CONSTRUCTION TECHNIQUES OF TRADITIONAL HOUSES IN NEVŞEHİR; CASE STUDY ON ÜRGÜP, MUSTAFAPAŞA AND İBRAHİMPAŞA

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

FUNDA SOLMAZ

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF SCIENCE IN RESTORATION
IN
ARCHITECTURE

JANUARY 2013

Approval of the thesis:

CONSTRUCTION TECHNIQUES OF TRADITIONAL HOUSES IN NEVŞEHİR; CASE STUDY ON ÜRGÜP, MUSTAFAPAŞA AND İBRAHİMPAŞA

submitted by **FUNDA SOLMAZ** in partial fulfillment of the requirements for the degree of **Master of Science in Restoration, Middle East Technical University** by,

Prof. Dr. Canan Özgen _____
Dean, Graduate School of **Natural and Applied Sciences**

Assoc. Prof. Dr. Güven Arif Sargın _____
Head of Department, **Architecture**

Assoc. Prof. Dr. Neriman Şahin Güçhan _____
Supervisor, **Architecture Dept., METU**

Examining Committee Members:

Assist. Prof. Dr. Güliz Bilgin Altınöz _____
Architecture Dept., METU

Assoc. Prof. Dr. Neriman Şahin Güçhan _____
Architecture Dept., METU

Prof. Dr. Ömür Bakırer _____
Architecture Dept., METU

Ins. Dr. Fuat Gökçe _____
Architecture Dept., METU

Assist. Prof. Dr. Gülsün Tanyeli _____
Architecture Dept., ITU

Date: 30.01.2013

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last name : Funda Solmaz

Signature :

ABSTRACT

CONSTUCTION TECHNIQUES OF TRADITIONAL HOUSES IN NEVŞEHİR; CASE STUDY ON ÜRGÜP, MUSTAFAPAŞA AND İBRAHİMPAŞA

Solmaz, Funda
M.S. in Restoration, Department of Architecture
Supervisor: Assoc. Prof. Dr. Neriman Şahin Güçhan

January 2013, 188 pages

The aim of this study is to survey the construction techniques of the traditional houses in Nevşehir and to make a comprehensive study which will guide for the further conservation works. In this manner, the terms of construction techniques were understood and defined basically before they altered.

To achieve this goal, firstly literature reviews were done about traditional houses in Turkey. General characteristics and history of the region as well as Cappadocia traditional houses were studied. The settlements which will be studied were chosen with the comprehensive field surveys. Meanwhile, the base drawings and maps of the settlements were gathered from municipalities and other public organizations of Nevşehir. In detailed field surveys, 20 houses were selected for surveying. After that, general architectural properties of the houses were investigated and measured drawings and sketches were drawn in detail. A code system which is special to this thesis was developed and applied to the drawings. Building parts were analyzed and defined from foundation to roof. Moreover, architectural elements were also described and classified according to their construction technique. In this survey, it is considered not only the construction technique but also the material and usage areas of building units. Frequency of the building units and their classifications can easily be seen on the drawings and tables.

Thus, Nevşehir traditional houses were studied in detail and a general evaluation was done about the construction techniques and architectural features of Nevşehir.

Key words: Traditional House, Construction Technique, Cappadocia, Nevşehir

ÖZ

NEVŞEHİR GELENEKSEL KONUTLARINDA YAPIM TEKNİĞİ; ÜRGÜP, MUSTAFAPAŞA VE İBRAHİMPAŞA ÜZERİNE ÖRNEK ÇALIŞMA

Solmaz, Funda
Yüksek Lisans, Restorasyon, Mimarlık Bölümü
Tez Yöneticisi: Doç. Dr. Neriman Şahin Güçhan

Ocak 2013, 188 sayfa

Bu çalışmanın amacı Nevşehir geleneksel konutlarının yapım tekniğini araştırmak ve bölgedeki koruma çalışmalarında kullanılmak üzere kapsamlı bir veri oluşturmaktır. Böylece geleneksel yapılar değişime uğramadan konutların yapım sistemlerinin özellikleri anlaşılmış ve tanımlanmış olacaktır.

Bu amaçla, ilk önce geleneksel konutlarla ilgili kaynaklar taranmış ve bölgenin genel karakteristiği ve tarihi üzerine çalışılmıştır. Bölgede yapılan kapsamlı arazi çalışmalarıyla incelenecek yerleşimler seçilmiş ve aynı zamanda gerekli belge ve haritalara ulaşılmıştır. Arazide çalışılacak 20 konut seçilmiş ve bu konutların mimari özellikleri detaylı çizim ve fotoğraflarla belgelenmiştir. Yapılan bu çizimlere bölgeye has oluşturulan bir kod sistemi uygulanmış ve temelden çatıya kadar yapı bölümleri ve öğeleri tanımlanmıştır. Bu çalışmada konut öğeleri, yapım tekniğinin yanı sıra malzeme ve kullanım alanlarına göre de incelenmiştir. Böylece yapı bölümlerinin sınıflandırmaları yapılmış ve kullanım sıklıkları belirlenmiştir.

Sonuç olarak, Nevşehir geleneksel konutları detaylı bir şekilde incelenmiş ve konutların yapım tekniği ve mimari özellikleri üzerine genel bir değerlendirme yapılmıştır.

Anahtar kelimeler: Geleneksel Konut, Yapım Tekniği, Kapadokya, Nevşehir

To My Family...

ACKNOWLEDGMENTS

First and foremost, I would like to express my gratitude to my supervisor Assoc. Prof. Dr. Neriman Şahin Güçhan. It could not be possible to improve this study without her guidance and supports. It was a great chance to make use of her experiences. I thank the jury members; Prof. Dr. Ömür Bakırer, Assist. Dr. Güliz Bilgin Altınöz, Inst. Dr. Fuat Gökçe and Assist. Dr. Gülsün Tanyeli for their valuable suggestions and criticism.

I also owe a debt of gratitude to Director of Regional Council for Preservation of Cultural Heritage, Mevlüt Çoşkun, who always supports me with his extensive knowledge of Cappadocia. I also thank to Architect Ülkü Demir who lets me to use her four drawings as a base.

Most especially, I wish to thank my beloved parents, Meryem, Şener Solmaz and my lovely sisters Damla, Dolunay Solmaz for their encouragements, confidence and love. Besides, I would like to mention my father's helps during the field survey. I really appreciate for his supports.

And more deeply, I would like to thank my fiancé Ahmet Burak Şakar who also helps me during the field survey and in formatting of the thesis text. I appreciate everything he did, his supports, patience and love.

TABLE OF CONTENTS

LIST OF TABLES

TABLES

LIST OF FIGURES

FIGURES

CHAPTER 1

INTRODUCTION

1.1. A REVIEW ON STUDIES ON TRADITIONAL HOUSES IN TURKEY AND DEFINITION OF THE PROBLEM

Turkish traditional houses have been defined in various studies and named with epithets such as Turkish House, Turkish Hayat House, Anatolian House/Synthesis and/or Ottoman House with respect to the approaches of these studies (Güçhan, 2007:3). Neriman Şahin Güçhan (2005) categorizes the studies on traditional houses into three groups:

The studies in first group, according to Güçhan, suggest that traditional house evolved parallel with ethnicity and examine house with respect to the positioning of *sofa* and aiwan. The earliest study treating house according to plan typology was made by Sedad Hakkı Eldem (1952; 1955; 1984). Eldem and later Kuban (1982) considered sofa as the main element and room as second element of house. On the other hand, Küçükerman (1973, 1991) and Tanyeli while underlining the significance of sofa, suggested room as the main element of the house (Asatekin, 2005:391-392).

The studies in second group are made by Aksoy (1963), Kuban (1966); Tanyeli-Kazmaoğlu (1979) and Eriç (1979) (Güçhan, 2005). These studies are focused on construction technique, building materials and climatic factors suggesting that the selection of building material and construction technique is influenced by climatic conditions, flora, physical structure and traditions (Asatekin, 2005:393). There are two techniques used in construction of traditional houses: In first technique houses are built with load bearing masonry. In this system timber, mud brick, brick and stone are used as building materials. In second technique houses are built with timber frame and infill. From this point of view, timber frame houses are named as Turkish House, while masonry houses are considered as belonging to minorities (Güçhan, 2007: 4).

Studies in third group were made by Arel (1982), Cerasi (1998; 2001) Tanyeli (1996) (Güçhan, 2005). These studies examined traditional houses more comprehensively and considered it as a product of geographical distribution and cultural interaction (Şahin, 2005).

Asatekin (2005) on the other hand classifies the studies on traditional houses into three main groups according to their methods of analysis: First group is composed of the studies which examine houses according to layout of ground floor (piano nobile). The studies in second category focus on the relationship between construction technique and building materials. Third category consists of the studies made according to the geographical distribution of plan typology. In addition to these categories, masonry buildings are treated in different way (Asatekin, 2005:395). From this perspective, masonry houses are considered as belonging to other nationalities or religious backgrounds such as Rum Houses or non-Muslim architecture (Imamoglu, Erpi); or they are classified in terms of geography or settlement characteristics such as Mediterranean architecture, Aegean architecture, Bodrum houses and Mardin Houses.

Tanyeli and Kazmaoğlu (1979) assert two geographical regions in their analysis of traditional house: the region of authentic Anatolian synthesis and transition region. They state that first region *indicates the phenomenon which is called as Anatolian-Turkish house* while the latter *exhibits external influences or traditions inherited from the ancient cultures of Anatolia*.[1]

[1] Italics are author's

In this respect, Cappadocia is located in 'Kayseri Region' which is one of the sub-regions of transition. Tanyeli ve Kazmaoğlu (1979: 38), suggests that in smaller houses Anatolian house plan isseen while in large houses plans with central sofa and interior sofa are noticed. Besides, in these houses cut-stone masonry and flat roofs are wide spread and window frames and arches are ornamented with decorations which root far back to ancient Egypt.

In formation of vernacular architecture which has been a popular subject of analysis since World War II, climate, topography, local building materials, agricultural productivity and defensive requirements became influential (Tanyeli, Kazmaoğlu, 1979: 29). These factors which affected local settlement are very noticeable in Cappadocia. The settlements in Ortahisar and Uçhisar, Cappadocia which were built by carving of tuff-stone slopes and extending inside indicate how topography and defensive requirements shape architecture.

Cappadocia has always been an attractive region with its natural beauties and architectural fabric. Many scholars from around the world made various studies on the region. Nevertheless, despite of this genuine interest on Cappadocia, the architecture and urban fabric of region were not thoroughly studied. It is notable that majority of publications is focused on tourism. In these works, tourism is usually treated in terms of economy and labour force but issues of sociology and urban morphology are underestimated.

Most of the researches on the architectural features and history of region are made by foreign scholars. There are many studies in Greek made on settlements which were densely populated by non-Muslim minorities before the Population Exchange such as Mustafapaşa. Evangelia Balta editor of several books on Ürgüp and Mustafapaşa is the most prominent among the researchers who publish in Greek. Another trendy research subject is churches. The plans of rock-carved churches and frescos inside are very exciting. There are many foreign conservation teams in the region working on the frescos (Interview with Mevlüt Coşkun, 2011).

Cappadocia house on the other hand, has been subject to very few studies. Majority of these studies deal with the houses which were transformed into touristic facilities. Most remarkable works include Abdullah Erinç's PhD dissertation "Kapadokya Yerel Konutlarında Turizme Yönelik Yenileme Çalışmalarına Bir Yaklaşım" prepared at ITU in 1979; Saba Tatar Akman's MA thesis "The Preservation and Rehabilitation Project of 'Yeni Mahalle', Mustafapaşa" prepared at METU in 1985 and Demet Ulusoy Binan's "Güzelyurt örneğinde, Kapadokya Bölgesi Yığma Taş Konut Mimarisinin Korunması İçin Bir Yöntem Araştirmasi" a PhD dissertation prepared at YTU in 1994.

In these treatises, Cappadocia house was examined with respect to its units, the functions of these units and their spatial features. Integrated usage of rock-carving and masonry construction techniques is not frequent in anyplace other than Cappadocia. Nonetheless there is not much detailed and systematic study on this regional construction technique.

After the region became an important tourism destination throughout the world, the number of touristic activities rapidly increased. Local community who were previously engaged in agriculture, started to make its living on tourism which became the focal economic activity. This situation immediately caused an increase in need for touristic facilities thus many existing buildings began to be transformed. Traditional houses constitute to the greatest part of transformed buildings. Many householders sold their estates to investors pretending that the houses did not meet their requirements. For sake of raising their income rapidly, investors immediately engaged in renovation activities. Thus many original details in houses disappeared.

Since the inspection mechanism in Cappadocia does not work properly as like in other regions, original details of many traditional buildings are destroyed under the cover of "simple intervention permit". In this respect, raising user's awareness to protect their cultural values would be more efficient than the inspection mechanism.

1.2. THE AIM OF THE THESIS

In order to fill the aforesaid gap in researches, the construction techniques of Cappadocia traditional houses are examined in this study. The main reason for the selection of Cappadocia as the field of

study is that there is very limited research of this type made in the region. Besides existing data on construction techniques are incomplete and inadequate. By overcoming these problems, the technical background for the preservation of cultural heritages in the region will be provided. Another reason is that the author while working for the Preservation, Implementation and Control Bureaus has faced frequently with the problems appearing in application phase.

Within the scope of this thesis which dealt with the construction techniques in Cappadocia traditional houses, unrepaired original houses were examined from ground to roof, documented thoroughly and evaluated. Although the traditional fabric has been intervened various times, it is still possible to find houses which exhibit traditional construction techniques. As a result of surveys twenty houses were selected and studied. In order to reveal building detail, the selection was made on partly demolished houses which can provide observability of original details. At the end of the thesis, evaluations on house units and construction techniques were made.

As a result of the study, construction methods of Cappadocia traditional houses particularly those located in Nevşehir territory were explained. Construction technique in the region, which has poorly studied before, was aimed to be revealed considering all house units and architectural elements. Therefore, a publication which may guide to the restoration works in the region was prepared. The conservation works without understanding the original construction technique cause irreversible damages in traditional buildings. This type of interventions causes in decay the original system of building and shortens building lifespan. In this respect, existence of such a reference is crucial for protection of civil architecture and proper conservation applications. In addition to that, since the transformation of houses started immediately after tourism activities accelerated as mentioned in the definition of problem, making the description of the construction techniques is important for protection and documentation of our cultural heritage.

1.3. METHODOLOGY

The method of this study which was made for defining the construction techniques of Nevşehir traditional houses consists of three stages: First stage is the preparation stage which includes the decision of subject of the study and field of study, collecting of related documents, literature review and determining the method of field study.

Within the scope of the thesis, various articles and publications on traditional houses were reviewed. Besides, data on approaches and analyses on traditional houses were collected with respect to scholars such as Uğur Tanyeli, Gül Asatekin, Maurice Cerasi and Neriman Şahin Güçhan who prepared important publications on the subject (see title 1.1). During the research on traditional houses, Cappadocia and Nevşehir were also analysed and thesis and publications on Nevşehir was reviewed. Additionally, since the region is enlisted in UNESCO World Heritage List and conservation works are held heavily, the archives of Regional Council for Preservation of Cultural Heritage and municipalities were searched. The history of conservation works in the region was researched and conservation plans and council decisions were collected. All these data comprises the second chapter in which general characteristics of the region and selected sites, history of preservation activities were mentioned.

The surveys can also be included in the preparation stage. In these surveys, some observations on settlements such as Ürgüp, Mustafapaşa, İbrahimpaşa, Ortahisar were made to decide the areas which to be studied extensively. The general settings of these settlements were determined and evaluations on which settlement would provide more information on construction techniques were made. Moreover, a general evaluation on architectural features of traditional houses in the region is stated in the end of second chapter.

After these evaluations, Ürgüp Kayakapı district, Mustafapaşa town and İbrahimpaşa Village were selected as the study area. The main reason for this decision was that the construction technique is still original and observable in these settlements. Ürgüp Kayakapı district is an abandoned area with high demolition rate. Since the houses did not undergo intervention, their wall sections, floor and arch details are thoroughly examinable. Besides, since the area was studied previously within “Kayakapı

Conservation Development and Revitalization Project", the plan drawings of many houses were available.

Mustafapaşa town is a privileged area considering other settlements in the region. Since Mustafapaşa Conservation Master Plan was produced early in 2004, traditional fabric was preserved considerably without being exposed to unnecessary interventions. Thus, Mustafapaşa was included in the areas to be studied extensively.

İbrahimpaşa is a small village where the local community maintains the traditional lifestyle. It has not been studied entirely except references in several thesis works, however recently it became an attraction zone for foreign visitors and investors. As the traditional houses are considerably preserved, the village should be examined extensively. However, the studies were made through 1/5000 scale cadastral plan since there is not any map of İbrahimpaşa.

The second stage of methodology comprises the extensive field studies and documentation and analyses made prior to and after these field studies. This stage which constitutes to the core of the thesis work started with collecting the information and documents on study fields. The council decisions, conservation master plans and remarkable restoration and conservation activities in the archives of Nevşehir Council for Preservation of Cultural Heritage, Nevşehir Provincial Special Administration and Municipality of Mustafapaşa were studied and certain notes on settlements' history of conservation works were taken.

After gathering this information, general classifications on houses were made during second field study and houses which were to be analysed extensively were chosen. These houses were marked on base maps and cadastral maps and photographed. The selection of these houses was made with respect to similar criteria such as not being intervened, being partially demolished and providing original details. Additionally, due not to increase similar cases, use of different building materials and construction techniques became an asset. As a result, nine houses from Kayakapı, Ürgüp, six houses from Mustafapaşa and five houses from İbrahimpaşa summing up to twenty houses were selected.

The scaled drawings and restoration projects of the buildings were searched through the archives, after the houses that were to be analysed extensively selected. In this respect, plan charts of houses in Kayakapı, Ürgüp which were prepared by Kaba Architects were retrieved from the archives of the Council, measured drawings of three houses in Mustafapaşa were retrieved from architect Ülkü Demir and the plan of another house in Mustafapaşa was taken from MS thesis of Esin Tekin (2009). Since there is not any project work or drawing of other seven houses, their plan sketches were drawn by author during field study.

Subsequent to collect the drawings, extensive field study was started. First field survey was made to Kayakapı, Ürgüp. Firstly the plan drawings of the houses were completed and then system sections from front facades of buildings were taken. These sections were drawn so as to indicate foundations, walls, floors and roofs. Additional system sections were taken from the parts where building detail changed and point details of window profiles and similar architectural elements were drawn. After these drawings were finished, necessary measurements were taken and every unit and element of houses were photographed. Similar field studies were repeated several times in Mustafapaşa and İbrahimpaşa and in the end system sections and point details of twenty houses at total were drawn and measured.

Then, another field survey was made to the region for the houses which provide partial original details according to their demolishment level. The analyses in these houses were limited to the parts exhibiting building details. During these surveys which were made to Mustafapaşa and İbrahimpaşa, certain details of houses were drawn and measured.

The second stage was completed with merging of the information gathered from these studies and forming a catalogue. System sections and point details measured in the field were redrawn digitally in AUTOCAD program. Layers such as rock, fine cut-stone wall, rough carved rock wall and timber were added to the digital drawings and the parts where these materials were not seen but presumed were drawn with the dashed line in the same layer style (see App. C). Legends explaining this layering system were added on every drawing as explanatory note.

The third stage of the method of this thesis work is the analysis and evaluation phase. In order to analyse the studied houses better, a coding system was developed. While producing this coding system MS Thesis work of Filiz Diri (2010) was used as the main reference. Diri's coding system was improved to adapted to Cappadocia region where masonry and carved rock architecture is widespread.

In this system (see Fig. 1.02), buildings were divided into parts such as foundation, ground floor, first floor and roof and coded with letters which are the abbreviations of the names of parts such as" FD, G, F, R". After that, building parts were enumerated in three parts which represented the lower part, middle part and upper part of the element. Thus for instance lower part detail of ground floor was encoded as G1. Then the codification was maintained according to the name and type of building element. So, the wall in lower part of ground floor detail was encoded as "G1_W" and continued with the type numbers such as "G1_W1" or "G1_W2" when the type of the wall changed. A rock in lower part of ground floor for instance was encoded as "G1_R1" (see Fig. 1.01)

This coding system was applied to every building details and system sections that were drawn. The purpose of this type of coding is to understand whether construction system varies with elevation, to see where and how the details change and to determine which construction techniques were used in different parts of buildings.

The complexity emerged as a result of transferring the codes onto the drawings was resolved with a table including these codes and building parts where they belong to. The columns of the table include the building lots or addresses of buildings were given; the rows on the other hand indicate the building parts/elements (see Fig.3.01). The purpose of this table was to see the information on details of every building part and to determine where building elements excessively vary.

Another work which was done parallel with coding system was the interviews with local craftsmen. A meeting was held with masons Orhan Öz and Metin Ayan in November 2011 and information on the traditional building techniques in the region was gathered. In addition to that these interviews aided to reveal certain obscurities in building details seen during the field surveys.

After assembling all the information and generating survey sheets (see Fig. 1.03) for every building, construction techniques of Nevşehir traditional houses were determined. These techniques were classified with photographs and drawings. Almost all photographs were given with their locations and numbers of building block and building lot (e.g. Ürgüp, block/lot: 131/45). If the building block and lot numbers cannot be reached, the addresses of buildings were given below the photographs (e.g. İbrahimpaşa, No: 39). In these classifications every building element was described under certain titles and accordingly typologies generated.

Therefore the third stage of method of thesis was completed with general evaluations and definitions made on Nevşehir traditional houses and their construction techniques. Brief descriptions about features of traditional houses were done in evaluation chapter. Finally, the third stage of methodology was ended with conclusion chapter. In this chapter, the outputs of thesis were determined. It was mentioned how this thesis can be utilized in terms of preservation of traditional houses. The subjects that could not be surveyed within the scope of this thesis were also stated in conclusion chapter.

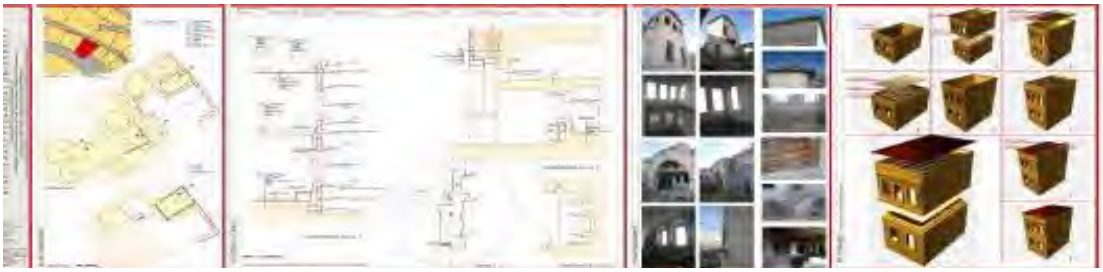


Figure 1.01, Survey sheet

CHAPTER 2

GENERAL CHARACTERISTICS&HISTORY OF CAPPADOCIA REGION AND SELECTED SITES

2.1 CAPPADOCIA

Cappadocia is a historical region in the Central Anatolia. It covers the cities of Nevşehir, Niğde, Kırşehir, Kayseri and Aksaray. In this locale, the well known geological formations known as fairy chimneys are most frequently found in Uçhisar, Göreme, Avanos, Ürgüp, and Derinkuyu towns of Nevşehir and Ihlara town of Aksaray. The geographical scope of this thesis covers Ürgüp, Mustafapaşa, İbrahimpaşa towns which are in the boundaries of Nevşehir Province; therefore in the second chapter, Nevşehir Province and the selected settlements are explained in detail.

Fig. 2.01, Cities in Cappadocia region (Google Earth map used as template)

There are several views put forward to explain the origin of the name "Cappadocia". Among those, two arguments are credited in the sources: According to the first argument, "Cappadocia" was first mentioned in 6th c. BCE in Bisutun Inscription which was carved to celebrate the conquests of Persian king Darius I. It is suggested that the name written as "Katpatuka" referred to the land of well bred horses (Sevin, 1998:47). Source of the second argument is natural historian Pliny the Elder who lived in 1st century CE. According to Pliny the region took its name from the *Kappadoks* stream which is a tributary of the Kızılırmak River (Sevin, 1998:47).

The geological formation of Cappadocia was started in Neogene epoch approximately 25 million years ago and took its current form with the eruption of Erciyes, Hasandağ and Göllüdağ volcanoes (Tuncel, 1998:19-22). Volcanic ashes and lava covered the area of 170km from north to south, 150km from east to west. White/yellowish ashes created the soft rocks and lava created the dark coloured hard rocks (Tuncel, 1998:27). The geological rocks like tuff, tuffite, volcanic ash, clay, sandstone, marl, agglomerate, basalt and ignimbrite were generated by the activities of these volcanoes

Fairy chimneys were generated from the erosion of volcanic rock layers by continuous activity of floods, winds and temperature changes. Since the volcanic eruptions that formed the rock layer occurred in different periods and the mineral content of lava changed, floods and winds eroded the rock masses in different shapes and dimensions. For this reason, there are different types of fairy chimneys such as capped, conical, mushroom shaped, columnar and pointed (Tuncel, 1998:29).

Fairy chimney formations vary in shape depending on the type of rock which generates their body. Tuncel (1998: 30) defines these varieties as follows: if body consists of one single rock, it becomes conical; if fairy chimney grows on a horizontal rock layer, its body become smooth and cylindrical. The lower parts of the rock layers that composed of heterogenic mineral structure are eroded deeper than the upper parts so that capped fairy chimney, the most known type is formed. The shape of capped fairy chimney is conical and there is a rock block on the top (Kapadokya Mevcut Durum Raporu-KMDR, 2002:143). The fairy chimney formations are usually seen in Ürgüp-Göreme-Avanos triangle.

Fig. 2.02, Valley of Bağlıdere and Cevizli (Photo: Özge Önderoğlu Akkuyu)

In addition to fairy chimneys, due to the erosive rain waters, valley slopes of diverse shapes are formed. The colour variations caused by oxidation or rapid heat change of lava are noticeable upon some hillsides (Tuncel, 1996:43). This kind of hill slopes is mostly seen at Uçhisar, Çavusin-Güllüdere, Göreme-Meskendir, Ortahisar- Kizilçukur and Pancarlik. (See Fig. 2.03). On low-pitched slopes (badlands) of most of these valleys, sharp edged, round shaped or flat forms coloured in waves of yellowish-white, pink or red are seen (Tuncel, 1996:39). Güvercinlik and Kılıçlar valleys are places to find this type of formations.

Fig. 2.03 View of Göreme and Zelve (Photo: Özge Önderoğlu Akkuyu)

Demographic and Social Structure

Cappadocia has been centre for certain religions as well as it has hosted people from different beliefs and ethnic origins and provided them with the conditions of living together for centuries. Thanks to its unique geological structure, the region has supplied human's housing requirements by itself.

During 19th century under Ottoman rule, the social structure of the region was composed of Muslim Turks, Orthodox Greeks and Catholic, Protestant and Gregorian Armenians. According to 1887 yearbook (*salname*) of Konya, there were 29.140 Muslim, 8528 Roman Orthodox, 469 Armenian Gregorian, 20 Armenian protestant, 14 Armenian catholic, summing up to 38171 people were living in Nevşehir (Yurt Ansk., Vol. VII, pp. 6068).

In 20th century, social structure changed due to an additional protocol to 1923 Lausanne Treaty which brought the decision of population exchange between Turkey and Greece. In accordance with this protocol, excluding the Greeks of Istanbul, Bozcaada and Gökçeada and the Muslims of western Thrace; Greek Orthodox people who live in Turkey and Muslims of Greece were subjected to emigrate. The non-Muslim population of Cappadocia were among those who had to immigrate to Greece (Geray, C., Keleş, R., Yavuz, F., Hamamcı, C., 1983: 2358-2384).

After the proclamation of the Republic, Kayseri's industry developed excessively by taking benefits of government investments. This industrial improvement could halt the emigrations from Kayseri and its surrounding cities (Binan, 1994:30). Below is the list of population change in Nevşehir between 1965 and 2010:

Table 2.01, Population changes between 1965-2010 (TÜİK, population database, http://tuikapp.tuik.gov.tr/adnksdagitapp/adnks.zul, last visit on April, 2011)

YEARS	VILLAGE	CITY	TOTAL
1965	156 606	46 710	203 316
1970	172 285	57 545	229 830
1975	180 674	68 634	249 308
1980	179 529	77 404	256 933
1985	183 258	94 871	278 129
1990	54 235	145 697	289 509
2000	173 391	136 523	309 914
2010	128 234	154 103	282 337

In Nevşehir, there are 8 counties, 44 municipalities, 133 villages. The most crowded counties are the Nevşehir, Avanos and Ürgüp (TÜİK, 2009). 53 % of population lives in the Centrum, while 43 % of people live in towns (TÜİK, 2009). With respect to a research of TÜİK, Nevşehir's city/county and village/town population and population density in 2009-2010 are listed at following chart.

In Nevşehir, which covers the chosen settlements of field study, there are two institutions of higher education: Nevşehir University was established on May 17th, 2007 by banding together certain vocational schools and faculties those were working under Erciyes University, Gazi University and Hacettepe University before. Presently, there are 7 faculties, 1 school of higher education, 6 vocational schools, 2 institutes and 4 research centres under Nevşehir University (www.nevsehir.edu.tr, last visit December 2012). Another institution of education in the region is Cappadocia Vocational School which was first established as a trust institution in Mustafapaşa in 2005.

Economic Structure

Nevşehir is in an economical circulation based on agriculture and tourism. Although the industry is not fully developed, it is growing with newly established flour factories and wine distilleries. Wheat and potatoes are the most common agricultural products. Viticulture (*grapery*) is also frequent (TÜİK, 2009). Livestock farming is limited with the geological structure of the region and the shortage of pasturelands, yet it is maintained in barns as family business (TÜİK, 2009).

Although the percentage of agriculture workers is above the standards of Turkey, Nevşehir's rates of urbanization, annual population increase, GDP and percentage of industry workers are below the average (TÜİK, 2009).

Table 2.02, City/county and village/town population and population density in 2009-2010 (TÜİK, http://tuikapp.tuik.gov.tr/adnksdagitapp/adnks.zul, last visit on April, 2011)

	1990			2000			Annual growth rate of pop(%)	Pop. Denst.
NEVŞEHİR	**Total**	**City**	**Village**	**Total**	**City**	**Village**	**Total**	
Center	86 800	52 719	34 081	105 078	67 864	37 214	19,10	196
Acıgöl	26 048	6 489	19 559	24 844	6 702	18 142	-4,73	51
Avanos	39 661	10 010	29 651	43 131	11 921	31 210	8,39	43
Derinkuyu	20 043	8 580	11 463	24 631	11 092	13 539	20,61	55
Gülşehir	34 526	8 499	26 027	31 664	9 377	22 287	-8,65	33
Hacıbektaş	20 811	8 062	12 749	18 933	7 274	11 659	-9,45	27
Kozaklı	25 932	7 556	18 376	23 629	7 755	15 874	-9,30	33
Ürgüp	35 688	11 040	24 648	38 004	14 538	23 466	6,29	68
Total	**289 509**	**112 955**	**176 554**	**309 914**	**136 523**	**173 391**	**6,81**	58

Tourism

After the region was declared as "Tourism Development Area" in 1973, tourism became the major factor reshaping the economy. Since many historical and natural protected sites drew native and foreign tourists' attention, Cappadocia became one of the important destinations of the world for tourists. In 1986, UNESCO declared the Historical Göreme Natural Park as a world heritage site with

the name of "Göreme Natural Park and the rock sites of Cappadocia". This declaration contributed to tourism potential so that most of the visitors do not leave Cappadocia without seeing the Historical Göreme Natural Park. Moreover, many Turkish movies and TV series shot in the region added to tourism income. According to statistics of Tourism Ministry, the number of tourists visited the region is like in the following table:

Table 2.03, Tourism Statistics (http://www.nevsehir.gov.tr/nevsehir/turizm-istatistikleri/16.html, last visit on April, 2011)

YEAR	DOMESTIC TOURISTS	FOREIGN TOURISTS	TOTAL
1991	277.432	391.057	668.48
1992	328.281	788.817	1.117.098
1993	327.642	780.629	1.108.321
1994	313.473	510.774	824.247
1995	330.561	581.356	911.917
1996	412.596	797.993	1.210.589
1997	430.669	1.054.611	1.489.280
1998	329.192	968.050	1.297.242
1999	441.408	384.540	825.948
2000	1.109.624	641.174	1.750.798
2001	776.122	838.534	1.614.656
2002	1.024.439	708.397	1.732.836
2003	1.260.393	468.113	1.728.506
2004	819.783	571.846	1.391.629
2005	954.042	860.239	1.814.281
2006	1.053.481	765.740	1.819.221
2007	890.899	984.781	1.875.680
2008	989.681	1.149.746	2.139.427

Due to the increase in the number of tourists visiting the region, many new touristic facilities built. As tourism became a profitable business, the restoration projects were accelerated and many residential buildings were converted to boutique hotel in short period. The number of touristic facilities, room and bed capacities of the region is as follows:

Table 2.04, Statistics of Tourism Licensed Facilities (General Directorate of Investment and Enterprises Ministry Culture and Tourism, 1990-2003)

	Tourism Investment Licensed			**Tourism Operation Licensed**		
YEARS	Number of Establishments	Number of Rooms	Number of Beds	Number of Establishments	Number of Rooms	Number of Beds
2003	10	1110	2528	38	3571	7351
2002	10	923	1952	37	3619	7445
2001	12	943	1933	38	3752	7731
2000	15	985	1940	32	3466	7141
1990	54	4274	8873	25	2081	4385

History of Cappadocia

Due to its distinct geological structure and geographical position Cappadocia was occupied by various civilizations for millennia. According to written evidence, settlement history of Cappadocia dates back to 3000s BCE the Assyrian Trade Colonies-Proto-Hittites period. The history of region can be studied in three main epochs. The first epoch covers the long duration between the Palaeolithic and antiquity. Roman and Byzantine eras constitute to the second epoch and finally the Turkish era is the third epoch (KMDR, 2002:11).

Following the volcanic eruptions, the settlements were very few in the region until the Neolithic. During the excavations and field surveys many tools and artefacts belonging to Neolithic were discovered. It is known that from the middle of the 9th c. BCE to end of the 7th c. BCE, there were the countries of Tabal, Muskhi, and people of Kaska (Kashku) settled in the area. Luvians and Hittites lived in Cappadocia until 700s BCE (Sevin, 1998:48).

Around 2500 BCE Assyrians established trade colonies in the area (Kapadokya Mevcut Durum Raporu, 2002:12). In their terracotta tablets they called the land "Katpatuta" meaning "the land of beautiful horses" which later transformed to Cappadocia during the Achaemenid Era (KMDR, 2002:12). "Tablets of Cappadocia" of Assyrian traders are the first trade documents of Central Anatolia and they are very important documents to identify the history of the region (Ateş, 1996:66). At around 2000s BCE, city-states were established in the region. After the Hittite conquest in 1750s BCE, Assyrian trade colonies vanished; and the area was taken under the reign of Hittite Empire for 500 years (KMDR, 2002:12).

After the Kingdom of Tabal which reigned until 1200s BCE, Phrygians and then Lydians conquered the land. Achaemenid Persians defeated Phrygians and Lydians between 575 and 546 B.C. and took the lands under their command (Ateş, 1996:66-67). By Persian era, the region began to be called as "Cappadocia" (Ateş, 1996:68). Macedonian king Alexander the Great ended the Persian domination over the region between 333 and 323 BCE (Ateş, 1996:68). The Kingdom of Cappadocia which was established after Alexander's conquest did not last long and fallen under the Roman rule. Roman Emperor Tiberius declared Cappadocia as a city of Rome in 17 CE (Elford, 1992:21).

It was during the Roman era when Christianity began to diffuse in the region. The threats and coercion of pagan Romans, some Early Christian communities took refuge in the rocky cliffs of Cappadocia (KMDR, 2002:16). After the Edict of Milano, the oppression on Christians disappeared. In 18th century CE Avanos became the second greatest religious centre after Kayseri and the third largest administrative centre after Kayseri and Comana Aurea (Komana) (Ateş, 1996:69). After the

Theodosius' death in 395 CE and disintegration of Roman Empire in 5th century, Cappadocia stayed within the borders of Eastern Empire. The region continuously exposed to the raids of Arabs and Sassanid armies. The dwellers of plains took refuge in underground cities such as Derinkuyu and Kaymaklı, while others lived in highlands hid in rock carved churches and cells (KMDR, 2002:17). During the Byzantine Iconoclasm (726- 843), which started by Emperor Leon III's prohibition of the use of icons in Christian worship, local people and priests moved to rock carved churches to escape from the oppression of state (KMDR, 2002:17). Many monasteries scattered around Göreme and Zelve are dated to this era and following few centuries (9th and 11th centuries).

After the Battle of Manzikert in 1071, Turkish clans under the command of Seljuk Armies entered Anatolia and captured Cappadocia as well. In Anatolia, Seljuk Turks established an autonomous state that lasted for more than two centuries (1077–1307 CE), Seljuk Sultanate of Rum. This state under the reign of Keykhusrev I (1207) reached the golden era and covered the inner-western Anatolia, Central Anatolia and greater part of southern Anatolia. (KMDR, 2002:19). On the other hand in eastern Anatolia, Turcomans founded a principality named Danismend. Danismends ruled over the part of eastern Anatolia including Cappadocia region until 1170s when Sultanate of Rum brought their downfall.

Meanwhile, by 1230s the Mongol armies began to threat the eastern borders of Sultanate of Rum. After the Battle of Kose Dağ in 1243, Mongols ended the Seljuk rule made them their vassal and took control of Cappadocia. The region was ruled by governors of few Mongol khanates such as Ilkhanids and Eretnids. From 1328 to 1381, Eretnids managed to establish their own state and ruled over a large region in Central Anatolia extending between Kayseri, Sivas and Amasya including Cappadocia region. By the beginning of 14th century, Ottomans a small emirate in north-western Anatolia gained power. In the beginning, Ottomans directed their invasions to the west, Byzantine territories, but in 1400 Mongols under the command of Tamerlane entered Anatolia and began threat Ottomans from the east. After the Battle of Ankara which was fought by Ottomans and Mongols in 1402, Ottomans forces were defeated and the empire entered to the Interregnum Period that ended in 1413. During Mongol Invasions and the Interregnum, Cappadocia was administrated by Karamanids, a Turcoman principality reigned in south and central Anatolia from 1250s to 1483. In the reign of Murad II, Ottomans re-captured the region (KMDR, 2002:19). The remnants of Karamanids likewise other Turkish principalities in Anatolia were terminated in 1482, during the reign of Bayezid II.

The Ottoman rule brought gradual peace and stability to the region. From beginning of Ottoman era until the 17th century the most important centre of the region was Ürgüp. In 1530 Ürgüp consisted of 6 districts and 248 residences. 213 of these residences belonged to Muslims whereas the remaining 35 to other ethnic groups (KMDR, 2002:20). Nevşehir that was named as Nyssa and Muskara at that time, with its 18 dwelling was a village of Ürgüp town of Niğde. It prospered under the patronage of Damat İbrahim Pasha, an important grand vizier of Tulip Period, and ornamented with many architectural monuments (KMDR, 2002:20). After this development the settlement became a town of Niğde and was named as Nevşehir. In the Republican Era, Nevşehir became a city in 1954.

One of the travellers who visited Anatolia, Greffiths, gives an overview of the economic situation of Cappadocia during 18th century. According to his notes, the trade was mainly under the control of Muslims. Armenians usually dealt with transit trade whereas Rums were not very active in commerce (Binan, 1994:22). The foreign traders and minorities under their support became effective in economy after signing of Baltalimanı Treaty between the Ottoman Empire and the United Kingdom of Great Britain and Ireland in 1838 and the following covenants signed with other European countries until 1841(Yerasimos, 1986:24-26). The reforms such as t*he Noble Edict of the Rose Chamber* in 1839, *the Imperial Reform Edict* in 1856, and the enactment of laws such as *the Land Code* in 1858, *Code of Real Estate and Expropriation* 1867, non-Muslims and foreigners gained the right to own real estate and to construct edifices, which caused Anatolian urban fabric to change (Binan, 1994:25). At the end of 19th century, Cappadocia was one of the regions that hosted extensive minority population whom began to build their own houses and buildings (Binan, 1994:26).

Ramsey, who visited Anatolia at the end of 19th century, describes the villages with high population of Rums as well-prospered whereas he points to the poverty and misery of Turkish villages (Ramsay, 1897:243- Binan, 1994:26). After the time passed, minorities began to be effective in their environment with the rights they get and helped to improve the construction techniques of the region.

In these times around Cappadocia, non-Muslims went to rich cities with caravans for trade. It is known that after turning back to hometown with the money they earned, they built wealthy houses for themselves in the region (Binan, 1994:44-47).

During Ottoman era when we look through in demographic aspect to Cappadocia, there was a social structure consists of Muslim Turks, Orthodox Rums, and Catholic, Protestant and Gregorian Armenians in the 19th century. According to 1887 Konya yearbook, 29140 Muslim, 8528 Rum Orthodox, 469 Armenian Gregorian, 20 Protestant Armenian, 14 Catholic Armenian, totally 38171 people were living in Nevşehir (Binan, 1994:33-34).

Table 2.05, Chronological Table (KMDR, 2002:11)

THE CHRONOLOGY OF CAPPADOCIA	
3000-1750 BCE	Assyrian Trade Colonies; Proto-Hittite Period
1750-1400 BCE	Hittite Kingdom
1400-1200	Hittite Empire
1200-1100	Arrival of Sea People to Anatolia
1100-950	Phrygians
800	Revival of Kingdom of Tabal
950-585	Cimmerian-Scythian Invasions; Lydian Reign
585-334	Achaemenid Persian Era
334-335	Macedonian control during Alexander's Invasions (3 months)
334 BCE-17 CE	Kingdom of Cappadocia
17-395 CE	Roman Empire Period
395 CE	Eastern Roman Empire (Byzantine) Period
1072	Arrival of Turkish Clans
1086-1175	Seljuk Era
1175	Seljuk Sultanate of Rum
1243	Battle of Kose Dag; Mongol Rule
1307	The end of Seljuk Sultanate of Rum
1318	Ilkhanid and Eretnid Governors' Administration
1340	Autonomous Eretnid State
1365	Karamanid rule
1381	Rule of Kadi Burhan Al-Din (Revival of Eretnid State)
1398	Karamanid re-conquest of Cappadocia
1398-1402	Ottoman Rule
1402	The Battle of Ankara, Ottoman Interregnum
1436	Murad II captured Cappadocia
1482	End of Karamanid Dynasty
1867	Nevşehir *liva* (shire) was reduced to township and annexed to Niğde
1902	Nevşehir was annexed to Ankara
1954	Nevşehir became a city

History of Planning and Conservation Studies in Preservation of Cappadocia

Despite the fact that Cappadocia has distinct geological features and many unique rock-cut dwellings which were inhabited by various communities for centuries, the preservation studies have started very lately.

The land surveys in the region were started in 1970 by the experts of General Directorate of Ancient Arts and Museums of Ministry of Culture. The boundary lines of sites proposed by those experts were approved by High Council of Immovable Monuments and Antiquities' decision no: A-69 on July 10th 1976. These boundary lines were plotted on 1/25000 scaled chart and settlements conditions of transition period were determined. The decision no: A-69 also comprises of Güzelyurt and Ihlara towns of Aksaray and *Soğanlı* Valley of Kayseri. In the provincial border of Nevşehir, site boundaries involve four districts, five towns, twelve villages. With respect to the Ancient Monuments Law No: 1710 the site boundaries were classified as 'Historical and Natural Site', 'Buffer Zone', 'Tourism Settlement' and 'Existing Settlement' (Coşkun, 2009: 68).

In 1981, Ministry of Tourism took over the authorization of approval of plans from Ministry of Public Works and Settlement and prepared a 1/25000 scale environmental plan. The aim of this plan was allocating the areas of tourism to develop with respect to the conservation principles of the region which has an extensive tourism potential. The process of receiving opinion from Ministry of Tourism for every plan has been started with this plan.

The decision No: A-69 enacted in 1976 were added with new decisions on site boundaries for Özlüce Village enacted in 1976, Mustafapaşa and Göreme Valley in 1981 and Uçhisar and Avanos in 1982 and these decisions were carried into effect and published in The Official Gazette No: 18225 on November 18th 1983.

İli	İlçesi	Mevkii Adı	Kurul Kararı	
Nevşehir	Özlüce Köyü	Yeralti Şehri	10.9.1976/A-132	Doğal Sit
»	Merkez	Damat İbrahim Paşa Külliyesi Çevresi	8.10.1976/A-168	Tarihi İskân Sit'i
»	Avanos	—	13.11.1982/A-3894	Kentsel Sit
»	Avanos - Özkonak Bucağı	Genezin	10.4.1982/A-3527	Arkeolojik - Kentsel Sit.
»	Ürgüp	Mustafa Paşa Kasabası	9.5.1981/A-2810	Kentsel ve Arkeolojik Sit
»	»	Göreme Açıkhava Müzesi	24.7.1981/A-3066	Doğal Sit
»	Uçhisar	Merkez	10.4.1982/A-3462	Arkeolojik - Kentsel Sit
»	Ürgüp	Göreme Örenyeri	14.5.1976/A-38	Doğal ve Tarihi Sit
»	»	Eski Ürgüp	9.3.1974/7737	Tabii ve Jeoloji Sit
»	»	NEVŞEHİR - ÜRGÜP Karayolu ile NEVŞEHİR - ORTAHİSAR ve GÖREME - ORTAHİSAR girişi arasında kalan üçgen alan.	20.6.1981/A-3109	Doğal Sit
Niğde	Merkez	Alaattin Tepesi	15.7.1978/A-1207	Arkeolojik Sit
»	Aksaray	Yeşilova mevkiinde Acem Höyük	10.3.1978/A-1013	Arkeolojik Sit
»	»	Ihlara Vadisi	10.7.1976/A-69	Arkeolojik - Doğal Sit
Ordu	Merkez	—	20.10.1979/A-1976	Kentsel Sit
»	»	Kirazlıması Mahallesinde bulunan ve Bozok-		

18 Kasım 1983 — Sayı : 18225 RESMİ GAZE

Figure 2.04, 18.11.1983 Dated and 18225 Numbered Official Journal

Mevlüt Coşkun (2009: 68), the director of "Regional Directorate of Council for Preservation of Cultural Heritage", pointed out to the necessity of re-examination of existing sites with respect to the new "Law of Cultural and Natural Properties" No: 2863 enacted in 1983, the "Law for certain procedures to deal with the edifices that are violating the Code of Construction and Squatters and amendment of one article of the Code of Construction No: 6785" No: 2981 enacted in 1984. Thus, an examination was done by a commission of experts from Ministry of Tourism, Ministry of Environment, Ministry of Forestry, Ministry of Public Works and Settlement, Mineral Research and Exploration Institute and Council for Preservation of Cultural Heritage.

On December 6th 1985, Göreme Valley was enlisted as a cultural and natural heritage in UNESCO's list of "World Heritage" with No: 357. Besides, with respect to the Article No: 3 of Law No: 2873, Göreme Valley and its surroundings were declared as 'national park' with the decision of Council of Ministers enacted on October 10th 1986. The surface area of Göreme Historical National Park is 9.572ha and it comprises Göreme, Çavuşin, Uçhisar, Ortahisar and Zelve (http://www.milliparklar.gov.tr/mp/goremetarihi/index.htm, last visit January 2013).

In 1980s, a general development plan was prepared by Ministry of Forestry for the national park. However, this plan could not be promulgated because of the Forestry. Law of the date prevented transformation of non-forested lands to national parks. For this reason, the decision of the Council of Ministers which was enacted on October 10th 1986 to establish "Göreme National Park" was concerned only with the boundaries of the site and did not include any explanation note for the future development principles of the region.

The site boundaries were re-determined in the decision no: 1112 of Nevşehir Council for Preservation of Cultural Heritage dated November 12th 1999. Besides, settlement conditions of the transition period were determined in the decision no: 1148 dated November 26th 1999. Accordingly, the new site boundary covers four districts, nine towns and fifteen villages.

Because Cappadocia site boundaries cover quite large area, the boundary lines were plotted on 1:25000 scale map but settlement conditions of transition period were inscribed as 1:5000 and 1:1000 scale plan decisions. Because the settlement conditions of transition period were prepared elaborate but the subscale site boundaries could not be determined due to largess of the area, the master plan and the base map sometimes mismatched. "For instance; there have been split-ups in cadastral properties because one part of cadastral parcels remained within site boundary while the other part was outside" (Coşkun, 2009: 68).

In 2001, Ministry of Environment and Forestry started to prepare 'Göreme National Park Long Term Development Plan'. Because the site was promulgated as 'Tourism Conservation Development Area' on January 5th 2005, in accordance with the law no: 4848 the authority and legal responsibility on the area were transferred to the Ministry of Culture and Tourism. Thus, it became inevitable that the 'Göreme National Park Long Term Development Plan' which is a management plan be submitted to the Ministry of Culture and Tourism. Due to this conflict of authority between the Ministry of Culture and Tourism and the Ministry of Environment and Forestry, there has not been a settlement reached on this development plan yet. Meanwhile, the boundary line of 'Tourism Area for Nevşehir and its Periphery' which was determined in 1989 was cancelled in 2005 and the region was transformed to 'Cappadocia Culture and Tourism Conservation and Development Region' (CCTCDR).

