CONSTRUCTION TECHNIQUES AND BUILDING PROCESSES OF TRADITIONAL TIMBER FRAME ARHAVI HOUSES

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ABSTRACT

CONSTRUCTION TECHNIQUES AND BUILDING PROCESSES OF TRADITIONAL TIMBER FRAME ARHAVI HOUSES

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Traditional Eastern Black Sea region house is a regional subgroup of Ottoman traditional house heritage. Traditional Eastern Black Sea region house differentiates from its counterparts as a response to regional conditions such as; climatic conditions, topography, and availability of resources. They show unique qualities in terms of stone and wood workmanship and represent a regional architectural culture which is formed on a harsh topography and rich flora. Arhavi's traditional timber frame houses represent this uniqueness and architectural culture in their technique, details and architectural elements.

This study aims to gather detailed information on the original construction technique of historical Arhavi houses to understand their original construction process for the conservation of this tradition. For this, the buildings were surveyed with the help of on-site drawings, laser scans, photographs, and visual data. All collected information was evaluated and the qualities and characteristics of the Arhavi traditional houses were identified. These qualities are documented with drawings and visuals in various details to illustrate techniques and architectural features. A hypothetical story of the construction process of a traditional house was written with the gathered data. The hierarchy of the techniques used in the buildings and transitions between the systems grouped together to evaluate the relation between the surveyed structures.

Keywords: Architecture, Eastern Black Sea, Traditional House, Construction Technique

ÖZ

GELENEKSEL AHŞAP KARKAS ARHAVİ EVLERİNİN İNŞA TEKNİKLERİ VE YAPIM SÜRECİ

İlhan, Tolga
Yüksek Lisans, Kültürel Mirası Koruma
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Geleneksel Doğu Karadeniz Bölgesi evi, Osmanlı geleneksel evi mirasının bölgesel bir alt grubudur. Geleneksel Doğu Karadeniz Bölgesi evi iklim şartlarına, topoğrafyaya ve malzemelerin ulaşılabilirliğine göre benzerlerinden farklılaşır. Bu evler taş ve ahşap işçiliği bağlamında özgün nitelikler taşırlar ve sert topoğrafyanın ve zengin floranın üstüne kurulmuş bölgesel mimari kültürü yansıtırlar. Artvin ilçesi Arhavi'nin geleneksel ahşap karkas evleri bu özgünlüğü ve mimari kültürü inşa tekniklerinde, detaylarında ve mimari elemanlarında taşırlar.

Bu çalışmanın amacı tarihi Arhavi evlerinin özgün yapım teknikleri konusunda, özgün inşa sürecini anlayarak bu geleneğin korunmasına katkı sağlamak için kaynak oluşturmaktır. Bunun için yapılar; arazi çizimleri, lazer taramaları, fotoğraflar ve görsel veriler ile yerinde gözlemlenmiştir. Toplanan bilgiler değerlendirilmiş ve geleneksel Arhavi evlerinin nitelik ve karakteristik özellikleri belirlenmiştir. Bu nitelikler, tekniklerin ve mimari özelliklerin tanımlanması için farklı detaylardaki çizimler ve görsellerle belgelenmiştir. Elde edilen verilerle geleneksel bir yapının inşa sürecinin varsayımsal hikayesi yazılmıştır. Yapılarda kullanılan tekniklerin hiyerarşisi

ve sistemler arası geçişler beraber gruplandırılıp değerlendirilerek gözlemlenen yapıların ilişkileri saptanmıştır.

To my family.

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CHAPTER 1

INTRODUCTION

Arhavi is in a region that has been populated by Lazs and influenced by Greek, Roman, Byzantine cultural spheres, lastly has been under Ottoman influence since 15^{th} century. The traditional architecture can be classified under the superset of Ottoman house, while it holds a separate location influenced by previous entities and local culture.

The studies on the traditional timber frame Ottoman house are classified by Şahin Güçhan in three groups (Şahin Güçhan, 2017). The first group focuses on the spatial order, the second group focuses on geographical setting and local material and the third group focuses on historical and cultural interaction.

In the first group of studies of her classification, Şahin Güçhan (2017) states that the Ottoman house or the Turkish house has been classified according to plan types and functional organization in the early studies that focus on the architectural culture in mostly urban areas of the Ottoman Empire, of Sedad Hakkı Eldem and Doğan Kuban (Eldem, 1954; Kuban, 1995).

Eldem states Turkish houses has mezzanines (*ara kat*), courtyards (*avlu*), open ground floors (*taşlık*) with compressed earth or stone grounds. Based on the planimetric order of the upper floors (piano nobile), he builds his typology on the variations of the rooms around the *sofa*, which is a space connecting the rooms, while being an active space of daily life. In the types of inner sofa and central sofa, *eyvan* and stairs are added to the arrangement of the space (Eldem, 1954, p. 11-25).

Kuban introduces the *hayat* (the main hall), rooms and architectural elements in Turkish house. He adds onto the classification of Eldem (1954) and describes *hayat* as the rib of the house. Similarly to the sofa of Eldem (1954), he defines *hayat* as a space of daily life. He describes additions to the *hayat* space, such as *eyvan*, stairs, sitting areas (*köşk*). (Kuban, Türk "Hayat"lı Evi, 1995)

In the second group of studies, spatial organization is interpreted with regional factors (Aksoy, 1963; Kuban, 1966; Eriç, 1979; Kazmaoğlu and Tanyeli, 1979). Kazmaoğlu and Tanyeli point out regional differences in the styles and construction techniques in Anatolian architecture and define the traditional houses of Eastern Black Sea Region as a regional subset of “Authentic Anatolian Synthesis”. They relate the techniques of the region to the to those of Anatolia but mention the existence of differences in the timber frame technique (Kazmaoğlu & Tanyeli, 1979).

In the third group of studies, Şahin Güçhan (2017) mentions Arel (1982) and Cerasi (1998, 2001); as these studies define the Ottoman house in relation to historical and cultural interaction while suggesting holistic methods.

Considering the limitation related to geography, Neriman Şahin Güçhan use “Ottoman house” term to define the traditional timber frame houses in Turkey, which described as “Authentic Anatolian Synthesis” by Kazmaoğlu & Tanyeli. Then she defines Ottoman house in three parts; masonry base, timber frame, and timber roof structure and explain important constructional features and regional variations. She expresses that bond beams (*hatıl*), braces (*payanda*) and widely used lath technique (*bağdadi*) are the elements of main construction techniques developed to resist earthquakes in this geography (Şahin Güçhan, 2007, p. 846-848).

With reference to Suraiya Faroqhi, Şahin Güçhan (2013, p. 222) mentions that the earliest known record of construction of the upper floors with timber frame technique in Ottoman houses date back to 16th century in İstanbul (Şahin Güçhan, 2013, p. 222). The spread of the technique through Anatolia continued until 20th century. In earlier times, the timber frame houses in İstanbul were mostly single story high and only had one or two rooms. The second floor was started to be introduced in the later half of 17th century (Şahin Güçhan, 2017, p. 2). The houses were built with stone and adobe masonry according to the sources before the introduction of the timber frame. The timber elements that formed the frames were imports guided by the Ottoman state itself (Canbulat, 2016, p. 5).

On the other hand, in the Eastern Black Sea Region, which is accepted as a part of this Ottoman house tradition, timber becomes the archaic and most basic material. Primitive timber masonry techniques such as log house systems still exist in desolate parts of the region. Therefore, the expansion and evolution of the technique in the Eastern Black Sea Region region may not exhibit the parallelism seen in its Anatolian and Balkan counterparts. After all, the fact is the tradition observed today in Arhavi shares the same principles of the Ottoman house with regional characteristics.

Was the timber frame a technology to be shared along the core of the empire, or was it a symbiosis of different cultures? According to Cerasi, (1998, p. 135) the homogeneity of the construction technologies of the Ottoman house must be emerged from Istanbul. The city acted as the crossroads of the thousands of carpenters and builders from the other regions, which they utilized wood techniques and shared know-how of the basic timber frame construction. It could be compared with the impact of reinforced concrete today. The timber frame technique was basic enough to implement and rewarding enough to adopt by the stone masonry builders of Mediterranean and mud brick builders of Mesopotamia.

Another aspect of the timber frame is rapid settlement and resettlement features. The spread of the technique meets the demand of Ottoman population of evolving settlement patterns between 17^{th} and 20^{th} century. The light timber construction style succeeded the primitive timber and stone masonry techniques (Cerasi, 1998, p. 149).

Regional studies that focus on the Eastern Black Sea Region such as Orhan Özgüner and Mustafa Reşat Sümerkan give outlooks on the region, analyzing construction techniques and functional organizations (Özgüner, 1970; Sümerkan, 1990). Özgüner focuses on social, cultural, geographical, and architectural characteristics of the region while focusing on the variations of construction techniques, plan and façade features of the Eastern Black Sea Region architecture on a large scale, from Samsun to Artvin.

Sümerkan (1990) points out variations of techniques on smaller scales in the region and defines physical properties of the materials and techniques.

These documents form the basis of many later studies that are focusing on the Eastern Black Sea Region. On the other hand, comprehensive modern studies focused on the Eastern Black Sea Region’s architecture does not go back earlier than 1970’s.

1.1. Problem Definition

Arhavi is located in the Eastern Black Sea Region of Arhavi at the coordinates of 41°20'58.3"N and 41°18'16.3"E. The locality is surrounded by the Eastern Black Sea Mountain Range, specifically Kaçkar Mountains. The region has a rough terrain, as the settlements are located in the river valleys and mountain plains. In addition to the topography, the climate and the flora of the region provides unique aspects. Arhavi is located in a zone that has the highest precipitation rate and the densest vegetation of the country.

Dense forests of the region play a crucial role in the characteristics of the local architecture. They have been serving as vast sources of timber as construction material for ages. Consequently, the distinctive conditions of the region generate peculiar architectural techniques and solutions.

In addition to distinctive conditions, this cultural uniqueness is divided by the mountain ranges on the south. For centuries, the Eastern Black Sea Mountain Range has been cutting the historical and cultural relations between the Eastern Anatolia and the Black Sea Region; even shaping the borders of the states. This line still restricts the realm of the Eastern Black Sea Region’s cultural and architectural sphere from the south, forcing it to span only in east-west axis. Tanyeli and Kazmaoğlu draw this area from Ordu to Artvin by the coastline and define the south of the region in masonry category. (Kazmaoğlu & Tanyeli, 1979)

Arhavi’s rural settlements and structures have cultural values that represent the identity of the Lazic and other local ethnic groups, and Turks. The architecture of the region is tied to historical and the past of the local population. The houses that are built with traditional techniques of the Eastern Black Sea Region, which are located in Arhavi, Fındıklı, Hopa and many neighboring settlements along that axis, display the character of the region that cannot be illustrated in any other way. In addition to the cultural identity, the diverse natural assets of the environment in the valleys and mountains of Arhavi are distinctive natural values of the Eastern Black Sea region. The architectural culture of the Arhavi is inclusive of the traditional values and local identities, and this culture manifests itself through built environment spread across the land.

Today, the values and identities tied to local architecture are subject to degradation caused by several direct and indirect factors. The evolution of lifestyle and adaptation of modern materials and techniques has started to change the traditional fabric in the 20^{th} century. The rise of urbanization has shifted the population out of their cultural spheres, standardizing the modern human and its built environment. In addition to the shift of populations, exploitation and monetization of natural resources leads to inability of sustaining cultural heritage. The changes in these matters affected not only urban fabrics but also rural settlements.

Arhavi still has surviving traditional entities that can shine light on the cultural heritage. However, the population shift, modern lifestyle, changing production techniques, loss of livestock raising, and agricultural activities are erasing the traditional methods and orders. The built environment is clearly getting affected by the purge of modernity.

Regional studies that focus on the Eastern Black Sea Region such as Orhan Özgüner and Mustafa Reşat Sümerkan give outlooks on the region, analyzing construction techniques and functional organizations (Özgüner, 1970; Sümerkan, 1990). These original studies form the basis of many later studies that are focusing on the Eastern Black Sea Region.

