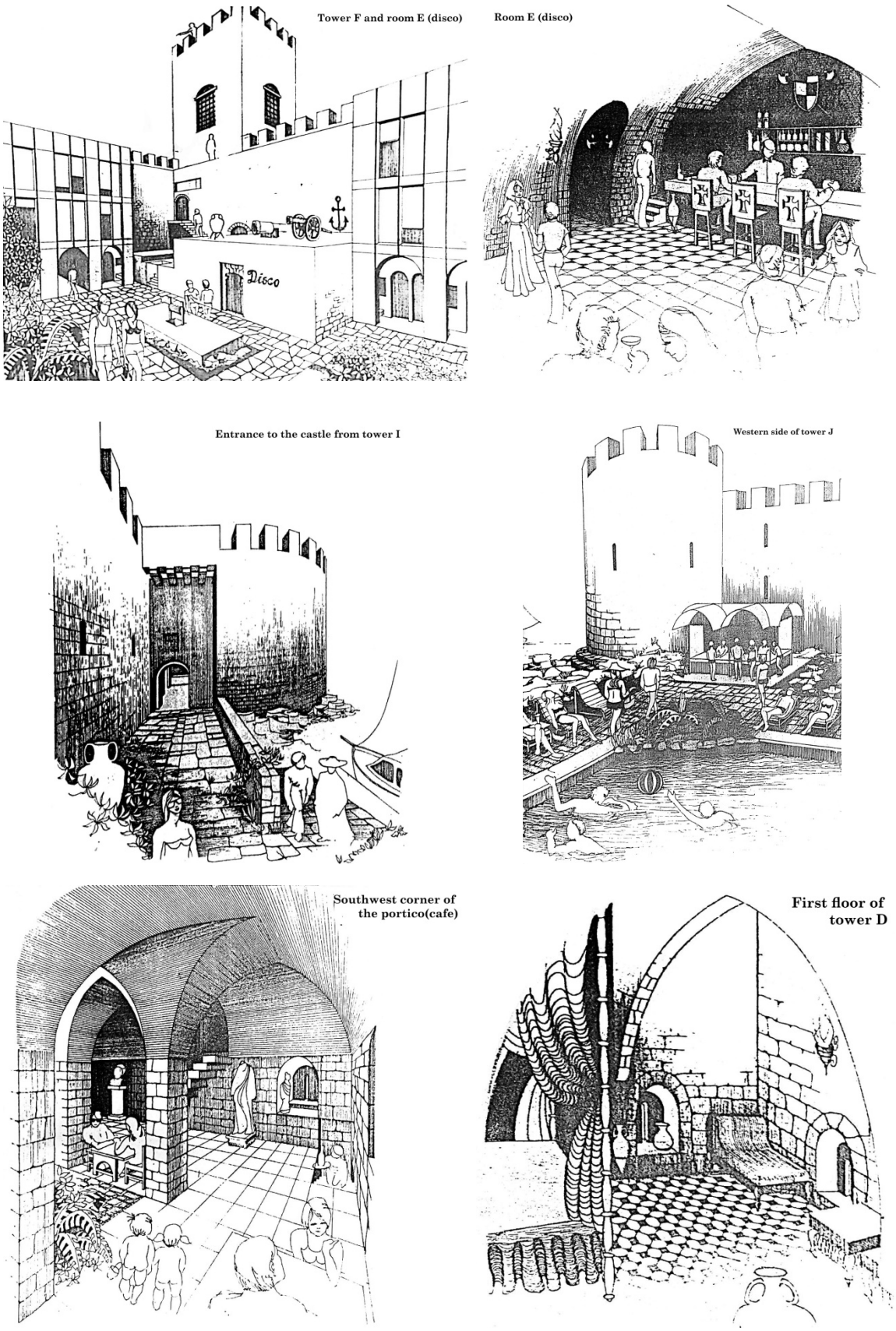


Figure B.12. Visualisation of the function of the castle in 1979
(Source: Regional Council for Conservation, 2020)

APPENDIX C

DRAWINGS

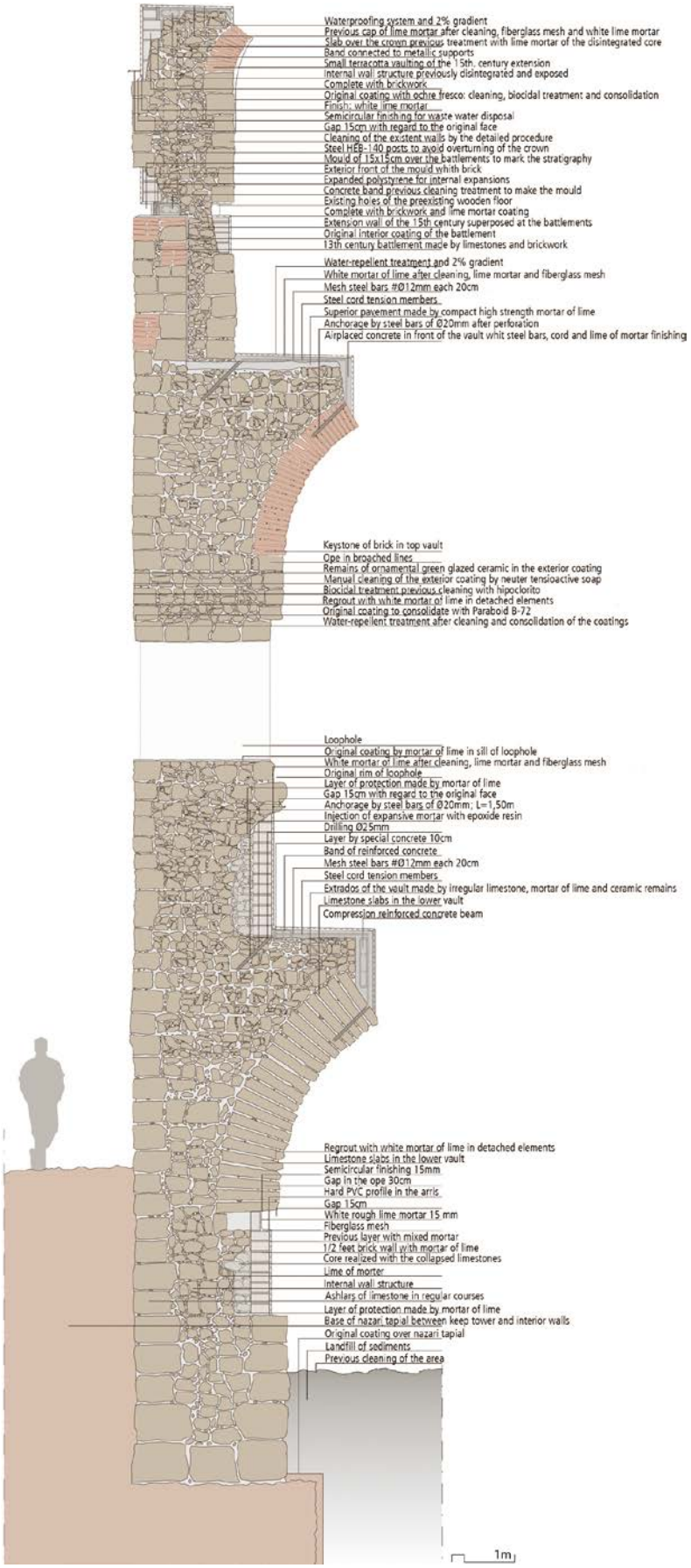


Figure C.1. Longitudinal wall section detail (Source: Carquero Arquitectura, 2016a)

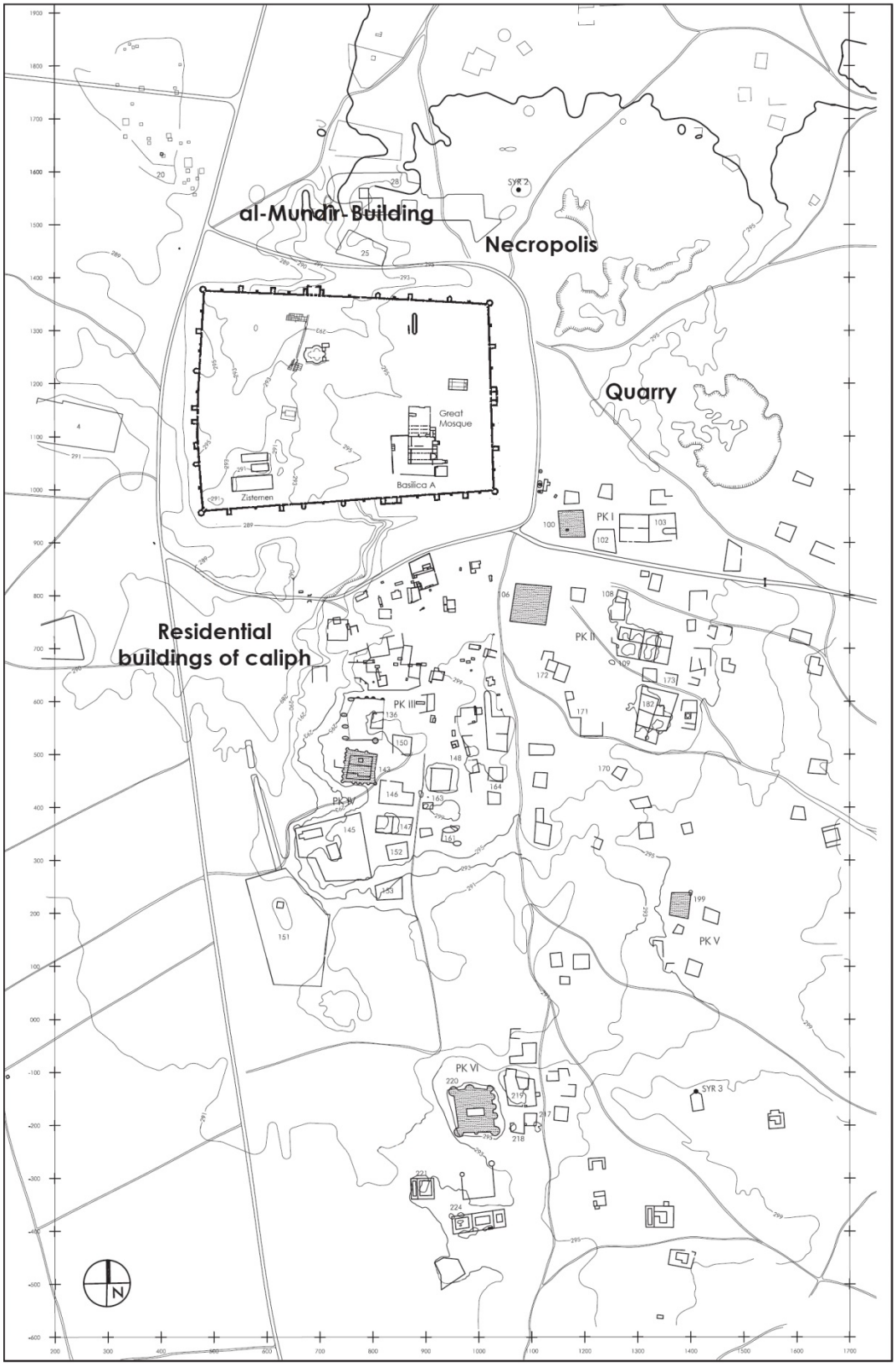


Figure C.2. Site plan of the Resafa ancient city and its surrounding
(Source: Sack et al., 2008, p. 33)

APPENDIX D

TABLES

Table D.1. Historical defense structures in present-day rural context of Anatolia

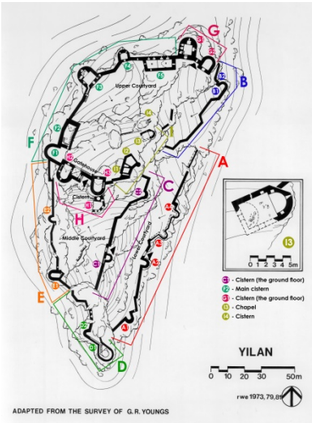
Name	Location	First Construction Period	Construction Technique of Observed Remains	Restoration Date
Tumlu Castle	Adana	Armenian Kingdom (12th century)	Mortared rubble stone core and cut / rough cut stone facing	2010 (project), 2014-2016 (implementation)
Feke Castle	Adana	Byzantine (10th - 11th century)	Mortared rubble stone core and cut stone facing	2006 (project), 2014-2016 (implementation)
Yılan Castle	Adana	Byzantine (11th century)	Mortared rubble stone core and cut stone facing	2007 (project), 2014-2016 (implementation)
Kızkalesi	Mersin	Byzantine (12th century)	Mortared rubble stone core and cut stone facing	2002 (project), 2014-2015 (implementation)
East Byzantine Gate and Fortifications in Laodicea	Denizli	Byzantine (4th century)	Mortared rubble stone core and cut stone facing	2008 (project), 2008 (implementation)
Kütahya Castle	Kütahya	Byzantine (later restored by Seljuks, Germiyans and Ottomans)	Rubble stone masonry, and rubble stone core and cut stone alternating with brick facing (opus mixtum)	2014 (project) 2006, 2016 – continuing (implementation)
Ciha Castle	Rize	Genoeses (14th century)	Rubble stone masonry	2018 - continuing (implementation)
Kız Kulesi	Rize	Genoeses or Trebizond Empire (13th - 14th century)	Rubble stone masonry	2014 (implementation)
Zilkale	Rize	Trebizond Empire (13th - 15th century)	Rubble stone masonry	2007-2011 (implementation)
Kale-i Bala	Rize	14th - 15th century	Rubble stone masonry	2018-2019 (implementation)
Kov Castle	Gümüşhane	Trebizond Empire (1361)	Rubble stone masonry	2005 (project), 2007-2008 (implementation)
Akçakoca Fortress	Düzce	Genoeses (13th century)	Brick and rubble stone masonry	2015 (project), 2016-2020 (implementation)
Güvercinada Castle	Aydın - Kuşadası	Keep: Genoeses (13th - 14th century), fortification walls: Ottoman Empire (1826)	Brick and rubble stone masonry	2011 (project), 2012-2016 (implementation)
Harşena (Amasya) Fortress	Amasya	3200 BC (Early Bronz Age), mostly Hellenistic (Pontus Kingdom: 2nd - 1st century BC)	Rubble stone masonry, and mortared rubble stone core and cut stone facing	2005 (project), 2007 - continuing (implementation)
Fortification walls of Termessos ancient city	Antalya	Hellenistic (3th - 2nd century BC)	Mortared rubble stone core and cut stone facing	2017- continuing (implementation)

(cont. on next page)

Table D.1. (cont.)

Perge Hellenistic gate and towers	Antalya	Hellenistic	Dry masonry	2007-2010, 2017-2019 (implementation)
North Byzantine Gate, Hierapolis	Denizli	Byzantine (4th century AD)	Dry masonry	unknown
Frontinus (Domitian) Gate, Hierapolis	Denizli	Roman Empire (1st century AD)	Dry masonry	2013-2014 (implementation)
Triumphal Arch of Anazarbos	Adana	Roman Empire (3rd century AD)	Mortared rubble stone core and cut stone facing	2008 (project), 2018-2020 (implementation)
Mamure Castle	Mersin	Roman Empire (3rd - 4th century), later rebuilt by Seljuk Empire (13th century)	Rubble stone masonry	2014-2019 (implementation)
Rumkale	Gaziantep	known since 855 BC, mostly 12th - 14th century	Mortared rubble stone core and cut stone facing	2014-2016, 2020 - continuing (implementation)
Ani city walls	Kars	10th century (Bagratid Kingdom of Armenia), 11th century (Seljuk Empire)	Mortared rubble stone core and cut stone facing	2012 - continuing (implementation)
Harun Reşit Castle	Osmaniye	Abbasid Caliphate (8th century AD)	Mortared rubble stone core and cut stone facing	2005 (project), 2009-2011 (implementation)
Van Fortress	Van	Urartian Kingdom (9th century BC) and later Ottoman Empire	mud brick, rubble stone masonry, and mortared rubble stone core and cut stone facing	2009-2014 (implementation)
Hoşap Castle	Van	Ottoman Empire (17th century)	Rubble stone masonry, and mortared rubble stone core and cut stone facing	2006-2011 (implementation)
Adilcevaz Castle	Bitlis	Urartian Kingdom and later Ottoman Empire	Mortared rubble stone core and cut stone facing	2005 (project), 2020 - continuing (implementation)
Pertek Castle	Tunceli	Urartian Kingdom and later Roman Empire	Mortared rubble stone core and cut stone facing	2008-2011 (implementation)
Boyabat Castle	Sinop	Paphlagonians period (7th century BC), mostly Ottoman Empire	Rubble stone masonry	2005 (project), 2007, 2016, 2021 - continuing (implementation)
Yeni Kale (Kahta)	Adıyaman	Hittite Empire and later Memluk Empire	Mortared rubble stone core and cut stone facing	2008-2020 (implementation)
Beymelek (Ission) Castle	Antalya	3rd century BC	Dry masonry	2009 (project), 2013-unknown (implementation)
Ünye Castle	Ordu	Pontus Kingdom (3rd century BC)	Rubble stone masonry, and mortared rubble stone core and cut stone facing	2009 (project), 2018-2019 (implementation)
Canca Castle	Gümüşhane	Tzanihides (6th century AD)	Rubble stone masonry	2015 (project), 2017- continuing (implementation)
Keçi Castle	Gümüşhane	unknown	Rubble stone masonry	2005 (project), 2007-2008 (implementation)

Table D.2. Identification of Yılan Castle (*Yılankale*, Shahmaran Castle)



Plan of Yılan Castle
(Source: Edwards, 1983, p. 627)

Before restoration, 1874 (Source: ETFA, n.d.)

After restoration, view of the upper courtyard and the gatehouse (2020, October 20th)

References:

1. Edwards, R. W. (1983). The Fortifications of Medieval Cilicia (Turkey) [Doctoral dissertation, University of California, Berkeley]. ProQuest Dissertations & Theses Global. Retrieved from https://search-proquest-com.libezproxy.iyte.edu.tr/docview/303126998?accountid=15253, accessed on October 31, 2020.
2. ETFA. (n.d.). Yılankale [Image]. Retrieved from http://www.eskiturkiye.net/arama/yılankale, accessed on November 25, 2019.

Location:
- Yılankale village, Ceyhan, Adana
- Yılankale village in the northeast of the castle, Küçükburhaniye village and Sirkeli Mound in the southwest, and Kokartepe Necropolis in the west

Topography:
- On a very steep limestone outcrop on the north bank of the Ceyhan river in Çukurova and completely dominating the Ceyhan plain
- Built upon the most northern outcrop of the Cebel-i-Nur Mountains and separated from the main range and from the Misis-Ceyhan road by the River Ceyhan

Geology:
- Formed by sedimentary rocks
- Tectonically active area, and many active and abandoned limestone quarries

Hydrology:
- In Ceyhan river basin and surrounded by the river and Cingöz stream

Landscape quality:
- Mediterranean climate
- Covered with maquis and garrigue, pine trees on the hillside, and agricultural lands around the hill
- An important breeding site for some bird and bat species

Original function:
Observation and defense

Construction date:
11th century - Byzantine period

Donor/Architect/Constructor:
-

Previous repairs:
- Byzantine, Crusader, Armenian and Memluk repairs

Periods of the building:
- 395 - 653 AD: Byzantine Empire, 7th c. AD: Umayyads, 8th c. AD - 965 AD: Abbasid Caliphate, 965 AD - 11th c. AD: Byzantine Empire, 11th c. AD: Seljuks, 1080 – 1375: Armenian Kingdom of Cilicia, 1097: Crusaders, 1268: Armenian Kingdom, 14th c. AD: Memluks, 1353-1517: Ramadanid Principality, after 1517: Ottoman Empire
- 1357: The castle named as Kovara (Govara) abandoned during the reign of Ramadanids.
- 17th century: Evliya Çelebi named it as Shahmaran Castle.

Dimensions:
About 15.000 m^2 and 700 m circumference of the castle

Number of floors:
- Eastern gatehouse tower: a single tower-room
- Western gatehouse tower: two stories and a roof

Current morphologic characteristics:
- Irregular spatial layout with a long longitudinal axis in northeast-southwest direction and organic walls at four sides
- Three courtyards lying progressively at higher levels: lower, middle and upper courtyards
- Crenellated walls, and merlons with holes for shooting at some portions
- Access to the castle court after three gates and portable ladders on the way from one gate to the other

Lower Courtyard:
- Enclosed by two parallel fortification walls along the gently sloping southeast aspect of the outcrop

Middle Courtyard:
- One circular, five houseshoe planned towers and a gateway
- A small circular cistern

Upper Courtyard:
- Enclosed by high curtain walls defended by eight large horseshoe planned towers and contains a postern gate, two cisterns, a chapel and rooms

The Gatehouse:
- L planned entrance juxtaposed by two horseshoe planned towers

Original morphologic characteristics:
-

Conservation state prior to current intervention:
Partially in need of repair and in ruin.

Wall profile:
- Mortared rubble stone core and cut stone facing
- Generally isodomic coursed cut stones
- Generally well coursed rectangular stone blocks whose faces have been left rough or have drafted margins and bossed centres
- The mortar: often studded with brick pieces
- Cisterns with plastered inner walls

Lower Courtyard:
- 1.30-1.35 m wall thickness
- Rough-faced and bossed stone blocks

Middle Courtyard:
- The external wall faces: well coursed large rough faced and bossed stone blocks, and the internal wall faces: small rubble stones and roughly rectangular stones in both regular and irregular courses

Upper Courtyard:
- Around 2.25 m wall thickness in the F1 tower (wall walk: 1.50 m, crenellations: 0.75 m)
- Generally large rough faced and bossed stone blocks, and small rubble stones at some portions

The Gatehouse:
- 1.31-1.36 m wall thickness
- Large rough-faced and bossed blocks, and smooth cut stone blocks

Wall material:
Limestone and brick (only in the cistern I4)

Spanning elements:
- Arches:
  - Relieving arch with a segmented lintel: at the main gate and C gate (outer arch)
  - Pointed arch: at the main gate (outer arch), the gatehouse and embrasures
- Vaults:
  - Barrel vault with depressed profile: at the A, C and H gates, and the doorways of the towers, cistern F2 and room F5
  - Barrel vault with semi-circular profile: at the cistern I4
  - Barrel vault with pointed profile: at the main cistern (F2), F4, G1, H2 and H3 towers, room F5, and the chapel
  - Groin vault: at the rectangular space of the gatehouse
- Domes: at the cistern at the north of the room H1 (partially collapsed) and apse of the chapel (semi-dome)

Architectural elements:
- Gates:
  - Entrance gates: A, and C and H gates that are tripartite unit (an outer arch, a slot machicolation and an inner arch)
  - Postern gate: juxtaposed by G1 and G2 towers
  - Door openings: at the entrances of towers, cisterns and rooms
- Embrasures:
  - V shaped embrasure: in F4 tower and the fortification wall between F4 and F5
  - Pointed arched (internally) embrasure pierced by semicircular crowned loophole (externally) : in the tower rooms at the upper coutyard, and D and F walls
- Windows:
  - Rectangular window: in room F5, H1, and F3, H2 towers
  - Round-headed window: at the chapel
  - Depressed profile internally and rectangular profile externally: in H3 tower
- Wall-walks (with two types of crenellation): along the C, D and F walls
- Stairs: attached to wall-walks (next to the F3 tower) and walls of the gatehouse, in the C1, D1, E1, G1, H2 and H3 towers and cistern F2 and I4
- Niches:
  - Niche with a rectangular hole in the floor: on the D and E walls, in the southwest of the F3 tower, and in the G1 and H3 towers
  - Round-headed niche: in the chapel
  - Square niche: on the fortification wall in the east of the H3 tower
- Corbel: on the eastern wall of the H2 tower
- Water pipes: in rooms H1 and I2
- Carvings: on the relieving arch of the main gate (H)

Material of inscriptions:
-

Values:

1. Landscape scale	Attributes
Integrity value	1. Possessing integrity with natural elements and cultural assets 2. A symbolic monument crowning its hilltop in a picturesque site with view of Ceyhan River, limestone outcrops in the plain, and cultural assets 3. Harmony of the ruins with natural setting 4. Contributing to multiple representation of castle building type in Çukuova region and within sight of Anavarza and Tumlu Castles 5. Gripping curiosity for exploration
2. Site scale	**Attributes**
Documentary value	1. Representing the social, economic and technical aspects of Byzantine, Armenian and Crusaders military culture
Authenticity value	1. Site-castle relation, castle spatial layout have their original qualities
3. Building scale	**Attributes**
Age (oldness) value	1. 11th century structure from Byzantine period
Documentary value	1. Traces of the previous repairs: different construction techniques and material, and the reliefs
Authenticity value	1. Size, facade form, space organization, design mentality, plan layout, access style to the castle, architectural elements, construction technique and material all authentic
Artistic value	1. The reliefs of the figure of a king between lions, and the cross figure
Memory value	1. Shahmaran myth

Conservation problems:

1. Landscape scale	Attributes
Structural and material problems: 1. Being in the tectonically active area, presence of active faults, fractured bedrock of the hill, and erosion 2. Threat of the active quarries Accessibility problems: 1. Lack of public transportation, and narrow road leading to the castle on the hillside	
2. Site scale	**Attributes**
Functional problems: 1. Being abandoned since the 14th c. Accessibility problems: 1. Lack of a visitor path, dense vegetation on hillside and slippery ground due to debris Safety problems: 1. Lack of a visitor path and railings along it, unstable bedrock and wall portions, steep slope and slippery skirts of hill Presentation problems: 1. Aesthetically incompatible service facilities, and lack of lighting equipment, security point, trash cans and information boards	
3. Building scale	**Attributes**
Structural and material problems: 1. Damages caused by movements on the ground, cracks on the bedrock, soil erosion, weathering, rain penetration, rising damp and vandalism Accessibility problems: 1. Dense vegetation in the courtyards and blocked entrances Safety problems: 1. Unstable massive rocks and wall portions Presentation problems: 1. The castle not presented	

Table D.3. Conservation Activities in Yılan Castle (*Yılankale*, Shahmaran Castle)

Reintegration with imitation stones in the G1 tower (2020, October 20th)

Consolidation of the chapel (2020, October 20th)

References:

1. RESEARCH

- Scientific researches since the late 1930s by important researchers: J. Gottwald, J. Thomson, G. R. Youngs (1965), W. Müller-Wiener, H. Hellenkemper, and R. W. Edwards (1983)
- 1988, April 15th: listed as 1st degree archaeological site by Adana Regional Council for Conservation with the decision numbered 6
- 2014, May 18th - 2015, January: archaeological excavation within the scope of the restoration project under the control of Adana Archaeology Museum and Adana Directorate of Surveying and Monuments
- Adana Ceyhan Yılankale restoration and environmental design project: architect Saadet Sayın (project manager), architect Mehmet Ali Cinoğlu (site manager), architects Özgür Genca, Gürem F. Özbayar, Zeynep Kutlu, and restoration technician Evren Atlı
- Yılan Castle environmental design project: architect Kadri Cemiloğlu (project manager), architect Çağrı Öztürk, landscape architect Filiz Savatlı, civil engineer Adem Kütük, city planner Cüneyt K. Erginkaya, and archaeologist Adem Yıldız

2. PROJECTS

Name	Project responsible	Collaborators	Client	Area	Budget	Responsible Institution	Funding supplier	Public participation
Adana Ceyhan Yılankale restoration and environmental design project	Sayka Architecture & Construction Ltd., and contractor: Delta Construction & Consultancy Ind. Trade. Co. Ltd.	P-Delta Construction and Design (led by civil engineer Hasan Ziya Çetin), Kuzey Endüstriyel Dağcılık (consolidation of I3 chapel), Atilla Eser Engineering & Consulting Co. Ltd. (structural engineering), Ali Çetin İdil (examination of building materials)	Adana Special Provincial Administration	around 15000 m^2	1,709,545.49 TL	Adana Directorate of Surveying and Monuments, KVMGM, Adana Regional Council for Conservation	Ministry of Culture and Tourism	-
Yılan Castle environmental design project	Dor Restoration Ind. Trade. Co. Ltd	Kent İmar Consulting & Engineering Ind. Trade. Co. Ltd. (consultant)	Adana Special Provincial Administration	-	-	Adana Directorate of Surveying and Monuments, KVMGM, Adana Regional Council for Conservation	Ministry of Culture and Tourism	-

3. IMPLEMENTATION

3a. Important Dates

- Adana Ceyhan Yılankale restoration and environmental design project
  Approval of the project: 31.10.2007
  Contract date: 30.12.2013
  Construction date: 02.01.2014 – 22.02.2016
  Provisional admission: 27.09.2016
- Yılan Castle environmental design project
  Project date: 2018

3b. Interventions	
Addition	- Element additions: frames out of timber above the openings of the H3 tower, and the vaults of cistern F2 and room F5
Reintegration	- Reintegration of the upper parts of the fortification walls and crenellations, southwestern wall of the cistern I4, northern wall of the G2 tower, parts of the arches and vaults such as pointed arch at the north side of the rectangular space of the gatehouse, inner vault of the main gate and gate C with authentic parts - Reintegration of the bossed stone blocks at the north of the H3 tower on the first floor, interior portions of the H2 and H3 towers, sourthern and western walls of the room F5, and southern wall of the G1 tower with the authentic construction technique, but with imitation stones in beige color
Reconstruction	- Dismantling of the deteriorated stones and reconstructing with new material: the outer arch of the main gate, and stones of the eastern first floor wall of the H2 tower
Consolidation	- Filling the cracks with hydraulic lime mortar reinforced with araldite - Applying chrome steel cramps with araldite to the center block of the segmented lintel of the gate C, and covering with mortar - Cleaning joints and grouting of joint discharges with hydraulic lime mortar - A temporary timber post for supporting the vault of the cistern I4 - A temporary scaffolding for the consolidation of the chapel - Applying hard capping on the top of the walls
Cleaning	- Cleaning of plant colonization on the walls, and the vegetation in the castle courtyards - Cleaning of graffiti and black crust on the stone blocks with micro sandblasting technique - Cleaning of carbon deposit on the walls with scrubbing with dry (rubber) sponge
Presentation	- Covering the ground of the entrance and a part of the visitor path with slate stones - Installation of an electric transformer and electric poles along the path - Designing visitor paths, timber viewing platforms along the path, timber benches, metal lighting poles, and stairs for reaching the gates A and C in the Yılan Castle environmental design project, but not realized yet

4. AWARDS

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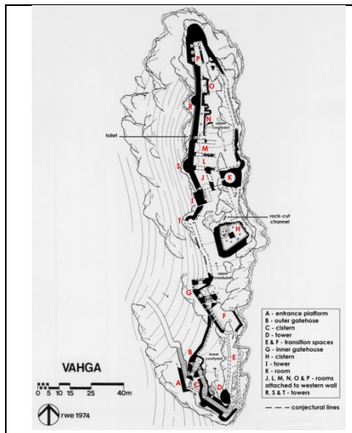
Table D.4. Evaluation of Yılan Castle after the Current Restoration

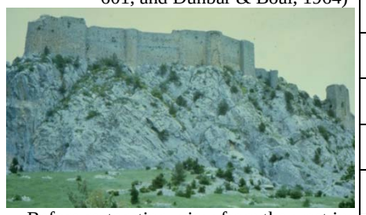
	Sustainability and Enhancement of Values	Success in Solving Conservation Problems
1. Landscape scale	Integrity value:	Structural and material problems:
	o 1. Threats to the integrity of cultural landscape with natural elements and cultural assets due to the lack of scientific researches and conservation activities, quarries, vandalism and exposure to weathering conditions o 2. Continuing to crown the hilltop, but negative effects of surrounding quarries on the picturesque view o 3. Loss of harmony of the ruins with natural settings after current interventions • 4. Preserving its strategic position and characteristics of the castle building type in Çukurova region • 5. Increasing curiosity for exploration and cultural tourism potential after restoration that may give way to become part of a castle route	o 1. No precautions against the potential threats of earthquake, fractured bedrock and soil erosion o 2. The quarry continue to damage the cultural landscape
		Accessibility problems:
		o 1. Nothing proposed against accessibility problems
2. Site scale	Documentary value:	Functional problems:
	• 1. Continuing to document the social, economic and technical aspects of the past military cultures	o 1. Open to public, and used as like an open-air museum, but inadequate interventions for refunctioning
		Accessibility problems:
		o 1. Although cleaning of dense vegetation during the restoration, due to lack of regular maintenance, the accessibility problems continue. Lack of visitor path and slippery ground are still obstacles for accessibility
	Authenticity value:	Safety problems:
	• 1. Preserving site-castle relation and castle spatial layout	o 1. No taking precautions, except consolidation of some wall portions. So, climbing up and walking around the castle ruins continues to be dangerous
		Presentation problems:
		o 1. Inadequate service facilities in terms of being few in number, useless and unaesthetic
3. Building scale	Age (oldness) value:	Structural and material problems:
	o 1. Low representation of its characteristics as a Medieval defense structure due to extensive interventions such as reintegration and reconstruction	o 1. Continuation of problems due to unsystematic conservation activities, usage of incompatible material such as new injection materials and steel cramps, abrasive cleaning techniques and insufficient monitoring
	Documentary value:	Accessibility problems:
	• 1. Preserving the remains and traces of the past repairs	o 1. Nothing was done, except partial cleaning dense vegetation and debris. Due to lack of regular maintenance, these are still obstacles
	Authenticity value:	Safety problems:
	• 1. Castle size and form, space organization, design mentality, plan layout, access style to the castle are sustained, but o low authenticity of facade form, architectural elements, construction technique and spanning elements due to reintegration and reconstruction with undistinguishable material	o 1. Safety problems still threaten both life safety of visitors and the structures of the castle
		Presentation problems:
		o 1. The castle is not presented
	Artistic value:	
	• 1. Sustaining artistic value of the reliefs	
	Memory value:	
	• 1. Continuation of interest of Shahmaran myth	

•	Positive impacts
o	Negative impacts

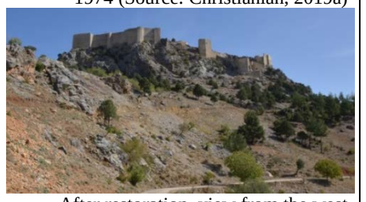
Table D.5. Identification of Feke (Vahga) Castle



Plan of Feke Castle
(Source: revised from Edwards, 1983, p. 601, and Dunbar & Boal, 1964)



Before restoration, view from the west in 1974 (Source: Christianian, 2019a)



After restoration, view from the west (2020, October 21st)

References:

1. Edwards, R. W. (1983). The Fortifications of Medieval Cilicia (Turkey) [Doctoral dissertation, University of California, Berkeley]. ProQuest Dissertations & Theses Global. Retrieved from https://search-proquest-com.libezproxy.iyte.edu.tr/docview/303126998?accountid=15253, accessed on October 31, 2020.
2. Dunbar, J. G. & Boal, W. W. M. (1964). The Castle of Vahga. *Anatolian Studies, 14*, 175-184. British Institute at Ankara. Retrieved from https://www.jstor.org/stable/3642473, accessed on December 8, 2019.
3. Christianian, J. (2019a). Vh I: Color Transparencies, 1974 [Image]. The Christian Architecture of the Levant. Retrieved from https://charlvarchive.org/Album/27, accessed on October 15, 2020.

Location:
- Old Feke village (Sülemişli neighbourhood), Feke, Adana
- Located 6 km.s to the northeast of Feke district center, in the mountainous Cilicia and on a strategic position on Kozan-Kayseri-Cappadocia caravan route

Topography:
- On a very steep limestone outcrop (highest point: 1170 m. high) rising in the north-south direction, and overlooks the Göksu river on the east and south, and the valleys
- On a rough terrain in the Central Taurus mountain range

Geology:
- on the Geyik Dağı unit, and formed by sedimentary rocks
- one of the important centers where the ore mining activities has been operated since ancient times
- In the fourth degree earthquake zone

Hydrology:
- In Göksu river basin, which is a sub-basin of Seyhan river basin
- Located between the banks of the Göksu river, which is famous for whitewater tourism, and Asmaca stream
- Containing rivers with hydraulic energy potential

Landscape quality:
- Continental climate
- Covered with coniferous trees, maquis and bushes except the rocky zones, and agricultural lands in the west of the castle
- Rich and diverse fauna, especially in terms of bird species

Original function:
Observation and defense

Construction date:
Byzantine period (965 AD - 11th century AD)

Donor/Architect/Constructor:
-

Previous repairs:
- Byzantine, Armenian, Memluk and Ottoman repairs

Periods of the building:
- Until 1098: ruled by the Byzantine Empire, later conquered by Constantine I
- Until the reign of King Levon I (1198/99-1219): residence of the princes and capital of Roupenian dynasty
- Earliest defense structure of the Armenians in Cilicia, which played role in the establishment of the kingdom
- 1137: besieged by the Byzantines, but no results from the siege. The best warrior of the two sides (Armenians and Byzantines) fighted and Byzantine warrior won.
- 1139: taken by Muhammed ibn Gazi (Danishmend emir)
- At the beginning of 1145: taken back by Thoros II, son of Levon I, and used as an epicenter in the conquest of lower Cilicia
- Came under the domination of Memluk Empire (1375), Ramadanid Principality (1378), and Ottoman Empire (1517)
- Until 1927: housed Armenians
- 1943: The castle and village were abandoned and population moved to a new settlement on the plane: Feke district

Dimensions:
Around 4000 m^2 (187 m long and 30 m wide)

Number of floors:
- Inner gatehouse: two stories with a mezzanine floor and a flat roof

Current morphologic characteristics:
- Irregular spatial layout with a long longitudinal axis along north-south direction; organic walls enclosing north, west and south sides continuously, and partial walls integrated with natural bedrock at the eastern cliff side.
- Eastern and northern facades surrounded by steep cliff, and decrease in altitude progressively from the north to the south
- Only access from the entrance gate in the southwest
- Two courtyards (lower and upper courtyards) with square and semi-circular planned towers, two gatehouses, two cisterns, vaulted chambers and one toilet

Original morphologic characteristics:
- Outer gatehouse had two stories, and the room K had at least two stories in the original.