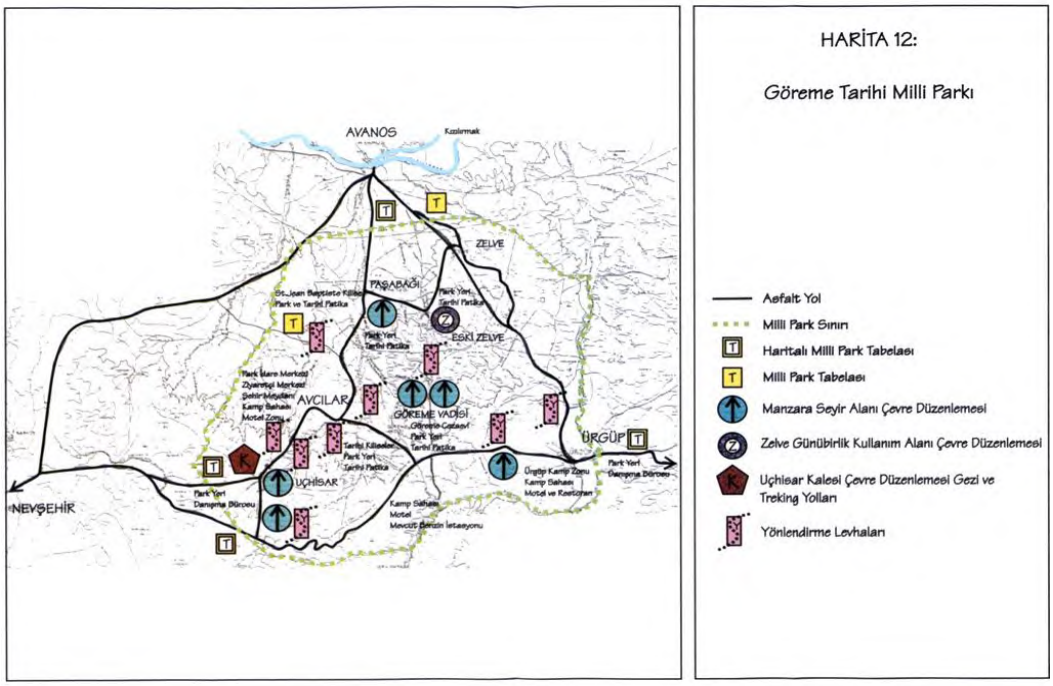


Figure 2.05, Göreme Historical and Natural Park (KMDR, 2002:199)

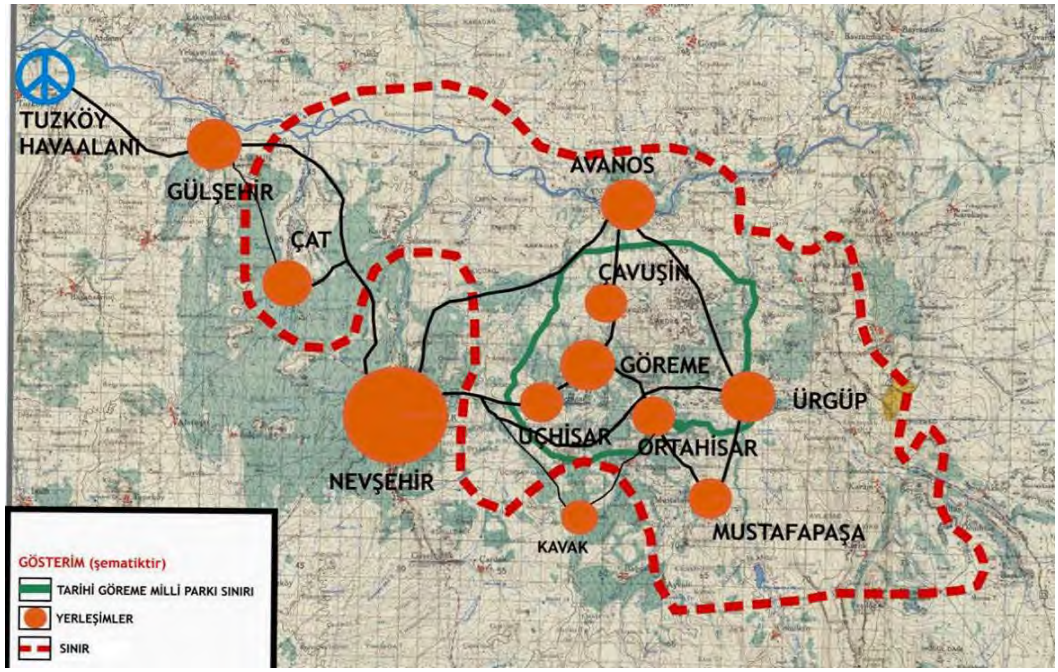


Figure 2.06, Boundaries of Cappadocia Cultural and Tourism Conservation and Development Region, Göreme Historical and Natural Park (Regional Directorate of Council for Preservation of Cultural Heritage)

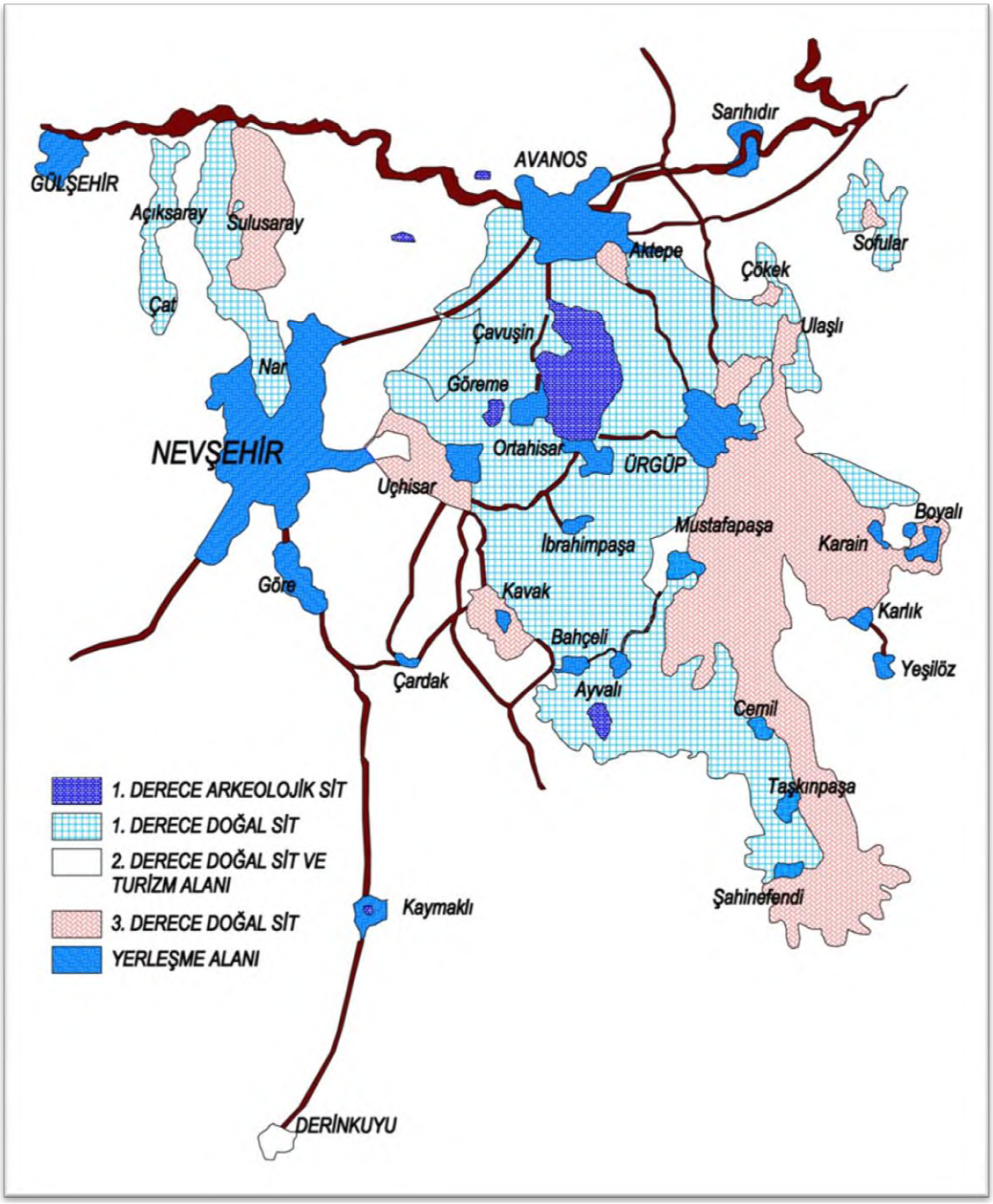


Figure 2.07, Appendix of 1123 Numbered Decision (Regional Directorate of Council for Preservation of Cultural Heritage)

2.2. SELECTED SITES

2.2.1. ÜRGÜP

Ürgüp district is located 20 km east of Nevşehir city centre. It is surrounded by Kayseri in the east and south, Avanos town in the north, Kaymaklı town in the west, and Derinkuyu town in the southwest. Ürgüp consists of 4 towns and 21 villages.

Ürgüp was an important settlement until 17th century. During the Ottoman era, it was Niğde's centre of jurisdiction (*kadılık*). Later it was annexed to Konya city (Nevşehir İl Yıllığı, 1973). Ürgüp lost its significance to another town Muşkara which prospered under Damat İbrahim Pasha's patronage, became the new centre of jurisdiction and was renamed as Nevşehir (Newcity). Ürgüp was reduced to a township of Niğde between the years of 1777 and 1787 and then became a district of Kayseri city in 1935 (KMDR, 2002:41).Ürgüp was added to Nevşehir after when the latter became a city centre.

Ürgüp was named as Osiyana during the Hellenistic Period. It was renamed as Hagios Kapios in the Roman era which became Prokopi in the Byzantine Period. Seljuk Turks called it Başhisar. In the Ottoman era the town's name was Burgut Castle (KMDR, 2002:43).

The demographic history of Ürgüp is known through the Ottoman yearbooks (*Salname*) and registries of Republican Era. Accordingly, in 1530, there were 248 houses and 6 districts in Ürgüp, 213 of which were Muslim and remaining 35 were from other ethnic and religious origins. According to 1887 yearbook of Konya, 15027 Muslims, 11397 Rum Orthodox, 485 Armenian Gregorian, 20 Armenian Protestant, 34 Armenian Catholic which sums up to 28952 people were cohabiting in Ürgüp (Yurt Ansiklopedisi, C:7,8). Ürgüp's population change in last 50 years is as follows;

Table 2.06, Population of Ürgüp between 1964 and 2010
http://tuikapp.tuik.gov.tr/adnksdagitapp/adnks.zul, last visit on April, 2011)

	1965	**1970**	**1975**	**1980**	**1985**	**1990**	**2000**	**2010**
Ürgüp	5.607	6.546	6.758	6.998	9.018	11.040	14.538	18.631

2.2.2. MUSTAFAPAŞA

Mustafapaşa is a town of Ürgüp District. It is on the route of Ürgüp-Soğanlı to Kayseri, and 6 km far from Ürgüp and 26 km from Nevşehir.

In antiquity Mustafapaşa had many names. Apart from the well-known *Sinasos* it was called with various names throughout its history such as *Sasima, Sasime, Levidis, Assuma, Mortman, Sunasyun, Sinason, Sinassus* (Berk, 1990:107). According to N.S. Rizous, the name "Sinasos" comes from "Synaxis" which means to place of reunion, reassembly for those who were expelled. On the other hand L. Takadapoulos suggests that the name is the combination of the names of two eastern deities "Sin" and "Assos" (Mustafapaşa Mevcut Durum Raporu ve Eylem Planı, 2007:32).

Until 1924, Rums were actively dealing with trade in the region. People of Sinasos who made their money on "caviar, grain, paint and shipping" in İstanbul, spent most of it in their hometown in building manors, resorts, monasteries, and schools (Mustafapaşa Mevcut Durum Raporu ve Eylem Planı, 2007:33).

After 1924, Rums of Mustafapaşa had to immigrate from their hometown to Greece due to a matter in Lausanne Treaty that regulated the population exchange. According to the statistical registries of the exchange committee indicates the rapid change of population in this town where an advanced Greek Orthodox culture existed: there were about 3000 Rums and 600 Turks in 1890 however 878 Rums and 1000 Turks after 1924 living in Mustafapaşa (Mustafapaşa Mevcut Durum Raporu ve Eylem Planı, 2007). Population change of Mustafapaşa in the last 50 years is as follows;

Table 2.07, Population of Mustafapaşa between 1965 and 2010
http://tuikapp.tuik.gov.tr/adnksdagitapp/adnks.zul, last visit on April, 2011)

	1965	**1970**	**1975**	**1980**	**1985**	**1990**	**2000**	**2010**
Mustafapaşa	2.157	3.015	3.102	2.054	1.700	1.781	1.804	1.740

Figure 2.08, Musatafapaşa General View (Th&İdil Mim. Şeh., 2007)

According to the graphic, there has been a rapid increase in population after 1966 when the town became a municipality. The population remained stable until 1975, after when however it began to decrease sharply. By 1980 the decrease of population decelerated and after 1985 it followed a constant line. It is obvious from the graph that the opening of Cappadocia Vocational School in 2005 did not play a major role on population rate.

There were various projects for Mustafapaşa proposed by Provincial Bank, Ministry of Tourism and Municipality of Mustafapaşa from 1970 to 2004, however only "Tourism region plan" of 1981 was approved (Municipality of Mustafapaşa).

With the enactment of the regulation of Nevşehir Council for Preservation of Cultural Heritage dated November 12th 1999, numbered 1123, Mustafapaşa town centre was declared as 'urban site' and peripheries of town centre were registered as '1st and 3rd degree natural site'. Preservation works in the settlement were started with aforesaid regulation and continued with the "Master Plans for Conservation of Natural and Urban Site of Mustafapaşa (Ürgüp-Nevşehir)" proposed by Th&İdil Architecture-Urban Design Co. in 2004.

Ministry of Culture and Tourism and Nevşehir Council for Preservation of Cultural Heritage proposed a master plan for the conservation in 2004. Its revision made in 2008 has been used since. Mustafapaşa contains an urban site and several 1st and 3rd degree natural sites within its borders. In addition to that, as of the date of May 2011, there are 116 edifices of civil architecture which are registered as cultural heritage and 12 monumental buildings. Among those monumental buildings, there are 2 mosques, 1 madrasa, 9 churches, 1 fountain and 1 bridge. Church of St. Helena, Church of St Basil, Pancarlık Church, Church, Sinasos Church, Şakir Paşa Madrasa and Üzengi Bridge are some of those significant monumental buildings in Mustafapaşa.

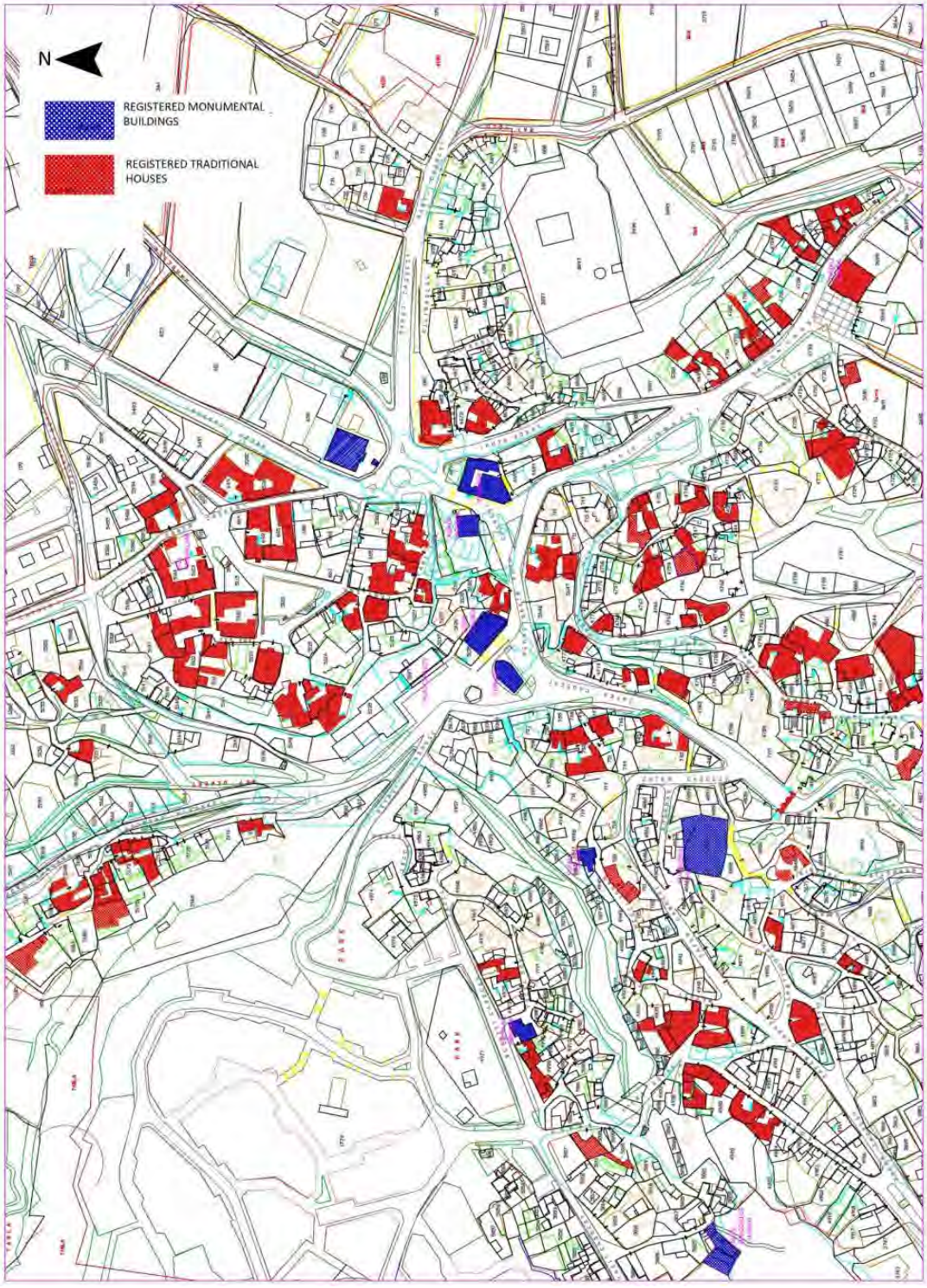


Figure 2.09, Mustafapaşa registered buildings (Mustafapaşa master plan used as template)

2.2.3. İBRAHİMPAŞA

İbrahimpaşa is a village of Ürgüp District. It is 2 km far from Nevşehir – Ürgüp road, 12 km from Nevşehir and 14 km from Ürgüp.

Because of shortage of sources on the history of the village, it is not possible to bring new information other than the general history of Cappadocia that was given before. The earlier names of the village are 'Babayan' and 'Papayanni'. Papayanni is a compound noun form of Pope Yoannis (Korat, 2004:257). After the population exchange, the village was begun to be called as Babayan, which later became İbrahimpaşa. It is suggested that this name was given after the grand vizier of the Tulip Era, Damat İbrahim Pasha who was a native of Nevşehir (Demir, 2006:11). Population change of İbrahimpaşa for last 50 years is as below;

Table 2.08, Population of İbrahimpaşa between 1965 and 2010
http://tuikapp.tuik.gov.tr/adnksdagitapp/adnks.zul, last visit on April, 2011)

	1965	**1970**	**1975**	**1980**	**1985**	**1990**	**2000**	**2010**
İbrahimpaşa	1.186	1.219	1.393	1.233	1.199	1.483	1.070	796

There are limited numbers of studies about İbrahimpaşa. The most comprehensive one is Özlem Karakul's PhD dissertation of which title is "A holistic approach to historic environments integrating tangible and intangible values case study: İbrahimpaşa village in Ürgüp".

There is not any master plan for İbrahimpaşa existing today. The old centre of the village was registered as "urban site" and its peripheries were declared as 1st and 3rd degree natural sites with the Act No: 1123 on November 12th 1999. As of the date of May, 2011 there are 3 registered monumental structures including 1 bridge, 1 church and 1 cemetery and 9 edifices of civil architecture which are registered as cultural heritage.

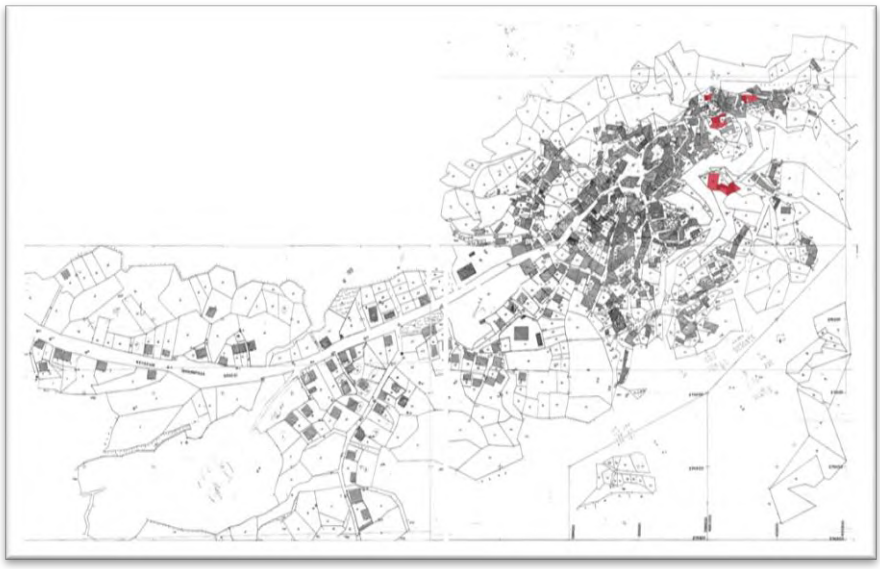


Figure 2.10, Registered buildings in İbrahimpaşa (İbrahimpaşa cadastral map used as template)

2.3. GENERAL ARCHITECTURAL CHARACTERISTICS OF TRADITIONAL HOUSES IN CAPPADOCIA WITH SPECIAL EMPHASIS ON SELECTED SITES

The geographical setting concerned in this thesis includes the settlements which present remarkable instances of Nevşehir traditional houses within the provincial borders of Nevşehir city. Despite of certain similarities with other cities of Cappadocia region, Kırşehir, Kayseri, Niğde and Aksaray in building materials and construction techniques, Nevşehir traditional houses differ from them due to the diversity of the local geological structure.

Studies on architecture of traditional houses of Cappadocia are limited. This chapter is focuses on architectural characteristics of Nevşehir traditional houses which were revealed via review of past research and literature. In addition to that, the study is enhanced with field surveys and analysis and concluded with a general evaluation.

Most of the former studies on Cappadocia have been concentrated on several subjects such as the alteration of residential fabric caused by developing tourism, rock-carved churches and frescos.

This thesis in which is studied architecture of traditional houses in Nevşehir has primarily been utilized from written studies; "Kapadokya Yerel Konutlarında Turizme Yönelik Yenileme Çalışmalarına Bir Yaklaşım" titled doctoral thesis of Abdullah Erençin at ITU Architecture Faculty in 1979, "The Preservation and Rehabilitation Project of 'Yeni Mahalle': Mustafapaşa" titled doctoral thesis of Saba Tatar Akman at ODTU Restoration Program in 1985, and "Güzelyurt(Aksaray) Örneğinde, Kapadokya Bölgesi Yığma Taş Konut Mimarisinin Korunması için Bir Yöntem Araştırması" titled doctoral thesis of Demet Ulusoy Binan at Yıldız Technical University Restoration Program in 1994.

A. Erençin's dissertation has become the basis for almost all studies. Later his study was enhanced by the researches of Binan and Tatar. This thesis is based on these three sources. Erençin's thesis is used as main source however other studies based on his work are not included in bibliography.

Cappadocia house or in specific "Nevşehir house" is genuine typology that exhibits perfect eurhythmy with the local natural conditions. It is built as 2 or 3 storied and originally flat roofed. Since it is sat on slopes it naturally generates terraces. It is generally constructed upon rock-carved spaces which serve as storeroom. Comparably to Nevşehir city centre where the number of preserved traditional houses is quite low, the residential fabric of some settlements such as Ürgüp, Mustafapaşa and İbrahimpaşa Village is maintained.

The building materials used in Nevşehir traditional houses are stone, wood and iron. A local sort of stone being called as *kepez* is the main building material of the region. It is soft when it is first quarried and can be shaped easily. As being exposed to air, it solidifies and gains resistance. Thanks to its thermal insulation feature, this material provides comfortable indoor conditions cooler in summers and warmer in winters. This stone is given different names according to its varieties such as *Sulusaray kepezi*, *yaprakseki kepezi*, *kavak kepezi* (Alper, 1998:527).

Usage of wood is limited due to the extinction of forestlands in Cappadocia in recent past. Wood is generally used in architectural elements such as cupboard, *seki*, *musandra*, and floor and ceiling covering. The most notable use of wood appears in a form of wooden superstructure which is called as "hezen". Iron is generally used in window rails, at the door elements, and inside the walls to provide durability.

Figure 2.11, Using timber and iron (Ortahisar)

Most extensive classification of the traditional settlement pattern is done by Binan (1994: 66-67). The safety needs and defensive requirements caused different layouts in the past:

1. Underneath the towns in lowlands which lack natural defensive qualities there are multi-storeyed underground settlements such as Derinkuyu and Kaymaklı.

2. The settlements established on valley slopes include another settlement area which is carved into the rocky slopes of valley for safeguard and defensive purpose. In addition to Çavuşin, Göreme, Zelve, the study area of this thesis İbrahimpaşa and some parts of Ürgüp can be considered as examples.

3. The settlements placed to the sides of large volcanic tuff rocks, such as in Ortahisar, behind the main settlement there is another settlement area which is carved into rock mass. Kadı Castle of Ürgüp is example for this kind of settlement

Figure 2.12, Settlement established on valley slopes (İbrahimpaşa)

Figure 2.13, Settlement established to the side of big volcanic tuff rock (Ortahisar Castle)

Houses:

Within this variety of materials and layout patterns, Erençin (1979: 54) categorizes the traditional houses into three main groups: rock-carved houses, rock-carved-masonry houses leaned on slopes, masonry houses facing to road.

1. Rock-carved houses constitute to the earliest housing type. In this kind of houses, spaces are generated by carving out valley slopes or fairy chimneys. The houses carved into valley slopes can be added with new spaces by carving out the slope horizontally. On the other hand, the houses carved in fairy chimneys can be enlarged by carving the fairy chimney vertically.

Figure 2.14, Rock-cut houses (Ortahisar)

2. The houses, constructed in the mixed technique of rock-carving and masonry are generated by addition of a wall, aiwan or masonry complete room in front of the main rock-cut space to gain extra room. There are variations of this housing type such as that there is only one room connected to rock-cut space; or a two-storied house.

Figure 2.15, Rock-cut and masonry houses (Ortahisar, block/lot: 28/5184- Ulaşlı, block/lot: 202/2-5)

3. Masonry houses are one, two or three storied buildings which are decorated with stone carved ornaments to show the wealthy and statue of the owner. In earlier instances the houses are dragged back of the building lot. In later examples houses are faced to road. This type of houses are not directly connected to rock-cut spaces, these units are reached via a courtyard. Binan (1994: 70), who improved this classification, considers the masonry houses as the last stage of other two construction techniques.

Figure 2.16, Masonry houses (İbrahimpaşa- Mustafapaşa)

Building- Courtyard- Lot Relation:

House types in Cappadocia that are briefly explained above formed the building lot-building relation. In the rock-cut houses, there is not a systematic construction because new spaces are added through the owners' needs. A rock-cut space which remained under masonry and/or rock-cut building can be used by neighbours. This pattern which paves way to the development of inconsistent property form in the vertical axis is a complex structure which cannot be solved by current 2dimensioned cadastral maps.

For instance in this situation, while the ownership of a masonry building on the lot belongs to a person, the ownership of the rock-cut space which is located under that masonry building can belongs to other neighbour. This complication has been resolved by writing the note of "elevation right" on the land title of rock-cut space. Today this situation which causes many problems is being handled by taking certificate of consent from the neighbours.

High courtyard walls which are one of the most common features of Anatolian traditional house architecture are also seen in Cappadocia houses. Courtyard is the place which the daily life activities occur in. It is surrounded by high walls for concerns of privacy. Barn, hayloft, storage room, tandır room and other living spaces are placed in courtyard and directly or indirectly connected with it.

In some building lots of traditional pattern, a masonry building is placed facing to street and has a door which is directly opened to the street. The court does not have a direct relation to the street. Some other masonry buildings can be drawn back of the parcel and so connection between building and street is providing by courtyard. In both cases, limits and shape of the courtyard are designated by the orders of house's service units like tandır, kitchen, and toilet (Erençin, 1979:104). Floor of the courtyard is covered with either stone or hard soil.

Plan Units:

The house units separated with high walls from the street and spread in courtyard which is known as "*Hayat*" in the region. Houses are generally single or double storied, but triple storied houses exist too. Courtyard is formed and bordered by service units. In Nevşehir houses which consist of rock carved spaces, every single service unit isn't necessarily connected directly to courtyard. House units are as follows; room, aiwan-sofa, kitchen, tandır room, storage room, barn, hayloft and fodder store, and toilet.

Binan (1994:138) states that, Cappadocia houses basically consist of two functional parts; room – living area, aiwan-transition space and work places. In more than one-storied buildings, ground floor functions as service unit. There is not an obvious ordered plan of downstairs of rock-cut and stone masonry, mixed type houses. Kitchen, tandır room if exists are placed again downstairs. It can be reached to upper floor from aiwan with a close-top stairs or from courtyard with an open-top stairs. In some cases these open-top stairs are placed side front of the building. Stairs generally supported with half arch known as "orphan arch" in locale or complete half arch. There are also stairs corbelled on the side wall.

Upper story is reshaped according to locations of room and aiwan. Considering averagely 380cm wide vaulted room as a module, house is composed of two or three of these modules (Binan, 1994:136). Binan (1994:136) who considers upper-stair aiwan as *sofa* indicates that the layout is formed notwithstanding its location but according to whether sofa is opened and if it is near the rooms or between the rooms.

Figure 2.17, Courtyard wall (Ortahisar)

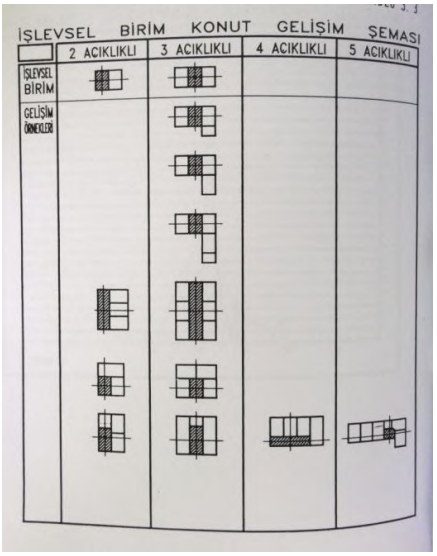


Figure 2.18, Sofa- room relation (Binan, 1994:142)

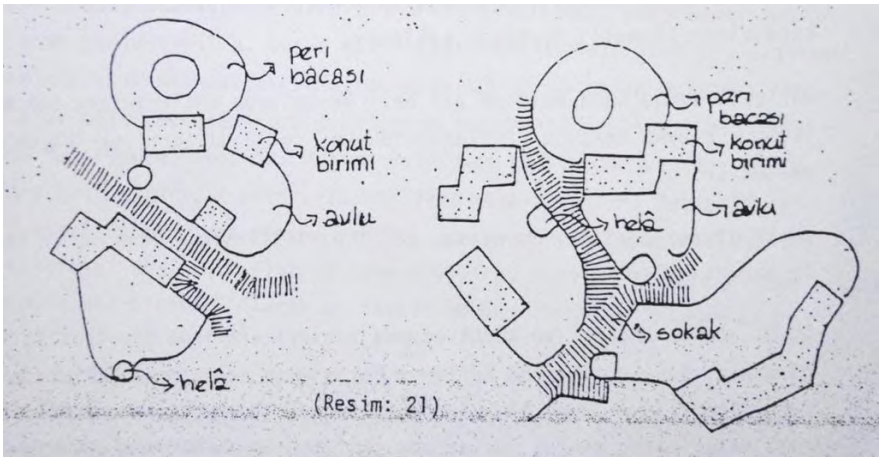


Figure 2.19, Building-courtyard (Erençin, 1979:105)

Also climate conditions affect the locations of house units. Abdullah Erençin (1979:45) indicates that spaces of houses such as guest room, room, tandır room, winter kitchen and barn are specialized by intended purpose and also some of these units are used seasonal. For instance; guest room, rooms in down stairs and winter kitchen are used in winter frequently, rooms in upper stairs and aiwans and summer kitchens are used mostly in summer time.

Features of spaces of a Cappadocia house are as follows:

Room: Rooms which is the basic unit of house can be placed in both upper and lower floors. According to the size of house, there can be more than one room. The number of rooms depends on economic status and population of family. Ground floor rooms are generally used in winter. Rooms are the spaces where members of family gather, eat and even sometimes cooking. Besides rooms are where women spent most of their times in winter and weave carpet or rug (Erençin, 1979:105). If there is second floor on the house, the rooms in this floor are only used in summers. The upper floor

rooms are placed to gaze either the courtyard or the street. The layout of second floor follows that of the ground floor but can be extended through the street with cantilevers. Upper floor rooms are built in masonry and superstructure is made up of *hezen* or vaults created by arches. Floor coverings may be stone in ground floors and stone or timber in upper floors. There can be certain architectural elements in the room, such as *seki, pabuçluk, musandra, sedir,* fire place, cupboard, niche and lamp niche.

Guest room or main room which is built more spacious and elaborate is reserved for guests. It differs from other rooms with these features. In terms of configuration sand comfort the main room is the most significant space of house (Binan, 1994:133). There are more windows on the walls of the guest room than the others. Furthermore, guest room differs from other rooms in that it provides visual advantage and accessibility from main entrance (Binan, 1994:133). The guest room is rich in architectural elements such as *seki, pabuçluk, musandra, sedir,* fireplace, cupboard, niche etc.

Figure 2.20, Room (Ulaşlı, block/lot: 202/2-5)

Aiwan-Sofa*:* After rooms the most distinctive space of Nevşehir traditional house is aiwan. Aiwan is a semi-open space which is closed in three sides, opened in one side and covered with vault. It also maintains the courtyard life (Erençin, 1979:111). There can be more than one aiwan in a house and it can be placed both in ground floor or upper floors. In case there are more than one aiwan in a house, one of them can be named as 'summer kitchen' because it is used as tandır room during summer (Erençin, 1979:112).

Apart from courtyard aiwan, there might be an upper floor aiwan which is similar to others in terms of form. Open side of the upper story aiwan can be ended with one, double, triple, quarterly arch or hanging arch (Erençin, 1979:114). On upper floors the aiwan which the room/rooms are opened through it, is faced to courtyard. In some examples it can also be seen that the aiwan closed and/or ended with an open balcony.

The space defined as "upper story aiwan" in this text is called "*sofa*" in some other studies. Even though it has similarities with the "*sofa*" of traditional Anatolian houses in sense of function such as being a connection area between rooms and a living area at the same time, this space is named as "upper floor aiwan" in this study because it does not match exactly to the "layout with *sofa*" recognized in traditional Anatolian houses.

Figure 2.21, Ground floor aiwan- upper floor aiwan ended with triple arches (Ortahisar, block/lot: 28/5184)

***Tandır* Room, Kitchen, Storage Rooms:** *Tandır* room is a vaulted aiwan which is placed right front of the kitchen in the ground floor/lower elevation. *Tandır* is used to cook food and bread. It is a kind of architectural element which is located in the middle of the room by carving the floor with the size of 40x45x50cm (Erençin, 1979: 110). Some of *tandır*s in the houses which made of terra-cotta still have stone covers. When *tandır* is placed in a closed room such as kitchen, it has a terra-cotta shaft for air circulation. Erençin (1979: 110) defines the *tandır* house as summer kitchen and states that all kitchen activities including the cooking are taken place in there during summer period.

Figure 2.22, *Tandır* (Ortahisar, block/lot: 79/5432)

The kitchen in the ground floor is a winter area which is connected to tandır room and storage rooms. The fireplace is the main element of the kitchen. In most of the examples the fireplaces are placed on the wall between two main arches. It can also be seen that they are fitted on the side walls. Even though some kitchen architectural units like sink and water installation are not found in traditional structures, they have been added later with the improving and changing living conditions.

Storage rooms are connected to kitchen directly or indirectly, and kitchen staff and food are stored in these storage rooms. They are generally constructed by carving rocks and there are niches, shelves and carved holes on the walls (Erençin, 1979:109). Binan (1994:134) mentions that in some of the Greek houses, storage rooms placed on east are also used as praying room for abundance.

Barn, Hayloft- Fodder Storage: In traditional Cappadocia houses barn is reached through courtyard or directly from street. Barn can be constructed under the house by carving rocks or at the courtyard level with masonry technique using vault or *hezen* (Binan, 1994: 135).
The hay gathered during the summer is stored in hayloft to feed livestock during the winter. There is hayloft and/or feed storage in all houses which have livestock. They are located as related with barn and having easy accessible.

Toilets: They are constructed next to the courtyard wall and very close to entrance but elevated from courtyard floor (Erençin, 1979: 112). In the examples belong to late period in Ürgüp-Kayakapı; the toilet is placed inside the house. This kind of toilets does not have many architectural elements. In some examples there would be seen a few and small niches on toilet walls.

Plan Elements:

Fireplace*:* In Nevşehir houses the fireplaces are located in upper and ground floor rooms and in kitchens. It may not exist in all rooms. Nevertheless there is not a significant difference between room fireplaces and kitchen fireplaces, it has been seen that bottom of room fireplace is averagely 30-40 cm high from the room floor and much more decorated, even spot by spot painted. On the other hand, the kitchen fireplace is close to floor for cooking easier. The fireplace that stands on a 20cm height rock is shaped rectangle and 120-140 cm height (Erençin, 1979:130). The examples that have niches and cupboards on two sides are numerous.

In rock-cut spaces, there are fireplaces which are located in rock. Also there are some other examples that the front face of fireplace is made by plaster and decorated with various colours and patterns.

Built-in Cupboard- *Yüklük*: Cupboards which is carved into the rock or placed into the stone wall right next to the fireplace or built-in cupboard can be used with various combinations. Erençin (1979:129-130), defines the combinations according to these orders: "cupboard-built in cupboard-cupboard", "cupboard-fireplace-cupboard". In wealthy people's houses, cupboard doors are timber ornamented and painted, in rest of them generally, plain wooden cupboard doors are used without any ornamentation. Even the cupboard placed into the rock, it has doors with wooden frame.

Built-in cupboards are used for putting the staff like quilts and pillows. They are deep niches which are close to floor and wider than the cupboards. Generally the front faces are closed by a curtain (Erençin, 1979:129).

Figure 2.23, Fireplaces (Ortahisar, block/lot: 28/5184- Ortahisar, block/lot: 29/5336)

Figure 2.24, Fireplaces (Ortahisar, block/lot: 29/5336- Ortahisar, block/lot: 28/5129)

Figure 2.25, Built-in Cupboards (Ortahisar, block/lot: 28/5129)

Figure 2.26, *Yüklük* (Ortahisar)

Gusülhane: According to studies done in Mustafapaşa settlement, there is a 1x1 meter sized *gusülhane* is constructed on the other side of the *pabuçluk* in almost all houses which have *seki* and *pabuçluk* (Akman, 1985: 82). *Gusülhane* which is a very narrow spot and a stone niche built for ablution. It is generally planned with cupboard and has a wooden cover like a cupboard door. They are mostly placed close to the outer wall with the aim of water disposal. Besides that in Nevşehir houses there is a space called "*çağ*" which is surrounded with 10-15 cm heighted stone. It is located on the across side and same direction with room door. It also has a sewage drain. The "*Çağ*" is used for being washed in the houses which have not *gusülhane*.

Sedir, Seki, Pabuçluk,* and *Musandra: In Cappadocia houses an entrance space is generated by elevating the room floor from the entrance about 15-20 cm. This entrance space is named as *seki altı* or *pabuçluk* and the elevated area which is for main living is called as *seki üstü*. *Seki*s which are constructed by stone or wood according the features of the floor create a hierarchy in the living room. The lower elevated area between seki and the door is called pabuçluk which is also continued parallel to the wall. There is a wooden balustrade named "*musandra*" between pabuçluk and seki. It emphasizes the hierarchy among them. The sedir which is placed on the area named "*seki üstü*" is constructed by stone or wooden with 30-40 cm height and 50-70 cm wide. It continues through one, two or three walls of the room. Sedir is used sitting and/or sleeping space above the *seki*.

Figure 2.27, *Gusülhane* (Ortahisar, block/lot: 28/5184

Figure 2.28, Stone *seki* and *sedir* (İbrahimpaşa)

Figure 2.29, Timber *seki*, *pabuçluk* and *musandra* (Ortahisar, block/lot: 28/5184)

Figure 2.30, Timber- stone *sedirs* (Ortahisar, block/lot: 28/5184)

Taka: *Taka* is the local name of the niche which is used 30-40 cm above from the floor in the aiwan and room (Erençin, 1979:122). Taka can be placed into the rock by carving or into the stone walls. There are some kinds like top side decorated, pyramidal shaped, or arched. Top side can be decorated with numerous figures by stonework or by carving. *Taka*s generally placed exactly in the middle of interspaces between the two main arches in the rooms.

Shelf: It is the element which placed 2 meters above the room floor, covered one or two walls. It is constructed with the aim of putting the small movable belongings. Most of them have a decorated profile. It is seen that in the vaulted rooms, the shelf is not placed on side walls because of the arches. In these houses, shelf is constructed above the windows and turned the corners on two sides up to the first arch of vault.

Lambalık: It is a cantilevered element for putting enlightening equipment on. Nowadays they lost their main function. *Lambalık* is generally placed on side walls or on the wall where the windows are.

Şıralık: *Şıralık* is used to squeeze grape for vine and *pekmez*. *Şıralık* is generally placed in kitchens and it consists of an area 15-20 cm lower than the floor which grape is squeezed in and a deep hole which grape juice is gathered in. In some cases the *şıralık* consists of only the wide, 15-20 cm deep squeezing area without the hole. In the rock-cut kitchens, it can be placed either the left or the right side of entrance.

Room Doors*:* Room doors are usually constructed with depressed arch and lintel (Erençin, 1979:123). These lintels can be made of either wood or stone. Door wings are also made by wooden and there are not many ornaments on it. On the walls that the door wings sitting on, there are very thin niches for the doors fit in.

Figure 2.31, *Taka* (Ortahisar)

Figure 2.32, *Taka*s placed between the arches (Ortahisar, block/lot: 24/5377)

Figure 2.33, Shelf (Ortahisar, block/lot: 24/5377)

Figure 2.34, *Lambalık* (Ortahisar, block/lot: 24/5377)

Figure 2.35, *Şıralık* (Ortahisar, block/lot: 28/5113)

Figure 2.36, *Şıralık* (Ortahisar, block/lot: 28/5113)

Figure 2.37, Room doors (Ortahisar, block/lot: 28/5184-Ulaşlı, block/lot: 202/2-5)

Facade Units:

Facade characteristics of Nevşehir houses is designated by selections of materials, number of stories and some architectural elements such as projections, doors/windows and its frames, entrances, cornices and roof.
The story number in the houses is the most important reference while defining the features of the mass. Nevşehir houses are two storied in general yet it is possible to see single or triple storied examples. Binan (1994:166) clarifies that in Güzelyurt, a two storied house can be maximum 900cm from ground up to eave cornice. This situation is related that 900 cm (12 Zıra) is allowed limit of highness for non-Muslim citizen's residences before 'Edict of Reform' in 1856 (Binan, 1994:166).

Mass proportion is also determined by story number, entrances with or without aiwan and entrances opened through the street. When we consider the whole mass the entrance aiwan is also important for determining emptiness-fullness proportion. The doors and windows on facade and the aiwan are formed the emptiness-fullness relation. Aiwan can be found in either upper or down story. It can be placed right on the middle to maintain the symmetry of façade. If it is placed in down story, it continues double or triple to all way the façade.

Figure 2.38, Façade organization (İbrahimpaşa)

Window openings are generally 1 over 2 portions, 70-80 cm wide and 150-160 height. In contrary to this proportion there are some openings which are closer to square in Ürgüp-Kayakapı. Windows are placed all the way on the facade as in single, double or tripled groups. There are not many windows on the ground floor because of privacy concerns. Windows on this floor are more simple and closer to square form.

In later examples, in the houses of which the entrance door is directly opened to the street, the door would be located in the middle as a portal and a top window would be placed on it

In early period examples, projections are generated by upper story's aiwan which is projected from building and determines the entrance and stairs to up story. In the late period examples, they are again generated by aiwan which is openly and closely projected from building.

Figure 2.39, Façade organization (Ortahisar-İbrahimpaşa)

Facade Elements:

Projection: There are open and close projection types in Cappadocia houses. Open projections are formed like balcony and supported by cantilevered stones from bottom. Many different kinds of ornaments can be seen on these cantilevered stones. If we consider the every single room as a module, open projections are placed on the middle module and maintain the symmetry of the facade. Open projection is usually generated by recessing the middle module (*sofa*-aiwan). In this manner the mass is emphasized on the façade strongly.

Closed projections are classified as perpendicular projections and bevelled projections (Binan, 1994:156). Bevelled projections are constructed to form a regular plan on upstairs of the house of which down stair is constructed as the shape of building land. It can be placed either on the whole façade or just at corner of building (Binan, 1994:156). It is generated by sliding the cantilevered stones from each other's. Perpendicular closed projections are constructed through the facade or in width of a room by being parallel to downstairs wall (Binan, 1994:156). Closed projections are also generated either by cornices which continues in the height of 1-2 stone or by cantilevered stones which is arrayed with intervals.

Figure 2.40, Bevelled close projections (İbrahimpaşa)

Figure 2.41, Perpendicular close projections (İbrahimpaşa)

Figure 2.42, Open projections (İbrahimpaşa-Ürgüp, block/lot: 131/45)

Door: The building entrance in traditional Nevşehir houses can be studied on two titles as doors opened to the courtyard or doors opened directly to the house. In early period examples, the connection between street and house is maintained via the courtyard door.

In both ways the entrance door openings are spanned by lintel, flat arch, depressed arch, semi- circular arch (Erençin, 1979:122-123). The stones of door openings are profiled and decorated. There can be seen some example only with a simple plain profile around. In many examples the key stone of door arch is decorated and has the inscriptions on it. Door wings are wooden. There are many examples painted in various colours with madder (alizarin). These features rule for both kinds.

Among these features there is a top window on the door which is opened directly to street. Besides that there are some examples which two decorative columns are placed on both sides. The building doors opened directly to street are smaller than the courtyard doors. The courtyard doors are constructed in bigger dimensions as height and breadth for enabling access to agricultural equipment and all kinds of livestock.

Figure 2.43, Courtyard entrance doors (Ortahisar- İbrahimpaşa-Ortahisar)

Figure 2.44, Building entrance doors (Ortahisar- İbrahimpaşa)

Windows: Windows are the elements that allow space to contact with outside and to get air and light in. The windows of living spaces of Cappadocia houses are placed on the front façade and face to street or courtyard. They are usually used in single or in double, triple groups and vertically rectangle by ½ proportions. Because of the down stair is used for serving space and concerns about privacy, downstairs' windows are placed higher from the floor, in small size and less in numbers. The windows of the down stairs in most of the examples are rectangle but more close to square. There are examples which is used with lattice and iron bars (Erençin, 1979:126).

Window sizes are also big in some the bigger houses. There are various ornaments and profiles on the outer surface of the windows. Mostly the ornament figures are started on both the sides of window opening and become different on the top.

Top windows which are also known as "star window" in the region are placed either above the room windows and under the story cornice or above the entrance door (Binan, 1994:153). They are

generally constructed as horizontal rectangle of which top is ornamented or concave diamond-shaped (Erençin, 1979:129). Top windows are used in the rooms for ventilation and on the entrance door for lightening the entrance hall. In the original examples there is no window profile. Because of to get more light in, the top windows above doors are in bigger size than the top windows in rooms. The ones above the entrance door are closed with lattice or iron bars.

Yazlık Kemer: The facade which faced to courtyard or street, of the aiwan the semi-open space of the up story is called as "summer arch" in the region. This space is finished in the end with double or triple arch groups. These arches are sometimes opened towards to a balcony and sometimes connected to the up story stairs. There will be different kind of arches profiles. Voussoirs' of arches are generally ornamented. The columns on which the arches stand on can be circle, quadrangle, octagon, and cross shaped (Akman, 1985:104). The space between column's heads, columns and the arches is decorated with geometrical and plant figures (Akman, 1985:104). Double or triple grouped hanging arches can also be used at 'summer arches' therefore the obligation for arches to be stand on a column would be done away.

Figure 2.45, Window ornaments (İbrahimpaşa)

Figure 2.46, Windows (İbrahimpaşa)

Figure 2.47, Windows (İbrahimpaşa-Taşkınpaşa)

Figure 2.48, Top windows (Ortahisar- İbrahimpaşa)

Figure 2.49, *Yazlık kemer* (Ortahisar, block/lot: 28/5184- Ürgüp, block/lot: 131/45)

Cornices on Façade: Cornices wander around façade between the stories and/or under the eaves by projecting just a slight. Besides wandering around only the one facade, there are also examples to be covered of all four facades of building by depending on position of the parcel. The ones between the

stories are named as “story cornice”. These are the horizontal elements to separate the stories visually (Binan, 1994:160). The ones under the eaves are named as “eave cornice”. The eave cornices emphasize the finishing of the building and may also continue on the courtyard wall and entrance door (Binan, 1994:160). The cornices would be plain and simple besides that there can be seen frequently examples which decorated with detailed figures and ornaments too. With these decorations the cornices become components which increase the magnificence of house. There are examples of cornices like “diamond, nail, and triangle cornices” (Akman, 1985:106).

Figure 2.50, Simple story and eave cornices (İbrahimpaşa)

Figure 2.51, Decorated story cornices (İbrahimpaşa)

Figure 2.52, Decorated story cornices (İbrahimpaşa)

A Pre-Evaluation on Architectural Features of Nevşehir Traditional Houses:

A characteristic architecture in Cappadocia which is differ from other settlements in Anatolia, is generated with the results of the physical factors such as geological structure and topography, and diversity of the social structure. As the bringing of volcanic structure, the various stone quarries in the region determine the major construction material.

The tuff rocks in Nevşehir even provide partly the basic need of housing with carved spaces and settlements, so the rock carving is progressed by being one of the major characteristic of traditional architecture. Nevşehir houses differ from the other houses of Kayseri, Niğde, Aksaray and Kırşehir in Cappadocia region by having this rock carved settlements. Therefore in Nevşehir a unique architectural texture which progressed in the way of social structure's needs and differed as stone construction and rock carving combined together was created.

When being overlooked to the settlement pattern of Nevşehir, the villages and towns around, it is possible to say that the geological structure of the region differs from rest of the traditional Anatolian settlements. The easily workable tuff rocks help to create a settlement order which is in accord with self-defence for the region which was subjected to many attacks in the history. The cities were either established into the rocks and valleys expanded through the slopes or on the flatland which expanded downwards both with security concerns.

Even though the traditional Nevşehir houses have been subjected to many studies, the materials and construction technique has not been specifically investigated. There are three major building construction kinds in the traditional house pattern. These are rock carved, rock carved and masonry, and masonry buildings. Because of the rock carved settlements expanded with masonry additions, nowadays there is only a few "rock carved house" exist. Wholly rock-carved houses are renovated again with masonry constructions with increasing restoration studies.

Being open ended and reproducible are the most significant features of the traditional Nevşehir houses[2]. A simple house unit starts with an only rock-cut space which can be expanded by carving a new space into the rock when needed. Furthermore in the next step, an additional masonry mass will be constructed and by this way the renewable and reproducible space organization is being generated.

When we take the relation between the building lot and house into account, there are two different aspects in the region. In the masonry houses facing to street, the courtyard stays behind the continuously attached buildings and the main entrance directly opens to street. According to the second approach, it is seen that the masonry structure is drawn back of the lot and the courtyard is a transition space between street and house.

There are not a systematic progress seen in the progress of house's units, however some rooms began to be used seasonal as summer and winter with respect to the expansion of house. Room, the basic element of house, and kitchen – aiwan are the most significant examples of this seasonal usage. The rooms in ground floor are generally used in winter while the upper floor rooms are generally used in summer. Kitchen made of rock-cut and masonry is for winter use, but in the summer, the aiwan placed in front of the kitchen is used as 'summer kitchen'.

Aiwans together with rooms have a great effect of generating the house. This semi-open aiwans constructed in front of the rock-cut or masonry rooms are used as passage way. The upper floor aiwan and ground floor aiwan are in similar forms. The upper floor aiwan works as a '*sofa'* because this aiwan is generally placed between the rooms and provides the access between ground floor and upper floor rooms.