There are several master theses and quality publications that cover the construction techniques. However, these studies mostly stay at a broader theoretical level, or focus on single buildings. Due to the undocumented potential of relations between the construction techniques and architectural features, this thesis aims to compare several houses and define any possible similarities, contrasts and anomalies that may have a meaning in a medium scale. In addition to the relations in between, the analysis of the structures and architectural elements will generate a hypothetical construction process. The aim is to provide a comprehensive basis for future studies and to create a document that represents further details on the cultural heritage of the built environment in Arhavi and in the Eastern Black Sea Region.

1.2. Aim and Scope of the Study

Decisions and actions in conservation of immovable cultural heritage set their basis on documentation and analysis of the entities. Surveys and studies collected together strengthens the future studies and actions cumulatively. In the context of Eastern Black Sea Region’s architectural entities; the documentation and analysis of construction techniques and processes of Arhavi’s traditional rural architecture will be a means this collaborative effort to preserve respective cultural legacy.

The studies on the architecture of the Eastern Black Sea region focuses on a greater scale or a single building scale. As mentioned above, many qualified sources, theses and articles focus on the general characteristics and features of the construction techniques of the Black Sea Region such as Özgüner (1970) and Sümerkan (1990).

Within this framework; the aim of this thesis is to provide a local study in the context of Arhavi’s traditional houses, construction systems and the relation of these systems.

For this aim, the architectural features and the construction techniques of the houses will be documented, analyzed, and evaluated.

The traditional houses of Arhavi are scattered across the valleys and mountains of the locality. The settings of the houses differ depending on their settlements along the rural geography and they can be categorized based on this as; river settlements, mountain settlements and plain settlements. In addition to the settings of the houses, villages differ by clustering together or separated around their own lands. In order to cover a diverse range of the variations, 11 cases are selected among 5 villages. One of those villages, Arılı, is located on a mountainside, Şenköy is near river, Dereüstü and Yolgeçen are located on plains, and Yukarı Hacılar is close to the city center.

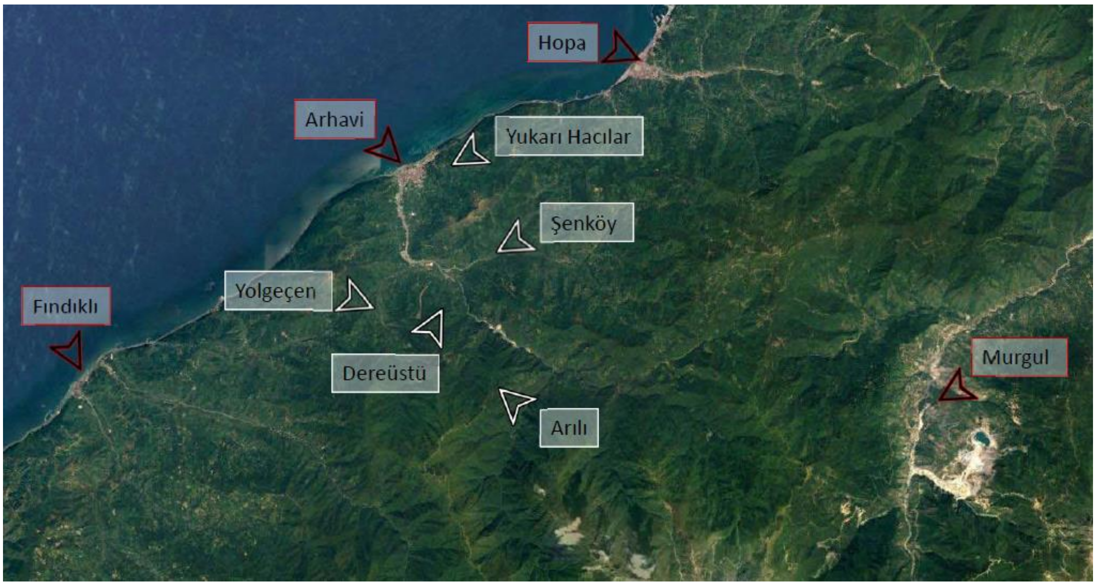

Figure 1.1. Locations of the villages the studied houses are located in

The selected houses have diverse stories. Three of the houses are used seasonally, while Şenköy 3 and Yolgeçen 15 have been unoccupied for decades. All of the houses have been altered and modified for the modern utilities and even new functions. For example, Dereüstü 58 and Dereüstü 20 are restored recently to be used as guesthouses or boutique hotels. Arılı 33 and Dereüstü 28 are divided and both are used by two families.

1.3. Methodology

This study is done in several stages that are blended in all chapters. Main steps were research, survey, documentation and transcription. The stages in detail are as follows:

1) pre-site research,

2) site survey,

3) collection of the written and visual information in literature and media,

4) second site survey,

5) documentation of the data,

6) analysis,

7) evaluation,

8) conclusion.

Firstly, a literature research on the Black Sea architecture and Ottoman/Anatolian houses is done. related literature and the gathered data were analyzed to form an idea of the Arhavi house and its construction techniques. By this research, the scope of the thesis was decided. 11 houses were decided to be studied for the production of schematic plans and detailed sections.

The site was visited in November 2015, for the survey of Şenköy 3 (Bilgin House). The house is scanned with a Faro 3D laser scanner, some details measured by hand, sketched, and photographed extensively. Then a measured 3D model of the house was created on Faro Scene software with the scanner data. 2D projection views are taken from the software and plans, sections and elevations were drawn on the measured model on AutoCAD with miniscule error margins.

Figure 1.2. 3D point cloud of Şenköy 3

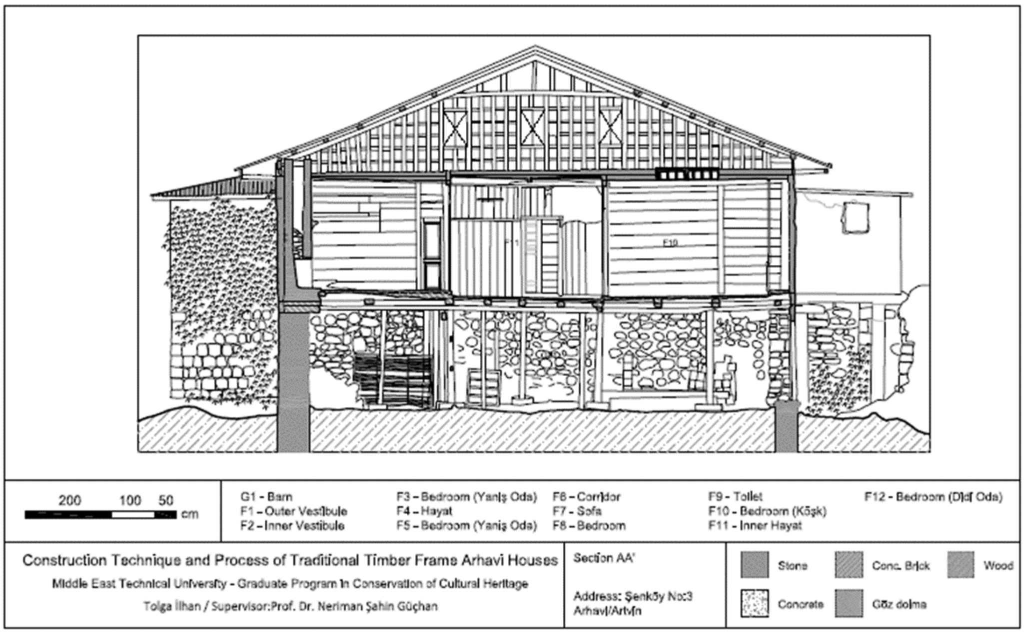

Figure 1.3. A section drawing of Şenköy 3 produced from the data taken from 3D point cloud

With the newly gained information, another site survey was planned in 2016. 10 more houses were surveyed in seven days by measuring with laser distance meter and tape measure, drawing hand sketches, taking photographs. Access to the houses were difficult and the purpose was to study various cases in the villages of Arılı, Yolgeçen, Dereüstü and Yukarı Hacılar. The floor plans and ceiling heights were measured with laser meters. To gather the data for the varying sections and details of each house tape measure and laser meter were used, and the dimensions and techniques were noted and photographed.

In the fifth stage, plans, models and system sections were drawn on AutoCAD for the analysis of the construction techniques and the structural systems of the latter 10 houses. The details, load bearing elements, wall systems, architectural elements, floor and ceiling systems were analyzed and classified. With the collected information and material, the thesis started to form. System drawings were created in sections where the techniques and details vary and presented with the plans and photographs of the respective houses to understand relations between the techniques and their hierarchy. The structure of Filiz Diri's master thesis "Construction Techniques of Traditional Birgi Houses" (Diri, 2010) was taken as example to form the progress of the thesis and documentation design., In the sixth stage, a coding system was created, and a table was produced for comparing the variations and determining frequency of the systems used in the structures. The materials from this step were used to created Chapter 4 and the documentations in the appendices.

Figure 1.4. Design of the documentation posters used for each case

Architectural features of houses and a hypothetical construction story of Şenköy 3 is depicted in detail in Chapter 4. A poster illustrating construction phases through 3D models were created at the end of the chapter.

In the evaluation stage; surveyed architectural features, literature studies and findings from the comparison table are combined and evaluated together. The conclusion of the study and final remarks are presented in Chapter 5.

CHAPTER 2

CHARACTERISTICS OF RURAL HOUSES IN ARHAVİ

This chapter aims to define historical, geographical, economic and social characteristics of the traditional Arhavi architecture in reference to literature and the studied houses. The traditional houses of the region represent the history, geography, production activities and cultural background of Arhavi. The observations in this chapter will be the base of the research on the architectural features and culture, and regional characteristics. All the findings will be combined and presented with the traditional local construction techniques.

2.1. History and Geographical Features of Rural Settlements in Arhavi

2.1.1. Location and Geography

Arhavi is a sub-province of Artvin, located on the coast of the Black Sea. The county borders are surrounded by the Black Sea on the north, Fındıklı/Rize on the west, Murgul and Yusufeli on the south and Hopa on the east.

City center of Arhavi is at the coordinates of 41°20'58.3"N and 41°18'16.3"E. Turkish-Georgian border is only 30 km away from the city. The boundaries of the county span up to 32 km on the north-south axis and up to 16 km on the east-west axis, covering 314 km^2.

The city of Arhavi is approximately 10 km away from Hopa, 17 km away from Fındıklı, 45 km away from Artvin, 75 km away from Rize, 140 km from Trabzon and 40 km away from Batum (Georgia) all by air line. All of the coastal cities of the Black Sea region are connected through coastal motorway. Transportation is easier through this road compared to inner areas of the region. The harsh topography of the region with mountain ranges parallel to the coastline causes sloped and winding roads for the settlements that are further from the sea. To compare, Arhavi and Rize coastal city centers are 80 km away from each other by road and 75 km by air line. While Arhavi and Artvin city centers are 80 km away from each other by road and 45 km by air line. In addition to the length of the road, bends and slopes mean more journey time to Artvin compared to Rize when it is much closer on the map.

Figure 2.1. Location of Arhavi and Artvin (prepared on simplemaps.com)

The county shows geographical characteristics of the Black Sea region of Turkey with its mountainous geography and dense vegetation. Several rivers carve numerous valleys in the region. Those rivers merge into the Arhavi River (*lz*. Kapisre River) and flow into the sea in Arhavi plain, next to the city center. While the city center is at sea level, V-shaped valleys raise gradually. Younger headwaters feeding the Arhavi river carve numerous smaller high valleys (Koday, 2011).