Conservation state prior to current intervention:
Partially in need of repair and in ruin, and partially or completely under the earth and debris (especially in the middle and upper parts of the site)

Wall profile:
- Mortared rubble stone core and cut stone facing
- Generally isodomic coursed cut stones, some cut stones with bossages
- Hydraulic lime mortar with rubble stone and brick pieces
- Buttresses and the towers that act like buttresses: e.g., R, S, T and I towers
- 2.25-2.30 m wall thickness in the lower courtyard, 1.87-1.89 m wall thickness in the upper courtyard (except the eastern wall of the room F: 1.00 m in width)
- Decrease in wall thickness by 0.75 m at the upper levels: west fortification wall between room M and P
- Use of different colored stones: in the inner and outer gatehouses

Wall material:
Mainly limestone, and also travertine (in the inner gatehouse, room M and P), sandstone (in room N) and brick (cistern H)

Spanning elements:
- Arches:
  - Semi-circular arch: at the interior side of the embrasures of the outer gatehouse, the room F and the inner gatehouse, and in the first floor of the inner gatehouse
  - Pointed arch: on the opening between the outer gatehouse and the entrance passage; and probably pointed arch remains: in the inner gatehouse and at the interior side of window next to the tower I
- Vaults:
  - Barrel vault with pointed profile: at the outer and inner gatehouses, above the blocked entrance at the end of the room O as half-vault, and above the niches of the room P
  - Barrel vault with semi-circular profile: at the cistern C, along the entrance passage continuously, at the passage between the rooms N and O (as a half-vault) and at room O
  - Barrel vault with segmental profile: around the central pier continuously in the cistern H, and at the room N
  - Groin vault: in the northern part of the outer gatehouse

Architectural elements:
- Entrance gates: L planned main gate in the outer gatehouse (double leafed and out of timber), and the other gate that is a tripartite unit in the inner gatehouse
- Machicolations: above the entrance gate in the inner gatehouse, and barrel vault of the outer gatehouse and the arch at the entrance of the passage
- Rectangular door openings: on the walls of entrance passage, cistern H and rooms
- Embrasures:
  - Graded into two semi-circular arches (internally), and semi-circular crowned loophole (externally): in the outer gatehouse
  - Semi-circular profile (internally) and semi-circular crowned loophole (externally): in the room F and the inner gatehouse
- Windows:
  - Pointed arched window: the entrance gate of the inner gatehouse
  - Pointed profile internally and rectangular profile externally: in the first floor of the inner gatehouse and in the southwest of the room J
- Wall-walks: in the southwestern part of the castle, on the western wall of the lower courtyard, and along the rooms from J to O in the upper courtyard
- Staircase: in the southwest of the castle, outer gatehouse and the passage, from the inner gatehouse towards cistern H, in the northeast corner of room N, and between the rooms O and P (stone stairs); in the transition space (E), and in the west of the room K (rock-cut steps)
- Niches: Rectangular (on the eastern wall of room J), round-headed (in the first floor of the inner gatehouse), pointed vaulted (in the room P), and L planned (in the room P)

Material of inscriptions:
-

Values:

1. Landscape scale	Attributes
Integrity value	1. Possessing integrity with movable and immovable cultural assets in its vicinity 2. Being an important place for the tableland and whitewater tourism 3. A symbolic monument crowning a focal hill which itself is a distinctive element within its natural setting 4. Harmony of the ruins with natural setting 5. Contributing to multiple representation of castle building type in Çukuova region 6. Integrating with the rural church (*Kara Kilise*) on its skirt in terms of historic usage 7. The castle and its environs arousing interest and curiosity for exploration
2. Site scale	**Attributes**
Documentary value	1. Representing the social, economic and technical aspects of Byzantine, Armenian, Danishmend, Memluk, Ramadanid and Ottoman military cultures
Authenticity value	1. Authentic site-castle relation and castle spatial layout sustained by the help of the isolated positioning of the castle
3. Building scale	**Attributes**
Age (oldness) value	1.10th-11th century structure from Byzantine period
Documentary value	1. Traces of the previous repairs: different construction techniques and material from different periods, and documenting the restoration approach of the early 21st century
Authenticity value	1. Facade form, space organization, design mentality, plan layout, architectural elements, construction technique and material all authentic
Rarity value	1. Two differences from the other castles in its region: existence of a vaulted passage with a staircase and unexistence of a chapel

Conservation problems:

1. Landscape scale	Attributes
Accessibility problems: 1. Lack of public transportation and guidance	
2. Site scale	**Attributes**
Functional problems: 1. Being abandoned since 1943 Structural and material problems: 1. Soil erosion risk, and damages caused by strokes of lightning in almost every rain Accessibility problems: 1. Lack of a visitor path until reaching to the path that was covered with slate stones, slippery skirts of hill Safety problems: 1. Lack of a visitor path, slippery ground, unstable wall parts and the lack of railings along with the path Presentation problems: 1. The castle not presented and service facilities not provided	
3. Building scale	**Attributes**
Structural and material problems: 1. Damages caused by soil erosion, weathering, rising damp, rain penetration, the past implementations with incompatible material, and vandalism Accessibility problems: 1. Slippery floors of the structures and courtyards Safety problems: 1. Missing wall portions near the edges of the hill, unstable wall portions, slippery floors due to debris Presentation problems: 1. Hindering perception of the structures due to covering partially or completely with debris	

Table D.6. Conservation Activities in Feke (Vahga) Castle

Reintegration at the west facade of the cistern C (2020, October 21st)

Reconstruction of a vault between the rooms J and K (Source: KMKD, n.d.)

References:

1. KMKD. (n.d.). Feke-Vahka Castle [Image by Ashot Grigoryan]. Retrieved from http://www.kmkm.org.tr/category/envanter/feke--vahka-kalesi, accessed on December 3, 2019.

1. RESEARCH

- 1988, May 6th: listed as 1st degree archaeological site by Adana Regional Council for Conservation with the decision numbered 31
- Revision of the conservation site borders: on 1998, September 24th with the decision numbered 3164, and on 2009, June 30th with the decision numbered 5136
- Archaeological excavation within the scope of the restoration project by Adana Archaeology Museum under the control of KVMGM and Adana Directorate of Surveying and Monuments
- Some implementations by the Ministry and the residents of Feke at the beginning of the 21st century: covering of the portion of the visitor path in front of the entrance platform with slate stones, addition of an iron leaf to the main gate, repair of some wall portions of the outer gatehouse and the entrance platform, construction of parapet walls with the authentic stone blocks in the castle and cement between the cistern C and the entrance passage, at the eastern part of the transition spaces E and F, blocking of the gate of the inner gatehouse with construction of a wall in its opening by using authentic stone blocks and cement, and construction of stone stairs in the southeast corner of the inner gatehouse
- Adana-Feke Castle Surveying, Restitution and Restoration Project: architect restorer Bora Işık (project manager), archaeologist Adem Yıldız (site manager), architects Burhan Çiçek, Sezer Kaya, Tuğba Yazıcıoğlu, Dilge Aka and Çiğdem Yan, technician Hüseyin Kavak, and the photogrammetry specialist Kemal Gülcen

2. PROJECT

Name	Project responsible	Collaborators	Client	Area	Budget	Responsible Institution	Funding supplier	Public participation
Adana-Feke Castle Surveying, Restitution and Restoration Project	BOAZ *Eski Eserler Koruma ve Mimarlık*, and contractor: Dirlik Construction and Advertisement Co. Ltd.	Assist. Prof. Dr. Bekir Eskici (conservation and restoration), Assoc. Prof. Dr. Mustafa S. Akpolat (art historian), Murtaza Tan (statics), and Assoc. Prof. Dr. Ali Akın Akyol, Assoc. Prof. Dr. Yusuf K. Kadıoğlu, Kürşat Demirel and Hilal Şen (examination of building materials)	Adana Special Provincial Administration and Adana Directorate of Surveying and Monuments	around 4000 m^2	1,593,789.03 TL	KVMGM, Adana Regional Council for Conservation and Adana Directorate of Surveying and Monuments	Ministry of Culture and Tourism	-

3. IMPLEMENTATION

3a. Important Dates

Project date: 2006
Bidding date: 16.12.2013
Construction date: 07.01.2014 - 25.08.2016 (provisional admission)

3b. Interventions

Addition	- Element additions: I-shaped iron profiles around the openings of the cistern C and room K; iron grilles in the opening of the cistern C, between the vault of the outer gatehouse and its iron door, in the window openings of the first floor of the inner gatehouse and room J; timber frames above the openings of vaults of the rooms N and O; and a lightning conductor in the northern part of the castle
Reintegration	- Reintegration of cut stone facings of the buildings with beige colored imitation stones and the authentic construction technique: at the upper parts of the outer gatehouse; interior and exterior facades of the entrance passage and the room K; exterior facades of the cistern C, the inner gatehouse, the cistern H, the towers I and S, some portions of the western fortification wall; and the wall between the rooms J and K - Reintegration with the authentic large stone blocks together with small rubble stones: at the western facade of the tower D
Removal	- Removal of some implementations belonging to the early 21st century due to incompatible material usage, e.g. cement; and structural failures: walls between the cistern C and the entrance passage, in the eastern facade of the transition space (E), in the southern facade of the inner gatehouse, and stairs in the southeastern corner of the inner gatehouse
Reconstruction	- Reconstruction with the authentic construction technique, but with new stones in beige color that imitated authentic stones: at the eastern walls of the transition space (E), embrasures in the ground floor of the inner gatehouse, and vaults and the wall between the rooms J and K that was attached to the northwestern corner of the room K
Consolidation	- Cleaning joints and grouting of joint discharges with hydraulic lime mortar - Filling the minor cracks with ethyl silicate resin - Applying chrome steel cramps with araldite in the structural cracks - Consolidation of some flanking plasters on the inner walls of the cistern H by attaching them to the wall with hydraulic lime mortar - Applying hard capping on the top of the walls and some of the vertical surfaces, e.g., at the entrance of the outer gatehouse, upper parts of the entrance passage and the wall remains between the rooms L and M, and on the partly unearthed stairs at the east of the room P
Cleaning	- Cleaning of plant colonization on the walls, and the vegetation in the castle courtyards - Removal of debris and earth
Presentation	- Unearthing of some elements: wall, vault, door opening, embrasure remains in the upper courtyard; stairs in the inner gatehouse that leads to the cistern H, the room N, between the rooms O and P, and in the eastern part of the room P; vaulted niches and toilets in the room P; and openings on the vaults of the rooms N, O and P

4. AWARDS

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Table D.7. Evaluation of Feke (Vagha) Castle after the Current Restoration

	Sustainability and Enhancement of Values	Success in Solving Conservation Problems
1. Landscape scale	Integrity value:	Accessibility problems:
	o 1. Limited integrity with movable and immovable cultural assets due to the lack of the ground survey or archaeological excavations, conservation activities, and vandalism, but • starting to record and register these cultural assets • 2. Continuing to be a tourist attraction with the tableland and whitewater tourism • 3. Continuing to crown the hilltop in a picturesque site o 4. Loss of harmony of the ruins with natural settings after the extensive reintegration • 5. Preserving characteristics of the castle building type in Çukuova region • 6. Preserving integrity with the rural church (*Kara Kilise*) in terms of their positioning, and restoration approaches • 7. Sustaining of curiosity for exploring the landscape and increase in cultural tourism potential after the current restoration that may give way to become part of a castle route	o 1. Nothing proposed for guiding circulation
2. Site scale	Documentary value:	Functional problems:
	• 1. Continuing to document the social, economic and technical aspects of the past military cultures	o 1. Refunctioned as an open-air museum, but insufficient related managerial measures
		Structural and material problems:
		o 1. No precautions against the potential threat of soil erosion
	Authenticity value:	Accessibility problems:
	• 1. Site-castle relation and castle spatial layout sustained	o 1. Lack of a visitor path and slippery skirts of hill are still obstacles for accessibility
		Safety problems:
		o 1. No taking precautions, except consolidation of some wall portions
		Presentation problems:
		1. Nothing was done for presentation
3. Building scale	Age (oldness) value:	Structural and material problems:
	o 1. Sustaining limited qualities of a 10th - 11th century structure due to extensive interventions such as reintegration and reconstruction	o 1. Continuation of problems due to unsystematic conservation activities, usage of incompatible material and lack of regular maintenance
	Documentary value:	Accessibility problems:
	• 1. Continuing to represent different construction techniques and material from different periods and document the restoration approach of the early 21st century	o 1. Due to lack of regular maintenance and partial cleaning of debris, slippery floors are still obstacles for accessibility
	Authenticity value:	Safety problems:
	• 1. Castle size and form, space organization, design mentality and plan layout are sustained, but o low authenticity of facade form, architectural elements, spanning elements, construction technique and material due to the current interventions: extensive reintegration with new materials; with undistinguishable and imitative material; with unscientific methods that are not based upon historical research and traces; and reconstruction using stone similar to the original	o 1. No taking precautions in the castle, except consolidation and reintegration of some wall portions
		Presentation problems:
		• 1. Presentation of the wholeness of the architectural unit with removal of debris, structural consolidation, reintegration and reconstruction of missing parts, but o except these, nothing was done for presentation. Revealed stone blocks, which are not presented, become obstacles for circulation, and presence of the equipment used during the restoration give way to an aesthetic problem
	Rarity value:	
	• 1. Preserving the differences from the other castles in its region	

•	Positive impacts
o	Negative impacts

Table D.8. Identification of *Kızkalesi* (Maiden's Castle / Sea Castle), Korykos

Ground floor plan of the castle (Source: Miyar Mimarlık Mühendislik, 2020)

Before restoration, view of the courtyard from the southeast (Source: Erim, 2007, p. 59)

After restoration, view of the courtyard from the southeast (2020, October 23rd)

Location:
- Kızkalesi neighbourhood (in the borders of the ancient city Korykos), Erdemli, Mersin
- On an island in the bay of the neighbourhood, the distance to the shore varies according to location, it is approximately 300-600 m

Topography:
- On a small rocky island floating in the Mediterranean, off shore
- In the mountainous Cilicia and at the foothills of Central Taurus mountain range

Geology:
- In the Miocene Mut Basin that has geotourism potential, and formed by sedimentary rocks
- No tectonic movements that affect the site

Hydrology:
- In Kızkalesi river basin formed by Karyağdı stream, the fourth largest basin among the surrounding basins
- Two beaches have the blue flag in the site: Kızkalesi beach and Kızkalesi Kilikya Hotel

Landscape quality:
- Subtropical climate, terra rossa (red Mediterranean soil), and rich and diverse flora and fauna
- Center of olive oil and wine export especially in Roman period

Original function:
Pre-defense and observation structure (for preventing attacks from the sea, and protecting the ancient city of Korykos and the land castle)

Construction date:
- The ancient city established by the Hellens: 4th century B.C
- *Kızkalesi*: beginning of the 12th century - Byzantine Empire

Donor/Architect/Constructor:
- The admiral Eustathius Kymineianos re-fortified the island with the castle on the orders of the Byzantine Emperor Alexios I Komnenos

Previous repairs:
- repair works in 1206 and in 1251 by the Armenians, and Lusignans and Karamanids
- restored in the late 1950s, 1966, and 1992 (installation of lighting elements and construction of a transformer substation in the courtyard)

Periods of the building:
- The city: Seleucids (197 - 79 BC), Romans (79 - 20 BC), Kingdom of Cappadocia (20 BC - 72 AD), Romans (72 - 395 AD), Byzantines (395 AD - 6th c.), Isaurians (479 AD - 7th c.), Sasanians and later Arabs (7th c.), Byzantines (9th - 12th c.), Armenians (12th c. - 1361), Kingdom of Cyprus (Lusignans) (1361 - 1448), Karamanids (1448 - 1482), Ottomans (after 1482)
- The land castle: In 1099, constructed by the architect Megas Drungarios Eustatias by command of Emperor Alexion I
- *Kızkalesi*: According to Strabo, used by pirates as a shelter during the Roman period
- According to Texier and Strabo, constructing a royal palace on the island named as Elaussa by King Archélaüs
- 1482: conquest of Korykos by Ottomans, later begun to lost its importance and became abandoned

Dimensions:
The outer peripheral length: 192 m, south walls: around 75 m long, west walls: around 40 m long

Number of floors:
- Tower F: three stories, and the others: two stories and a flat roof

Current morphologic characteristics:
- The architecture integrated with topography of the island: some rocky areas had been left intact
- Polygonal plan layout: southern and western walls are perpendicular to each other, northern and eastern walls are irregular
- 8 towers that are triangular (as buttress), square, semi-circular and circular planned which is related with the repairs of different periods
- Each facade has a single entrance, and main entrance is provided from the north through tower I
- Contains rectangular planned room remains, a portico along the western wall and partly along the northern and southern walls, two chapels, six cisterns and reservoirs for collecting rainwater, workshops and a building complex probably used as a summer palace
- The building complex: dated to the Early Byzantine period (5th and 6th c. AD). The rooms used for religious, administrative and residential purposes are interconnected and most of them open to the central hall.

Original morphologic characteristics:
- Connected to the land castle by a breakwater with a lighthouse in the past, but now, on an island
- The traces on the inner wall of the tower I: present the original floor level, probably a stone flooring at a higher level

Conservation state prior to current intervention:
Generally in need of repair, except most of the buildings in the courtyard

Wall profile:
- Mortared rubble stone core and cut stone facing
- Generally isodomic coursed cut stones with header and stretcher courses
- Generally large and rectangular stones, and have both smooth and bossed faces (used by Armenians), also small rubble and roughly rectangular stones used in both regular and irregular courses (from Lusignan period)

Wall material:
- Limestone provided from the environs and island of the castle, and marble (column pieces)
- Smooth cut stone blocks in the castle: mostly taken from the neighboring abandoned buildings of the Korykos ancient city

Spanning elements:
- Arches:
  - Pointed arch: at the southern gate as an outer arch, and in the tower D and K
  - Flat arch: at the first floor entrance of the tower F
  - Segmental arch: at the entrance of the room E and the western gate of the castle as an outer arch
- Vaults:
  - Barrel vault with pointed profile: above the southern and eastern gates; the windows of the western and eastern walls; at the interior side of embrasures of the towers A, F, J and northern, southern and western walls; at the tower D and F; and along the portico continuously (partially plastered)
  - Barrel vault with segmental profile: at the interior side of windows of the tower F and above the western gate of the castle
  - Barrel vault with semi-circular profile: at the cistern B, room E, tower I and J, chapel C, above the windows of the western and northern walls, embrasures of tower J and the gates of the tower I

Architectural elements:
- Gates: four gates on each facade: one is main gate (L planned, and located on the east facade of the tower I) and others are postern gates
- Door openings: rectangular, except the entrance of the tower I (crowned with a barrel vault), and the entrance of the room E (crowned with a segmental arch) differentiated with the corbeling stones and the door frame
- V shaped embrasures: with pointed or semi-circular vaulted niches at the interior and semi-circular crowned loophole at the exterior: on the fortification walls except the eastern wall and in towers A, F and J; with semi-circular profile at the interior and exterior: in the towers A, D, F and K; with rectangular profile at the interior and exterior: in the towers D and I
- Windows: rectangular window: in the chapel C; with pointed or semi-circular profiles: on the fortification walls, except the southern wall; with segmental profile at the interior and rectangular profile at the exterior: in the tower F
- Stairs: on the inner sides of the southeast and south walls, and the northwest facade of the tower F; and remains on the western and northern walls; and in the towers A, F, J, K, and room E
- Wall-walks: along the southern fortification wall
- Niches: vaulted niche: at the interior sides of the embrasures and windows; and square niche: in the chapel C
- Corbels: at the entrance of the room E and on the western wall, and partly northern and southern walls along the portico
- Floor mosaics: *opus sectile* and *opus tessellatum* (also *opus vermiculatum* for some figures) dated to the Early Byzantine period (5th - 6th c.): at building complex
- Inscriptions: in the tower F, on the mosaics of some rooms of the building complex, on the portico in the western corner of the castle
- Carvings: a cross figure at the chapel C

Material of inscriptions:
Limestone, and marble (on the mosaics)

Values:

1. Landscape scale	Attributes
Integrity value	1. Possessing integrity with cultural assets, natural and geological elements 2. Integrity of the Korykos ancient city with its cultural assets 3. A symbolic monument on an island in a picturesque site 4. Being at turistic attraction area, gripping curiosity for exploration
Documentary value	1. Representing the social, economic, military and technical aspects of past civilizations 2. Representing the characteristics of an important trade center and one of the important harbours of the eastern mountainous Cilicia
Memory value	1. Heaven - Hell Caves associated with a Greek myth
Rarity value	1. One of the rare examples of the coastal cities in the region with a defense structure in the sea, which distinguishes it from many ancient coastal settlements
2. Site scale	**Attributes**
Documentary value	1. Representing the social, economic, military and technical aspects of past civilizations
Authenticity value	1. Relation of the sea castle with the mainland (the land castle) and the island, and the castle's spatial layout all authentic
3. Building scale	**Attributes**
Age value	1. 12th c. structure from Byzantine period
Documentary value	1. Traces of repairs: different construction techniques, material and inscriptions 2. Documenting the social and economic life, and natural characteristics of the region
Authenticity value	1. Authentic facade form, space organization, design mentality, plan layout, architectural elements, construction technique and material
Artistic value	1. The inscriptions, carvings and mosaics
Memory value	1. Kızkalesi myth

Conservation problems:

1. Landscape scale	Attributes
Structural and material problems: 1. Damages caused by lack of regular cleaning and maintenance of the ruins 2. Being under potential threat of the soil erosion Safety problems: 1. Negative events related with women security Presentation problems: 1. Negative impression of the site 2. Reducing the perceptibility of the archaeological site due to new buildings, highway, and insufficiency of presentation	
2. Site scale	**Attributes**
Functional problems: 1. Being abandoned since 15th century Structural and material problems: 1. Vandalism due to the uncontrolled physical access Presentation problems: 1. Lack of service facilities	
3. Building scale	**Attributes**
Structural and material problems: 1. Damages caused by weathering, coastal erosion, vandalism, past implementations, inadequate conservation precautions after the excavations Accessibility problems: 1. Inadequacy of the pier, and limited access to the upper floors of the castle Safety problems: 1. Unstable ground of the visitor access, the gaps in the superstructures of the cisterns and the ceiling of the ground floor of the tower F Presentation problems: 1.The castle not presented	

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1. Miyar Mimarlık Mühendislik. (2020). Mersin Erdemli Kızkalesi (2000) [Image]. Linkedin. Retrieved from https://www.linkedin.com/company/miyar-mimarl%C4%B1k/posts/, accessed on February 15, 2021.
2. Erim, M. (2007). Türkiye'deki Restorasyon Çalışmaları ve Restorasyon İşletmelerinin İncelenmesi [Unpublished master's thesis]. Çağ University, Mersin.

Table D.9. Conservation Activities in *Kızkalesi* (Maiden's Castle / Sea Castle), Korykos

The new building (WC)
(2020, October 23rd)

Reintegration of vault of the portico
(2020, October 23rd)

References:
1.

1. RESEARCH
- The first researches in and around Korykos: in the 19th century, and the first systematic study on the ancient city carried out by Herzfeld and Guyer
- Important researches who studied in the site in the 19th and 20th century: F. Beaufort (1817), Pliny (1856), V. Langlois (1861), R. Heberdey and A. Wilhelm (1896), Strabo (1929), Herzfeld and Guyer (1930), G. H. Forsyth (1957), W. Müller-Wiener (1966), A. Machatschek (1967), T. S. R. Boase (1978), R. W. Edwards (1983), F. Hild and H. Hellenkemper (1990), Hill (1996)
- 1973-1976: the first comprehensive archaeological inventory studies conducted by Prof. Dr. Halet Çambel
- 1995: a survey carried out to research the coastal remains of Korykos by Robert L. Vann
- 1985, November 15th: listed as 1st and 3rd degree archaeological site by Adana Regional Council for Conservation with the decision numbered 1560
- 2004 - 2010: Ground surveys and archaeological excavations in Korykos carried out periodically by Prof. Dr. Serra Durugönül as site director with a team
- Archaeological excavation (2001-2002): archaeologist F. Güler Gürkan (site director) with the participation of researcher Yaşar Ünlü under the control of Mersin Museum Directorate and KVMGM with the funds by the DÖSİMM
- 2014: 3D model of the castle generated by using terrestrial laser scanning technique by Ali Ulvi and Murat Yakar
- 2014, April 15th: included in the UNESCO World Heritage Tentative List with 5909 reference number
- Restoration of the church floor mosaics in *Kızkalesi*: conservators Celaleddin Küçük and N. Mine Yar (project managers); architect restorer Emine Karaman and anthropologist Coşkun Köysu (field supervisors); architect restorers Fatih Bölükler, Elif Topaç, Seren Aydınalp, Hülya Nilgün, Rahime Çalışkan, Emre Tunçdemir and Emrah Pamuk; and technician Rıfat Güllüce
- Mersin Erdemli *Kız Kalesi* (Sea Castle) Surveying, Restitution and Restoration Project: master architect Kemal Nalbant (project manager), architects Evrim Pekaslan and Oya Bakacak

2. PROJECTS

Name	Project responsible	Collaborators	Client	Area	Budget	Responsible Institution	Funding supplier	Public participation
Restoration of the church floor mosaics in *Kızkalesi* (started as a restoration project of mosaics, later became an archaeological site conservation project)	Art *Restorasyon Kültür Sanat ve Araştırmacılık*	-	-	-	-	Adana Regional Council for Conservation	-	-
Mersin Erdemli *Kız Kalesi* (Sea Castle) Surveying, Restitution and Restoration Project	Miyar Architecture & Engineering	Tuba Construction Co. Ltd., and chemistry technician Ali Çetin İdil (consultant)	Mersin Governorship	-	-	Adana Directorate of Surveying and Monuments and Adana Regional Council for Conservation	Ministry of Culture and Tourism	-
Kızkalesi (*Denizkalesi*) Restoration and Environmental Design Project	-	-	Mersin Governorship DIMCs	-	-	-	-	-

3. IMPLEMENTATION

3a. Important Dates
- Restoration of the church floor mosaics in *Kızkalesi*
  Implementation date: 2006 - 2007
- Mersin Erdemli *Kız Kalesi* (Sea Castle) Surveying, Restitution and Restoration Project
  Project date: 2000; and approval of the project: 2001, January
  Revision of the project (after the excavations in the courtyard): 2002, August; and approval of the revised project: 2002, October 18th with the decision numbered 4929
- *Kızkalesi* (*Denizkalesi*) Restoration and Environmental Design Project
  Bidding date: 09.10.2014
  Contract date: 10.11.2014
  Implementation date: 14.11.2014 - 2015

3b. Interventions

Addition	- Mass additions: a new building flanking the room E and used as toilet, and a transformer substation juxtaposing the tower J - Element additions: iron grilles with iron profiles in the door and window openings of the castle; a modern timber door frame in the opening of the tower D; timber ceilings in the towers A, D, F and K; timber joists at the springing level of the vault in the tower F; an iron cover above the gap between the ground and first floor of the tower F; steel frame staircases with handrails at each facade of the portico where the remains of stairs are located, and at the entrance of the tower J with the stone landing; a lightning conductor on the top of the tower K; and a flag on the top of the tower I - Material additions: steel mesh above the gap on the cistern B, and stone floor coverings on the ground floor of the tower D, I and on the second floor of the tower F
Reintegration	- Completing cut stone facings with imitation stones that are cladding stones with different construction technique and coursing: at the piers and arches of the portico, embrasures, windows, stone stairs attached to the southern wall, vault of the tower I, upper wall parts of the towers except the tower G and H, etc. - Completing wall parts constructed with rubble stone and roughly rectangular stones: at the vaults of the portico and the tower J - Partially completing of mosaics with the stones in the courtyard whose original positions were figured out
Removal	- Removal of the transformer substation in the courtyard, and the lighting elements installed in 1992
Reconstruction	- Reconstruction with new cladding stones and with a different construction technique: at the embrasures and door opening of the tower A, and in some portions of the tower F
Consolidation	- Cleaning joints, and grouting of joint discharges and cracks with hydraulic lime mortar (Malta 6001 mortar for hair cracks) - Injection of liquid hydraulic lime mortar to the cracks and gaps of the mortar below and between the mosaics - Consolidation of non-resistant ground under the mosaics by removing the soft soil layer and then filling with gravel and hydraulic lime mortar under the mosaics in the order of the authentic layers - Coating the upper surfaces of the mosaics with paraloid B72 which is an acrylic polymer - A timber post at the springing level for supporting the vault in the first floor of the tower F - Applying hard capping on the top of the walls, except the tower G, and most of the vertical surfaces that have lost their cut stone facings: e.g. the northern and northeastern walls
Cleaning	- Cleaning of the vegetation in the courtyard, and plant colonization on the walls and floor coverings of the building complex - After the cleaning of the plant colonization on the mosaics: disinfecting mosaics and driving copper nails on the ground to prevent the re-growth of the plants - Cleaning of the surfaces of the mosaics with poultice: AB 57 paper pulp, then soft plastic brush with water and lastly, cleaning with a sponge - Cleaning of partly rock-cut water channels
Renewal	- Renewal of the partly rock-cut water channels by changing the broken stone blocks
Presentation	- Providing orientation and information boards, trash cans in the courtyard, and lighting equipments in the courtyard, on and outside of the castle walls - Constructing a viewing platform on the wall remains of the building complex to view its rooms and mosaics that are presented by in situ conservation and neutral colored lacuna - Constructing a platform in front of the visitor entrance to organize the pier - Tourist facilities such as cafe, portable souvenir shop, toilet and parking lot at the beach; viewing platforms with observation binoculars, timber benches and information boards at the coastline

4. AWARDS
-

Table D.10. Evaluation of *Kızkalesi* after the Current Restoration

	Sustainability and Enhancement of Values	Success in Solving Conservation Problems
1. Landscape scale	Integrity value:	Structural and material problems:
	o 1. Threats to the integrity with cultural assets, natural and geological elements due to unplanned urbanization, coastal and sea pollution, weathering and vandalism o 2. Threats to the integrity of the Korykos ancient city with its cultural assets due to the lack of the conservation activities of the ruins except the land and sea castles, exposure to weathering conditions and vandalism • 3. Continuation of being a symbolic monument on an island in a picturesque site, but o decrease in the picturesqueness of the Korykos ancient city due to new constructions • 4. Continuation of being at turist attraction area, and increasing interest of the tourists	o 1. Korykos ancient city is not preserved except the land and sea castles, so structural and material problems continue o 2. No precautions against the possible soil erosion
		Safety problems:
		• 1. Trying to eliminate the undesired events threatening women by increasing the security measures, but these problems continue to threat the tourism potential of the site
		Presentation problems:
		• 1. Festivals, sea sports organizations and contemporary projects with the aim of further activating the tourism and attract foreign tourists by increasing the international recognition of *Kızkalesi*, but o putting pressure on the cultural assets in the site with the uncontrolled development of sea-sand-sun tourism o 2. Korykos ancient city is not presented except the land and sea castles, so new buildings, highway, and insufficiency of presentation and service facilities continue to hinder the perceptibility of the archaeological site
	Documentary value:	
	o 1. Low representation of the social, economic, technical and military aspects of past civilizations due to uncontrolled tourism development, vandalism, weathering and lack of the scientific researches and conservation activities • 2. Preserving the characteristics of an important trade center and harbour of the Ancient Cilicia	
	Memory value:	
	• 1. Heaven - Hell Caves fame in Greek mythology	
	Rarity value:	
	• 1. Continuing to be one of the rare examples of the coastal cities in the region with a sea castle	
2. Site scale	Documentary value:	Functional problems:
	• 1. Continuing to document the social, economic, technical and military aspects of the past civilizations	•1. Functioned as an open-air museum, and o proposed to be used a cultural space with incompatible usages (a stage and a cafeteria)
	Authenticity value:	Structural and material problems:
	• 1. Preserving the authentic sea castle - land castle and sea castle - the island relations, and the castle spatial layout	o 1. Vandalism continues to damage the ruins
		Presentation problems:
		• 1. Providing tourist facilities
3. Building scale	Age (oldness) value:	Structural and material problems:
	o 1. Low representation of its characteristics as a 12th century defense structure due to extensive interventions such as addition, reintegration and reconstruction	• 1. Some interventions were carried out to solve these problems, but o continuation of coastal erosion risk; and continuation of some problems due to unsystematic, irreversible or inadequate conservation activities
	Documentary value:	
	• 1. Continuing to document the previous repairs by preserving the inscriptions, different construction techniques and material • 2. Continuing to document the social and economic life, and natural characteristics	
		Accessibility problems:
		• 1. Access by boats, and the pier organized with a platform; and steel frame staircases constructed and stone stairs reintegrated
	Authenticity value:	Safety problems:
	• 1. Castle size and form, space organization, design mentality, plan layout are sustained, but o the authentic facade form, architectural elements, spanning elements, construction technique and material are lost due to the extensive interventions	• 1. The railings and the iron cover above the gaps provided for visitors' safety
		Presentation problems:
		• 1. Placing information and orientation boards, trash cans, lighting elements and viewing platforms, but o difficulties in understanding the data on the boards due to weathering, and aesthetic problems and material deteriorations caused by the toilet and lighting elements
	Artistic value:	
	• 1. Sustaining artistic value of the inscriptions, carvings and mosaics	
	Memory value:	
	• 1. Continuation of interest of Kızkalesi myth.	

•	Positive impacts
o	Negative impacts

Table D.11. Identification of East Byzantine Gate and Fortifications, Laodicea (*Laodikeia* / Lycum)

Plan of the East Byzantine Gate (Source: Şimşek, 2008, p. 117)

Before restoration, aerial view of the North and South towers (Source: Şimşek, 2013a, p. 99)

After restoration, photo of the gate as viewed from the southeast (Source: 2020, February 19th)

References:

1. Şimşek, C. (2008). 2006 Yılı Laodikeia Antik Kenti Kazıları. *29. Kazı Sonuçları Toplantısı, 3,* 99-122. DÖSİMM Basımevi, Ankara. Retrieved from http://www.kulturvarliklari.gov.tr/sempozyum_pdf/kazilar/29_kazi_3.pdf, accessed on January 4, 2020.
2. Şimşek, C. (2013a). Laodikeia Çalışmaları 2: Laodikeia (Laodicea Ad Lycum). Ege Yayınları & Celal Şimşek.

Location:
- The city: at 6 km north of Denizli and 10 km south of Hierapolis, on the borders of Eskihisar, Goncalı and Bozburun districts (western Phrygia), at the cross point of important roads
- East Byzantine Gate: on the Syria street in Laodicea

Topography:
- In a brook-valley system, under medium to high erosion risk
- On a slightly elevated plateau that is approximately 250-285 m above sea level within the Lycus valley

Geology:
- Formed by the Denizli graben-horst system, and located on Laodicea sub-horst in the Denizli graben
- Formed by sedimentary rocks, and rich in terms of especially travertine and marble quarries
- In the first degree earthquake zone

Hydrology:
- Surrounded on its three sides with water sources: Lycus stream (Çürüksu) in the NE, Kapros (Başlıçay) in the SE, Asopos (Gümüşçay/Goncalı stream) in the NW and Kadmos (Gökpınar) in the E.
- A health tourism center since ancient times due to possessing many geothermal springs
- Presence of a lake in the middle of the valley in ancient times

Landscape quality:
- At the cross point of Mediterranean and continental climate
- Flora: 110 plant species. Maquis, meadow, grassland, and also agricultural lands around the ancient city
- Fauna: 159 animal species: vertebrate (amphibians, reptiles, birds, mammals) and invertebrate (mostly insects)

Original function: Defense and observation structure

Construction date:
- The ancient city: between 261-253 BC - Hellenistic period (founded by the Seleucid King Antiochus Theos II in the name of his wife Laodice)
- East Byzantine Gate and fortifications: in 395 - 396 AD - Early Byzantine period

Donor/Architect/Constructor:
With the command of the emperors Theodosius and Arcadius

Previous repairs:
- The city had suffered from earthquakes and was rebuilt many times
- East Byzantine Gate was repaired after the earthquake in 494

Periods of the building:
- from Chalcolitic Period (Copper Age, 5500 BC) to 7th century: a settlement continuously
- 190 BC:Until the date, dominated by Seleucids, later domination of the Pergamons with the battle of Magnesia between Seleucids and Romans with Pergamons support and the Treaty of Apamea (modern Dinar) in 188 BC
- 133 BC: The last Pergamon king gave the region to Rome in his will and later Roman rule (130-129 BC)
- 88-85 BC (First Mithridatic War): captured and destroyed by the Pontus Empire
- 81-96 AD (reign of Emperor Domitianus): intense construction activities in the city, such as Aphrodisias Gate, Hierapolis Gate, Ephesus Gate, Syria Gate and the main streets were constructed between 84-85 AD
- 1st-5th centuries AD: the golden age of the city and most of the buildings from this period
- 395-396 AD: fortifications around the city, Nortwest and East Byzantine gates were constructed against threat of Persians and Arabs, and life outside the city walls until the abandonment especially between 4th - the late 5th c. AD
- 494 AD: completely destroyed, then not regained its power, became a small town
- 602-610 AD (reign of Emperor Phocas): abandoned after a severe earthquake and population moved to a new settlement: Kaleiçi, Hisarköy, Asartepe (Hisar) and environs on the northern slopes of Babadağ mountain chain
- After abandonment, usage of towers and fortifications as a quarry and moving blocks from the site until 1990s
- 12th century: became a haunt of Turkish nomads (Yörüks)

Dimensions:
- The city: approximately 5 km^2; fortification walls: 3444 m long in total
- 7.75x8.95 m.: overall size of the South Tower (remained wall height: between 2.60 - 3 m (hmax))
- 7.15x8.95 m.: overall size of the North Tower (remained wall height: 3.70 m (hmax))

Number of floors: Two stories

Current morphologic characteristics:
- The city: Hippodamian (grid) plan layout, and after the earthquake in 494: random positioning of buildings
- Fortification walls: surrounded one third of the city, 14 rectangular planned observation towers at certain intervals in the corners, use of the walls of some Roman buildings as the city walls
- Gates from the city walls: East Byzantine, Ephesus (West Byzantine), Northwest Byzantine, Aphrodisias (South Byzantine) gates and also secondary gates, and outside the city walls: Hierapolis and Syria gates
- East Byzantine Gate: organised around a symmetry axis: main gateway at the center and the Syria street passes through it, square planned towers projecting out at its two sides: North and South towers
- Two gateways; main gateway is larger, 2.90 m in width to allow horse carriages and the northern is much narrower, 1.90 m in width used by the pedestrians
- Remains of a Roman villa (Hellenistic period) whose walls were decorated with frescos: inside the North Tower

Original morphologic characteristics:
- The gateways were reduced to one after the earthquake in 494 AD

Conservation state prior to current intervention: In ruin and under earth and debris

Wall profile:
- Three layered walls: rubble stone core and cut stone facing with mortar
- Isodomic coursed cut stones with headers and stretchers in exterior walls
- Wall thickness of the towers: around 1.80 m (faces: 0.5-0.7 m and core: 0.6-0.7 m); and at a height of 1.80 m from the foundation level of the North tower walls: thickness became 2 m by expanding 10 cm both inside and outside of the walls
- Wall thickness of the fortification wall: between 3-4 m (faces: 0.4-0.7 m and core: 2.20-2.60 m)
- Reused stone blocks from Roman structures

Wall material:
- Travertine and marble blocks (on facing walls of the gate and in the core of city walls), and brick pieces
- Compacted earth and travertine blocks: floor coverings

Spanning elements:
-

Architectural elements:
- Door openings: two gateways, entrance of the South Tower at its north corner with travertine jambs and a threshold, entrance of the North Tower at its north corner, entrance of the Roman villa that was single leafed at its northwest corner
- Niche with frescos: at the eastern corner of the wall remains of the Roman villa
- Inscriptions: on a Doric architrave with triglyph-metope in the southwest facade of the South Tower, and in the fortification wall at the northwest of the South Tower

Material of inscriptions:
Marble

Values:

1. Landscape scale	Attributes
Integrity value	1. One of the ancient cities in Lycus region that are Laodikeia, Hierapolis, Attuda and Trapezopolis, etc. 2. At the cross point of important roads 3. Located in the fertile plains with suitable climate for living conditions and in health center region with warm healing water 4. Arousing interest in terms of tectonic characteristics and geological formations, and possessing ancient quarries
Memory value	1. Arousing interest of Christians to the region with Hierapolis and Colossae
2. Site scale	**Attributes**
Age (oldness) value	1. Contains the ruins of humanity from Chalcolithic period
Documentary value	1. Preserving the social, economic and technical aspects of past civilizations 2. Remains of urban spaces document the evolution of the city 3. Traces of different construction periods 4. Reliefs document antique flora and fauna of the city, and movable assets document the social and economic life
Authenticity value	1. Plan layout of the ancient city, and defense structures: gates, towers and fortification walls all authentic
Memory value	1. Religious center of Christianity
Rarity value	1. Possessing one of the churches mentioned in the Book of Revelation and the biggest stadium, and being the only city that had two theatres
3. Building scale	**Attributes**
Age (oldness) value	1. 4th century defense structure from Early Byzantine period
Documentary value	1. Construction technique and material, and inscriptions
Authenticity value	1. Facade form, space organization, design mentality, plan layout, architectural elements, construction technique and material all authentic
Artistic value	1. Frescos and triglyph-metope pattern carved on the Doric architrave

Conservation problems:

1. Landscape scale	Attributes
Structural and material problems: 1. Being in the first degree earthquake zone and under threat of erosion	
2. Site scale	**Attributes**
Functional problems: 1. Being abandoned since the 7th c. Structural and material problems: 1. Damages caused by weathering, vandalism, and fire risk due to lack of regular cleaning of vegetation growing on the ruins Presentation problems: 1. Partially visible state above ground level and loss of third dimension 2. Lack of service facilities	
3. Building scale	**Attributes**
Structural and material problems: 1. Damages caused by the earthquakes, weathering and vandalism Presentation problems: 1. Under the ground and covered with debris, and no information board around them	

Table D.12. Conservation Activities in East Byzantine Gate and Fortifications, Laodicea (*Laodikeia* / Lycum)

Photo taken during the restoration of the South Tower (Source: Laodikeia Kazı Başkanlığı, 2008)

After restoration, southwest facade of the South Tower (2020, February 19th)

References:

1. Laodikeia Kazı Başkanlığı. (2008). 2008 Yılı Çalışmaları: Doğu Bizans Kapısı ve Kuleleri [Image]. Retrieved from http://laodikeia.pau.edu.tr//tr/sayfa/dogu-bizans-kapisi-ve-kuleleri-2, accessed on March 22, 2021.