The planning elements in Nevşehir houses are fireplace, *tandır*, cupboard, built-in cupboard, *taka, gusülhane, sedir, seki, pabuçluk, musandra*, shelf, *lambalık* and *şıralık*. Mostly stone is used as main

[2] B. Maude (1971:213-215) indicates that one of the features of traditional houses before Industrial period is being open ended and reproducible.

material, however timber is used in some elements like *gusülhane, musandra,* cupboard and shelf. In the region architecture, timber is also used in beam system called '*hezen*' and in ceiling coverings.

Stonemasonry is the most characteristic component of traditional housing architecture in the region. The façades are emphasized by using rich stone ornaments on the windows, doors and projections of the house. Cornices between the stories of stone masonry buildings and continued under the eaves are again decorated with stone ornaments in the façade and turn into a major characteristic component.

CHAPTER 3

CASE STUDY: CONSTRUCTION TECHNIQUES OF TRADTIONAL HOUSES IN SELECTED SITES

3.1. METHODOLGY OF FIELD SURVEY AND DETECTION

Three different settlements are chosen to survey the construction techniques of traditional houses in Nevşehir. These settlements are Kayakapı District of Ürgüp, Mustafapaşa and İbrahimpaşa villages. The partially demolished houses in Kayakapı provide more data about construction techniques. Mustafapaşa is chosen due to its variety of examples which are known for their architectural richness. İbrahimpaşa is preferred because traditional houses in this locality still preserve their authenticity without any interventions.

Before the field surveys to the site, literature reviews and documentation studies were done. Documents and maps of selected sites were gathered from the Nevşehir Council for Preservation of Cultural Heritage and provincial special administration of Nevşehir. In August 2011, a survey was held covering Ürgüp, Mustafapaşa and İbrahimpaşa. During this survey, the general features of the houses were determined and the houses which are going to be studied in detail were chosen. In addition to these houses, others which exhibit partial authentic details were marked on site maps.

After the field survey, plan sketches and measured drawings were gathered. Plan sketches of nine houses in Ürgüp, Kayakapı District were taken from the Directorate of Nevşehir Council for Preservation of Cultural Heritage. These sketches were drawn by 'Kaba Eski Eser Koruma ve Değerlendirme-Mimarlık' within the scope of the project of "Kayakapı Kültürel ve Doğal Çevre Koruma ve Canlandırma". Measured drawings of four of seven houses in Mustafapaşa were drawn by Architect Ülkü Demir, one house was drawn by Esin Tekin during her MA thesis research in Restoration Program at Istanbul Technical University. Plan sketches of other two houses in Mustafapaşa and five houses in İbrahimpaşa were drawn in the field by the author.

These sketch drawings were revised and necessary additions and corrections were made on site. The buildings that lack plan sketches and measured drawings were measured and drawings were done by the author. All building elements were measured from foundation to roof and system sections and details were drawn. Details were also analyzed and drawn at the points where the construction system changes. 3D images of constructions and drawings done in the field were later digitalized in AutoCAD.

Thus, the settlements of the surveyed buildings, information of buildings' blocks and lots and the references of building plan sketches are as follows;

1. Ürgüp/Kayakapı District, building block/lot:131/14, *Kaba Eski Eser Kor. ve Değ.-Mimarlık*
2. Ürgüp/Kayakapı District, building block/lot:131/10, *Kaba Eski Eser Kor. ve Değ.-Mimarlık*
3. Ürgüp/Kayakapı District, building block/lot:131/23, *Kaba Eski Eser Kor. ve Değ.-Mimarlık*
4. Ürgüp/Kayakapı District, building block/lot:131/45, *Kaba Eski Eser Kor. ve Değ.-Mimarlık*
5. Ürgüp/Kayakapı District, building block/lot:132/121, *Kaba Eski Eser Kor. ve Değ.-Mimarlık*
6. Ürgüp/Kayakapı District, building block/lot:182/10, *Kaba Eski Eser Kor. ve Değ.-Mimarlık*
7. Ürgüp/Kayakapı District, building block/lot:185/12, *Kaba Eski Eser Kor. ve Değ.-Mimarlık*
8. Ürgüp/Kayakapı District, building block/lot:131/21, *Kaba Eski Eser Kor. ve Değ.-Mimarlık*
9. Ürgüp/Kayakapı District, building block/lot:184/29, *Kaba Eski Eser Kor. ve Değ.-Mimarlık*
10. Mustafapaşa, building block/lot: 6 /4668, *Ülkü Mimarlık Ofisi*
11. Mustafapaşa, building block/lot: 62/ 4731, *Ülkü Mimarlık Ofisi*
12. Mustafapaşa, building block/lot:96 /5644, Esin Tekin

13. Mustafapaşa, building block/lot:59 /4821, *Ülkü Mimarlık Ofisi*
14. Mustafapaşa, building block/lot:73/5112-A, Funda Solmaz
15. Mustafapaşa, building block/lot:73/ 5112-B, Funda Solmaz
16. İbrahimpaşa, No:39, Funda Solmaz
17. İbrahimpaşa, No:26B, Funda Solmaz
18. İbrahimpaşa, No:108, Funda Solmaz
19. İbrahimpaşa, No:93, Funda Solmaz
20. İbrahimpaşa, No:87, Funda Solmaz

After this extensive field survey, another field surveys were held to the region to analyze a group of houses which have partial remains of original details and can provide important data about construction techniques of traditional houses in the region. The system sections were not drawn but the important building parts and architectural elements were measured and drawn in detail. List of these houses and their addresses are as below:

1. Mustafapaşa, Leylak Sok. No:2B
2. Mustafapaşa, Cami Sok. No:12
3. Mustafapaşa, Nane Sok. No:1
4. Mustafapaşa, Mehmet Şakir Paşa Cad., Topakoğlu Konağı

During the field survey, some interviews with builders were made. A meeting was held with masons Orhan Öz and Metin Ayan in November 2011 to reveal the traditional building techniques in the region to discuss reasons for special situations of surveyed buildings. Some information on building and material selection was also obtained. Making an interview with masons was very beneficial to analyze the construction system better.

After digitalizing the drawings, a coding system was developed to make a better analysis of the construction technique. While generating this coding system Filiz Diri's MA thesis titled as "Construction Techniques of Traditional Birgi Houses" prepared in 2010 was used as main reference. Diri's coding system which is specified for timber frame/ Birgi traditional houses was adapted into stone/Nevşehir traditional houses. Hereunder these codifications, parts of the building are coded from foundation to roof with letters which are the abbreviations of the names of parts (e.g. FD-foundation, W-wall, Wn- window) (see Fig. 3.03). Ground floor and first floor vertical structural elements were coded in three parts which represented the lower part, middle part and upper part of the element (e.g. G1, G2, G3, F1, F2, and F3). The purpose of this type of coding is to understand whether construction system varies at the lower, middle, upper part or not. When the detail becomes different, it is shown with a new number on right bottom of code. For instance, the code "FD1" indicates us the first type of foundation. When the detail is being varied, code takes further numbers like "FD2, FD3".

A chart was prepared after the coding was done on the drawings. This chart shows us all codes and the buildings/details which the codes belong (see App. B). Here, the aim is to briefly understand which details belong to which buildings. Another aim is to make a typology of building units and to determine the extensity of these units in the selected sites.

Some details cannot be reached in some buildings. These circumstances are shown on the cart with different notations. The sign "- -" indicates the building units which could not be reached; "-" indicates the inexistent building units; "X" indicates the building units which are demolished or disappeared .

During codification process, it was found necessary to indicate certain distinctions in some building units. In this respect, windows were classified according to their dimensions and locations; however another classification was also made for window profiles which do not exist in all windows. Windows which have profiles are shown with the sign "*". The code of window profile is written with "*" sign, under the window openings. In addition to these window and door distinctions there are also some variations in building material. Rock-carved windows and doors are shown with the sign "**".

Another situation that has to be clarified comes up in walls-vertical structural element. When the walls were classified according to their construction technique, it was figured out that some walls were

constructed with the same technique and the same material however they differ in the variation of material such as rough cut stone or fine cut stone. Therefore since they were constructed with the same technique; a different code is not assigned to the walls. This diversity is indicated with the letters ‘a’ or ‘b’ which is written near the existing code. For example; if the second type wall was constructed with fine cut-stone, it takes the code ‘W2a’. If the second type wall was constructed with rough cut-stone, it takes the code ‘W2b’ (See fig. 3.02).

In addition to the table of codes, survey sheets were prepared for every single building (see App. C). These charts include an identification tag which has the address or block/ lot number of the building, 1/1000 scaled site plan which shows the location of the building, 1/200 scaled plan sketches, 1/50 scaled system details, special details from essential points, photographs and 3D images.

The information on construction techniques of traditional houses is enhanced with these tables and charts which consist of the data from field study. The construction technique is analyzed under following titles and put down on paper with supporting various photographs and drawings. These titles are determined with respect to the basic building units such as foundation, wall, floor, roof and architectural elements. Authentic features of traditional architecture are considered in this specification. For instance; walls are examined under the title of vertical structural elements regarding rock using in traditional Nevşehir houses.

Construction techniques of Nevşehir traditional houses are studied under these titles with field studies and detailed drawings:

- Foundations
- Walls
    - Stone Masonry Wall
    - Rock-Cut Wall
- Spanning Elements/ Connections
    - Arches& Vaults
    - Timber Beams
- Roof and Its Elements
- Architectural Elements
    - Projections &Cornices
    - Openings: Doors& Windows
    - Floor& Ceiling Coverings
    - Other Architectural Elements: Fireplace, *Tandır*, *Pabuçluk, Musandra, Seki, Sedir, Şıralık*, Niche, Built-in Cupboard, *Yüklük, Lambalık*, Shelf, Staircase
- Materials Used in Traditional Houses in Nevşehir
    - Rock
    - Stone
    - Timber
    - Iron

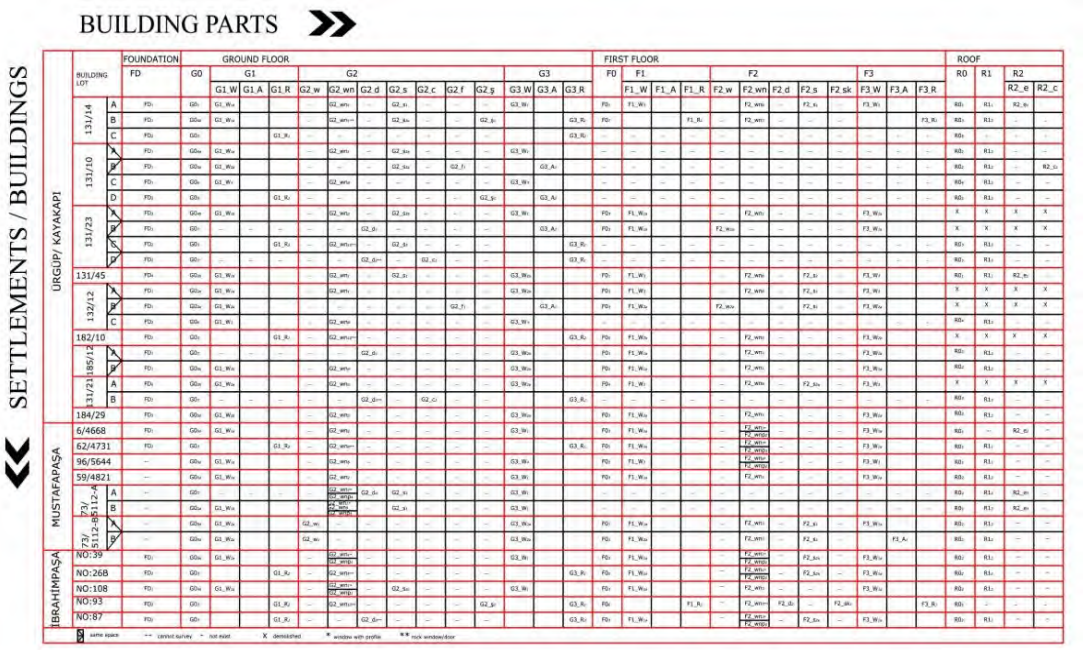


Figure 3.01, Table of codes

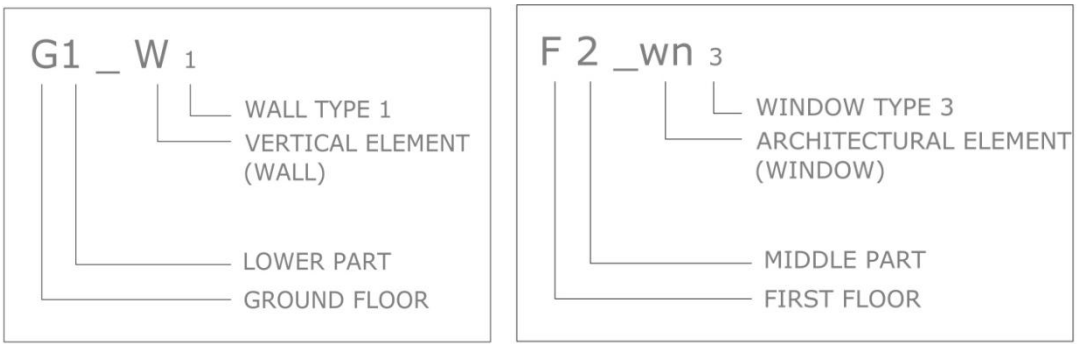


Figure 3.02, Examples of codes

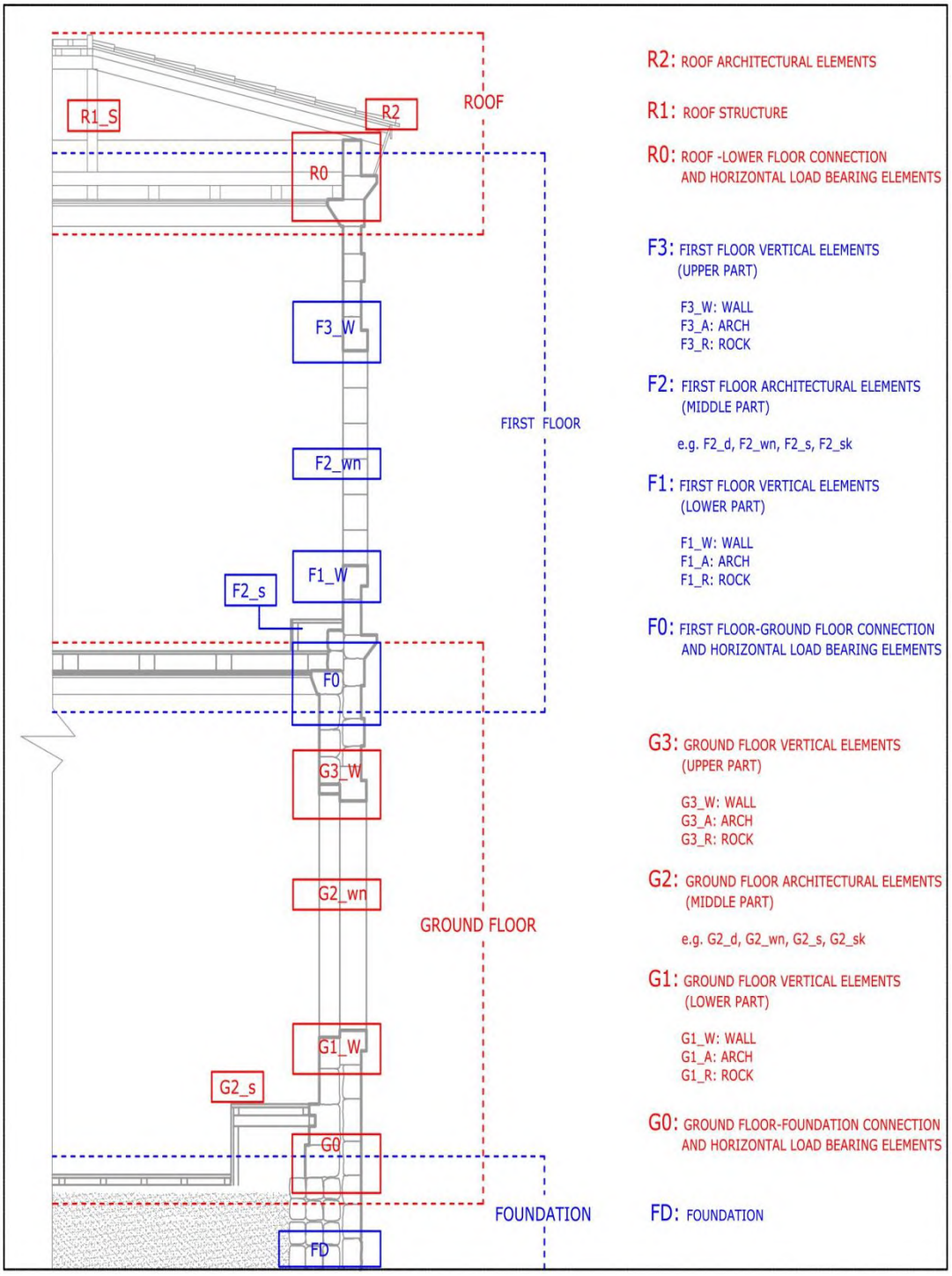


Figure 3.03, Code system

3.2. CONSTRUCTION TECHNIQUES USED IN TRADITIONAL HOUSES IN NEVŞEHİR

3.2.1. FOUNDATIONS

To determine the general features of traditional houses, surveys and measurements were done in Ürgüp (Kayakapı), Mustafapaşa and İbrahimpaşa. Every house's foundation could not be analyzed due to limits of accessibility. Therefore 16 of 20 houses' foundation were surveyed and determined.

Due to the geological structure of Cappadocia, the selected sites are generally established on rocky ground. This situation affects the construction technique and rock as a building material is usually used as construction system in foundations. As mentioned before, rock is used sometimes to create space, sometimes to support a wall of room and sometimes partially or completely to form the foundation of building. The rock ground has an important role to reshape foundations in Cappadocia.

The foundations beneath the masonry walls can be made entirely of stone, partially stone/rock or completely rock. The width of foundation wall changes according to masonry wall and its height depends on the ground's condition. The outer faces of stones which are used in foundation wall are fine cut and inner faces are rough cut. The rough cut-stone inner faces enable mortar to fix stones easily. It is also an advantage for workmanship. Wall is constructed with two or three stone row and the gap between stones filled with mortar about 5cm thicknesses. It is seen that rock particles and stone pieces of 3cm to 20cm are used as infill material as local name of '*k'*.

As a result of field studies, the foundations of 16 houses and 23 different details belong to these houses could be reached. According to these 23 details, it is possible to classify foundation types into six groups. The types of foundation materials, width and height of foundation walls, connections with rock ground and relations with inner and outer space levels are the criteria of these classifications.

Foundation Type 1: Shallow Foundations Sitting Directly on Rock

First types of foundations were observed in 12 different details of 7 houses. In this type, foundation walls directly sit on the rock ground. It is usually seen in the houses which are located on the ground with no slope, so that it is called "shallow foundation". The level of ground floor is very close to the level of foundation because foundation walls are low (see Fig. 3.04).

Construction of foundation walls starts with opening several gaps of approximately 40cm on the rock ground. The main function of these gaps is together with foundation walls to transfer the load of building to rock ground. The dimensions of gaps changes according to structure of the ground. Upon these gaps which are around 2 rows of stone, the foundation walls are raised 30-40 cm more till the ground floor level. In this way 70-80 cm level difference emerges between inner ground level and outer ground level (see Fig. 3.04). With this level difference it becomes possible to keep away ground humidity and bad weather conditions such as rain, snow. The thickness of foundation wall usually changes between 40cm and 70cm. If there are outer faces of foundation wall, these faces are constructed with fine cut-stone. The inner faces which are between rock and outer wall are constructed with rough-cut stone and infill (see Fig. 3.03). In Cappadocia it is also seen in some houses that foundation is constructed by bonding single row stone wall in front of rock mass. The thickness of foundation wall decreases to 30cm in this situation.

Foundation Type 2: Rock Foundations

Second types of foundations are formed by carving ground rock to produce foundation walls. This type is seen in 11 of 23 details. In rock carving technique which is seen very often because of geological structure of the region, the rock itself works as foundation with its long durability. Thus stone foundation walls are not needed (see Fig. 3.05). While it is anticipated to see rock carved foundations in rock-carved houses, it is a common practice also in masonry structures (see Fig. 3.07).

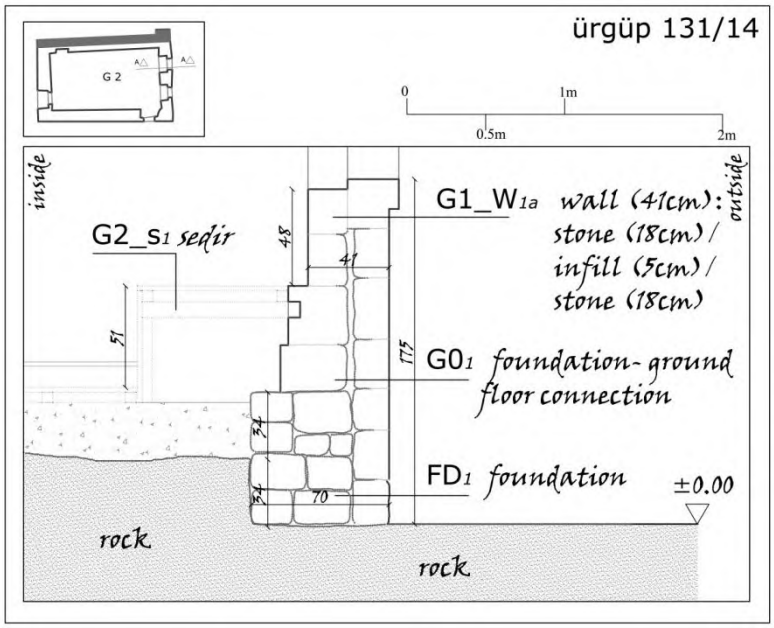


Fig. 3.04, Detail of foundation type 1

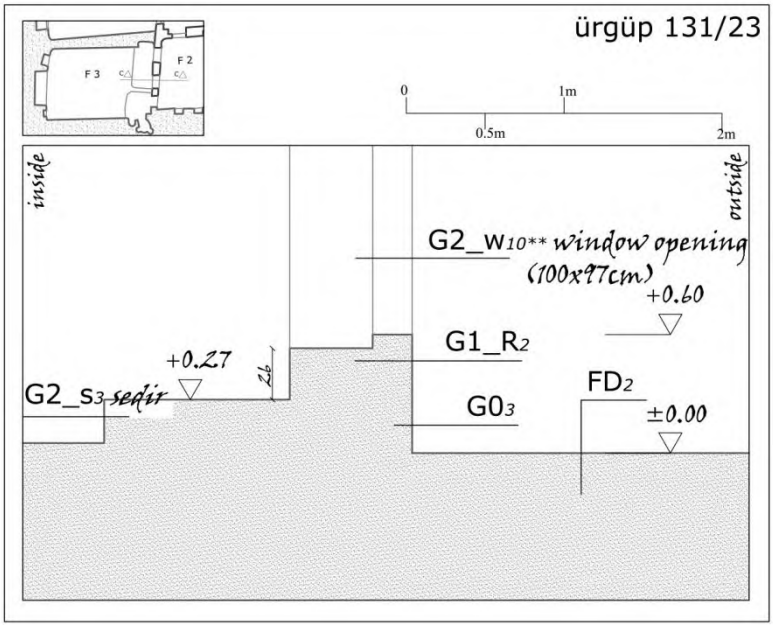


Fig. 3.05, Detail of foundation type 2

Fig. 3.06, Foundation type 1 (Ürgüp, block/lot: 131/14)

Fig. 3.07, Foundation type 2 (Ürgüp, block/lot: 131/21)

Foundation Type 3: Deep- Slope Foundations

Despite the fact that this type of foundations has some similarities with the first type, their widths and heights of vary. The 3rd type is called "deep- slope foundation" due to its extensive usage in the houses built on steep slopes. The difference in height between outer ground level and inner ground level is more than previous types.

The average thickness of foundation walls which also sit on rock is 45-50cm and the height is above 1m. Therefore at least 1m high subbasement is generated between outer and inner ground (see Fig.

3.09). Inner faces of foundation wall are constructed with rough-cut stone. Although the outer faces of foundation wall are constructed with fine cut-stone, rough-cut stones can also be seen on the façade.

Foundation Type 4: Canal Foundation

The stone walls in this type of foundations are placed on a canal which is formed by carving the rock ground. The part of the wall which sits on the rock ground is constructed as a footing. The footing is 80cm in width and 40cm in height (see Fig. 3.10). In this type of foundation floor is elevated 60-100cm above from the ground. Therefore the height difference between inner and outer ground is obtained (see Fig. 3.11).

Type-4 foundation is seen in one surveyed house however it should be noted that it is hard to determine canal foundation unless the floor is partially or entirely demolished.

Foundation Type 5: Shallow-Inner Foundations

These foundations are constructed with both rock and stone. The single row foundation wall is constructed on 50cm-gap which is carved out of rock. Constructing foundation walls to inner side makes this type different from other type of foundations (see Fig. 3.13). In other words, the carved gap and foundation walls are located on inner side. Therefore, a rock layer can be seen on façades of the building (see Fig. 3.12). Thus it is called "shallow-inner foundations". The height difference is not big between inner and outer ground levels.

Foundation Type 6: Deep-Inner Foundations

This type is constructed with the same idea of shallow-inner foundation. Depending on the structure of the ground, ground rock is levelled and foundation walls are constructed to inner side of it. The distinguishing feature of this type is the height of foundation wall. 100-150cm height foundation wall is induced the height differences between inner and outer ground level (see Fig. 3.14). Floor is raised with timber posts so that 150 cm level difference is gained (see Fig. 3.15).

Fig. 3.08, Foundation type 3 (Ürgüp, block/lot: 131/23)

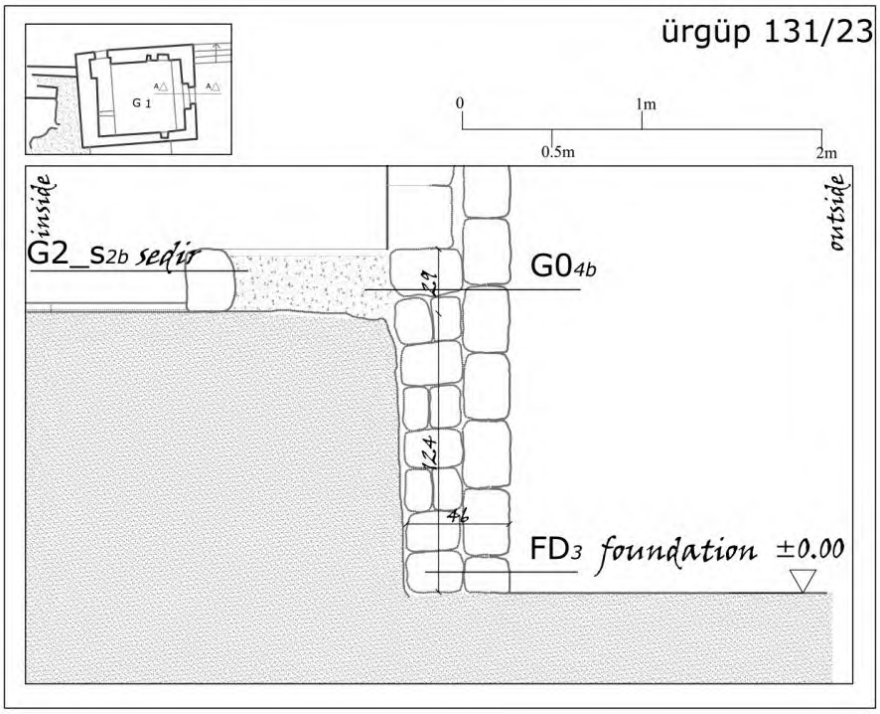


Fig. 3.09, Detail of foundation type 3

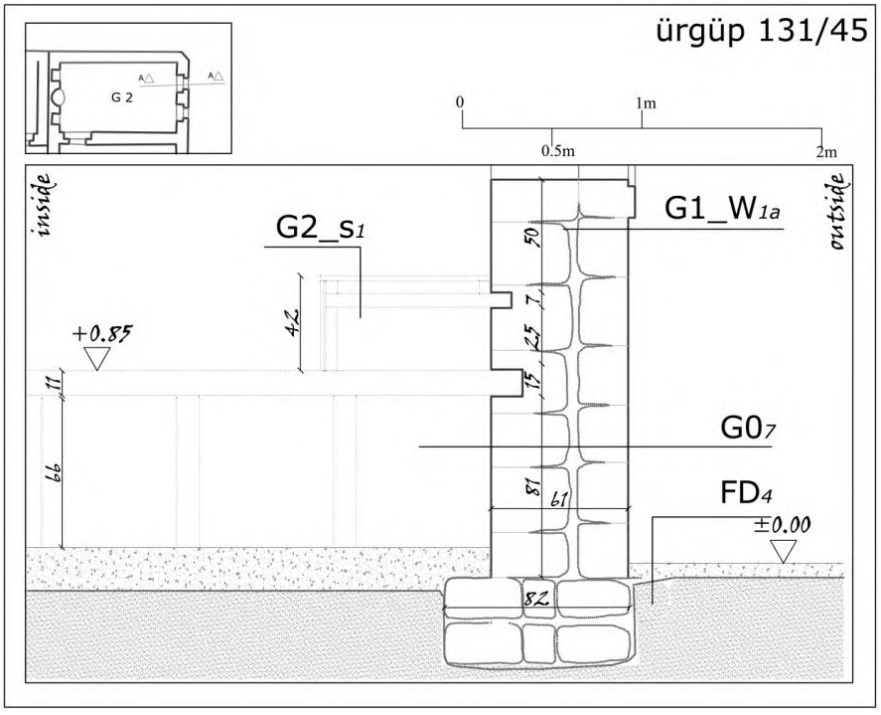


Fig. 3.10, Detail of foundation type 4

Fig. 3.11, Foundation type 4 (Ürgüp, block/lot: 131/45)

Fig. 3.12, Foundation type 5 (Ürgüp, block/lot: 184/29)

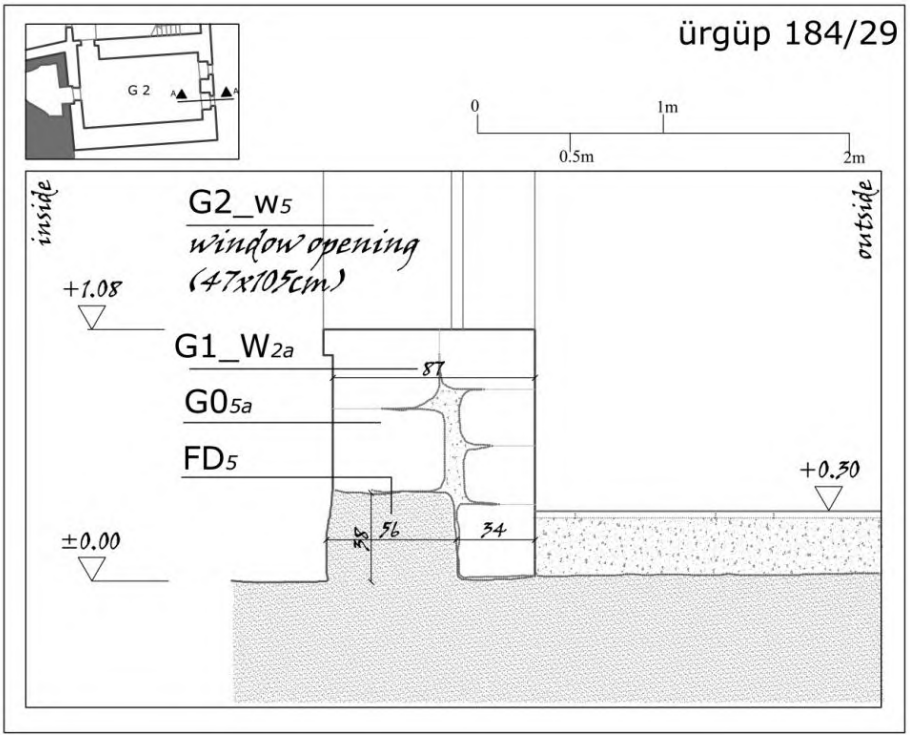


Fig. 3.13, Detail of foundation type 5

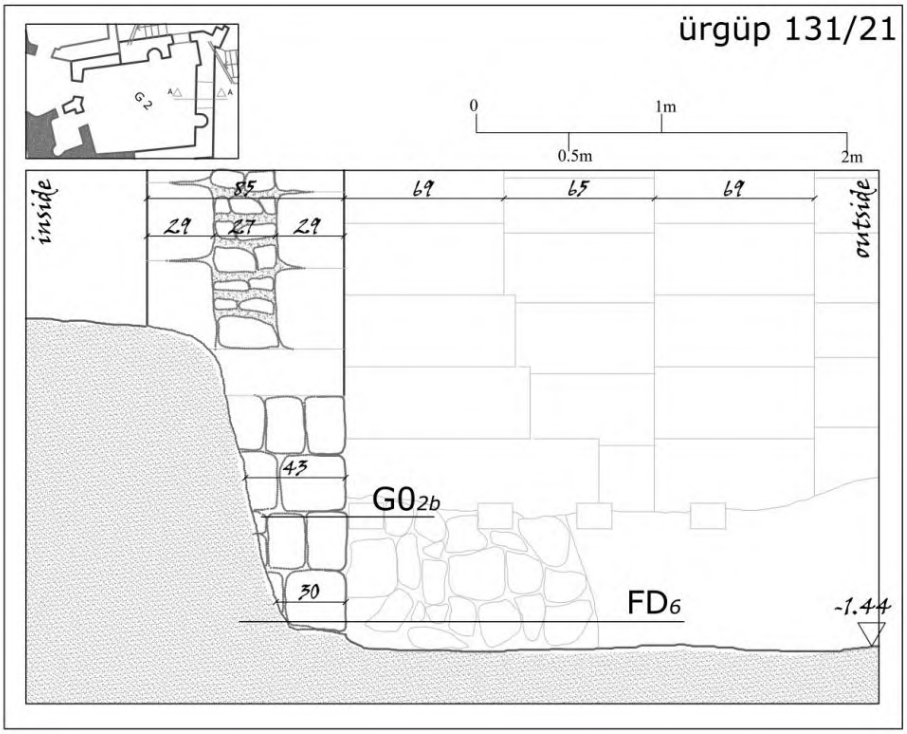


Fig. 3.14, Detail of foundation type 6

Fig. 3.15, Foundation type 6 (Ürgüp, block/lot: 131/21)

3.2.2. WALLS

Walls and rock as a part of structure constitute to the vertical structural elements in traditional houses of Nevşehir.

3.2.2.1. STONE MASONRY WALL

The masonry walls are made up of local stone which is called "Nevşehir stone" in the region. The stones used in constructions are divided into two types: fine cut-stone and rough cut-stone. Rough cut-stones which are quarried and then shaped roughly are mostly used in storages and service units. Some rare examples show us rough cut-stone can also be used in main building walls (see Fig. 3.16). Masons Orhan Öz and Metin Ayan stated that rough-cut stone usage in main building walls can be related with the owners' economic conditions and/or the quarries' situation in times of construction (Interview, November 2011). Fine cut-stone is used extensively in the region. Most of the buildings are constructed with fine cut-stone which are brought in blocks from quarry and reshaped elaborately.

In traditional buildings, walls and foundation walls are constructed in masonry technique after the rock ground which foundation sits on is prepared. The main difference between foundation walls and walls is that foundation walls are made up of rough cut-stone, which is more resistant to abrasion, rough-cut stones. It can be said that masonry walls are also formed according to ornaments and decorations on building façade and the architectural elements used in buildings such as window, cupboard and niche. There are holes seen on the wall which are opened for timber beams of some architectural elements such as *seki* and *sedir* (see Fig. 3.17). Thus, masonry wall works as main supporter of some architectural elements. The indents for window profiles and window openings are left while constructing the wall. Also, window cornices and decorations around cornices cause differences in the section of the wall.

Ground floor walls are built in two rows and infill and/or mortars between the rows. The gaps between rows are filled with rock and stone pieces which are called "*kesek*" in the region. The special mixture called "*şillez*" in the region is poured into the wall gaps. Ş*illez* enables *kesek* infill to adhere wall rows.

The iron tie bars, which are explained in detail in the section of upper floor walls, are not frequently used in ground floor walls (see also page 63). Only one instance of tension bar is seen in ground floor during the survey (Ürgüp, 131/45). Apart from that, in one house use of timber girders was noted (see Fig. 3.18). There are some criteria to classify the walls such as type of material, width of wall and construction techniques. According to construction techniques, we can group the ground floor walls into three.

Fig. 3.16, Rough-cut stone on buildings (Ürgüp, block/lot: 182/10- 185/12)

Fig. 3.17, Hollows on the wall (Ürgüp, block/lot: 131/45)

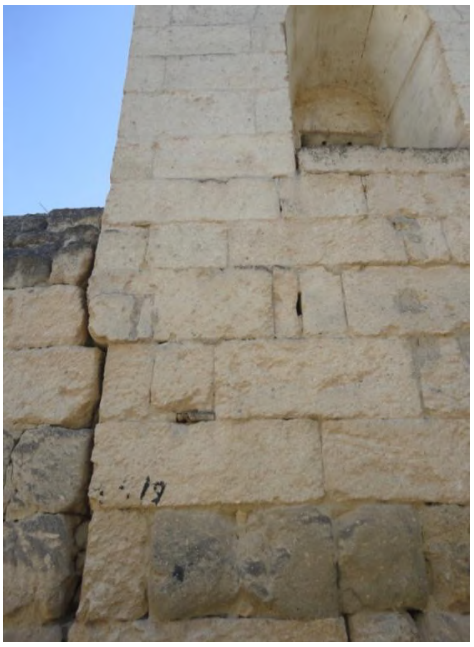


Figure 3.18, Timber tie beam (M.paşa:73/ 5112)

Wall Type 1: Thin Double Sided Wall

This type of walls is constructed right above the foundation walls in ground floor and on the arches of aiwan in upper floors. Total thickness of thin double sided walls changes between 40cm to 60cm. The technique of construction of the wall is as follows: Two stones of 18-25cm are put together side by side; between these two stones 5cm gap is left. 5cm gap is filled with rubble and mortar (see Fig. 3.21). Thus, the total thickness reaches to about 40cm.

Thin double sided walls are usually built with fine cut-stone; however there are few examples of rough cut-stone wall type-1. Thin double sided walls with fine cut-stones are shown with the letter 'a' while those built with rough cut-stones are shown with the letter 'b' in the coding system (see App. B).

When the wall is constructed with cut-stone, only the outer sides of stones are cut finely, inner sides facing to gaps are left roughly (see Fig. 3.19, 21). Thereby, infill and mortar are became integrated with stones better. It is observed in demolished parts of buildings that the gaps between these two stones are filled with broken pieces of stones and rock.

Although rare there are instances of walls which constructed in the same technique with fine cut-stone and rough cut-stone are used together with gap. In this condition, the inner sides of wall is constructed with fine cut-stone, the outer side is constructed with rough cut-stone (see Fig. 3.20).

It is revealed that in some houses these two techniques are used together. In this combined type, at corners and nearby the corners both sides of wall are constructed with cut-stone; at the middle part of the wall one side is constructed with cut-stone and the other side with rough cut-stone (see Fig. 3.20). Mix technique is seen in only one of surveyed houses. It is clear that the technique of using cut-stones on the wall corners is for keeping the building steady and for preventing the wall loosening from corners (sees Fig. 3.16).

On the upper levels of facades ornaments can be seen with floor cornices. Especially at İbrahimpaşa, decorative stone cantilevers can be seen on both sides of window spans on upper floor (see Fig. 3.24, 25).

Fig. 3.19, Infill between the stones of wall (Ürgüp, block/lot: 131/14)

Fig. 3.20, Rough-cut and cut stone wall (Ürgüp, block/lot: 131/23)

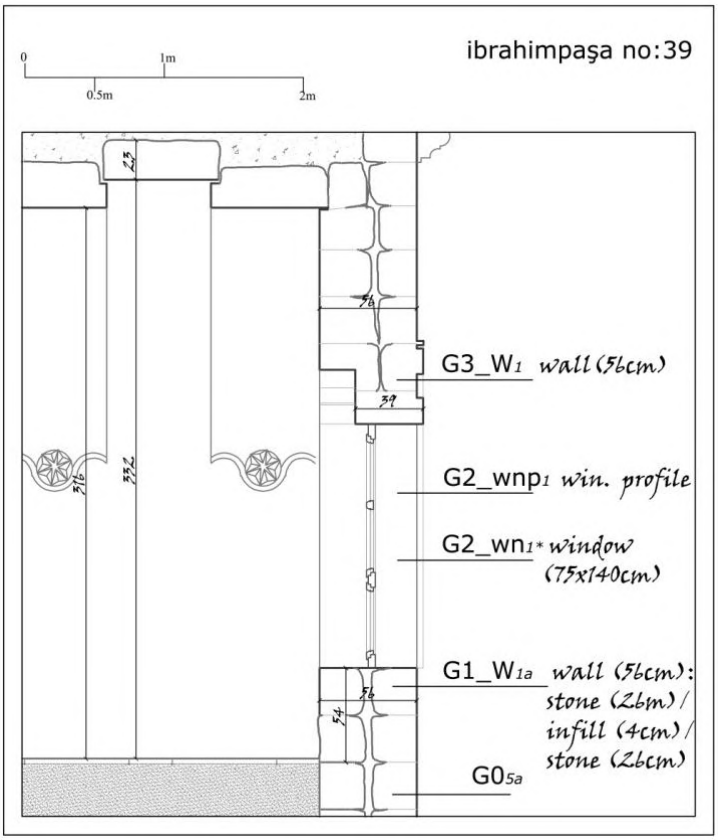


Fig. 3.21, Wall type 1a (cut-stone/infill/cut-stone)

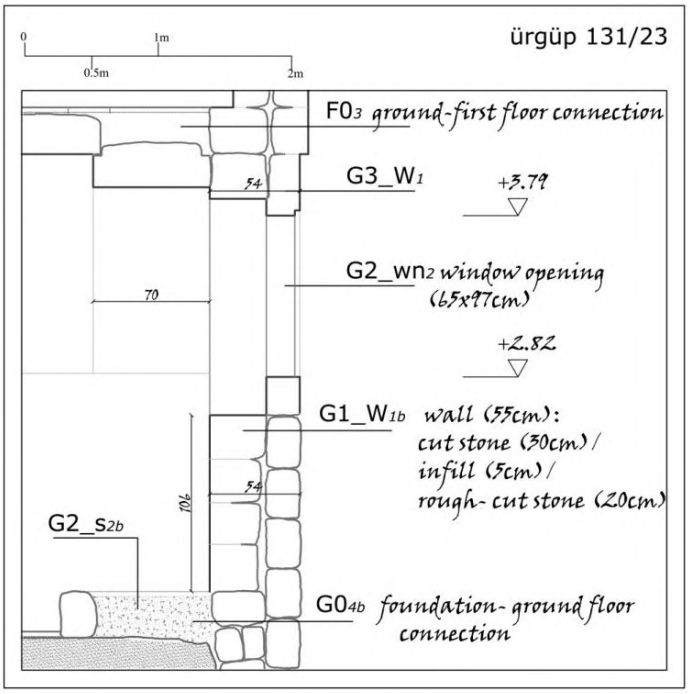


Fig. 3.22, Wall type 1b (cut-stone/infill/rough cut-stone)

Figure 3.23, Wall corners
(Ürgüp, block/lot: 182/10)

Figure 3.24, Stone projections
(İbrahimpaşa, no: 26- no: 39)

Fig. 3.25, Stone projections (İbrahimpaşa, no: 26- no: 39)

Wall Type 2: Thick Double Sided Walls

Thick double -sided walls are also constructed with two stones and filled gap between them. The thickness of stones varies between 20 and 30cm and the total thickness of wall changes between 60cm

to 85cm. Main differences of this wall type is the width of the gap between the stones. This gap which can reach to 35cm in some houses is filled with particles of stones and rock that is called '*kesek* and '*kayır'* locally (see Fig. 3.26, 27). Because the width of gap can cause structural problems, stones 60-85 cm in length are set perpendicular to others along the wall. These orthogonal stones are usually located randomly. They can be distinguished on facades by their square shaped bases among rectangular stones of the wall (see Fig. 3.28). It is known that this construction technique was also used in buildings in ancient settlements such as Labranda (see Fig. 3.29).

It is noted that thick double-sided wall technique is used especially on the walls with fireplace. In two houses the walls which fireplaces are located on were this type. Thick double-sided wall is usually constructed with cut-stone however in one house use of rough cut-stone was observed. Rough cut-stones are used for both layered on this 68cm width wall and the gap between the stones is again infilled (see Fig. 3.30).

Although not as systematically as in single-sided walls, iron tie bars can be seen on upper floor double-sided walls. Tie bars on thin double-sided walls can be seen on the front and side facades (see Fig. 3.28). Another similar technique is using timber tie beams instead of iron tie bars. At three surveyed house, timber tie beam is used approximately two times in every floor and located above or under the door and window openings if exist, otherwise along the wall close to the floor level (see Fig. 3.31). Different than iron tie bars there is no tightening system outside of the wall. Timber tie beam is hidden on façade of building.

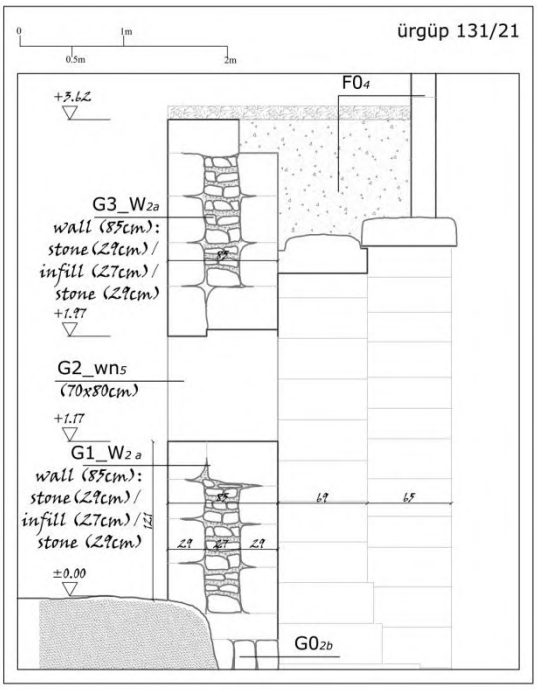


Figure 3.26, Wall type 2a

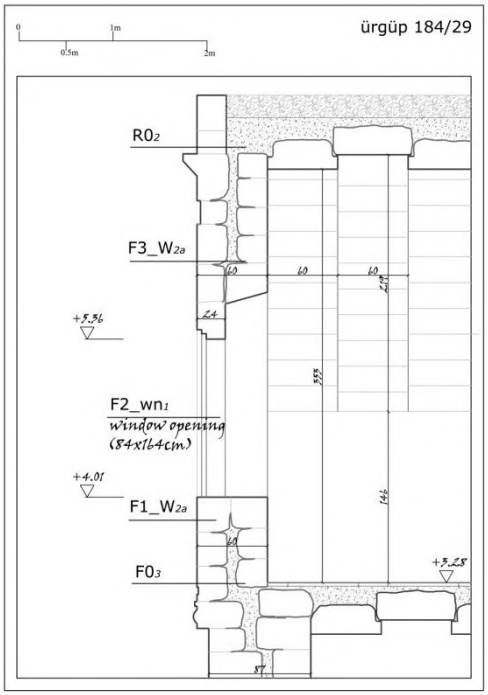


Figure 3.27, Wall type 2a

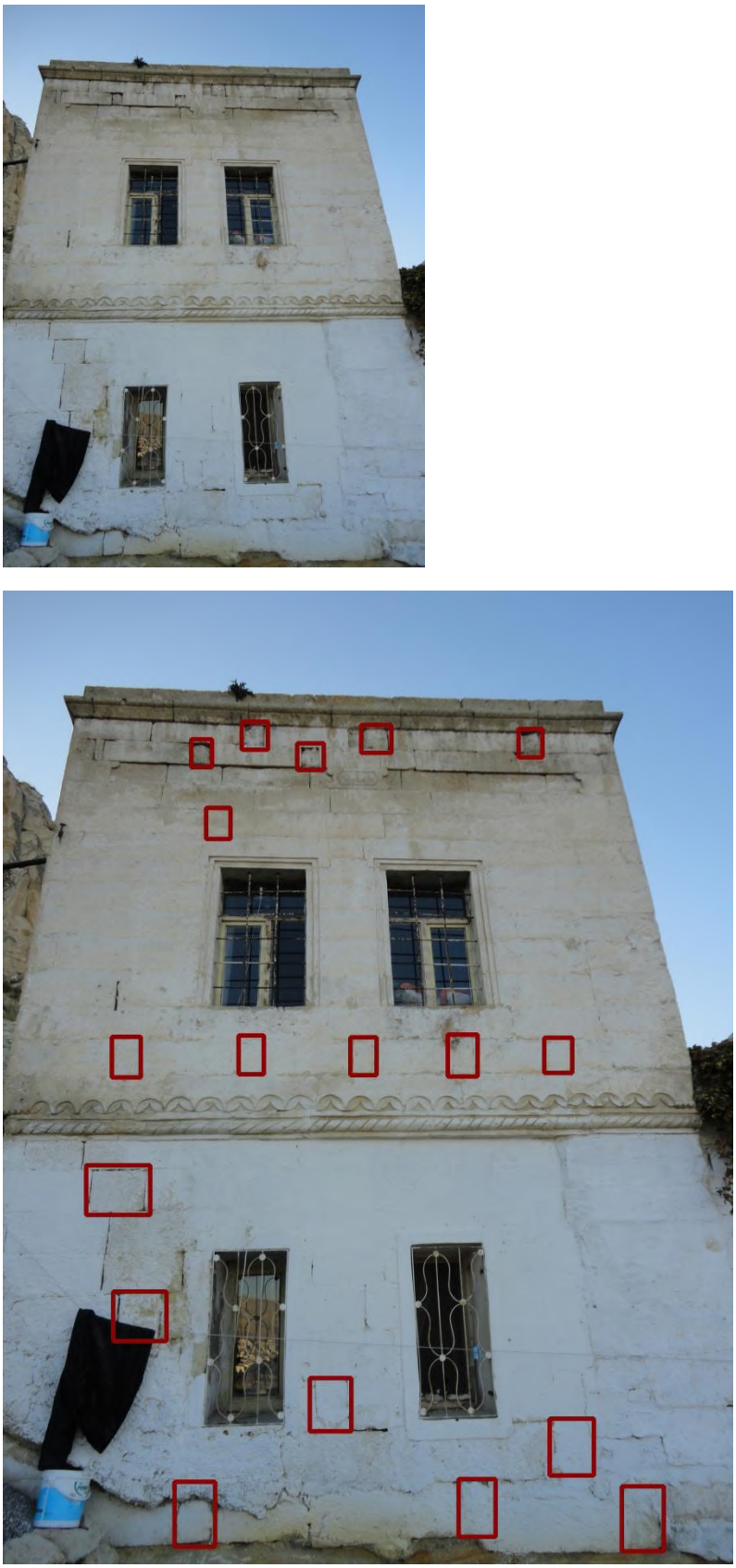


Fig. 3.28, Stones connected perpendicular to others (Ürgüp, block/lot: 184/29)

Figure 3.29, Labranda Archeological Site, Milas, 2012 (Photo: Göze Akoğlu)

Fig. 3.30, Infill between the stones of wall type 2 (M.paşa, block/lot: 73/5112-B)

Fig. 3.31, Timber tie beams on the wall (Mustafapaşa, block/lot: 73/5112-B)

Wall Type 3: Single-Sided Walls

Single-sided walls are built with stones varying 18-30cm in thickness set in one row. This type was observed in ground floors very rarely-in fact only two of twenty-eight buildings. These were inner walls built in single row on rock ground. The purpose is enclosing entrance of an interior rock-carved space (see Fig. 3.32).