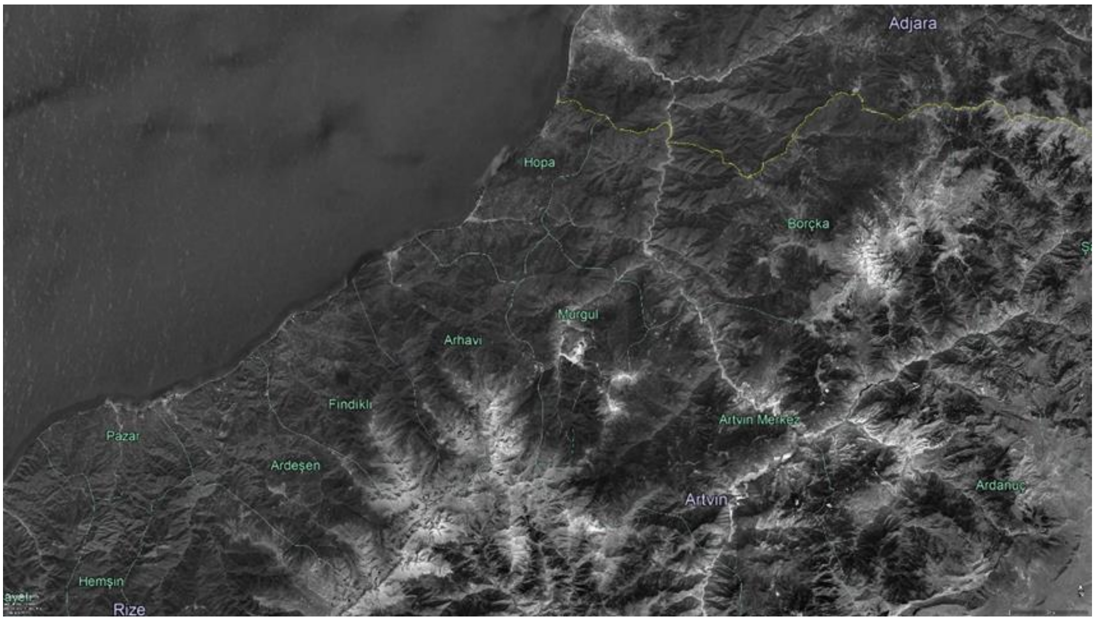

Figure 2.2. Arhavi and surrounding counties (taken from Google Earth in May 2019)

Villages of Arhavi show same altitude pattern in the valleys. Altitude increases as it gets further away from the sea. Villages can be situated on riversides, mountainsides or mountains. Yukarı Hacılar has an altitude of 60 m, Şenköy, which is a riverside village, has an altitude of 100 m, Yolgeçen has an altitude of 150 m, Dereüstü has an altitude of 190 m and Arılı, which is a mountain village, has an altitude of 600 m.

The tough geography of Arhavi is topped with 3371 m high Gül Dağı Summit, which is 27 km away from the seacoast. Additional to the Gül Dağı, there are several summits around 3000 m high on the mountain ranges divided by the valleys. These valleys harbor slopes that have more than %100 inclination. (Kurdoğlu & Akbulut, 2015)

Arhavi is situated in the region that has the highest amount of rainfall in Turkey. The average precipitation of the county is 2053 mm, and the average temperature is 14,4 °C. Highest average rainfall is seen in spring while the lowest average is in autumn. (Alataş, Batan, & Ezer, 2018)

Arhavi River as known as Kapisre River flows into the sea near the city center of Arhavi. It is 29 km long with %10,3 slope and has an annual average stream flow of 28,5 m^3/s (Koday, 2011). Smaller rivers in the Arhavi basin merge with Arhavi river. Orçi River and Sidere River are major tributary rivers that flow within their respective valleys.

2.1.2. Demographical Sociological and Economic Features

Arhavi covers 30 villages and 7 districts. TÜİK (Türkiye İstatistik Kurumu) data of the year 2000 show central population as 14079, village population as 5268 with a total of 19347 for the whole county. According to 1980-2014 values, it is observed that there is a %14 increase for total county population, %133 increase for the urban population and %60 decrease for the rural population in Arhavi in 34 years. During this time the population of Turkey increased by %74, while urban population of Turkey increased by %263 (Arhavi Belediyesi, 2018).

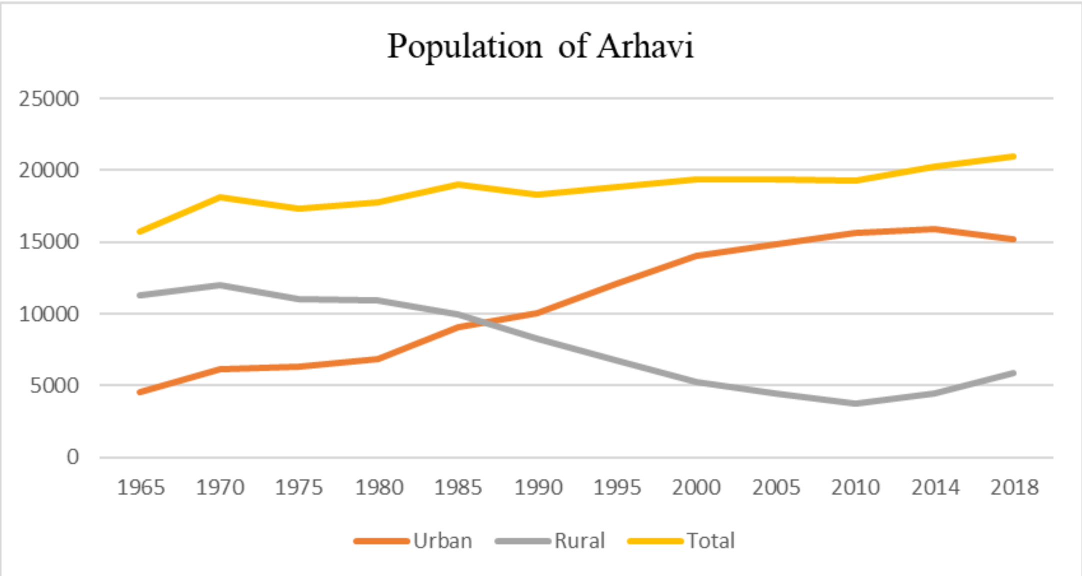

Figure 2.3. Population of Arhavi from 1965 to 2018 (data taken from biruni.tuik.gov.tr)

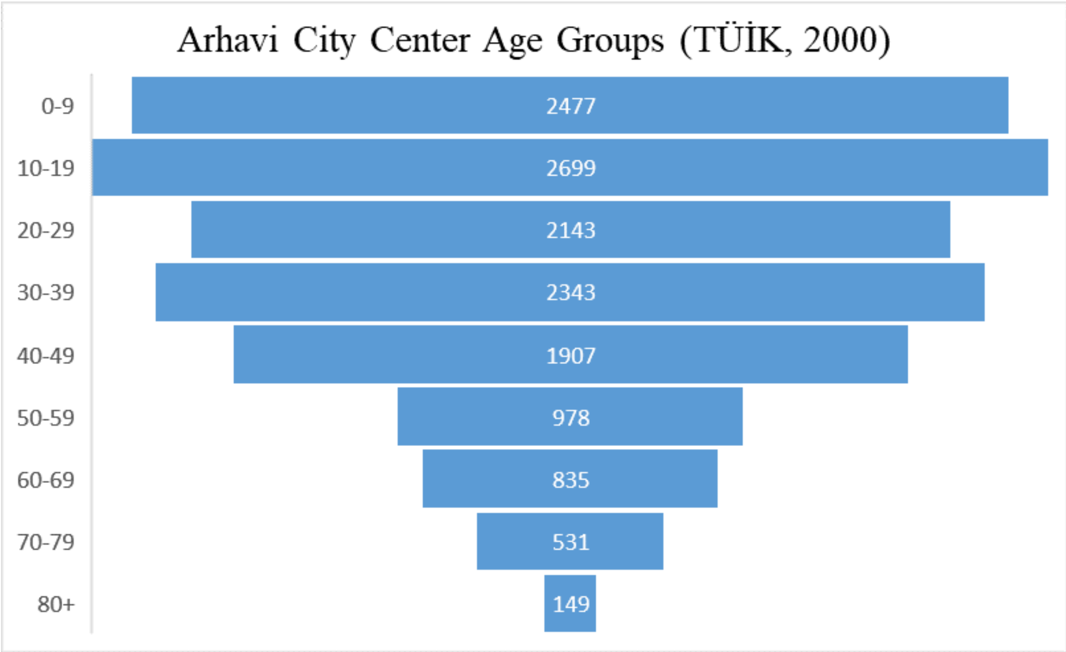

Figure 2.4. Population of age groups in Arhavi city center

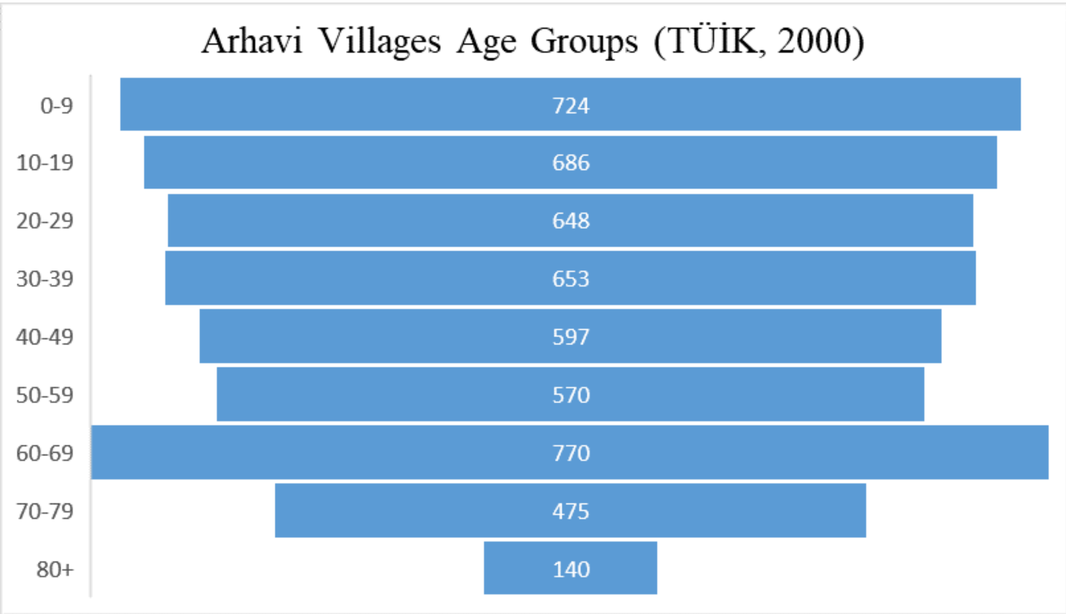

Figure 2.5. Population of age groups in the villages of Arhavi

Pop./Year	1965	1970	1975	1980	1985	1990	2000	2007	2008	2009	2010	2011	2012	2013	2014	2018
Urban	4510	6110	6311	6801	9079	10048	14079	16101	15194	15362	15610	15622	15973	14823	15901	15165
Rural	11256	12003	11036	10971	9937	8303	5268	3035	3995	3770	3709	3740	3629	5076	4405	5838
Total	15766	18113	17347	17772	19016	18351	19347	19136	19189	19132	19319	19362	19602	19899	20306	21003

Figure 2.6. Population of Arhavi from 1965 to 2018 (data taken from biruni.tuik.gov.tr)

Labor emigration is a phenomenon which is felt drastically in Arhavi as well as the whole of the Black Sea Region. The emigration does not mean there is no immigration to the city center. The people, especially the younger generation, move to bigger cities for easier access and better conditions for education, healthcare, jobs and daily life. Even if people do not leave the region, they still live at the closest center for better services. However, there is a recent trend reversing this effect. People return to their villages after they work and retire in cities (Doğanay & Orhan, 2014). The village of Arılı is a stark example of this situation. 2018 population of Arılı is 270 according to Turkish Statistical Institute; however, the village had less than 20 people in the autumn. More than half of those 20 people were to leave as well in winter, due to cold weather and closure of roads with snowfall.

DISTRICTS			**VILLAGES**			
Aşağı Hacılar	1227		Arılı	270	Kireçlik	179
Boğaziçi	4934		Aşağışahinler	102	Konaklı	263
Cumhuriyet	973		Balıklı	106	Küçükköy	110
Kale	586		Başköy	228	Ortacalar	159
Musazade	6190		Boyuncuk	66	Şenköy	21
Yemişlik	348		Derecik	96	Sırtoba	283
Yukarı Hacılar	907		Dereüstü	260	Soğucak	138
			Dikyamaç	67	Tepeyurt	231
			Dülgerli	148	Üçırmak	328
			Güneşli	65	Üçler	128
			Güngören	256	Ulaş	211
			Gürgencik	45	Ulukent	239
			Kavak	538	Yıldızlı	114
			Kemerköprü	202	Yolgeçen	472
			Kestanealan	183	Yukarışahinler	330
Subtotal	**15165**		**Subtotal**	**5838**		
TOTAL	**21003**					

Figure 2.7. 2018 District and Village Populations of Arhavi

More than half of the county area is forestland. According to the Department of Forestry, 174,50 km^2 of total area of 308,82 km^2 belongs to the forestland. 20 of the 30 villages are either in forest or near. Majority of the forests are beech, alder and chestnut trees (Arhavi Belediyesi, 2018).