1.RESEARCH

- Visited by many important travelers and researches since 17th century: T. Smith (1671), R. Chandler (1775), V. J. Arundell (1776), G. Weber (1833-1843), W. J. Hamilton (1842), C. Texier (1849), W. M. Ramsay (1883-1886), F. Sarre (1895), W. H. Buckler and W. M. Calder (1939), etc.
- 1833-1843: the first short-period excavation work, and the first plan of the city drawn by G. Weber
- 1961-1963: the first comprehensive archaeological excavation in the city: the excavation of the Caracalla Nymphaeum carried out by the archaeologist Prof. Dr. J. Des Garniers from Laval University in Québec
- 1982, December 10th: listed as 1st degree archaeological site with the decision numbered A-3988; 1997, February 26th: revised by Aydın Regional Council for Conservation with the decision numbered 6551, and 2007, January 24th: listed as 1st and 3rd degree archaeological site with the decision numbered 660 (final form of the listing borders)
- 1992: the rescue excavation of the Syria street carried out by the archaeologist Haşim Yıldız from Directorate of Denizli Museum
- 1993-2000: geo-prospection and documentation to prepare the topographic map of the city by a team led by Prof. Dr. G. Traversari from Ca'Foscari University of Venice
- 2002: start of systematic excavation by Ali Ceylan and Cevdet Sevinç from Directorate of Denizli Museum, and carried out by Celal Şimşek since 2003
- 2008: excavation, restoration and conservation works going on 12 months of the year with the protocol signed between Denizli Municipality and the Ministry
- 2009, September 7th: approval of the Conservation Development Plan by Aydın Regional Council for Conservation with the decision numbered 2163
- 2013, April 15th: included in the UNESCO World Heritage Tentative List with 5823 reference number

- Archaeological excavations of the East Byzantine Gate: archaeologist Prof. Dr. Celal Şimşek (site director), sociologist Prof. Dr. Mehmet Meder, archaeologist Asst. Prof. Dr. Mustafa Büyükkolancı and conservators Uluç Erten and Uğur Genç, research assistants M. Ayşem Tarhan, Mehmet Okunak, Bahadır Duman, Sedat Akyol, Erim Konakçı and Barış Yener, archaeologists Mustafa Bilgin, Bilge Yılmaz, Gözde Adıgüzel, Arzu Deniz Karabeyin, Leyla Korkmaz, Gökhan Yılmaz, Zerrin Kuzu, Ü. Kemal Parlak and Ayşegül Arığ, and the students from different universities. Responsible institutions: Ministry of Culture and Tourism, General Directorate of Cultural Assets and Museums, and Directorate of Denizli Museum; and funding suppliers: Ministry of Culture and Tourism (DÖSİMM), Denizli Governorship-Special Provincial Administration, Denizli Municipality, Pamukkale University, TÜBİTAK, TÜRSAB, Denizli Chamber of Industry and other chambers, donations, businessmen and industrialists

2.PROJECTS

Name	Project responsible	Collaborators	Client	Area	Budget	Responsible Institution	Funding supplier	Public participation
Surveying, Restitution and Restoration Project of East Byzantine Gate and its Towers (within the scope of the archaeological excavations)	a team under the direction of the archaeologist Celal Şimşek	-	-	-	-	Aydın Regional Council for Conservation	Ministry of Culture and Tourism	-

3.IMPLEMENTATION

3a.Important Dates

Archaeological excavations of the East Byzantine Gate: 2006 and 2008
Approval of the project: 23.05.2008 (with the decision numbered 1552)
Construction date: 2008

3b.Interventions	
Reintegration	- South Tower (almost all of the walls were in ruins except for 3-4 rows of stones): raising tower with replacement of 10 rows of stones and the wall height reached up to 5-6 m - Fortification wall attached to the South Tower: replacement of 4 rows of stones to show continuation of the walls from the tower - North Tower (almost all of the walls were in ruins except for 3-4 rows of stones in the east and west, 5-6 rows of stones in the north-south): raising tower with replacement of 9 rows of stones and the wall height reached up to 5-6 m - Fortification wall attached to the North Tower and the nymphaeum: replacement of 5 rows of stones - All the travertine blocks excavated were used for the restoration, but exact positions of the blocks were not known, so they were used randomly
Consolidation	- Consolidation of the walls with angular sand, travertine pieces, lime putty and hydraulic lime in the facing, and portland cement in the core - Applying iron cramps to some stone blocks and the corner stones in each row and stabilization with the epoxy araldite at the point where they were fixed at the South Tower - Attaching rows of stones forming the inner and outer corners of the North Tower with 3/5 metal sheets and stabilization with injection of epoxy araldite
Cleaning	- Removal of debris around the towers, and revealing spaces and workshops from Roman and Early Byzantine period - Regular cleaning of plant colonization in the site - Cleaning joints with mechanical methods
Presentation	- Providing a small cafe with a souvenir shop and a toilet, and car park near the gate in the site, and also a security point at the entrance of the site, an excavation house at the east of the site and a storage for the findings at the west of the gate - Placing information boards and trash cans - Short and long tours offered to visitors with auditory aids - Presenting the southwest facade of South Tower in the way some parts of the facade were thought to be collapsed in the earthquake in order to show the destructive effects of the earthquake to visitors - Presenting revealed stone blocks in front of the gate

4.AWARDS

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Table D.13. Evaluation of East Byzantine Gate after the Current Restoration

	Sustainability and Enhancement of Values	Success in Solving Conservation Problems
1. Landscape scale	Integrity value:	Structural and material problems:
	• 1. Continuation of group value with the ancient cities in Lycus region • 2. Due to location of the site, preserves being at the cross point of important roads • 3. Location of the city is continuing its characteristics: in the fertile plains and in health center region with warm healing water, but o threats to the biodiversity due to pollution of the Lycus stream caused by the industrial wastes • 4. Sustaining tectonic characteristics, geological formations, and ancient quarries, but o no attempt for preservation of the quarries	• 1. Reinforcement and conservation of the structures evaluated as appropriate, but o the site continues to being in the first degree earthquake zone and under threat of erosion
	Memory value:	
	• 1. Continuing to arouse interest of Christians	
2. Site scale	Age (oldness) value:	Functional problems:
	• 1. Preserves the ruins of humanity from Chalcolitic period	• 1. Functioned as an open-air museum and a living archaeological park: positive in terms of public education, but o incoherent interventions to exhibit the destructive effects of the earthquakes in the site
	Documentary value:	
	• 1. Preserving the social, economic and technical aspects of past civilizations • 2. Plan layout of the city, spatial layout, ancient roads, design mentality and construction technique of urban elements and buildings sustained • 3. Preserving the traces of damages on structures and different construction periods after the earthquakes • 4. Continuing to document natural characteristics, and social and economic life	Structural and material problems: • 1. Precautions against vandalism, regular cleaning of vegetation, but o material deterioration due to location of the parking lot opposite to gate
	Authenticity value:	Presentation problems:
	• 1. Plan layout of the ancient city sustained in terms of the overall organization, but o negatively affected by extensive reintegration, reconstruction and additions	o 1. Approach to excavation of the whole site can damage the authenticity of the site. Also, no environmental management plan for the site • 2. Providing service facilities, but o their architectural quality may be reconsidered
	Memory value:	
	• 1. Continuation of characteristics as a religious center for Christianity	
	Rarity value:	
	• 1. Sustaining its rare characteristics	
3. Building scale	Age (oldness) value:	Structural and material problems:
	o 1. Preserving the age value of only the revealed wall portions due to extensive interventions	• 1. Consolidation and reinforcement works were carried out, but o over reinforcements: new injection materials, metals and usage of cement; or unsystematic consolidation. Also, excavation and restoration works completed within two excavation periods: the efficiency and the long-term effects of the new materials were not checked, and the process were not documented.
	Documentary value:	
	• 1. Individual blocks including the ones with inscription sustained, but o preserving the documentary value of only the revealed wall portions due to random reintegration	
	Authenticity value:	
	• 1. Plan layout and architectural elements sustained, but o loss of authenticity of mass of the original ruin and its facades due to random reintegration, and material and workmanship	Presentation problems: • 1. Debris was removed, but o as-found state of the ruin not legible, and creating a false image due to random reintegration • Placing information boards, but o aesthetic problems stemming from the stone block pavement
	Artistic value:	
	• 1. Frescos and triglyph-metope pattern sustained, o but wrapping the frescos against weathering instead of presenting under a protective shelter or preserving by reburying	

•	Positive impacts
o	Negative impacts

APPENDIX E

COMPARATIVE STUDIES

The four comparative studies are introduced in the below: Kalø Castle (*Kalø Slotsruin*) in Denmark, Pombal Castle *(Castelo de Pombal)* in Portugal, Matrera Castle (*Castillo de Matrera / Pajarete*) in Spain, and Northern Gate of Resafa (Rusafa/Sergiopolis) in Syria.

E.1. Kalø Castle (*Kalø Slotsruin*), Denmark

Kalø Castle (*Kalø Slotsruin*), the first of the comparative studies, is introduced in the below.

E.1.1. Geographic Characteristics

Kalø Castle (*Kalø Slotsruin*) is located in Rønde, Denmark, and 20 km away from Aarhus (*Århus*) which is Denmark's second largest city. The castle was constructed by Kalø Bay in the north-east of the Jutland Peninsula, and on the south of Djursland Peninsula. The site is part of Mols Bjerge National Park (Figure E.1).

Kalø Tower (*Kalø Slotstårn*) is the main tower of the Kalø Castle. It juxtaposes the gate of the main courtyard (Figure E.18).

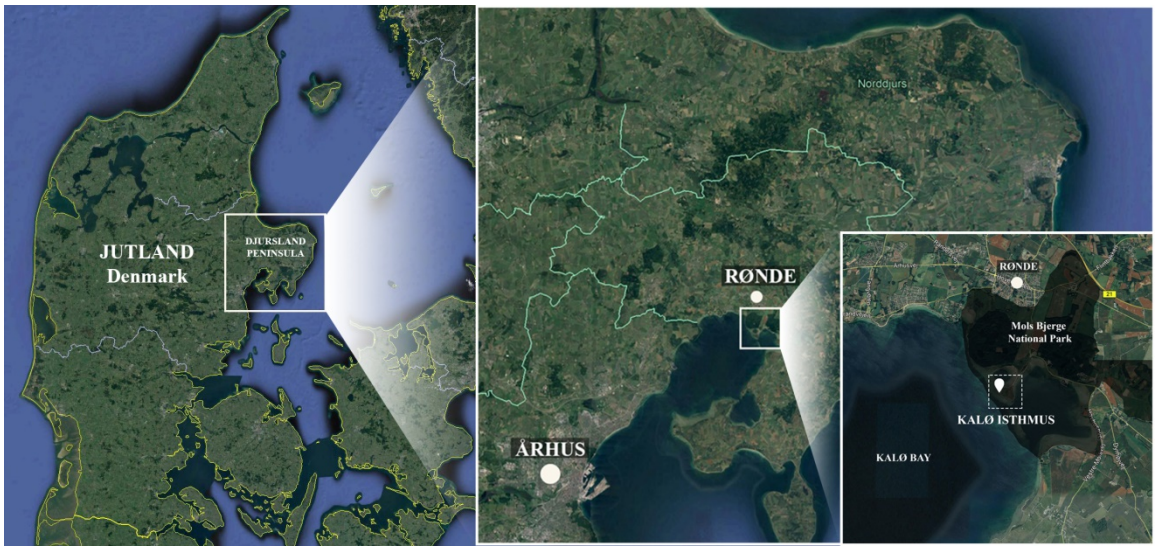


Figure E.1. Satellite images of the site of Kalø Castle
(Base map source: Google Earth; date of image: 07.10.2019, access date:18.06.2020)

The castle is situated on an island which was linked to the coast with a man-made isthmus (Figure E.2) (Castro, 2019). Marshland exists around the island (Reese-Petersen, n.d.). It is connected to the mainland by a 500 m long artificial embankment that is 1.2 m above sea level (Figure E.3) (DF: DKF, 2001/2020; Miljøministeriet & Naturstyrelsen, 2008). This is the longest Medieval road in Denmark that was constructed simultaneously with the castle (Danmarks Nationalparker, n.d.). Base area of the castle is 21 m above the sea level (Figure E.4) (Engberg et al., 2008).

Figure E.2. Aerial view of Kalø Castle and its surrounding (Source: VisitDenmark, n.d.)

Figure E.3. View from the Medieval road towards Kalø Castle by David A. Garcia (Source: Castro, 2019)

Figure E.4. Topological map of the site (Source: Sakares & Soelberg, 2017)

The landscape was formed in the Ice Age and had gradually evolved in every Glacial period (Figure E.7). The site is located close to the end of terminal moraines from the Weichsel Glacial period (Figure E.5). Materials including a mixture of meltwater sands, clays and boulders were carried with ice from the Baltic shield (Danmarks Nationalparker, 2012a; Koppelt et al., 1999). The moraine soil that consists of lime-based clay, sand, gravel and stones formed the site during the Young Baltic Ice Age (Figure E.5 & Figure E.6) (Danmarks Nationalparker, 2012a; Houmark-Nielsen, 2010). In the area of Kalø Bay, the layers of soil from bottom to top are as follows: chalk, plastic clay and moraine clay (Figure E.8) (Nationalpark Mols Bjerge, n.d.). About 8000 years ago, in the Stone Age, the coastline of the mainland took its final form as the sea level decreased (Danmarks Nationalparker, 2012a). Marine clay and sand with dragged boulders formed the coastline (Figure E.6) (Houmark-Nielsen, 2010).

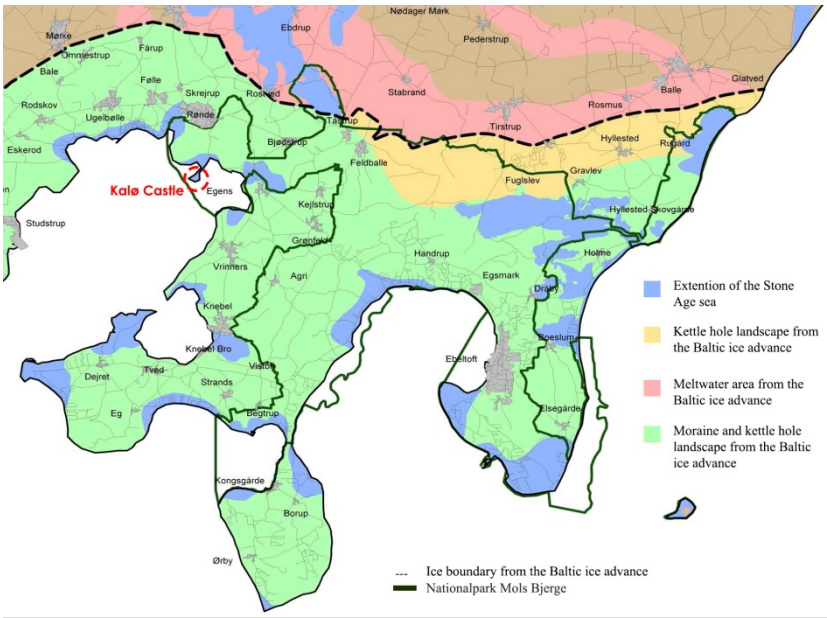


Figure E.5. Geological map of Mols Bjerge (Source: Nationalparkmolsbjerge.dk, n.d.)

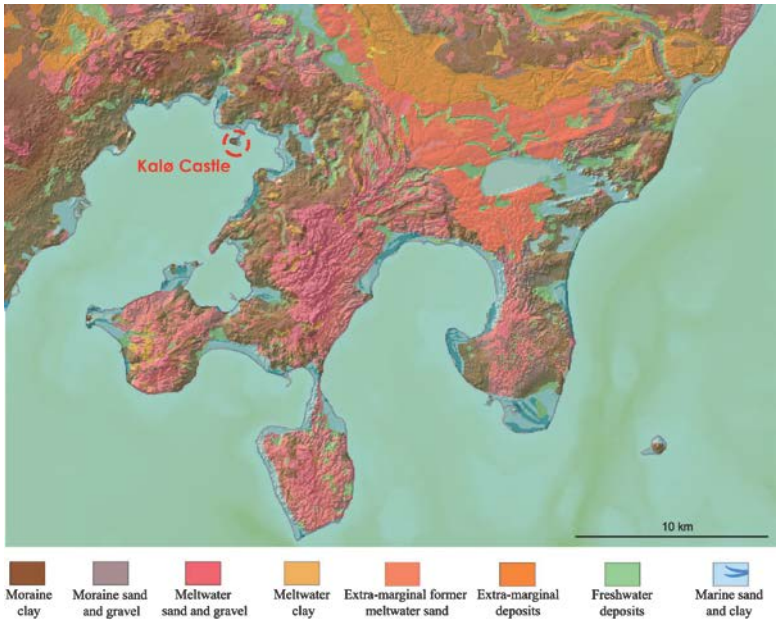


Figure E.6. Map of the soil types (Source: Houmark-Nielsen, 2010)

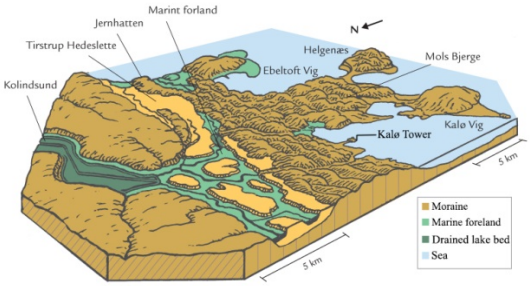


Figure E.7. Model of the landscape (Source: Thinglink, 2017)

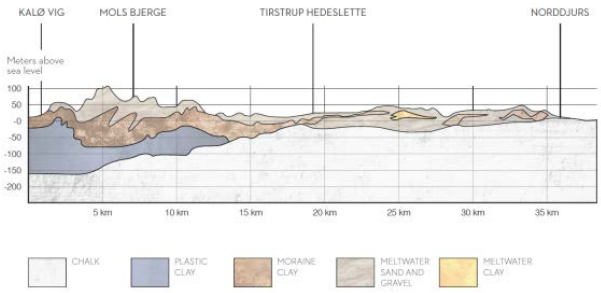


Figure E.8. Geological section through subsurface below the site and its surrounding (Source: Sakares & Soelberg, 2017)

The variation of water level in relation with high tide and flooding, and global warming is a potential threat for the site (DMI, 2018a). These risks are lowest in Mols Bjerge in Denmark (DMI, 2018b), but the areas that are 0-3 m above the sea level in Kalø Bay are under threat (Sakares & Soelberg, 2017).

Nature is very diverse in Mols Bjerge National Park. There are both deciduous and pine forests around Kalø Bay; Hestehave, Ringelmose (Figure E.9). The flora of the site consists of sea meadow and grassland (Figure E.10). This site was originally a medical herb garden (Figure E.11) (Danmarks Nationalparker, n.d.; Sakares & Soelberg, 2017). The mammals such as deer, fox, badger, bat, etc.; birds such as red kite that is listed by *Miljøministeriet* (the Danish Ministry of Environment) as a bird species to be protected; insect and spider species constitute of the fauna of the site (Nationalpark Mols Bjerge, n.d.).

Figure E.9. Satellite map of the forests around the Kalø Tower (Source: Google Earth; date of image: 07.10.2019, access date: 02.07.2020)

Figure E.10. Natural characteristics of the site (Source: Wikipedia, 2014a)

Figure E.11. Painting of Kalø landscape by Vilhelm Groth in 1868
(Source: Laursen, 2014, p. 306)

E.1.2. Historic Background

The original function of the Kalø Castle was defense. The castle was constructed by the local peasants in 1313 (14th century) with the command of the Danish king Erik Menved (Erik VI) (Miljøministeriet & Naturstyrelsen, 2008; Danmarks Nationalparker, n.d.).

In 1320, the castle was partly demolished by the new king Christoffer II with enforcement of the Danish nobility, but it is not clear how much of the castle was demolished. During this time, the domination of the Crown decreased (Frandsen, 1991). Claus Limbæk who is a Holstein nobleman mortgaged the castle in 1340 and became the king's sheriff (Engberg et al., 2008; Lauring, 1968/2006). In 1343, King Valdemar Atterdag bought the castle. The current ruins are from the period of expansion of the castle under his domination (DF: DKF, 2001/2020; Miljøministeriet & Naturstyrelsen, 2008). The castle was bought by Valdemar Atterdag's daughter Margrethe I in 1407 (Engberg et al., 2008; Miljøministeriet & Naturstyrelsen, 2008). From the 15th century onwards, the castle was used as a local administrative center and later as a state prison (DF: DKF, 2001/2020). In the middle of the 16th century, a major repair was carried out in the artificial embankment (Hansen, 2012b).

The Swedish occupants damaged the castle during Torstenson War between 1643 to 1645. When the elective monarchy was converted into an absolute monarchy by King Frederick III in 1660; the castle lost its defensive function and was used as the manor house (Danmarks Nationalparker, n.d.; Lauring, 1968/2006). In 1661, King Frederick III gave the castle to his son Ulrik Frederik Gyldenløve (Hensel & Rønne, 1942/2016). The castle was demolished with the command of Ulrik Frederik Gyldenløve in 1672. He re-used most of its construction material to build his palace in Copenhagen, which is known as the Charlottenborg Palace (Miljøministeriet & Naturstyrelsen, 2008; Frandsen, 1991). It is understood from the paintings that Kalø Castle was the portion which was best preserved (Figure E.12, Figure E.13 & Figure 2.14). The site was declared as a nationally protected site in the early 1800s (Franklin, n.d.). In September 1824, Kalø estate was sold in an auction to the German Jenisch

family (Hansen, 2012a; 2012b). It is evaluated from a painting dated to 1839 that the family did not realize a repair (Figure E.14). In 1903, the archaeologic excavation of the site and the restoration of the castle was started by architect C. M. Smidt from the National Museum of Denmark with the consent of the family (Hansen, 2012a). During World War II (1939-1945), the Germans used the ruin as a target for shooting practices and the ruins were slightly damaged (Hansen, 2012a; Lauring, 1968/2006). The Danish State took it back in 1945 (Hansen, 2012b). In 2009, the State of Denmark incorporated the site into the Mols Bjerge National Park (Franklin, n.d.).

Figure E.12. Painting of Kalø Tower and its vicinity, Søren Abildgaard, 1770 (Source: Vedsted, 2013)

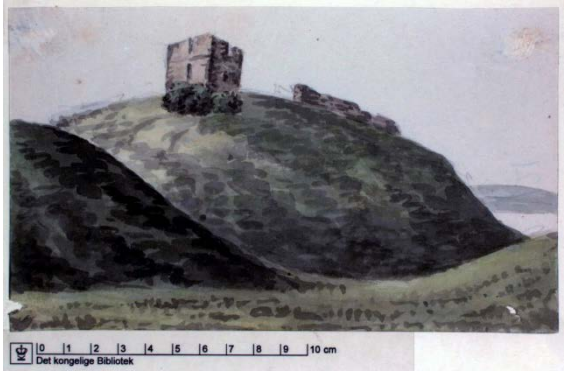


Figure E.13. Painting of Kalø Tower and its vicinity (Source: Rawert, 1800)

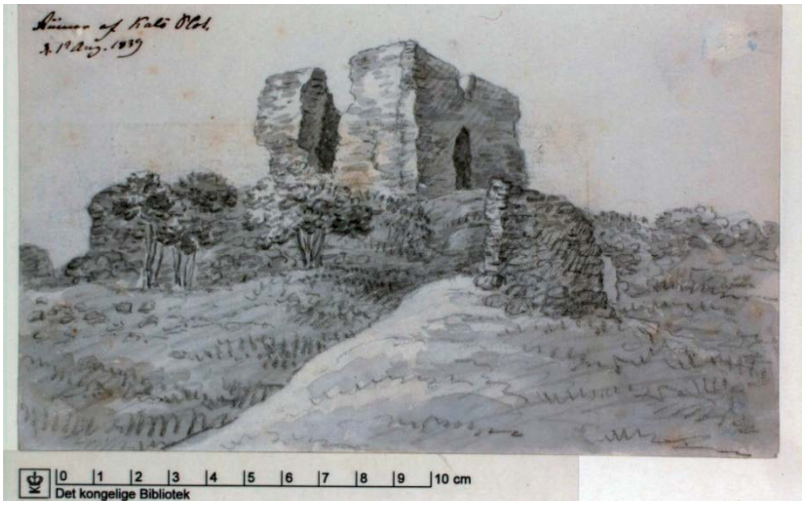


Figure E.14. Painting of Kalø Tower (Source: Rawert, 1839)

E.1.3. Morphologic Characteristics

The castle is protected with two wet moats which separate the castle from the east part of the peninsula, and dry moats and earth mounds on three sides. The western

side of the peninsula has steep slope, which makes access very difficult (Figure E.15 & Figure E.16). The Medieval embankment is out of cobblestone pavement (Figure E.17).

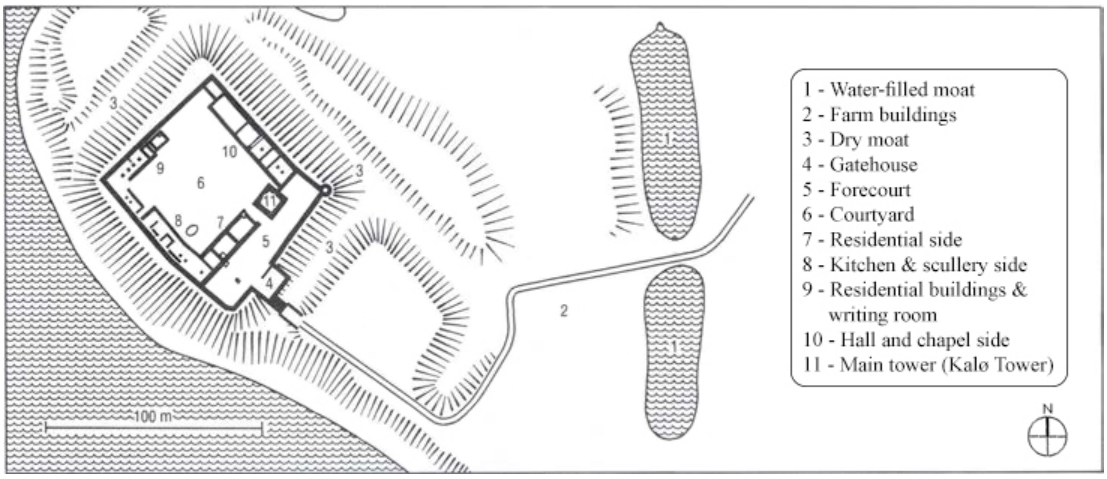


Figure E.15. Site plan of the Kalø Castle
(Source: Miljøministeriet & Naturstyrelsen, 2008)

Figure E.16. Restitution drawing of the Kalø peninsula with buildings from 16th century by Anders Berthelsen in 1999 (Source: Engberg et al., 2008)

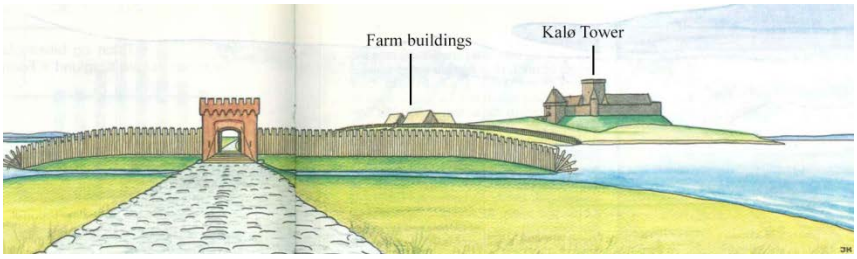


Figure E.17. Restitution drawing of the embankment with assumed gatehouse and palisade by Rikke Agnete Olsen in 1982 (Source: Poulsen, 2016)

At the crosspoint of the embankment and the peninsula, the existence of a gatehouse and palisade was assumed, but the remains of either the gatehouse or the palisade could not be found in 2006 excavations (Figure E.17) (Hansen, 2012b; Engberg et al., 2008). There are remains of a group of farm buildings in the west of the moats. They date to 1500s (Engberg et al., 2008; Koppelt et al., 1999). These buildings can be reached after passing from the water-filled moats by a drawbridge, and palisade (Figure E.16) (Miljøministeriet & Naturstyrelsen, 2008; Koppelt et al., 1999). The castle covered an area of 70x80 m. A wall-walk surrounded it (Engberg et al., 2008). The wall-walk has a passage projecting towards the exterior of the castle for guards (Figure E.19). The entrance of the castle is from the gatehouse and the drawbridge adjacent to it. There is a forecourt and a main courtyard that has remains of buildings on all sides. In the forecourt, medieval forge and latrine is located. The south side of the main courtyard comprehends a dining and living space for workers on the ground floor. The residence of the king's sheriff was used to be on the upper floor. The remains of the kitchen and scullery, and a half-timbered building are at the west. At the northwest, there are remains of half-timbered buildings where the craftsmen and the priest had lived, and a writing room. In the northern corner of the castle there were remains of the castle built in 1313. These remains are a round tower that is 9.5 m in diameter. Its wall thickness is 2 m. The wall remains attached to round tower can be followed around 37 m. The east side consists of a storage for gun on the ground floor. There were a hall, guest rooms, and a chapel on the first floor. The main tower together with the remains of the original tower is located between the east and south sides (Figure E.18 & Figure E.19). Only the foundations and some wall pieces of these buildings can be observed except the main tower (Miljøministeriet & Naturstyrelsen, 2008; Engberg et al., 2008).

Kalø Tower is square planned (around 12x12 m) (Engberg et al., 2008). The height of the tower from the ground is 10 m. In the original, it was about 3-4 m higher (Hansen, 2012b).

The tower had 3 stories above the basement, and a terrace roof (Hansen, 2012b). The third floor was spanned with a brick vault as a precaution against fire (Miljøministeriet & Naturstyrelsen, 2008). The top two floors had been used by shooters. The ground floor was for accommodation in case of emergency. The basement was for storage of food. The current entrance from the ground level is a later intervention. The original entrance was from the second story (Hansen, 2012b). The studies carried out in the tower revealed that it was constructed in three phases, probably three succeeding summers (Hansen, 2012b; Engberg et al., 2008). Before the current interventions, Kalø Tower was in ruins.

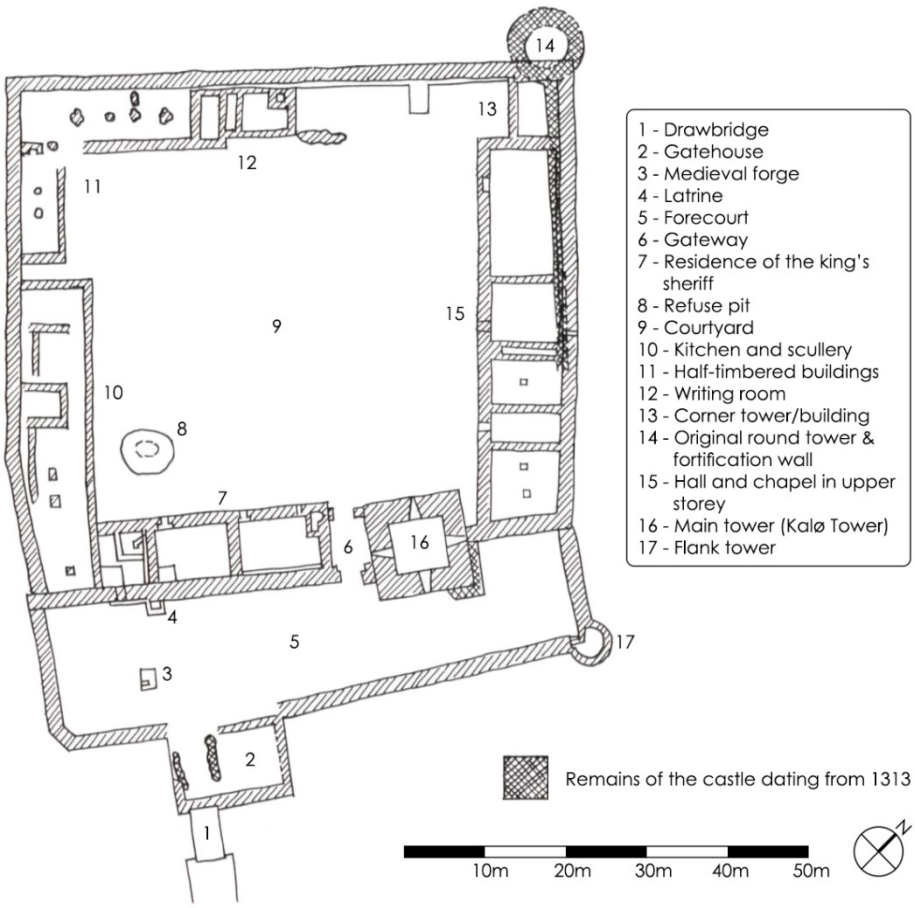


Figure E.18. Plan of the Kalø Castle (Base drawing source: Frandsen, 1991, p. 27)

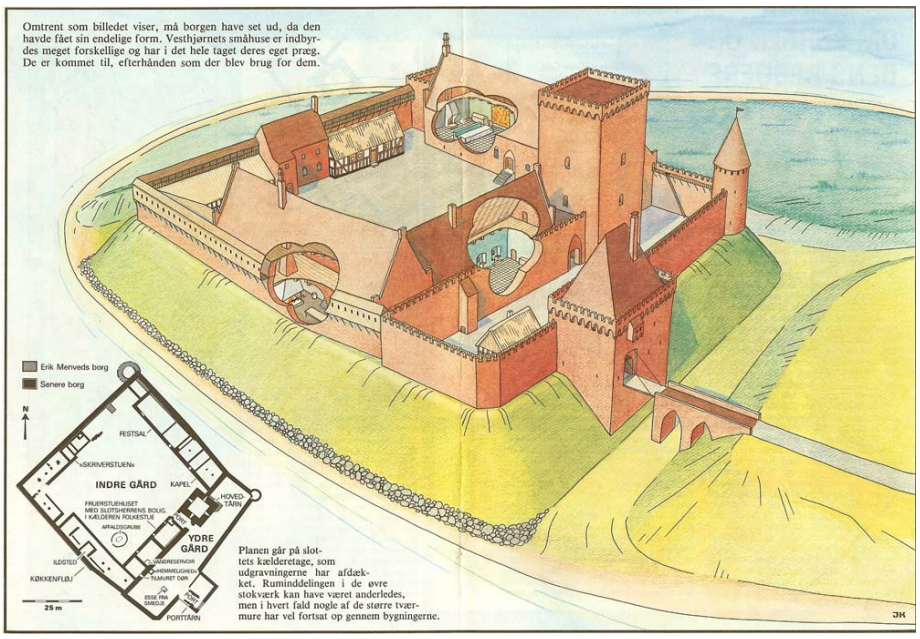


Figure E.19. Restitution drawing of the castle by Rikke Agnete Olsen in 1982 (Source: Hansen, 2010).

E.1.4. Construction Technique and Material Usage

Kalø Tower is brick masonry. Construction technique of the walls is structura testacea: this means both the core and the faces are brick (Van Deman, 1912a, pp. 232-233; Van Deman, 1912b, pp. 388, 390, 391, 395, 402; Van Aken, 1952, p. 145). Masonry style in exterior walls is Flemish bond as regular courses with two stretchers between every header (Figure E.21) (Lourenço, 2014, pp. 3-4). Thickness of the walls is 3 m (Miljøministeriet & Naturstyrelsen, 2008). There are two construction joints because the construction has taken three summers (Figure E.20). These joints were determined under the plaster (0.5 - 4 cm) that was out of sand and straw. In this way, the wall portions were protected from freeze-thaw cycles during the winters (Frandsen, 1991, p. 31).

The wall material is traditional redbrick with lime mortar, and foundation of the tower consists of boulder (Figure E.22) (Sakares & Soelberg, 2017, p. 56; Frandsen, 1991, pp. 30-31).

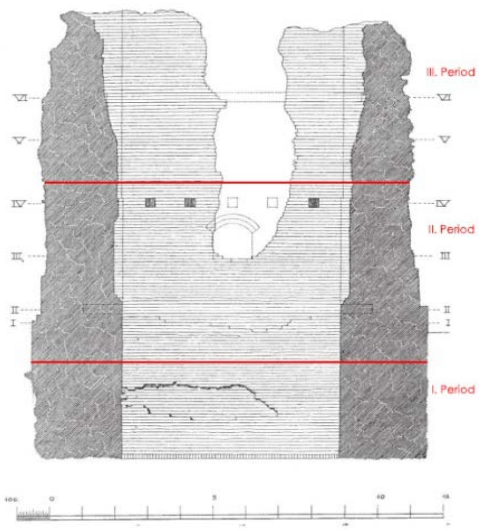


Figure E.20. Section with three construction periods by C. M. Smidt, 1909 (Source: Frandsen, 1991)

Figure E.21. Coursing detail of an exterior wall of the tower (Source: Reese-Petersen, n.d.)

Figure E.22. View of the tower from the north and wall details as viewed from the interior (Source: Tripadvisor, 2017a)

Semi-circular arched and V-shaped embrasures (Akarca, 1987, p. 145), and construction holes of the lost timber floors are architectural elements of the tower (Figure E.23).

Figure E.23. Views from the interior, left (Source: Tripadvisor, 2017b); right (Source: Tripadvisor, 2016).

E.1.5. Conservation Activities

In this section, conservation activities regarding Kalø Tower are analyzed under the titles of research, projects, implementation and awards.

E.1.5.1. Research

The first archaeological excavation at the site was started in 1903 and have been continued until 1944 by architect C. M. Smidt from the National Museum of Denmark. Martin Rücker von Jenisch who was the castle's owner in 1903 funded the excavation. Then, some other groups, institutions and notables funded work: C. M. Smidt in 1904, a local committee in 1933, the State and the Aarhus Municipality with Baron Wilhelm von Jenisch in 1940s. During this period, implementations such as reintegration, consolidation, and cleaning the debris of the Kalø Tower were also realized (Figure E.24) (Hansen, 2012a; Frandsen, 1991, pp. 28-32).