In upper floors, single-sided walls are constructed with cut-stone upon double-sided walls of ground level. In order to do that, the 40-60 cm thick wall of ground floor is extended to second floor level and conjoined with it by using cornice inside. After its outer surface is coated with cornice to underline the start of next floor the wall is continued to be built in single row the thickness of which varies between 18cm and 30cm (see Fig. 3.33). In one case out of twenty-eight houses it was observed that the upper level walls were not directly seated on ground level wall, instead drawn back and placed on the arches of ground floor (see Fig. 3.34).

Upper level single-sided walls are attached with iron tie bars to hold them together (see Fig. 3.35). The dimensions of these tie bars are 0.3 cm in thickness and 3cm in width. They are located under or above the window openings right after the stones forming window openings and go along with wall and fastened up with another 50cm length, 0.3cm width vertical bar which is pulled through the hole on the top edge of tie bars (see Fig. 3.36). Walls are strengthened to the lateral load by applying this technique to all building walls. It is also revealed that horizontal tie bars are used right above the inner cornices at interior walls (see Fig. 3.37). Iron tie bars are seen eight surveyed houses. One of the eight tie bars is in İbrahimpaşa, two of them are in Mustafapaşa and five of them are in Ürgüp.

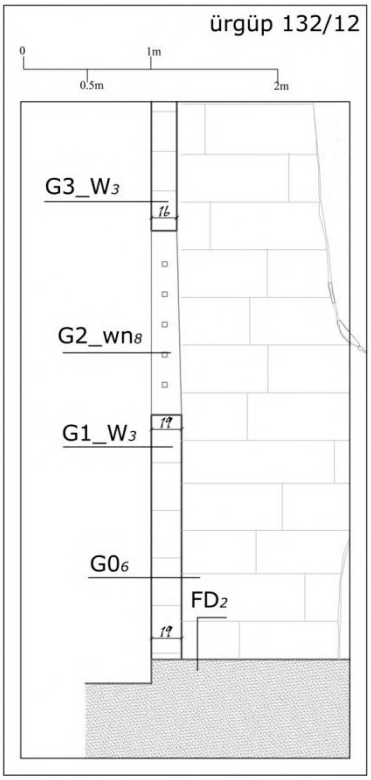


Figure 3.32, Wall type3

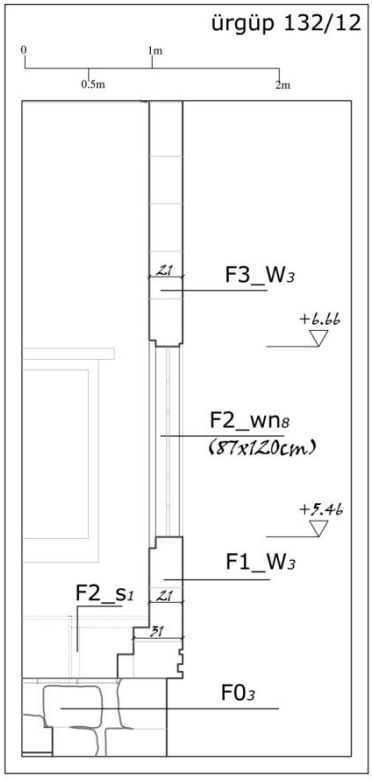


Figure 3.33, Wall type 3

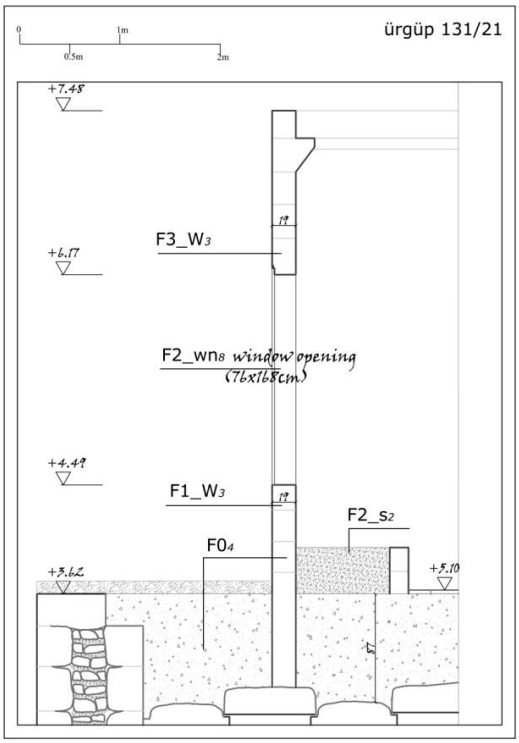


Figure 3.34, Wall type 3

Figure 3.35, Tie bars on the wall
(Ürgüp, block/lot: 131/45)

Figure 3.36, Tie bar
(Ürgüp, block/lot: 131/14)

Figure 3.37, Tie bars on interior and exterior walls (Ürgüp, block/lot: 131/45)

3.2.2.2. ROCK-CUT WALL

In Nevşehir houses, rock is frequently used in foundations, in walls, roof and architectural elements as a part of building. Local people make good use of this very formable material. In addition to formability, due to its structural features rock plays an important role as a vertical element in buildings. In rock-carved spaces the need for load-bearing walls disappears.

People shape rock into different length, width and depth to make spaces more functional in accordance with their needs. In some cases rock is carved in to generate a space; in other cases it works as a separator between two spaces. In both situations, architectural elements such as niches, cupboards, fireplaces are made of carved rock. These architectural elements do not contribute to the classification of carved rock because they are fashioned according to changing requirements of users. On the other hand, as a vertical structural element, rock can be classified according to the method by which it is processed. In this respect, there are two groups for investigating rock vertical structural elements.

First group comprises the rock elements which are constructed with rough carving technique and the traces of carving tools can easily be noticed on the surfaces (see Fig. 3.38, 39). The dimensions of window and door openings are not standard in this type.

The second group consists of the rock elements that are finely carved which have smooth edges (see Fig. 3.40-41). Space units built by this technique are in regular geometric forms so that sometimes it is possible to confuse the stone surfaces and lime-washed rock surfaces. Elements such as niche and window/door openings are also constructed very accurately.

Rock structures are usually used in ground floors. In houses located on the edge of a big rock mass, ground floor spaces are made of carved- rock while upper floors are built with masonry. As it was observed in other examples, rock mass is conjoined with masonry room or aiwan built in front it and if needed, upper floors are built with masonry (see Fig. 3.42-44). In upper levels rock structures can be seen according to quality of rock mass. It was seen only one house that both ground floor and second floor were rock-cut structure.

Figure 3.38, Rough carving technique (İbrahimpaşa, no: 39)

Figure 3.39, Rough carving technique (Mustafapaşa, block/lot: 62/4731)

Figure 3.40, Smooth carving technique (Ürgüp, block/lot: 131/23)

Figure 3.41, Smooth carving technique (Mustafapaşa, block/lot: 62/4731)

Figure 3.42, Masonry room in front of the rock- (Ürgüp, block/lot: 131/21)

Figure 3.43, Arch built nearby the rock mass (Ürgüp, block/lot: 1321/12)

Figure 3.44-45, Aiwan built in front of the rock mass **(**Ürgüp, block/lot: 182/10)

3.2.3. SPANNING ELEMENTS

In Nevşehir houses, spanning elements consist of ceiling/floor and the wall parts which they are related. According to construction techniques, spanning elements can be grouped into two as arches-vaults and timber beams.

Ground floors are constructed with stone floor coverings. Flooring is on the rock ground while stone masonry wall is rising up (see Fig. 3.45-184/2-a). Before floors are set, rock ground is covered with *kayır* (pumice) around 3-10 cm in thickness. The purpose of this technique is to protect floor from ground dampness.

In another floor type which is also constructed with stone floors, *sedir* connects floor and the elevated building wall. In order to do that, single row of Nevşehir stone is set 80cm away from wall and the gap between stone and wall is filled with certain materials. Thus, a *sedir* with dimensions of 90-100cm in width and 30-40cm in height is constructed. After *sedir,* floor is constructed with stone floor coverings or rock (see Fig. 3.47).

In almost all of rock carved houses, floor is also constructed with rock without using any flooring material (see Fig. 3.38, 40).

Another type used in ground floors is floor raised with timber posts. In this type, floor is elevated on 50-100cm high timber posts in order to keep floor away from ground dampness. This type of floor is usually completed with a timber *sedir* (see App. C-131/45). It is also possible to use lower timber posts to elevate the floor but in this case the gap is filled with *kayır* (pumice). In some instances *kayır* is covered with clay mud and timber beams carrying floor are located on it (Interview, November 2011).

Similar techniques are also used in upper floors. Timber beams are placed on inner cornices and then floor boards are set on these timber beams (see App.C-131/14).

There is a unique ceiling system in the region called as *hezen. Hezen* is barked tree trunk. *Hezen*s are used to span over openings. In ceilings of ground floor and/or second floor they are covered with infill and straw, upon which floor boards are set. In last floor ceilings *hezen*s, covered with straw, infill and clay soil, form the roof.

Another widely used system is covering of ground floor with vaults which also forms the floor of next floor. There are examples of this floor type with stone *sedir*.

Aiwan's *atkı kemerli tonoz* built in front of a rock mass and rock are generated the upstairs' floor. Top of the vault is filled with *kayır*, by this way a flat surface is made and stone floor covering is placed under this layer. This type of flooring has very commonly using in the region that rock-cut and masonry systems are frequently faced with together.

In houses which ground floor and upper floors are constructed with carved rock, floor of upper level is also formed by carved rock (see App. C). The thickness of floor varies in these houses.

3.2.3.1. ARCHES & VAULTS

In Nevşehir houses, arches and vaults are one of the most important architectural elements which add architectural value to them. Arch is used very commonly in spanning the large openings, supporting parts which have to be reinforced structurally, bearing stairs to the upper floors and produce superstructure in front of the rock-cut spaces. In a local traditional technique, *kaburga kemer* and *kapak kemer* are built next to each other to support vaults, which are known locally as *atkı kemerli tonoz*. (see Fig. 3.46, 47). These vaults are frequently used as structural elements. The spaces, which are created with these vaults, are named as 'arched room *(kemer oda)*' in the region.

The construction technique of arches and vaults was revealed via interviews held with local craftsmen and surveys in the field. Accordingly, room walls are constructed up to the impost line which is locally known as 'foot level *(ayak seviyesi)*'. After impost, front and rear walls are constructed. In the meantime, a wooden vault framework with is located between side walls and arches are started to be constructed on inner sides of wall. The front and side surfaces of voussoirs are fine cut while back surfaces are rough cut.

Kaburga kemer which act as main bearing elements, are begun to be constructed in dimensions varying between and 60-80cm width. *Kaburga kemer*s are located with 60-80cm intervals and these intervals are covered with secondary row of arches which are locally called as *'kapak kemer*' or '*ara kemer*'. *Kapak kemer*s are placed on 5-10cm wide indents locally called '*lamba*' which are opened on both sides of voussoirs of rib arch (see Fig. 3.48-52). Construction of *kapak kemer*s can be started before the row of rib arches is completed as long as *kaburga kemer* is constructed before. *Kapak kemer* which is around 20-25cm wide is usually thinner than *kaburga kemer*. When necessary, it is built as self-supporting. The width of *kaburga kemer's* voussoir is about 20 to 30cm. The wider the opening is covered with arch, the thicker the voussoirs are needed. Thus, vaults varying 500 to 700cm in length are generated by constructing *kaburga kemer*s and *kapak kemer*s together (see Fig. 3.46, 47).

When arch profiles are analysed, it can be seen that height of top points of arches used in arch rooms change from 300cm to 400cm. This height rarely exceeds 400cm-it is seen in only one house. In aiwans, the top points of arches are usually higher than 400cm. Between *kaburga kemer* and *kapak kemer*s there is always 5-10cm difference in thickness and 10-20cm in height from ground level.

The space between the arch and wall which begun to be set together and separated at impost level is called 'arch seat' *(kemer koltuğu)*'. This space is filled with light material called '*kesek*' which consist of construction rubbles, pieces of broken stones/rock and pumice. Soil is not preferred as an infill material as it causes extra load; however it is used when *kesek* and pumice are not available (see Fig. 3.48, 53).

These arches are used not only in rooms but also in aiwans constructed in front of rock spaces (see Fig. 3.46).The width of arches conjoining with rock mass can be adjusted according to the form of rock. It was observed that in some cases broken pieces of stone/rock were filled in the gap between arch and rock mass when their surfaces could not be levelled (see Fig. 3.44).

Arch and vaults can be added with some architectural elements. The elements such as cupboards, niches, fireplaces are installed in the wall while it is being constructed. It is seen that these architectural elements are usually built in *kapak kemer*s (see Fig. 3.49, 50) because *Kaburga kemer* is load bearing arch. Moreover door and window openings are adjusted to the *kapak kemer*s which only bears its own load. Ornaments can be seen on impost level of *kaburga kemer*s.

Vaults are used as superstructure on aiwans, ground floors and first floors. These superstructures also form the floor of next storey. Vault is covered with pumice to produce a plane surface upon which stone coverings measuring 30-40x50-70cm are placed (see Fig. 3.48). Compared to other stone materials used in different parts of house, these floors are more enduring. They are more resistant to abrasion and dampness. In some houses coverings are set on deeper pumice infill measuring from 5 to 40cm. If a *sedir* is installed in upper floor, it is constructed on the same infill (see Fig. 3.52). In order to construct roof, vault is filled with *kesek* and pumice and then covered with earth.

While horizontal construction of building is being defined, cornices and/or projections between ground floor and second floor and second floor and roof should also be examined. Cornices on façades are the elements which separate floors and emphasize the finishing of storey. Exterior cornices are not directly connected with floor; they are façade elements. Similarly projections on walls also do not extend to floor.

Figure 3.46, Vault of aiwan (İ.paşa, no: 87)

Figure 3.47, Vault of room (İ.paşa, no: 26b)

Figure 3.48, Infill on the extrados of the vault (Mustafapaşa, block/lot: 73/5112-2)

Figure 3.49, *Kaburga kemer* and *kapak kemeri* (Ürgüp, block/lot: 131/23)

Figure 3.50, *Kaburga kemer* and *kapak kemeri* (Ürgüp, block/lot: 132/12)

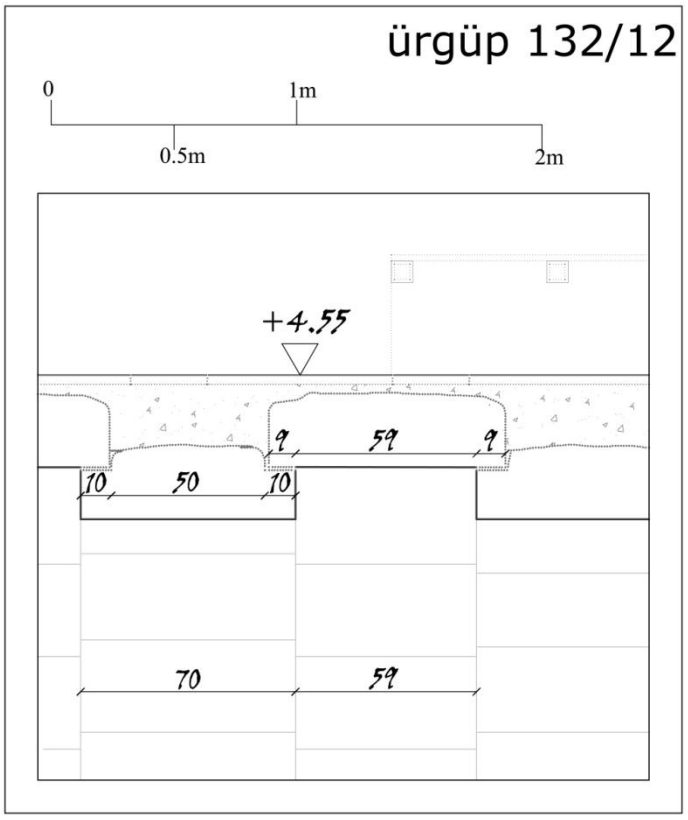


Figure 3.51, Vault detail (Ürgüp, block/lot: 131/12)

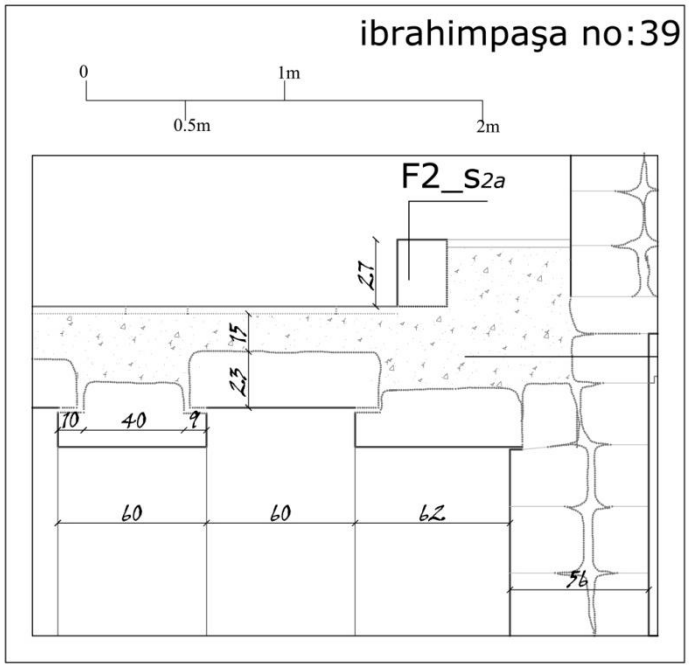


Figure 3.52, Vault detail (İ.paşa, no: 39)

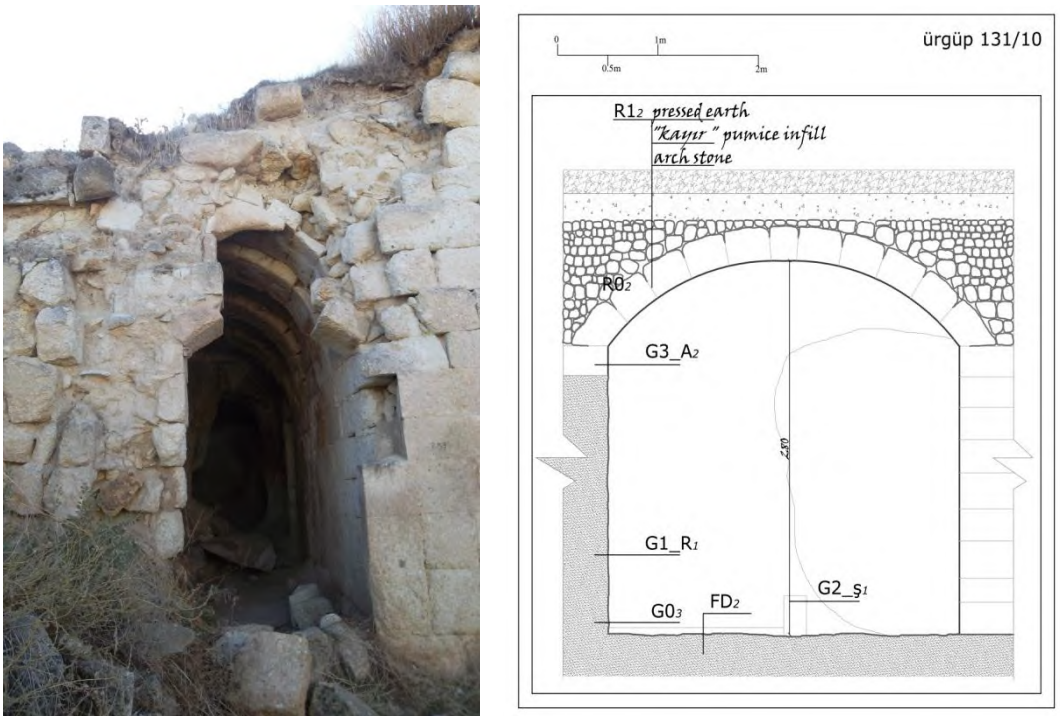


Figure 3.53, "*kemer koltuğu*", (Ürgüp, block/lot: 131/10)

3.2.3.2. TIMBER BEAMS

Timber beams are second most common horizontal elements after vaults. Timber which has a limited area of usage in Cappadocia is often used in floorings. In surveys it was detected that the classified timber floors are installed in ground floors and first floors.

Timber floors are usually used in upper storeys. Timber floors are placed on inner cornices which are constructed together with walls. These inner cornices varying 15-30 cm in depth, are built on inner surface of the wall and 50-60cm above outer cornices (see Fig. 3.54, 55).Usually, two row of rough cut-stone is placed on cornice in front of the window for timber *sedir* which is constructed at the same time with timber flooring. Strength of inner cornice is important for the strength of spanning elements too. If the cornices are stable, when needed, timber flooring can be renewed without causing any deformation in the building. For this reason, stones of inner cornices are selected from more durable Nevşehir stones (Interview, November 2011).

The measure of timber beams that are used in ground floor is 5x10cm and in first floor, 15x15cm. These timbers are rarely in regular geometric form; they are usually shaped roughly or used as trunks. Timber beams are located parallel to short side of the room on inner cornices with 30-50cm intervals. Planks measuring 30cm in width and changing in length baseboards are set on these timber beams. If *sedir* is to be used in the building, the posts of *sedir* are placed on timber beams of floor and its 5x5cm horizontal beams are installed on rough cut-stones on inner cornices (see Fig. 3.54, 59). It is also seen that baseboards are constructed up to the *sedir* level or close to it (see Fig.3.57). The bottom sides of timber beams are covered with ceiling of downstairs (see Fig. 3.60).

It was noticed in some instances that this type of floor is also used in ground storey. In this case, ground is filled with pumice and this infill is covered with clay mud in order to keep the floor away from ground dampness. After that, 5x10cm floor beams are set upon which is covered with wooden planks (see Fig.3.58).

Timber beams are also used in elevated floors. The purpose of this usage is to keep away dampness. In order to do that, 40-100cm high vertical timber posts are inserted directly on rock or on filled ground, along the central long axis of the room with 60-90 cm intervals (see Fig. 3.61-63). Then 15x15cm beams are set horizontally on these posts along the same axis. Upon these beams, another row of 10x10cm beams are placed orthogonally (see Fig. 3.61). After that, timber planks are fixed onto these beams with nails. If a *sedir* is to be added into room, the posts of *sedir* are inserted on these transverse beams. All the timber beams are also placed on the indents opened along the wall (see Fig. 3.61, 62).

The timber floor beams are called locally as *hezen* (see Fig. 3.56). *Hezen*s can be used in regular geometric form or as a trunk. Because they span over the openings, *hezen*s are used in first storey floors and roof floors. *Hezen*s are located on inner cornices, indents or holes on walls. They are placed adjacently or with 20-60cm intervals. After *hezen*s are located on wall, they are covered with layer of straw and lastly filled with pumice. Floor construction is completed by placing 5x5cm or 5x10cm timber laths on pumice infill and nailing timber boards upon these boards

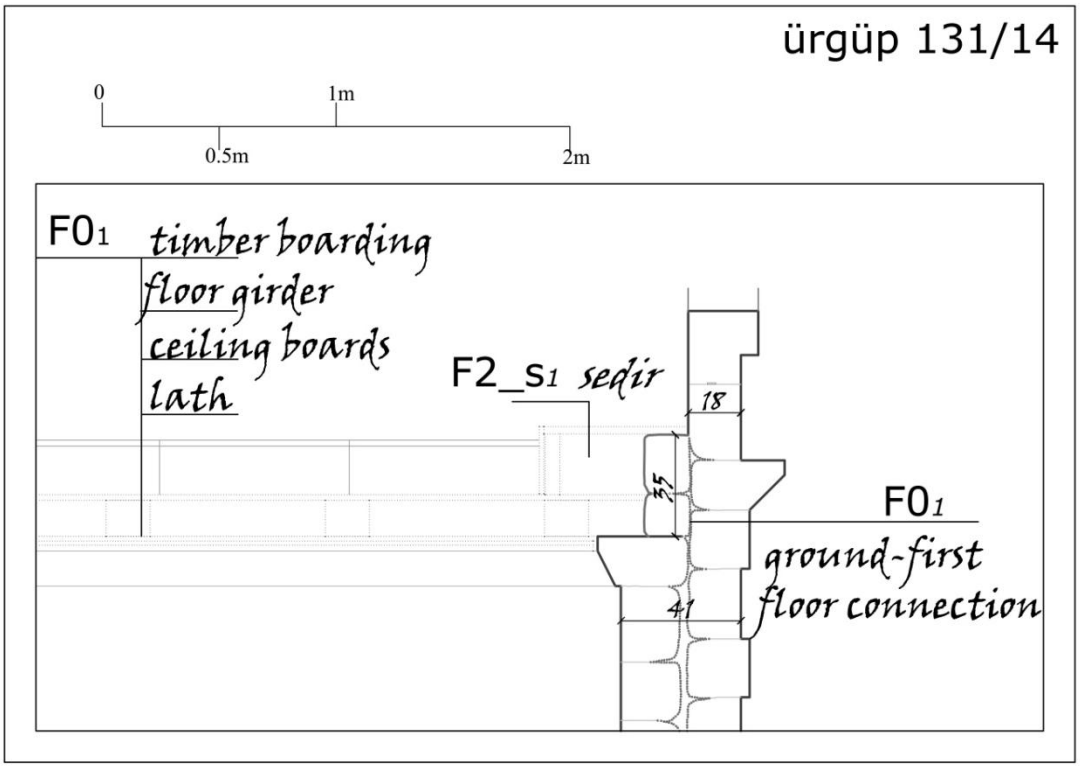


Fig. 3.54, Timber floor

Figure 3.55 Inner cornices
(Ürgüp, block/lot: 131/45)

Figure 3.56, *Hezen*
(M.paşa, block/lot: 96/5644)

Figure 3.57, Baseboards
(M.paşa, Topakoğlu Konağı)

Figure 3.58, Timber floor beams
(M.paşa, Topakoğlu Konağı)

Figure 3.59, Timber sedir beams
(M.paşa, Topakoğlu Konağı)

Figure 3.60, Ceiling coverings
(Ürgüp, block/lot: 131/45)

Figure 3.61, Bottom view of elevated timber floor and sedir (Mustafapaşa, block/lot: 73/5112-1)

Figure 3.62, Bottom view of elevated timber floor and sedir (Mustafapaşa, block/lot: 73/5112-1)

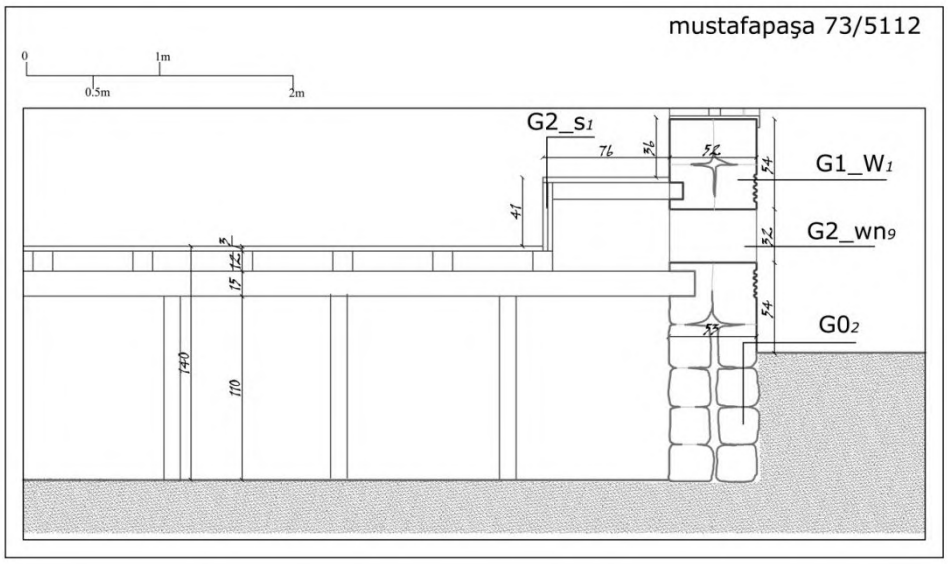


Figure 3.63, Elevated timber floor and sedir (Mustafapaşa, block/lot: 73/5112-1)

3.2.4. ROOF AND ITS ELEMENTS

Roof is the most difficult part of buildings to analyze. It could be described only in 25 of 35 drawn system details because most buildings' roofs were demolished in Kayakapı, Ürgüp and many existing roofs were inaccessible. Three main types were identified in these twenty-five buildings: timber roofs, earthen roofs and rock-cut roofs.

First Type: Timber Roofs

Timber roofs are constructed with timber boards inclined in one way or they are generated as hipped roof. It is seen that this type of roofs are used in wealthy peoples' houses.

Exterior and interior cornices are placed while building walls are being constructed. As in storey cornices, exterior roof cornices emphasize the floor ends and interior cornices support the beams of roof floor (see Fig. 3.64). Another function of roof cornices is to act as a drip for rain and snow water coming from the roof. For this reason, some exterior cornices are constructed as extruding. Wall continues 40-60cm more after these cornices and ended with two or three rows of stone according to pitch of roof which are called as *kafa tahtası* (see Fig. 3.65).

Beams of roof measure 10x10 cm and are placed on the interior cornices parallel with the short side of space. Then an intermediate stringer is placed on these beams perpendicularly (see Fig. 3.64, 66). If the intermediate stringer is not to be used, floor beams measuring 15x15cm are used. After that 10x10cm or 15x15cm posts of roof are located on this intermediate stringer. Heights of posts are adjusted according to building dimensions and pitch of the roof. Braces are nailed between the posts to prevent the roof brake down (see Fig. 3.67,69).

In Nevşehir traditional houses, roofs are usually constructed as hipped roof with inclination of 35% (Interview, November 2011). Angle rafters are placed after posts are adjusted to pitch. 15x15cm or 10x10cm timbers are placed to act as purlins. It is seen that the timbers used in angle rafters are not always in a regular geometric form, they are often used as logs (see Fig. 3.67). 5x10cm fine cut purlins are located with averagely150cm intervals (see Fig. 3.67). 5x10cm rafters which are also cut sharply are placed on purlins perpendicularly with 50-60cm intervals.

Rafters are covered by 20-25cm wide and 2cm thick timber boards. Mediterranean tiles are placed after timbers boards. It is important to stabilize first row of tiles to prevent sliding of tiles. For this reason, averagely 5x5cm sized laths, lengths of which are the same with the tile are nailed with 20-50cm intervals on timber boards (see Fig. 3.68). For the same reason, tiles sometimes are linked with each other with wires (Interview, November 2011). After placing timber boards of roof, 5x10cm rafters are nailed perpendicularly and hip tiles are put on these rafters (see Fig. 3.68, 70).

Rafters also generate the eaves of buildings if they are extended 15-20cm over the building. Eaves under are closed with timber boards and edge of rafters are capped by fascia board so that birds and etc. are prevented from entering inside (see Fig. 3.71).

Second Type: Earth Roofs

Earthen roofs are commonly used roofs in the region to cover vaulted spaces or *hezens* (see Fig. 3.72). Upper parts of rib arches and *kapak kemer*s are filled with pumice and broken pieces of rock/stone and then a mixture of soil and water which is also called '*şillez*' is poured into the wall to adhere infill materials. Clay soil is laid on infill and compressed with the tool called '*yuvak*'. Thereby, earth roof is constructed (see Fig. 3.74). This type of roofs are recompressed and weeded on every autumn to be prepared for winter (Interview, November 2011). Clay soil is preferred especially in parts which can be exposed to dampness and rain such as roof and floor, because clay's water absorbing capacity is higher than the other soil types (Interview, November 2011).

In spaces where *hezens* are used, a straw is laid on *hezen*s. Pumice and stone/rock pieces are filled and again roof is covered with clay soil.

Finishing stones called *kafa tahtası* are located on outer cornices also in the earth roofs. Earth infill and finishing stones are at almost at the same level (see Fig. 3.72).

Third Type: Rock

Cut-rock used in horizontal and vertical structures also generates the roof of some buildings (see Fig. 3.73). An extra superstructure is not constructed in the rock-carved spaces or in the spaces built by masonry-rock-cut mix systems such as aiwan; rock, is continued to be used by shaping it for rain and snow water (see Fig. 3.75).

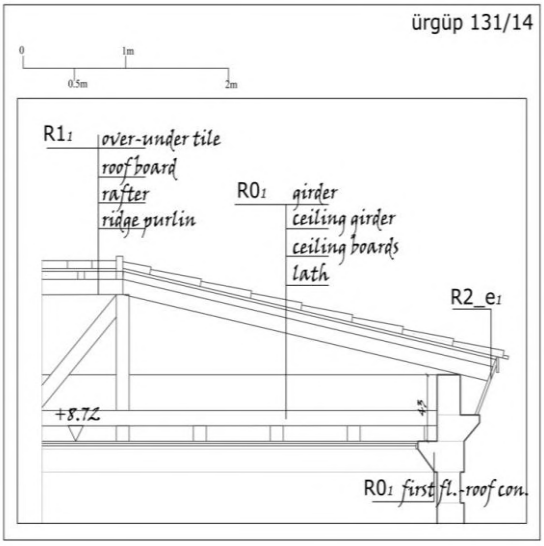


Figure 3.64, Timber roof on cornices

Figure 3.65, *Kafa tahtası* (Ürgüp, 131/23)

Figure 3.66, Intermediate stringer (Ürgüp, block/lot: 131/45)

Figure 3.67, Angel rafters and purlins (Ürgüp, block/lot: 131/45)

Figure 3.68, Laths which are used to prevent movements of tiles (Ürgüp, block/lot: 131/14)

Figure 3.69, Timber roof (Ürgüp, block/lot: 131/45)

Figure 3.70, Over and under tiles (Ürgüp, block/lot: 131/14)

Figure 3.71, Bottom of eaves and edge of rafters are closed by eaves fascia (Ürgüp, block/lot: 131/14)

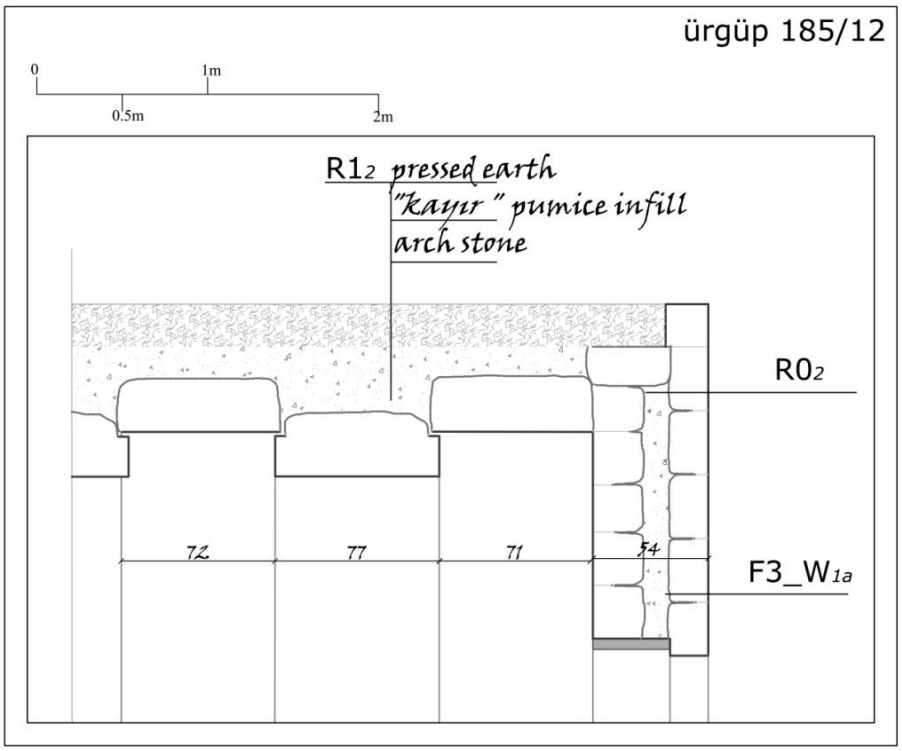


Figure 3.72, Earth roof and *kafa tahtası*

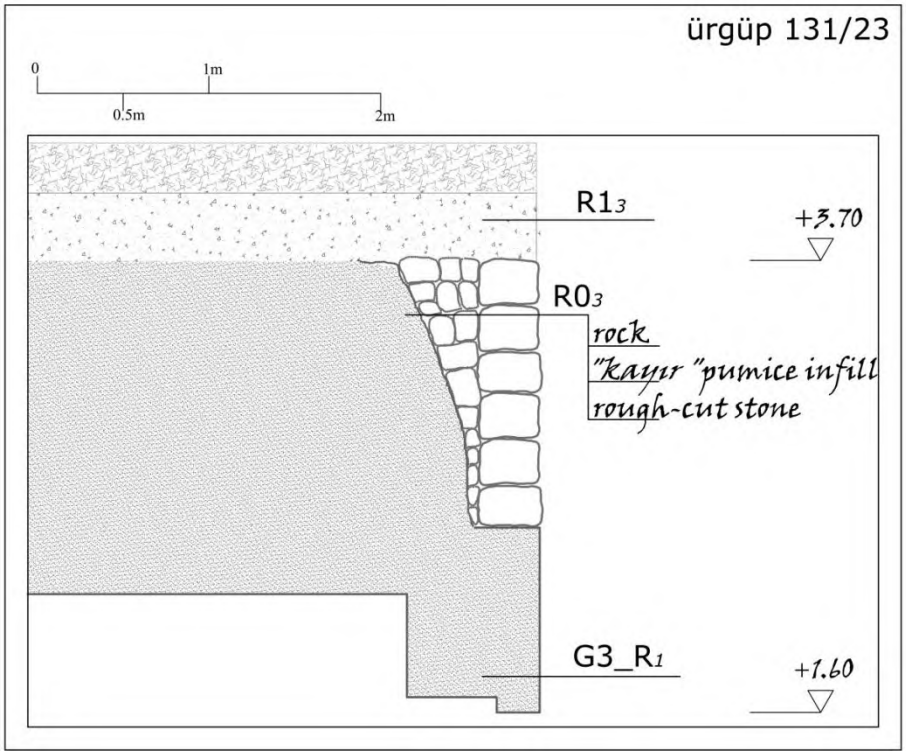


Figure 3.73, Rock as a roof

Figure 3.74, Earth roof (Mustafapaşa, block/lot: 73/5112-1)

Figure 3.75, Rock as roof
(Ürgüp, block/lot: 131/14)

Figure 3.76, 'yuvak'
(*http://wowturkey.com/forum/viewtopic.php?p=2743856*)

In Nevşehir houses, there is no variety in roof elements. Roof elements seen on surveyed houses are as followings: eaves, chimney and *çörten*.

Eaves:

Eaves vary according to type of the roof of building and are not used in every house. The rafters which are projected over the building also generate the eaves in timber hipped roofs. Edge of the rafters can be capped with bargeboard (see Fig. 3.68, 71). Under the rafters are also closed with timber fascia boards of 2cm thick. One edge of these fascia boards is fixed on outer cornices; the other edge is fixed on rafters with 45 degrees (see Fig.3.71).

In the other type of eaves used in hipped roofs, bottom of eaves projected averagely 70-90cm is closed with fascia board and eave is supported by the buttresses leaned on the wall (see Fig. 3.77). One edge of fascia boards is fixed horizontally on outer cornices; the other edge is fixed horizontally on rafters. Because the eaves are wider, buttresses start 60cm below the roof and reach to the bottom of eaves. The edges of buttresses on the bottom of eaves are nailed and the other edges are placed into the small indents on the wall (see Fig. 3.78).

In the field study, stone eaves were also encountered as another type. It was used in one surveyed house which is covered by vault and earthen roof. The stones of 30cm wide and 80cm long are located above the outer cornices. The 30cm wide stones which are located next to each other generate the eaves by projecting 60cm over the building. It is also seen that downward-sloping eave stones are constructed with more strong and durable Nevşehir stones considering rain and snow waters (see Fig. 3.79). The building walls are raised 50-60cm after eave stones to hold the earth roof.

Chimney:

Limited information is gathered about chimneys in surveyed houses. However, a classification was made with respect to the chimneys of fireplaces used in houses. Two types of chimneys were determined: stone and rock chimneys.

In stone chimneys, chimney flues are constructed averagely in dimension of 25x25cm (Interview, November 2011). In spaces covered with vault, chimneys of fireplaces placed on *kapak kemer*s are constructed with stone and raised by passing through the infill and earthen roof (see Fig. 3.80).

Rock-cut chimneys are constructed by carving rock measuring averagely 50x50cm. The flue must be in this width because the foreman carves through in it with *külünk*.

Çörten:

Çörten is used in only one house and limited information is gathered from the field survey. This flume is constructed 70cm in length and 20cm in thickness and shaped cylindrical (Tekin, 2009). It is placed 30cm above the outer cornice (see Fig. 3.81).

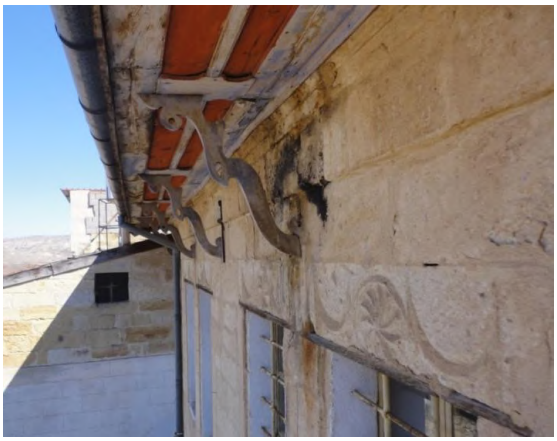


Figure 3.77, Buttresses leaned on the wall (M.paşa, block/lot: 6/4668)

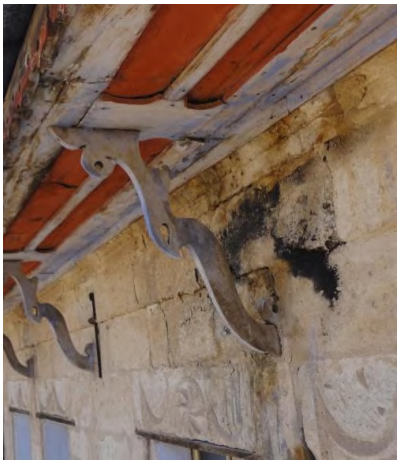


Fig. 3.78, Butress placed into the small gaps on the wall (M.paşa, block/lot: 6/4668)

Figure 3.79, Eave stones on earth roof (M.paşa, block/lot: 73/5112)

Figure 3.80, Chimney raised by passing through the infill and earth roof(M.paşa, block/lot:73/5112-2)

Fig. 3.81, *çörten*s on the wall (M.paşa, block/lot: 96/5644)

3.2.5. ARCHITECTURAL ELEMENTS

In traditional Nevşehir houses, the architectural elements play an important role in shaping the house. Window and door openings, projections and cornices generate authenticity on façades. Furthermore the architectural elements give a hint about life style of the house owner and the era which the house was built in. The elements used frequently in the region like *şıralık*, *Lambalık* are some of those elements. The architectural elements in traditional Nevşehir houses are constructed with timber, stone or rock-cut. The rock-cut architectural elements are the most significant elements that distinguish the region's houses from rest of the traditional houses.

3.2.5.1. PROJECTIONS & CORNICES

Little information was gathered from the surveyed houses about the projections of Nevşehir houses. Because most of them placed in upper storeys and the floors of upstairs were ruined, it was not possible to reach and measure them. In houses with open projections, the basic measuring of projections was done from balconies and they were also photographed. Moreover, these photographs and measurements were transferred to computer and actual detailed sizes of projections could be calculated.

Projections are generated by pulling out the upper storey ahead; there are two kinds of projections as open and close projections. In Nevşehir houses the closed projections can be made in two ways as bevelled projection and plain projection. In a building ground floor of which has to fit with the form of the ground, bevelled projections enable constructing upper floors in a regular geometry. The bevelled stone projections are constructed by placing stones upon each other extruding 10 -15cm through the street (see Fig. 3.82, 83). The plain projections provide enlarging the upper floor. At the end of ground floor 20-30 x 20-65 x 40-65cm cantilevered stones are placed with 30-50cm intervals inside the wall. The upper storey is built on this cantilever which continues along the façade (see Fig. 3.84, 85). Therefore there is a 20-40 cm projection extends to the street. It was noticed that the cantilevered stones were decorated with various figures and carvings (see Fig. 3.85). Plain and bevelled projections are used especially in Mustafapaşa and İbrahimpaşa.

Open projections, in other words balconies, are placed on middle module on the façade and enhance the façade symmetry and increase the emphasis of the mass. When constructing open projections, to

the end of ground floor 20-30 cm wide, 60-80 cm high and 70-85 cm deep cantilever stones are placed projecting 50-60cm from the wall. This console stones are located 30-50cm intervals and/or filled with recessed stones (see Fig. 3.86, 87).

Storey cornices are the most attracting element of traditional Nevşehir houses. Cornices even if they are made in the simplest form, in triangular profile, decorated with numerous figures. Mustafapaşa houses are the best examples for decorated cornices with very rich ornaments (see Fig. 3.88, 89). The storey cornices can be studied in two groups; these are inner cornices and outer cornice (see Fig. 3.90, 91).

The cornices between the storeys and at storey endings are used for emphasizing the floor distinction and endings visually. It is the most important decoration element on the façade and has not any structural function. The cornices between the storeys are constructed one or two step higher than the floor and have no connection with the floor. The eave cornice at the end of last storey also works as a drip line for the snow and rain waters, while again emphasizing the ending of the storey. For this reason some of the eave cornices are built outward to prevent collecting of snow and rain waters.

The inner cornices, besides being a visual complementary element, they are also important structurally. Inner dimensions of the cornices are between 20cm and 25 cm. The timber beams which carry the floor, sit on the inner cornices which are projected from the wall. Because of that if the inner cornices were not damaged, the floor can be reconstructed without causing any harm to the building.

Fig. 3.82, Beveled projection (İbrahimpaşa,no:98)

Fig. 3.83, Beveled projection (İbrahimpaşa)

Figure 3.84, Cantilevered stones on the façade (İbrahimpaşa, no: 39)

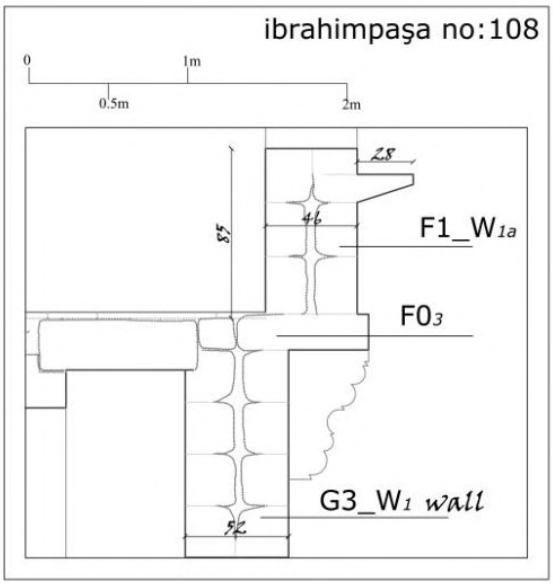


Figure 3.85, Projecting first floor (İbrahimpaşa, no: 1089)

Figure 3.86, Console stones of projection (Ürgüp, block/lot: 131/45)

Figure 3.87, Console stones of projection (İbrahimpaşa, no: 108)

Figure 3.88, Cornices with very rich ornaments (M.paşa, block/lot: 62/4731)

Figure 3.89, Cornices with very rich ornaments (Mustafapaşa, Topakoğlu Konağı)

Fig. 3.90, Exterior cornice (Ürgüp, block/lot: 131/14)

Figure 3.91, Interior cornice (Ürgüp, block/lot: 131/14)

3.2.5.2. OPENINGS: DOORS & WINDOWS

DOORS:

Doors can be categorized into three groups as according to their relationship with space: interior doors connect the interior spaces; exterior doors connect house to exterior spaces; courtyard doors connect the courtyard to the street.

Courtyard doors have double wings with dimensions of 160 x 210cm and made of timber. Plain, depressed or semi-circle arches are used to span the door openings. Variety of ornaments is seen above the doors (see Fig. 3.92, 93). The timber door wings are also decorated with various figures. Door openings are usually framed with a stone cornice. This stone cornice can be thin as 10 cm or it can be as thick as 25 – 30 cm (see Fig. 3.94, 95). The voussoirs of arches of courtyard doors are generally not ornamented; only there may some figures on the key stone (see Fig. 3.96). The top window can also be used on the courtyard doors (see Fig. 3.97).

Exterior doors connect the house to the courtyard or to the street. Most of the exterior door openings are spanned by arches (6 of 8 doors; 6/8). The exterior doors of larger houses have double wings and depressed arch. (1/6). Door dimensions are averagely 160 x 220 cm. On the wall, a cornice is constructed that frames the door opening. To enlighten the *taşlık,* entrance hall a top window with 20-40 x 30-50cm dimensions is placed upon this cornice (see Fig. 3.98, 99). Some of the exterior doors (3/6) are single winged and arched (see Fig. 3.100, 101). The dimensions of these doors are 80 x 210 cm. The other type of outer doors seen in the region is plain door that span the opening with flat arch or lintel (2/6). These doors are constructed double winged and with dimensions of 150 – 160 x 200 – 210 cm. Top window might be used in this type (see Fig. 3.102).

The interior doors are built with timber in 80 – 90 cm wide and 200 -210 cm high. Doors of vaulted rooms are placed between two cover arches. Door is made ready to use with the metal components such as parts hinge, door lock and door handle (see Fig. 3.103, 104). The simplest way of building a room door is firstly to assemble four or five pieces of wood with 2-4 cm thickness. Then parallel with these pieces three other wood pieces 8-10 cm in width and 80 cm in length are fixed by nailing (see Fig. 3.105, 106). In some examples only these woods are left on the outer surface. However in some examples there is a frame seen on the outer surface with horizontal and vertical supports (see Fig. 3.107, 108). It is also seen that the outer surfaces of inner room doors are decorated with ornaments (see Fig.3.109).

Hinges are used to fix the inner door wings to the wall. 5x5 cm or 10x10cm wooden boards are nailed to the wall and the door wing is attached to these boards with hinges. The door lock is placed on the opening side of the wing. Another board in door height or at lock level is nailed to the wall for letting the lock work. The metal parts which are used to open or close the door are fitted on this timber part (see Fig. 3.103-110).

There are three ways to cover the door openings. First way is using depressed arches. The top point of arch is adjusted according to wide and height of the door, is placed 20 – 40 cm above the door (see Fig. 3.106-111). Arches are also used in courtyard door openings (see Fig. 3.113-114). In second way, 2-5cm thick and 20-30cm width timber pieces are inserted partly into the wall along the door opening to work as a lintel (see Fig. 3.110). Third way is inserting logs into *kapak kemer*. Logs with 10 – 20cm diameter are placed next to each other in three or four rows so that to work as a lintel and support the arch from bottom (see Fig. 3.112).