Primary source of income in Arhavi is agriculture, specifically tea production and partially hazelnut production. Agricultural land covers 48 km^2 around the whole county. 30 km^2 of this area is tea farms, 9 km^2 is hazelnut farms, 7 km^2 is corn farms and the rest of it is cultivated with other fruit and vegetables. Kiwi production has been endorsed in the latest years with substantial effects. Beekeeping is practiced with a historical background in the region. Approximately 200 migratory beekeepers are registered. The county has 3 tea factories and an industrial area with 100 offices. (Arhavi Belediyesi, 2018)

Education is considered essential in Arhavi. It has 7 primary schools with 2586 students and 4 high schools with 775 students. The county has %99,9 literacy rate, the highest in the region. It has the highest ratio of professors to population in a county in Turkey. Arhavi also holds festivals such as a film festival, a culture and art festival, sculpture competition and similar ones. There is a library with extensive inventory and a cinema hall in Çarmıklı Eğitim ve Kültür Merkezi.

2.1.3. History of Arhavi

The name of Arhavi is seen as early as in the 4th century BC on historical sources. Pseudo-Scylax mentions Arhavi as the Arabis River which belongs to Byzeres and Ekekheirieis (truce-maker) people in his Periplous, in the 330's BC. (Bilgin, 2000, Arslan, 2012). In the Periplus of the Euxine Sea written in AD 131 by Arrian of Nicomedia, Arhavi is referred to as Archabis (Arrianus & Arslan, 2005). Procopius spoke of the name Archabis in his book History of the Wars in the 6th century (Procopius & Dewing, 1928).

In ancient times Arhavi was a part of Colchis state, which was founded by Caucasian tribes. The region was far from the state's authority, leaving the tribes partially self-governed. Procopius refers to the locals as free people (Procopius & Dewing, 1928).

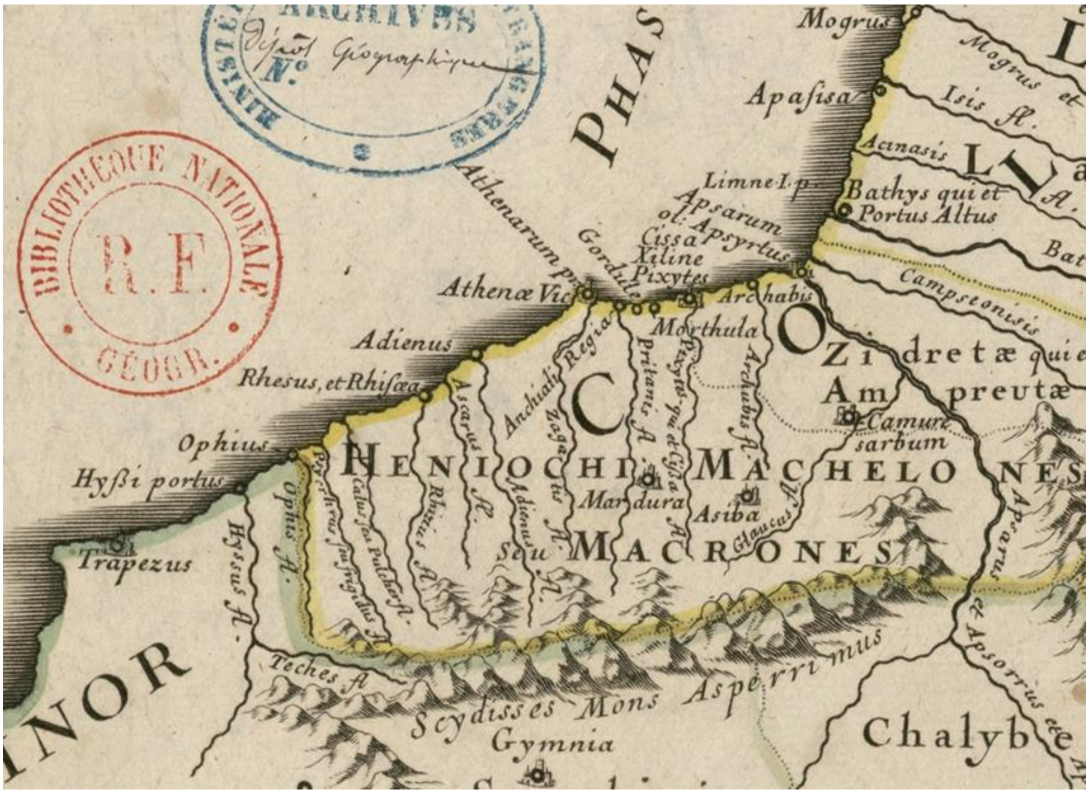

Figure 2.8. Section of a map showing Pontus Euxinus and Colchis where Arhavi is labeled with its ancient name Archabis (Sanson, Guillaume. Colchis, Iberia, Albania quae q., Caucasiae gentes, istmum quod Pontum Euxinum Caspium q., mare interjacet incolunt, 1667)

Later, the region has been annexed for a brief time by Alexander the Great, the king of Macedonia. After Alexander's death, the empire has been divided, and the region subjugated by the newly founded Kingdom of Pontus. Their reign over the lands lasted for nearly 150 years.

In 63 BC, after the last Mithridatic War between Roman generals, Pompey and Lucullus, versus Mithridates VI caused the collapse of the Kingdom of Pontus. Romans took control of the region made it a Roman province under the name of Pontus and Bithynia. Later the provinces were rearranged while Archabis became a part of Pontus Polemoniacus and Cappadocian Pontus respectively. After the fall of Rome, the Byzantines continued to hold the region. In the first half of the 9th century, the region was reorganized as a *theme* with the name of Chaldia.

Archabis was a border town and east of it was a vassal kingdom of the Rome under the name of Lazica (Egrisi, Lazistan) founded by the conquest of Pontus. Lazs rebelled against the empire several times for more autonomy. After the year 457, Lazica was influenced by Persians and started to seek Zoroastrianism as religion. In 522, Laz king Tzath baptized and accepted Christianity as official religion to improve relations with Byzantium. This led to more autonomy for Rome and Lazica being a protectorate and created discontent. Lazs rebelled in 541 under the reign of Laz king Gubazes who sought Persian help. This rebellion started Lazic Wars from 541 to 562, which is a part of the Roman-Persian Wars. King Gubazes changed sides during the war, this time against Persian authority. At the end of the war, Lazica remained with Byzantines (Evans, 1996). The vassalization continued after the fall of Rome with the Byzantine Empire. After Arab invasions, Lazica merged into the Kingdom of Abkhazia (Abasgi) through dynastic union in the 8th century. Finally, in the 11th century, the Kingdom of Georgia was established.

Turkish and Arab invasions weakened the Byzantine Empire and led to more and more autonomy for the Black Sea region for centuries. This became more prominent after the establishment of the Seljuk Empire when the land connection between the capital and Chaldia is cut. The region is isolated by geography from the fluctuations in the rest of Anatolia. It is possible to say that the region was never strictly controlled until the 12th century. This part of the Black Sea region was mostly at the gray border of the power holders. The region has been under the influence of eastern states such as Colchis until Romans annexed the Pontus. While Arhavi and neighboring lands were in Roman and Byzantine domain, it was also under the influence of Lazica, Abkhazia and Georgia states. On the south, Seljukids subjugated Artvin and surrounding lands in the 11th century. At the conflux of all these power struggles, local authority has remained with the Lazic or other the local tribes. (Bilgin, 2000)

Figure 2.9. Empire of Trebizond and Anatolia after the Fourth Crusade in the 13th century (Andrew Andersen, 2003)

After the sack of Constantinople of the Fourth Crusade in 1204, the Komnenos family founded the Empire of Trebizond (Trapezuntine Empire). Empire of Trebizond was the latest successor of the Byzantines that was annexed by the Ottomans. They gave the area more autonomy under the name of the Theme of Lazia. Their reign over the region continued for 250 years. However, this reign was not always linear. During the 14th century, Trebizond was struggling between Turks and Genoese, both fighting them and forming dynastic relations. Arhavi was subjugated by the Republic of Genoa for a short time period. Trebizond was conquered by Mehmet II in 1461, which marks the end of the Trebizond empire. Arhavi must have been conquered from the Genoese at a time between 1470 and 1486; between the conquest of Rize and the year of first Ottoman cadastral records of the city. (Bilgin, 2000)

Arhavi was an administrative district (Laz kazası, Lazistan) center during the Ottoman era and became a part of Batum province (Gönye sancağı) in the 16th century. Its borders were larger than today's, including Fındıklı and some parts of Hopa. 1486 records show 2980 households, 1520 records show 2983 households, 1554 records show 2229 households located in Arhavi administrative district. Two fortresses were in use in the borders of Arhavi district in the 16th century. Arhavi Fortress (Arhavi Kalesi) had 30 soldiers, Kise Fortress (Ciha Kalesi) had 11 soldiers and the whole district had 3070 soldiers garrisoned. (Öztürk, 2011)

During the Russo-Turkish War in 1877–78 (Turkish: 93 Harbi) Batum was lost. Sancak (capital of the province) was moved from Batum to Trabzon. Arhavi was not invaded; but close cities, Artvin and Batum were. As a result of territorial loss, Arhavi has become a county of Rize, while Hopa and Fındıklı have become Arhavi's communes. At the start of 1900s Hopa has become a county and Arhavi became its commune. (Öztürk, 2011)

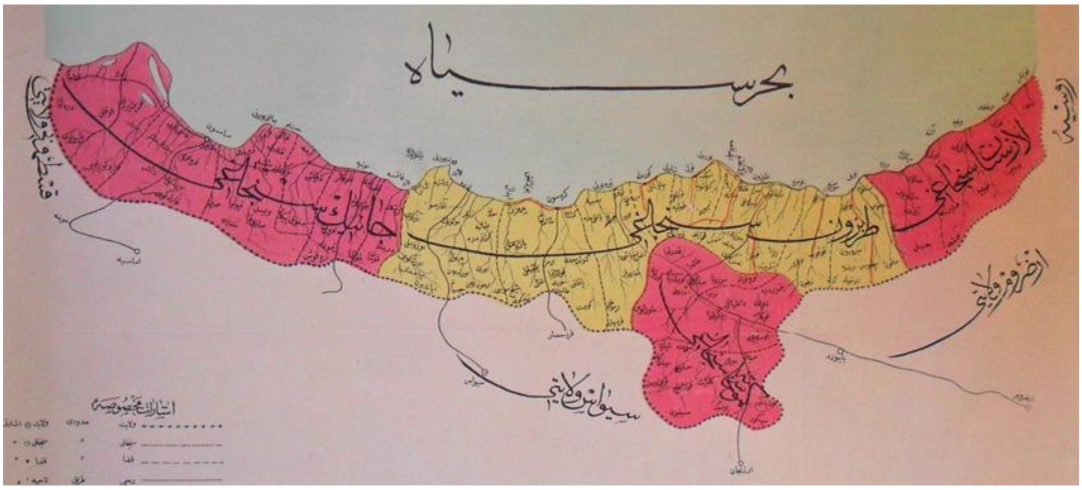

Figure 2.10. The Vilayet of Trabzon in the later 20th century. The Sanjak of Lazistan is on the right. (TC BOA HRT.0622)

Russians invaded Arhavi this time in the First World War. Hopa was captured on 23 February 1915. After 20 days of resistance, Arhavi was captured on 15 March 1915. The whole valley of the Arhavi River was occupied gradually in a year. After the collapse of the Russian Empire, Russian troops ended the war and left the region. Locals still tell stories about the occupation today. (Öztürk, 2011)

In 1933, Artvin merged into Rize as a single province named Çoruh. After three years, on 4 November 1936, this province was dissolved and Hopa and the commune of Arhavi became a part of Artvin province. On 1 June 1954 Arhavi was given county status again after nearly 60 years. (Taşpınar, 2004)

2.1.4. Characteristics of Rural Settlements in Arhavi

There is no reliable information about the development of the settlements of Arhavi through the ancient and middle ages.