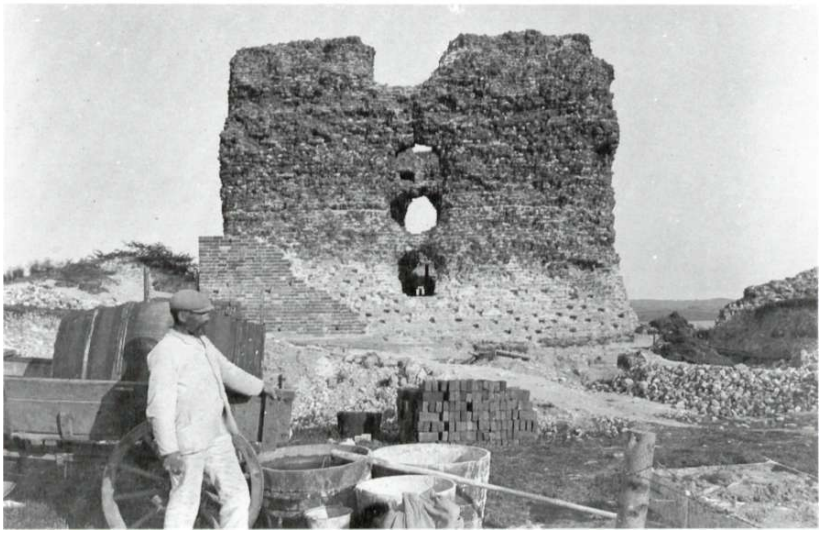


Figure E.24. A photograph from the north taken during the excavation in 1909
(Source: Frandsen, 1991, p. 28)

The castle walls and the Medieval path were restored between 1940-1945 (Frandsen, 1991, p. 28; Frandsen, 2013, p. 4). In the 1940s, wall remains of all the buildings of the castle were surveyed (Hansen, 2012a). Between 1954-1962, restoration of the southern part of the path has been carried out by Stiesdal from the National Museum (Frandsen, 2013, p. 4). In 1986, Smidt's additions that had damaged the tower were removed. Reintegration, consolidation, capping, and cleaning were realized (Frandsen, 1991, pp. 29-35). In 1990, the first survey with geophysical method (geo-radar) was made in collaboration with the Geological Institute of Aarhus University (Frandsen, 1991, p. 30; Koppelt et al., 1999, p. 147). In 1996, a survey with high resolution geomagnetic tools was carried out. Later, research for location of the former farm houses was started, and an open air museum presenting the locations of these remains was planned (Koppelt et al., 1999, p. 147). In 2006, excavation of the site was carried out by Nils Engberg from the National Museum (Hansen, 2012a).

Realdania, a private association in Denmark, and *Naturstyrelsen* (the Danish Nature Agency) launched national campaigns in October, 2011: *Stedet Tæller* (Place Matters) and *Steder i Landskabet* (Places in the Landscape). The aim of these campaigns was enhancement of the potentials of the rural and remote areas in Denmark, and providing harmony between nature and touristic place with minimal architectural

interventions. Kalø Castle is a part of these campaigns (MAP Architects, n.d.; Reese-Petersen, n.d., pp. 71-73).

E.1.5.2. Projects

There are two projects for the site. The first is Kalø Tower Visitor Access (*Kalø Slotsruin Besøgs Adgang*) project, which was selected via an architectural competition (MAP Architects, 2012). It was prepared by architect David A. Garcia with his team and Mast Studio[55] (Castro, 2019; EU Mies Award, 2019a). The second is the Visitor Center Nationalpark Mols Bjerge project. The winning proposal of the architectural competition in 2016 was by Arkitema Architects[56] (Arkitema Architects, n.d.).

[55] The firms in charge of implementation were HSM Industri and Moelven (Castro, 2019; EU Mies Award, 2019a). The collaborators were Vision+ for engineering and, architect Marco Mercuri as a consultant (Reese-Petersen, n.d.). The responsible institution was the Danish Crown. Funding suppliers were Realdania, Naturstyrelsen, Mols Bjerge National Park, and Kulturstyrelsen (Realdania, n.d.). The project area which includes parking and recreation areas is 2654 m^2. The budget of the project was 359.174 €/m^2 (EU Mies Award, 2019a).

[56] The collaborator for engineering was SlothMøller. The responsible institution was Mols Bjerge National Park. The project area is 750 m^2 (Arkitema Architects, n.d.). Expected opening time of the project to the public was in 2019 (Lynch, 2017).

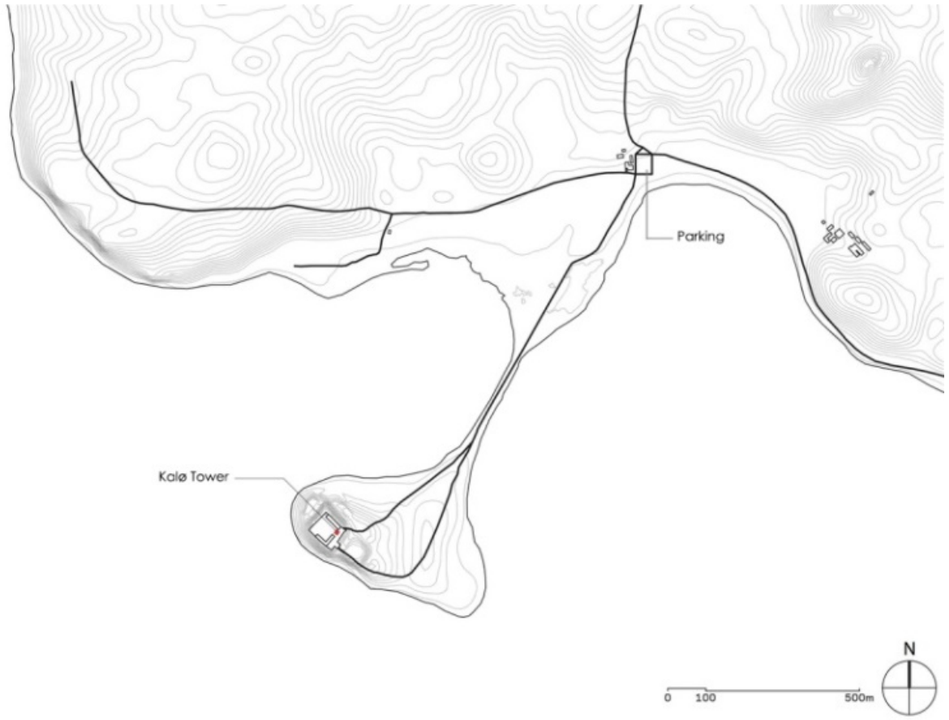


Figure E.25. Site plan (Source: Castro, 2019)

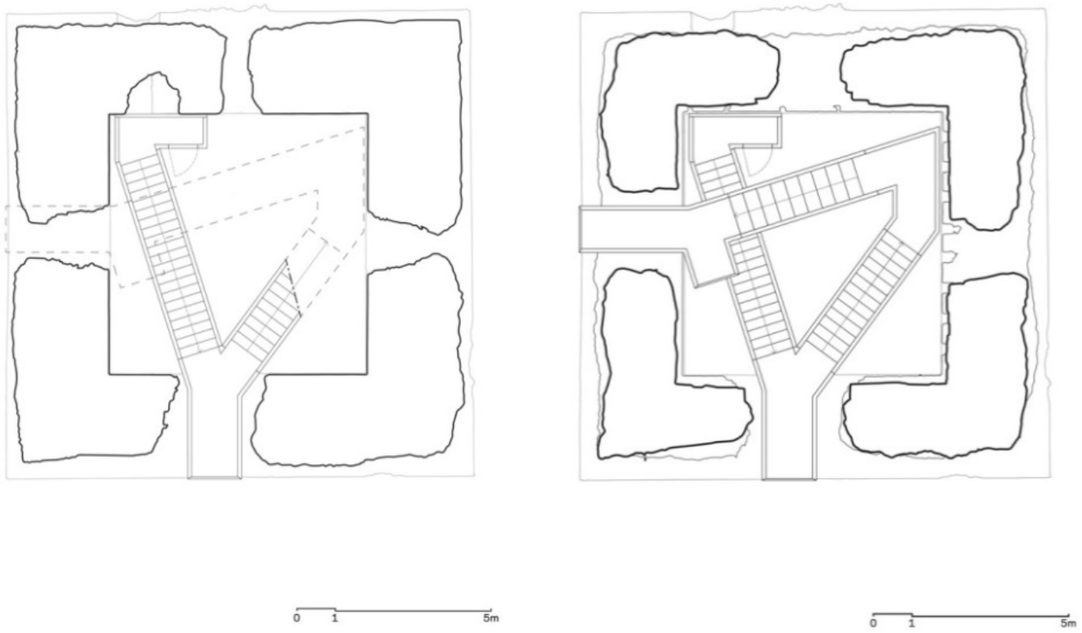


Figure E.27. Ground floor plan (left), first floor plan (right) (Source: Castro, 2019)

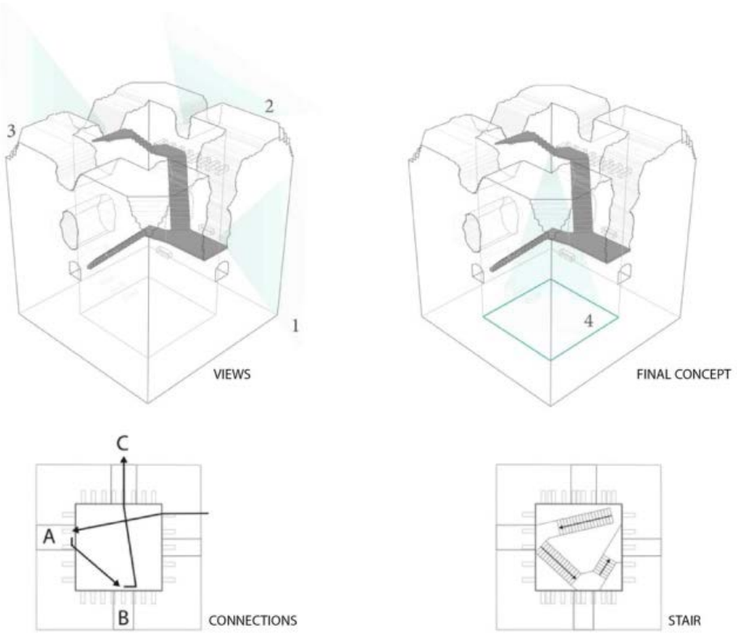


Figure E.26. Concept diagrams of the project (Source: Castro, 2019)

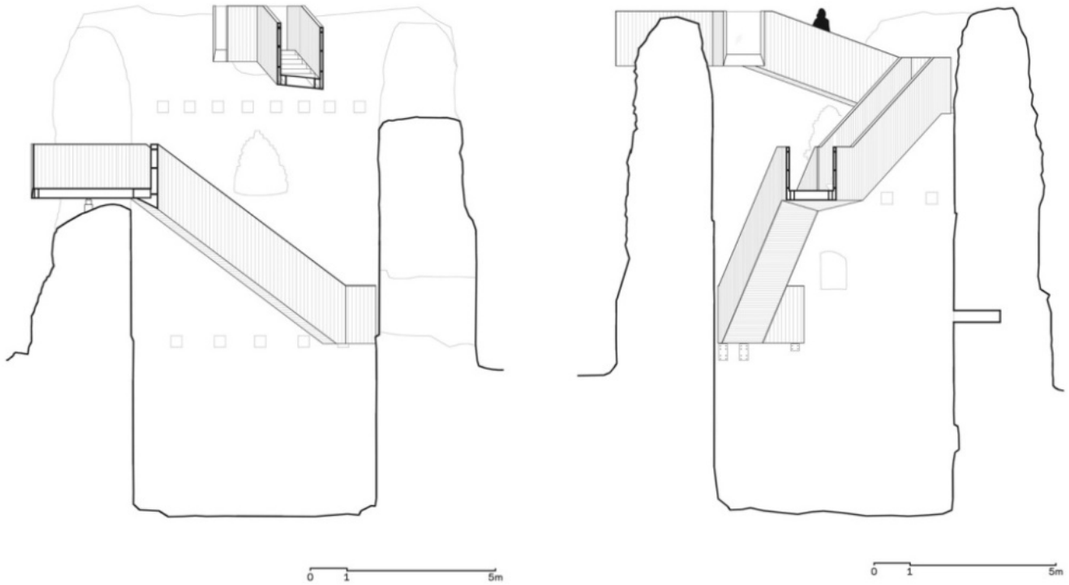


Figure E.28. Sections in east-west direction (left), in north-south direction (right) (Source: Castro, 2019)

E.1.5.3. Implementation

The project of the Kalø Tower Visitor Access was realized between 2015 and 2016 (Stevens, 2017; Stedet Tæller, n.d.). Addition, consolidation and presentation are the interventions practiced in this project.

Addition is determined inside the tower. Steel frame staircase that is only visible from inside the structure with a continuous handrail was designed by using a portable 3D scanner (Figure E.29 & Figure E.30). The scanner provided a 3D of every single brick, so the implementation was simulated before it was realized (HSM Industri A/S, n.d.; MAP Architects, n.d.). It was constructed in 7 large pieces in a workshop and placed in the tower with the help of a crane (Figure E.31). It was connected to the ruin at only four points for minimum intervention. The sides and the bottom surface of the staircase were covered with ash wood that has been treated with heat to maximize durability up to 60 years without paint. The stairs and handrails were made out of metal, and painted in matt black to protect them against the harsh coastal weather. The staircase guides the visitor from existing opening to another in the facade and creates balconies at various heights (Figure E.32). Glass balustrades were located at vista points (Castro, 2019).

Figure E.29. 3D model of the staircase (Source: EU Mies Award, 2019a)

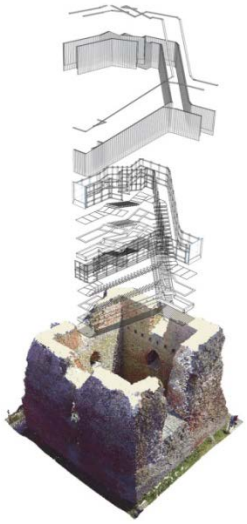


Figure E.30. Axonometric projection of the ruin and the staircase (Source: Castro, 2019)

Figure E.31. Images during assembling of the staircase; from outside of the tower (left), from inside of the tower (right) (Source: HSM Industri A/S, n.d.)

Figure E.32. Images by David A. Garcia after realizing the project; from outside of the tower (left), from inside of the tower (right) (Source: Castro, 2019)

Consolidation of the original Medieval path and drawbridge was carried out (Reese-Petersen, n.d.).

Presentation of the site was provided with reorganization of the arrival areas, construction of a new path that goes directly towards the tower, and installation of information boards and timber benches that were placed along the path (Figure E.35) (HSM Industri A/S, n.d.; Reese-Petersen, n.d.). Information boards explain general characteristics and historical background of the castle; characteristics of landscape and Mols Bjerge National Park and the project (Figure E.33 & Figure E.34). Tourist facilities such as parking lot, cafe, toilet and trash cans were provided near the Medieval path. Public transport was also provided for access to the site (Miljøministeriet & Naturstyrelsen, 2008). The entrance to the Medieval path was provided with a small gate, and surrounded by wires. Also, an app was designed for virtual reality that shows the ruins in reconstructed state and explains characteristics of the site (Figure E.36). This project enabled the site to become a more popular destination with approximately 150 000 visitor annually (Nationalpark Mols Bjerge, 2016). So, it was a pioneer project. Later, a visitor center at Mols Bjerge National Park with an exhibition area, gathering

space for tourists, families and class trips, and a restaurant was designed by Arkitema Architects.

Figure E.33. Information boards; near the parking lot (left), near the Medieval path (right) (Source: Reese-Petersen, n.d.)

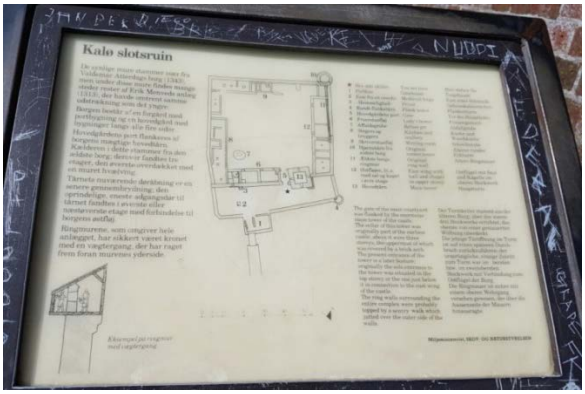


Figure E.34. Information board about the castle near the tower (Source: Tripadvisor, 2016)

Figure E.35. Benches placed along the path (Source: Reese-Petersen, n.d.)

Figure E.36. Restitution of the castle, virtual reality app (Google Play, 2017)

E.1.5.4. Awards

The project was nominated for the European Union Prize for Contemporary Architecture - Mies van der Rohe Award in 2017 (EU Mies Award, 2019a).

E.2. Pombal Castle (*Castelo de Pombal*), Portugal

Pombal Castle (*Castelo de Pombal*), the second of the comparative studies, is defined in this section.

E.2.1. Geographic Characteristics

Pombal Castle is located in Pombal town in Portugal. The city is in Leiria District in the sub-region of Pinhal Litoral, and 150 km in distance to Lisbon and Porto, 33 km in distance to Coimbra (Figure E.37) (Município de Pombal, 2020a; GTF Pombal, 2009, p. 6). The castle was constructed on the remains of a Roman fortress and at the junction of the main roads in the kingdom, at a strategic position (Município de Pombal, 2020b; Pedrosa, 2014, p. 10). In the southeast of the castle, the city's cemetery is located.

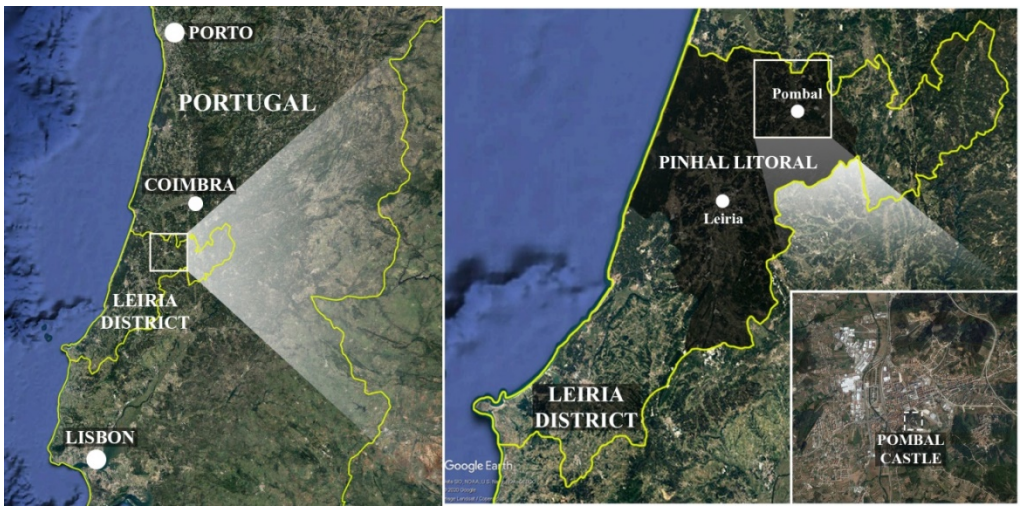


Figure E.37. Satellite images of the site of Pombal Castle
(Base map source: Google Earth; date of image: 31.12.2016, access date: 06.09.2020)

The landscape of Pombal covers an area composed of the coast line, Arunca and Pranto rivers, valleys and a mountain range (*Serra de Sicó*). So, there is a gradual increase in altitude from the coast to the interior: 0-553 m (Figure E.38) (GTF Pombal, 2009, pp. 6, 9, 11; CMP-GPU, 2014, pp.88-89). The castle is situated on a massive rock

with full vista of the surrounding and overlooking the valley of the Arunca River (Figure E.39) (Município de Pombal, 2020c; Noé, 2016).

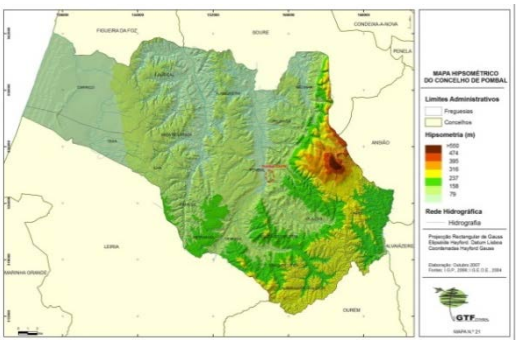


Figure E.38. Physical map of Pombal (Source: GTF Pombal, 2009, p. 10)

Figure E.39. Aerial view of Pombal Castle (Source: Pinto, 2012)

The Pombal Municipality is located in the Lusitanian Basin which was formed during Mesozoic Era (CMP-GPU, 2014, p. 8). The basin is located in a geomorphologically diverse and tectonically active area (Minning et al., 2006, p. 187). Sedimentary rocks are common (GTF Pombal, 2009, pp. 23, 24, 28). The area is rich in a variety of mineral deposits: there is ongoing mining activities. The soil consists of limestone, marl, clay, sand, gravel mineral salt, lignite (CMP-GPU, 2014, pp. 179-197). It includes Pliocene marine fossils (Diniz et al., 2016, pp. 41-43, 56). The castle site was formed in the Upper Jurassic period with calcerous soil (Figure E.40) (CMP-GPU, 2014, p. 31; Manuppella et al., 1978, pp. 30-31; GTF Pombal, 2009, pp. 23-24). Pombal is in the eighth degree isoseismic intensity zone that has medium/high seismic risk (Figure E.42) (APA, 2014, pp. 18-21; Silva et al., 2014, pp. 8-9). In relation to a major fault (Nazaré-Lousã) which passes through the city, there is a dense network of secondary faults in its vicinity (Figure E.41) (CMP-GPU, 2014, p. 54).

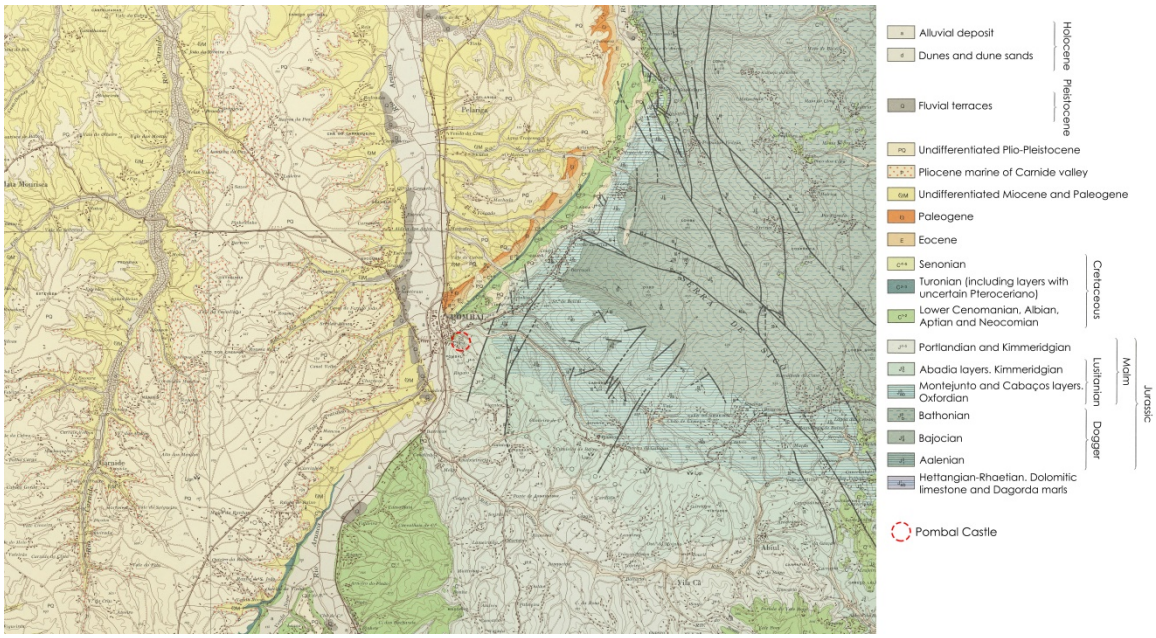


Figure E.40. Geological map of Pombal (Source: LNEG, 1974)

Figure E.41. Neotectonic map of Portugal (Source: APA, 2014, p. 21)

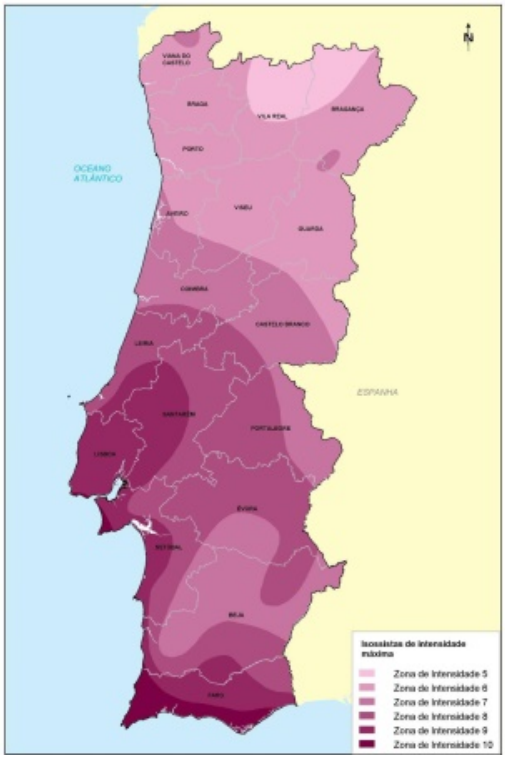


Figure E.42. Intensities map of isoseismal lines of Portugal (Source: APA, 2014, p. 19)

The Pombal Municipality is included in the hydrographic basins of Mondego that covers the Pombal township, Lis and Tagus rivers. There is very branched and

dense hydrographic network (CMP-GPU, 2014, pp. 157-160). Arunca and Pranto Rivers (*Ribeira de Carnide*), that are branches of Mondego River, are two main water lines located in Pombal Municipality in the N/S direction (Figure E.43) (CMP-GPU, 2014, p. 54; GTF Pombal, 2009, p. 30). The Pombal township is currently under slight erosion. But, it is included in medium to high potential erosion classes (GTF Pombal, 2009, pp. 61-67).

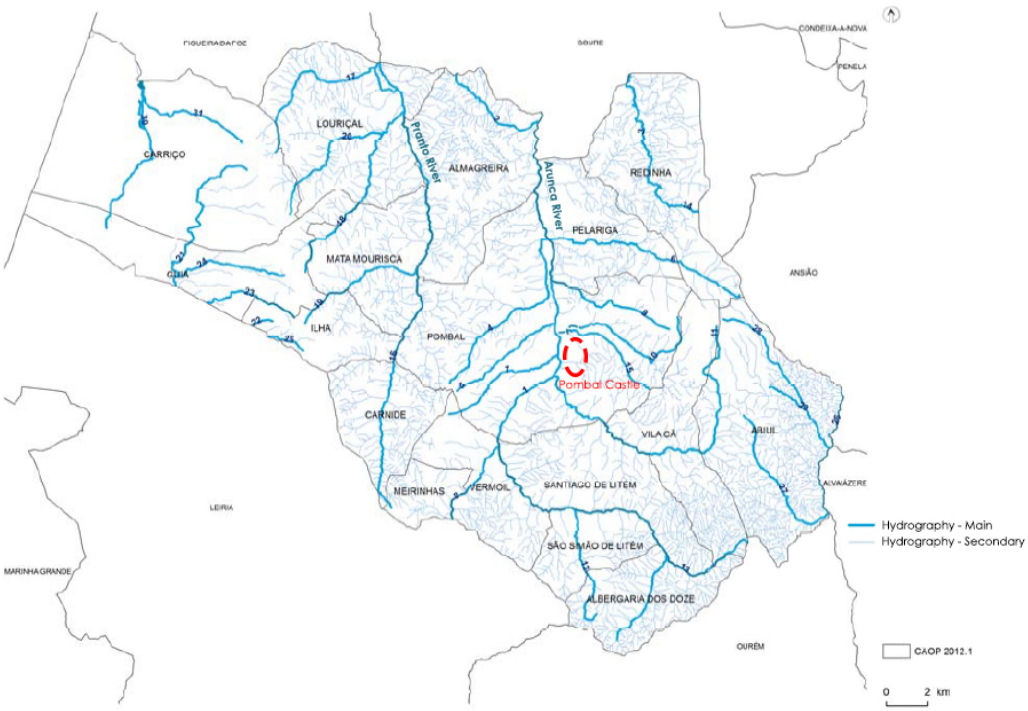


Figure E.43. Hydrographic network in Pombal (Source: CMP-GPU, 2014, p.160)

Mediterranean climate predominates in Pombal. There are dominant two seasons: rainy and mild winter, and dry and hot summer. Due to the high and heavy rainfall in winter, there can be a potential threat of soil erosion (Município de Pombal, 2020f; CMP-GPU, 2014, pp. 315-316). Also, significant fluctuations in the percentages of annual rainfall occur in the Municipality. So, there could be very dry or very rainy years (Município de Pombal, 2020f). Due to the variety of landscape forms from the coast to the interior, Pombal has rich and diverse flora and fauna (CMP-GPU, 2014, p. 321). For example, the site of Sicó / Alvaiázere, which covers the eastern part of the Pombal Municipality, was classified as the Site of Community Importance (*SIC-Sítio de Importância Comunitária*) in the Natura 2000 Network in 2008 due to its environmental value and richness of biodiversity (Figure E.44) (CMP-GPU, 2014, pp. 321, 327-328, 333-334). The flora of Pombal consists of tree species such as holm and cork oak, maritime pine, and olive; herbaceous plants and shrub vegetation (Município de Pombal, 2020f; CMP-GPU, 2014, p. 336). The flora of the Pombal Castle consists of meadows, and trees which were planted in 1934: pine, acacia, white cedar and deciduous trees (Figure E.45) (Pedrosa, 2014, p. 19). The mammals such as rabbit, genet, fox, wild boar, etc.; reptiles such as rat snake; amphibian species; birds such as spotted-backed kestrel, owl, partridge, pigeon and dove constitute the fauna of the site (Município de Pombal, 2020f).

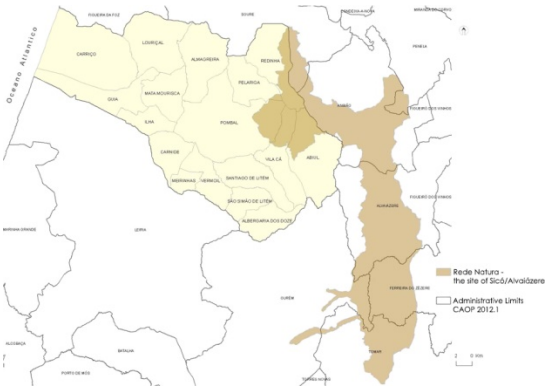


Figure E.44. Site of Sicó/Alvaiázere and Pombal
(Source: CMP-GPU, 2014, p. 333)

Figure E.45. Aerial view of the castle
(Source: Pinto, 2012)

E.2.2. Historic Background

The original function of Pombal Castle was observation and defense together with a number of other military structures: Montemor, Soure, Penela, Germanelo, Miranda do Corvo, Arouce (Lousã) Castles; Almedina and Buarcos Towers in the line of defense of the Mondego (Figure E.46) (CMM, n.d.). Their aim was to protect Mondego basin and Coimbra against Muslim (Almohads) attacks, to consolidate borders, and to ensure the permanence of the newly conquered territories by Christians. The strategic location of Pombal Castle on the main circulation routes of the kingdom was suitable for its role. It is also one of the members of the castle building group in the south that consists of Ceras, Tomar and Almourol Castle. The castle was founded by Gualdim Pais, Master of the Order of the Temple, between 1156 and 1171 (construction of the keep), during the reign of D. Afonso Henriques (Correia, 2006, p. 87; Pedrosa, 2014, pp. 9-10).

Figure E.46. Network of castles and defensive walls of Mondego *(Rede de Castelos e Muralhas do Mondego)* (Base map source: Anyformsdesign, 2016)

It is thought that the settlement dates back to the Neolithic Period. According to the information obtained from archaeological research, the first settlers were Romans, and latter were Muslims (Município de Pombal, 2020b; Noé, 2016; Cruz, 2016). In 1128, D. Afonso Henriques donated the former Roman fortress to the Order of the Temple (Almeida, 2012, p. 143; Pires, 2017, p. 92). Construction of Pombal Castle with several towers began in 1156 and continued until almost the end of the 12th century. In 1171, the keep (the main tower, *Torre de Menagem*) was constructed. The castle was attacked and partially destroyed during Muslim attacks in the late 12th century (Pedrosa, 2014, p. 13). In 1353, the castle and the village were donated to the Order of Christ (Correia, 2006, p. 87; Noé, 2016). During the succeeding crisis between 1383 and 1385 after the death of King Ferdinand I, Pombal Castle was attacked and plundered by the Castilians in 1385 (Pedrosa, 2014, p. 13). The first alterations of the castle; e.g., construction of barbican and consolidation of the walls, was carried out around 1500s during D. Manuel I period (1495-1521). Then, gunpowder was started to be used (Almeida, 2012, p. 143; Pires, 2017, p. 93). In the early 16th century, the defense function of the castle lost its importance. It was transformed into the residence of Pero de Sousa Ribeiro, the Count of Castelo Melhor, Mayor of Pombal and Commander of the Order of Christ. The alterations were window additions at the upper level of the walls, relocation of the entrance from the south to the north, and construction of a vaulted structure and a new fortresses (Município de Pombal, 2020c; Pedrosa, 2014, p. 14; Correia, 2006, p. 87). In 1560, reconstruction of the Santa Maria's Church of the castle was carried out by the reign of Pero de Sousa Ribeiro (Cruz, 2016; Noé, 2016). The castle was damaged by the earthquake in November, 1755 (Noé, 2016). During the

Peninsular War, the castle was abandoned and ruined. The village was burned after attacks of French army lead by Marshal Michel Ney in 1811 (Correia, 2006, p. 87; Cruz, 2016). Due to the cholera epidemic in 1833, Pombal turned into an abandoned place (Município de Pombal, 2020b). The population moved to a new settlement at the lowlands (Igespar, n.d.). The family of Sousa Ribeiro owned the castle until 1834 (Pedrosa, 2014, p. 14). Following the dismantling of the royal road passing through the village between 1790s to 1855, the castle was totally isolated from the rest of the country (Município de Pombal, 2020b).

Figure E.47. Pombal Castle at the end of the 18th century (Source: Pedrosa, 2014, p. 16)

Figure E.48. The castle and surrounding before the interventions of DGEMN in 1936 (Source: Pedrosa, 2014, p. 17)

Figure E.49. South facade of the castle and barbican in 1937 (Source: Pedrosa, 2014, p. 21)

Figure E.50. View from the courtyard and keep in 1936
(Source: Pedrosa, 2014, p. 20)

Figure E.51. View of remains in the courtyard before the interventions
(Source: Município de Pombal, 2020c)

Figure E.52. North facade of the castle in 1936 (Source: Pedrosa, 2014, p. 21)

Figure E.53. The keep in 1936
(Source: Município de Pombal, 2020c)

Pombal Castle was classified as a National Monument on June 16, 1910. Starting with, December 7, 1924; the Nucleus of the Union of Friends of the Monuments of the Order of Christ (*Núcleo da União dos Amigos dos Monumentos da Ordem de Cristo*) became responsible for the conservation and control of the site. The Ministry of Defense continued to be the land owner. In 1931, Pombal Initiative and Tourism Commission (*Comissão de lniciativa e Turismo de Pombal*) rented the site (Pedrosa, 2014, p. 18). It was transferred to the Ministry of Finance *(Ministério das Finanças)* on April 13, 1939 (Cruz, 2016). On January 15, 1947, it was included in special protection zones (*ZEP - Zonas Especiais de Protecção*), and defined as *zona "non aedificandi"*: any construction are forbidden (Figure E.54) (Correia, 2006, p. 87; Município de Pombal, 2020c). In short, it has been property of the City Council since the first half of the 20th century (Lara, 2017).

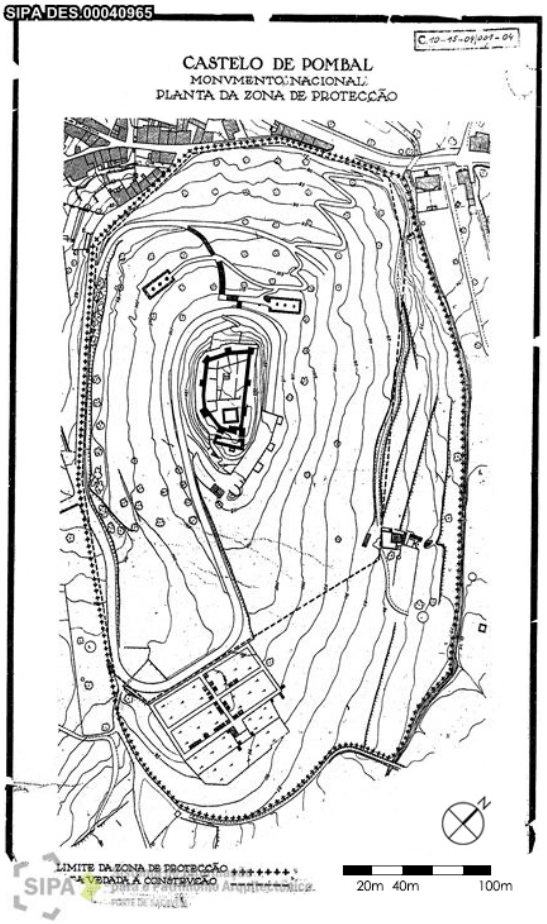


Figure E.54. Protection zone of the Pombal Castle (Source: SIPA, n.d.)

E.2.3. Morphologic Characteristics

The castle has polygonal plan layout with nine rectangular towers placed on the walls at regular intervals: about 10 m. There are two entrances. The southeast gate, which is the original, is juxtaposed by two towers. The northwest gate dates to D. Manuel I period (Município de Pombal, 2020c). All of the towers were used to be higher than the castle walls (Pedrosa, 2014, p. 11; Noé, 2016) (Figure E.57 & Figure E.58). The castle walls are surrounded by a wall-walk reached by stairs juxtaposing the walls, and crowned with crenellations (Figure E.59) (Município de Pombal, 2020c). The castle's courtyard is around 1200 m^2 (Pereira, 2019). Foundations of two storied houses, São Miguel Church and a cistern in the courtyard have reached today (Figure E.56) (Pedrosa, 2014, p. 12; Noé, 2016). The original pavement was limestone cobbles (Noé, 2016; Pereira, 2019). In a document dated 1663, the courtyard was described as a garden with thorn trees. There were a series of rooms whose balconies had vista of the landscape. There were large chimneys, and the walls were covered with wood (Município de Pombal, 2020c).

The keep is located on a higher level in the courtyard of the castle, close to the southeast gate (Figure E.56). It was the last defensive tower of the Lords to continue the resistance against possible attacks (Afonso, 2013, p. 524). The independent structure is square planned, and has 3 stories (the closed ground floor) and a terrace roof (Figure

E.59) (Noé, 2016). The entrance of the keep is from the first floor through a wooden ladder provided from the courtyard (Afonso, 2013, p. 524; Pedrosa, 2014, p. 12). The ground floor has thicker walls than the other floors. Access to the ground floor is only from the inside. Initially, it had been used as a storage, and later as a prison in the 17th century (Pedrosa, 2014, p. 12). The keep is surrounded by prismatic crenellations just like the castle walls (Figure E.57 & Figure E.58). A talus surrounding the tower's ground and two buttresses on the north facade was constructed in order to achieve greater stability (Noé, 2016; Pedrosa, 2014, p. 12). Construction of the keep and talus were the examples of innovations that was brought by Gualdim Pais to Portuguese military architecture in the 12th century (Município de Pombal, 2020c). The keep originally had an inscription above the gate, but it was given to the Convent of Christ in Tomar Municipality at the request of Infante D. Henrique between 1420-1460. Cruz (2016) questions the reliability of the attribution of the inscription in the convent to the castle. Before the current interventions, Pombal Castle was partially in ruin, partially in need of repair: e.g., the keep.