Doors can be grouped in four according to their construction technique:

Door Type 1:

First type of doors is built on stone walls of masonry buildings. This type of doors are usually in dimensions of 80-95x180 – 190 cm. The door openings are covered with arches and timber lintels (see Fig. 3.115). The thickness of arch that placed on door opening varies between 15 and 20 cm (see Fig. 3.115). The timber lintels are placed to the part of opening after the arch. The gap between the lintels and the arch may be filled with broken pieces of stone and rock. These lintels are in dimension of

6x24x130 cm. The door sills can be built by shaping rock floor or with a stone placed to the floor (see Fig. 3.116).

Door Type 2:

These doors constructed with cut-rock. Their dimensions are around 70-80 x 150-160 cm (see Fig. 3.117). The rock is cut in linear or in arcuated form (See Fig. 3.120). The second type doors are generally closed with very simple wooden door wing. The outer ground level is higher than the inner floor level and the sill is made from rock. In two examples in which this type of door found, a place to take out shoes locally called *pabuçluk* exists (see Fig. 3.121).

Door Type 3:

The third type doors are in dimensions of 80-90 x 200 cm and built in rock carved spaces. The difference of this type doors is that the outer ground level is lower than the inner floor level. Because of this situation the door is accessed by a rock carved doorstep (see Fig. 3.118). The surveyed houses which have this type of doors that is seen only in two examples contain *pabuçluk* inside the inner space.

Door Type 4:

The fourth types of doors are in dimension of 110-120 x 220 cm. They are used as an entrance door in stone masonry buildings. The fourth type of door is seen only in one house which was made of wood and had double door wings (see Fig. 3.119-122).

Figure 3.92, Ornaments above the door (Mustafapaşa, Cami sok. No:5)

Figure 3.93, Ornaments above the door (Mustafapaşa, Cami sok. No: 3)

Figure 3.94, Cornices around the courtyard door (Mustafapaşa, Cami sok.)

Figure 3.95,Cornices around the courtyard door (Mustafapaşa, block/lot: 6/4668)

Figure 3.96, Ornaments on key stone (İbrahimpaşa, no: 93)

Figure 3.97, Top window on courtyard door (Mustafapaşa, Şahin cad. no: 15)

Figure 3.98, Top window
(Ürgüp, block/lot: 131/45)

Figure 3.99, Top window
(M.paşa, Nane sok. no: 1)

Figure 3.100, Single winged door with arch
(Ürgüp, block/lot: 185/12)

Figure 3.101, Single winged door with arch
(M.paşa, block/lot: 59/4821)

Fig. 3.102, Double winged door with top window (İbrahimpaşa, no: 108)

Figure 3.103, Metal components of door (Mustafapaşa, block/lot: 5/4668)

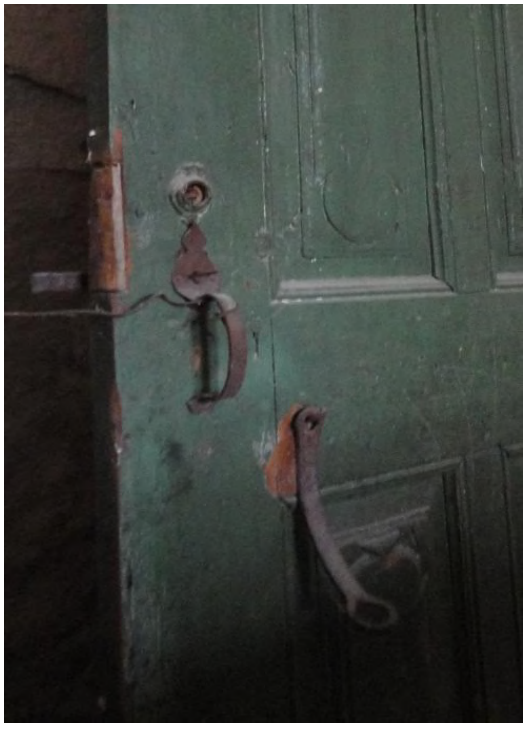


Figure 3.104, Metal components of door (Mustafapaşa, block/lot: 74/5112)

Figure 3.105, The simplest room door-outer face (İbrahimpaşa, no:39)

Figure 3.106, The simplest room door- inner face

Figure 3.107, Horizontal supports of room door (M.paşa, block/lot:5/4668)

Figure 3.108, Door frame with horizontal and vertical supports

Figure 3.109, Ornamented door faces
(İbrahimpaşa, no: 87)

Fig. 3.110, Ornamented door faces
(M.paşa, block/lot: 73/5112)

Figure 3.111, The arch of door
(İbrahimpaşa, no: 26)

Figure 3.112, Trunks supported the arch of vault
(İbrahimpaşa, no: 39)

Figure 3.113, Plain arch of courtyard door (İbrahimpaşa no: 86)

Figure 3.114, Depressed arch of courtyard door (İbrahimpaşa no: 87)

Fig. 3.115, Arch and timber lintels on door opening/ inside-outside (Ürgüp, block/lot: 131/23)

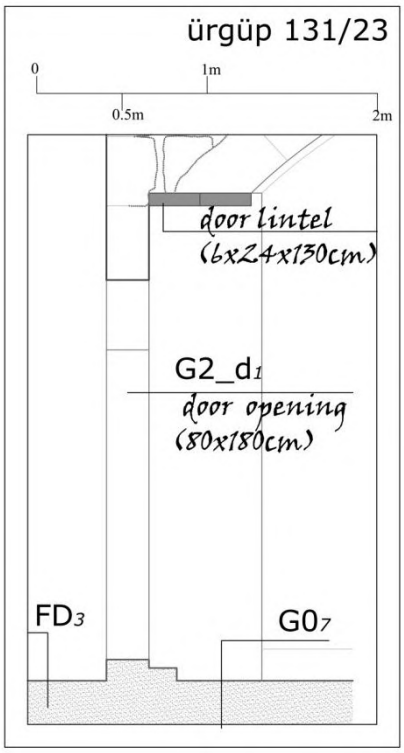


Figure 3.116, Door type 1
(Ürgüp, block/lot: 131/23)

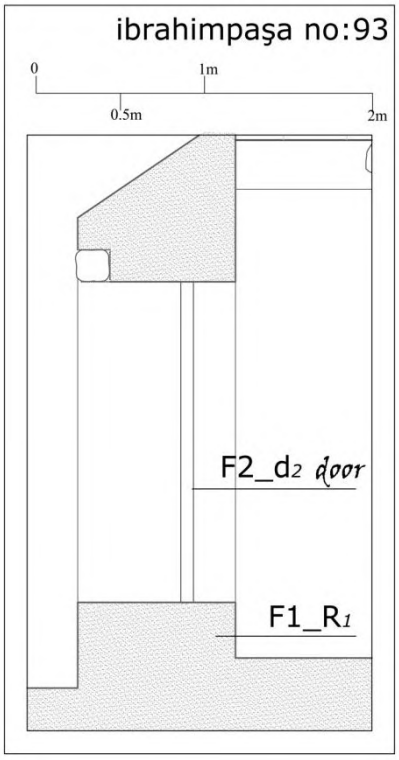


Figure 3.117, Door type 2
(İbrahimpaşa, no: 93)

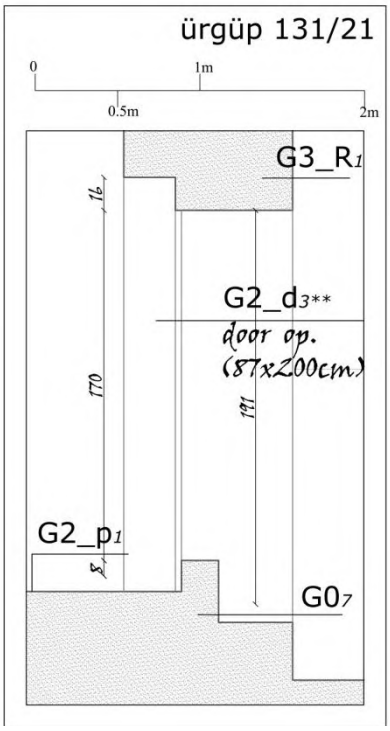


Figure 3.118, Door type 3
(Ürgüp, block/lot: 131/21)

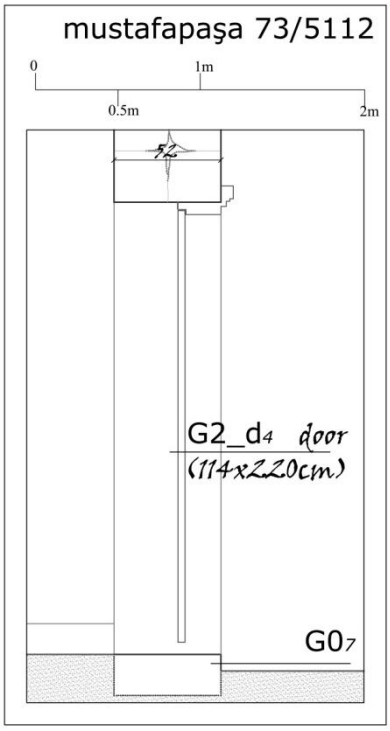


Figure 3.119, Door type 4
(M.paşa, block/lot: 73/5112

Figure 3.120, Rock-cut door in an arch form (Ürgüp, block/lot: 131/23)

Figure 3.121, Rock-cut pabuçluk in front of the door (Ürgüp, block/lot: 131/23)

Figure 3.122, Double winged door type 4 (M.paşa, block/lot: 73/5112)

WINDOWS:

Windows are the openings that allow the spaces to relate to each other. There are many different types of windows seen in Nevşehir houses. In Kayakapı, Ürgüp only one window profile was seen among

three houses studied. There are various reasons for window profiles to demolish in this partially razed district. Original window profiles were found only in Mustafapaşa and İbrahimpaşa surveys. However it was noticed that some of the profiles damaged and some of them were replaced with PVC profiles. Since the number of authentic profiles found is really low, the main classification was made basically according to the window openings. In this classification considered criteria were size, height from the floor and depth of openings. Besides of this classification, another was made through the window profiles that were found. In this classification the window profiles are shown with code "wnp" in charts and span sections. The windows used in ground floor and upper floor are shown on chart separately (see App. B). Windows having window profile are marked with a "*" sign; those constructed with rock carving are marked with "**" sign. Rock-cut windows are treated together with other windows as they do not exhibit any pattern because their sizes and construction technique depend on the needs of users.

Therefore classification of windows which was made according to window openings consists of ten groups:

Window Type 1:

These windows are made in rectangular shape at the ratio of ½ vary in measure between 60 x 120 cm and 90 x 180 cm. They are placed in main spaces of house like living room and rooms. In the upper floors these type of windows are placed averagely 50cm high from the floor (in only one example it is 100cm - İbrahimpaşa no: 108); in ground floors, they are located 120 – 150 cm above the outer ground level. In these windows some indents are made at the adjunction point of wall and window profile upon which profiles are set. These indents are 5-8 cm above the bottom and 5-20 cm below the top of window (see Fig. 3.122). Various techniques are used to span the window openings on the walls which span between 40 cm and 60 cm.

In first technique, a stone 25 cm thick is set on the outside surface of the wall to act as outer layer. Inside, the window opening is spanned with 10 to 20 cm thick, 3-10 cm high and 100 – 130 cm long wooden lintels. These lintels can be made with one piece of timber or three pieces assembled side by side (see Fig. 3.123, 124). It was noticed that in some examples the lintel continued above the window along the wall (see Fig. 3.125). An indent which is 15 cm high and 5 cm deep can be carved into the outer surface of stone which is placed on the outer side of the wall (see Fig. 3.124). This indent can be left plain or can be fashioned with ornaments. Thus in this way a window cornice, which seems like a frame from outside is generated (see Fig. 3.126).

The second technique is spanning rectangular formed window opening with an arch (see Fig. 3.127). Also in this technique a 25-35 cm stone is placed on the outside of the wall. The outer surface of the stone which forms the window cornice can be decorated with ornaments. Inside, window arches can be used with various profiles to span window opening (see Fig. 3.129). Thus a decorative element for the interior space is also created.

Window Type 2:

Although technically second type windows are similar with those in first type, their dimensions and geometrical shape differ. These windows are much closer to square form with dimensions of 65x95 cm, 100x120 cm. It was noted that they were only used in ground floors. They are constructed 100-200cm above the inner floor level and 200-280cm from the outer ground level (see Fig. 3.130). Indents may be carved to fit the profile in. Because the window opening is small in size; the opening may be covered with monolith. Monoliths can also be used vertically surrounding the opening as a frame (see Fig. 3.128).

Window Type 3:

The windows in third type are used on double layered walls and do not include indents left for the profiles. They are constructed in dimensions of 80x160 cm and 75x170 cm. It was seen that all these type of windows were used on upper floors (see Fig. 3.131).

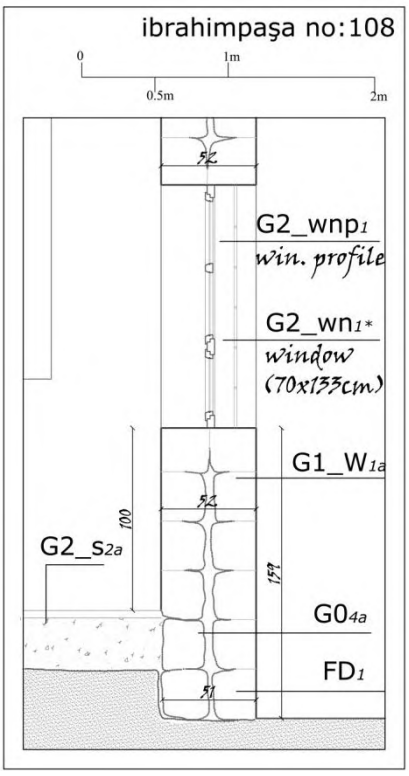


Figure 3.123, Window type 1 (İbrahimpaşa, no:108)

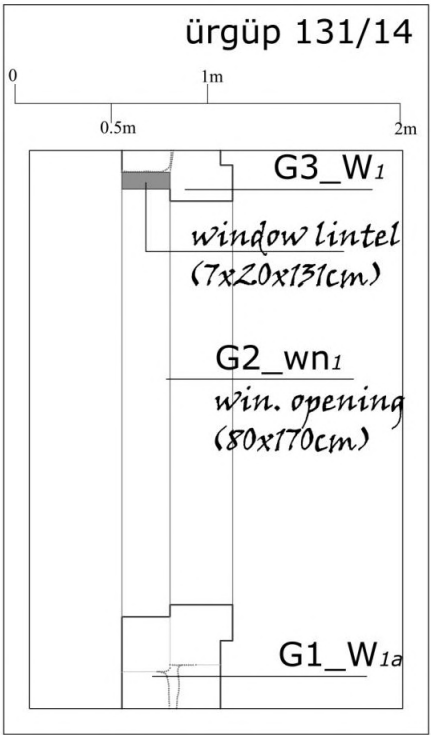


Fig. 3.124, Timber window lintels (Ürgüp, block/lot:131/14)

Figure 3.125, Timber lintel continues above the windows (Ürgüp, block/lot:131/23)

Figure 3.126, Window cornices as a frame (Ürgüp, block/lot: 131/45)

Figure 3.127, Window arch on the inner side of the wall (İ.paşa, no:39)

Fig. 3.128, Monolith stones around the window opening (Ürgüp, block/lot:131/23)

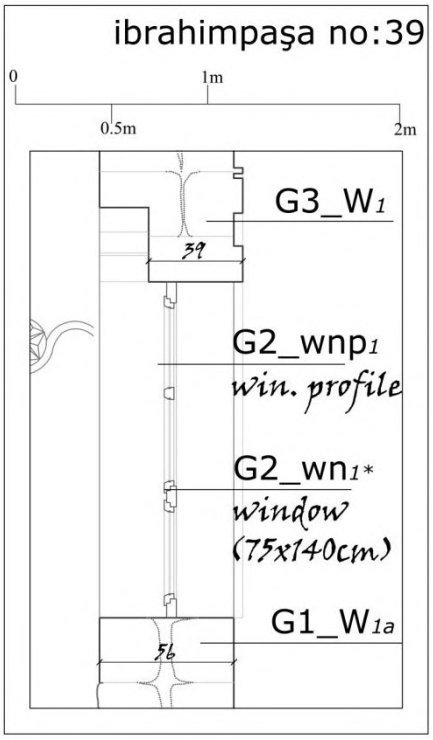


Figure 3.129, Window arch on the inner side of the wall (İ.paşa, no:39)

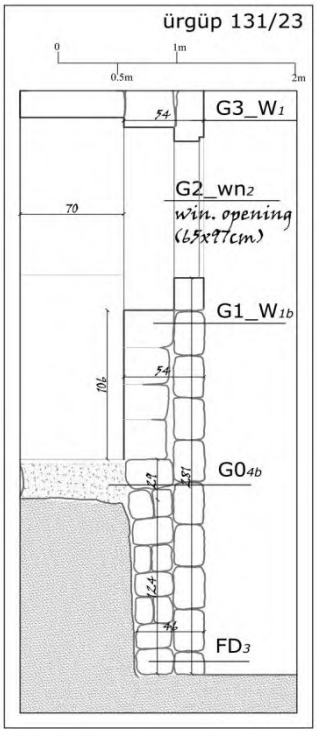


Figure 3.130, Window type 2 (Ürgüp,block/lot:131/23)

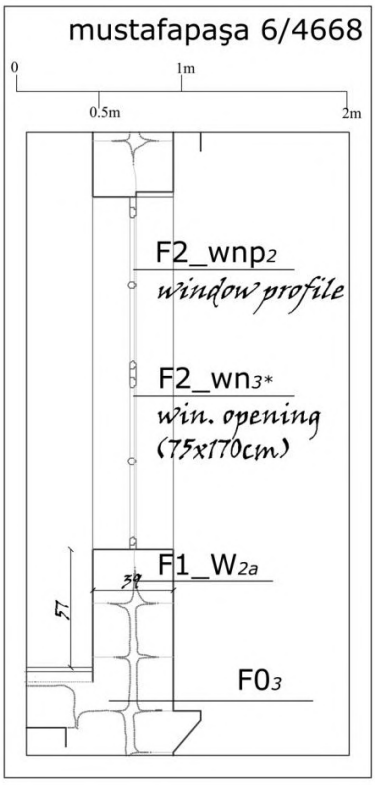


Figure 3.131, Window type 3 (Mustafapaşa, block/lot:6/4668)

Window Type 4:

This type of window was found only in one surveyed house (see Fig 3.132). It was in rectangular form with dimensions of 32 x 62. On rough cut-stone walls, the stones surrounding the opening of window are chosen from cut-stones (see Fig. 3.134). The height of window from inner floor level is 185 cm and 255 cm from the ground floor level. The inner surface of the window opening is recessed for lighting (see Fig. 3.132).

Window Type 5:

The fifth type of windows has the dimensions changing around 70x60cm, 70x80cm, and 50x80 cm (see Fig. 3.135). They are 130-250 cm above the inner floor level and 110-200 cm from the outer ground level. In this type of windows, indents are left to fit the profile in.

Window Type 6:

Sixth type of windows is built in size of 65 x 120cm. This type differs from other window types in its height from outer ground level which is 35cm above the outer ground level and 105cm from the inner floor level (see Fig. 3.133). The window profiles are fit in indents. Wooden lintels are used to span the window openings (see Fig. 3.133).

Window Type 7:

The seventh type windows are the top windows which are placed above the doors (see Fig. 3.138). These windows are constructed for increasing lighting in the entrance. They were frequently observed in Mustafapaşa. They can be in dimensions of 30-50cm x 50-70cm. The profile is not used in many of them, only iron railings are used (see Fig. 3.136, 137). Most of them are constructed in elliptic form, depressed from sides; however square formed examples are also seen. Small rock windows which are constructed for ventilating of rock spaces are also included in this type.

Window Type 8:

This type of windows is used on single layered thin walls. In upper floors, they are constructed with dimensions of 70x160cm or 95x184cm on the wall averagely 20cm thick (see Fig. 3.139). In ground floors they are generally used on dividing walls. It was considered that window profile is not used in interior windows of ground floor, if needed only window railings are used. The dimensions of inner windows can be 70x100 cm on the ground floor.

Window Type 9:

Only in one of the surveyed houses, this type of window was encountered. It is in size of 18x32 cm. This window is used when an elevated floor is constructed above the timber posts on the ground floor of a building (see Fig. 3.142). The purpose this window is to ventilate the space remaining under the floor (see Fig. 3.139). Only iron railings are used with this type, any examples with window profiles are not encountered (see Fig. 3.138).

Window Type 10:

The tenth type windows are in dimensions of 80x100 cm or 100x100cm and closer to square form (see Fig. 3.141). Difference of this kind of windows is the place they are used and their level. They are placed averagely 30 cm above the inner floor and 60 – 100 cm from the outer ground level (See Fig. 3.144).

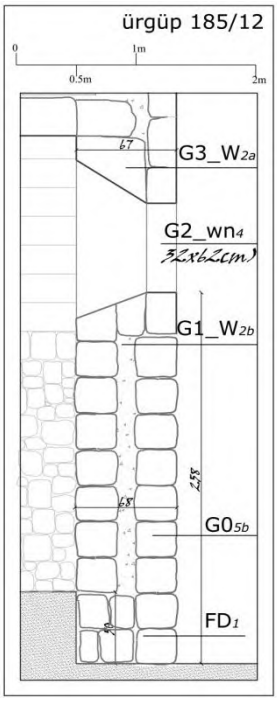


Figure 3.132, Window type 4
(Ürgüp, block/lot:185/12)

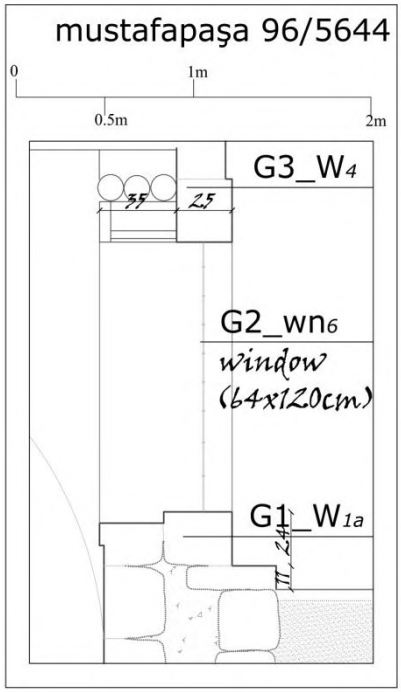


Figure 3.133, Window type 6
(M.paşa, block/lot:96/5644)

Figure 3.134, Cut-stones around
the window opening (Ürgüp, block/lot:185/12)

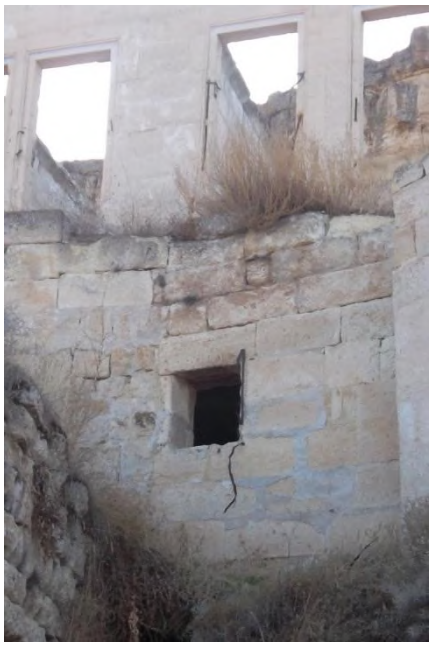


Fig. 3.135, Window type 5
(Ürgüp, block/lot:131/23)

Figure 3.136, Iron window railings
(M.paşa, block/lot: 73/5112)

Figure 3.137, Iron window railings
(Mustafapaşa, Şahin cad. no: 47)

Figure 3.138, Iron window railings on type 9
(M.paşa, block/lot: 73/5112)

Figure 3.139, Window type 9 located under the room window

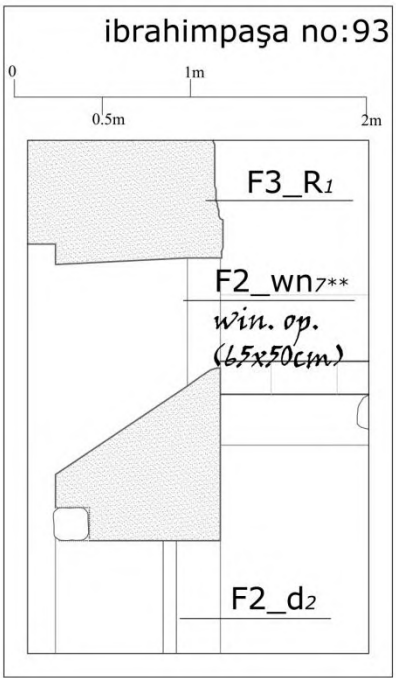


Figure 3.140, Window type 7
(İbrahimpaşa, no: 39)

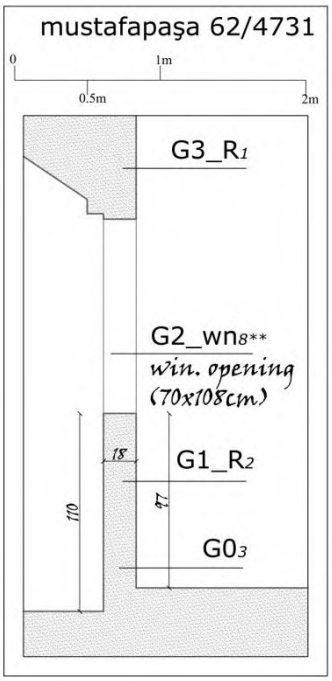


Figure 3.141, Window type 8
(M.paşa, block/lot: 62/4731)

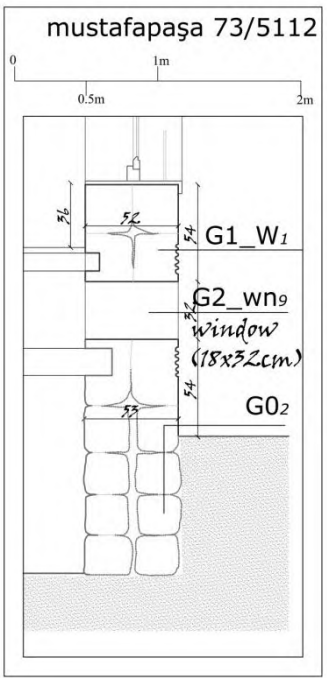


Figure 3.142, Window type 9
(M.paşa, block/lot: 73/5112)

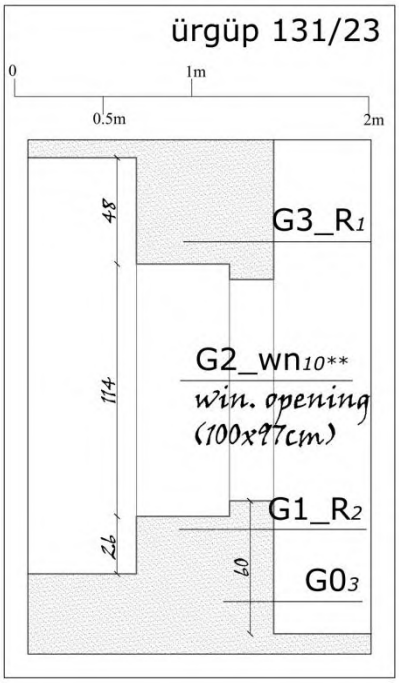


Figure 3.143, Window type 10
(Ürgüp, block/lot: 131/23)

Figure 3.144, Window type 10 (Ürgüp, block/lot: 131/23)

When windows were analyzed with respect to the window profiles, it was seen that only 10 of 45 windows had window profiles. The windows are classified according to their profiles, in four groups.

Window Profile Type 1:
All of the five examples of this type were found in İbrahimpaşa. Four of them were used in first type window opening and one was used in 3rd type of opening. Moreover, the observations in İbrahimpaşa village revealed that most of the original profiles of houses were in this type (see Fig. 3.129). They were used in both ground floors and upper floors. Window was divided into two parts horizontally and three parts vertically. While the top two parts were working together, lower part worked single (see Fig. 3.145).

Window Profile Type 2:
The second type profiles are used in third and eight type window openings vertical dimensions of which are longer than others. It has been seen that they are more frequently used in Mustafapaşa (see Fig. 3.131). The window is divided into two parts in horizontally and four parts in vertically. Top two parts work together and lower two parts work together (see Fig. 3.146).

Window Profile Type 3:
This profile type was observed in first and seventh type window openings. It is generally known as the guillotine type. The window which has two main parts in vertical is opened by sliding the lower part over the upper part (see Fig. 3.147-148).

Window Profile Type 4:
This type was seen once in the seventh type (top windows) windows opening in Mustafapaşa (see Fig. 3.149).

Figure 3.145, Window profile divided into two parts in horizontally and three parts in vertically (İbrahimpaşa, no: 26b)

Fig. 3.146, Window profile divided into two parts in horizontally and four parts in vertically (M.paşa, block/lot:6/4668)

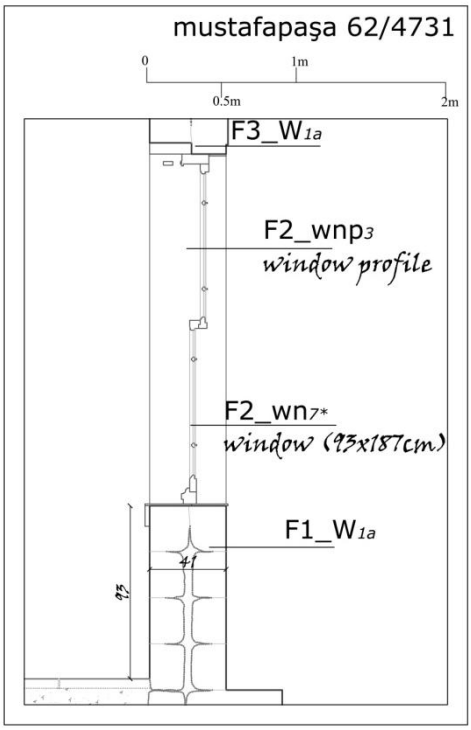


Fig. 3.147, Guillotine type window profile (M.paşa, block/lot:62/4731)

Fig. 3.148, Guillotine type window profile (Mustafapaşa, block/lot: 62/4731)

Fig. 3.149, Top window, profile type 4 (Mustafapaşa, block/lot: 73/5112)

3.2.5.3. FLOOR & CEILING COVERINGS

There are two kinds of flooring in the region: stone coverings and timber planks.

Timber planks are usually used in upper floors for the purpose of preventing it from water and dampness. Timber plank is used in ground floor when it is elevated (see App. 5112).

When timber planks are used either in ground floor or upper floors, 5x10 cm timber beams are placed on the infill or clay mud with 30cm intervals (see fig. 3.150). Then, 2 cm thick, 30 cm wide timber planks are nailed above these beams (see Fig. 3.151, 152). After then timber baseboards changing in height between 10 and 20 cm are placed.

Stones are other widely used floor coverings. They can be used either on ground floors which sit on rock or on the upper floors. Floor covering stones are chosen from the durable types andesite etc. They can be in square or rectangular form (see Fig. 3.153, 154). The first floor coverings of houses, of which ground floor is vaulted, are generally stone. Under the stone floor covering, again clay mud is used over the pumice infill.

In Nevşehir houses, there is not a diversity seen on the ceilings. In the vault covered spaces beneath the vault, a covering material is not needed. Ceiling coverings are used only if the upper storey has a timber floor. After the timber floor beams are placed over the inner cornices; 2 cm thick, 30 cm wide and 130-350 cm length wooden covering planks are nailed beneath that beams (see Fig. 3.155). These plates are placed one row short and one row long (see Fig. 3.156). Only one or two rows of these plates are nailed parallel to the wall and surrounded the space as a frame. The other covering plates are nailed in the way of long side and fixed each other with laths after that frame is generated (see Fig. 3.152, 156). These 3-5 cm thick laths can be nailed on every single or double plate row (see Fig. 3.152, 156).

Figure 3.150, Timber beams placed on the infill or clay mud (Mustafapaşa, block/lot: 73/5112)

Figure 3.151, Floor coverings nailed above the floor beams (M.paşa, Topakoğlu Konağı)

Figure 3.152, Floor coverings generates a frame (Ürgüp, block/lot: 131/14)

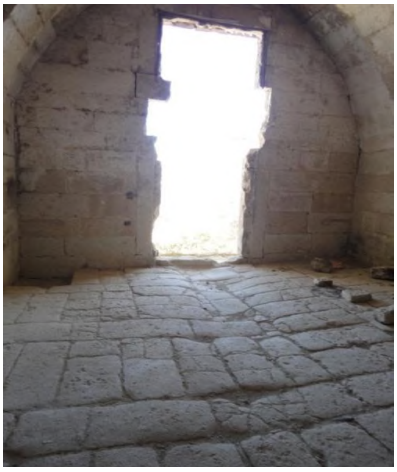


Figure 3.153, Floor covering stones (Ürgüp, block/lot: 131/12)

Figure 3.154, Floor covering stones (Mustafapaşa, block/lot: 62/4731)

Figure 3.155, Wooden covering plates nailed beneath the beams (Ürgüp, block/lot: 131/45)

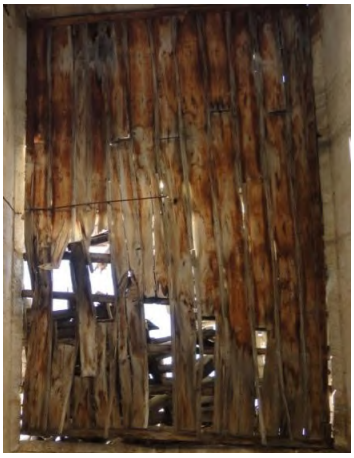


Figure 3.156, One row short and one row long covering plates (Ürgüp, block/lot: 131/45)

3.2.5.1. OTHER ARCHITECTURAL ELEMENTS

FIREPLACE:

Fireplace is an architectural element which is used for cooking and heating purposes. The fireplaces can be studied under two main groups according to the places they are used: room fireplaces and kitchen-aiwan fireplaces.

Room fireplaces are built for heating. They are placed on cover arch on the side wall of vaulted rooms. The wall which the fireplace is constructed in is generally (3/4) the exterior wall and the thickness of this wall changes between 65 and 80 cm. The dimensions of room fireplaces are 60-70 cm x 90-120 cm. The height of room fireplaces from the floor level is between 30 and 60cm.

The kitchen fireplaces are placed in kitchens or aiwans and used for cooking food. These fireplaces are constructed more closely to floor level (max 20 cm) in order to make cooking more comfortable. The size of kitchen fireplaces is 70 x 150 cm.

Fireplaces can be classified in two groups by their construction systems: stone fireplaces and rock cut fireplaces.

Fireplaces Type 1: Stone Fireplaces

Stone fireplaces are used in both masonry stone houses and rock carved houses. They are placed in stone masonry buildings on the side wall of the space and it is placed on the cover arch, if the space is vault covered (see Fig. 3.157). The thickness of the wall which the fireplace is located changes between 65 and 85 cm. While the wall is being constructed, a space is left to fit the fireplace in. The bottom stone of this element is adjusted to project 5-10cm ahead (see Fig. 3.158). The chimney flue of the fireplace is also left while the wall is being bonded and the sizes of chimney flue changes between 15x15 cm and 20x20 cm. Today most of the stone fireplaces are taken away and stolen to be used in other buildings. Only one of the four stone fireplaces seen during the surveys is still in its original place (see Fig. 3.159).

Fireplace Type 2: Rock-Cut Fireplaces

Rock fireplaces are the fireplaces used in rock carved spaces (see Fig. 3.160). The sizes of fireplaces which are generated by cutting the rock are different in every other house. The chimney shaft's dimensions of rock-cut fireplaces are 60-50 cm x 50-60 cm. The size of these shafts has to be large enough for letting the carving master pass through (Interview, November 2011).

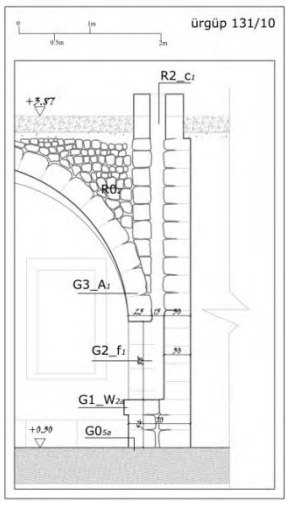


Figure 3.157, Stone fireplaces on the side wall (Ürgüp, block/lot: 131/10)

Figure 3.158, Bottom stone of fireplace (Ürgüp, block/lot: 131/10)

Figure 3.159, One of the four surveyed fireplace is still its place (İbrahimpaşa, no.93)

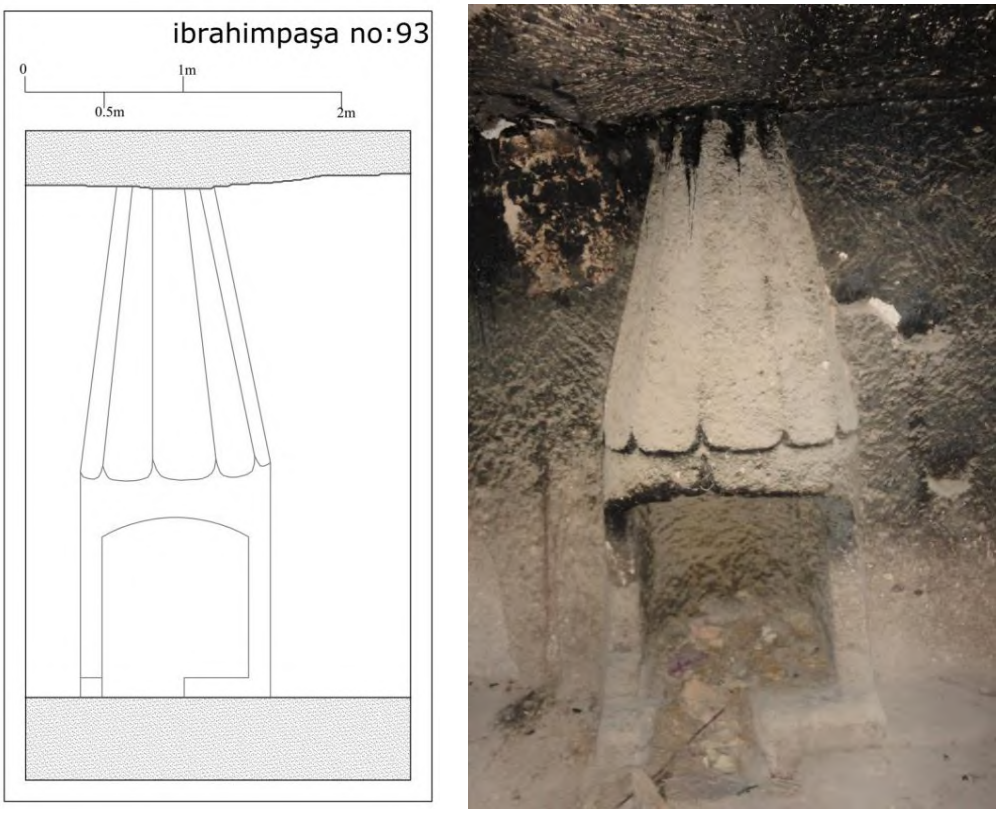


Fig. 3.160, Rock-cut fireplace (İbrahimpaşa, no.93)

TANDIR:

Tandır is other architectural element which is used for cooking and heating purposes. *Tandır* can be classified under two groups by their places of used.

The kitchen *tandır* is placed in the spaces where the cooking takes place like kitchen and aiwan or there can be in a special *tandır* room constructed for cooking purpose. In these houses the *tandır* room takes place of kitchen. In rock-cut tandır rooms, there can be more than one *tandır* which are placed into the floor and air canals are carved for circulation. As for in stone masonry *tandır* rooms, a platform is constructed with dimensions in 100-150 cm width, 50-60 cm height. *Tandır*s and air canals are placed on this platform. Air canals are opened a span to every *tandır* and on the middle of this 50-60 cm height (see Fig. 161). *Tandır*s are constructed with 40-50 cm diameter and with 30-50 cm depth.

The room *tandır* is smaller than every other *tandırs.* It is constructed into room floor with 25x30 cm dimensions. These *tandır*s are also used for mainly heating purposes. In the winter the firebrands are placed into the *tandır* to heat up the room (see Fig. 3.163). *Tandır*s can be classified under three types by their construction systems.

Tandır Type 1: Rock-Cut *Tandır*s

In this type the rock floor is carved and used as a *tandır.* The rock cut *tandır*s are constructed 35-80 cm in diameter and 40-60 cm in depth (see Fig. 3.162). The connection between *tandır* and outside is provided by 15-20 cm wide, averagely 30 cm deep air canals. Even the lengths of these canals depend on the position of *tandır*; opening of the canals to outside is minimum 100-120 cm away from the *tandır.* There would be more than one air canals for each *tandır* (see Fig.3.164).

Tandır Type 2: Mix Type; Rock-Cut and Terra Cotta *Tandır*s

The other *tandır* type seen in the region is the mixed type in which rock and terra cotta used together (see Fig. 3.165). The rock floor is carved 85-100 cm diameter and 50-60 cm deep. Inside of this carved space a terra cotta ware which has a wide bottom is placed as second layer (see Fig. 3.165). This terra cotta ware is in dimension of 45-50 cm diameter, 40-50 cm height and 1.5-2 cm thickness. The 10-20 cm gap between rock and terra cotta ware is filled by soil and mud. Therefore the heat is kept much longer. The top of the infill between the terra cotta ware and rock layer is covered with a 15-20 cm thick, 10 cm high rounded stones (see Fig. 3.166). A 10 cm wide, 30 cm deep air canal is opened through these two layers, therefore the air circulation of the *tandır* is ensured (see Fig. 3.167).

Tandır Type 3: Stone *Tandır*s

Stone *tandır*s are constructed on the platform in *tandır* room or on courtyard/room floor. The *tandır*s built in the floor for heating room are generally small sized and can be rectangular or circle shaped (see Fig. 3.163). The *tandır*s constructed on the platform in *tandır* rooms or courtyard floor have 40-60 cm diameter and 40-50 cm depth. Inner surface of these *tandırs* is also covered with terra cotta.

Figure 3.161, Tandır room (İ.paşa, no.93)

Figure 3.162, Rock-cut tandır
(M.paşa, Top.konağı)

Figure 3.163, Room tandır
(İ.paşa, no: 39)

Figure 3.164, Rock-cut air canals
(M.paşa, Topakoğlu konağı)

Figure 3.165, Terra-cotta
(M.paşa, Topakoğlu konağı)

Figure 3.166, Rounded stones on terracotta ware (İbrahimpaşa, no: 108)

Figure 3.167, Air canal (M.paşa, Topakoğlu konağı)

PABUÇLUK:

It is the area located at the entrance of rooms in traditional houses and bounded with *seki* and *musandra*. *Pabuçluk* took its name because of taking off shoes at the rooms' entrance. In the region *pabuçluk* can be a small space which only covers the opening area of the door. If it lays all the short wall side, it takes also the name of *seki altı* (see Fig. 3.168-169).

MUSANDRA:

It is the balustrade which showing the difference of elevation between *seki* and *pabuçluk*. *Musandra* is a very ergonomic architectural element that people hold on to it when taking off their shoes. It does not necessarily continue along the *pabuçluk*. (see Fig. 3.170).

SEKİ:

In some traditional houses, difference of elevation is generated between floor and entrance of room. The elevated room floor is named as *seki* and the other part is named as *pabuçluk.* The *seki*s can be classified under two groups: stone *seki*s and rock *seki*s.

Rock *seki*s are seen in the stone masonry houses which sits on rock ground and in rock-cut houses. It is generated by forming the rock floor. It has been determined that rock-cut spaces which have *seki*, are shapened quite regular. They are constructed 25-45 cm above the floor (see Fig. 3.171,172).

The timber *seki*s are constructed in two techniques. In the first one, room floor is elevated with timber posts. 10x10cm – 15x15cm sized and 45-100cm high timber posts are placed to the room floor with 60-90 cm spaced between each other. 8x10cm – 10x10cm sized timber beams are placed on timber posts parallel to the short side wall. There are hollows on the wall with 30-45 cm intervals to fit the beams in (see Fig. 3.173). These beams are covered by timber floor coverings and so timber *seki*s are generated (see Fig. 3.175).

In the second technique of *seki* constructing, clay mud is covered on the pumice (*kayır*) infill. 2 cm thick, 10 cm wide timber beams are placed to the ground with 30 cm interval. These beams located on the ground are covered with timber covering material. Therefore *seki* is constructed about 10cm height (see Fig. 3.174).

Figure 3.168, *Seki altı-pabuçluk* (Ürgüp, block/lot:131/23)

Figure 3.169, *Seki altı-pabuçluk* (İbrahimpaşa, no:39)

Figure 3.170, *Musandra* (Ortahisar)

Figure 3.171, Rock-cut *seki* (Ürgüp, block/lot: 131/21)

Figure 3.172, Rock- cut *seki* (Ürgüp, block/lot: 131/23)

Figure 3.173, Hollows on the wall (Ürgüp, block/lot: 131/12)

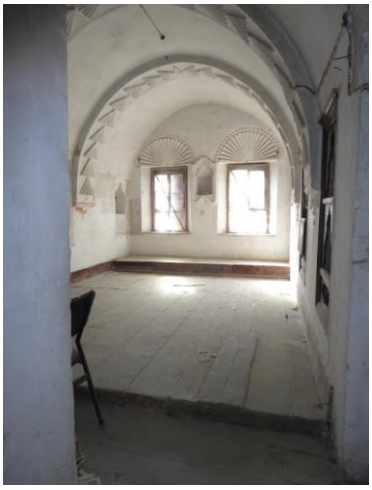


Figure 3.174, Timber *seki* (Mustafapaşa, Topakoğlu konağı)

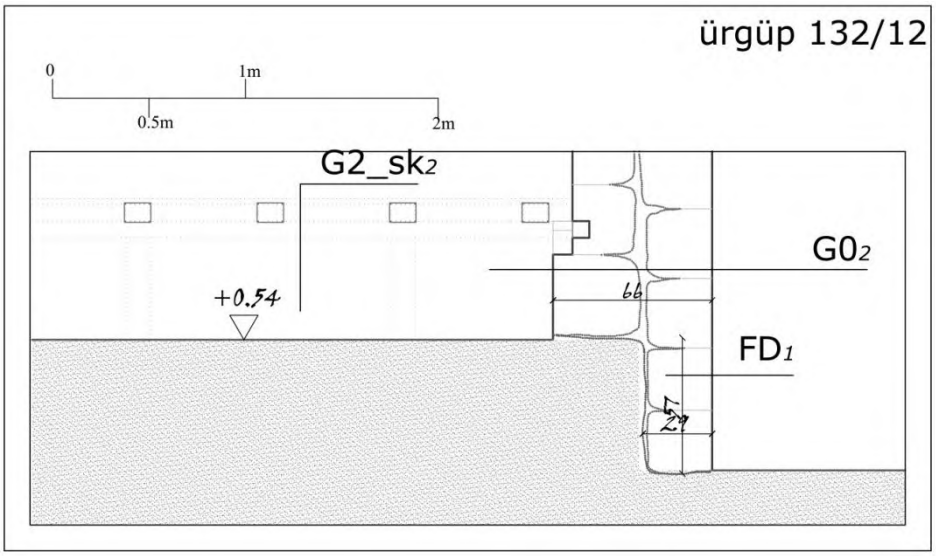


Figure 3.175, Timber *seki* (Ürgüp, block/lot: 132/12)

SEDİR:

Sedir is a commonly used architectural element for sitting and sleeping purposes. They are generally placed either in front of the window in one way or along two walls with "L" shaped. *Sedir*s can be classified under 3 groups by their construction techniques.

Sedir Type 1: Wooden *Sedir*s

Timber *sedir*s are generally used in ground and upper storeys which have timber floor coverings. They are planned with the timber floors which are elevated or directly sitting on to floor. Hollows are opened into the wall as 25-35 cm high from floor covering and with 20-25 cm intervals, to fit the *sedir* beams in (see Fig. 3.177). Within these hollows, *sedir* beams sized like 8x8 cm, 10x 10 cm are fitted. While these beams hold the wall from one side, from other side they are sat on to the timber supports which are sized 5x5x25-45 cm and nailed to the floor (see Fig. 3.179). In most of the examples (4/7) there are 5x5 cm sized secondary beams are seen as perpendicularly nailed to main beams (In Topakoğlu house, the secondary beams are sized 2 cm thick and 10 cm wide rectangular shaped (see Fig. 3.181). Furthermore *sedir* is covered vertically and horizontally with 2 cm thick timber covering plates. Vertically used timber coverings are placed 1-2 cm into the wall (see Fig. 3.178). It has been determined that in upper floors, 30-40 cm high, two rows recessed rough-cut stones are left on the wall to fit the timber *sedir* in (see Fig. 3.180).

The height of *sedir* from floor covering is between 25 to 50 cm and its width is 70cm to 80cm. The height between up level of *sedir* and window is adjusted to 40-50 cm, so that the person who sits on the *sedir* can see outside easily (see Fig. 3.176).

Sedir Type 2: Stone *Sedir*s

Nine of 19 surveyed *sedir*s are stone. Stone *sedir* can be used on ground and upper floors. It has been determined that they are used with rock or stone floors. While constructing the stone *sedir* a stone which we might say "*sedir* border stone" is put 65-90 cm far from the wall. This stone might be sized 15-20 x 30-40 cm and cut-stone or rough-cut stone (see Fig. 3.182, 183). The space stays between wall and the *sedir* border stone is filled with *kesek* (soil, broken stone pieces, rock pieces) (see Fig. 3.184). The top layer is finished with a pressed stiff earth (see Fig. 3.185). In one of the examples (1/9), it has been seen that the top layer covered with stones (see Fig. 3.186). Stone *sedir* is

constructed 80-100 cm wide and 20-30 cm high. The height between top layer of *sedir* and window changes from 45 cm to 100 cm (see Fig. 3.188).

Sedir Type 3: Rock-Cut Sedirs

Rock cut *sedir*s are used in ground floor rooms (2/2). Rock-cut *sedir*s which are generated by shaping rock ground are generally used in rock carved buildings or masonry buildings on rock grounds (see Fig. 3.187). Rock-cut *sedir*s are constructed as 20-30 cm high and 80-100 cm wide (see Fig. 3.189).