At the early stages of the Turkish Republic era, Arhavi had two central districts that were divided by Kapisre River. Musazade and Kale. Kapisre River had flowed into the sea on a point closer to today's city center. Old riverbed rehabilitated to current shape. Crossings over the river were done by boats until the first bridge was built in the 1950s.

KÖYLER			
YENİ ADI	**ESKİ ADI**	**YENİ ADI**	**ESKİ ADI**
Arılı	Papilat	Ortacalar	Ortaköy
Aşağı Şahinler	Çalen Napşit	Sırtoba	Otalahe
Yukarı Şahinler	Jilen Napşit	Şenköy	Çalen Kutunit
Balıklı	Emanyati (Yukarı Pilarget)	Tepeyurt	Jilen Kutunit
Başköy	Başköy	Ulaş	Durmat
Boyuncuk	Pareh	Ulukent	Çalen Pilarget
Soğucak	Jilen Potocur	Üçler	Hekolen Pici
Dülgerli	Çalen Potocur	Üç Irmak	Orçi
Derecik	Sidere	Yolgeçen	Lome
Dereüstü	Gidreva	Yıldızlı	Nobeğ'Leni (Nobageni)
Dikyamaç	Kamparna		
Güngören	Jilen Kapistona	**MAHALLELER**	
Güneşli	C'Giyazona (Takamandeni)	**YENİ ADI**	**ESKİ ADI**
Gürgencik	K'Opt'One	Kale	Kapistona
Kavak	Yakovit (Galata)	Aşağı	Borğola
Kemerköprü	C'Giyazen	Yukarı	Payante
Kestanealan	Çukalvat	Cumhuriyet	Çarmat
Kireçlik	Bahta	Musazade Mah.	Didinoğa
Küçükköy	Suhulet	Yemişlik	Kibeliti
Konaklı	Kordelit		

Figure 2.11. Former names of the villages and districts of Arhavi in Laz language

Figure 2.12. A photo of Şenköy taken near the house Şenköy 3.

Figure 2.13. A photo of the village of Arılı

Four of the seven districts of Arhavi were villages until the formation of the municipality. These are Aşağı Hacılar, Yukarı Hacılar, Yemişlik and Cumhuriyet districts. Boğaziçi district was created by decision along the river on the area between old and new riverbeds of Arhavi River (Kapisre River).

Today, the seashore is so much further than old shore from the town. Newly built roads, specifically D010 of the state highway system, (aka. Black Sea Coastal Road) pushed sea line back and has been a barrier between the city and sea.

Figure 2.14. An old photo of Arhavi city center dating the early 1900's. Retrieved on August 15, 2019, from https://ozhanozturk.com/2017/12/20/arhavi-artvin/

Ottoman records show demographical and military statistics, but the history of the city's general physical environment is unknown through the medieval ages. Similarly, there is no source on the history of the rural settlements of Arhavi.

As the geography of Arhavi is highly mountainous, formed at the sides of rivers perpendicular to the Black Sea, the villages are scattered around the terrain of the county, utilizing habitable lands. These villages can be classified according to their location in two categories. Valuable plains at the bottom of the valleys host most of the rural settlements. As another variation, higher settlements are located at the plains on the mountainsides.

The villages in the bottom of the valleys are located around the rivers closer to the city center of Arhavi. They are reached by roads that run parallel to the riverbed. These settlements are more advantageous than their higher counterparts in terms of transportation, flatness of the land and proximity to the rivers. Still, new houses are constructed in these villages as they don't have the hardships of higher villages on the mountainsides.

The settlements on the mountainsides are located at higher elevations compared to the river villages. They are also further from the city center of Arhavi as the elevation of the geography rises to the south. They are reached by the roads that also serve the river villages, passing after one or more of them. These settlements utilize plains on the mountainsides as agricultural fields. They are also bordered by the rich forests of the mountains.

Every village is accessed through main roads and its subdivisions. The main road of the village does not affect the locations of the houses. Houses or groups of houses are accessed by minor roads from the most optimal point of the main road through plots of neighbors.

Arhavi villages have mosques at central points of the settlements near the main roads. The location of the mosque defines a point of prominence, while the location is always chosen through prominence.

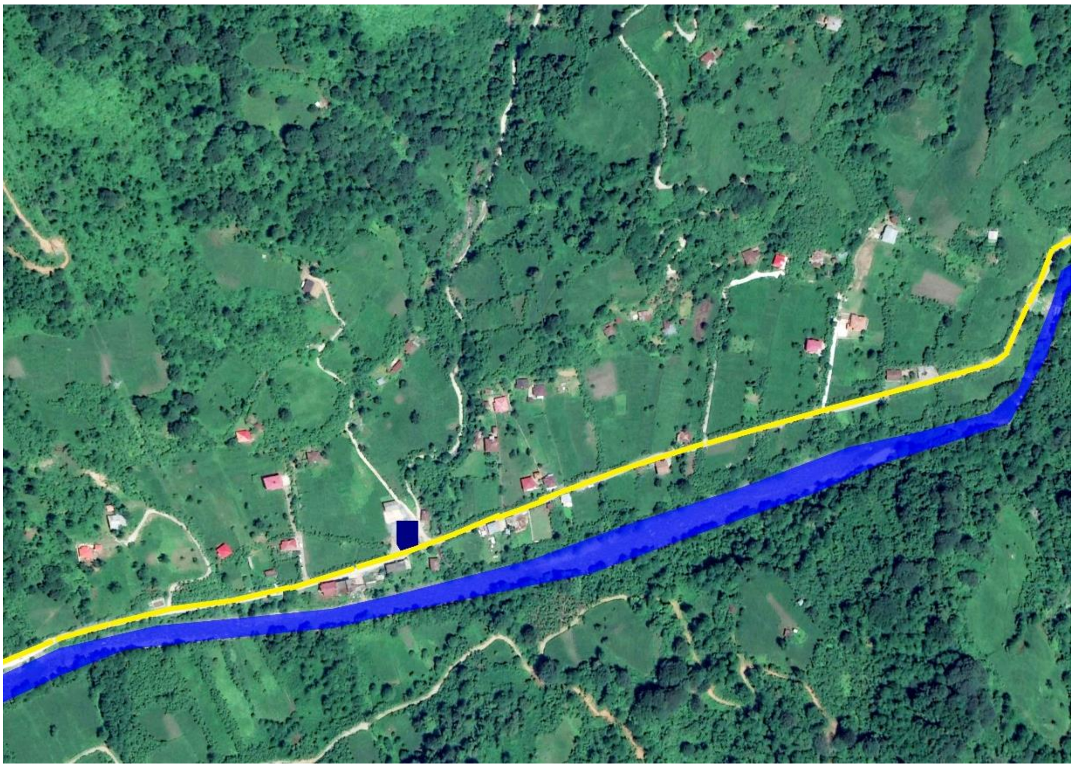

Figure 2.15. Satellite view of Şenköy village showing the scattered settlement pattern of the houses and the roads (Google Earth, 2017)

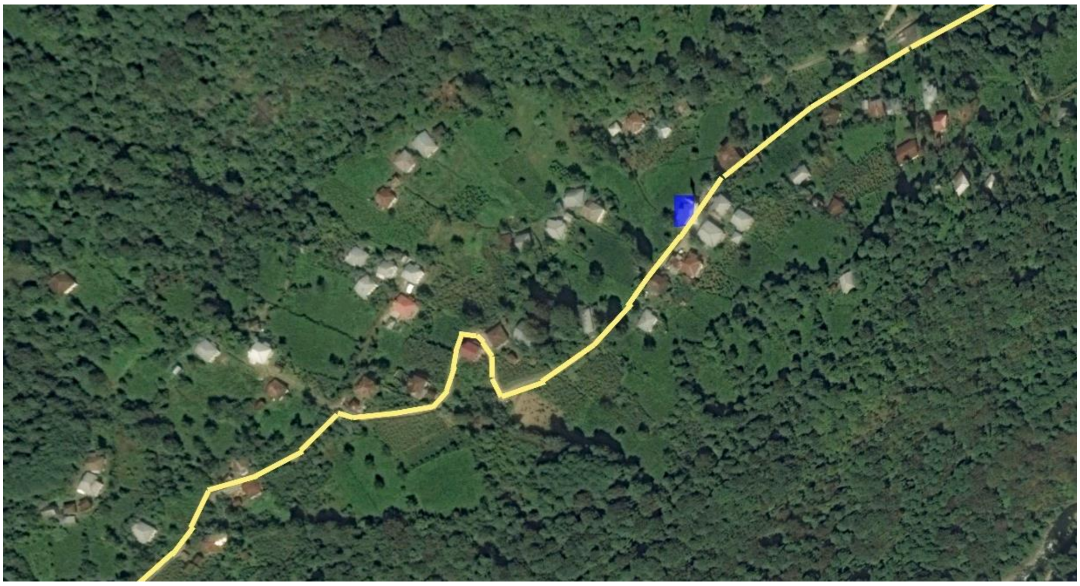

Figure 2.16. Satellite view of Arılı village showing the scattered settlement pattern of the houses and the roads (Google Earth, 2011)

One of the villages that was observed during the survey is Şenköy. Şenköy is 8 km away from Arhavi city center by road, which is very close compared to other settlements. The main road passes parallel to the river from Şenköy and continues to Aşağı Şahinler, Yukarı Şahinler, Tepeyurt, Ulukent, Derecik villages. The village is formed near the river on plains. Houses are situated near their agricultural fields and accessed through minor roads. The mosque is on the main road, where access is the easiest.

Another village that was observed during the survey is Arılı, on a mountainside. Arılı is 15 km away from the Arhavi city center by road. The road steepens with a very high slope at the last kilometer and does not reach to any other settlement. For this reason, the village has single point of access unlike Şenköy. This village does not have a direct relation with the river as it is located on a mountainside. Arılı is more compact than Şenköy with groups of houses concentrated around their fields. The mosque of the village is near the entrance of the settlement, where the houses are concentrated around the main road.

Figure 2.17. A view from the village of Arılı

2.2. Characteristics of Rural Houses in Arhavi

In this topic, architectural, physical, social and economic characteristics of the traditional rural Arhavi houses and their components are to be defined with special emphasis on open and closed spaces. In addition, daily life and functional distribution in the houses are to be discussed with a case study of Bilgin House (Şenköy 3).

2.2.1. The Land Forming the House

A rural Arhavi house cannot be defined without its open spaces. The open spaces in the Eastern Black Sea Region rural settlements differ from their counterparts in the rest of Anatolia. Scattered settlement patterns seen in the rural settlements of the Eastern Black Sea region hinder the possibility of defining lots of the houses. A household in Arhavi includes open and built-up spaces, interconnected to each other supporting daily life. While the house is the central space of the life, open spaces such as outdoors, vegetable gardens and agricultural fields are all spaces of daily activities. Due to outward oriented arrangement of the functional elements, rural Arhavi house can be defined as a complete system together with all of its land.

Understanding the socio-cultural characteristics of a rural Arhavi house may only be complete with all these elements. Albeit, the data of the ownerships of these components, especially the agricultural fields, are not gathered in the context of this thesis. Understanding economic sustainability and social effects may be the context of a further study.

As said before, the houses are generally dispersed, in some cases two or more houses can be grouped together in a closer arrangement. This groups mostly consist of houses of relatives, that have divided plots of family lands from their legators.

In this sense, the property of the rural Arhavi household can be discussed in two parts; open and built-up spaces.

2.2.1.1. Open Spaces: Outdoor, Vegetable Garden and Agricultural Field

As said before, a rural house in Arhavi functions together with its surroundings in the lives of its inhabitants. The Arhavi house uses its outdoors, close vicinity near the house, as production spaces. A vegetable garden provides food such as tomatoes, peppers, onions, collards for daily consumption. And agricultural fields around the house are used for crops such as hazelnuts and tea for economic gains.