At the southeast of the castle, there is an exterior fortification on the platform below the hill. It has three square planned towers that have two stories. There is also a chapel remain: the Santa Maria's Church. It has rectangular plan layout, spanned with a vault, finished with a gable roof, and plastered and whitewashed walls (Município de Pombal, 2020c; Noé, 2016). The castle was surrounded by remains of a second fortification and a barbican that were almost totally reconstructed by DGEMN (Pedrosa, 2014, pp. 11, 22; Cruz, 2016). The barbican dating to 1500s is located in front of the southeast gate. It is rectangular in plan and has crenellations (Figure E.55 & Figure E.59).

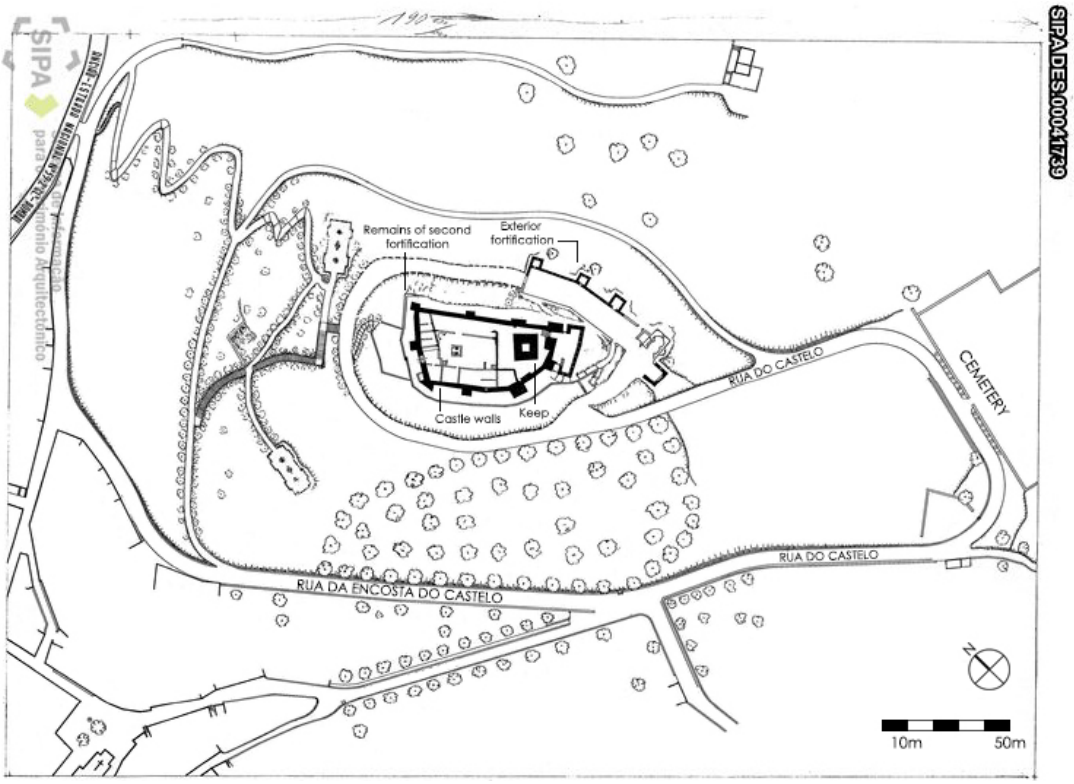


Figure E.55. Site plan of Pombal Castle (Source: SIPA, n.d.)

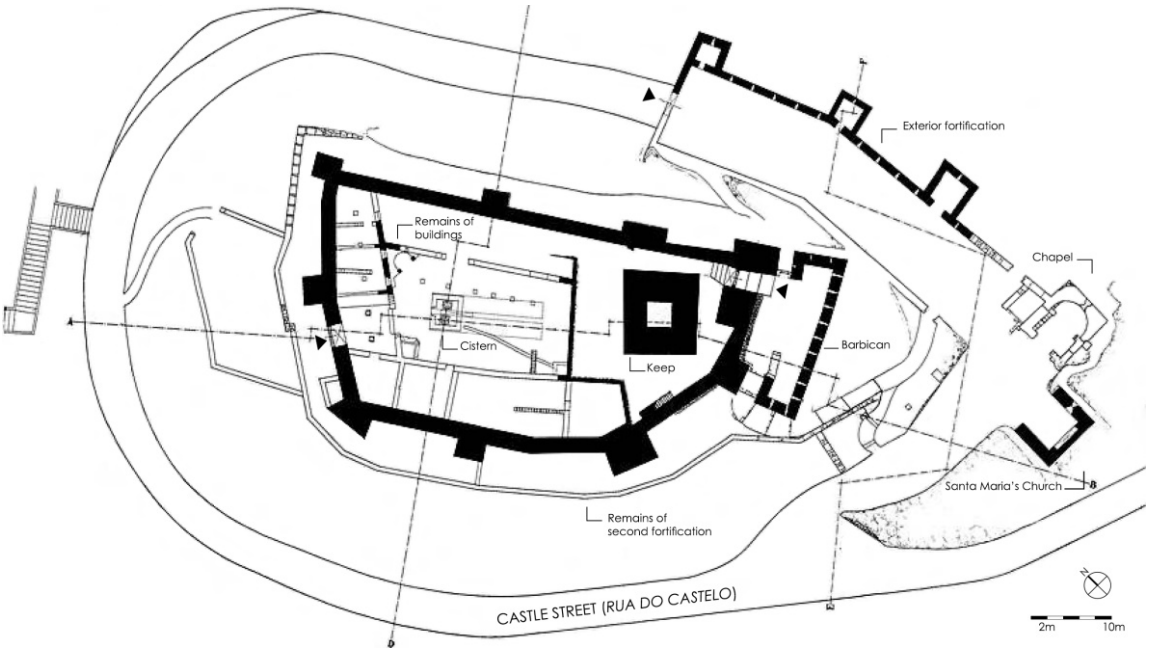


Figure E.56. Plan of Pombal Castle (Source: SIPA, n.d.)

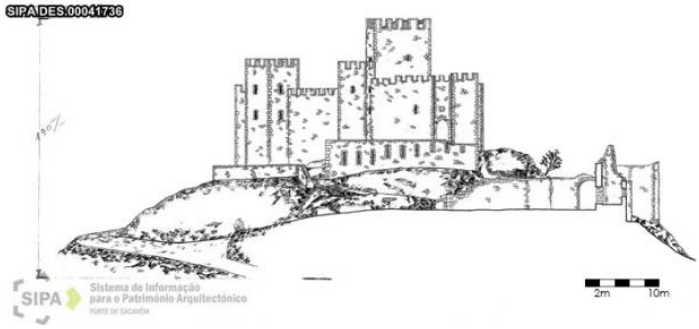


Figure E.57. South elevation of the castle (Source: SIPA, n.d.)

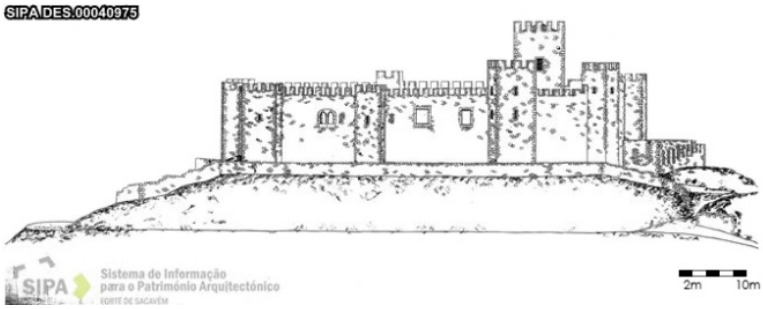


Figure E.58. West elevation of the castle (Source: SIPA, n.d.)

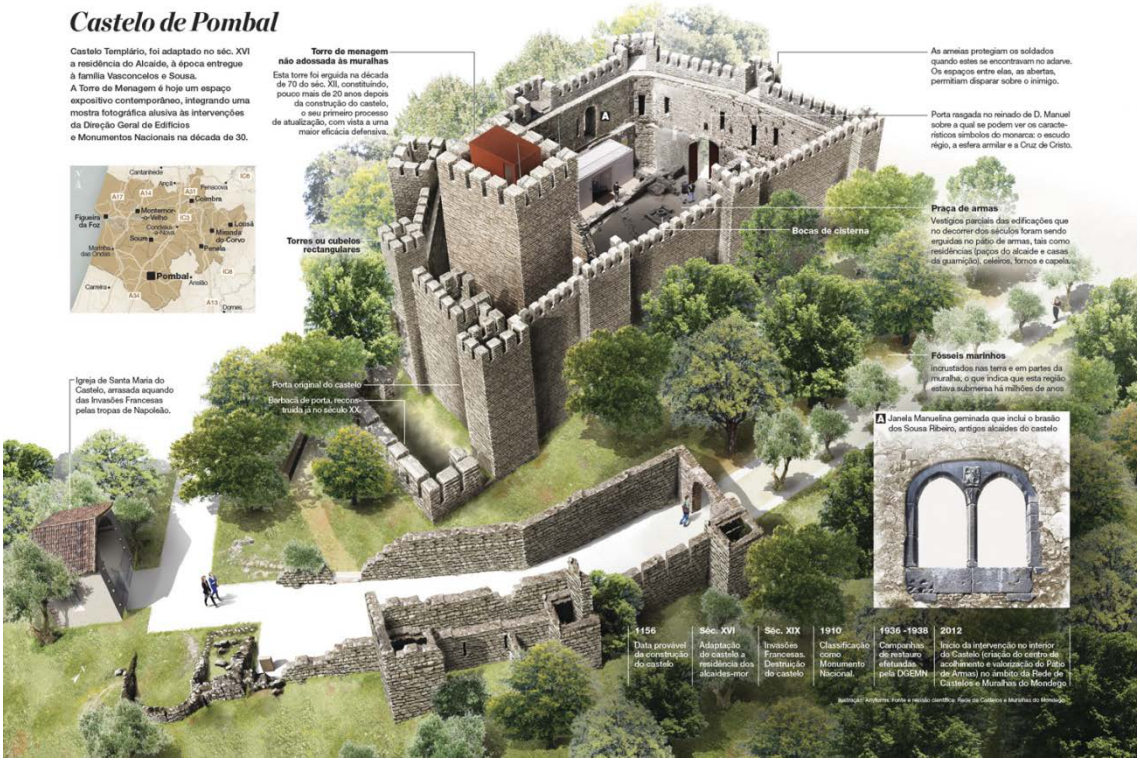


Figure E.59. 3D Model of the castle site (Source: Anyformsdesign, n.d.)

E.2.4. Construction Technique and Material Usage

Pombal Castle is rubble stone masonry (Nossov, 2009, p. 14). Construction technique of the walls is opus incertum (Figure E.60 & Figure E.61) (Adam, 2005, p. 250). The wall material is limestone and brick pieces with mortar (Architizer, 2016; Noé, 2016).

Figure E.60. The southwest wall as viewed from the exterior (Source: Wikipedia, 2011)

Figure E.61. Wall detail as viewed from the exterior (Source: Tripadvisor, 2012)

Arches and vaults out of limestone constitute the spanning elements of the castle. There are four profile types: pointed, semi-circular, segmental and blind. Pointed arches are located on the exterior side of the southeast and northwest gate (Figure E.62). Two of the semi-circular arches are located in the northeast of the courtyard, and the other two are located at the entrances of the fortification on the platform below the hill. The blind arch is located at the Santa Maria's Church. The barrel vault at the Santa Maria's Church has semi-circular profile. It is decorated with flower and grotesque figures (Figure E.64 & Figure E.65) (Noé, 2016). Vaults with segmental profiles are located at the interior side of the southeast and northwest gate (Figure E.63).

Figure E.62. Exterior view of the northwest gate
(Source: Wikipedia, 2008)

Figure E.63. Interior view of the northwest gate
(Source: Tripadvisor, 2017c)

Figure E.64. Interior view of the church
(Source: Tripadvisor, 2012)

Figure E.65. Decorated vault of the church
(Source: Tripadvisor, 2012)

Gates, doors, windows, wall-walks, stairs, gutters, carvings and inscriptions are architectural elements of the castle. The gates providing entrance to the castle are

double leafed and out of timber (Noé, 2016). Two door openings crowned with semi-circular arches are present at the fortification on the platform below the hill. The doors at the first floor of the keep and at the ground levels of the towers are rectangular. The windows dating to the 16th century are at the second floor level of the castle walls. There is a pointed arched double windows in Manueline-style, a rectangular window in four-lobed shape, and a rectangular window on the southwest walls of the castle (Figure E.66 & Figure E.60) (Correia, 2006, p. 87). There are also rectangular windows on the second floor of the keep and on the east facade of the church. V-shaped embrasures with rectangular and square facades are on the walls of the castle and the keep. Wall-walks are located along the walls of the castle. Stairs are attached to the castle walls and wall-walks. A gutter is located on the southwest facade of the keep. There are remains of rain gutters at the courtyard. They used to transmit rainwater to the cistern (Noé, 2016). There are two carvings whose of one is above the northwest gate with symbols of the reign of D. Manuel: the royal coat of arms, the armillary sphere and the cross of Christ (Figure E.62). The other is above the double window in the southwest wall with the coat of arms of Pero de Sousa Ribeiro (Figure E.66) (Município de Pombal, 2020c; Pedrosa, 2014, p. 14). There are limestone inscriptions. An inscription without any frame or decoration is located on the east wall of the northwest gate: “The History of the Castle was Recorded with Gratitude by the Portuguese of 1940” (Figure E.67). Another inscription is located on the west wall of the southeast gate: “Patrimony of the State. Military Square”. A third one is located in the keep. There are also two limestone inscriptions of tombstones in chapel ruins (Noé, 2016).

Figure E.66. The Manueline-style window from 16th century (Source: Flickr, 2018)

Figure E.67. An inscription on the east wall of the northwest gate (Source: Flickr, 2018)

E.2.5. Conservation Activities

Conservation activities regarding the Pombal Castle are presented in the below under the titles of research, projects and implementation.

E.2.5.1. Research

Archaeological research has been carried out at the site since November 23, 1920 (Noé, 2016). In 1933, construction of a road between the castle and the village was started by Pombal Initiative and Tourism Commission. This project was carried out by engineer Augusto Duarte Ralha. In 1934, the landscape design project of the Tourism Commission was approved for the hillside of the castle by the Executive Committee of the City Council (Pedrosa, 2014, pp. 18-19; Noé, 2016). Between 1936-1940s, interventions which are introduced in the below were carried out by the General Directorate of National Buildings and Monuments *(DGEMN - Direção Geral de Edifícios e Monumentos Nacionais)* with the mission of the *Estado Novo* (Pedrosa, 2014, pp. 19-20; Noé, 2016):

In 1936, partial reconstruction and restoration of the walls of the castle were carried out by the contractor Delfim Crispiano. Between 1937-1938, reintegration and consolidation of the southern and western portions of the castle, and consolidation of the keep; renewal of the exterior gates; reconstruction of the southern barbican; and excavation in the courtyard were carried out (Figure E.68 & Figure E.69). The contractors were António Domingues Esteves (1937, 1939-1940), Manuel Pinto (1938) and Bernardo Rosa (1938). During this process, the interventions were practiced with contemporary material of the time (Noé, 2016; Pedrosa, 2014, pp. 20, 22; Correia, 2006, p. 89). In 1956, new doors were placed in the castle, and the electric installation was realized. In 1959, exterior lighting was installed by the National Monuments Services (*Serviços dos Monumentos Nacionais)* in collaboration with the City Council. The contractor was Electro-Reclame (1956-1959). In 1970, cleaning of the walls, reinforcement of the joints with cement and restoration of the main gate were carried out by the contractor Anselmo Costa (Noé, 2016). New interventions took place in 1975 and between 2000-2001 with the aim of the enhancement of the keep (Pedrosa, 2014, p. 22):

In 1975, restoration and cleaning works of the keep and the main gate, reconstruction of the roof and floors, replacement the floor covering, installation of a metal ladder in the keep were carried out by the contractor José Neves (Noé, 2016; Correia, 2006, p. 89). Between 2000-2001, restoration of the keep was continued by engineer António Monteiro, electrical engineer Carlos Pessoa, and the contractor Cadimarte Construções (Noé, 2016).

In 2004, a project for the rehabilitation and enhancement of the castle and surrounding hillside was presented by the City Council to be assessed by the Portuguese Institute for Architectural Heritage (*IPPAR - Instituto Português do Património Arquitectónico*) (Pedrosa, 2014, p. 23; Noé, 2016). In 2005, the keep was converted into a museum (Noé, 2016). In November of the same year, a risk assessment was realized by the DGEMN (Cruz, 2016).

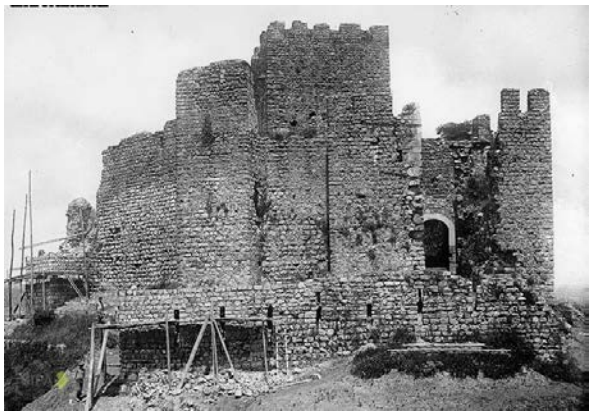


Figure E.68. The castle during the restoration (Source: Noé, 2016)

Figure E.69. Restoration of the walls of the castle (Source: Pedrosa, 2014, p. 22)

Figure E.70. South facade of the castle and barbican after the interventions in 1940 (Source: Pedrosa, 2014, p. 23)

Figure E.71. The castle in 1940 (Source: Almeida, 2012, p. 142)

Figure E.72. View from the courtyard after the interventions (Source: Pedrosa, 2014, p. 23)

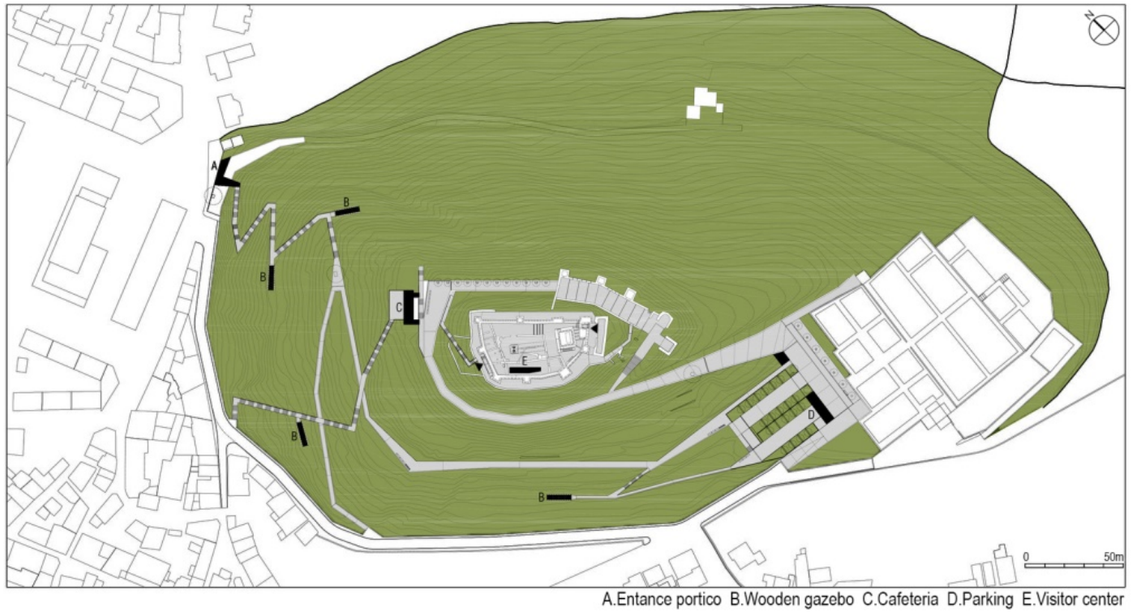
Figure E.73. The keep after the interventions (Source: Correia, 2006, p. 89)

E.2.5.2. Projects

There are two projects for the castle site. The first project is Reorganization of Pombal Castle's Hill. It was prepared by Luís Miguel Correia, Nelson Mota, Susana Constantino[57] (Comoco, n.d.). The second is Pombal Castle's Visitor Centre project. It was prepared by COMOCO Architects: Luís Miguel Correia, Nelson Mota, Susana Constantino[58] (Pereira, 2019).

[57] The consultant was a landscape architect: Luís Guedes de Carvalho. The general contractors were JRSF Joaquim Rodrigues e Silva Lda, Ibersilva, Argoconstrutora, Construção Civil Lda (Almeida, 2012, p. 147). The collaborators were ABL for the structural, hydraulic and acoustic engineering; and Luís Ribeiro for the electrical works (Almeida, 2012, p. 147; Archdaily, 2012). The client was Pombal City Council (Município de Pombal, 2020c). The responsible institution was the General Directorate of Cultural Heritage (*DGPC - Direção Geral do Património Cultural*) that is formerly known as IGESPAR and IPPAR (Noé, 2016). Funding supplier was the Mais Centro Program. The budget of the project was 3.4 million € (Município de Pombal, 2016). The project area is 48 650 m^2 (Archdaiy, 2012; Almeida, 2012, p. 147). The architects designed the project collaboratively with the politicians and technicians of the municipality, and public participation at phase of preliminary design of the proposal (Architizer, 2016).

[58] The general contractor was Alvape-Construção e obras públicas (Alvape-Construction and public works). The collaborators were ABL for the structural, hydraulic and acoustic engineering; Luís Ribeiro for the electrical works; and João Gonçalves Madeira Da Silva for the mechanical works (Pereira, 2019). The client was Pombal City Council (Município de Pombal, 2020c). The responsible institution was DGPC (Noé, 2016). Funding supplier was the Mais Centro Program (Município de Pombal, 2016). The project area covers 1200 m^2 (site area) (Pereira, 2019). The budget was 260.000 € (Margaretha, 2016).



A.Entance portico B.Wooden gazebo C.Cafeteria D.Parking E.Visitor center

Figure E.74. Site plan of Pombal Castle (Source: Pereira, 2019)

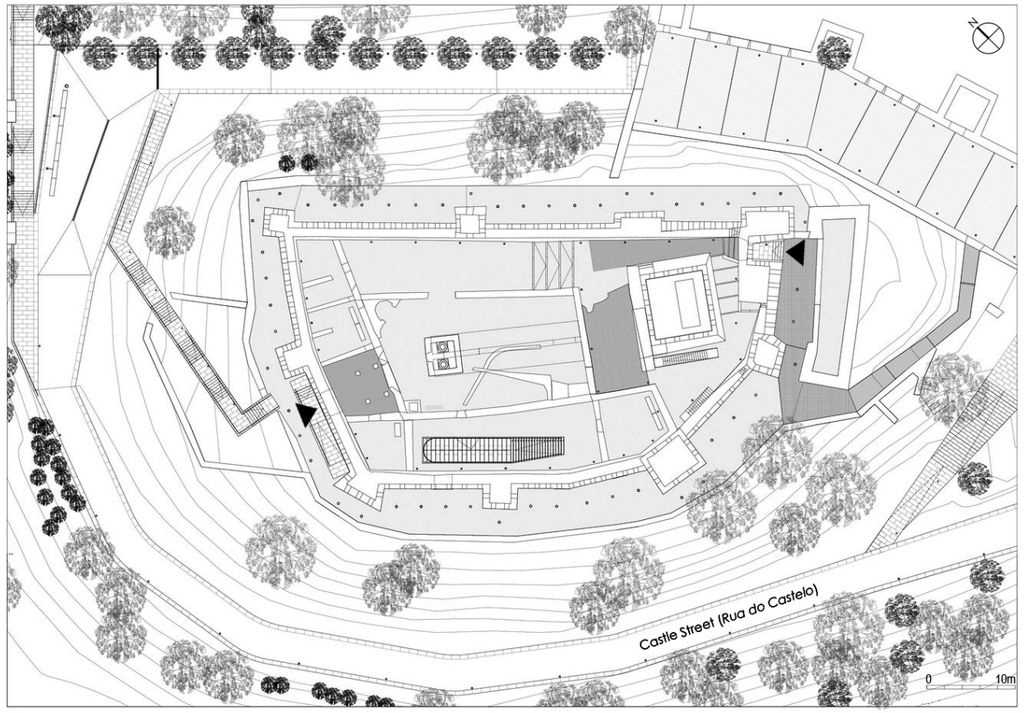


Figure E.75. Top view of the castle (Source: Pereira, 2019)

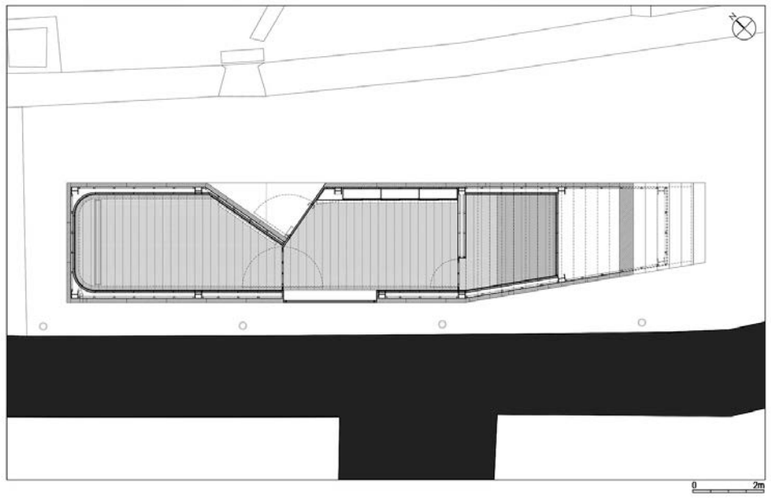


Figure E.76. Plan of the visitor center (Source: Pereira, 2019)

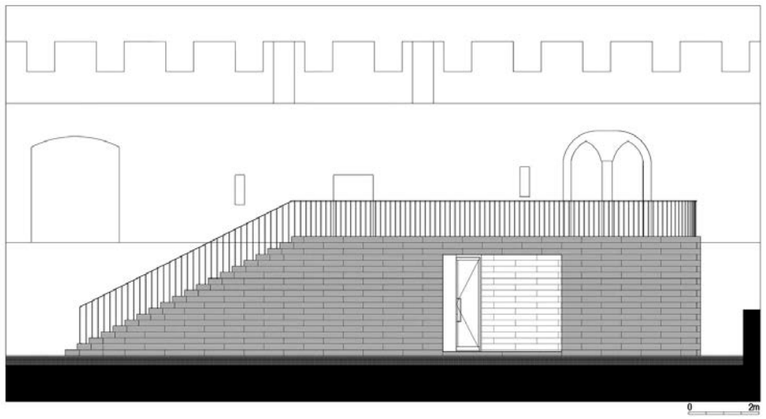


Figure E.77. Northeast elevation of the visitor center (Source: Pereira, 2019)

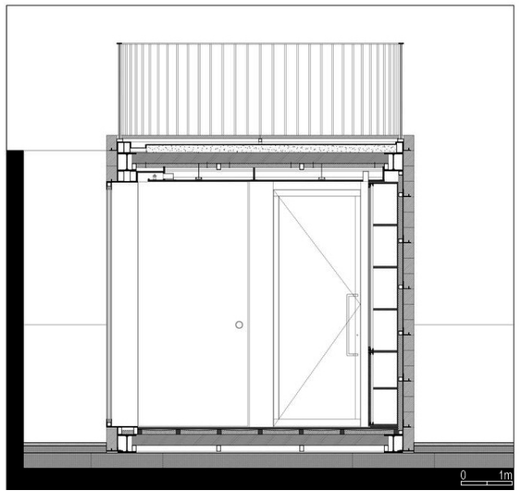


Figure E.78. Construction detail (Source: Pereira, 2019)

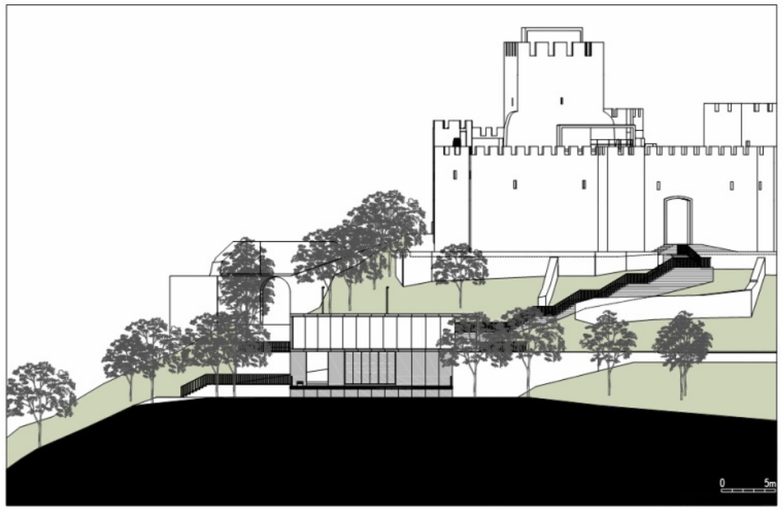


Figure E.79. Northwest elevation of the castle and the cafeteria
(Source: Archdaily, 2012)

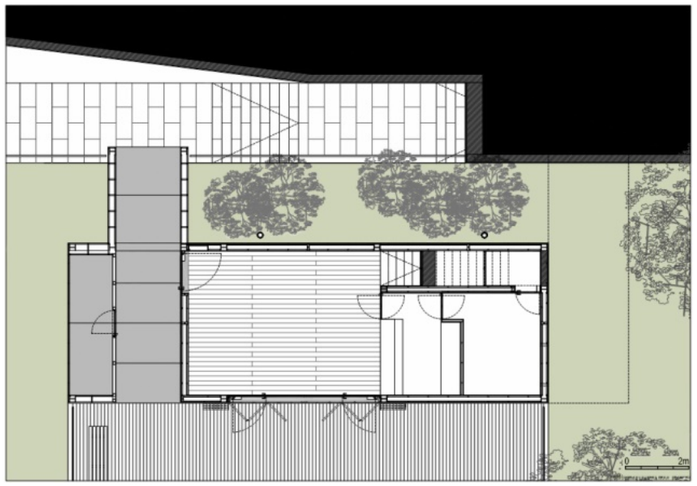


Figure E.80. Ground floor plan of the cafeteria
(Source: Archdaily, 2012)

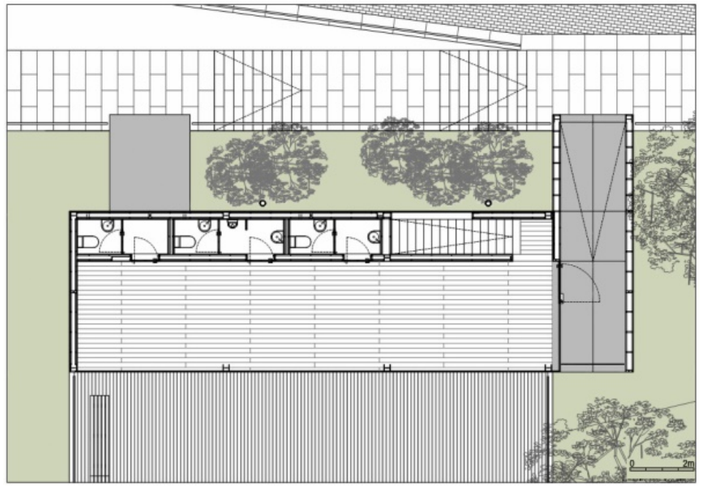


Figure E.81. First floor plan of the cafeteria
(Source: Archdaily, 2012)

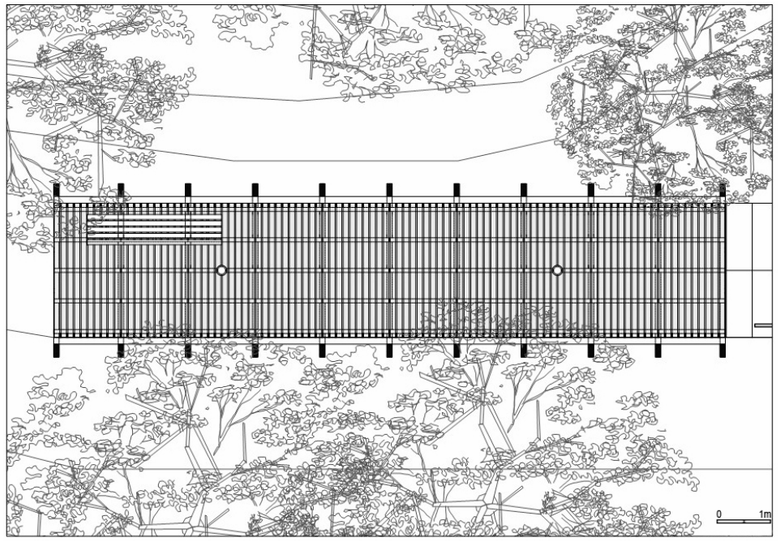


Figure E.82. Plan of the gazebo (Source: Archdaily, 2012)

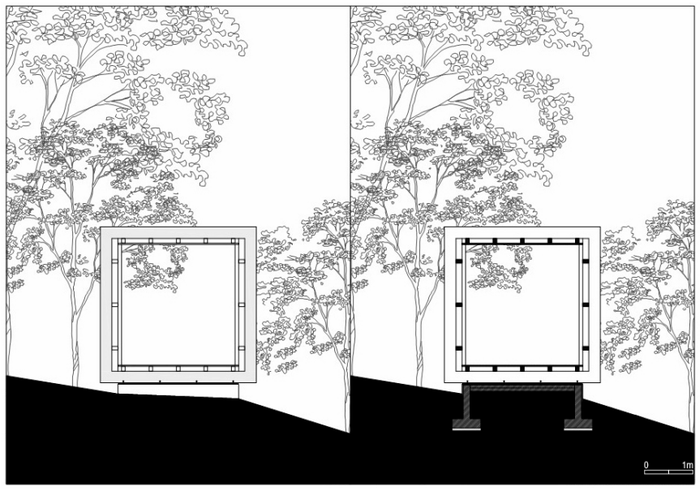


Figure E.83. Transversal elevation (left); section (right)
(Source: Archdaily, 2012)

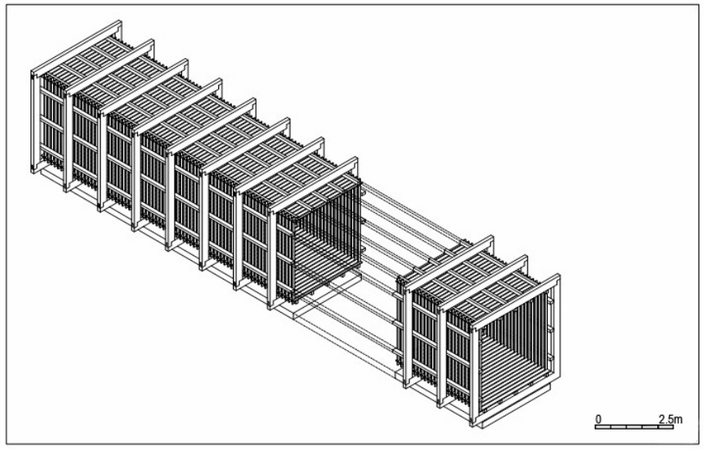


Figure E.84. Axonometric view of the wooden gazebo
(Source: Archdaily, 2012)

E.2.5.3. Implementation

The project of Reorganization of Pombal Castle's Hill was realized between 2004 - 2011 (Comoco, n.d.). The project of Pombal Castle's Visitor Centre started in 2011, and the castle was re-opened to the public on April 12, 2014 (Município de Pombal, 2016). The interventions of addition, renewal, consolidation, cleaning, and presentation were realized in the projects.

Addition: Mass, element and material additions are observed. Mass addition is the visitor center in the courtyard. It has three spaces: a reception area for the visitors, a room for virtual reality and audio-visual activities, and a storage (Pereira, 2019). It is also used as a viewing platform with its walkable roof and metal railings. It is made of limestone (Figure E.85). Element additions are the steel balcony of the keep with metal and glass railings; the corten steel (weathering steel) coated, reinforced concrete staircase ascending to the keep; and steel floor, staircase and railings inside the keep (Figure E.86 & Figure E.87) (Correia, 2006, p. 93; Noé, 2016). The openings of the keep were covered with glass. Material additions are observed in the keep. *Ataíja azul* stone which is a blue / grey colored limestone was used to cover the floor of the keep (Correia, 2006, p. 93; Portugalimestones, n.d.).

Renewal of the leaves of the exterior gates of the castle are observed.

Consolidation of the keep walls was made through embedding steel profiles in the walls. Cobble stone of the courtyard were consolidated; the lost portions of the floor covering were filled in with gravel. (Figure E.85) (Correia, 2006, p. 93; Noé, 2016; Pereira, 2019).

Cleaning of the plant colonization on the walls, and the vegetation in the courtyard and around the castle was carried out (Cruz, 2016; Noé, 2016).

Presentation is defined in three areas with different design approaches at the site. The first area is the southern and western slopes of the hill. New pathways along the slopes between the castle and the bottom of the hill, and resting areas with timber gazebos were designed (Figure E.90). The walls were plastered. Limestone, wood and compacted soil are the material preferred in the new parts (Architizer, 2016; Cruz, 2016). The second area is the surrounding of the cemetery. Touristic facilities such as parking area and toilet with concrete walls were placed next to the cemetery. Stone pavements were used. The third area is the surrounding of the castle. The castle access from the northwest was designed with platforms and stairs. Surroundings of the Santa Maria's Church was designed as a public space for performances and cultural activities. Limestone floor coverings and benches were used. The two story cafeteria out of steel construction coated with corten steel panels was placed in the north of the castle (Figure E.91) (Architizer, 2016). Also, the castle was presented with its visitor center, and the keep was presented with its balcony and the staircase. The visitor center has audiovisual equipment that gives information about the history of the castle (Município de Pombal, 2016; Erasmusu, 2015). In the courtyard, an interactive game named as *jogo das cisternas* (game of cisterns) next to the cistern remains can be played (Figure E.89). This game aims to inform the visitors about the reconstruction process of the courtyard, the cistern at the castle, and the network of castles and defensive walls of Mondego (Município de Pombal, 2016). There are also information boards, trash cans, stairs, benches, and lighting and sound equipment in the courtyard (Figure E.88) (Noé, 2016). Audio guides are provided (Município de Pombal, 2016). The keep was functioned as a museum and exhibition space was provided virtual reality and multimedia equipment, and specially designed furniture (Figure E.87) (Município de Pombal, 2016; Pereira,

2019). These give information about the state before and after the restoration, other tourist attractions in the municipality, and the monuments of the Mondego defensive line (Município de Pombal, 2016; Erasmusu, 2015).