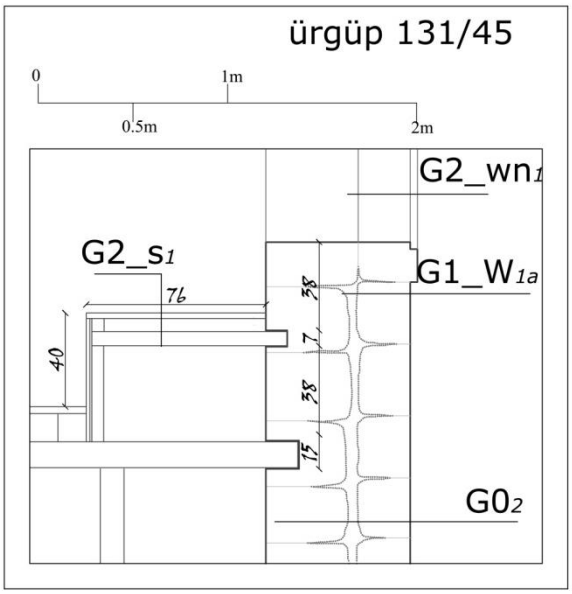


Figure 3.176, Height difference between up level of *sedir* and window (Ürgüp, block/lot:131/45)

Figure 3.177, Hollows opened into wall Ürgüp, block/lot: 131/14)

Figure 3.178, Timber coverings placed 1-2 cm into the wall (Ürgüp, block/lot: 131/14)

Figure 3.179, Timber beams of *sedir* (M.paşa, block/lot: 73/5112)

Figure 3.180, Two rows rough-cut stones left on the wall (Ürgüp, block/lot: 131/14)

Figure 3.181, Rectangular shaped timber beams (Mustafapaşa, Topakoğlu Konağı)

Figure 3.182, *Sedir* border stone (Ürgüp, block/lot: 131/21)

Figure 3.183, *Sedir* border stone (Ürgüp, block/lot: 131/14)

Figure 3.184, *Kesek* infill between wall and *sedir* border stone (Ürgüp, block/lot: 131/23)

Figure 3.185, *Sedir* finished with pressed earth (İ.paşa, no:39)

Figure 3.186, Stone *sedir* (M.paşa, block/lot: 62/4731)

Figure 3.187, Rock-cut *sedir* (M.paşa, block/lot: 73/5112)

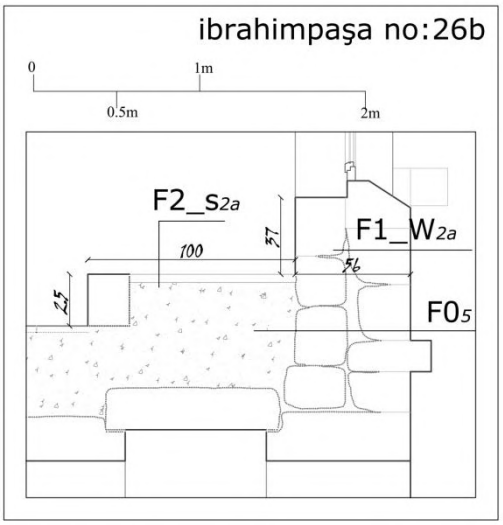


Figure 3.188, Stone *sedir* (İbrahimpaşa, no: 26b)

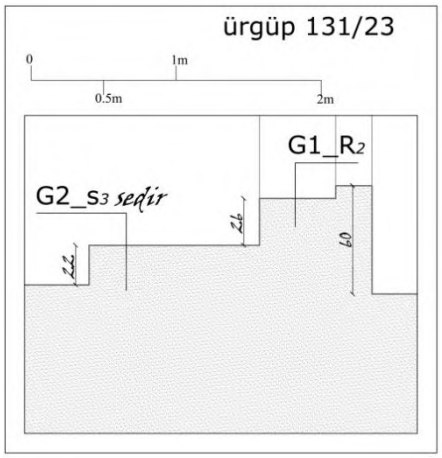


Figure 3.189, Rock-cut *sedir* (Ürgüp, block/lot: 131/23)

ŞIRALIK:

Şıralık is an architectural element, which is used for making grape juice. It is built in spaces like kitchens, aiwans, and storage rooms.

Grape growing and viniculture have an important role in the region's economy. Every year in September, the grapes are gathered with harvest. These grapes are used for making vinegar, *pekmez*, and wine. Nowadays *pekmez* is the most popular grape product in the region. While making *pekmez* these grapes are squeezed in the stone or rock carved architectural element called *şıralık.* After squeezing, the fermented grape juice is taken to another space with a hole or to a pot for resting. Furthermore *pekmez* is done after mixed with soil and boiled. There are two types of construction system for *şıralık.*

Şıralık Type 1: Stone Made *Şıralık*

In the corner of stone masonry or rock carved rooms, stone made *şıralık* is constructed by bonding stone parapet (see Fig. 3.190). The dimensions of *şıralık* are 100-150 x 150 -200cm. A deeper bowl is constructed for gathering the juice next to the *şıralık* in some of the examples (see Fig. 3.191). The juice of squeezed grapes flow to this bowl from a hole opened.

Şıralık Type 2: Rock Cut *Şıralık*

In rock carved buildings, rock-cut *şıralık* is again constructed by carving rock. Rock carved *şıralık is* seen in three different forms in traditional Nevşehir houses.

In the first technique, the rock is carved in dimensions of 120-150 cm x 120-180 cm and 15-20 cm thick, 20-40 high as a barrier. The depth of rock carved *şıralık* is between 20 and 25 cm (see Fig. 3.193).

In the second technique, *şıralık* is constructed by carving the rock floor with 10-20 cm deep (see Fig. 3.192). Because of the form and size differ so much, it has been thought that the *şıralık* is shapened according the needs of home owner. Right next to the rock carved *şıralık;* a deeper bowl is carved for gathering and resting the juice of squeezed grapes (see Fig. 3.192).

In the third technique, *şıralık* is constructed by carving the rock wall. A 150-180 cm wide, 120-150 cm deep niche is cut on the rock wall. The height of bottom of this niche is averagely 50 cm from the floor and the height of niche itself is about 200 cm. Also the inner depth of *şıralık* is 20-30 cm (see Fig. 3.194).

Figure 3.190, Deeper bowl with stone *şıralık* (Ürgüp, block/lot: 131/14)

Figure 3.191, Stone *şıralık* (Ürgüp, block/lot: 131/21)

Figure 3.192, Rock-cut *şıralık* and bowl (Ortahisar)

Figure 3.193, Rock-cut *şıralık* with barrier (Ürgüp, block/lot: 131/10)

Figure 3.194, *Şıralık* constructed by carving rock wall. (M.paşa, Topakoğlu Kon.)

NICHE:

Niches are the elements constructed on the rock and stone walls with various dimensions to put some staffs, tools and things (see Fig. 3.195-197). They are also named as "*taka*" in the region. Niche can be used in almost all of the house units like room, kitchen, aiwan, and storage room with various sizes and forms. Niches are the most seen architectural element in traditional Nevşehir houses.

Niches might be in very different dimensions according to their purpose of use. While the niches used in rooms are constructed smaller, the ones used in storage room, aiwan and the ones combined with built-in cupboard are constructed bigger. Niches can be classified in two groups by their constructing techniques: rock-cut niches and stone niches.

Niche Type 1: Rock- Cut Niches

The first type niches are constructed on walls of rock carved spaces and if exist on the rock walls of stone masonry buildings. They are generated by carving rocks with tools like *külünk* and cutter (see Fig. 3.195, 196). Even there is not an obvious measuring the average size changes between 30-50cm x 50-70cm. The depth of rock niches is averagely 40-50 cm.

Niche Type 2: Stone Made Niches

Second type of niches is the ones built on the stone walls (see Fig. 3.197). They have been seen in the spaces like room, aiwan, and kitchen. In the vault covered rooms, they are placed in one side or both sides of the cover arch. In *hezen* covered spaces, again they are placed in the stone wall with various dimensions. In the examples which the stone wall bonded next to rock, the background of that stone niche can leave as rock (see Fig. 3.198). Even the commonly used sizes are 30-40 x 40-50 cm; there are bigger niches constructed 60 x 100 cm. The depth of niches is between 25cm and 35cm.

Stone niches are classified in two groups as decorated and plain niches. Plant figures and geometrical ornaments are engraved on the decorated niches (see Fig. 3.199, 200). The plain niches are constructed on the wall in regular rectangular form without any ornaments.

BUILT-IN CUPBOARD:

Built-in cupboards are generated by adding wooden elements like shelf, wing, and frame to niches which are sized 50-60 x 90-110 cm high and 30-45 cm deep (see Fig. 3.201-207). The main construction material of built-in cupboards is wood. There are so many built-in cupboard types which are used in traditional Nevşehir houses.

In 5 of 16 surveyed built-in cupboard examples, ¼ of height is used as a shelf or drawer in bottom and the rest ¾ part is divided by shelves and closed by single or double door wings (see Fig 3.201, 202). In 6 of examples, the built-in cupboard is divided into two by a single shelf and closed by single door wing (see Fig. 3.203). In two examples, it is determined that a door wing is not used and built-in cupboard is finished only with a wooden frame (see Fig. 3.207). The rest three examples have different sizes and systems according to their purpose and places of use (see Fig. 3.204-206).

Figure 3.195, Rock-cut niche (Ürgüp, block/lot: 131/10)

Figure 3.196, Rock-cut niche (Ortahisar)

Figure 3.197, Stone niche (İbrahimpaşa, no:39)

Figure 3.198, Rock background of stone niche (Ürgüp, block/lot: 131/10)

Figure 3.199, Decorated niches (M.paşa, block/lot: 62/4731)

Figure 3.200, Decorated niches (Ürgüp, block/lot: 132/12)

Figure 3.201, Single winged built-in cupboard divided by shelf (İbrahimpaşa, no: 39)

Figure 3.202, Single winged built-in cupboard divided by shelf (İbrahimpaşa, no: 26b)


Figure 3.203, Single winged built-in cupboard divided by shelf (İbrahimpaşa, no: 87)

Figure 3.204, Built-in cupboard (M.paşa, block/lot: 73/5112)

Figure 3.205, Built-in cupboard (M.paşa, block/lot: 6/4668)

Figure 3.206, Built-in cupboard (M.paşa, block/lot: 62/4731)

Figure 3.207, Built-in cupboard with wooden frame (M.paşa, Topakoğlu Kon.)

***YÜKLÜK*:**

*Yüklük*s are deep and big niches in traditional houses to put and store the staffs like quilts and pillows. They are constructed on stone walls or on rock walls of rock-cut spaces. In vault covered rooms, width of two arches is saved for *yüklük, gusülhane,* and cupboard. A smooth surfaced wall is bonded next to the building exterior wall. Then, another separated wall is bonded after end of first two arches. Elements like y*üklük* are all placed in the space between this separated wall and exterior wall (see Fig. 3.208). The opening of *yüklük,* which is approximately 180 cm long and 60-80 cm deep, is usually spanned by timbers (see Fig. 3.209). The openings are spanned sometimes with a depressed arch and sometimes with a carved semi-circle arch form (see Fig. 213, 214). *Yüklük*s can be classified into two types according to their construction techniques.

The first type *yüklük*s are used with a wooden frame or covering wings. These *yüklük*s are constructed with the size of 120 x 180 cm and 30-40 cm high from the floor (see Fig. 3.210). It has been determined that in one of the surveyed *yüklük*s, the dimensions can reached to 150 cm in height and 350 cm in length (see Fig. 3.212). This type of *Yüklük*s commonly built with wooden elements, and use of shelves is also frequently seen (see Fig. 3.211). The *yüklük* covering wings are constructed by nailing 20-30 cm wide, 2 or 3 wood pieces to each other. The outer surface can be painted or decorated with wooden laths.

In the second type of *yüklük*s, the niche which is constructed on the stone or rock wall is left in that shape and not any components is used for it (see Fig. 3.212-216). These *yüklük*s are constructed 30-45 cm high from the floor with height of 120-180 x 150-200 cm and depth of 60-90 cm. They are built with cupboards or niches on both sides (see Fig. 3.214). Because there is not covering wings on these types of *yüklük*s, the *yüklük* is covered with a curtain or cloth. Almost all of the rock-carved *yüklük*s are second type *yüklük*s. Even though a frame or covering wings were not used; the shelf used examples can be seen (see Fig. 3.215).

Figure 3.208, *Yüklük* placed between separated wall and exterior wall (Ürgüp, block/lot: 132/12)

Figure 3.209, Opening of *yüklük* (Ürgüp, block/lot: 132/12)

Fig. 3.210, *Yüklük* with covering wings (İbrahimpaşa, no: 93)

Figure 3.211, *Yüklük* with covering wings (İbrahimpaşa, no: 39)

Figure 3.212, *Yüklük* with covering wings (M.paşa, block/lot: 73/5112)

Figure 3.213, Rock carved *yüklük* in arch form (İbrahimpaşa, no:26b)

Figure 3.214, Rock carved *yüklük* in arch form (Ürgüp, block/lot: 131/21)

Figure 3.215, *Yüklük* used with shelf (İbrahimpaşa, no: 87)

Figure 3.216, Rock-cut *yüklük* (İbrahimpaşa, no: 39)

***LAMBALIK*:**

In traditional houses, *lambalık* is an architectural element which is constructed like a console or a niche to put lighting elements on it. They are classified in two groups according to their construction techniques.

Lambalık Type 1: Overhanging *Lambalık*

The overhanging lamp shelf is generated by stones projected to the room from the wall. These overhanging lamp shelves are constructed generally in form of upside down cone (see Fig. 3.217, 218). The total height of these upside down cone is between 12 and 18 cm, the wide diameter is 10-30 cm and height is 140-150 cm from the room floor. Cone formed overhanging lamp shelves can be used single or with combinations double and triple (see Fig. 3.219).

In all surveyed houses only one of the examples is in different form cone, it is a rectangular shaped overhanging *lambalık* (see Fig. 3.220). This rectangular shaped over hanging lamp shelf is constructed in 23 cm height and 55 cm width.

When the positions of overhanging *lambalık*s are examined, it is seen that they are generally placed in the corners (5/18) or between the windows (7/18) (see Fig. 3.221). Even it is rarely seen, there are examples placed between two arches on the side walls (3/18) or on the wall which the cupboard placed (2/18) (see Fig. 3.222, 224). In one example, lamp shelf is placed in front of a window which is opened on an interior wall; therefore it is purposed to enlighten two spaces at the same time (1/18) (see Fig. 3.223).

Type 2: Niche *Lambalık*

The niche *lambalık*s are placed on a wall closer to the room entrance; with dimensions 70-95 x 150-200 cm and 70-80 cm high from the room floor (see Fig. 3.225-228). The second type is constructed averagely 20 cm deep but the lower part is projected 10-15 cm, so in total the second type has a 30-40 cm depth. These niche *lambalık*s are also characteristic decorative architectural elements.

SHELF:

Shelf is a wooden architectural element which is located approximately 200 cm high from the room floor for putting some staff on. 2-3 cm thick and 20 cm wide wooden plates are fixed to wall by nailing on laths and timber buttresses (see Fig. 3.229).

Generally seen in vault covered rooms the shelves are located on the front and back walls of space. Shelves surround all the way above the window to end of the first arch on the side walls. As in the back wall, shelf also surrounds above the architectural elements like cupboard and *yüklük* to the first arch (see Fig. 3.230-231).

Figure 3.217-218, *Lambalık* formed in upside down cone upside down cone (İbrahimpaşa, no: 39-108)

Figure 3.219 Cone shaped overhanging *lambalık* (İbrahimpaşa, no: 39)

Fig. 3.220, Rectangular shaped overhanging *lambalık* (İbrahimpaşa, no: 26b)

Fig. 3.221, *Lambalık* on the corners (İbrahimpaşa, no: 39)

Fig. 3.222, *Lambalık* on the wall (İbrahimpaşa, no: 39)

Fig. 3.223, *Lambalık* enlightens two spaces at the same time (İbrahimpaşa, no: 39)

Fig. 3.224, *Lambalık* near yüklük

Fig. 3.225, Niche *lambalık*
(Ürgüp, block/lot: 131/21)

Fig. 3.226, Niche *lambalık*
(Ürgüp, block/lot: 131/23)

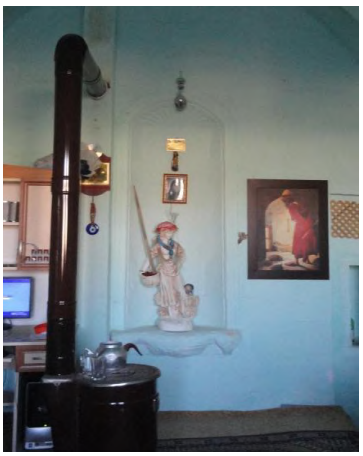


Fig. 3.227, Niche *lambalık*
(Ürgüp, block/lot: 184/29)

Figure 3.228, Niche *lambalık*
(Ürgüp, block/lot: 131/45)

Figure 3.229, Shelf with timber buttresses
(İbrahimpaşa, no:39)

Figure 3.230, Shelf
(İbrahimpaşa, no: 39)

Fig. 3.231, Shelf above architectural elements
(İbrahimpaşa, no: 39)

STAIRCASE:

The stairs are the circulation elements which connects the ground and upper floors. The most common kind of stairs used in Nevşehir is stone stairs. Stone is used in building of stairs as like in most of the architectural elements. In some examples it was seen that the side surfaces of stair stones are decorated with stone ornaments. Besides, there are also simple stair stones without any decoration. On the side surface of stair stone, there is a 2-3 cm indent named "*limonluk"* (see Fig. 3.232, 233). Also it is seen that the edges are rounded for preventing the sharp edges not to hurt the users (see Fig. 3.232, 233).

Timber stairs are rarely seen in the field survey; the ones have timber stairs mostly belong the later periods. There are not any timber stairs in surveyed houses in this thesis.

Another different stair type is the rock stairs. These are constructed by shaping the rock roughly (see Fig. 3.234). There is not a systematic measurement for rock stairs. There are four different stair groups according to construction techniques.

Stair Type 1: Console Stairs

These stairs continue all the way along the interior or exterior wall. While the one side of every step sits into wall, the other side is overhanging (see Fig 3.235, 236). The length of stair stones is 90-120 cm and the width is 25-35cm. The riser height is between 24cm and 27 cm. The 18-25 cm of stones goes into the wall and sits 5 cm on each other (see Fig. 3.235). In some special cases, it has been determined that the stairs sit on each other up to 15 cm (see Fig. 3.237, 238).

In this type of stairs, the main construction technique is that to fit the stair stones into the wall and sit them on each other neatly. The important point in this technique is that the first stone of the stairs has to be strong and durable. Because of that, the first stone is usually chosen from more durable stones (Interview, November 2011).

Stair Type 2: Stairs Supported by Rock/Wall

In this type of stairs, stones sit on a wall or on a rock mass (see Fig. 3.241). The riser height of stairs is 18-25 cm and steps of stairs are 25-35cm wide. The step stones can either be smooth faced with rock/wall or it can be projected 5-8 cm from them (see Fig. 3.239, 240). It has been thought that the purpose of this projection which is especially seen in exterior stairs is to protect the wall from rain and snow waters.

Stair Type 3: Stairs Supported by Arch

The arch used in many building units is also used to support the stairs. The most commonly use of arch profiles to carry stairs are semi-circle, depressed or pointed arches. The arches are used as half or ¾ constructed which are named as "orphan arch" (see Fig. 3.242). There are also examples of stairs carried with whole arch instead of half constructed (see Fig. 3.243). The length of stairs carried by arches differs according to their locations. The step is 30-35 cm wide and the riser height is 15-20 cm. In third type of stairs, the stair stones are again projected 5-8 cm from the arch carries it.

Carrying the stairs with arc has also some other easiness. In need of a stairs to be constructed between two transition areas, if the stairs is carried with an arch, the transition problem is solved by the emptiness generated under this arch (see Fig. 3.242). The same emptiness is also an advantage to store some tool and staff or to place an architectural element like fireplace (see Fig. 3.244, 245). Besides that, using arch beneath the stairs is also important to decrease the total building load.

Type 4: Mixed Type Stairs

In the fourth type stairs, many construction techniques are used together. Most frequently seen example of this type is mixed use of arch and walls (see Fig. 3.247). The stairs supported by wall and column are the other examples of this type (see Fig. 3.246).

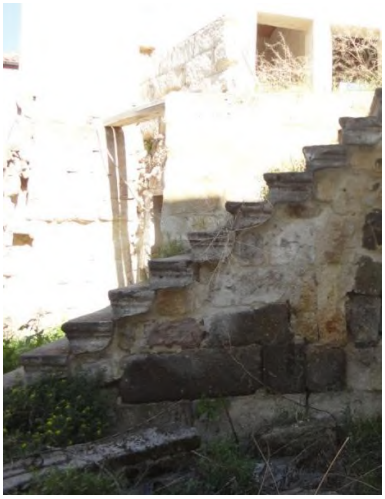


Figure 3.232, *limonluk*
(M.paşa, Topakoğlu Kon.)

Figure 3.233, Rounded edges
(Ürgüp, block/lot: 132/12)

Figure 3.234, Rock-cut stairs (İbrahimpaşa)

Figure 3.235, Overhanging stair stones
(Ürgüp, block/lot: 131/45)

Figure 3.236, Overhanging stair stones
(Ürgüp, block/lot: 131/45)

Figure 3.237, Console stairs (İbrahimpaşa)

Figure 3.238, Console stairs (İbrahimpaşa)

Figure 3.239, Stair supported by wall (M.paşa, Topakoğlu Kon)

Figure 3.240, Stair supported by wall (İbrahimpaşa)

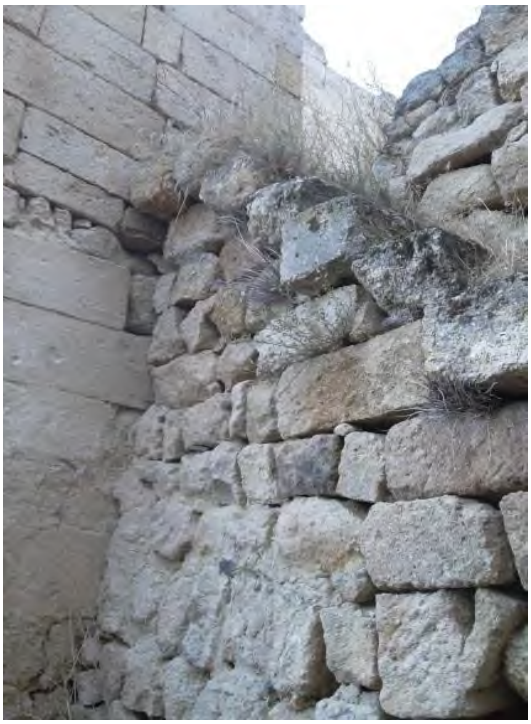


Figure 3.241, Stair supported by wall (Ürgüp, block/lot: 131/23)

Figure 3.242, Stair supported by arch (İbrahimpaşa, no: 108)

Fig.3.243, Stair supported by arch (İbrahimpaşa, no: 93)

Figure 3.244, Fireplace under the stair (M.paşa, Topakoğlu Kon.)

Figure 3.245, Space under the stair (İbrahimpaşa)

Figure 3.246, Mix type stair (Ürgüp, block/lot: 132/12)

Figure 3.247, Mix type stair (İbrahimpaşa)

3.3. MATERIALS USED IN TRADITIONAL HOUSES IN NEVŞEHİR

3.3.1. STONE

Stone is the most commonly used construction material in Cappadocia due to the over-numbered quarries of the region. Thus, stone houses are the most significant characteristic examples of traditional architecture. Nevşehir stone is very soft and easy to shape when it is first quarried. It is chosen as the main construction material and used with decorations and ornaments. There are many layers of tuffs with various thicknesses. Because of these numerous layers, the quarried stones are not always in same colour and shade. So, it is possible to see different lodes, colours and shades in one building.

In the construction process of traditional houses, stones were taken from the quarry as big blocks and brought to the construction field. Stone which would be used as cut-stone or rough cut-stone differs according to the quarry's situation and economical structure of the house owner. In the construction field, the strong, durable stones are reserved for foundation, cornices, and window/door openings. Other stones are classified according to the parts in which they are used. Stones which are going to be used in construction are sized and shaped by considering wall thickness. The building stones can be decorated with different figures according the economical condition of house owner and luxury. Today many building in the region has magnificent stone ornaments on their cornices, entrance doors and around the windows (see Fig.3.248).

As mentioned before, the geological structure of the region took part in the development of rock carving technique. While constructing a rock carved space, the rock blocks which are removed out, are used again in the building. There are many examples of these rock blocks used as stone in the building by shaping and cutting in smaller sizes (see Fig.3.249).

The tools which are used for rock carving and stone shaping are as follows: pickaxe, bellow and anvil, wedge and sledge (Öztürk, 2009:54).

3.3.2. ROCK

Rock is the oldest construction material of Nevşehir traditional buildings. The tuff layer 100-150 km deep generated by volcanic activities of mountains was eroded in time by natural factors like rain, floods and temperature differences. Thus, the formations called fairy chimneys were generated. Moreover, these tuff layers are still eroding continuously by the same natural factors.

In these settlements located in such a geological area, the great effects of this geological structure can be seen easily on both living culture and building structure. Supplying housing requirements by rock cut, forming structural and architectural elements by rock carving and using rock with purposes of storing, preparing and cooking are the distinguishing examples of this opinion

While the rock fulfils the housing need in the region, it also provides a hiding space (see Fig.3.250, 251). Because of many battles occurred in the region, an escape area was needed. Therefore the underground cities were constructed for hiding and escaping. Moreover it is a great example for how people can use and shape the environment according to their own needs. The rock has a very important role in people' life, even it is not only a shelter or living spaces but also it is a very basic construction material for their animals as a barn or *güvercinlik* (see Fig.3.252).

When we survey the use of rock in traditional Nevşehir houses, we can see it in almost every parts of the building. The advantage of geological structure is used while constructing the foundation. The rock is generated sometimes the whole foundation and sometimes only a part of it (see Fig. 3.253). In the horizontal and vertical structural elements, the rock sometimes as floor or superstructure and sometimes as a main or partition wall (see Fig. 3.253). The rock, which has a great place in the main structure of building, is also used in architectural elements.

Rock can also be seen most frequently in guest rooms as an architectural element like *sedir*, *seki*, cupboard, *yüklük*, and niche. Besides that rock-cut architectural elements can be decorated with many

ornaments by different tools such as pickaxe, bellow and anvil, wedge and sledge. Other than the rooms, the different shape and forms of rock can be seen in the spaces like aiwan, kitchen, storage room and barn. The rock carved *tandır* and fireplaces, *küplük*s for the terra cotta wares to fit in (see Fig. 3.254), built-in cupboards and niches carved in the storage rooms, *yemlik*s for feeding the livestock easily, carved rings to tie the livestock (see Fig. 3.255) and rock-cut stairs are the examples.

3.3.3. TIMBER

Timber is not used as the main construction material in traditional Nevşehir houses because there is not any forested land around the Cappadocia region. As mentioned before, since the region placed on a rock layer and having many quarries the stone became the most important construction material.

The most significant use of timber in the region is the *hezen*s which is the local name given for timber beams. It is still frequently used in local (see Fig. 3.257). As explained in third and second part there are two main spanning elements in traditional Nevşehir houses. The first one is vaults and the second one is timber beams. In timber beam, the *hezen*s are 10-15cm diameter logs. The logs are mostly used as in their rough shapes; there are also examples of square shaped logs. After these logs prepared to use in building, they are generally laid next to each other without leaving any space (however in some rare occasions with 50-70 cm intervals). The spaces can be made wider with the bigger log diameter.

3.3.4. IRON

Iron is rarely seen in Nevşehir traditional buildings. The general use of iron is in the window bars which is used in circle or square cross sectioned by interlacing to each other.

Other common usage area of iron is as a tie bar in the walls. Iron tie bars are 3 cm wide and 0.3 cm thick and laid all the way through the wall (see Fig. 3.258). These tie bars placed under and above the window openings are connected and fixed to other vertical iron element on the surface of the wall (see Fig. 3.259). The vertical iron tie bar is 50 cm high, 0,3 cm thick and stuck to the hole in the end of horizontal tie bar which come off the wall. In this matter the horizontal and vertical tie bars attach to each other, so the wall is ensured to be stable.

Figure 3.248, Stone ornaments (Uçhisar, no: 27)

Figure 3.249, Rock blocks used as stone (Ortahisar)

Figure 3.250-251, Rock carved spaces (Uçhisar Paşabağ, Castle)

Figure 3.252, Barn (Ürgüp, block/lot: 131/52)

Figure 3.253, Rock as a foundation and wall (İbrahimpaşa)

Figure 3.254, *Küplük* (M.paşa, Topakoğlu Kon.)

Figure 3.255, Carved rings to tie the livestock (Ürgüp, block/lot: 131/52)

Figure 3.256, Timber *musandra* (Uçhisar)

Figure 3.257, *Hezen* (Mustafapaşa)

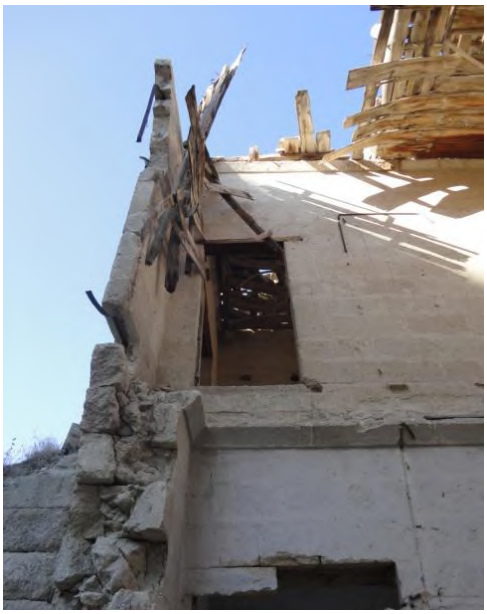


Figure 3.258, Iron tie bars
(Ürgüp, block/lot: 131/45)

Figure 3.259, Iron tie bar
(Ürgüp, block/lot: 131/14)

CHAPTER 4

EVALUATION OF THE CASE STUDY

In the first chapter, the problem of this thesis and the methodology was defined. The second chapter starts with the brief description of the region, its history and geography. The history of the preservation studies in the region is also mentioned in that chapter. At the last section of the second chapter the architectural features of Nevşehir traditional houses are explained with respect to the review of existing literature and observations in many traditional houses.

In consequence of the field study, detailed explanation about traditional houses is given in the end of the third chapter. In this section, parts of buildings from ground level to the roof are codified in system and these codes are shown at system sections. Additionally, survey sheets are prepared for each buildings separately (see App. C).

Moreover, these codes are gathered together in a table and twenty buildings being studied are categorized. With this categorization process, general descriptions are made on structural elements such as foundations, walls, floors, roof so that frequency of use, prevalence and types of these elements are identified. Other than the main parts of the buildings, architectural elements their intended usage and structural systems are defined.

In the end of third chapter, materials used are classified; construction techniques and their frequency are evaluated. All identified structural elements and building parts are explained with photos and drawings made by the author.

In this chapter, a general evaluation of previous surveys and analysis is given. It is aimed to briefly explain the construction process of a traditional house in Cappadocia (see Fig. 4.01, 02).

In this respect, first of all, the geological structure of the region affects the construction technique. People benefitted from the rock for many years since it is a convenient and easily shaped material. In the beginning, rock itself provided the housing requirements. People lived in spaces which were carved into rock. Rock carving was also economic; they did not need to pay for any other construction materials. It was also compatible with the climatic conditions of the region. As keeping heat inside, rock-cut spaces provided suitable inner conditions cooler during the summer and warmer in the winter. Wide usage area of rock has offered local people an employment opportunity. Today, rock carving is still considered as an important working area in construction.

In time, people started to add masonry structures their rock-cut houses because they need some extra spaces. Economic conditions of the society and the construction techniques were developed. Moreover, they were advantageous in finding new construction materials in the region. There were many stone quarries in Cappadocia. So, the stone was started to be used as a construction material. The masonry structure as an addition to rock-cut space could be either a single wall with a vault or a stone masonry room. People built these additions according to their needs.

In the end, masonry buildings and rock carved spaces were used together (see Fig. 4.02). Field studies show us that cut-spaces are still a part of construction nowadays. Almost in every building part such as foundation, floor and roof as well as in every architectural element, rock and rock-cut technique is used. Furthermore, rock carving is one of the significant factors which grant characteristic features to architecture of region. In Cappadocia, traditional houses become reproducible with these rock-cut spaces. Local people carve rock without any plan and regulation. That means there is not a systematic space organization of rock-cut buildings. The main principle is to respect to the rights of neighbours. Under these circumstances, two dimensioned cadastral plans are not appropriate for this distinctive region.

Thus we can say that there are two main construction materials in the region. These are rock and stone. Rock is cut with different tools such as: pickaxe, bellow and anvil, wedge and sledge. It is fashioned in two methods. In the first method rock is cut roughly; we can see the tool traces on the surface of the rock. The second method is cutting rock very smoothly; rock has a smooth surface as stone.

Stone masonry houses are either one or two storied. They can be built as facing to street or drawn back from the lot. In Nevşehir houses, generally the special type of stone called 'Nevşehir Stone' is used in two ways: cut-stone and rough cut-stone. Nevşehir stone is soft and can be shaped easily when it is first quarried. After used in construction, it becomes a durable and hard stone. More durable Nevşehir stones are preferred to be used in some special building parts which are structurally important such as stairs, foundations and inner cornices.

When a traditional house is built in Nevşehir, six types of foundations can be used. The most determinant factor which affects the formation of foundation is topography. It is seen that only two types of foundation are used in Mustafapaşa and İbrahimpaşa, however Ürgüp Kayakapı has variety of foundations due to its land topography. Foundations are constructed with rock or stone. Eleven of the twenty-three foundations are completely made of rock and remaining twelve are made of rock and stone. Rock mass can be used as a supporter of stone foundation or it is used as a foundation by itself. Stone foundations are constructed in width of 45-80cm and their walls are constructed in two or three stone rows leaving 5cm gap between them. This 5cm gap is filled with broken stone and rock pieces dimensions of which change between 3cm to 20cm. These infill materials are called as '*kesek'* in locality. If the pumice is used in infill, it is called as '*kayır'*. *Kesek* and *kayır* are also used in walls, arches and floors.

Masonry stone wall and rock are used as vertical structural elements of Nevşehir houses. As in other building units, rock can be used instead of stone wall. All sides of a space can be rock-cut. Rock is shaped according to space organizations in ground floor and upper floors. It is rarely used in upper floors. Except some houses which sit on slopes, rock is usually used in ground floor. It is also seen that the necessary architectural elements are also carved into rock. There are two types of rock-cut vertical elements according to carving techniques. First type is carving rock roughly. On the surfaces the marks of carving tools can be seen. On the other hand the second type is constructed masterfully with smooth corner and edges.

Like the other vertical structural element, stone masonry walls can be built in three ways. These are: single-sided walls, double-sided thin walls and double-sided thick walls. Single-sided walls are built with 18-30 cm thick single layer stones. All of the examples seen in ground floors are used to separate the spaces. The widest usage area of the single-sided walls is upper floors where the ground floor is made up with double-sided masonry walls. In most of such buildings, in order to hold together the structural walls iron tie bars are used. These iron tie bars are in 3cm width and 0.3 cm thick, laying along with the wall and stocked into the outer side of the wall by using another iron element. They are placed just above and below the window openings and may be used in interior walls just like exterior walls.

Double-sided thin walls are built in 40-60cm and thick double-sided walls are 60cm width. Both wall types can be used in first floor and upper stories. Double-sided walls are built with two rows of stone (18-25cm in thickness) with a gap of around 5cm between them. This gap may be more than 5cm in construction of thick double walls. The gap is then filled with "*kesek*" and a mixture of clay soil and water called "*şillez*" is added. This mortar helps to bind the stone layers and "*kesek*" to each other.

While building a stone masonry wall, both clean cut and rough cut-stone can be used. In construction of double-sided walls, while the outer sides of the wall stones are made up with cut-stones, inner sides of the stones are left as rough-cut. The reason behind this is to produce a strong binding effect between infill materials and stones. In double-sided walls built with cut-stones, in order to have them stick together, some stones are connected perpendicular to others. These stones can also be identified in the façade with their square form. In rough-cut double-sided walls, one side can be made up with cut-stone or both sides might be built with rough-cut stones. It is seen that construction of this kind of walls, cut-stones are preferred in corners and openings. Iron tie bars are also used in some double-sided walls.

In traditional houses arches-vaults and timber beams are used as spanning elements. The superstructure made up with arches coming together is called *atkı kemerli tonoz*. This vault is one of the key elements which give structural characteristic to the region. The rooms in which *atkı kemerli tonoz* is used, is then called "arch room". In construction of *atkı kemerli tonoz*, two kinds of arches are used which are rib arch (main arch) and cover arch (intermediate arch).

Rib arch is the main support element. It is constructed with stones with 20-30cm thickness and 60-80 cm width and the top point of the arch is at a lower level according to cover arch. On both sides of the voussoirs of the rib arch, 5-10 cm indents are opened upon which the cover arch sits. Cover arch is not a supporting arch; however it is used for closing the gaps between the elements of main arch. It just carries itself. Cover arch is made of 20-15 cm stones with 60-80 cm width. So that using two rib and one cover arches together, 500-700cm longing places are made up with *atkı kemerli tonoz*. After *atkı kemerli tonoz*, generally stone floor coverings are used.

Timber beams are the second horizontal elements used in Nevşehir traditional houses. It is widely seen in flooring of ground and roof. Averagely 15x15cm beams are placed on cornices on the inner side of the walls. Around 50cm depth these cornices are especially carved in wall for these beams. On that beams, floor coverings with 30cm wide and any length are placed.

Although rare, when timber floorings are used in ground floor, two methods are found to eliminate the ground moisture to affect the flooring. In first of them, rock ground is filled with pumice and covered with clayed soil. 5x10 cm timber floor beams are placed into hollows and/or threads of the wall. In the second method, 40-100cm length timber posts are placed on the ground with 60-90 intervals and by being parallel to long side of the room. 15x15cm timber beams are placed on these vertical posts in longitudinal way. Then, crosswise 10x10cm beams are placed and timber floor coverings are nailed on these crosswise beams. This method is called as 'elevated floor'. All the beams used in this method are inserted into the hollows on the wall.

Timber beams in traditional houses are called as "*hezen*" in local language. These are used as processed in smooth geometric forms or as trunks. *Hezen*s can be located next to each other or with intervals. Their diameter could be change between 10cm and15cm. When a space is covered with hezen, straws and *kesek/kayır* infill are located on them.

Following to span the floor with spanning elements, building has to be ended with a roof. So the traditional house will be completed basically. Three kinds of roof types are identified in the area. In the first and most used roof technique, extrados of the vault is covered with pumice and pressed earth (15/28). The second type is timber hipped roof (5/28) and the other technique is the roof that is made of rock, pumice infill and stone (4/28).

Timber roofs are made of timber laths either sloping to one side or four sides. Floor beams of roof are placed on inner cornices. After these cornices, structural walls are continued to be built 40-60cm more to support and hold the roof. This part is called as "*kafa tahtasi*". The roof is constructed with girders, purlins and rafters. Then, over-under tiles are covered. 5x5 cm laths can be used under first three rows of tiles to prevent the over-under tiles from laying down.

Earthen roofs are used on spaces covered with vault or "*hezen*". In vaulted spaces, the place between the wall and extrados of the arches is called "arch seat". Pumice and "*kesek*" are laid onto "arch seat" or straw of the hezen. After then "*şillez*" is poured into gaps. Onto that infill, clayed soil is laid and the earthen roof is completed. Because of having good water holding capacity, clayed soil is widely used in roof and ground floors. To be ready for winter, in every autumn these roofs have to be cleaned of the plants and compressed with a tool called "*yuvak*".

In the third type of roof, the rock, itself is generated the roof in rock-cut spaces. There is no need to construct another roof, as rock is shaped into one.

The most common roof elements are eaves, chimneys and *çörten*s. Due to the difficulties of accessing roof, its elements could not be analysed thoroughly. Limited data is collected especially about chimneys. Another roof elements used in traditional houses is eaves. Eaves are built in two ways. One of them is stone eaves which are seen at earth roofs. In this type stones are projected 60cm from the

buildings. It is preferred to use more durable stones at eaves. *Çörten* is not frequently used in Nevşehir houses. It is usually seen in the houses of late period.

Thus, the traditional house which is founded on stone or rock foundation and continued with vertical and horizontal elements is ended with earth or timber roof. After constructing these main parts of the building, it is started to build architectural elements. Architectural elements are mostly constructed with rock and stone. Beside the window and door profiles, some rare timber used examples are also seen.

We can start with projections to define architectural elements. In traditional houses of Nevşehir, there are two types of projections as open and closed projection. Closed projections are constructed as the types as bevelled and flat projection. With bevelled projection, it is possible to construct up story in a regular geometry. Bevelled projection is made up with stones stacked and projected as 10-15 up another. Flat projection is made of console stones placed with 30-50cm gaps between and projected to the street. It provides to enlarge the upper story. Open projections are used as balcony placed at middle module on the façade. It is a key element for strengthening the facade symmetry and emphasizing the mass. Balconies are built as to project 50-60cm from the wall.

Cornices are the most attractive architectural elements on façades. They are also one of the distinguishing elements of Nevşehir traditional houses. In the region, two types of classifications can be made for cornices. In first type, which is also frequently used in previous studies, cornices are classified according to their location as eave cornices and floor cornices. Second classification is made according to their function as interior cornices and exterior cornices. Interior cornices can be considered as kind of finishing element on ceilings of interior spaces. Their most important function is to support the timber floor beams. Exterior cornices are used to separate the floors visually and to emphasize their finishing.

It is also important to describe doors and windows briefly to explain Nevşehir traditional house. Doors used in Nevşehir traditional houses can be grouped into three categories according to their locations: courtyard doors, exterior doors and interior doors. Hinge, lock and door handle are metal components used in doors. Courtyard doors are constructed in dimension of 160x210cm with double wings. Exterior doors provide the contact between house and courtyard or street. Their dimensions are around 160 x 220 cm. Interior doors or room doors are around of 80-90 cm in width and 200-210 cm in height. According to their construction technique, they are studied in four categories. Door openings are spanned by three methods. These are using depressed arch, using rectangle profiled timber girders and finally round profiled wooden trunks.

Windows are analyzed in ten categories such size of the opening, height from interior and exterior ground, depth, etc. Window profiles on the other hand are categorized into four groups. In this respect, in almost all examples from İbrahimpaşa Village window profiles are type-1; in the first floors of buildings in Mustafapaşa, profiles are type-2 and in other buildings of Mustafapaşa, profiles are type-3 and type-4.

When floor and ceiling coverings are examined, it is seen that they do not exhibit variety. Actually, floor coverings are constructed with two methods in the region, stone and timber floor coverings. Timber coverings are used generally in upper stairs and rarely in ground floors; however stone coverings are commonly used in both stairs. Similarly, ceiling coverings are also simple. Usually, ceilings of vaulted rooms are not covered. Timber coverings are used in ceilings which are built with timber beams.

Fireplaces are divided into two groups according to their locations as room fireplaces and kitchen fireplaces. Purpose of room fireplaces is heating. If the room is vaulted the fireplace is always placed in cover arches the dimensions of which is around 60-70 cm x 90-120 cm. The width of the wall on which fireplace is located is between 65 and 80 cm. The kitchen fireplaces are located in kitchens and aiwans and used for cooking. Their dimensions are around 70x150cm. To provide comfortable cooking setting, kitchen fireplaces are constructed closer to floor level (about max 20 cm). According to their construction systems fireplaces can be categorized into two groups as stone fireplaces and rock fireplaces. Stone fireplaces can be seen in both masonry houses and rock-cut houses however rock-cut fireplaces exist only in rock-cut houses.

Tandır is another element which is similar to fireplace. Like fireplace, purpose of *tandır* is both cooking and heating. *Tandır*s can be separated into two groups according to their locations as room *tandır*s and kitchen *tandır*s. Kitchen *tandır*s can be placed in kitchens, aiwans and *tandır* rooms. Some houses include a room built particularly for *tandır*s. It can be rock-cut or masonry structure. Room *tandır*s are used mainly for heating. In winter braziers are placed into the *tandır*s to heat up the room. According to construction systems, *tandır*s can be examined in three groups: stone, rock–cut and rock-cut/terracotta *tandır*s. Stone *tandır*s are used either in *tandır* room or on courtyard/room. Rock-cut *tandır*s are constructed on rock-cut spaces by carving rock ground. They are 35-80 cm in diameter and 40-60 cm depth. In the last technique, terracotta and cut-rock are used together. In this technique a terra cotta ware is located into the rock-cut tandır with dimensions of 45-50 cm in diameter, 40-50 cm in height and 1.5-2 cm in thickness. In both two techniques, 15-20 cm wide, averagely 30 cm deep air canals are used for the circulation.

In Nevşehir traditional houses, rooms are improved with some other architectural elements such as *sedir*, *seki*, niche, built-in cupboard, *yüklük*, *musandra*. There are three types of *sedir*s according to their construction techniques as timber *sedir*s, stone *sedir*s and rock-cut *sedir*s. Timber *sedir*s are built in 70cm wide and 25-50cm high. They are usually placed 40-50cm below the window level. The timber *sedir*s are made by fitting 8x8cm or 10x10cm timber beams into the holes which are aligned horizontally on the wall with 20-25 cm intervals. The timber *sedir* beams are supported by timber posts. On the other hand stone *sedir*s are made by constructing a *sedir* border stone the dimensions of which is around 80-100 cm in width and 20-30 cm in height. Rock-cut *sedir*s are constructed by carving rock to form a *sedir*, in rock-cut spaces.

"*Taka*" is the local name of niche. It is the most common architectural element in the region. Niches are constructed in two ways: rock-cut and stone niches. Dimensions of niches depend on their purposes. Niches can also be used as built-in cupboards by adding some timber components such as shelf, wing or frame. Dimensions of built–in cupboards are around 50-60x90-110cm.

*Yüklük*s are used to store quilts, blankets and other similar staff. They can be built by using wooden frame or wings. *Yüklük*s are basically niches in larger dimensions without any other components.

In Nevşehir houses, another architectural element is added for lighting the room. It is named as *lambalık* in the locale and it has two types. First one is console *lambalık*s which are made as stones projecting from wall to inner space. Second one is niche stand which are constructed as a niche on the wall.

"*Şıraklık*" is an architectural element unique to the area. It is located in kitchens, aiwans or storages and used for pressing grapes. Two types of *şıralık* are seen in houses: rock-cut and stone made *şıralık*s. A deeper bowl can be added to rock-cut *şıralık*s for collecting and floating grape juice.

Stone stairs are the most common type in Nevşehir traditional houses. Additionally, instances of rock and timber stairs can also be seen. Timber stairs were rarely observed in surveyed houses. The houses which have timber stairs mostly belong to later periods. Another type, rock stairs are constructed by carving the rock roughly. The dimensions of rock stairs are variable. According to construction methods stairs are grouped into four as corbelled stairs, stairs sitting on wall/rock, stairs supported by arch and by composite systems. Consequently, a general evaluation is made after the surveys and analysis. In this chapter, it is given an outline of Nevşehir traditional houses.

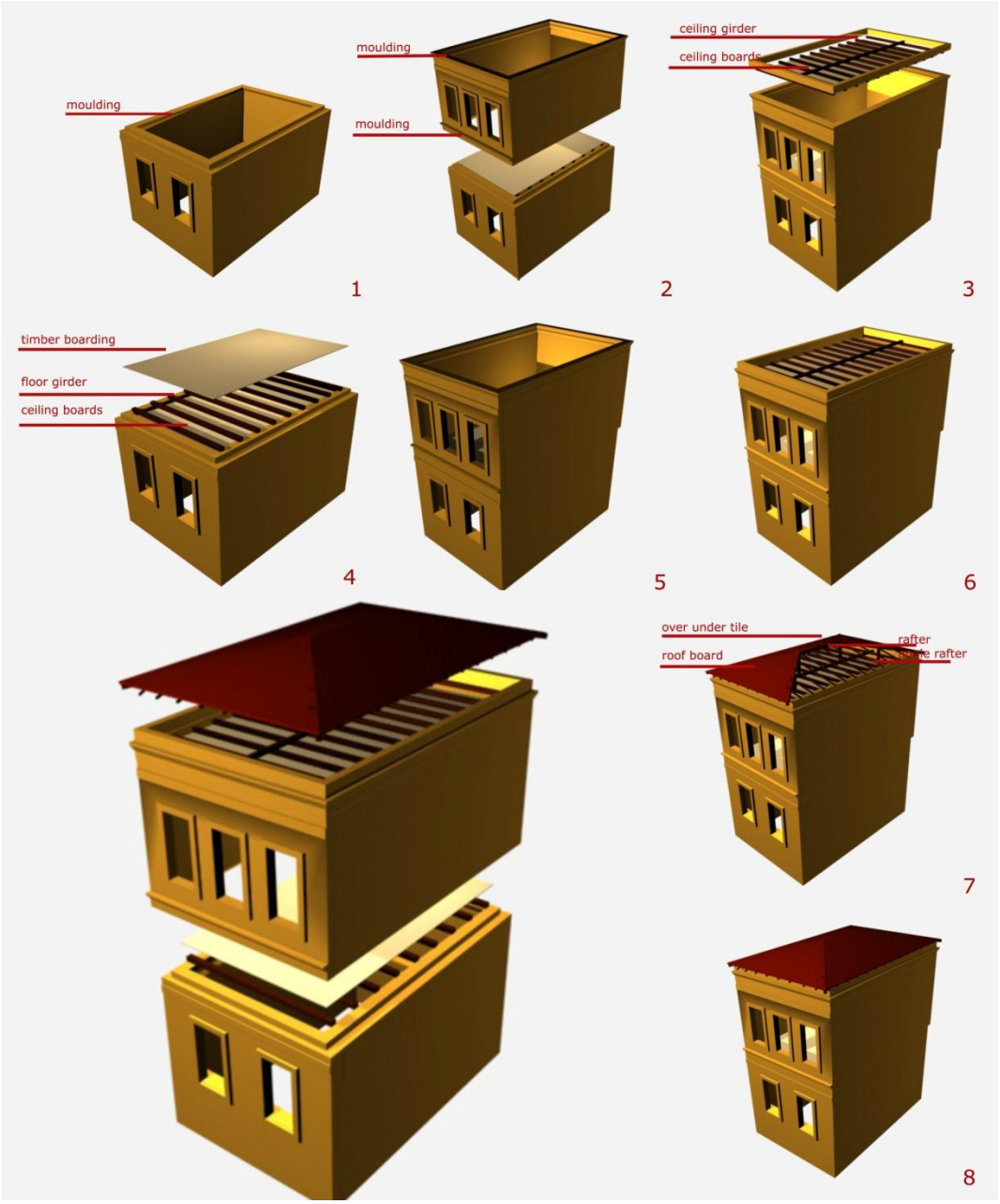


Figure 4.01, Construction process (Ürgüp, block/lot: 131/14)

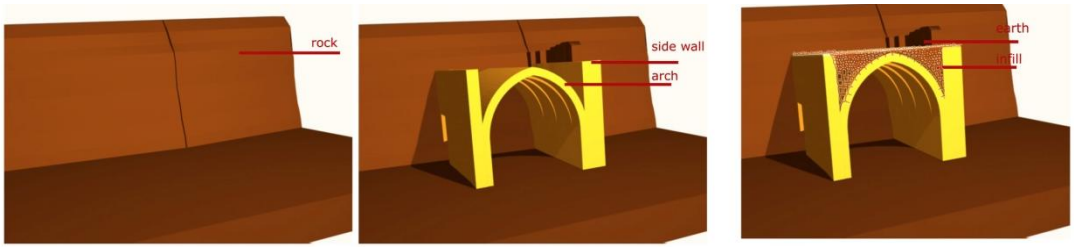


Figure 4.02, Construction process (Ürgüp, block/lot: 131/10)

CHAPTER 5

CONCLUSION

Cappadocia is a special and unique region with its authentic architectural pattern. It has to be preserved and planned carefully in the sense of its wonders of nature and cultural heritages. Moreover, tourism is a trendy sector resulting with large number of tourist visiting the region. This situation causes increasing need for accommodation and other facilities. Thus, in the region, re-construction activities and preservation works accelerated in short time which cannot be seen in any other part of the country. Unfortunately these restoration studies which are done for single building examples are not always serve to conserve these buildings. The authenticity of constructions cannot be preserved, unless the building units and elements are identified thoroughly. This thesis aims to identify the key elements of buildings to define their construction methods as well as to clarify the usages of construction materials in detail.