The lands of a household are bordered with the lands of other households. Most of these lands are divided by inheritance, making relatives neighbors of each other. The house is reached from the road as it is a necessity today, while the agricultural areas are sometimes accessed through paths from the house.

The complementary structures and the house are planned together considering circulation and proximity. The open space in between these structures or areas in the vicinity of a house are used for various purposes; building a fire for cooking, processing crops, weaving, or social gatherings.

A vegetable garden exists in close proximity of the house that provides daily produce for the consumption of the house. The inhabitants grow various type of vegetables according to seasons and their needs. Excess production may be processed and stored as conserves in jars. The food grown here can be tomatoes, peppers, onions, collards and most popularly corn. Corn was very popular in the region, because it was processed into flour with hand-mills or watermills near the rivers; then used for bread. Today, most of these vegetable gardens were converted to fields for other crops or left bare. Because maintaining these multi-purpose gardens need constant care. With easier access to markets and seasonal use of the houses, locals abandoned this practice as they already left these rural areas, visiting and using their houses usually in summer seasons.

In addition to these areas, agricultural fields belonging to the house sustain the household economy. These fields are mostly located near the house but can be further away. Economic crops in the region are mainly tea and hazelnut. Seasonal inhabitants of the region come to their villages and harvest these crops. This economic gain still keeps the local settlements functional, at least two or three months in summer. Tea is harvested and sold daily at local buyer locations such as Çaykur. Hazelnut is hand-picked, sun-dried, processed, and sold.