Figure E.85. View of the courtyard after current projects (Source: Spirou, 2016)

Figure E.86. View of the keep after current projects (Source: Spirou, 2016)

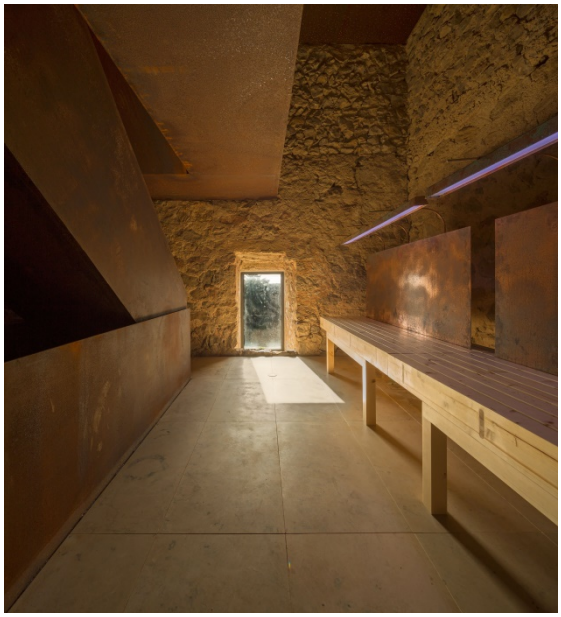


Figure E.87. Interior of the keep (Source: Spirou, 2016)

Figure E.88. An information board in the courtyard (Source: Flickr, 2018)

Figure E.89. Interactive game with the cistern remains (Source: CMM, 2015)

Figure E.90. Timber gazebo at the castle hill (Source: Archdaily, 2012)

Figure E.91. Cafeteria of the castle (Source: Archdaily, 2012)

E.3. Matrera Castle (*Castillo de Matrera / Pajarete*), Spain

Matrera Castle (*Castillo de Matrera / Pajarete*), the third of the comparative studies, is identified in this section.

E.3.1. Geographic Characteristics

Matrera Castle is located in Villamartín municipality of Sierra de Cádiz district in Cádiz province (Figure E.92). The province is in Andalusia autonomous community of the southern Spain. The castle is located at 9.5 km southeast of Villamartín, and at approximately 5-6 km northwest of Prado del Rey (Ayto. de Villamartín, 2016a). During the Medieval period, the castle was in a strategic position that was on the defensive border known as *Banda Morisca* or Nasrid border (*frontera Nazarí*) between the Nasrid Kingdom of Granada (*Nazarí de Granada*) and the Crown of Castile (*Corona de Castilla*) (Gutiérrez López & Martínez Enamorado, 2003, p. 103; Pérez Ordóñez, 2005, pp. 83, 91). It is located on the important roads that connect the north

and south (Guadalquivir and Bay of Gibraltar), and the east and west (Bay of Cádiz and the Baetic mountain range) of Andalusia (Gutiérrez López et al., 2015, p. 55-56).

Figure E.92. Satellite images of the site of Matrera Castle
(Base map source: Google Earth; date of image: 31.12.2020, 07.07.2018 (right bottom); access date: 05.04.2021)

Matrera Castle is located at the cross point of the Guadalete valley and the Grazalema mountain range (*Sierra de* Grazalema) which is western part of the Sub-Baetic mountain range (*Cordillera Subbética*) (Gutiérrez López et al., 2015, p. 55; Villalobos Megía & Pérez Muñoz, 2006, p. 87). The castle is situated on a limestone outcrop known as Pajarete hill that is 523 m above the sea level (Pérez Ordóñez, 2009, pp. 14-15, 39). The hill rises in the east-west direction, and overlooks the Búho hill in the north, Prado del Rey and Verdugo hill in the south, Grazalema mountain in the east, and Bornos and its reservoir, Villamartín and the valley in the west. While the northern side of the hill on which the keep is located has steep slope, the slope decreases gently at the other sides (Figure E.93) (Pérez Ordóñez, 2009, p. 41). The high slope of the northern side causes landslides (Hispania Nostra, 2021).

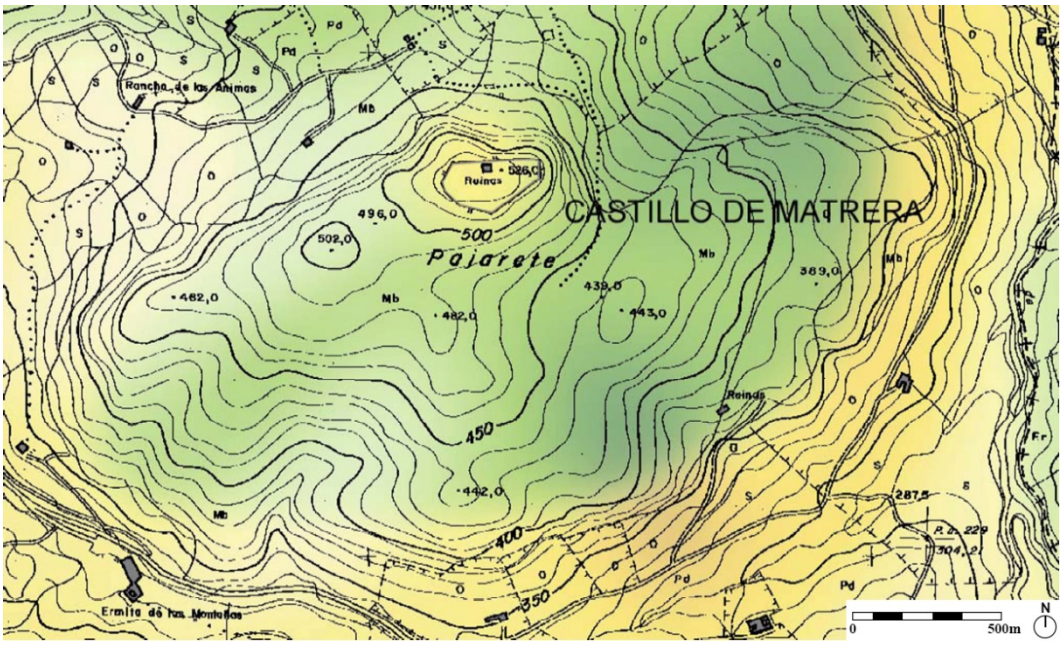


Figure E.93. Topological map of the site (Source: Pérez Ordóñez, 2009, p.44)

Andalusia was formed by three main geological zones from north to south as follows: Morena mountain range (*Sierra* Morena, Iberian massif), Guadalquivir valley (Baetic depression) and Baetic system[59] which divides into the external[60] and internal zones (Figure E.95) (Villalobos Megía & Pérez Muñoz, 2006, pp. 31-35). The site is located at the west of the external zone which is Sub-Baetic mountain range (Villalobos Megía & Pérez Muñoz, 2006, p. 35; IGN, 2020a; ITGE, 1990, pp. 5-6). It is part of the undifferentiated Sub-Baetic tectonic unit (*Subbético Indiferenciado*) (ITGE, 1990, p. 13). Sedimentary rocks are common[61] (Figure E.94). These are generally pelagic (deep-sea) sediments which are rich in terms of the fossils (ITGE, 1990, pp. 8, 17-18). The Baetic mountain ranges have very deformed and fractured structure as a result of the Alpine orogeny, so they constitute an unstable region (ITGE, 1990, p. 6; Villalobos Megía & Pérez Muñoz, 2006, pp. 34, 87). This region is rich in terms of karstic formations (Villalobos Megía & Pérez Muñoz, 2006, pp. 87-88, 94-113). In the western Baetic system where the castle is located, the seismic activities happen less frequently and have lower magnitude than the other parts of the system (IGN, 2020b). However, it is in the strong intensity (VI) seismic risk area, as a result of the location of Spain at the point where the Eurasian and African plates, and Mid-Atlantic Ridge meet (Figure E.96) (IGN, 2002). The movements of these plates set off the faults (Limón et al., 2021).

[59] The Baetic mountain ranges had formed in the lower Miocene period during the Alpine orogeny (Villalobos Megía & Pérez Muñoz, 2006, p. 34; IGN, 2020a).
[60] The external zone was deposited mostly between Triassic-Cretaceous periods of Mesozoic Era, and Middle Miocene period of Senozoic Era (Villalobos Megía & Pérez Muñoz, 2006, pp. 34-35; IGN, 2020a).
[61] The soil consists of limestone with flint and marl from the Middle Jurassic period, and dolomite from the Early Jurassic period (ITGE, 1990, pp. 17-18)

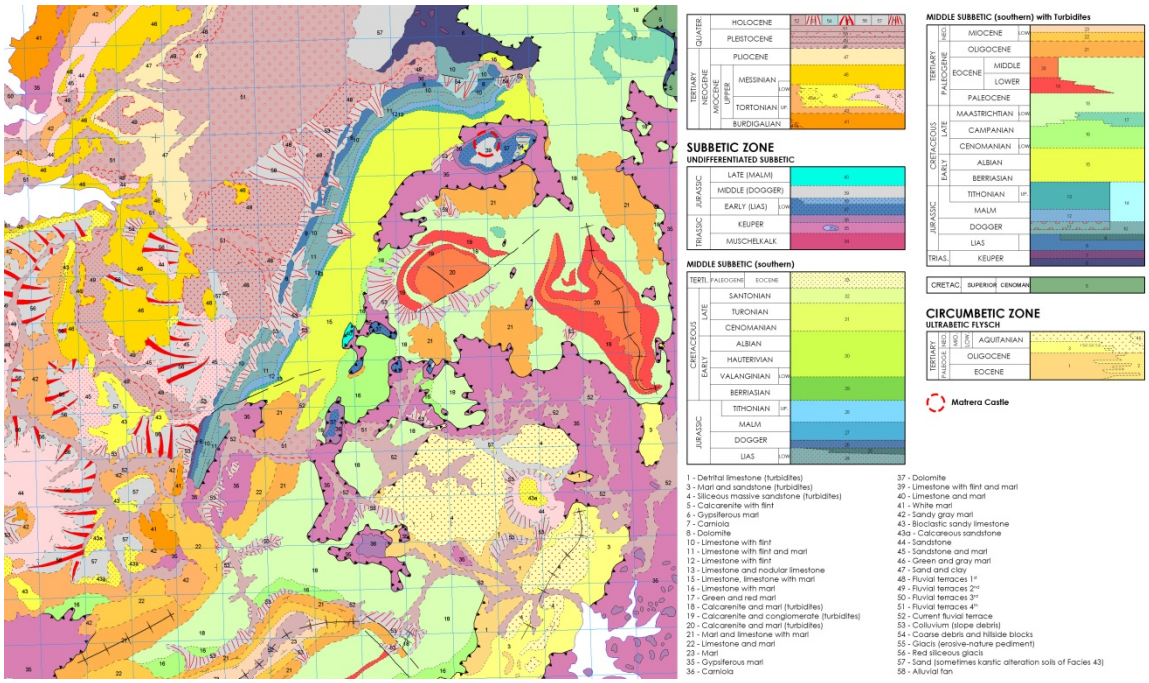


Figure E.94. Geological map of Matrera Castle site (Base map source: IGME, 1984)

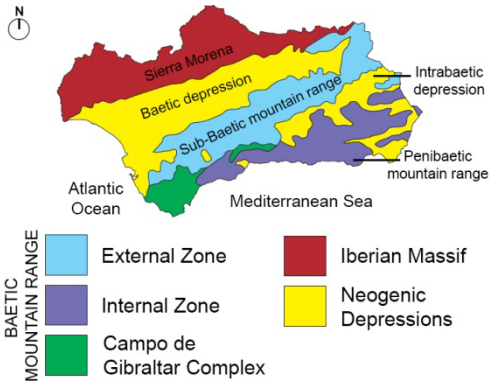


Figure E.95. Geological zones of Andalusia (Source: Villalobos Megía & Pérez Muñoz, 2006, p. 32)

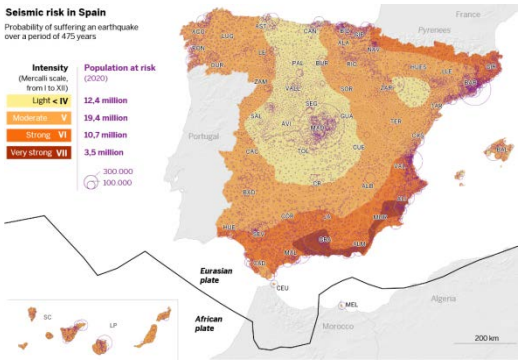


Figure E.96. The seismic risk map of Spain (Source: Limón et al., 2021)

Matrera Castle is located in the upper part of the Guadalete river basin which is sub-basin of the Guadalete-Barbate river basin (Figure E.97). The water regimes of the rivers are irregular due to rainy winters and arid summers (Junta de Andalucía, n.d., pp. 7, 13-14, 20). The Guadalete river, which is the main river of the Cádiz province, rises in the Ubrique mountain of the Grazalema mountain range, runs in the west of the site and flows into the Atlantic Ocean (ITGE, 1990, p. 5; Moreno Pérez et al., 2013, p. 17). The site is rich in terms of water resources, due to its location which is surrounded five reservoirs: Zahara, Bornos and Arcos reservoirs of the Guadalete river, and Hurones and Guadalcacín reservoirs of the Majaceite river (the main branch of the Guadalete river) (Moreno Pérez et al., 2013, p. 17; Junta de Andalucía, n.d., p. 11). They supply water for urban, agricultural and industrial activities in the western part of the Cádiz

province (Junta de Andalucía, n.d., p. 11). The Bornos and Arcos reservoirs are also used for sailing (ITGE, 1990, p. 5). The Guadalete-Barbate river basin is also rich in terms of groundwater bodies. The site is located on the Sierra de Grazalema - Prado del Rey groundwater body (Junta de Andalucía, n.d., pp. 10-13). But, both surface water and groundwater are under threat of pollution stemming from agricultural activities (Moreno Pérez et al., 2013, p. 20).

Figure E.97. Hydrographic network of the Guadalete-Barbate basin
(Source: Junta de Andalucía, n.d., p. 9)

Mediterranean climate is seen in Villamartín[62] (Pita López, 2003, p. 31). The castle site is located next to the Grazalema mountain range which has the highest rainfall in Spain as a result of the influence of the Atlantic Ocean on the mountainous topography of the region (Naranjo Barea, 2017, pp. 5, 8; Moreno Pérez et al., 2013, p. 17). Andalusia has very rich biodiversity of the flora and fauna with a large number of endemic and endangered species. Especially, the Baetic biogeographic province consists of the most unique species of the flora (López Ontiveros, 2002, pp. 49-51). The site is part of the Hispalense sector of the Baetic province (Naranjo Barea, 2017, pp. 15, 58; Rivas-Martínez et al., 1997, pp. 920-921). Also, it is located next to the *Sierra de* Grazalema National Park which is included in Biosphere Reserves (Pérez Ordóñez, 2009, p. 14). The flora consists of meadows, maquis such as olive and wild olive, bushes, oak species such as holm, cork and gall, and Spanish fir (Naranjo Barea, 2017, pp. 15-16). Vineyards and agricultural lands are common around the site (Ayto. de Villamartín, 2016b). The fauna is also rich and diverse in the region, especially in terms of bird species (Naranjo Barea, 2017, p. 16). Husbandry is common (Pérez Ordóñez, 2009, p. 14).

[62] Summers are hot and dry, winters are warm and rainy with the influence of the Atlantic Ocean. However, the temperatures are lower than the coastal regions (ITGE, 1990, p. 5; Pita López, 2003, pp. 31-34).

Figure E.98. Aerial view of the Matrera Castle (Source: Carquero Arquitectura, 2016a)

E.3.2. Historic Background

The original function of Matrera Castle was observation and defense. It is claimed that it was constructed with the command of Umar ibn Hafsun (*Omar ben Hafsún*) who was a rebel against Umayyad dynasty in 9th century. The aim was to defend Iptuci (modern Prado del Rey) (Pérez Ordóñez, 2009, p. 19; Hispania Nostra, 2021). However, the accuracy of this claim is uncertain due to the lack of the researches (Gutiérrez López & Martínez Enamorado, 2003, p. 113).

Villamartín has been inhabited since prehistoric ages[63] (Ayto. de Villamartín, 2016c). Although there is not much information regarding prior to the Middle Ages, there were remains of Tartessians and Iberians from the first millennium BC in the castle site (Quevedo Rojas, 2015, p. 1387; Pérez Ordóñez, 2009, pp. 39-40). The region was under the domination of Almoravid dynasty between 11th and 12th centuries, and Almohad dynasty between 12th and 13th centuries. In the 13th century, the castle was taken from the Almohads by Fernando III, King of Castile. During his reign, the castle was rebuilt (Gutiérrez López & Martínez Enamorado, 2003, p. 105; Hispania Nostra, 2021). On June 10th, 1256, Alfonso X donated the castle and the town to Pedro Yáñez, who was the master of the Order of Calatrava, because of the assistance against the Mudéjar (Muslims in Iberian peninsula) rebellion (Quevedo Rojas, 2015, p. 1387; Gutiérrez López & Martínez Enamorado, 2003, pp. 105-106). As a result of these events, a border consisted between Christians and Muslims (Gutiérrez López & Martínez Enamorado, 2003, p. 107). During the Middle Ages, the castle constituted a defensive border between the Nasrid Kingdom of Granada and Crown of Castile together with a number of defense structures[64] (Figure E.99). It is known as Nasrid

[63] For example, there are megalithic monuments, named as *Dolmen de Alberite*, date back to 4000 BC (Ayto. de Villamartín, 2016c).

[64] In the 13th century, Castilian defense structures were Morón, Cote, Lopera, Bornos and Arcos, etc. castles, and Bollo and Alocaz towers. Nasrid defense structures were Ayamonte, Olvera,

(*Nazarí*) border or Moorish band (*Banda Morisca*). Since it is the only Castilian castle located beyond the Guadalete river, it had a key role to defend the territories of the Crown of Castile from the Nasrid attacks especially during the Reconquest in 13th century (Gutiérrez López et al., 2015, pp. 56-57, 65; Quevedo Rojas, 2015, p. 1387). The castle was within the sight of Nasrid castles (Zahara and Hortales in contact with Aznalmara and Cardela); and Castilian castles (Cote, Bornos, Arcos and Espera) (Pérez Ordóñez, 2009, p. 39; Quevedo Rojas, 2015, p. 1387). Between the late 13th century and early 14th century, Nasrid Kingdom owned the castle. In 1341, the castle was reconquered by Alfonso XI (Gutiérrez López et al., 2015, pp. 58, 64). In 1342, Alfonso XI donated the castle and its surrounding to the Council of Sevilla (*Concejo de* Sevilla) (Gutiérrez López & Martínez Enamorado, 2003, p. 108; Pérez Ordóñez, 2009, p. 40). In the early 14th, and 15th centuries, repair works were carried out in the castle (Quevedo Rojas, 2015, p. 1391; Gutiérrez López et al., 2015, pp. 89, 91). In 1408 and 1445, the castle was besieged again by the Nasrid Kingdom, but this did not result in success (Pérez Ordóñez, 2009, p. 40; Hispania Nostra, 2021). In 16th century, the castle lost its function and was abandoned (Figure E.100) (Gutiérrez López et al., 2015, pp. 56-57).

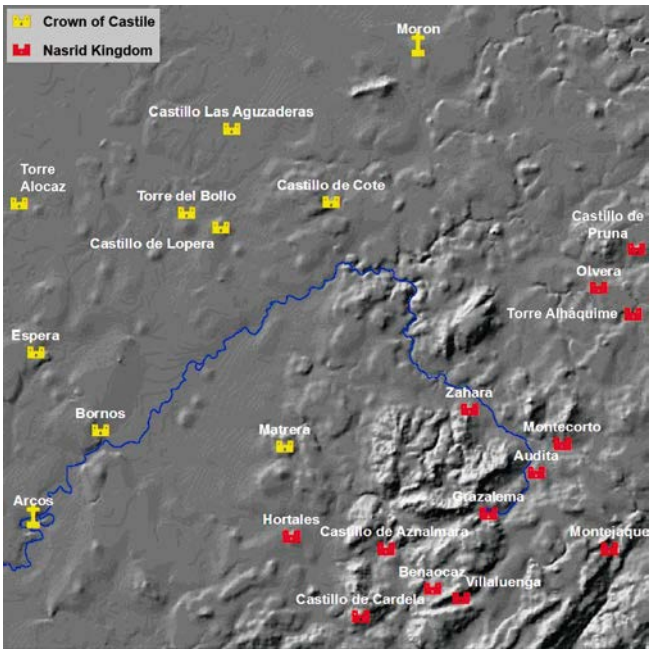


Figure E.99. Defense structures on the Nasrid border in the 13th century
(Source: Carquero Arquitectura, 2016a)

Setenil, Zahara, Aznalmara, Hortales, etc. castles, and Alháquime tower (Pérez Ordóñez, 2005, p. 86; Gutiérrez López et al., 2015, p. 57).

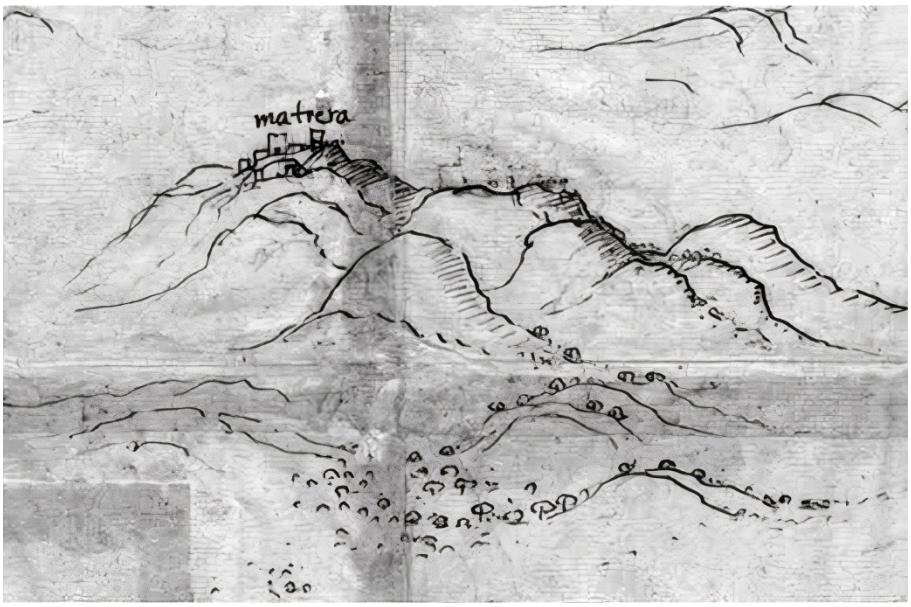


Figure E.100. Drawing of Matrera Castle probably dated to the middle of the 16th century (Source: Gutiérrez López et al., 2015, p. 58)

E.3.3. Morphologic Characteristics

Matrera Castle has an irregular polygonal layout with a slightly longitudinal axis in east-west direction (187 m in length) (Figure E.101). The peripheral length of the castle is 505 m. The fortification walls integrated with the topography of the site (Quevedo Rojas, 2015, p. 1389). The castle consists of nine rectangular towers, and the keep (*Torre del Homenaje*) which is enclosed by the inner walls on its three sides, except the northern side. The towers adjacent to the fortification wall were generally located out of the sight of each other except the towers in the east and west, because of the inbetween walls intersecting with each other at various angles (Figure E.101) (Gutiérrez López et al., 2015, pp. 84-85). There are some doubts as to whether the walls enclosed the castle continuously or not. Some researchers claimed that there were no wall remains at the northern side of the castle which has the steepest inclination in the site. Due to the lack of the systematic archaeological excavations, this is still uncertain (Gutiérrez López et al., 2015, p. 84; Pérez Ordóñez, 2009, pp. 39-40). The access to the castle is provided from two entrances. The main gate, called as *Puerta de los Carros*, is located at the west, and juxtaposed by two towers. The postern gate, called as *Puerta del Sol*, is located at the south, and juxtaposed by one tower (Gutiérrez López et al., 2015, pp. 85-86; Quevedo Rojas, 2015, pp. 1388, 1390). While some researchers claim that the castle functioned as a refuge for the people living near-by and livestock in times of war threat, the others claim that the site was a castle town (*Villa de* Matrera) with a stable population[65]. Based on the remains of structures observed in the courtyard, it is assumed that there could have been at least one cistern[66], houses, storages, a chapel, etc

[65] The great size of the courtyard of the castle, that contrasts with the other castles in the vicinity, supports this claim (Pérez Ordóñez, 2005, p. 88).

[66] It is not known where the cistern was located, but there are documents mentioning its cleaning in 1413. Also, there could have been another cistern in the keep, as a precaution in case of siege (Quevedo Rojas, 2015, p. 1390; Gutiérrez López et al., 2015, p. 74).

(Gutiérrez López et al., 2015, pp. 69, 123; Pérez Ordóñez, 2009, pp. 40-41; Quevedo Rojas, 2015, p. 1389).

The keep is located in the north of the courtyard which is the highest portion of the castle. Its northern facade is bordered by the steep cliff. It is isolated from the rest of the castle by the inner walls that were lower than the keep (Figure E.103). The castle and its keep were constructed on the remains probably dated to the late 11th - early 13th centuries. This corresponds to the transition period of Almoravid and Almohad. Among the remains, there are two rectangular towers (T1 and T2) which flank the inner walls around the keep. One of them is located in the northeast, the other is in the southwest of the keep (Figure E.111) (Gutiérrez López et al., 2015, pp. 73-77, 82, 89). The keep is rectangular planned (8.70 x 14.40 m), and has two stories that could have had timber mezzanine floors, and a flat roof (Figure E.104) (Quevedo Rojas, 2015, pp. 1389, 1391; Gutiérrez López et al., 2015, p. 69). The keep was crowned with crenellations, but later they had remained below the walls that were constructed for increasing the height of the keep, probably in the 15th century. It is claimed that the access from the inner walls was provided from the southern facade (Gutiérrez López et al., 2015, pp. 78-79, 90-92). Also, because of the demolished northern and eastern facades of the keep, the entrance and circulation element between the stories could not be determined. However, it is claimed that access was provided from the northern facade of the keep, and the stairs were attached to the eastern wall (Gutiérrez López et al., 2015, pp. 69, 88; Quevedo Rojas, 2015, pp. 1389, 1392, 1395).

Before the current interventions, Matrera Castle was in ruins. It was damaged due to the lack of the conservation and maintenance works in despite of the conservation reports that represented the serious structural problems of the keep. It had partially collapsed after heavy rains that fell on April 12th-14th, 2013[67] (Figure E.102) (Hispania Nostra, 2021; Quevedo Rojas, 2015, pp. 1392-1393). Also, most of the fortification walls, towers and gates have lost, especially their upper parts (Figure E.105). So, the castle was included in the Red List of Heritage (*Lista Roja del Patrimonio*) by Hispania Nostra, the Spanish heritage and conservation group, on October 30th, 2014 (Hispania Nostra, 2021).

[67] Before 2013, the eastern facade and part of the northern facade of the keep had already collapsed. During the rains in 2013, the northern facade, two vaults and part of the western facade of the keep collapsed (Quevedo Rojas, 2015, p. 1393).

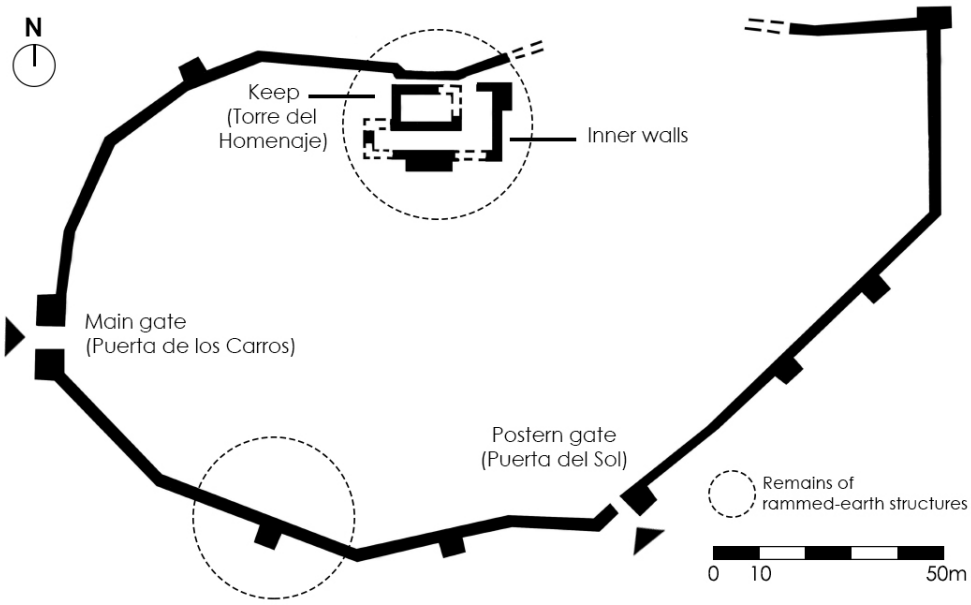


Figure E.101. Plan of Matrera Castle (Source: Pérez Ordóñez, 2009, p. 45)

Figure E.102. View of the keep towards west (Source: Grupo de Senderismo El Tercer Tiempo, 2013)

Figure E.103. View of the keep from the southeast (Source: Grupo de Senderismo El Tercer Tiempo, 2013)

Figure E.104. View of the keep from the southwest (Source: Grupo de Senderismo El Tercer Tiempo, 2013)

Figure E.105. View of the castle from the west (Source: Grupo de Senderismo El Tercer Tiempo, 2013)

E.3.4. Construction Technique and Material Usage

Matrera Castle is stone masonry. The walls of the castle consist of mortared rubble stone core, and rough cut and rubble stone facing with cut stones at the corners. While rough cut and rubble stones were used in both regular and irregular courses on the facades (at some portions alternated with courses of stone slabs), cut stones were used in regular courses (Figure E.107 & Figure E.109). The wall thickness of the fortification walls is 2.10 m. In the keep, the wall thickness is 2.75 m in the eastern and western walls, and 1.75 m in the northern and southern walls (Quevedo Rojas, 2015, pp. 1389-1390). The wall material is mainly limestone, and occasionally used brick, especially in the upper parts of the walls, and mortar. White / beige colored lime plaster mixed with sand was used to finish the walls. The exterior and some portions of the interior walls of the keep, inner walls around the keep and the fortification walls were plastered. The plaster has decorative green glazed ceramic pieces (approximately 1 cm in size) that are observed on the upper portions of the exterior facade of the western wall of the keep[68]. Lime screed was also used as floor covering material in the keep (Quevedo Rojas, 2015, pp. 1390, 1392, 1395-1397; Gutiérrez López et al., 2015, pp. 71-72, 82, 85).

Beside this construction technique, the pre-existing structures in the site were constructed with rammed-earth technique with lime mortar (*tapial calicastrado*), which was implemented on the sides of the formwork and between each layer of earth. The lime mortar tapers towards the inner portions of the earth layers (López Martínez, 1999, p. 81; Martín Civantos, 2002, p. 189; Gutiérrez López et al., 2015, pp. 73-74). The size of the formwork was between 0.80 - 0.88 m wide, around 1.70 m long and 0.70 m high (Gutiérrez López et al., 2015, pp. 75-76). The remains of the rammed-earth constructions were located below the keep and within the inner walls in the north of the castle, and both exterior and interior sides of the southwestern fortification walls (Figure

[68] It is claimed that these ceramic pieces constituted the exterior cladding of the keep (Quevedo Rojas, 2015, p. 1396-1397).

E.106 & Figure E.108) (Gutiérrez López & Martínez Enamorado, 2003, pp. 110-111, 126; Gutiérrez López et al., 2015, pp. 73-75). These were reinforced and reconstructed with stone masonry in later periods (Figure E.112) (Pérez Ordóñez, 2009, p. 42).

Figure E.106. Southern facade of the keep and the wall F, after the restoration
(Source: Carquero Arquitectura, 2020)

Figure E.107. Upper parts of the southern facade of the keep, before the restoration
(Source: Grupo de Senderismo El Tercer Tiempo, 2013)

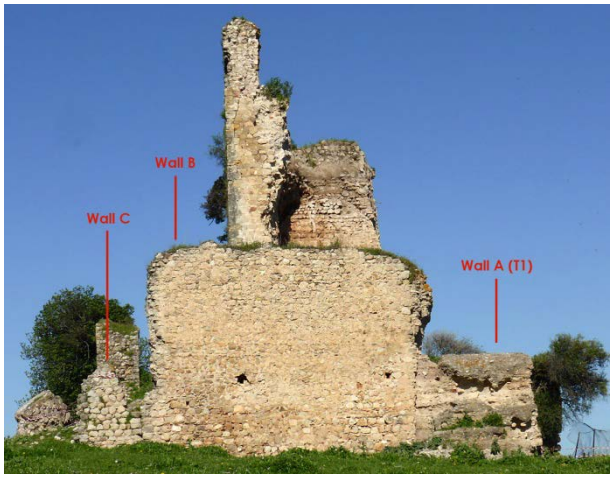


Figure E.108. Eastern facade of the keep and the walls A, B and C (Source: Grupo de Senderismo El Tercer Tiempo, 2013)

Figure E.109. Upper parts of the eastern facade of the keep
(Source: Grupo de Senderismo El Tercer Tiempo, 2013)

Four construction periods were observed in the castle (Figure E.110). However, there is lack of research to determine these periods, so the accuracy of these claims is discussable. The rammed-earth structure (A) constitutes the phase I that could be dated to the late 11th - early 13th centuries. The E and C walls, that were constructed with

small-medium sized stones with brick and tile pieces, and plastered with beige colored mortar constitute the phase II (probably during the reign of Order of Calatrava). In phase III, most of the construction, repair and reinforcement facilities were carried out: The fortification walls (MP) were constructed under the domination of Nasrid Kingdom. Based on the observations, the two towers of the main gate were constructed before the construction of the southern fortification wall. The keep (TH) could have been constructed after 1341. However, some researchers claimed that the castle remains were constructed between the middle of the 13th century and the second half of the 14th century, under the domination of Order of Calatrava or Council of Sevilla. After the construction of the keep, the wall (E) was reinforced by increasing the thickness via addition of new wall portions (F) on its southern and western sides (Figure E.106 & Figure E.111). B-1, B-2 and D walls that consisted of medium-sized irregular stones alternated with courses of brick pieces and stone slabs were constructed on the rammed-earth walls (Figure E.112). These walls were also plastered. Phase IV is more related to the repair of the structures, e.g. B-3 wall, and some portions of the fortification wall (MP) (Figure E.113). In this phase, the upper parts of keep, including a vault (THt) were constructed on the existing crenellations that were constructed with limestone and brick. At the end of the 15th century, this phase ended, and phase V, which represents the abandonment and progressive destruction of the castle, started (Gutiérrez López et al., 2015, pp. 66-67, 71-82, 87-93).

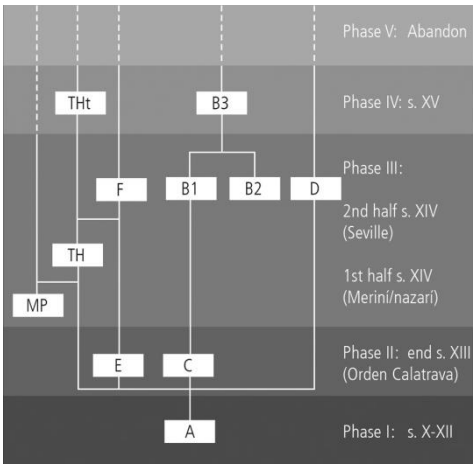


Figure E.110. Construction periods of the castle (Source: Carquero Arquitectura, 2016a)

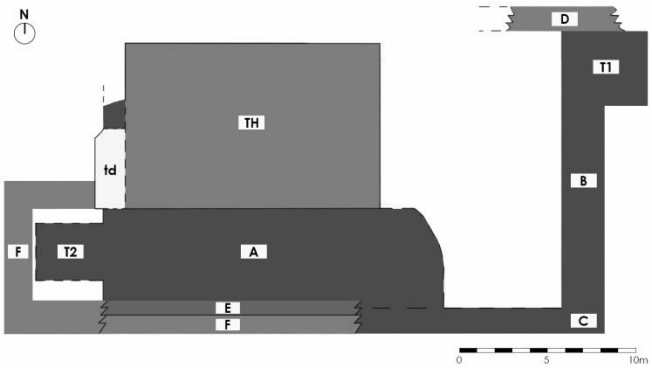


Figure E.111. Plan of the keep with surrounding wall remains
(Source: Gutiérrez López et al., 2015, p. 76)

Figure E.112. Western facade of the wall B built on the rammed-earth structure (A) (Source: Gutiérrez López et al., 2015, p. 79)

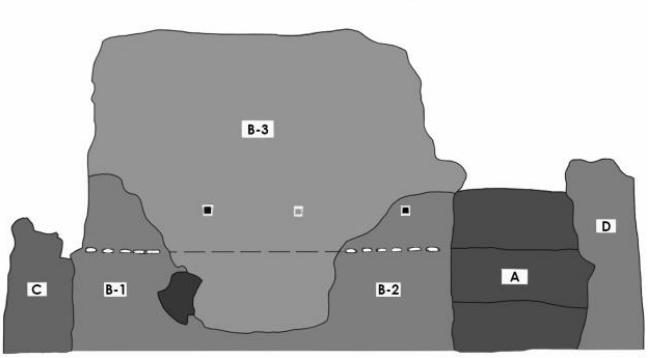


Figure E.113. Eastern facade of the inner walls (Source: Gutiérrez López et al., 2015, p. 80)

The spanning elements of the castle consist of vault and arch types. There were two barrel vaults with semi-circular profile at the keep. While irregular limestone slabs were used to construct the vault at the ground floor, brick was used at the first floor (Figure E.114). However, most portions of these vaults collapsed, there are only remains on the southern and western walls of the keep (Figure E.102). At the springing level of these vaults, there are joist holes[69]. Some remains of vaults were revealed in the keep: e.g., a small vault from the 15th century that was out of brick and completely plastered, above the wall-walk at the roof; and a vault that was constructed before the construction of the keep with irregular limestone slabs and spanning approximately 0.70 m, below the ground of the northwestern corner of the keep. Also, the arches of the castle have been preserved as remains. There were a few voussoirs probably belonging to a semi-circular arch of the postern gate. At the northwestern corner of the keep, another semi-circular arch, which was present before the keep was constructed, was revealed during the restoration works (Quevedo Rojas, 2015, pp. 1388-1389, 1394-1397).

Gates, embrasures, wall-walk and frescos are architectural elements of the castle. There are two entrance gates[70]: main gate (5.20 m in width) at the west, and postern gate (2.35 m in width) at the south. There are wall remains in front of the main gate, and these show that the gate was L planned. The postern gate was secured by cross-bars at the inner side (Quevedo Rojas, 2015, pp. 1388, 1390). Also there are remains of door openings: e.g. the eastern jamb of an opening on the wall E has been preserved, and the arch remains at the northwestern corner, which was mentioned in the above, may indicate a door opening (Gutiérrez López et al., 2015, pp. 78-79, 88, 90). Three rectangular embrasures have been preserved in the keep: one is on the western

[69] It is claimed that the timber joists could have been used to construct a wooden floor, or support the vaults or make temporary scaffolding for the construction of the vaults (Quevedo Rojas, 2015, p. 1391).

[70] Due to the absence of the *mocheta* that is a type of ornament generally located at bottom corners of lintels of gates, the gates of the castle are rare examples in the region (Pérez Ordóñez, 2005, p. 89).

facade in the ground floor, the other two are on the western and southern facades in the first floor. There are remains of wall-walk attached to the southern wall at the roof of the keep (Figure E.115). Some portions of the walls of the keep were decorated with frescos: inner parts of the vault remains at the northwestern corner, and on the surface of the walls and vault of the wall-walk (Figure E.116) (Quevedo Rojas, 2015, pp. 1389-1390, 1395-1397).