The definition of the problem, the aim and the method of the study is identified in the first chapter of this thesis which is titled "Construction Techniques of Traditional Houses in Nevşehir, Case Study on: Ürgüp, Mustafapaşa and İbrahimpaşa". In the second chapter, the regions geographical settings, general socio-economic situation, history and the previous preservation studies are mentioned. At the end of the section the architectural features of region are described in general. In the third chapter, construction techniques of traditional buildings are studied in detail. Extensive definitions on structural elements are done by the information gathered from 20 surveyed houses. Finally, in the fourth chapter, a general evaluation of previous three chapters is made. All the definitions and documentations are based on the examples chosen from the area. The distribution of selected houses is as follows; nine houses from Kayakapı district in Ürgüp, six from Mustafapaşa and five from İbrahimpaşa Village.

Due to the time limitations and extent of the study, surveys can be done only in three settlements. This study can be improved by increasing the examples and extending the geographical scope to comprise other settlements of Nevşehir such as Uçhisar and Ortahisar. Another subject that can be included in further studies is building materials. The origin of building materials and their transportation to construction field could not be analysed within the context of this thesis. Also, studies on types and properties of timber and stone used in the region can be another research topic.

Furthermore, some building parts cannot be surveyed in detail because of the difficulties to reach them; building parts such as roof, foundation and facade. More detailed surveys on these parts would be beneficial when conditions are suitable. Within the context of this thesis laboratory studies focused on traditional materials specifications and their behaviours cannot be fulfilled. This study would be more comprehensive with the analyses of stone and mortar in laboratories.

In this thesis a study has been carried on construction techniques of Nevşehir traditional houses that have poorly done before. And it is predicted that this study will form a base for future studies in restoration of Nevşehir traditional houses. The data collected in this study may be used as a base while doing a restoration project of a house. The building parts may be defined according to the classifications which are done in the context of this thesis. Thus, the original features of construction techniques of traditional houses can be preserved via restoration projects. This knowledge can also be beneficial for the new constructions or additions in historic areas. It may give an idea how to design the construction system of new buildings in historic towns of Cappadocia.

This study can be helpful to generate a hand book which can be used as a guide for simple repairs and interventions in the region by KUDEB and local people who want to repair traditional houses.

Another output of the study is about building archeology. This thesis may be considered as a preliminary study in archeology of historic buildings in Nevşehir since it considered the material and construction techniques via the direct observations and analyses in the field.

In preparation of this thesis, interviews are made with local craftsmen. Master builder and masons are doing this job as a family tradition. Although the demand of these jobs is decreasing; there are still many working craftsmen in the area, who are commonly living in Kavak Village. It is an advantage that there are still craftsmen and masons in the region for defining the general architectural features of the region and transferring this knowledge to the next generations. This interview can be considered as preliminary research of further studies with local craftsmen. In the long term, the author aims to document the whole construction process of a traditional house talking and practising with these local craftsmen.

Interview with local craftsmen was also helpful to generate a glossary about local terms of traditional architecture. The glossary is one of the significant outputs of this thesis. Many local names of architectural terms are gathered via the interviews and site surveys in the settlements. Local name of terms, equivalents in English if exist and explanations in English and Turkish are given in the glossary (see App. A). It is important to document these terms before they are forgotten.

REFERENCES

Akman, Saba Tatar, 1985.The Preservation and Rehabilitation Project of "Yeni Mahalle", Mustafapaşa, Unpublished master thesis, METU, Faculty of Architecture, Ankara.

Alper, Berrin, 1998. Tarihsel Coğrafya, In M. Sözen (Edt.), Kapadokya (pp.524-531). İstanbul: Ayhan Şahenk Vakfı Yayınları.

Asatekin, Gül, 2005. Understanding Traditional Residential Architecture in Anatolia, *The Journal of Architecture Volume 10, Number 4*, pp.380-414.

Ateş, Mehmet, 1996. Kapadokya'nın Başkenti Nevşehir, In Nevşehir (pp.54-113). Ankara: TC. Kültür Bakanlığı Yayınları.

Berk, Ö. (1990). Ev Pansiyonlarda Standart Oda Üretim Araştırması ve Mustafapaşa Örneği, unpublished master thesis, İTÜ, Fen Bilimleri Enstitüsü, İstanbul.

Binan, Demet Ulusoy, 1994. Güzelyurt örneğinde, Kapadokya Bölgesi Yığma Taş Konut Mimarisinin Korunmasi İçin Bir Yöntem Araştirmasi, unpublished phd thesis, Yıldız Teknik Üniversitesi, Fen Bilimleri Enstitüsü, İstanbul.

Cerasi, Maurice, 1998. The Formation of Ottoman House Types: A Comparative Study in Interaction with Neighboring Cultures, *Muqarnas*, Vol. 15,pp. 116-156.

Coşkun, Mevlüt, 2009. Kapadokya'nın jeolojik oluşumu, korunması ve geleneksel dokunun turizm katkısı. Mustafapaşa.

Demir, Ülkü, 2006. Nevşehir İli, İbrahimpaşa (Papayanni) Köyü, Hacı Mahmut Ağa Konağı Restorasyon Önerisi, Unpublished master thesis, Gazi Üniversitesi, Fen Bilimleri Enstitüsü, Ankara.

Elford, Robert George,1992. Cappadocia and its peripheral region. Convivo Nardini Editore

Epri, Feyza, 1991. Community Culture and its Reflection on Vernacular Architecture - Three Case Studies: Turkish, Greek and Levantine Housing in Anatolia, *Arch. & Comport. 1 Arch. Behav.. Vol. 7, no. 3, (*pp. 205-222).

Erençin, Abdullah, 1979. Kapadokya Yerel Konutlarında Turizme Yönelik Yenileme Çalışmalarına Bir Yaklaşım: Örnek Avcılar Köyü, unpublished phd thesis, İstanbul Teknik Üniversitesi, Fen Bilimleri Enstitüsü, İstanbul.

General Directorate of Investment and Enterprises Ministry Culture and Tourism, 1990-2003, *Statistics of Tourism Licenced Facilities.*

Geray, C., Keleş, R., Yavuz, F., Hamamcı, C., 1983. "*Şehircilik*", Cumhuriyet Dönemi Türkiye Ansiklopedisi, C.9

Güçhan, Neriman Şahin, Akarsu, Sinan, 2007. Tarihi Geleneksel Ahşap Karkas/Hımış Konutların Sismik Performansının Değerlendirilmesi - Project No: 106M499, Report 1, unpublished TUBİTAK report, Ankara.

Görmez, Kemal, 2002. Kapadokya Mevcut Durum Raporu. Nevşehir: Nevşehir Belediyesi Yayınları.

İpekoğlu, Başak, 2006. An Architectural Evaluation Method for Conservation of Traditional Dwellings, *Building and Environment, 41,* pp. 386–394.

Kalas, Veronica, 2007. Cappadocias Rock-Cut Courtyard Complexes:A Case Study for Domestic Architecture in Byzantium, In Housing in Late Antiquity ,pp.393-414. Boston.
Kalas, Veronica, 2004. Early explorations of Cappodocia and Monastic Myth, *Byzantine and Modern Greek Studies 28*, pp. l0l-119.

Kazmaoğlu, Mine, Tanyeli, Uğur, 1979. Anadolu Konut Mimarisinde Bölgesel Farklılıklar, *Yapı, Sayı 33*.

Korat, Gürsel, 2004. "İbrahimpaşa", Taş kapıdan Taç kapıya (pp. 211-212). İstanbul: İletişim yayınları.

Küçükerman, Önder, 1973. Anadolu'daki Geleneksel Türk Evinde Mekân Organizasyonu Açısından Odalar. İstanbul: Apa Ofset Basımevi San. ve Tic. A.Ş.

Maude, Barbara, 1971. The Conflict Between Environment and Accessibility in Areas of High Attraction and Means of Solving it, *Ekistiks 184*.

Öztürk, Fatma Gül, 2009. Kapadokya'da Dünden Bugüne Kaya Oymacılığı [Rock Carving in Cappadocia From Past to Present]. İstanbul, Arkeoloji ve Sanat Yayınları

Öztürk, M.Kemal, 2002. Nevşehir İli Nüfusu ve Nüfusun Eğitim Durum (1935-1996). Ankara. Hacettepe Üniversitesi Eğitim Fakültesi Dergisi 23, s. 249-258.

Sevin, Veli,1998. Tarihsel Coğrafya, In M. Sözen (Edt.), Kapadokya (pp.44-61). İstanbul: Ayhan Şahenk Vakfı Yayınları

Şahin, Neriman, 1995. A Study on Conservation and Rehabilitation Problems of Historic Timber Houses in Ankara, unpublished phd thesis, METU, Faculty of Architecture, Ankara.

Tuncel, Mehmet, 1996. Nevşehir Yöresi, In Nevşehir (pp.34-47). Ankara: TC. Kültür Bakanlığı Yayınları

Tuncel, Mehmet, 1998. Oluşum Çağları, In M. Sözen (Edt.), *Kapadokya* (pp.16-43). İstanbul: Ayhan Şahenk Vakfı Yayınları.

TÜİK, Bölgesel Göstergeler, http://tuikapp.tuik.gov.tr/adnksdagitapp/adnks.zul, last visit on April, 2011

Yerasimos, Stefanos, 1986. Az Gelişmişlik Sürecinde Türkiye, Kitap:2 Tanzimat'tan I. Dünya Savaşına. İstanbul: Belge Yayınevi.

Yurt Ansiklopedisi, 1983, Cilt VIII., pp. 6068, Anadolu Yayınları.

http://www.nevsehir.gov.tr/nevsehir/turizm-istatistikleri/16.html, last visited on 30.04.2011

http://www.milliparklar.gov.tr/mp/goremetarihi/index.htm, last visi, last visited on 25.01.2013

http://www.tuik.gov.tr/VeriBilgi.do?tb_id=39&ust_id=11, last visited on 30.04.2011

http://www.resmigazete.gov.tr/main.aspx?home=http://www.resmigazete.gov.tr/arsiv/18225.pdf&main=http://www.resmigazete.gov.tr/arsiv/18225.pdf, last visited on 10.05.2011

http://www.nevsehir.edu.tr/sayfa/72/universitemiz/tarihce, last visited on 15.05.2011

http://www.kapadokya.edu.tr/home-okul.asp?s=default, last visited on 15.05.2011.

APPENDIX A

GLOSSARY

Appendix A is given in the following pages.

ENGLISH	TURKISH	DEFINITION IN ENGLISH	DEFINITION IN TURKISH
___	Atkı kemerli tonoz	A kind of vault generated by *kapak kemeri* and *kaburga kemeri*	Kapak kemeri ve kaburga kemeriyle oluşturulan bir tür tonoz
Arched room	Kemer oda	Room which is formed by arches	Kemerlerle oluşturulan oda
Arch seat	Kemer Koltuğu	The space between the extrados of the arch and wall	Kemer sırtı ile duvar arasında kalan alan
___	Çağ	A space used for being washed in the corner of room which have not *gusülhane*.	Gusülhane olmayan evlerde, odanın bir köşesinde yıkanmak için kullanılan alan
Waterspout	Çörten	A pipe that carries water[3]	Dam çevresindeki yağmur sularını oluklardan alıp duvar temelinden uzağa akıtan, saçak kenarlarından dışarı doğru uzanmış ağaç oluk[4]

[3] Longman Dictionary, http://www.ldoceonline.com

[4] Türk Dil Kurumu, http://www.tdk.gov.tr

___	Gusülhane	A very narrow spot and a stone niche built for ablution	Eski evlerde, içinde yıkanılabilir biçimde yapılmış küçük bölme[5]
___	Hayat	The house units separated with high walls from the street and spread in courtyard	Genellikle köy ve kasaba evlerinde, üstü kapalı, bir veya birkaç yanı açık sofa[5]
___	Hezen	Local name of timber beam in traditional houses	Nevşehir geleneksel konutlarında ahşap kirişlemeye verilen isim
___	Kafa tahtası	In the roofs, the wall which continues 40-60cm more after cornices.	Çatıda silmeden sonra 40-60cm devam eden duvar
___	Kaburga kemer (ana kemer)	The arch which act as main bearing element in arched rooms.	Kemer odalarda ana taşıyıcı kemer
___	Kapak kemer (ara kemer)	The arch which covers the intervals of *kaburga kemer* in arched rooms	Kemer odalarda kaburga kemerin aralarını kapatan kemer
Pumice	Kayır	Local name of pumice	Yörede ponzaya verilen yerel isim
___	Kesek	Infill material of rock particles and stone pieces with dimensions of 3cm to 20cm	Boyutları 3ile 20cm arasında değişen kırık taş ve kaya parçalarından oluşan dolgu malzemesi
___	Kepez	A local sort of stone in	Kapadokya'da yerel bir taş

[5] Türk Dil Kurumu, http://www.tdk.gov.tr

		Cappadocia	cinsi
___	Küplük	Rock carved spaces for the terra cotta wares to fit in	Pişmiş topraktan yapılan küpleri koymak için kaya zemine oyulan alan
___	Lamba	5-10cm threads cut on both sides of voussoirs	Kemer taşlarının iki yanına açılan 5-10 cm genişliğinde diş
___	Lambalık	An element for putting enlightening equipment on	Aydınlatma elemanın konulması için yapılan mimari eleman
___	Musandra	Wooden balustrade between *pabuçluk* and *seki*	Pabuçluk ve seki arasına inşa edilen ahşap korkuluk
___	Sedir	Sitting and/or sleeping space above the *seki*	Arkalıksız, üstü minderli ve yastıklı olabilen, oturmaya veya yatmaya yarayan ev eşyası, divan[6]
___	Seki	The elevated area which is for main living	Oturulacak sedir biçiminde taş veya set[6]
___	Şıralık	An architectural element to squeeze grape for vine and *pekmez*	Şarap ve pekmez yapmak amacıyla üzümün koyulduğu ve ezildiği mimari eleman
___	Şillez	Special mixture of clay soil and water	Killi toprak ve sudan yapılan özel bir karışım

[6] Türk Dil Kurumu, http://www.tdk.gov.tr

___	Pabuçluk	Entrance space at lower level which is generated by elevating the room floor from the entrance about 15-20 cm. It is used for taking off the shoes	Oda döşemesinin kapı girişinden 15-20 cm yükseltilmesiyle oluşturulan, düşük kotta kalan ve ayakkabıların çıkarıldığı giriş alanı
___	Tandır	An architectural element which is used for cooking and heating purposes	-Yere çukur kazılarak yapılan bir fırın türü[7] -Bazı yerlerde, kışın ayakları ısıtmak amacıyla alçak bir masanın altına mangal konulup üstüne yorgan örtülerek yapılan düzen[7]
Niche	Taka	The local name of niche	Yörede nişe verilen isim
___	Yuvak	The tool which is used for compressing clay soil on the earth roofs	Yollarda, tarlalarda toprağı ezmek veya toprak damlı evlerin üstündeki killi toprağı sert bir katman durumuna getirmek için dam üzerinde yuvarlanan, silindir biçimindeki ağır taş[7]
___	Yüklük	Deep and big niches in traditional houses to put and store the staffs like quilts and pillows	Evlerde yatak, yorgan gibi şeyleri koymaya yarayan yer veya büyük dolap, yük, yük odası[7]

[7] Türk Dil Kurumu, http://www.tdk.gov.tr

APPENDIX B

TABLE OF CODES

Appendix B is given in the following page.

			FOUNDATION	GROUND FLOOR																FIRST FLOOR																	ROOF			
	BUILDING LOT		FD	G0	G1			G2									G3			F0	F1			F2									F3			R0	R1	R2	
					G1_W	G1_A	G1_R	G2_w	G2_wn	G2_d	G2_s	G2_sk	G2_p	G2_n	G2_c	G2_f	G2_ş	G3_W	G3_A	G3_R	F0	F1_W	F1_A	F1_R	F2_w	F2_wn	F2_d	F2_s	F2_sk	F2_pb	F2_n	F2_f	F2_ş	F3_W	F3_A	F3_R			R2_e	R2_c
ÜRGÜP/ KAYAKAPI	131/14	A	FD_1	$G0_1$	$G1\_W_{18}$			–	$G2\_wn_{11}$	–	$G2\_s_1$	–	–	–	–	–	–	$G3\_W_1$			$F0_1$	$F1\_W_3$				$F2\_wn_8$	–	$F2\_s_1$	–	–	–	–	–	$F3\_W_3$			$R0_1$	$R1_1$	$R2\_e_1$	
		B	FD_1	$G0_{16}$	$G1\_W_{18}$			–	$G2\_wn_{11**}$	–	$G2\_s_{28}$	–	–	–	–	–	$G2\_ş_1$			$G3\_R_1$	$F0_7$			–	$F2\_wn_7$	–	–	–	–	–	–	–				$F3\_R_1$	$R0_2$	$R1_3$	–	–
		C	FD_2	$G0_3$			$G1\_R_1$	–	–	–	–	–	–	$G2\_n_{11}$	–	–	–			$G3\_R_2$	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	$R0_1$	–	–	–
	131/10	A	FD_1	$G0_{16}$	$G1\_W_{18}$			–	$G2\_wn_1$	–	$G2\_s_{28}$	–	–	–	–	–	–	$G3\_W_1$			–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	$R0_2$	$R1_2$	–	–
		B	FD_1	$G0_{16}$	$G1\_W_{28}$			–	–	–	$G2\_s_{28}$	–	–	$G2\_n_{13}$	–	$G2\_f_1$	–		$G3\_A_1$		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	$R0_2$	$R1_2$	–	$R2\_c_1$
		C	FD_1	$G0_6$	$G1\_W_3$			–	$G2\_wn_8$	–	–	–	–	–	–	–	–	$G3\_W_3$			–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	$R0_4$	$R1_3$	–	–
		D	FD_2	$G0_3$			$G1\_R_1$	–	–	–	–	–	–	–	–	–	$G2\_ş_1$		$G3\_A_2$		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	$R0_2$	$R1_2$	–	–
	131/23	A	FD_3	$G0_{16}$	$G1\_W_{19}$			–	$G2\_wn_2$	–	$G2\_s_{28}$	–	–	–	–	–	–	$G3\_W_1$			$F0_3$	$F1\_W_{18}$			–	$F2\_wn_1$	–	–	–	–	$F2\_n_1$	–	–	$F3\_W_{18}$			X	X	X	X
		B	FD_3	$G0_7$	–	–	–	–	–	$G2\_d_1$	–	–	–	–	–	–	–		$G3\_A_2$		$F0_3$	$F1\_W_{18}$			$F2\_W_{18}$	–	–	–	–	–	–	–	–	$F3\_W_{18}$			X	X	X	X
		C	FD_2	$G0_3$			$G1\_R_2$	–	$G2\_wn_{10**}$	–	$G2\_s_2$	–	–	–	–	–	–			$G3\_R_1$	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	$R0_7$	$R1_3$	–	–
		D	FD_2	$G0_7$	–	–	–	–	–	$G2\_d_{2**}$	–	$G2\_sk_1$	$G2\_p_1$	–	$G2\_c_1$	–	–			$G3\_R_2$	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	$R0_3$	$R1_3$	–	–
	131/45		FD_4	$G0_{29}$	$G1\_W_{18}$			–	$G2\_wn_1$	–	$G2\_s_1$	–	–	–	–	–	–	$G3\_W_{28}$			$F0_1$	$F1\_W_3$			–	$F2\_wn_8$	–	$F2\_s_1$	–	–	–	–	–	$F3\_W_3$			$R0_1$	$R1_1$	$R2\_e_1$	–
	132/12	A	FD_1	$G0_{29}$	$G1\_W_{18}$			–	$G2\_wn_1$	–	–	$G2\_sk_2$	–	–	–	–	–	$G3\_W_{28}$			$F0_3$	$F1\_W_3$			–	$F2\_wn_8$	–	$F2\_s_1$	–	–	–	–	–	$F3\_W_3$			X	X	X	X
		B	FD_1	$G0_{29}$	$G1\_W_{28}$			–	–	–	–	$G2\_sk_2$	–	$G2\_n_{14}$	–	$G2\_f_1$	–		$G3\_A_1$		$F0_3$	$F1\_W_{28}$			$F2\_W_{28}$		–	$F2\_s_1$	–	–	–	–	–	$F3\_W_{28}$			X	X	X	X
		C	FD_2	$G0_6$	$G1\_W_3$			–	$G2\_wn_8$	–	–	–	–	–	–	–	–	$G3\_W_3$			–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	$R0_4$	$R1_3$	–	–
	182/10		FD_2	$G0_3$			$G1\_R_1$	–	$G2\_wn_{10**}$	–	–	–	–	–	–	–	–			$G3\_R_2$	$F0_5$	$F1\_W_{28}$			–	$F2\_wn_5$	–	–	–	–	–	–	–	$F3\_W_{29}$			X	X	X	X
	185/12	A	FD_1	$G0_7$	–	–	–	–	–	$G2\_d_1$	–	–	–	–	–	–	–	$G3\_W_{28}$			$F0_3$	$F1\_W_{18}$			–	$F2\_wn_1$	–	–	–	–	–	–	–	$F3\_W_{18}$			$R0_2$	$R1_2$	–	–
		B	FD_1	$G0_{16}$	$G1\_W_{28}$			–	$G2\_wn_4$	–	–	–	–	–	–	–	–	$G3\_W_{28}$			$F0_3$	$F1\_W_{18}$			–	$F2\_wn_1$	–	–	–	–	–	–	–	$F3\_W_{18}$			$R0_2$	$R1_2$	–	–
	131/21	A	FD_6	$G0_{26}$	$G1\_W_{28}$			–	$G2\_wn_5$	–	–	–	–	–	–	–	–	$G3\_W_{28}$			$F0_4$	$F1\_W_3$			–	$F2\_wn_8$	–	$F2\_s_{28}$	–	–	–	–	–	$F3\_W_3$			X	X	X	X
		B	FD_2	$G0_7$	–	–	–	–	–	$G2\_d_{2**}$	–	$G2\_sk_1$	$G2\_p_1$	–	$G2\_c_1$	–	–			$G3\_R_1$	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	$R0_3$	$R1_3$	–	–
	184/29		FD_5	$G0_{16}$	$G1\_W_{28}$			–	$G2\_wn_5$	–	–	–	–	–	–	–	–	$G3\_W_{28}$			$F0_3$	$F1\_W_{28}$			–	$F2\_wn_1$	–	–	–	–	–	–	–	$F3\_W_{28}$			$R0_2$	$R1_2$	–	–
MUSTAFAPAŞA	6/4668		FD_1	$G0_{16}$	$G1\_W_{18}$			–	$G2\_wn_2$	–	–	–	–	–	–	–	–	$G3\_W_1$			$F0_3$	$F1\_W_{18}$			–	$F2\_wn_{3*}$ / $F2\_wnp_2$	–	–	–	–	–	–	–	$F3\_W_{18}$			$R0_1$	--	$R2\_e_2$	–
	62/4731		FD_2	$G0_3$			$G1\_R_2$	–	$G2\_wn_{6**}$	–	–	–	–	–	–	–	–			$G3\_R_1$	$F0_5$	$F1\_W_{18}$			–	$F2\_wn_{1*}$ / $F2\_wnp_{13}$	–	–	–	–	–	–	–	$F3\_W_{18}$			$R0_1$	$R1_1$	–	–
	96/5644		--	$G0_{16}$	$G1\_W_{28}$			–	$G2\_wn_6$	–	–	–	–	–	–	–	–	$G3\_W_4$			$F0_2$	$F1\_W_3$			–	$F2\_wn_{8*}$ / $F2\_wnp_2$	–	–	–	–	–	–	–	$F3\_W_3$			$R0_1$	$R1_1$	–	–
	59/4821		--	$G0_{16}$	$G1\_W_{18}$			–	$G2\_wn_2$	–	–	–	–	–	–	–	–	$G3\_W_1$			$F0_3$	$F1\_W_{18}$			–	$F2\_wn_1$	–	–	–	–	–	–	–	$F3\_W_{18}$			$R0_2$	$R1_2$	–	–
	73/5112-A	A	--	$G0_7$	–	–	–	–	$G2\_wn_{7*}$ / $G2\_wnp_4$	$G2\_d_4$	$G2\_s_2$	–	–	–	–	–	–	$G3\_W_1$			–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	$R0_2$	$R1_2$	$R2\_e_2$	–
		B	--	$G0_{16}$	$G1\_W_{28}$			–	$G2\_wn_{1*}$ / $G2\_wn_9$ / $G2\_wnp_2$	–	$G2\_s_2$	–	–	–	–	–	–	$G3\_W_1$			–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	$R0_2$	$R1_2$	$R2\_e_2$	–
	73/5112-B	A	--	$G0_{16}$	$G1\_W_{28}$			$G2\_w_1$	–	–	–	–	–	–	–	–	–	$G3\_W_{28}$			$F0_1$	$F1\_W_{28}$			–	$F2\_wn_3$	–	$F2\_s_1$	–	–	–	–	–	$F3\_W_{28}$			$R0_2$	$R1_2$	–	–
		B	--	$G0_{16}$	$G1\_W_{28}$			$G2\_w_1$	–	–	–	–	–	–	–	–	–	$G3\_W_{28}$			$F0_1$	$F1\_W_{28}$			–	$F2\_wn_5$	–	$F2\_s_1$	–	–	–	–	–		$F3\_A_1$		$R0_2$	$R1_2$	–	–
İBRAHİMPAŞA	NO:39		FD_1	$G0_{16}$	$G1\_W_{18}$			–	$G2\_wn_{1*}$ / $G2\_wnp_1$	–	–	–	–	–	–	–	–	$G3\_W_1$			$F0_3$	$F1\_W_{18}$			–	$F2\_wn_{1*}$ / $F2\_wnp_1$	–	$F2\_s_{28}$	–	–	–	–	–	$F3\_W_{18}$			$R0_2$	$R1_2$	–	–
	NO:26B		FD_2	$G0_3$			$G1\_R_2$	–	$G2\_wn_{5**}$	–	–	–	–	–	–	–	–			$G3\_R_1$	$F0_5$	$F1\_W_{18}$			–	$F2\_wn_{1*}$ / $F2\_wnp_1$	–	$F2\_s_{28}$	–	–	$F2\_n_2$	–	–	$F3\_W_{18}$			$R0_2$	$R1_2$	–	–
	NO:108		FD_1	$G0_{16}$	$G1\_W_{18}$			–	$G2\_wn_{1*}$ / $G2\_wnp_1$	–	$G2\_s_{28}$	–	–	–	–	–	–	$G3\_W_1$			$F0_3$	$F1\_W_{18}$			–	$F2\_wn_3$	–	–	–	–	–	–	–	$F3\_W_{18}$			$R0_2$	$R1_2$	–	–
	NO:93		FD_2	$G0_3$			$G1\_R_2$	–	$G2\_wn_{10**}$	–	–	–	–	$G2\_n_2$	–	–	$G2\_ş_2$			$G3\_R_1$	$F0_6$			$F1\_R_1$	–	$F2\_wn_{7**}$	$F2\_d_2$	–	$F2\_sk_1$	$F2\_pb_1$	–	–	–			$F3\_R_1$	$R0_5$	–	–	–
	NO:87		FD_2	$G0_3$			$G1\_R_2$	–	–	$G2\_d_{2**}$	–	–	–	–	–	–	–			$G3\_R_2$	$F0_3$	$F1\_W_{18}$			–	$F2\_wn_{1*}$ / $F2\_wnp_1$	–	$F2\_s_{28}$	–	–	–	–	–	$F3\_W_{18}$			$R0_2$	$R1_2$	–	–

same space -- cannot survey - not exist X demolished * window with profile ** rock window/door

APPENDIX C

SURVEY SHEETS

Appendix C is given in the following pages.

MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR

CASE STUDY ON: ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NESLİHAN ŞAHİN GÜÇHAN

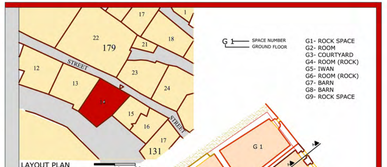
LOCATION:
ÜRGÜP/ KAYAKAPI

BUILDING:
BLOCK/LOT:
131/14

SURVEYOR:
FUNDA SOLMAZ

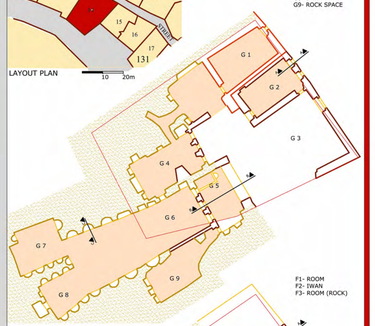
SHEMATIC PLANS ARE DRAWN BASED ON THE DRAWINGS OF "ARCHITECTURE, KAYAKAPI CONSERVATION AND DEVELOPMENT PROJECT"

PLAN DRAWINGS



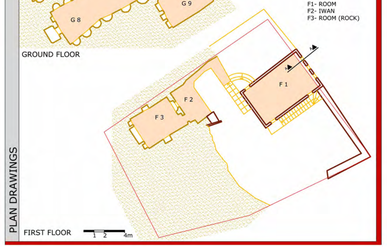
LAYOUT PLAN

G1- ROCK SPACE
G2- ROOM
G3- COURTYARD
G4- ROOM (ROCK)
G5- SWAN
G6- ROOM (ROCK)
G7- BARN
G8- BARN
G9- ROCK SPACE



GROUND FLOOR

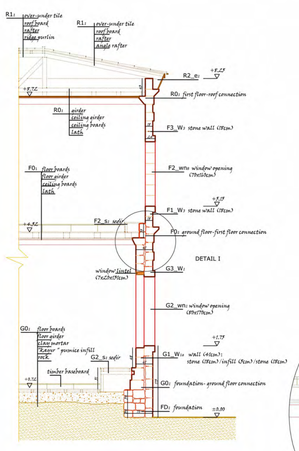
F1- ROOM
F2- SWAN
F3- ROOM (ROCK)



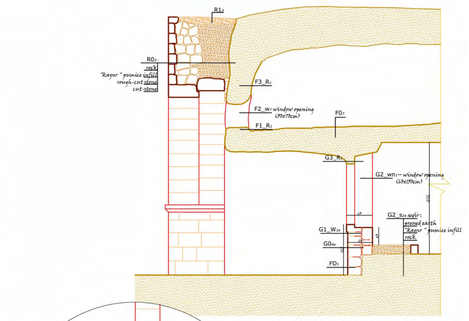
FIRST FLOOR

SYSTEM DETAILS*

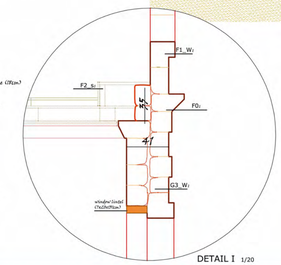
cut stone	estimated cut stone	rough-cut stone	estimated rough-cut st.	rock	estimated rock	timber	estimated timber	building lot	rock	infill	earth



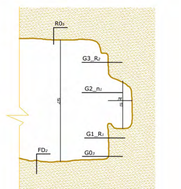
SYSTEM DETAIL BLOCK/LOT:131/14 _A



SYSTEM DETAIL BLOCK/LOT: 131/14_B



DETAIL I 1/20



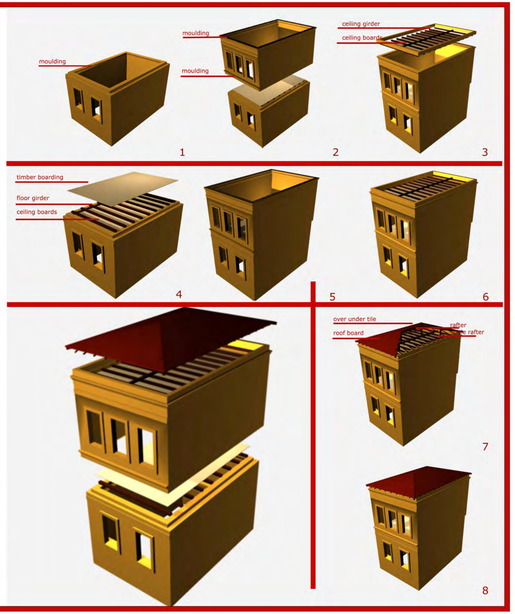
SYSTEM DETAIL BLOCK/LOT: 131/14_C

1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS

3D IMAGES (HYPOTHETIC/ COMPLETED DRAWINGS)



MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR

CASE STUDY ON; URGUP, MUSTAFAPASA, IBRAHIMPASA"

PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERMAN SAHIN GUÇHAN

LOCATION:
URGUP/ KAYAKAPI

BUILDING BLOCK/LOT:
131/10

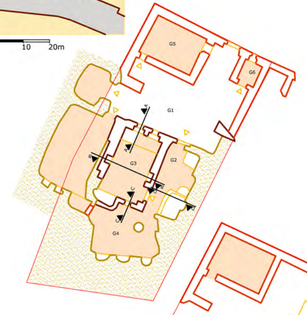
SURVEYOR:
FUNDA SOLMAZ

SHEMATIC PLANS ARE DRAWN BASED ON THE DRAWINGS OF KABA ARCHITECTURE; "KAYAKAPI CONSERVATION AND DEVELOPMENT PROJECT"

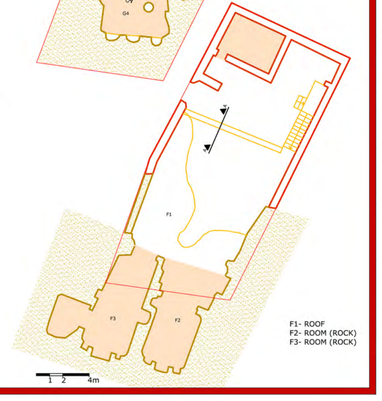
PLAN DRAWINGS

LAYOUT PLAN

10 20m



GROUND FLOOR



FIRST FLOOR

1 2 4m

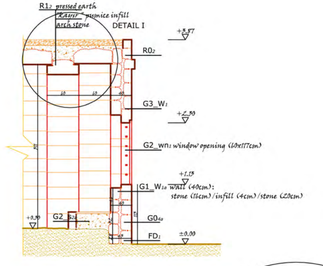
G 1 SPACE NUMBER / GROUND FLOOR

G1- COURTYARD
G2- ENTRANCE SPACE
G3- ROOM
G4- ROCK SPACE
G5- STORAGE
G6- *HELA*

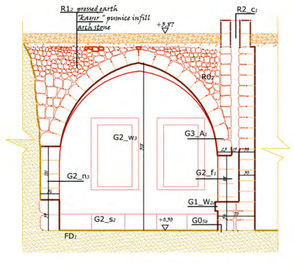
F1- ROOF
F2- ROOM (ROCK)
F3- ROOM (ROCK)

SYSTEM DETAILS*

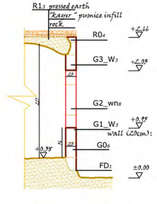
cut stone	estimated cut stone	rough-cut stone	estimated rough-cut st.	rock	estimated rock	timber	estimated timber
				building lot	rock	infill	earth



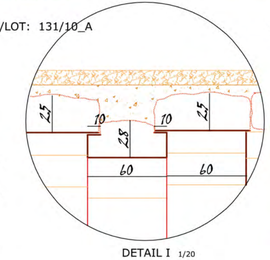
SYSTEM DETAIL BLOCK/LOT: 131/10_A



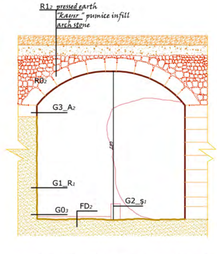
SYSTEM DETAIL BLOCK/LOT: 131/10_B



SYSTEM DETAIL BLOCK/LOT: 131/10_C



DETAIL I 1/20



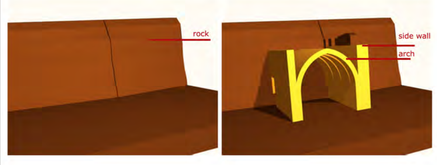
SYSTEM DETAIL BLOCK/LOT: 131/10_D

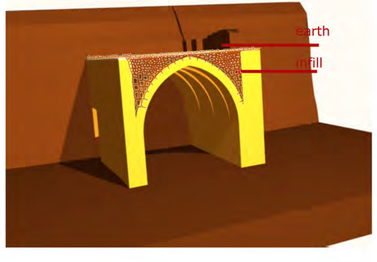
1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS

3D IMAGES (HYPOTHETIC/ COMPLETED DRAWINGS)





MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHİR CASE STUDY ON: ÜRGÜP, KAYAKAPI, STONE-CUT HOUSES"

PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

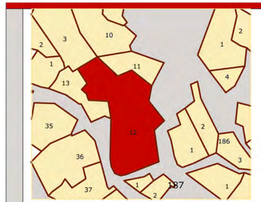
LOCATION:
ÜRGÜP/ KAYAKAPI

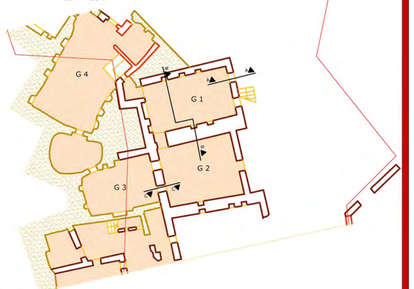
BUILDING BLOCK/LOT:
132/12

SURVEYOR:
FUNDA SOLMAZ

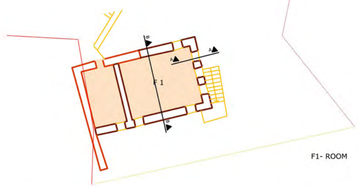
SHEMATIC PLANS ARE DRAWN BASED ON THE DRAWINGS OF KABA ARCHITECTURE, "KAYAKAPI CONSERVATION AND DEVELOPMENT PROJECT"

PLAN DRAWINGS





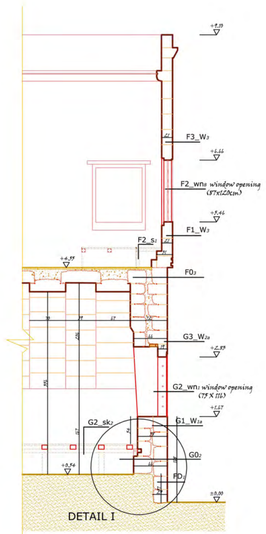
GROUND FLOOR 1/200



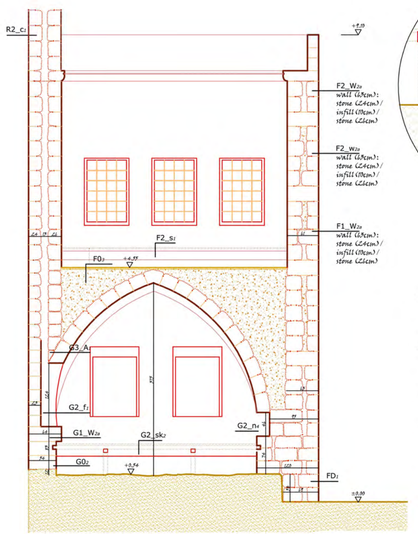
FIRST FLOOR 1/200

SYSTEM DETAILS*

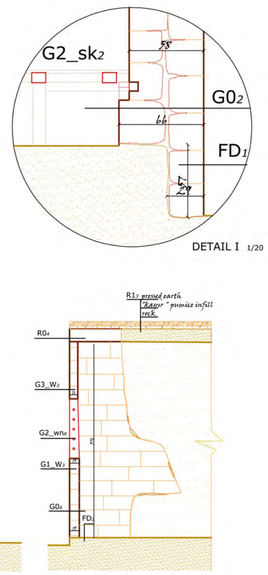
cut stone	estimated cut stone	rough-cut stone	estimated rough-cut	rock	estimated rock	timber	estimated timber	building lot	rock	infill	earth



SYSTEM DETAIL BLOCK/LOT:132/12_A



SYSTEM DETAIL BLOCK/LOT:132/12_B



SYSTEM DETAIL BLOCK/LOT:132/12_C

1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS

MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR

CASE STUDY ON; ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

PREPARED BY: FUNDA SOLMAZ SUPERVISOR; ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

LOCATION:
ÜRGÜP/ KAYAKAPI

BUILDING BLOCK/LOT:
131/21

SURVEYOR:
FUNDA SOLMAZ

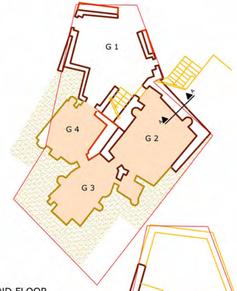
SHEMATIC PLANS ARE DRAWN BASED ON THE DRAWINGS OF KABA ARCHITECTURE, "KAYAKAPI CONSERVATION AND DEVELOPMENT PROJECT"

PLAN DRAWINGS

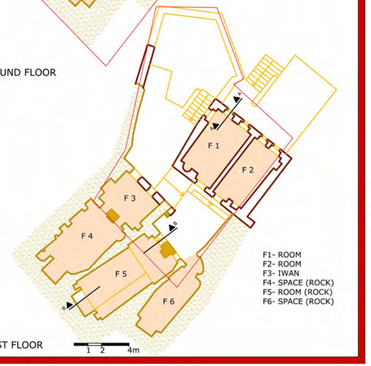
G 1 — SPACE NUMBER / GROUND FLOOR

G1- COURTYARD
G2- ROOM
G3- SPACE (ROCK)
G4- SPACE (ROCK)

LAYOUT PLAN 10 20m



GROUND FLOOR

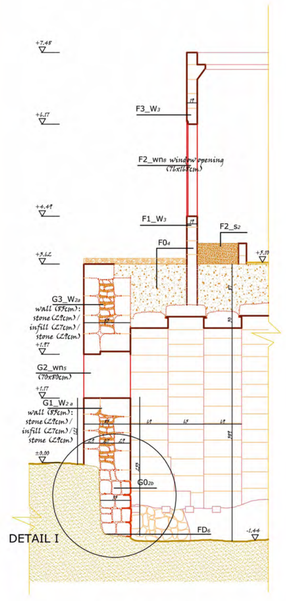


F1- ROOM
F2- ROOM
F3- IWAN
F4- SPACE (ROCK)
F5- ROOM (ROCK)
F6- SPACE (ROCK)

FIRST FLOOR 1 2 4m

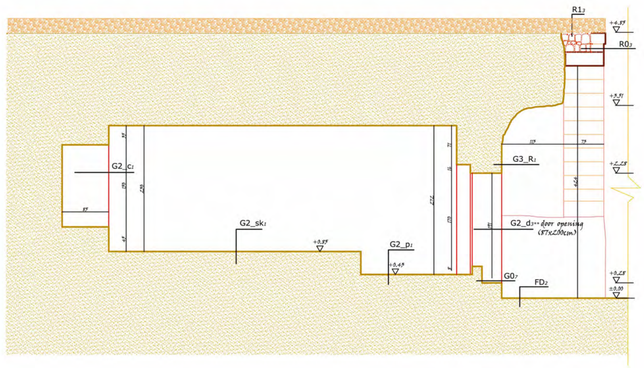
SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut	rock	estimated rock	timber	estimated timber	building lot	rock	infill	earth

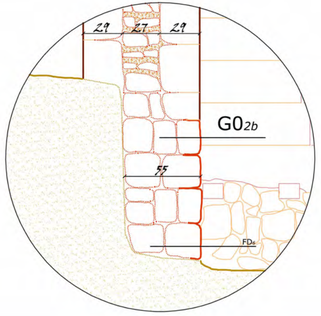


SYSTEM DETAIL BLOCK/LOT:131/21_A

1 2m 4m



SYSTEM DETAIL BLOCK/LOT:131/21_B



DETAIL I 1/20

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS

MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR
CASE STUDY ON: URGUP, MUSTAFAPASA, IBRAHIMPASA"

PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERMAN ŞAHİN GÜÇHAN

LOCATION:
URGUP/ KAYAKAPI

BUILDING
BLOCK/LOT:
131/23

SURVEYOR:
FUNDA SOLMAZ

SHEMATIC PLANS ARE DRAWN BASED ON THE DRAWINGS OF KABA ARCHITECTURE "KAYAKAPI CONSERVATION AND DEVELOPMENT PROJECT"

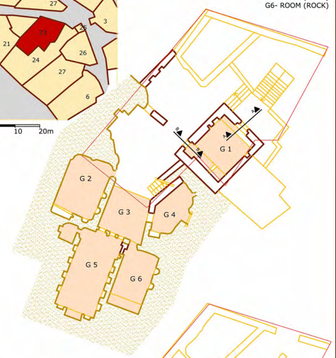
PLAN DRAWINGS

LAYOUT PLAN

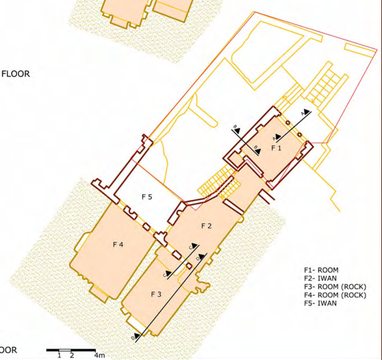
10 20m

G 1 SPACE NUMBER
GROUND FLOOR

G1- ROOM
G2- ROCK SPACE
G3- ROCK SPACE
G4- ROCK SPACE
G5- ROOM (ROCK)
G6- ROOM (ROCK)



GROUND FLOOR



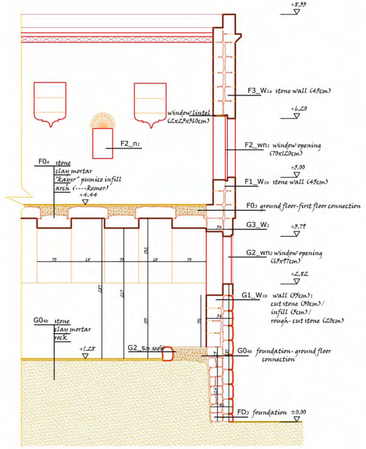
F1- ROOM
F2- IWAN
F3- ROOM (ROCK)
F4- ROOM (ROCK)
F5- IWAN

FIRST FLOOR

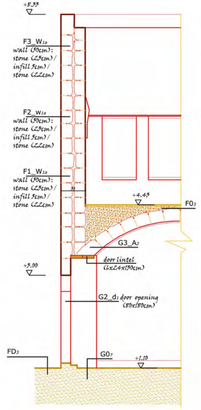
1 2 4m

SYSTEM DETAILS*

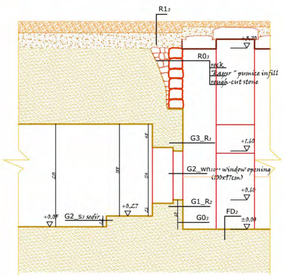
estimated cut stone	rough-cut stone	estimated rough-cut st.	rock	estimated rock	timber	estimated timber	building lot	rock	infill	earth



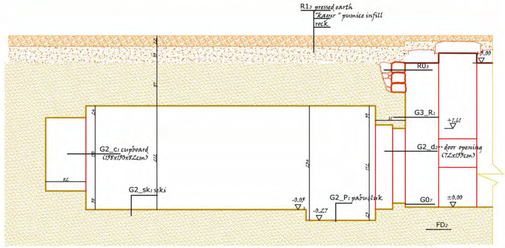
SYSTEM DETAIL BLOCK/LOT:131/23_A



SYSTEM DETAIL BLOCK/LOT:131/23_B



SYSTEM DETAIL BLOCK/LOT:131/23_C



SYSTEM DETAIL BLOCK/LOT:131/23_D

1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS

MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR
CASE STUDY ON; ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

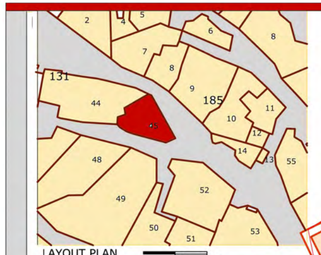
LOCATION:
ÜRGÜP/ KAYAKAPI

BUILDING BLOCK/LOT:
131/45

SURVEYOR:
FUNDA SOLMAZ

SHEMATIC PLANS ARE DRAWN BASED ON THE DRAWINGS OF KABA ARCHITECTURE, "KAYAKAPI CONSERVATION AND DEVELOPMENT PROJECT"

PLAN DRAWINGS

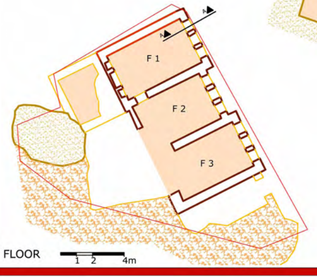


LAYOUT PLAN 10 20m

G 1 — SPACE NUMBER / GROUND FLOOR

G1- ENTRANCE SPACE
G2- ROOM
G3- ROOM
G4- SPACE
G5- SPACE (ROCK)
G6- SPACE (ROCK)
G7- SPACE (ROCK)
G8- BARN (ROCK)

GROUND FLOOR

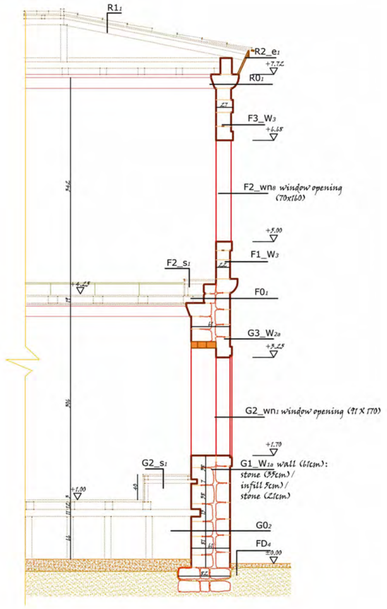


F1- ROOM
F2- SOFA
F3- ROOM

FIRST FLOOR 1 2 4m

SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut	rock	estimated rock
timber	estimated timber	building lot	rock	infill	earth



SYSTEM DETAIL BLOCK/LOT:131/45_A

1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS

MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR CASE STUDY ON; ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

PREPARED BY: FUNDA SOLMAZ
SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

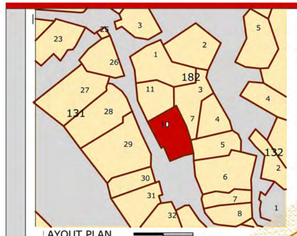
LOCATION:
ÜRGÜP/ KAYAKAPI

BUILDING BLOCK/LOT:
182/10

SURVEYOR:
FUNDA SOLMAZ

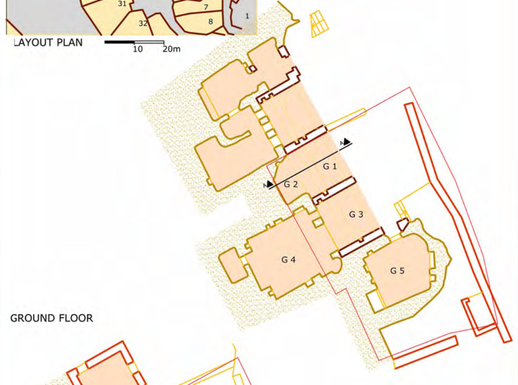
SHEMATIC PLANS ARE DRAWN BASED ON THE DRAWINGS OF KABA ARCHITECTURE, "KAYAKAPI CONSERVATION AND DEVELOPMENT PROJECT"