Figure 2.18. Outdoors of Dereüstü 28 with its serender and merek

Figure 2.19. Serender, vegetable garden and merek of Arılı 91

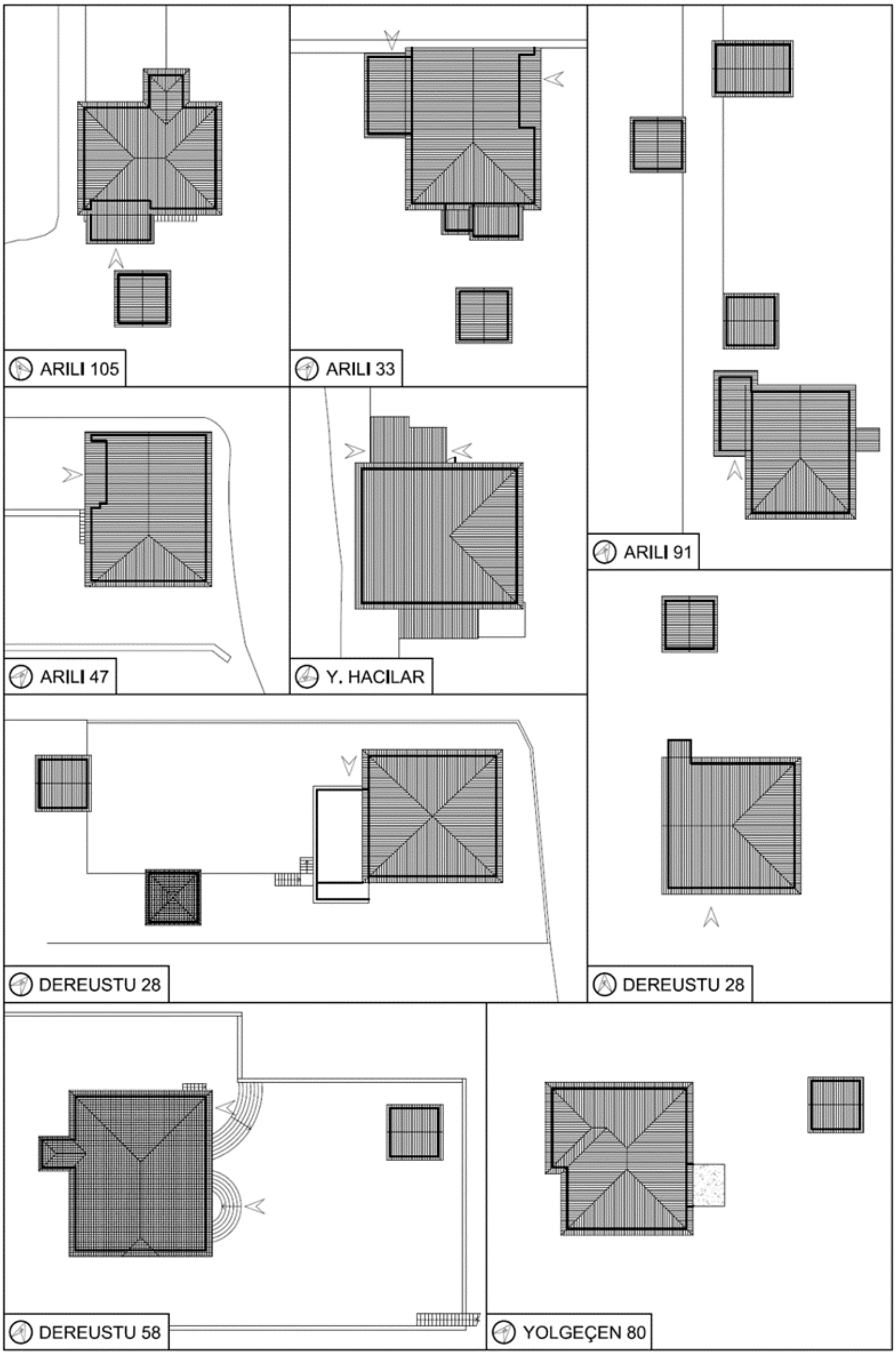

Figure 2.20. Positioning of the houses and complementary structures

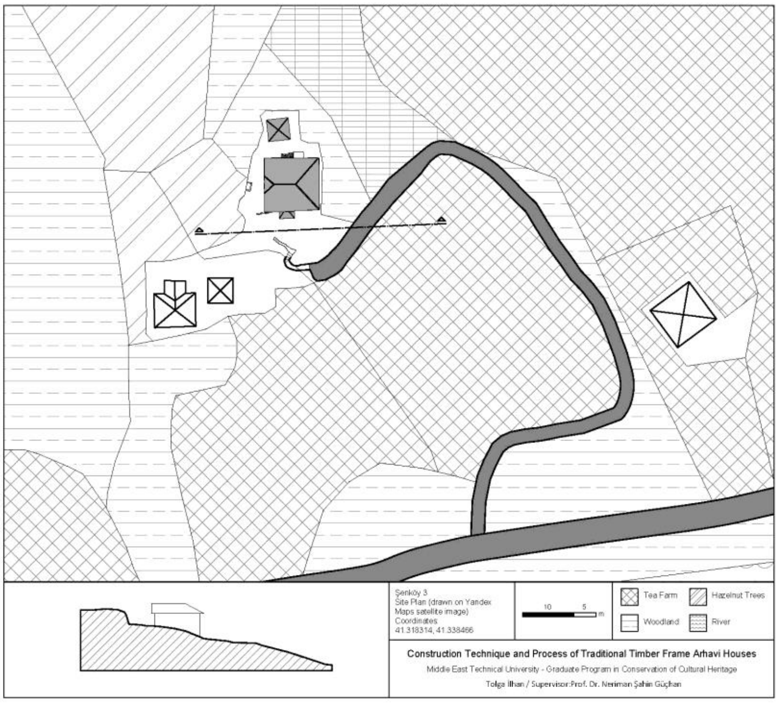

Figure 2.21. Site plan of Şenköy 3

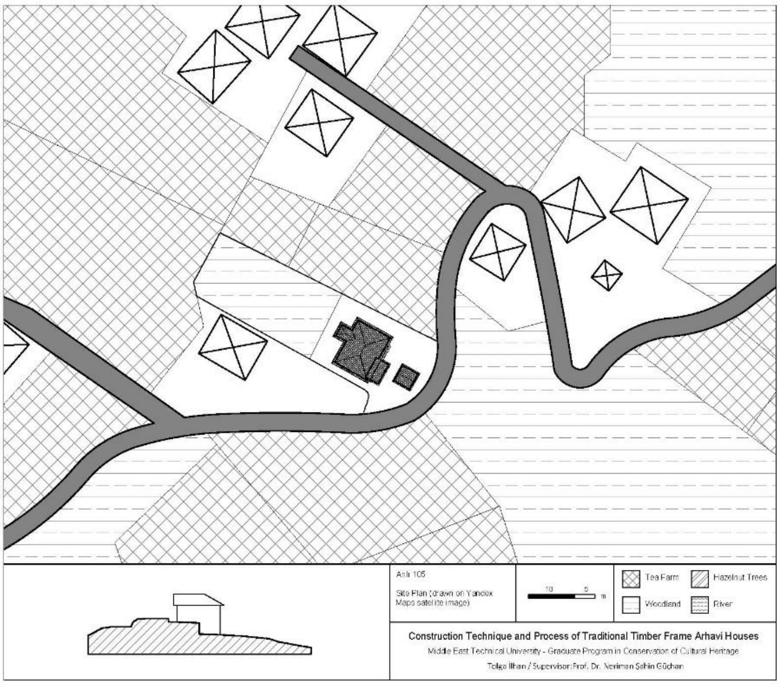

Figure 2.22. Site plan of Arılı 105

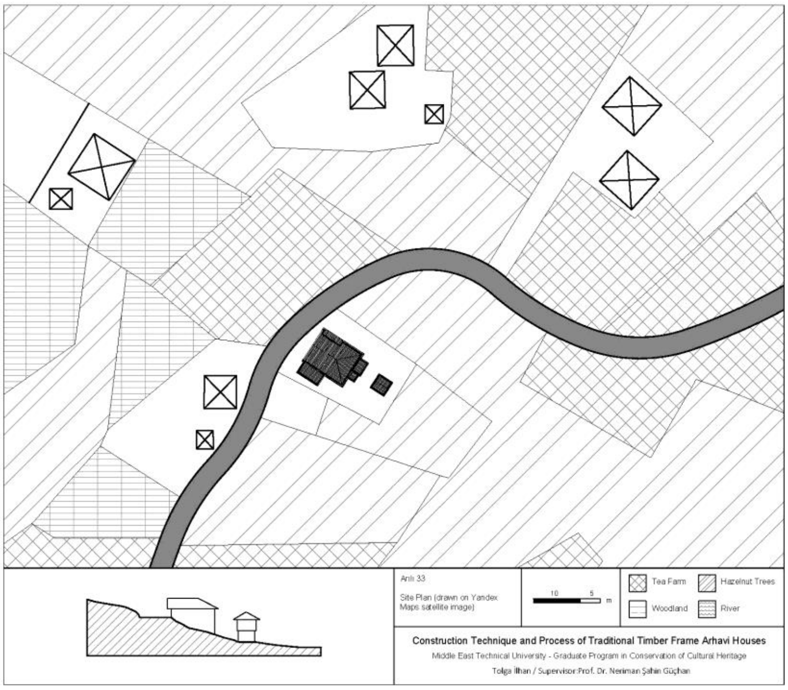

Figure 2.23. Site plan of Arılı 33

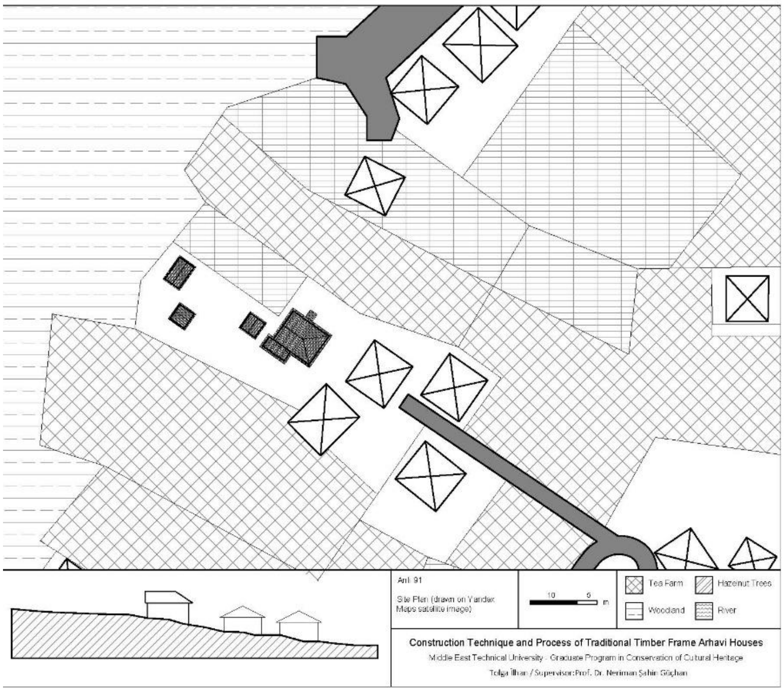

Figure 2.24. Site plan of Arılı 91

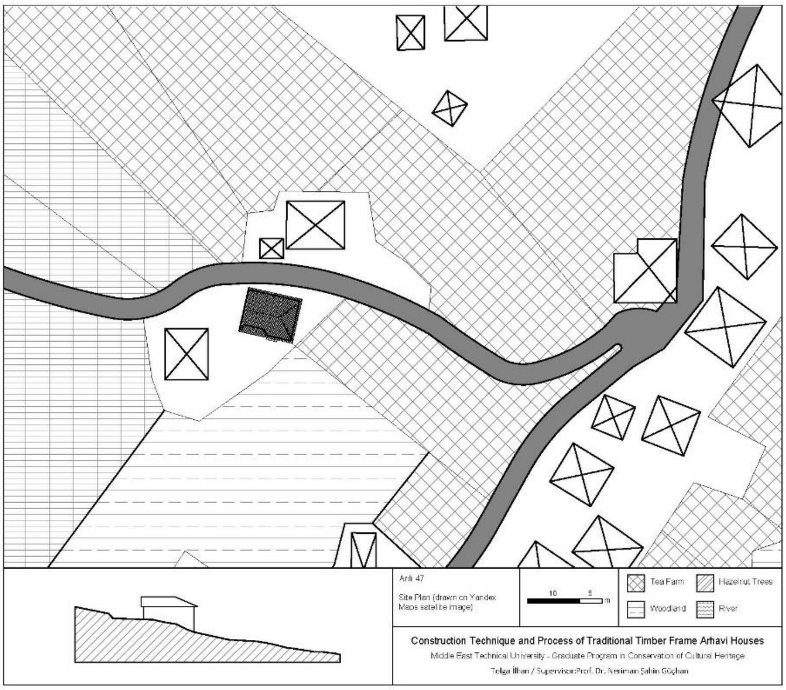

Figure 2.25. Site plan of Arılı 47

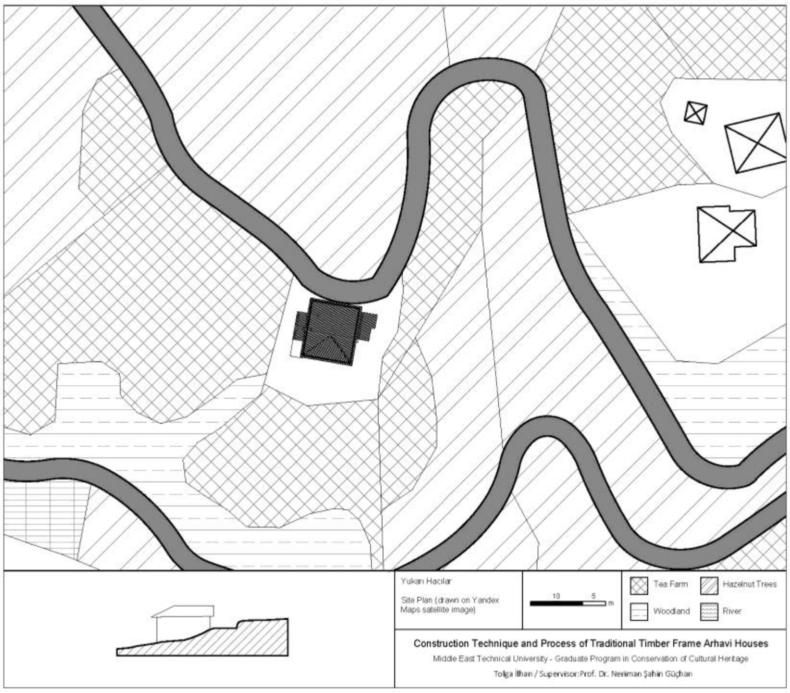

Figure 2.26. Site plan of Yukarı Hacılar

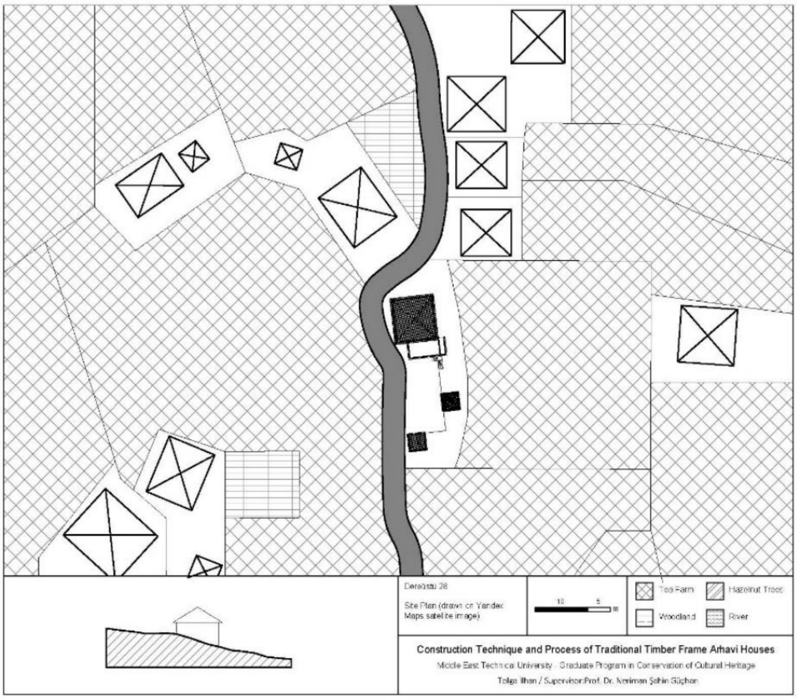

Figure 2.27. Site plan of Dereüstü 28

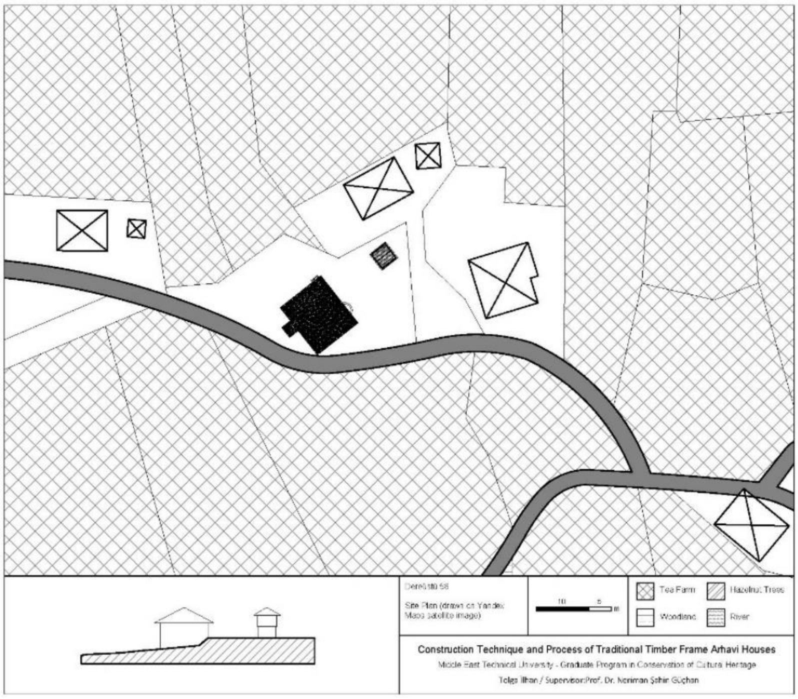

Figure 2.28. Site plan of Dereüstü 58

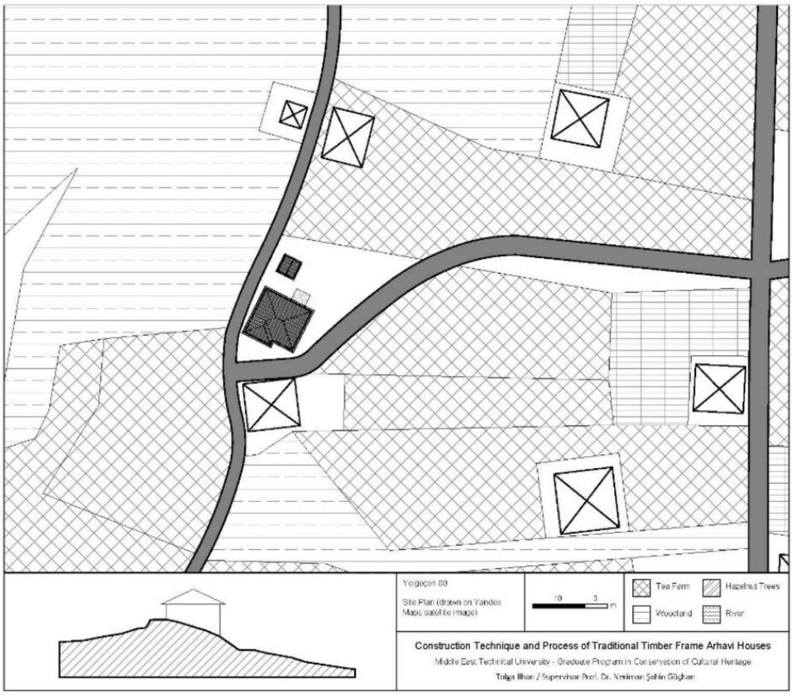

Figure 2.29. Site plan of Yolgeçen 80

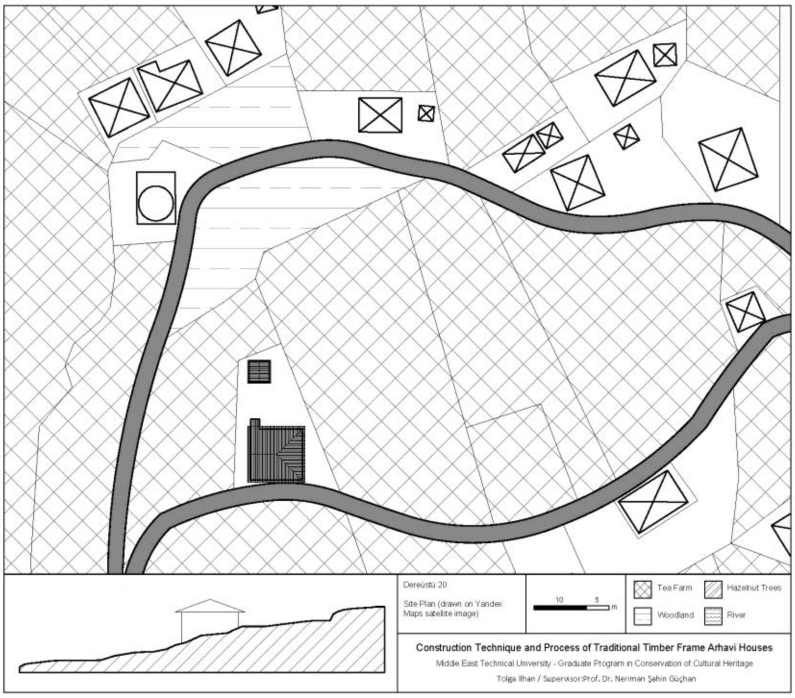

Figure 2.30. Site plan of Dereüstü 20

2.2.1.2. Built-up Spaces: The House and its Complementary Structures

Organization of the site and positioning of the building in traditional architecture are subject to rules defined by architectural culture, physical conditions and specific needs. Number, function and size of the structures and relations between them affect decisions while executing the traditional rules.