Figure E.114. Interior view of the keep (left), and its upper vault (right) (Source: Grupo de Senderismo El Tercer Tiempo, 2013 (left); Pavos Trotones Blog, 2012 (right))

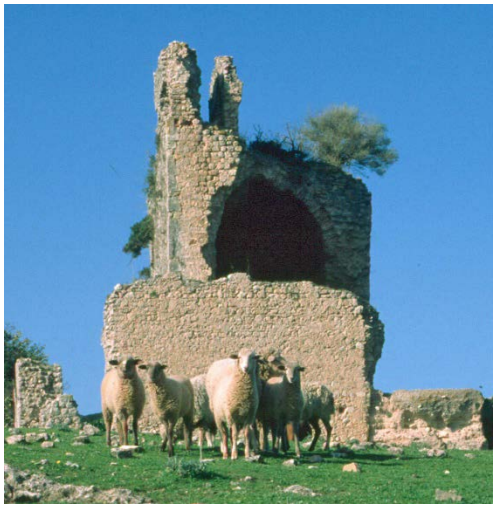


Figure E.115. Eastern facade of the keep and inner walls, before the collapse in 2013 (Source: Grupo de Senderismo El Tercer Tiempo, 2013)

Figure E.116. View of the frescos on the walls of the wall-walk
(Source: Carquero Arquitectura, 2016a)

E.3.5. Conservation Activities

Conservation activities regarding Matrera Castle are analyzed under the titles of research, projects, implementation and awards.

E.3.5.1. Research

There is lack of the research on defense structures in Spain, especially in Nasrid border. So, the historical background before the Middle Ages is uncertain (Cobos Guerra & Retuerce Velasco, 2011, pp. 12-14; Pérez Ordóñez, 2005, pp. 83, 87, 90). Matrera Castle has been subject to scientific research since the early 20th century[71] (Gutiérrez López & Martínez Enamorado, 2003, p. 103). The castle was registered as a national monument with the Decree of April 22nd, 1949 by the Ministry of National Education (MEN) (Cobos Guerra & Retuerce Velasco, 2011, pp. 11, 23). In 1985, it was declared as an asset of cultural interest (BIC) with the Law 16/1985 on Spanish historical heritage (Hispania Nostra, 2021). There is lack of systematic archaeological excavations (Pérez Ordóñez, 2005, pp. 87, 90). Only the ground survey of the castle was carried out in 1999 by *Museo Histórico Municipal de* Villamartín[72] (Gutiérrez López & Martínez Enamorado, 2003, p.104-105, 110).

E.3.5.2. Projects

The restoration project known as Consolidation of the Matrera Castle Keep Tower (*Consolidación de la Torre del Homenaje del Castillo de* Matrera) was prepared by Carquero Arquitectura between 2011 - 2013[73]. The former project aimed to

[71] The first researchers who studied the castle were Miguel Mancheño y Olivares and Pedro Pérez Clotet (Gutiérrez López & Martínez Enamorado, 2003, p. 103). Enrique Romero de Torres worked on the catalog of the monuments in form of photos that was carried out between 1907 and 1908, and named as *Catálogo de los Monumentos Históricos y Artisticos de la Provincia de Cádiz* (Gutiérrez López et al., 2015, p. 59; Romero de Torres, 1934). At the end of the 20th century, the structural and functional characteristics of the castle was analyzed with the methods of *Esquema Gaditano* by Luis de Mora-Figueroa (Gutiérrez López & Martínez Enamorado, 2003, p. 104).

[72] This work was part of a research project named as *Carta Arqueológica del Término Municipal de Villamartín y valoración de los yacimientos Necrópolis Megalitica de Alberite, Torrevieja y Castillo de Matrera*. This project aimed to revaluate the sites and complete the archaeological catalog of the municipality. It was approved by the General Directorate of Cultural Assets of the Junta de Andalucía (*Dirección General de Bienes Culturales de la Junta de Andalucía*) (Gutiérrez López & Martínez Enamorado, 2003, pp. 104-105).

[73] The project was prepared by the architect Carlos Quevedo Rojas with his team. The collaborators were architects Cristina Pérez Prado, Joaquín Martín Rizo, civil engineers José Antonio Cabeza Pérez and Emilio García Chacón, and archaeologist José María Gutiérrez López. The contractor was Arcobeltia Construcciones S.L. The client was Ubri-Prado S.L (EU Mies Award, 2019b; Carquero Arquitectura, 2016a). The responsible institutions were *Comisión Provincial de Patrimonio Histórico de Cádiz* and *Consejería de Cultura y Patrimonio Histórico*. The castle is privately owned, and the funding supplier was the land owner Juan García Doblas. The budget was around 100.000 € (Armario, 2013; Garófano, 2016; Mora, 2016). The project area covers 136 m^2 (Carquero Arquitectura, 2016a).

consolidate the structure against the risk of collapse. However, due to the partial collapse of the keep in 2013, this project could not implemented, and was revised. So, the current project was designed after 2013 (Figure E.117 & Figure E.118). The current implementation was realized between 2014 - 2015 (Carquero Arquitectura, 2016a; Quevedo Rojas, 2015, pp. 1392-1393).

Figure E.117. View of the keep from the southwest, after the restoration
(Source: Carquero Arquitectura, 2016a)

Figure E.118. View of the keep from the southeast, after the restoration
(Source: Carquero Arquitectura, 2016a)

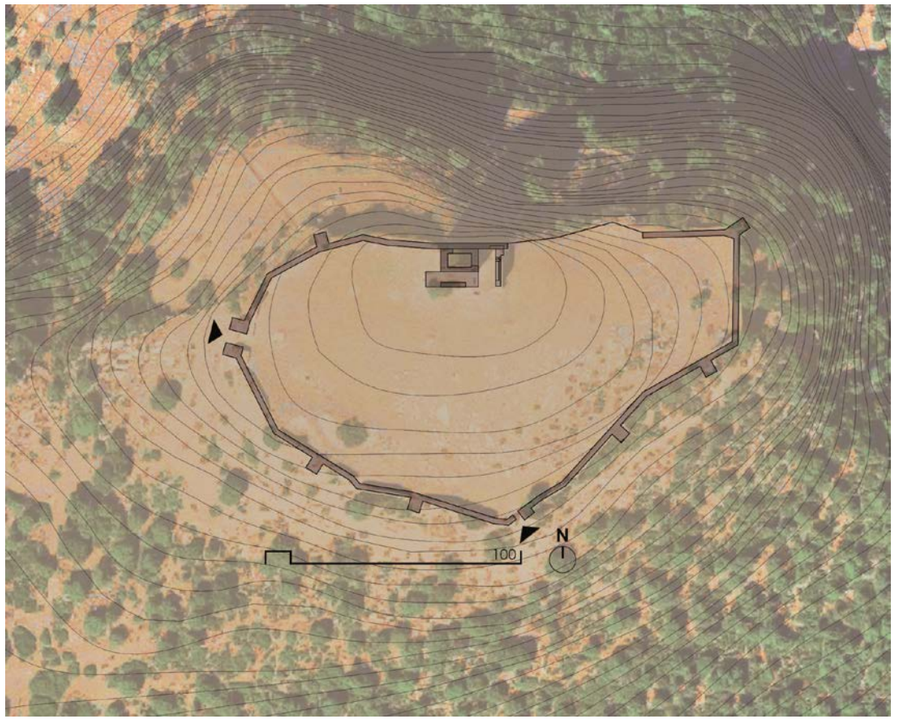


Figure E.119. Site plan, after the restoration (Source: Carquero Arquitectura, 2016a)

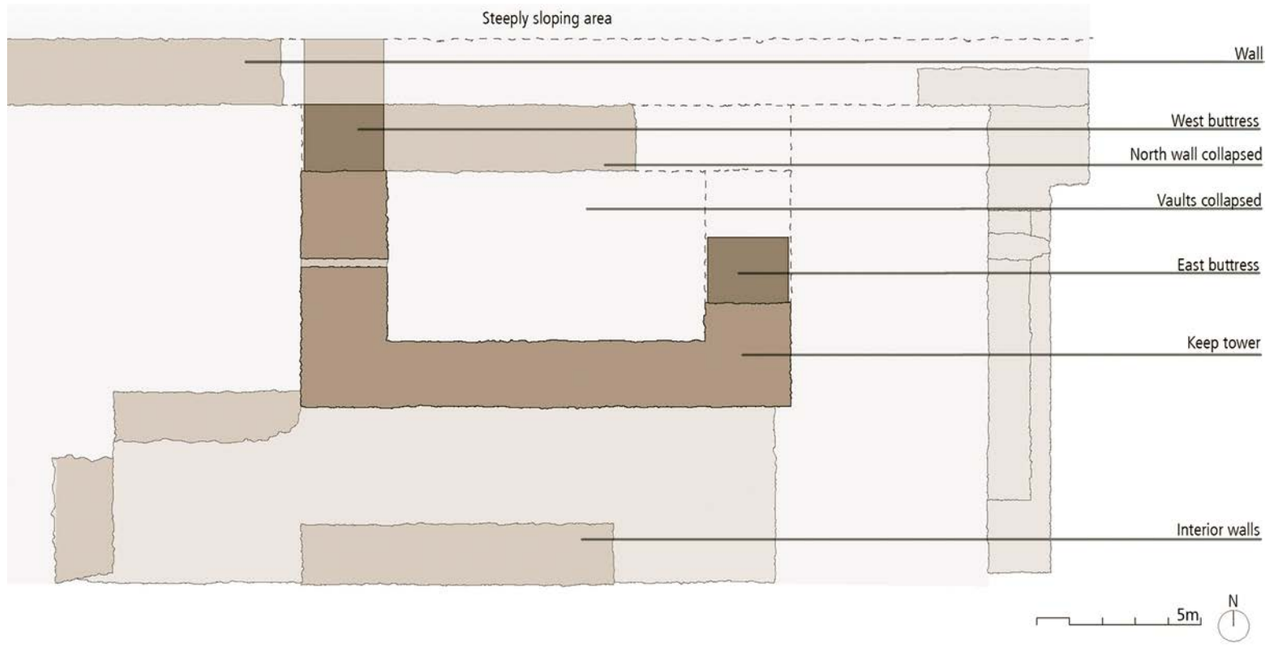


Figure E.120. Plan of the keep and inner walls, after the restoration (Source: Carquero Arquitectura, 2016a)

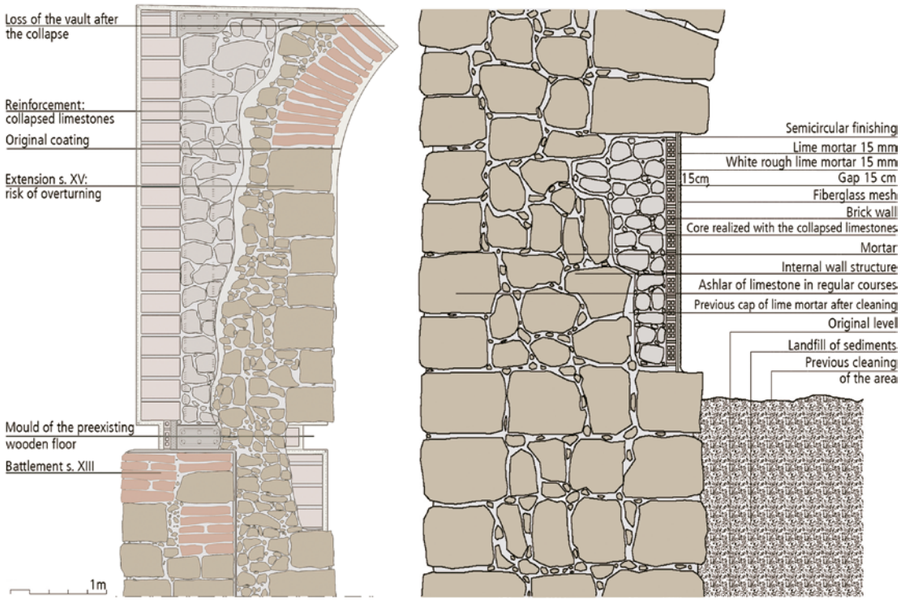


Figure E.121. Southern wall details, after the restoration (Source: Carquero Arquitectura, 2016a)

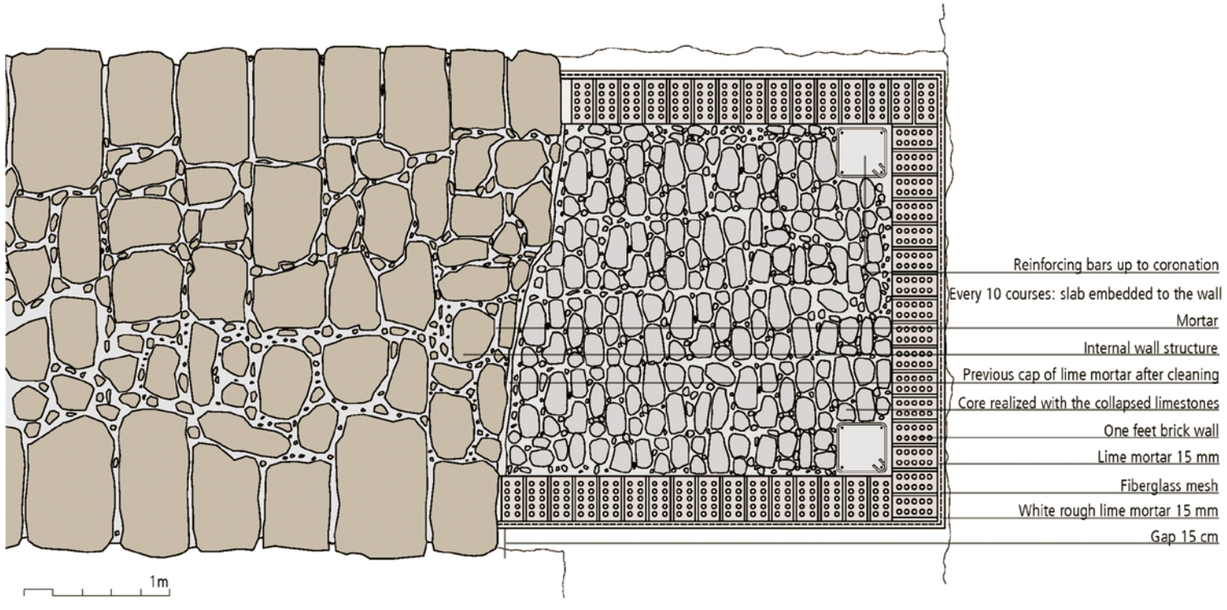


Figure E.122. Detail of the reintegrated wall portions (buttress) (Source: Carquero Arquitectura, 2016a)

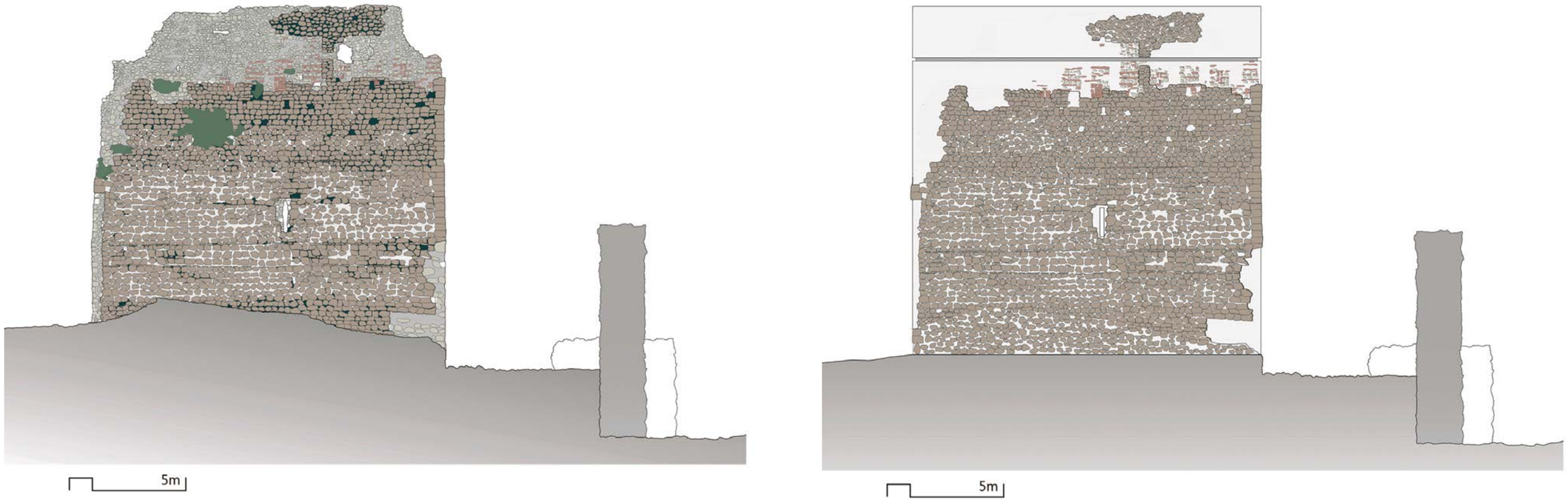


Figure E.123. South elevation of the keep; before (left) and after (right) the restoration (Source: Carquero Arquitectura, 2016a)

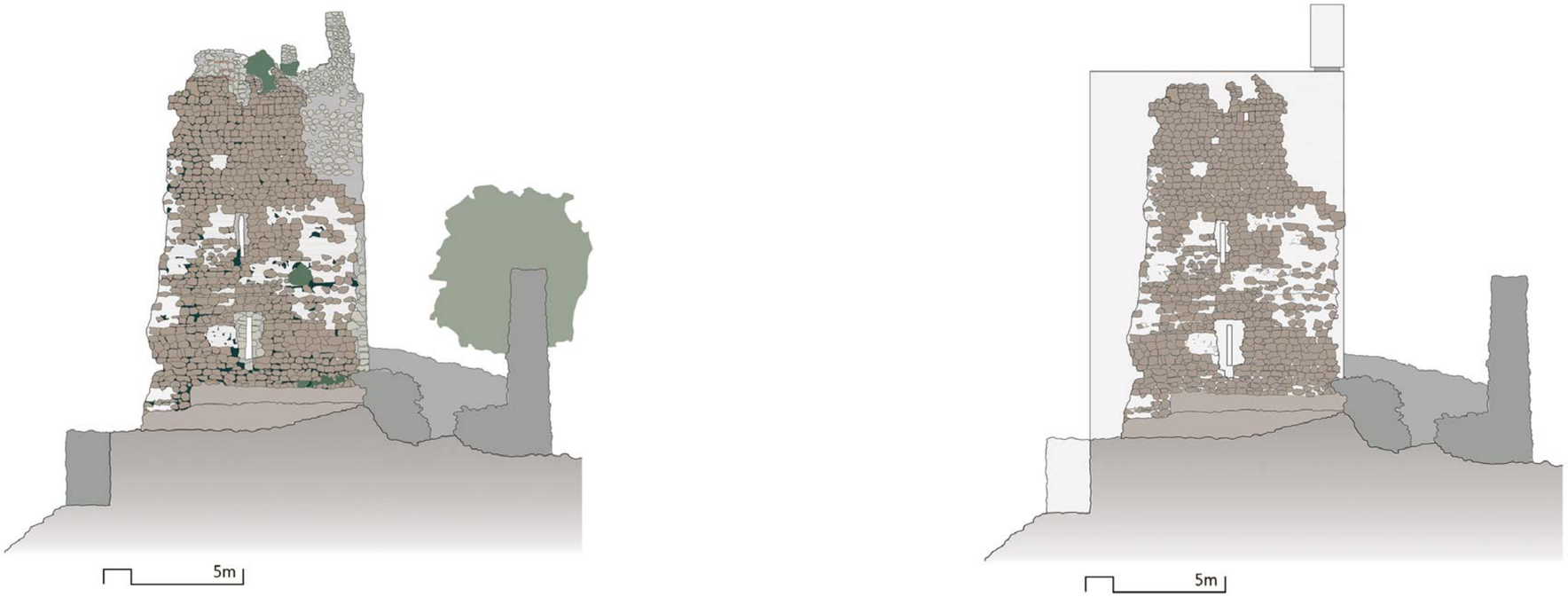


Figure E.124. West elevation of the keep; before (left) and after (right) the restoration (Source: Carquero Arquitectura, 2016a)

E.3.5.3. Implementation

The interventions of reintegration, consolidation, cleaning, and presentation were realized in the restoration project of the keep.

Reintegration was carried out to consolidate the wall portions that were at risk of collapse and recover the volume of the keep (Figure E.119 & Figure E.120). It was realized with rubble stone core that consisted of collapsed limestones found in debris (with reinforcing bars and slabs at the inner corners of the buttresses), and brick facing (Figure E.122). Bricks were covered with the lime mortar (15 mm), fiberglass mesh and white rough lime mortar (15 mm). The mortar is similar with the original whose remains were found in the site. These implemented wall portions were recessed 15 cm from the original wall surface. In the same way, a gap (15x15 cm) was formed between the crenellations and the wall portion constructed on it to distinguish their construction periods (Figure E.121). The edges of these recesses was formed semi-circular against rain penetration (Carquero Arquitectura, 2016a).

Consolidation: Joints were cleaned and lime mortar was used for grouting of cracks and joint discharge. To consolidate the vault remains, reinforced concrete bands (in the ground floor) and air-placed concrete (in the first floor) with steel cord tension members and steel bars were used (Figure C.1). Steel bars were stabilized with expansive mortar and epoxide resin. To consolidate the vault remains at the roof, concrete bands with steel HEB-140 posts were used. The original plaster and frescos were consolidated against weathering conditions by applying paraloid B72 on their surfaces. Water-repellent finishing with %2 gradient was implemented on the floor of the roof and the top of the wall portions above the crenellations (Carquero Arquitectura, 2016a).

Cleaning: Debris was removed around the keep, and some movable and immovable elements were revealed: ceramic pottery, the arch and vault remains with frescos, stone blocks that were probably served as a lintel or sill of one of the embrasures, etc (Quevedo Rojas, 2015, pp. 1394-1397). Plant colonization on the walls and the vegetation in the courtyard were cleaned. The stone surfaces were cleaned with hypochlorite, and later biocidal treatment was realized against the plant colonization. The plaster and frescos were cleaned with neuter tensioactive soap, and biocidal treatment was applied (Carquero Arquitectura, 2016a).

Presentation: The castle is functioned as a landscape landmark (Carquero Arquitectura, 2016a). As the restoration project comprised only the keep, rest of the castle was not presented. However, the castle and its vicinity are on a popular hiking and trekking route. So, there are orientation boards that were placed along the route before the current implementation (Ayto. de Villamartín, 2016b; Tocino, 2015) (Figure E.125). The castle site was surrounded with wire fence. The keep is presented via the plastered walls by making distinction between the authentic and new wall parts, recovering the original volume and coating of the keep, and presenting the construction periods (Figure E.123 & Figure E.124).

Figure E.125. An orientation board on the hiking route leading to the castle (Source: Tocino, 2015)

E.3.5.4. Awards

The restoration project of the tower received many awards[74]. It was catalogued in Prize Arquia/Próxima of Young Spanish Architects of the Spanish Architecture Institute (Carquero Arquitectura, 2016b).

E.4. Northern Gate of Resafa (Rusafa / Sergiopolis), Syria

Northern Gate of Resafa (Rusafa / Sergiopolis), the fourth of the comparative studies, is introduced in this section.

[74] 2016 Architizer A+ Award in the architecture and preservation category with the public choice vote, gold winner of the International American Architecture Prize in heritage architecture category in 2016, Torres Clavé Award (*Premio* Torres Clavé) from the Architectural Institute of Cádiz in 2016, gold winner of the A' Design Award & Competition in cultural heritage and culture industry design category in 2017, second prize of the Leonardo Award 2017 of the International Biennale of Young Architects, and second prize of the 4th Baku International Architecture Award in 2019. It was nominated for the European Union Prize for Contemporary Architecture - Mies van der Rohe Award in 2017. Also, it was the selected project in International Landscape Award "Rosa Barba" and Bienal, International Prize of Architecture and Nature "Simonetta Bastelli", and the young architects program FACtual of the *Fundación Arquitectura Contemporánea*.

E.4.1. Geographic Characteristics

Resafa is located in Raqqa Governorate in the northern Syria. The ancient city is located 40 km southwest of Raqqa and 25 km south of the Euphrates river (Figure E.126) (Konrad et al., 2017b, p. 158). It was located on an important military road (*Strata Diocletiana*) in the border between the Roman Empire and Sasanian Empire, and at the cross point of the historic caravan roads. These roads connect the north and south (Euphrates river and Gulf of Aqaba at the Red Sea), and east and west (Latakia), together with Palmyra, Dura-Europos, and Aleppo (Karnapp, 1977, p. 17; Ulbert, 2008, pp. 43, 45; Weber & Kuhoff, 2002, p. 577). The Northern Gate of Resafa is located on one of the main streets of the city, and occupies a special position among the other gates of the city. It was in a position where the emperors entered the city and official welcoming ceremonies and processions were carried out (Karnapp, 1977, p. 24; Jacobs, 2009, p. 208; Karnapp, 1970, p. 98).

Figure E.126. Satellite images of the site of Resafa
(Base map source: Google Earth; date of image: 31.12.2020, 04.05.2018 (right bottom); access date: 21.05.2021)

Resafa is located on a flat terrain in the vast steppe landscape (Figure E.127). The ancient city is surrounded by Euphrates river in the north, Abū Rujmayn mountain in the south, Bishrī mountain in the southeast and Wadi es Sélé in the west (Beckers, 2012, pp. 54-59). The site is about 300 m above sea level, and the altitude increases slightly from the west to the east in the city (Karnapp, 1970, pp. 106, 111).

Figure E.127. Aerial view of the Resafa ancient city
(Source: Konrad et al., 2017b, p. 159)

Syria is located on the northern Arabian plate and it is surrounded by active plate boundaries: Anatolian plate at the north, Eurasian plate at the east and Levantine subplate (African plate) at the west. As a result of the movements of these plates, Syria consists of four major tectonic zones: Palmyrides[75], the Euphrates fault system, the Abd el Aziz and Sinjar uplifts, and the Dead Sea fault system. Resafa is located at the east of the Aleppo plateau where the Euphrates fault system and the northeastern Palmyrides (Bilas and Bishri blocks) meet (Brew, 2001, pp. 2-8, 14-15, 184-187). Sedimentary rocks, which are part of the Lower Fars formation, form the site[76] (Figure E.128) (Beckers, 2012, pp. 55-56). There are many gypsum and limestone[77] quarries that provide high quality stones in the vicinity of the Resafa (Hof, 2009, pp. 814, 818; Hof, 2016, p. 399). Beside these quarries, hydrocarbon resources (oil and gas reserves) in the region are economically important and attract attention for further exploration of the region (Brew, 2001, pp. 185, 187, 276-277). The region is dense in terms of fault lines[78]. Devastating earthquakes occured along these fault lines in the past, but the seismicity of Syria is determined as moderate for to the last century (Sbeinati et al., 2005, pp. 347-349).

[75] It consists of the southwest Palmyride fold and thrust belt, and the Bilas and Bishri blocks (Brew, 2001, pp. 184).
[76] The soil consists of gypsum, limestones, marls, clays, sandstones, conglomerates and rock salt from Tortonian age (Late Miocene) of Neogene period of Senozoic Era. There are also alluvial deposits that are gypsiferous soil deposited by dust storms, and marine calcareous sandstones and conglomerates such as lacustrine clays and marls, loams from Pleistocene epoch of Quaternary period (Beckers, 2012, pp. 55-56; SAR, GEGMR, 1986).
[77] Especially, the region named as the Limestone Massif that is about 200 km northwest of Resafa was important in terms of qualified stones used as building material (Hof, 2016, p. 399).
[78] Ar-Rassafeh fault is bordered the eastern side of the city in the north-south direction (Beckers, 2012, p. 56).

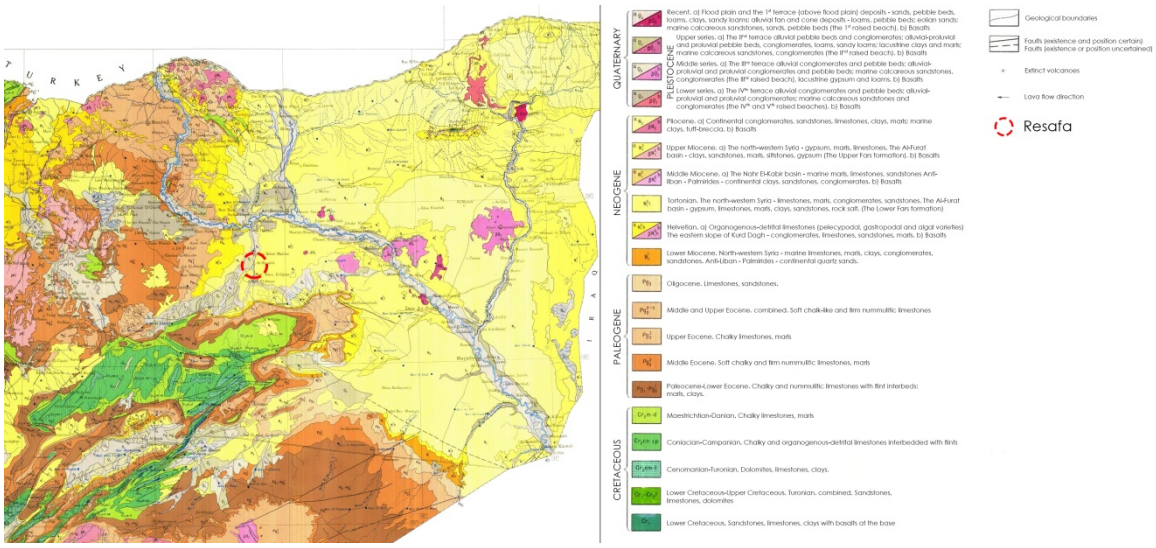


Figure E.128. Geological map of Resafa (Base map source: SAR, GEGMR, 1986)

The Euphrates (*Fırat*) river, which is the main water source of Syria, rises in the eastern Anatolia and flows from the northwestern part of Syria to the southeast. Thus, it divides the country lands into two. There are only small seasonal streams (*wadi*) at the southern bank of the river. Resafa is located at the eastern bank of the Wadi es Sélé in the Resafa basin, and at the north of the confluence of its branches (Wadi Gharawiy and Wadi al Meleh). Due to the lack of springs or running water in the city, three techniques were applied to supply water demand of the city: rooftop water harvesting and floodwater harvesting systems[79] for drinking water, and the brackish groundwater from the wells for agricultural and domestic usage (Beckers, 2012, pp. 34, 37-38, 53-60; Tapete & Cigna, 2020, pp. 3, 12). Due to the location of the city in the floodplain of the Wadi es Sélé and the lack of maintenance of the floodwater harvesting system, the city is under threat of flooding (Tapete & Cigna, 2020, p. 12). However, the risk is low due to the current amount of precipitation, which is lower than that in the antiquity (Beckers, 2012, pp. 57, 75, 77).

Desert (hot and arid) climate dominates in Resafa[80] (Meslmani et al., 2010, pp. 15-19; Beckers, 2012, pp. 12-13). Due to the lack of rainfall[81] and overgrazing, the landscape is mostly devoid of any vegetation, and is covered with loose gravel and sand (De Pauw et al., 2004, pp. 7, 19-20; Meslmani et al., 2010, pp. 18, 79). The biodiversity of flora and fauna is scarce due to drought in Syria (Barkoudah et al., 1999, p. 6). The flora consists of sparse xeric shrubs and ephemeral grasses. The plateau is generally used for grazing. Agricultural lands are limited with the alluvial plains of the Wadi es Sélé[82]. There are remains of gardens at the south of the city, but they were not large

[79] For applying these techniques, many cisterns were constructed inside and outside the fortification walls. Also, a series of embarkments, hydraulic structures and a dam were built outside the city (Beckers, 2012, pp. 5, 38, 55-56; Tapete & Cigna, 2020, p. 12).

[80] According to the Köppen-Geiger climate classification, the climate named as BWh has the mean annual temperature higher than 18°C, and the mean annual precipitation is less than 200 mm (Meslmani et al., 2010, pp. 18-19, 21).

[81] In Resafa, the mean annual precipitation is 136 mm. Due to the location of the city near the Mediterranean climate zone, rainfall is relatively regular and falls between October and April (Beckers, 2012, pp. 37, 39, 45, 77).

[82] Agricultural products are grains (wheat, barley, corn, millet), sugar beet and cotton, etc (Barkoudah et al., 1999, pp. 10-11).

enough to provide sufficient food to the city (Beckers, 2012, pp. 37-38). Due to the climate change, the location of the city in an arid zone and the lack of vegetation, the site is under threat of desertification, wind and water erosion, and dust storms (Meslmani et al., 2010, pp. 78, 91-95). The fauna consists of desert species (vipers, lizards, and chameleons, etc.) and livestock (cattle, camel, sheep, goat, poultry, etc.). Many of the animal species in the country are endangered or extinct due to the climate change, agricultural and human activities such as uncontrolled hunting and overgrazing (Barkoudah et al., 1999, pp. 6-9).

E.4.2. Historic Background

The original function of the Northern Gate of Resafa and fortification walls was defense and observation against threat of Sasanians. Construction of the fortification walls began around 500 AD with the command of the Byzantine emperor Anastasius I (491–518), and lasted throughout the reigns of the emperors Justin I (518–27) and Justinian I (527–65)[83]. It was completed probably before 526, when the Iberian War broke out between Byzantine Empire and Sasanian Empire. The gate was probably constructed around 518 AD (Hof, 2016, pp. 397-400, 406).

According to the cuneiform texts, the site was the administrative center of Assyrians in 9th century BC, however, the accuracy is uncertain due to the lack of the archaeological evidence (Karnapp, 1977, p. 17). In the site, Romans[84] constructed a border fort in the 1st century AD that was constituted as a defense border with a series of defense structures (known as *limes Orientalis*). This border was a fortified road named as *Strata Diocletiana*[85] and was constituted with the command of the emperor Diocletian (284-305) against the Sasanian attacks (Figure E.129) (Konrad et al., 2017b, pp. 158-159; Weber & Kuhoff, 2002, p. 577; Sack, 2008). In the 5th century, Resafa became an important pilgrimage center for Christians under Byzantine rule after St. Sergius who was a Christian Roman soldier martyred in the city in 312 AD, and was renamed as Sergiopolis. Since this century, due to the popularity of the martyrdom, the wealth of the city increased and this gave way to the development of the city with numerous construction activities[86] (Sarre, 1909, p. 97; Karnapp, 1977, p. 17; Konrad et al., 2017b, pp. 158-159). The fortification walls, which were constructed between 500-526 AD to protect the city and its religious buildings, were completed in five

[83] Procopius claimed that emperor Justinian I (527–65) built the fortification walls on the previous walls made of mud brick. However, the archaeological researches has revealed that this claim is false (Sarre, 1909, pp. 98, 107; Karnapp, 1977, pp. 18, 21; Hof, 2016, p. 398).

[84] Before the dominance of the Roman Empire, the region was under the domination of the Achaemenid Empire (First Persian Empire) (between 6th - 4th century BC), Kingdom of Macedonia during the reign of Alexander the Great (4th century BC), and Seleucid Empire (between 4th - 1st century BC) (Karnapp, 1977, p. 17).

[85] This road started from Sura and continued to Amman in northeast-southwest direction by connecting the cities such as Palmyra, Damascus and Bosra (Weber & Kuhoff, 2002, p. 577). Some of the defense structures on this road were Sura, Tetrapyrgium, Al - Qusair, Cholle, Tell Fhêdé, Al - Qudair (Qdeir), Al - Kum (Al - Kawm), Oriza (Al - Taiyiba), As - Sukhneh, Al - Hulaiha (Hulayhilah) and Aracha, etc (Beckers, 2012, p. 54).

[86] Besides the fortification walls; religious buildings (e.g., churches, basilicas), a central building, hydraulic structures (e.g., dam, cisterns, water channels) and houses were constructed in the 5th and 6th centuries (Karnapp, 1977, p. 17; Hof, 2009, p. 813).

construction periods[87] (Hof, 2016, pp. 397-406). Around 518, the Northern Gate was constructed, but the ornamentation of the gate (on the western and eastern walls of the forecourt) could not be completed due to the simultaneous construction of the basilica B and the central building. The government had ran out of resources (Jacobs, 2009, pp. 207, 212; Hof, 2017, pp. 64, 71). In 542, Chosroes I (531–79), who was a Sasanian king, besieged the city, however due to the water scarcity, they had to withdraw (Sarre, 1909, p. 98; Hof, 2016, pp. 406, 408). Starting with the late 6th century, the city fell into decline due to conflicts, plague pandemic and earthquakes (Hof, 2016, pp. 407-408). In 616, the city was taken by the Sasanians after the war (602-628) between the Sasanians and Byzantines (Hof, 2016, p. 408). In 636, the city was conquered by Arabs as a result of the Battle of Yarmouk between Arabs and Byzantines. Even under Muslim rules, the city sustained its importance as a pilgrimage center (Karnapp, 1977, p. 18). In the 8th century, Resafa regained its power after the construction of the residence of the Umayyad caliph Hisham ibn Abd al-Malik (724-743) with several palaces at the south, outside of the fortification walls, and later named as Ruṣāfat Hišām[88] (Figure C.2) (Karnapp, 1977, p. 18; Sarre, 1909, p. 99; Ulbert, 2008, p. 47). The city began to lose its importance under the domination of Abbasids in the 8th century[89], and was seriously damaged by a great earthquake in the late 8th century (Karnapp, 1977, p. 18; Gussone, 2016, p. 152). Although there was a revival of the settlement around the city during the Ayyubid dynasty between the 12th and 13th centuries, the city was gradually abandoned after the invasion of the Mongols in 1258/59 (Gussone, 2016, pp. 151-153; Ulbert, 2008, pp. 46-47). In 1269, the last residents moved to Hama and Salamiyah (Karnapp, 1977, p. 18; Sack, 2008). Since the conquerence of Raqqa by ISIS in 2013 during the Syrian Civil War, Resafa ancient city has been damaged. In 2017, the city was taken back from ISIS by the Syrian military forces (Danti et al., 2017, pp. 3, 91, 189; Konrad et al., 2017a, p. 111).

[87] In the first stage, a prototype wall portion (between towers 10-16) at the northeast and another western portion with hydraulic facilities (t33-t34) were constructed. It started after the construction of Basilica A in a time of peace and prosperity, so the focus was creating a flamboyant and imposing building as soon as possible, instead of ensuring defensive characteristics. In the second stage, this failure was overcome after the Byzantine-Sasanian war in 502, and some wall portions (t29-t42) were constructed with round, polygonal and U-planned towers, and gates. In the third stage, the missing wall portions were completed with rectangular towers and without wall-walks at some parts (t6-t10, t27-t29, t47-t49). It stemmed from the lack of the money and labour force due to the priority of the construction activities at Dara and Zenobia, construction of different buildings in Resafa, and the pressure of the Persian attacks in 513. In the fourth stage, the towers that were originally constructed with wooden ceilings were reinforced with masonry vaults by Justinian I in the late 530s, during the Eternal Peace (532-540). In the last stage, extensive repairs were carried out, and all gates of the city were blocked probably around 610, except the central gateway of the northern gate (Hof, 2015, pp. 303-304, 311; Hof, 2016).

[88] He also constructed a mosque in the courtyard of the city, and repaired some structures in the city (Konrad et al., 2017b, p. 159; Gussone, 2016, p. 153).

[89] During the Abbasid period, some construction activities were carried out at the north, outside of the city, e.g. a shelter for animals of pilgrims and merchants (Konrad et al., 2017b, pp. 159-163).