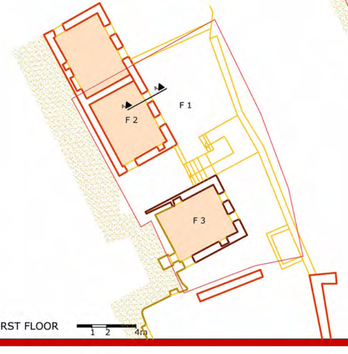
PLAN DRAWINGS



G 1 — SPACE NUMBER / GROUND FLOOR

G1- IWAN
G2- SPACE (ROCK
G3- IWAN
G4- SPACE (ROCK)
G5- SPACE (ROCK)

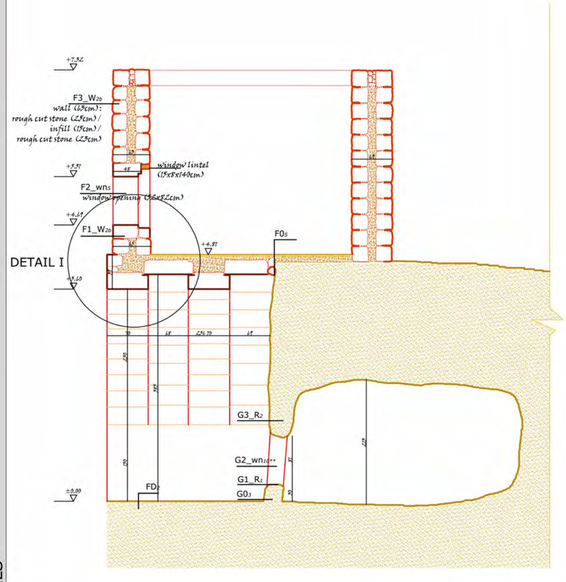


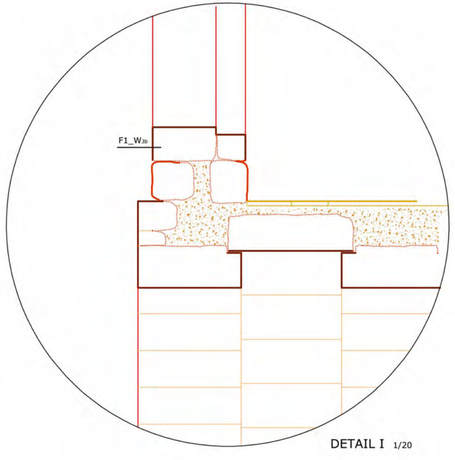


F1- COURTYARD
F2- ROOM
F3- ROOM

SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut	rock	estimated rock	timber	estimated timber	building lot	rock	infill	earth





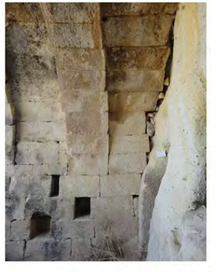
SYSTEM DETAIL BLOCK/LOT:182/10_A

1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS



MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR CASE STUDY ON; ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

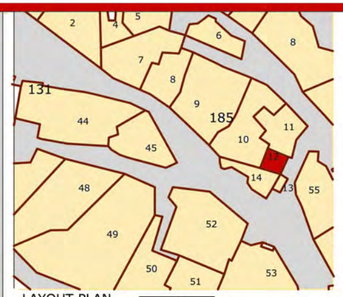
LOCATION:
ÜRGÜP/ KAYAKAPI

BUILDING
BLOCK/LOT:
185/12

SURVEYOR:
FUNDA SOLMAZ

SHEMATIC PLANS ARE DRAWN BASED ON THE DRAWINGS OF KABA ARCHITECTURE, "KAYAKAPI CONSERVATION AND DEVELOPMENT PROJECT"

PLAN DRAWINGS

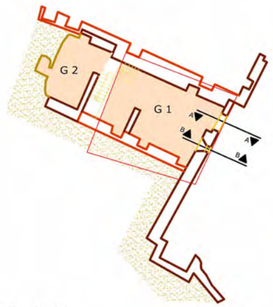


LAYOUT PLAN

10 20m

G 1 — SPACE NUMBER / GROUND FLOOR

G1- ENTANCE SPACE
G2- STAIRCASE



GROUND FLOOR

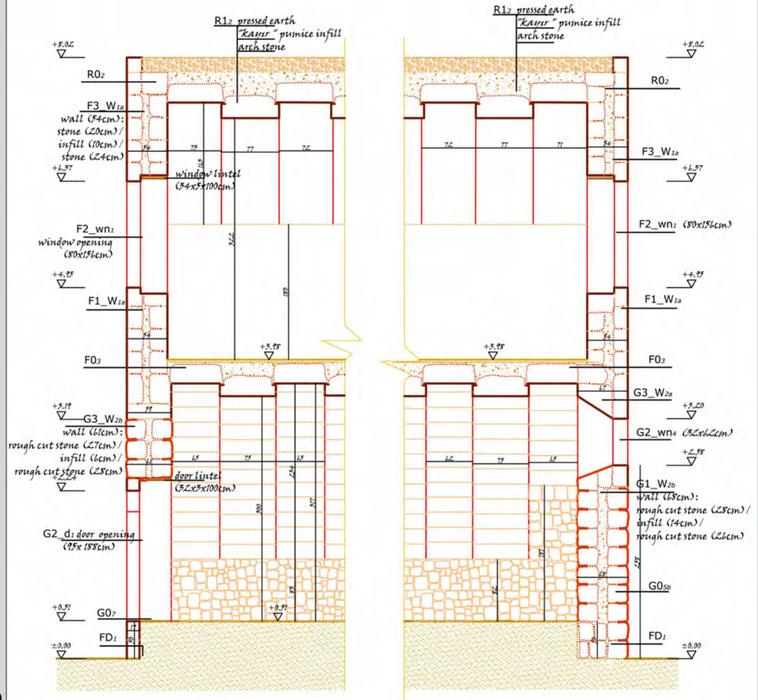
F 1- STAIRCASE
F 2- ROOM

FIRST FLOOR

1 2 4m

SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut st.	rock	estimated rock
timber	estimated timber	building lot	rock	infill	earth



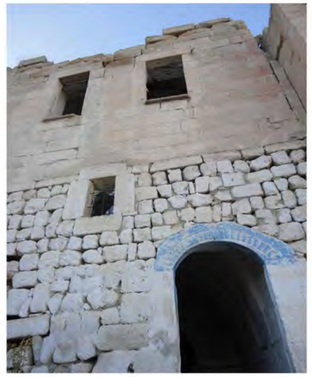
SYSTEM DETAIL BLOCK/LOT:185/12_A

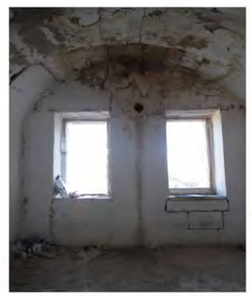
SYSTEM DETAIL BLOCK/LOT:185/12_B

1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS





MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR
CASE STUDY ON; ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

LOCATION:
ÜRGÜP/ KAYAKAPI

BUILDING
BLOCK/LOT:
184/29

SURVEYOR:
FUNDA SOLMAZ

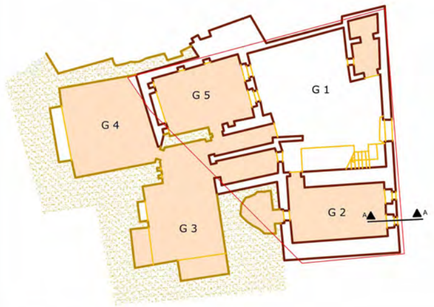
SHEMATIC PLANS ARE DRAWN BASED ON THE DRAWINGS OF KABA ARCHITECTURE, "KAYAKAPI CONSERVATION AND DEVELOPMENT PROJECT"

PLAN DRAWINGS

G 1 — SPACE NUMBER / GROUND FLOOR

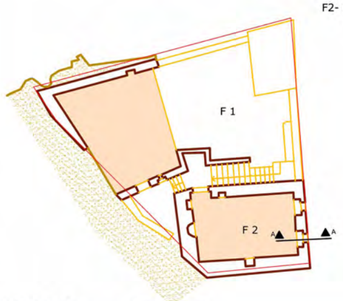
G1- COURTYARD
G2- ROOM
G3- SPACE (ROCK)
G4- SPACE (ROCK)
G5- ROOM

LAYOUT PLAN 10 20m



GROUND FLOOR

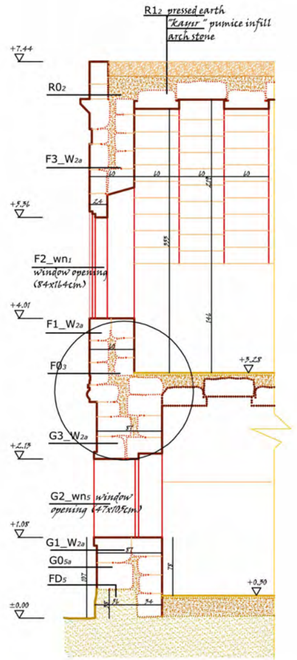
F1- COURTYARD
F2- ROOM



FIRST FLOOR 1 2 4m

SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut st.	rock	estimated rock
timber	estimated timber	building lot	rock	infill	earth

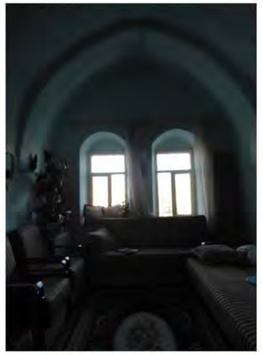


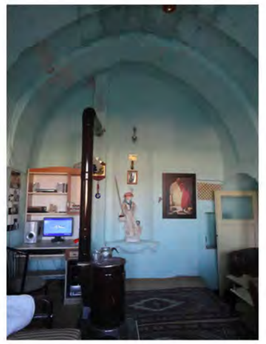
SYSTEM DETAIL BLOCK/LOT:184/29_A

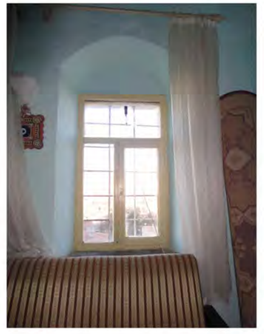
1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS







MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR
CASE STUDY ON; ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

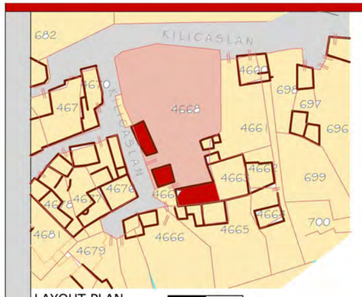
LOCATION:
MUSTAFAPAŞA

BUILDING
BLOCK/LOT:
6/4668

SURVEYOR:
FUNDA SOLMAZ

SHEMATIC PLANS ARE DRAWN BASED ON THE DRAWINGS OF ÜLKÜ DEMİR

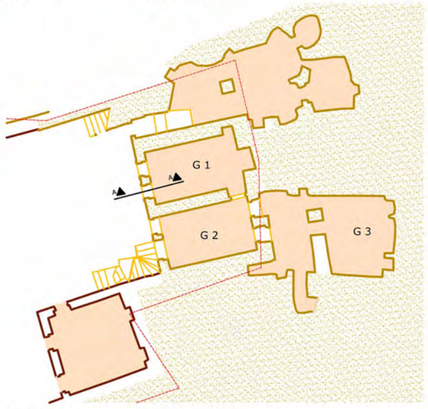
PLAN DRAWINGS



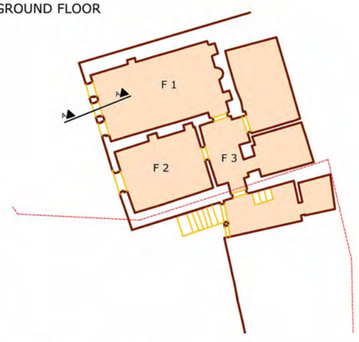
G 1 — SPACE NUMBER / GROUND FLOOR

G1- KITCHEN
G2- KITCHEN
G3- STORAGE

LAYOUT PLAN 10 20m



GROUND FLOOR

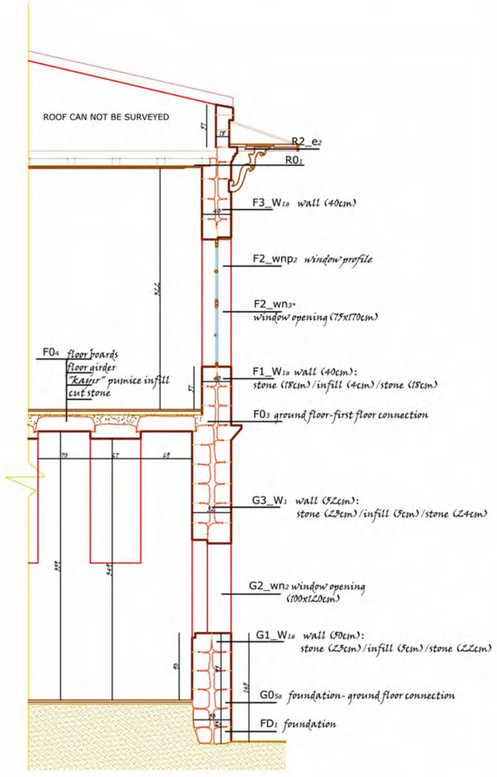


F1- ROOM
F2- ROOM
F3- ENTRANCE SPACE

FIRST FLOOR 1 2 4m

SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut	rock	estimated rock
timber	estimated timber	building lot	rock	infill	earth



SYSTEM DETAIL BLOCK/LOT:6/4668

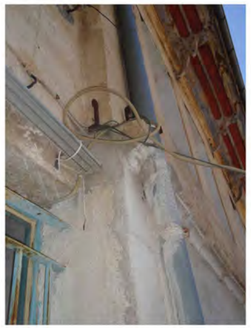
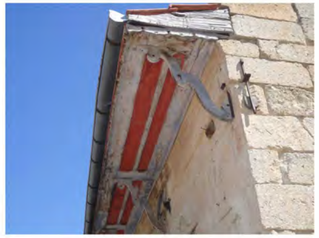
1 2m 4m

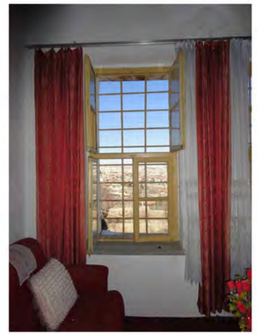
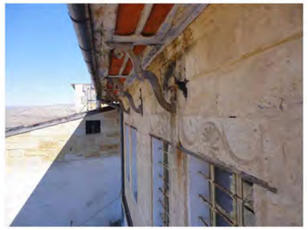
*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS






MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR
CASE STUDY ON; ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

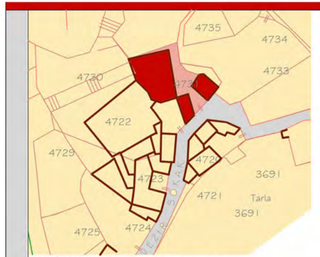
LOCATION:
MUSTAFAPAŞA

BUILDING
BLOCK/LOT:
62/4731

SURVEYOR:
FUNDA SOLMAZ

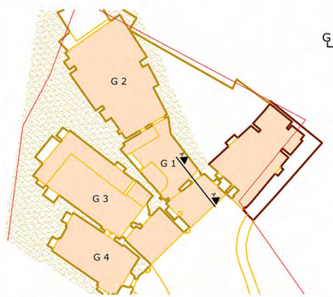
SHEMATIC PLANS ARE DRAWN BASED ON THE DRAWINGS OF ÜLKÜ DEMİR

PLAN DRAWINGS



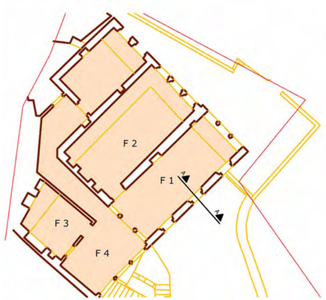
LAYOUT PLAN 10 20m

G 1 SPACE NUMBER
GROUND FLOOR



G1- KITCHEN
G2- STORAGE
G3- ROOM (ROCK)
G4- ROOM (ROCK)

GROUND FLOOR

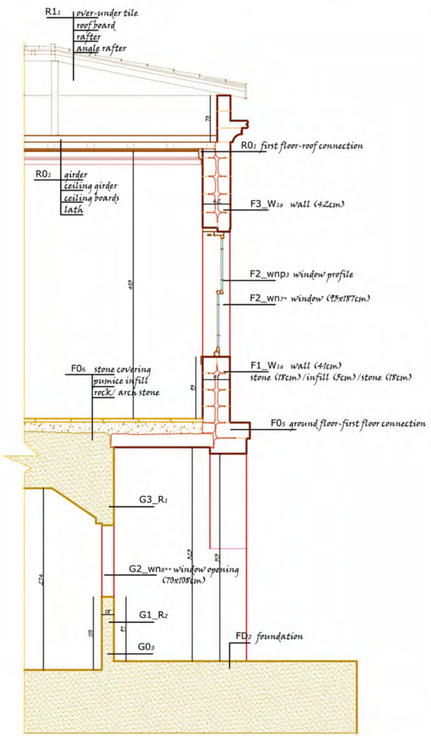


F1- SOFA
F2- ROOM (ROCK)
F3- ROOM (ROCK)
F4- ENTRANCE SPACE

FIRST FLOOR 1 2 4m

SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut	rock	estimated rock
timber	estimated timber	building lot	rock	infill	earth



SYSTEM DETAIL BLOCK/LOT:62/4731

1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

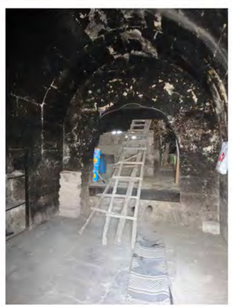
PHOTOGRAPHS

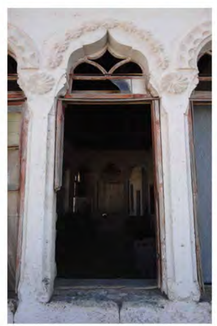











MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR
CASE STUDY ON; ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

LOCATION:
MUSTAFAPAŞA

BUILDING
BLOCK/LOT:
96/5644

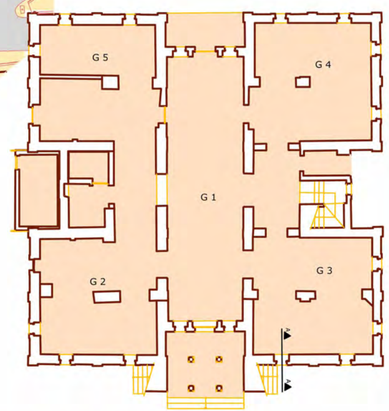
SURVEYOR:
FUNDA SOLMAZ

SHEMATIC PLANS ARE DRAWN BASED ON THE DRAWINGS OF ESİN TEKİN

PLAN DRAWINGS

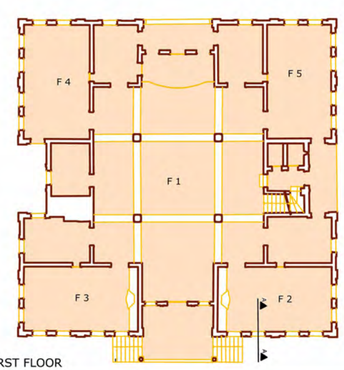
G 1 — SPACE NUMBER
GROUND FLOOR

LAYOUT PLAN 10 20m



G1-
G2- ROOM
G3- ROOM
G4- ROOM
G5- ROOM

GROUND FLOOR

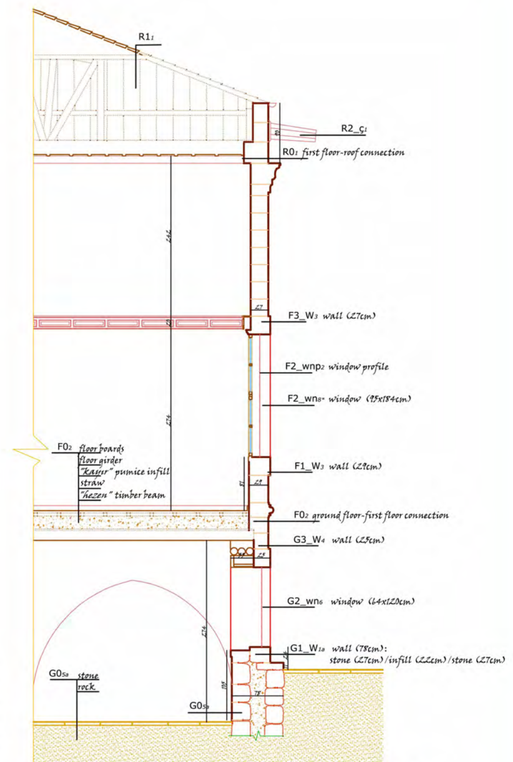


F1- ENTRANCE SPACE
F2- ROOM
F3- ROOM
F4- ROOM
F5- ROOM

FIRST FLOOR 1 2 4m

SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut	rock	estimated rock
timber	estimated timber	building lot	rock	infill	earth



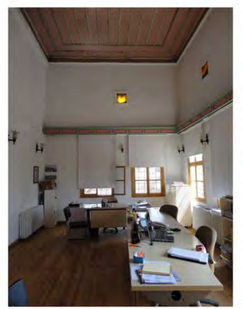
SYSTEM DETAIL BLOCK/LOT:96/5644

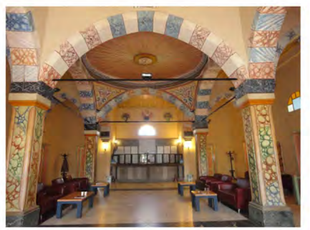
1 2m 4m

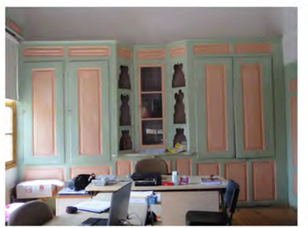
*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS






MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR

CASE STUDY ON: ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

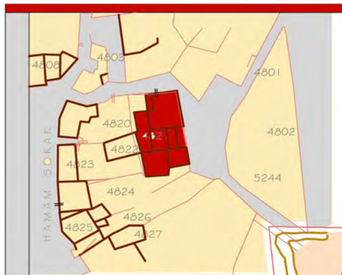
LOCATION:
MUSTAFAPAŞA

BUILDING
BLOCK/LOT:
59/4821

SURVEYOR:
FUNDA SOLMAZ

SHEMATIC PLANS ARE DRAWN BASED ON THE DRAWINGS OF ÜLKÜ DEMİR

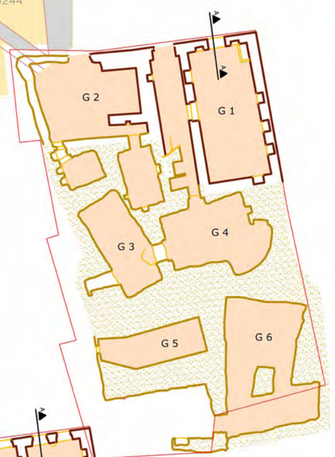
PLAN DRAWINGS



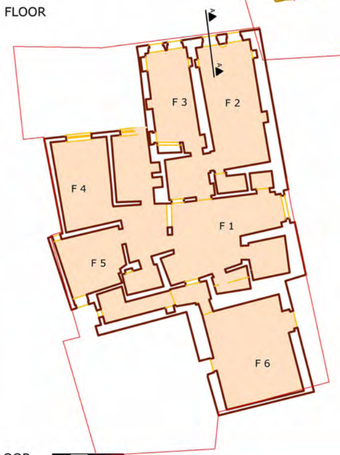
G 1 SPACE NUMBER
GROUND FLOOR

LAYOUT PLAN 10 20m

G1- BARN
G2- STORAGE
G3- ROCK SPACE
G4- ROCK SPACE
G5- ROCK SPACE
G6- ROCK SPACE



GROUND FLOOR

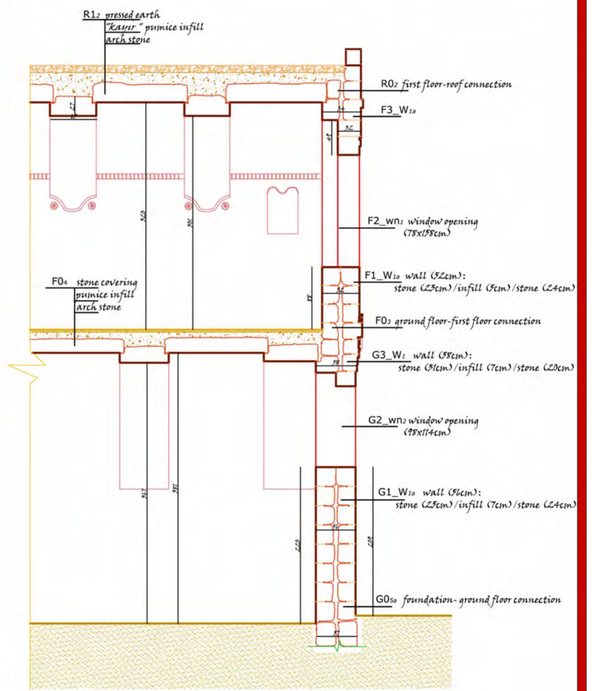


F1- ENTRANCE SPACE
F2- ROOM
F3- ROOM
F4- ROOM
F5- ROOM
F6- ROOM

FIRST FLOOR 1 2 4m

SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut	rock	estimated rock
timber	estimated timber	building lot	rock	infill	earth



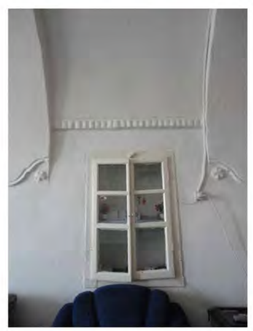
SYSTEM DETAIL BLOCK/LOT:59/4821

1 2m 4m

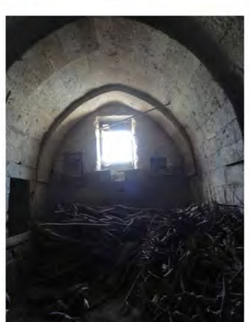
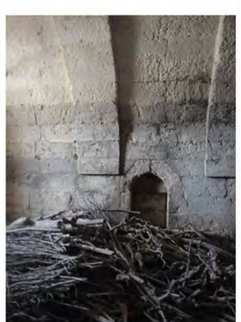
*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS





MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR

CASE STUDY ON; ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

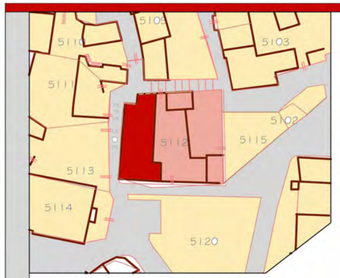
PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

LOCATION:
MUSTAFAPAŞA

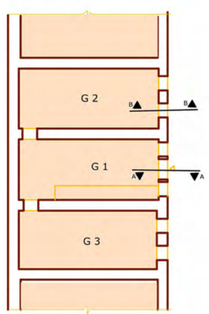
BUILDING
BLOCK/LOT:
73/5112-A

SURVEYOR:
FUNDA SOLMAZ

PLAN DRAWINGS



LAYOUT PLAN 10 20m



G 1 SPACE NUMBER
GROUND FLOOR

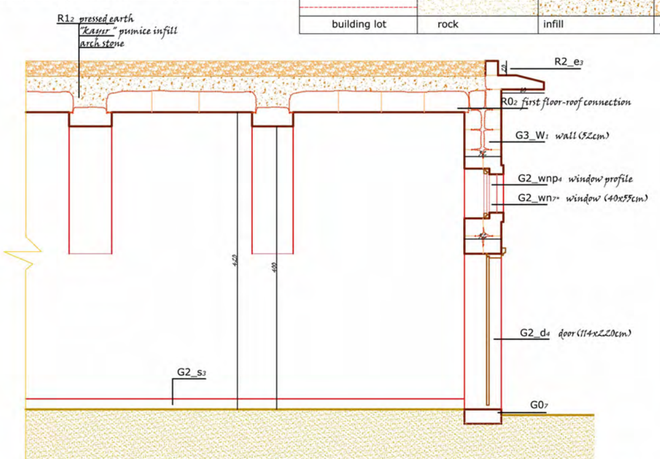
G1- SOFA
G2- ROOM
G3- ROOM

GROUND FLOOR

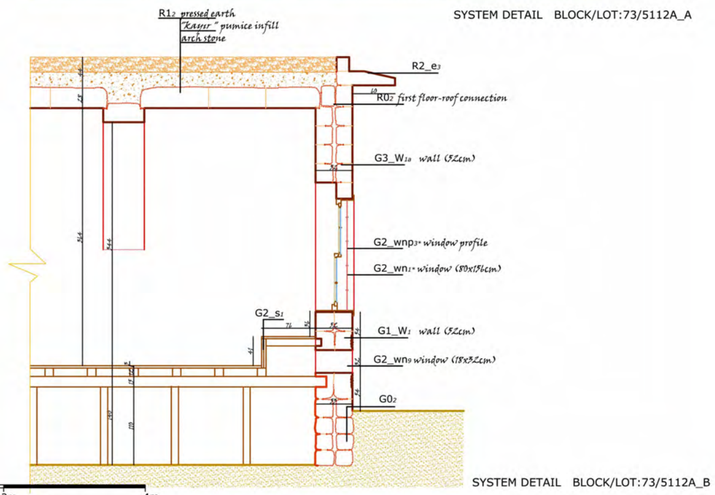
1 2 4m

SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut st.	rock	estimated rock	timber	estimated timber
				building lot	rock	infill	earth



SYSTEM DETAIL BLOCK/LOT:73/5112A_A

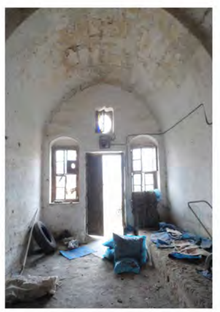


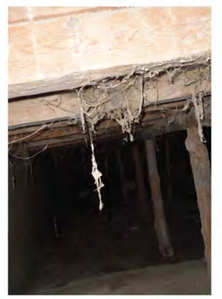
SYSTEM DETAIL BLOCK/LOT:73/5112A_B

1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS





MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR

CASE STUDY ON; ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

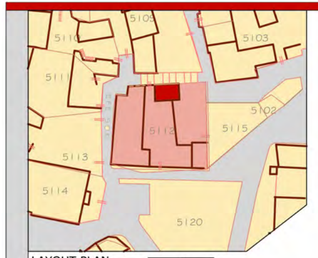
PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

LOCATION:
MUSTAFAPAŞA

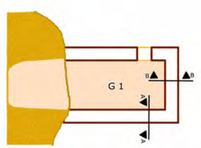
BUILDING
BLOCK/LOT:
73/5112-B

SURVEYOR:
FUNDA SOLMAZ

PLAN DRAWINGS



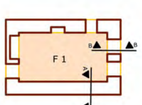
LAYOUT PLAN 10 20m



G 1 SPACE NUMBER
GROUND FLOOR

G1- ROOM

GROUND FLOOR

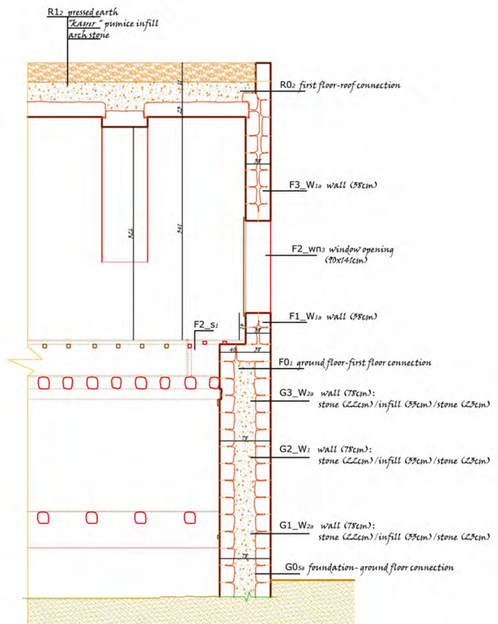


F1- ROOM

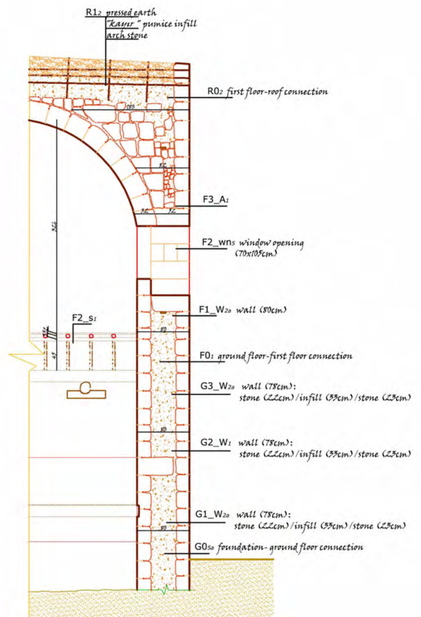
FIRST FLOOR 1 2 4m

SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut	rock	estimated rock	timber	estimated timber	building lot	rock	infill	earth



SYSTEM DETAIL BLOCK/LOT:73/5112B_A

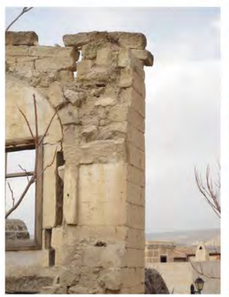


SYSTEM DETAIL BLOCK/LOT:73/5112B_B

1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS



MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR
CASE STUDY ON; ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

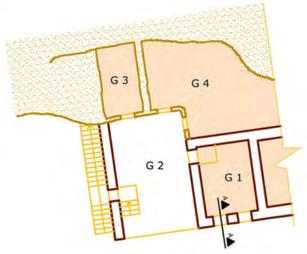
LOCATION:
İBRAHİMPAŞA
VILLAGE

BUILDING ADDRESS:
ÇALIDİBİ MAH.
NO: 39

SURVEYOR:
FUNDA SOLMAZ

PLAN DRAWINGS

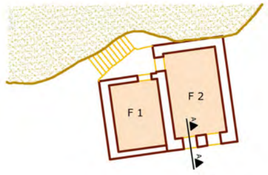
LAYOUT PLAN 10 20m



G 1 — SPACE NUMBER / GROUND FLOOR

G1- ROOM
G2- ENTRANCE SPACE
G3- ROCK SPACE
G4- ROCK SPACE

GROUND FLOOR

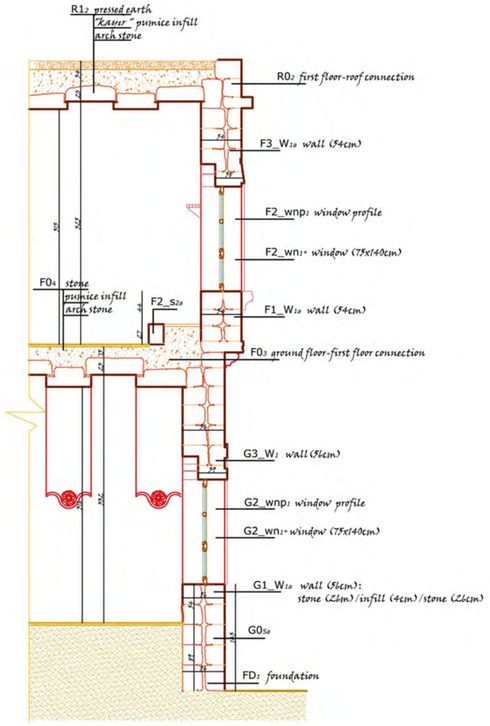


F1- ROOM
F2- ROOM

FIRST FLOOR 1 2 4m

SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut	rock	estimated rock
timber	estimated timber	building lot	rock	infill	earth



SYSTEM DETAIL NO:39

1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS








MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR CASE STUDY ON; ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

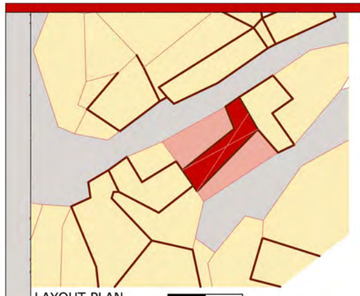
PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

LOCATION:
İBRAHİMPAŞA VILLAGE

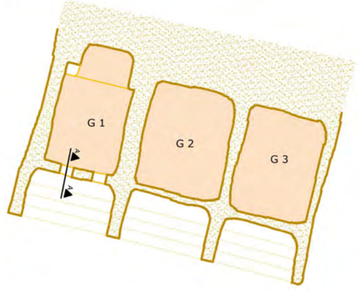
BUILDING ADDRESS:
ÇALIDİBİ MAH.
NO: 26B

SURVEYOR:
FUNDA SOLMAZ

PLAN DRAWINGS



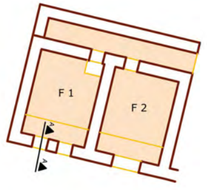
LAYOUT PLAN 10 20m



G 1 SPACE NUMBER
GROUND FLOOR

G1- ROCK SPACE
G2- ROCK SPACE
G3- ROCK SPACE

GROUND FLOOR

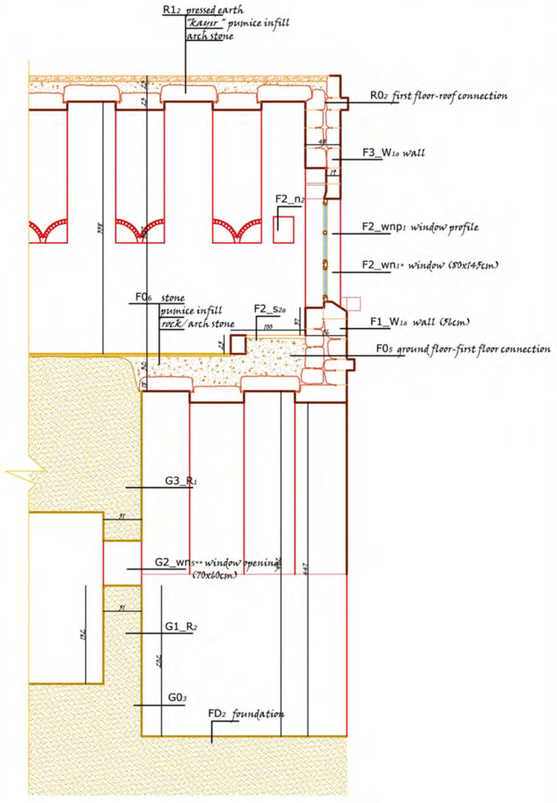


F1- ROOM
F2- ROOM

FIRST FLOOR 1 2 4m

SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut	rock	estimated rock
timber	estimated timber	building lot	rock	infill	earth

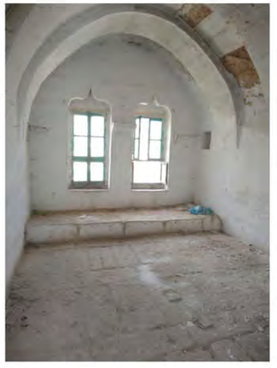


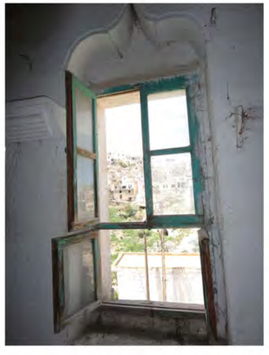
SYSTEM DETAIL NO:26B

1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS







MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR
CASE STUDY ON; ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

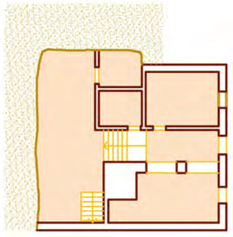
LOCATION:
İBRAHİMPAŞA
VILLAGE

BUILDING ADDRESS:
ÇALIDİBİ MAH.
NO: 108

SURVEYOR:
FUNDA SOLMAZ

PLAN DRAWINGS

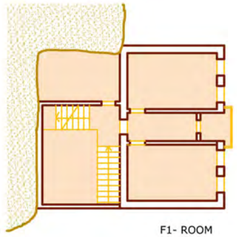
LAYOUT PLAN 10 20m



G 1 SPACE NUMBER
GROUND FLOOR

G1- ROCK SPACE
G2- ROOM
G3- COURTYARD
G4- ROOM (ROCK)
G5- IWAN
G6- ROOM (ROCK)
G7- BARN
G8- BARN
G9- ROCK SPACE

GROUND FLOOR

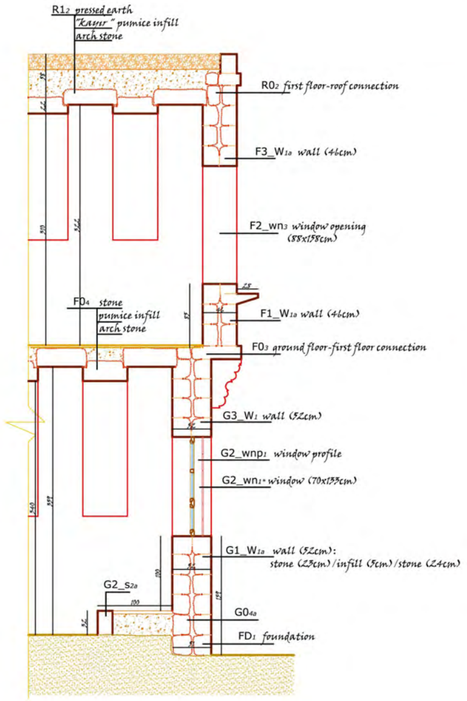


F1- ROOM
F2- IWAN
F3- ROOM (ROCK)

FIRST FLOOR 1 2 4m

SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut	rock	estimated rock
timber	estimated timber	building lot	rock	infill	earth

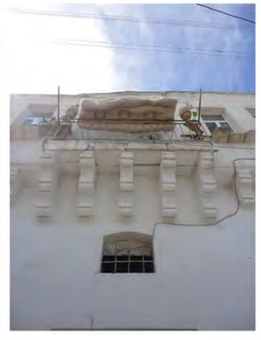


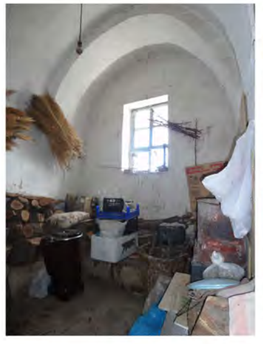
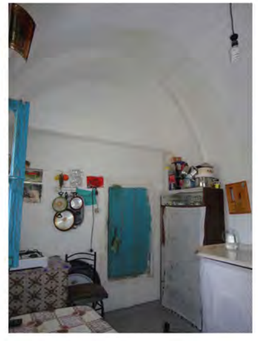
SYSTEM DETAIL NO:108

1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS



MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHIR
CASE STUDY ON; ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

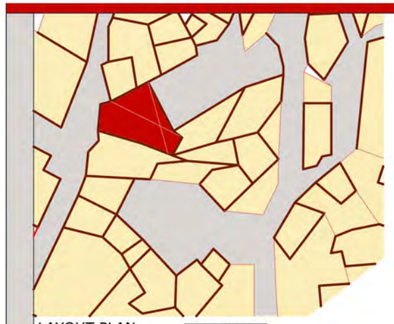
PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

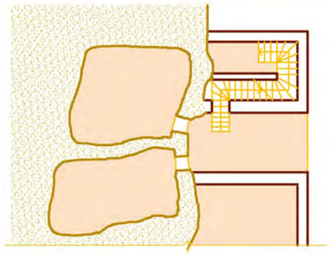
LOCATION:
İBRAHİMPAŞA
VILLAGE

BUILDING ADDRESS:
ÇALIDİBİ MAH.
NO: 87

SURVEYOR:
FUNDA SOLMAZ

PLAN DRAWINGS

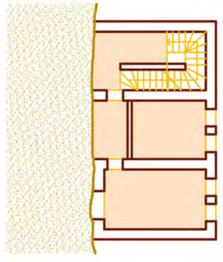




G 1 — SPACE NUMBER
GROUND FLOOR

GROUND FLOOR

G1- ROCK SPACE
G2- ROOM
G3- COURTYARD
G4- ROOM (ROCK)
G5- IWAN
G6- ROOM (ROCK)
G7- BARN
G8- BARN
G9- ROCK SPACE

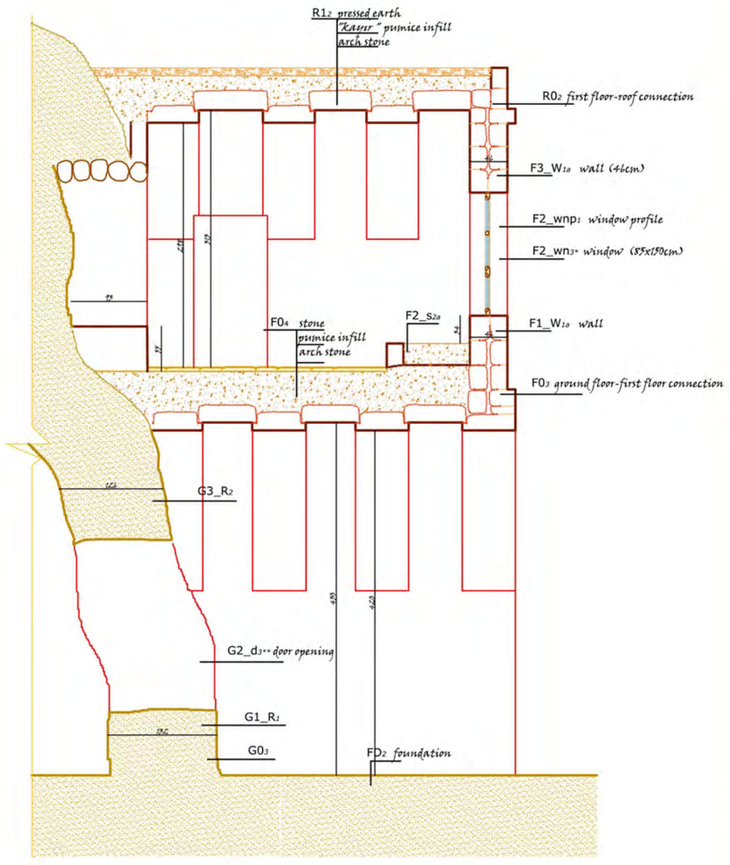


FIRST FLOOR
1 2 4m

F1- ROOM
F2- IWAN
F3- ROOM (ROCK)

SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut	rock	estimated rock
timber	estimated timber	building lot	rock	infill	earth



SYSTEM DETAIL NO:87

1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS






MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE PROGRAM IN RESTORATION

"CONSTRUCTION TECHNIQUES OF THE TRADITIONAL HOUSES IN NEVSEHİR

CASE STUDY ON; ÜRGÜP, MUSTAFAPAŞA, İBRAHİMPAŞA"

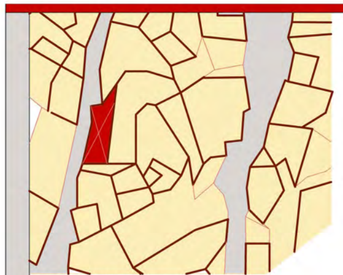
PREPARED BY: FUNDA SOLMAZ SUPERVISOR: ASSOC. PROF. DR. NERİMAN ŞAHİN GÜÇHAN

LOCATION:
İBRAHİMPAŞA VILLAGE

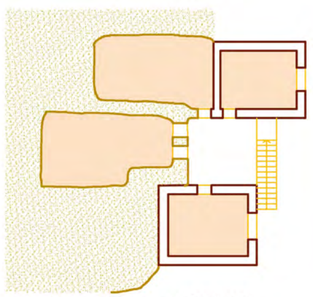
BUILDING ADDRESS:
ÇALIDİBİ MAH.
NO: 93

SURVEYOR:
FUNDA SOLMAZ

PLAN DRAWINGS



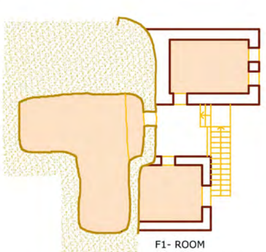
LAYOUT PLAN 10 20m



G 1 SPACE NUMBER / GROUND FLOOR

G1- ROCK SPACE
G2- ROOM
G3- COURTYARD
G4- ROOM (ROCK)
G5- IWAN
G6- ROOM (ROCK)
G7- BARN
G8- BARN
G9- ROCK SPACE

GROUND FLOOR

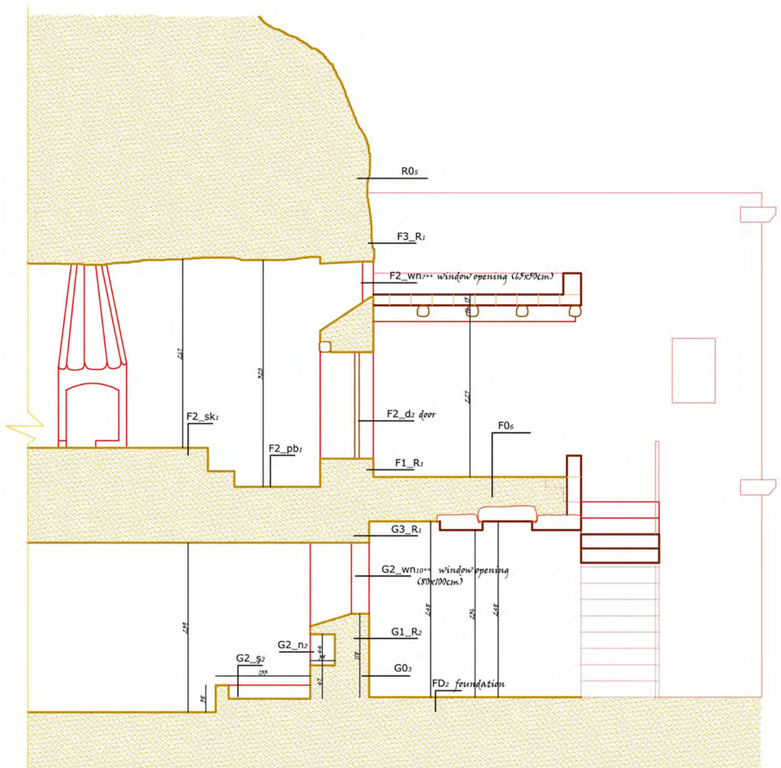


F1- ROOM
F2- IWAN
F3- ROOM (ROCK)

FIRST FLOOR 1 2 4m

SYSTEM DETAILS*

cut stone	estimated cut stone	rough-cut stone	estimated rough-cut	rock	estimated rock	timber
estimated timber	building lot	rock	infill	earth		



SYSTEM DETAIL NO:93

1 2m 4m

*1/20 SCALED DRAWING OF EACH DETAIL IS GIVEN IN THE TEXT WITH ITS MEASURES

PHOTOGRAPHS