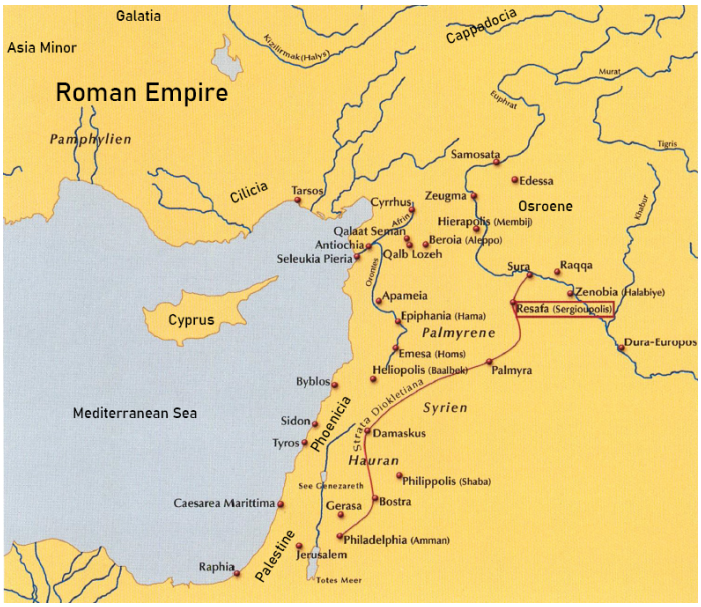


Figure E.129. The fortified road (*Strata Diocletiana*) on the border between Roman and Sasanian Empires (Source: Ulbert, 2008, p. 43)

E.4.3. Morphologic Characteristics

Resafa has irregular rectangle plan layout, and covers an area around 400 by 600 m[90] (Figure E.130). The ancient city was protected by moats and earthen mounds surrounding it. It was enclosed by continuous fortification walls that were around 1.9 km in length and 14 m in height (Karnapp, 1977, pp. 21-22; Lawrence, 1983, p. 199). The walls were reinforced by 29 large towers alternating with 21 rectangular turrets at irregular intervals. Most of the towers were rectangular planned, but there were polygonal, circular (at the corners) and U-planned towers. These different types of the towers were related to the construction process of the fortification wall. Each tower had three stories and a roof. While the turrets were originally constructed with masonry vaults, the towers were constructed with wooden ceilings, and later they were replaced with masonry vaults (Karnapp, 1976, pp. 146-147, 151; Lawrence, 1983, p. 200; Hof, 2015, pp. 303-305). There are four main and four secondary gates (probably used for vehicle traffic) on each side of the rectangular planned city (Karnapp, 1976, pp. 148-149).

[90] The northern side of the city is 543 m, the southern side is 558 m, the eastern side is 356 m and the western side is 422 m in length (Karnapp, 1977, p. 22).

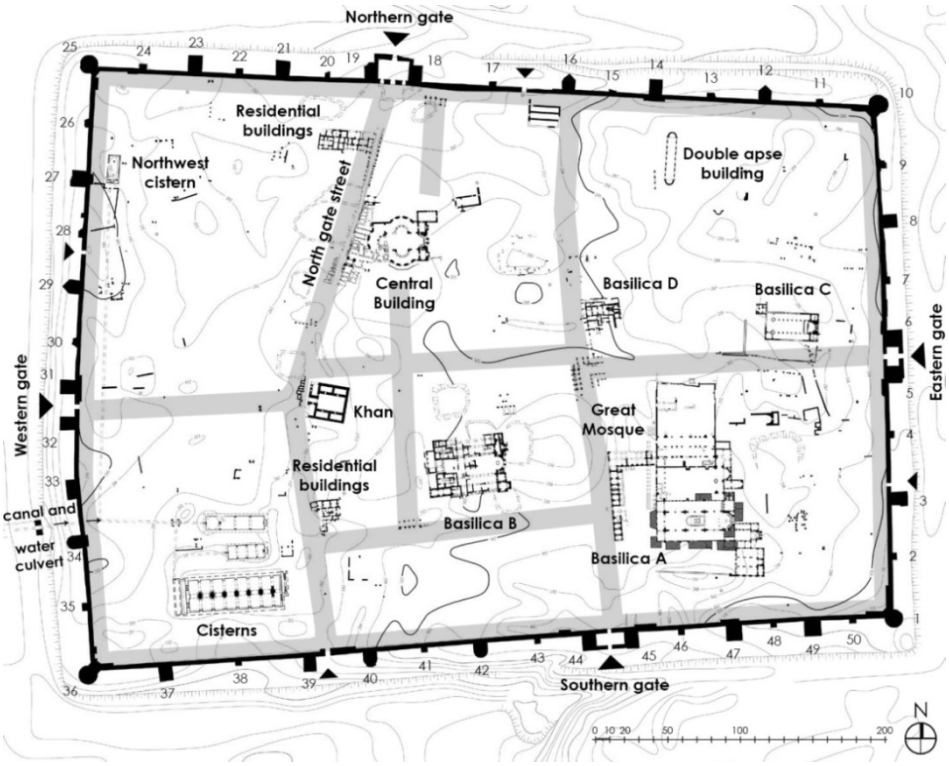


Figure E.130. Site plan of Resafa (Base map source: Konrad et al., 2017b, p. 162, revised from Westphalen, 2000, p. 340)

The northern gate is the main entrance of the city, and its rich architectural ornamentation distinguishes it from the other gates. One of the main streets named as the north gate street, flanked by shops on its both sides, passes through the gate (Karnapp, 1977, p. 24). The gate is designed symmetrically. It consists of a closed forecourt projecting outward from the fortification walls, and two towers flanking the gate and the forecourt[91] (Figure E.132; a & Figure E.136) (Karnapp, 1970, p. 98; Jacobs, 2009, pp. 198-210).

The forecourt is rectangular planned (about 21 m in length and 14 m in width). Also, at the northeast corner of the forecourt, there are remains of a wall (60 cm in width) that may have been constructed instead of earthen mounds. While the northern wall of the forecourt was designed for defense purpose as its unornamented facade and probably only one narrow door opening indicates, the southern wall where the northern gate of the city is located represented the glory of the city (Karnapp, 1970, pp. 110-111; Jacobs, 2009, pp. 200-201). So, importance was given to the facade of the gate facing outside, instead of the city side (Jacobs, 2009, pp. 206-207).

The Northern Gate of Resafa has three doorways; the largest one (3.10 x 4.90 m), which is located at the center, was used for wagon traffic, and the other two side doorways (2.24 x 3.55 m) were used by pedestrians. On the northern facade, five blind arches, crowned with three wider arches and two smaller arches between them, are supported by six columns with Corinthian capitals (Figure E.133). This ornamented

[91] This type known as cavaedium gate gives way to the multi-functionality of the gate, e.g. the forecourt is used for collecting taxes and exchanging the products of merchants. At the same time, it is the symbol of the city. It also has defensive advantages (Jacobs, 2009, pp. 198, 209-210). Except the western gate, all the other gates of the city were constructed as cavaedium type of gate (Karnapp, 1970, p. 98; Jacobs, 2009, pp. 200-201).

architecture style on the southern facade of the courtyard continues on the other facades of the courtyard and the southern facade of the gate (city side facade) in a simpler form (Figure E.132; b & Figure E.134) (Karnapp, 1970, pp. 98-102, 112-120).

The towers which had three stories are rectangular at the exterior, U-planned at the interior (Figure E.132; a & Figure E.135) (Karnapp, 1970, pp. 106-107; Hof, 2015, p. 309). The rooms of the towers are around 9 m in length and 4 m in width. The ground floor of the towers that were accessed from the city side were used as storage (Karnapp, 1970, p. 107). While the first floor was accessed from lower wall-walks, the second floor was accessed from the upper wall-walks. But, access to the roof could not be determined. Before the current interventions, Northern Gate of Resafa was in need of repair (upper wall portions and the northern wall of the forecourt were demolished), and its ground level was under earth and debris that reached a height of about 5 m (Figure E.131) (Karnapp, 1970, p. 111; Karnapp, 1976, p. 150).

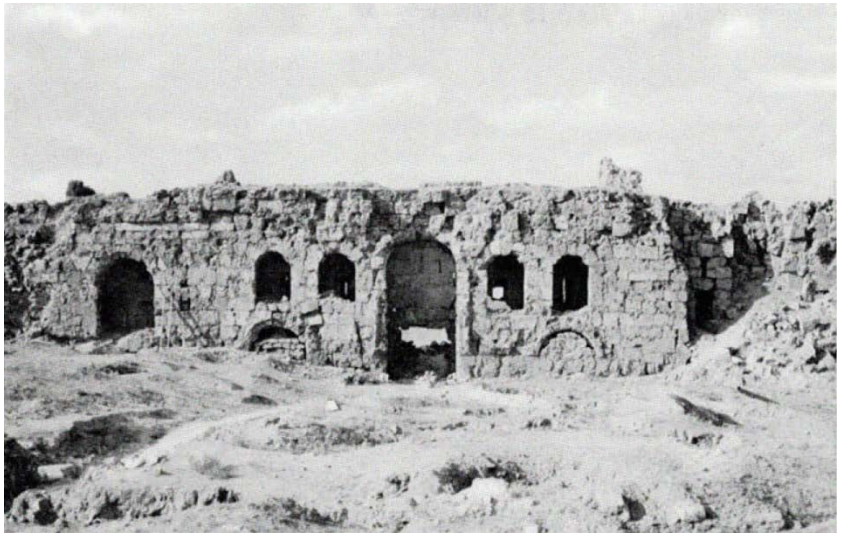
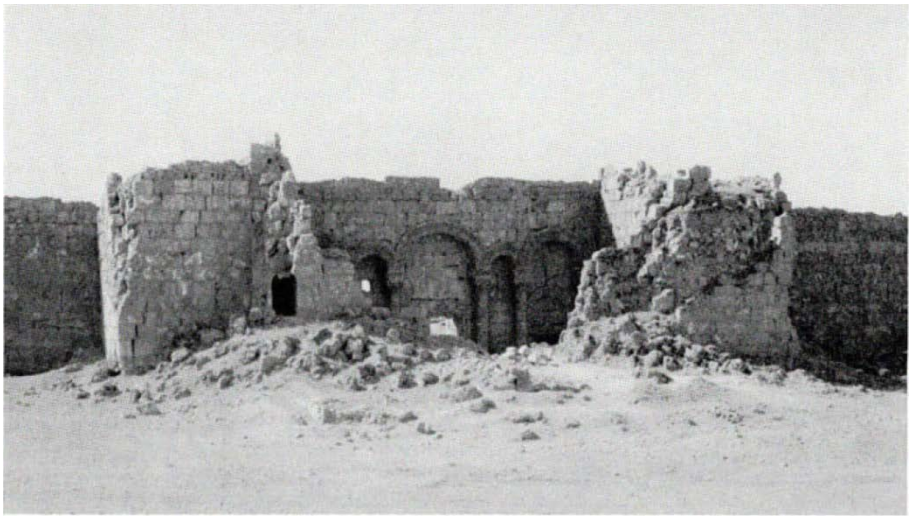


Figure E.131. Views of the northern gate in 1970s; a) Southern facade,



b) Northern facade (Source: Karnapp, 1970, p. 103)

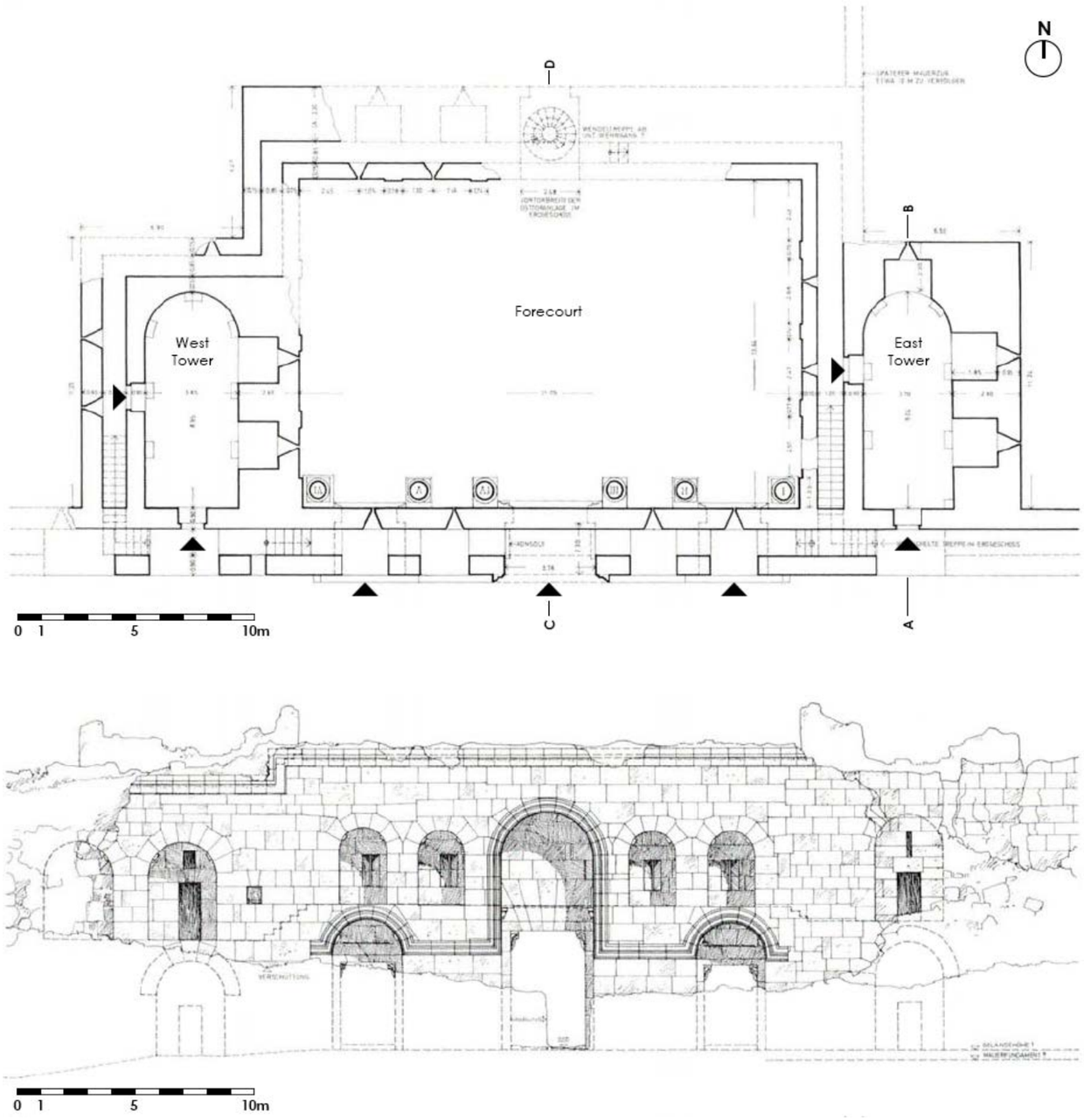


Figure E.132. Measured drawings of the gate; a) First floor plan, b) Southern facade
(Source: Karnapp, 1970, p. 104)

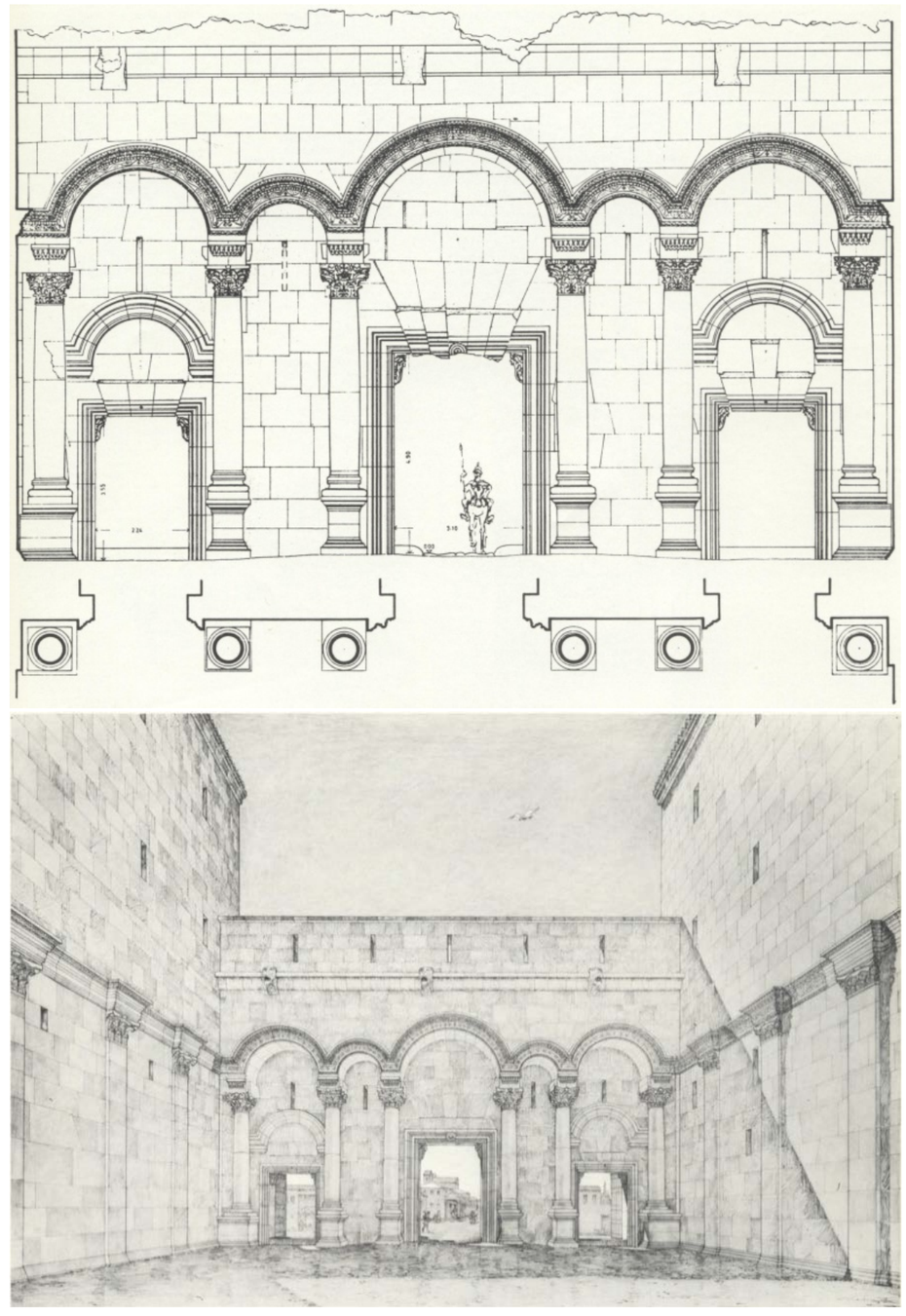


Figure E.133. Northern facade of the gate; a) Measured drawing, b) Restitution drawing
(Source: Karnapp, 1970, pp. 112, 122)

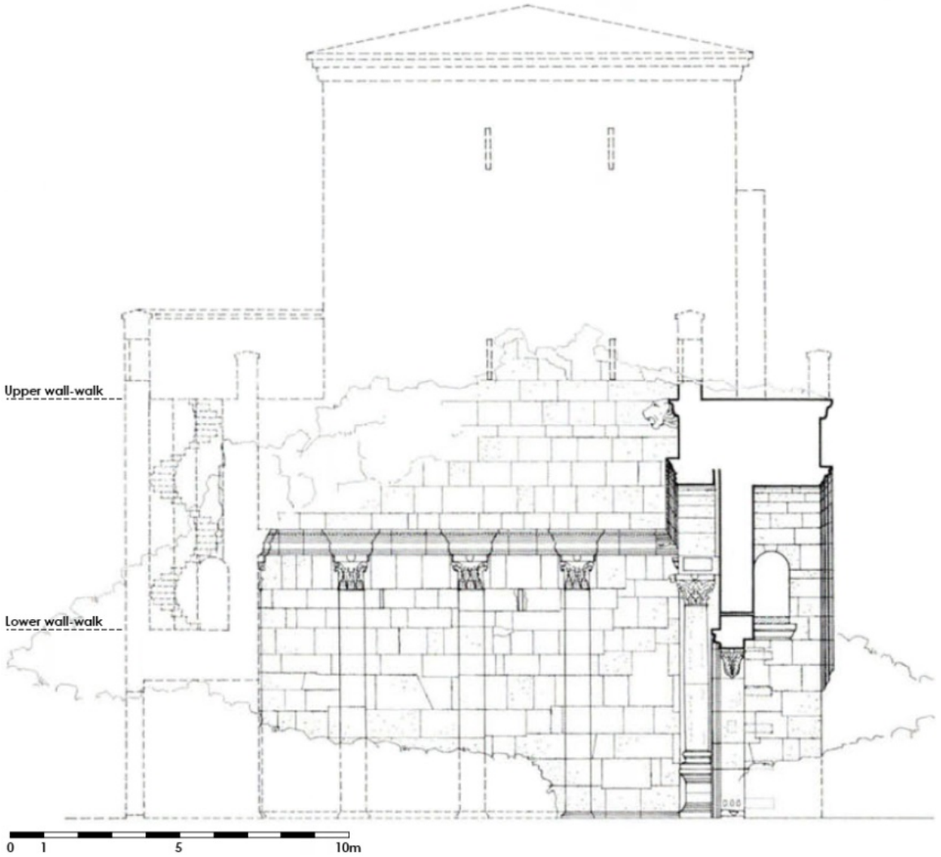


Figure E.134. Measured drawing, section C-D (Source: Karnapp, 1970, p. 107)

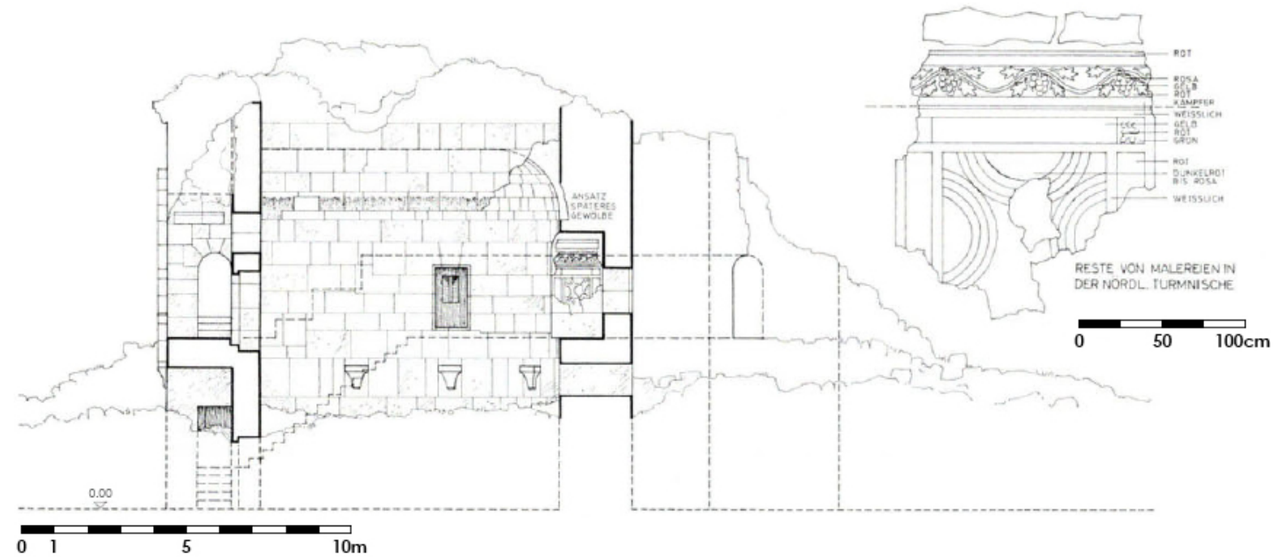


Figure E.135. Measured drawing, section A-B from the eastern gate tower (Source: Karnapp, 1970, p. 108)

Figure E.136. Panoramic view of the northern fortification wall (Source: Flickr, 2021)

E.4.4. Construction Technique and Material Usage

The walls were constructed with the technique of smooth cut stone facing and mortared rough cut stone core (Figure E.137). The thickness of the walls is around 3 m, and these layers divide the wall into three equal parts about 1 m thick[92]. Each layer was constructed as three separate and independent faces due to the lack of bonding between the layers[93] (Karnapp, 1976, p. 147; Hof, 2009, pp. 813-815, 819). However, on the contrary of the cavity walls, the void between the layers resembled thicker vertical joints. So, the fine debris that fell down and accumulated in the void caused to separate the wall layers at some points (Hof, 2009, p. 820). At the first floor level where the lower wall-walk surrounds the fortification walls, the core layer becomes the continuous corridor between the inner and outer layers. The wall material is mainly gypsum stone, but limestone was used to construct the vaults of the towers. Also, small quantities of brick and limestone were added in repairs. The stone blocks were used in regular courses whose average height is about 60 cm[94]. Gypsum mortar was used with low amount of aggregates (Karnapp, 1970, pp. 99, 106; Karnapp, 1976, p. 147; Hof, 2009, pp. 814-815).

The spanning elements of the northern gate consist of arch, vault and dome types. There are three types of arches: semi-circular, flat and relieving arches. Semi-circular arches which constitute a blind arcade are located above the door openings on the northern facade. Six columns located on high pedestals supported these arches. Flat arches with profiled relieving arches above them are located above the side doorways as an outer arch at the northern facade. There are barrel vaults with semi-circular profile out of limestone. They are located at the gate towers[95], interior side of embrasures of the gate towers, above the doorways of the gate and towers (at the ground level) as an inner vault and along the galleried wall-walk (Figure E.138 & Figure E.140). Joist holes which were remains of scaffolding used during the construction of the vaults can be observed (Hof, 2015, pp. 308, 310). Semi-domes that are attached to the end of the vaults are located at the northern side of the tower rooms (Karnapp, 1970, p. 109). There are grooves on the side faces of the voussoirs that were used for pouring mortar between the stones (Hof, 2009, pp. 816-817).

[92] At the northern gate, the wall thickness is 2.85 m (the inner and outer walls are 0.90 m in width, and the corridor of the wall-walk is 1.05 m in width). The wall thickness of the northern wall of the forecourt is 3.90 m (the outer wall is 2.30 m, the inner wall is 0.75m, and the corridor of the wall-walk is 0.85 m in width) (Karnapp, 1970, pp. 106, 110).

[93] This construction technique was probably developed from the techniques used in the Limestone Massif region (Hof, 2009, pp. 813, 819).

[94] The largest stone blocks were used for the construction of the northern gate: some of them is 1.06 m in height and 1.70 m in width (Jacobs, 2009, pp. 207, 212).

[95] At the towers, the springing line of the vaults overlapped the keystones of the vaults of the embrasures. So, the keystones of these vaults were demolished (Hof, 2015, pp. 306-307).

Figure E.137. Wall section of the northern gate
(Source: Hof, 2009, p. 819)

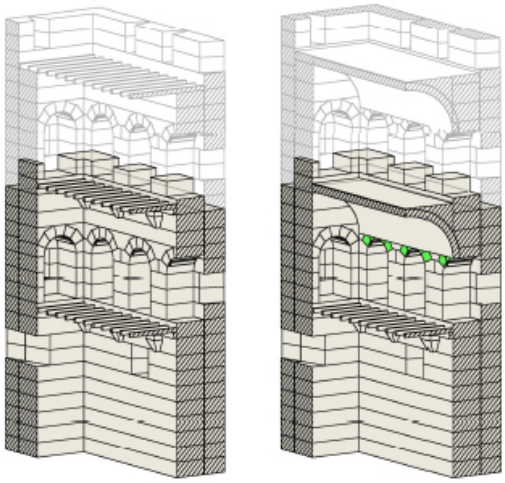


Figure E.138. Isometric section of the tower; authentic construction with wooden ceilings (left), and after the construction of masonry vaults (right) (Source: Hof, 2015, p. 307)

The architectural elements of the gate consist of door openings, machicolations, embrasures, wall-walks, stairs, niches, corbels, cornices, moulded profiles, pilasters, carvings and frescos. The doorways of the northern gate, which provide access to the city, are rectangular, and door leafs were out of timber. The main doorway was double leafed (Karnapp, 1970, p. 102). Each doorway has moulded door frame profiles and thresholds (Figure E.139). The doorways of the towers are also rectangular (1 x 2 m). The three arches above the door openings of the gate were pierced by rectangular machicolations (Karnapp, 1970, pp. 107, 117). There are V shaped embrasures. At the eastern wall of both towers and the northern wall of the east tower, embrasures have vaulted niches at the interior side. The fortification walls, towers and forecourt of the northern gate were surrounded by two wall-walks, one located above the other (Figure E.132; a & Figure E.134). The lower wall-walk (at a level of 5.90 m) consists of numerous barrel vaults facing the city side, embrasures aligned along the outer wall and a continuous corridor between them. This corridor was formed by vaulted openings on the pillars of the barrel vaults (Figure E.140). The upper wall-walks (at a level of 11.70 m) were demolished (Karnapp, 1970, p. 106; Karnapp, 1977, p. 22). The stairs are located at the corridor of the lower wall-walk[96]. Semi-circular vaulted niches are located at the interior sides of the embrasures of the gate towers. Corbels are located in the towers in a simpler form, but the corbels that are located at the bottom corners of the lintels of the each doorway of the northern gate were richly decorated with floral motifs. Also, three corbels in the shape of lion heads are located asymmetrically on a cornice at the northern facade of the gate. Cornices ornament the south and north facades of the gate, and the walls of the forecourt. Also, moulded profiles ornament both the south and north facades of the gate by surrounding the doorways, arches and vaults on the facades (Figure E.132; b & Figure E.133). While some of them are in a simple form, the others

[96] However, access from the first floor to the ground and upper floors of the towers could not be determined due to the debris and demolished wall portions. It is assumed that a staircase led to the ground floor, and a spiral staircase located at the northern wall of the forecourt led from the first floor to the upper floors (Karnapp, 1970, pp. 107-111).

are decorated with geometric patterns, floral and animal figures. Pilasters which had ornamented capitals are located on the walls of the forecourt, except the southern wall (Figure E.133; b & Figure E.134). Carvings of cross figures are located on the flat arches of the doorways, and on the vault of the western tower. The stone blocks of the vaulted niche at the north of the eastern tower were decorated with frescos (Figure E.135) (Karnapp, 1970, pp. 101-120; Jacobs, 2009, pp. 200-207).

Figure E.139. Northern facade of the northern gate (Source: Wikipedia, 2007)

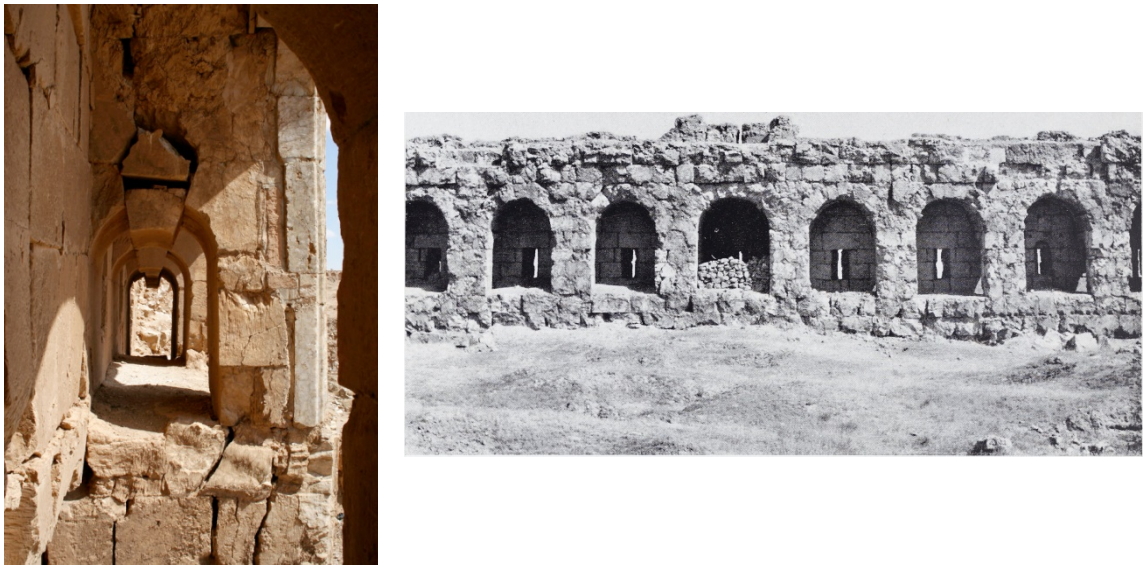


Figure E.140. View of the lower wall-walk from its corridor (left), view of the upper and lower wall-walks from the courtyard (right) (Source: Flickr, 2008 (left); Karnapp, 1976, p. 150 (right))

E.4.5. Conservation Activities

Conservation activities regarding the Northern Gate of Resafa are analyzed in this section under the titles of research, projects and implementation.

E.4.5.1. Research

The settlement in Resafa was first mentioned by Ptolemy (DAI, n.d.). The book of Procopius (*De Aedificiis* II) from the 6th century was the only source about the city and the fortification walls. However, the city was discovered by chance in 1691[97]. Since the middle of the 19th century, the city had been visited by travelers and researches. They contribute to knowledge about the city with their drawings, photos and descriptions[98]. In 1952, systematic excavations and ground surveys were started under the management of J. Kollwitz (1952-1968)[99] (Karnapp, 1970, p. 121; Karnapp, 1977, pp. 18, 29). During the excavations, W. Karnapp studied the fortification walls and the city gates, and provided comprehensive documentation of these remains (Sack, 2008; Hof, 2009, p. 813). In the 1960s, the forecourts of the gates were excavated, and the two side doorways of the northern gate were unblocked (Hof, 2016, p. 409). Between 1976 and 1982, excavations and surveys in and around the city had been carried out under the management of T. Ulbert (Karnapp, 1977, p. 29; DAI, n.d.). Since 1983, studies were concentrated on the remains around the city by Dorothée Sack (Sack, 2008; Gussone, 2016, p. 152).

Between 2006 - 2011, a comprehensive research project, named as Resafa-Sergiupolis/Rusafat Hisham, *Pilgerstadt und Kalifenresidenz*, had been carried out under the management of Dorothée Sack from the Berlin University of Technology. It consisted of five sub-projects about different subjects of research that had been carried out by different working teams[100]. The northern gate was studied within the scope of the third sub-project which was under the management of Catharine Hof. However, due to the outbreak of civil war in Syria, the researches in the site had to be delayed. So, since

[97] The writings by M. W. Halifax was the first mention of Resafa in modern times (Karnapp, 1977, p. 18).

[98] For example; B. Moritz (1884), J. Østrup (1893), V. Chapot (1901), E. Herzfeld and F. Sarre (1907), S. Guyer, H. Spanner (1918), A. Musil and A. Mendl, J. Kollwitz, and W. Karnapp, etc. (Sarre, 1909, pp. 95-96; Karnapp, 1970, pp. 99-102). In the 21th century, the fortification walls and gates have been studied by Catharine Hof, and the ornaments of the city gates have been studied by Gunnar Brands (Hof, 2009, p. 813; Hof, 2015, p. 304).

[99] These studies were funded by the DFG and DAI. The DGAMS was the responsible institution for the excavations (Karnapp, 1977, p. 29). Also, before these excavations, at the beginning of the 1950s, Georges Tchalenko carried out excavations of some building in the city (DAI, n.d.).

[100] The first sub-project aimed to prepare an archaeological map by chronologic plans that show historic periods and development of the city and its vicinity. The second, known as archaeology and prospection, aimed to investigate the residence of the caliph in the south and the settlement in the north of the city. The third, known as the city wall of Resafa, aimed to analyze the construction techniques, construction process and historic periods of the fortification walls and gates. The fourth aimed to carry out restoration, consolidation and cleaning works of the structures in the city. The last sub-project aimed to provide the presentation of the archaeological site with service facilities for fulfilling visitor needs, and develop site management (Sack, 2008). These projects were carried out in cooperation with the DAI and DGAMS. The DFG and Fritz Thyssen Foundation were the funding suppliers (Hof, 2016, p. 397; Sack et al., 2008, p. 34).

2011, the studies have focused on the evaluation of the site surveys (Sack, 2008; Hof, 2016, pp. 397, 409; Konrad et al., 2017b, pp. 158, 162).

E.4.5.2. Projects

The restoration project of the Northern Gate of Resafa with its towers, and the northern fortification wall attached to the gate was carried out by DGAMS within the scope of the archaeological researches in the site since 1970s, and later continued between 2001 – 2007 (Al Saeed, 2009, pp. 9, 16, 19, 23-24; Sack et al., 2008, pp. 34, 79).

E.4.5.3. Implementation

The restoration approach to Northern Gate of Resafa is identified and evaluated in this section. In general, it is aimed to give an idea about the authentic mass with partial reintegration. The interventions of reintegration, consolidation, cleaning, and presentation were realized in the restoration project.

Reintegration was carried out with imitation stones and the authentic construction technique to complete cut stone facing of the southern facade and its ornamentations of the northern gate (Figure E.141).

Consolidation: After cleaning the joint discharges and cracks on the walls, they were filled with mortar which consists of plaster of Paris and gypsum stone chipping. However, it was implemented unsystematically: some wall portions were consolidated, while some joint discharges and serious cracks continue to pose risk (Al Saeed, 2009, pp. 18, 20, 44; Sack et al., 2008, p. 79). To provide color match between the intervention mortar and the authentic stones, the mortar was painted with clay mixed with water. It is stated that the mortar was recessed 2-5 cm from the original surface. Hard capping was applied on top of the walls with the same mortar mixture (Al Saeed, 2009, p. 18).

Cleaning of plant colonization on the walls and dust in joints were carried out. Debris and sand was removed around the door openings and the forecourt, and the lower level of the walls were revealed.

Presentation: There is no intervention to present Resafa ancient city[101]. The northern gate was presented by reintegration of the southern facade and conservation of the northern facade via consolidation works.

[101] A visitor center, in which a permanent exhibition about the historical background and excavations set up, in the northwest, and a cafeteria in the southeast of the city is planned. Short and long visitor tours entered the city from the northern gate were designed (Figure E.142). Information and orientation boards, and safety measures for visitors e.g., cover above well pits in the city, are proposed. Also, to provide a wide view of the southern land of the city including the quarries and the residence of caliph, a viewing platform with a staircase was proposed at the southeast corner tower (t1) (Mollenhauer et al., 2007, p. 23; Sack et al., 2008, p. 80). However, none of these interventions could not be realized due to the conflicts in Syria.

Figure E.141. View of the southern facade of the northern gate after the restoration
(Source: Alamy, 2009 (top); Flickr, 2021 (bottom))

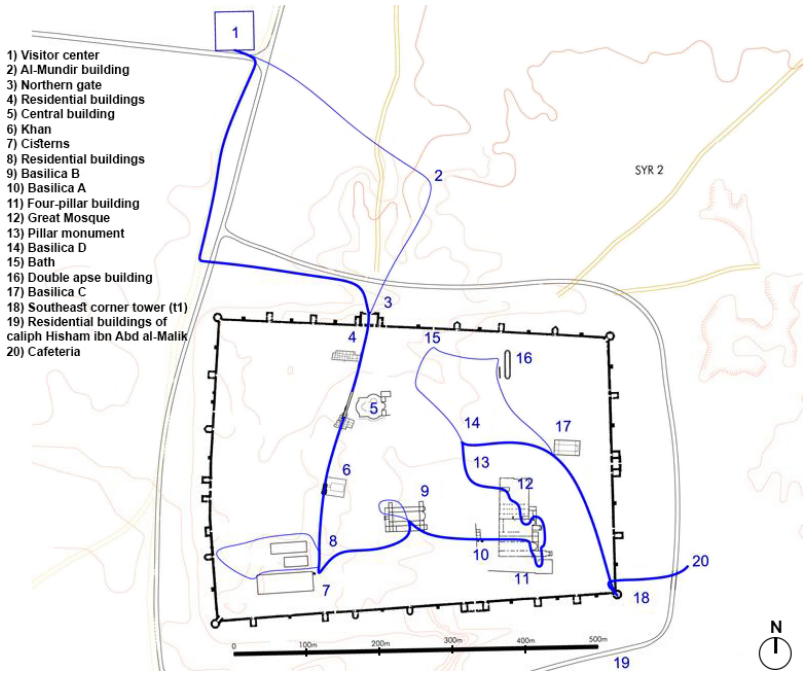


Figure E.142. Proposed short and long visitor tours
(Source: Mollenhauer & Khoury, 2006)