Traditional houses of Arhavi are shaped by conditions and activities brought by rural environment of the Eastern Black Sea Region. Rural residential architecture in the region consists of structures built for functionality and compatible with the climate, topography and environment. Production activities and daily life reflect itself on the schemes of architectural culture. The houses are complemented with additional structures such as barns, storehouses, ovens and uniquely serenders/nalyas.

In order to organize practical aspects of all elements and agents, the builder uses numerous tools. Orientation, position, space, form, material and color are variables with differentiating flexibilities that the builder must decide on.

The Arhavi household is organized freely in its borders, as settlements are strongly dispersed. Territory of the household surrounds or neighbors the house. Topography and plan define access to the agricultural lands. The house is the main mass and the center of the lot, and complementary structures serve the house. Today, most of the complementary structures are not needed. None of the houses studied had livestock or poultry as a traditional lifestyle in the past relied on for daily needs.

This topic will be discussed in two parts; the characteristics of house and complementary structures.

2.2.1.2.1. The House: Mass, Façade, Plan Features and Architectural Elements

Traditional Arhavi houses and their complementary structures display contrast with surrounding chaotic image of the nature in terms of forms. All buildings have a cubic form topped with hipped roofs. The straight lines and right angles dominate the form and plan due to ease of implementation and durability for the timber framework systems. The size and the scale of the houses follow a set of rules as compatible with the structural systems, the materials and the needs.

Location and Mass

All houses are situated on a sloped site. The slope defines the positioning and the orientation of the building. Ground floor and plinth walls create base for timber framework upper floor structure. Plans of the ground floors follow the slope of the building footprint. By this way, ground floors may adopt rectangular or L shaped plans based on the angle and the direction of the slope. The plans are defined by retaining walls with up to 100 cm thickness bordering the earth fill of the slope. These walls are built with rough stone, with a basic technique; however, they are thick and sturdy. Outer walls of the ground floor are 50 cm – 60 cm thick. These walls have better workmanship than inner walls.

Ground floors are not rich architecturally. These spaces are mostly used as barns and storage spaces. Comfort is not considered as much as living spaces on the upper floor. Heating and water insulation are not regarded. Wooden columns, beams, and soil is in open view as there is no aesthetical concern for this space.

Height of the ground floors vary between 2.60 m and 3.20 m in the studied houses. However, elevations of these levels may be longer or shorter as the levels of the ground indoors differ.

Upper floor plans always follow the lines of ground floor plans. There are no projections or balconies to break the unity of the façades. 50 cm thick stone walls of the ground floors expand to 10 cm timber framework walls. The plans and the major structural elements are always designed with straight lines and right angles. This results in clean masses that are rectangular prisms. This order may be broken with additions to the mass that are smaller rectangular prisms. These attachments to the main mass of the houses are mostly wet spaces and anterooms.

The roof structure is hipped with one side is half hipped or gabled. The later attachments to the main mass are covered with flat roofs. If the attachments are original, they have hipped roofs.

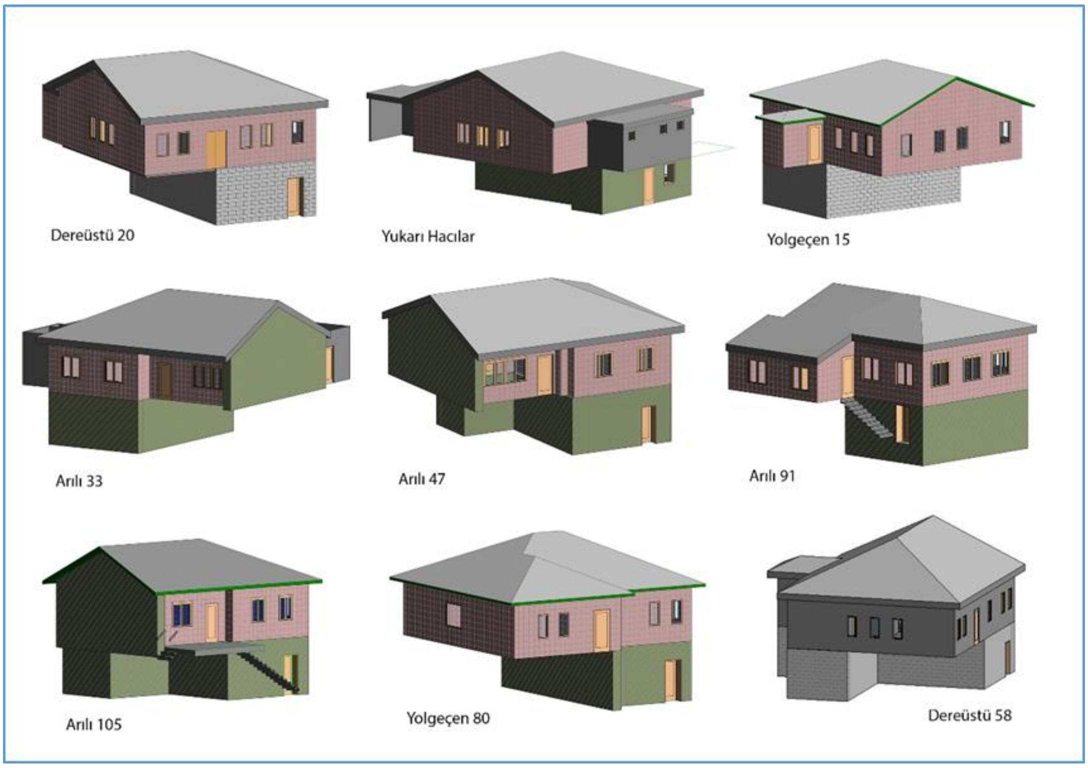

Figure 2.31. Mass models of the studied houses

Façades

The Arhavi houses are expressive and unique as their structures are exposed on their façades. The structure is integrated in the aesthetics of the buildings. In addition; the patterns of the walls define openings such as windows and doors, without disturbing each other, thus the structure integrates into the function. One cannot decide on the prominence; if the window is designed for the wall, if the wall is designed around the window, if the patterns are for the structure.

Ground floors are mostly built by stone masonry, while there are four types of first floor walls in the region: Dolma göz, Muskalı, Çatma, and Timber masonry. All these types rely on similar set of principles, plans, materials and details.

For clarity, the elevation on the lowest part of the slope will be referred as lower elevation, and the façade on the highest part of the slope will be referred as the upper elevation. Considering upper elevation is on the top, and the lower is at the bottom; side elevations are to be referred as right-side elevation and left-side elevation.

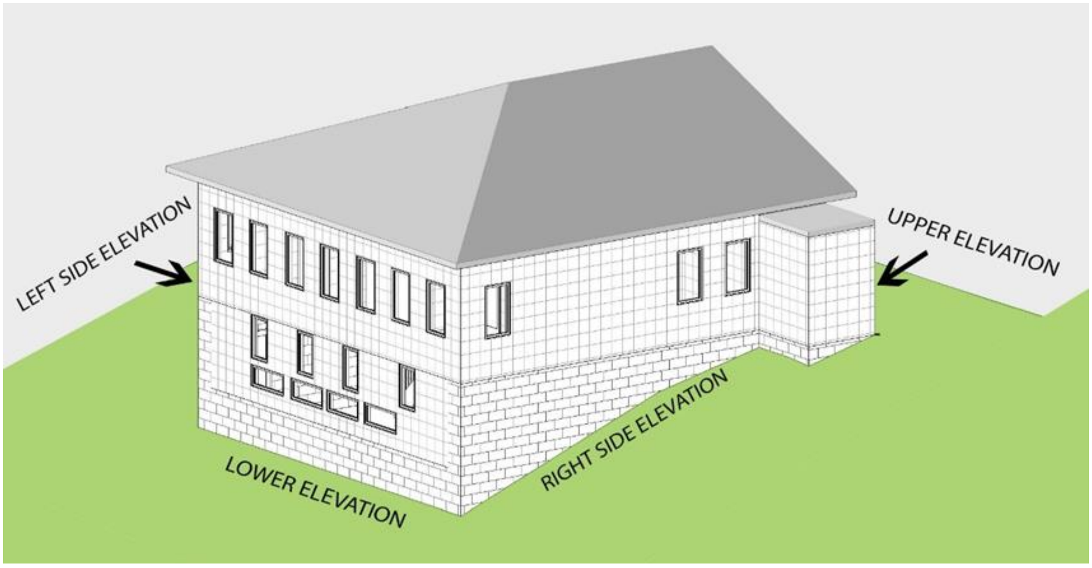

Figure 2.32. Alternative naming of the elevations that will be used in this study for clarity

Ground floor of the Arhavi houses projects itself on the side elevations and the lower elevation. This level’s walls are mostly cut-stone masonry, but on some examples, timber framework of the upper level walls may extend into this level up to 1 m height on the lower elevations. Windows for the lighting and ventilation are located on the lower elevations, while doors are mostly located on the side elevations. This levels' windows are usually smaller and fewer than the first levels'. There may be smaller openings or holes instead of windows.

Figure 2.33. Ground floor walls on the lower elevation of Dereüstü 20

The lower elevations are the highest façades of the Arhavi houses. They display the complexity of the structure with different levels. These façades have the highest number of windows and no disturbances, because they get the views to and from the down slope. The roof is always hipped on this side to drain water downstream.

The upper elevations consist of plinth walls, first floor façades, and gables of roofs. The roofs on these elevations are usually gabled. They differ in two variations. The first group has stone retaining walls with no openings as upper walls. Second group has plinth walls up to the timber plate beam. The first group's upper elevation walls might reach to the gable or rise until top plate beams. When the wall is cut at the plate beams, wooden elements or framework wall cover the gable. They start from the foundation and vary between 50 cm and 80 cm in thickness. The second group walls start with plinth walls with 50-70 cm thicknesses. Their outer faces are usually built with cutstone. The walls of this type have at least two windows. Their gables are covered with wooden planks or timber frame wall. These gables may have hips, half hips named “Sağrıcık”, and gables.

Retaining upper wall up to plate beam - Arılı 47

Retaining upper wall up to gable - Arılı 33

Upper wall with plinth half hipped roof - Şenköy 3

Upper walls with plinth - Yolgeçen 80 and Dereüstü 20

Figure 2.34. Upper wall types

Side elevations have less limitations compared to upper and lower elevations. The slope is observed on these elevations where plinth walls and ground floor walls show continuity in their construction technique. Plan organization of the upper and lower elevations does not permit entrances, toilets, and other possible attachments to the mass to be placed; therefore, they are put on the side elevations. Anteroom or the entrance doors are put closer to the upper part of the slope, where the elevation is at an appropriate level. The remaining level difference, due to the plinth, is solved with stone stairs. Buildings may have two entrances, one on each side. These façades always have windows.

On the Arhavi traditional houses, timber elements of the façades are left open to view without plastering. The fill materials of the framework may be plastered and strengthened with mortar if the materials are loose, such as small coarse stones. Plaster material is lime with no paint added, so the plaster color is white.

The pattern of the first floor is defined by the techniques that mentioned before: Dolma göz, Muskalı, Çatma, and Timber masonry. Other than these techniques brick masonry and stone masonry houses exist but they are not covered in this study as they are fairly unique. Dolma göz creates a grid pattern with square stone fillings that stabilized with mortar. Muskalı creates triangle patterns between timber posts with diagonal wooden elements. These triangles are filled with small stone fillings and plastered. Çatma technique covers all timber framework techniques by definition, still it is used to define stone filled and plastered technique with timber posts with 20-30 cm intervals. Timber masonry is locally named *Ahşap Çatkı*. Basic structural principles of this technique are similar to the other ones, except filling. Wooden boards are placed in between wooden posts and connected with joints at the end. This post and plank technique is used in partition walls in the houses and called *Taraba* or *Daraba*.

The windows of the first floor are usually one type. They are all timber sash windows with metal locks. Some houses have exterior timber shutters in addition to the windows. When glass was not common in previous times, timber shutters was used.

Plan

The plan schemes of the Arhavi houses are subject to rules and regulations brought by the architectural tradition. This tradition is shaped by physical conditions and cultural context of the region. The builder starts the design on an established plan scheme and modifies it to satisfy the particular family's needs. Variations in design stem from residents' lifestyle, while similarities by the architectural culture. Altogether; the building, mainly the plan scheme, is a response to requirements of habitation and activities.

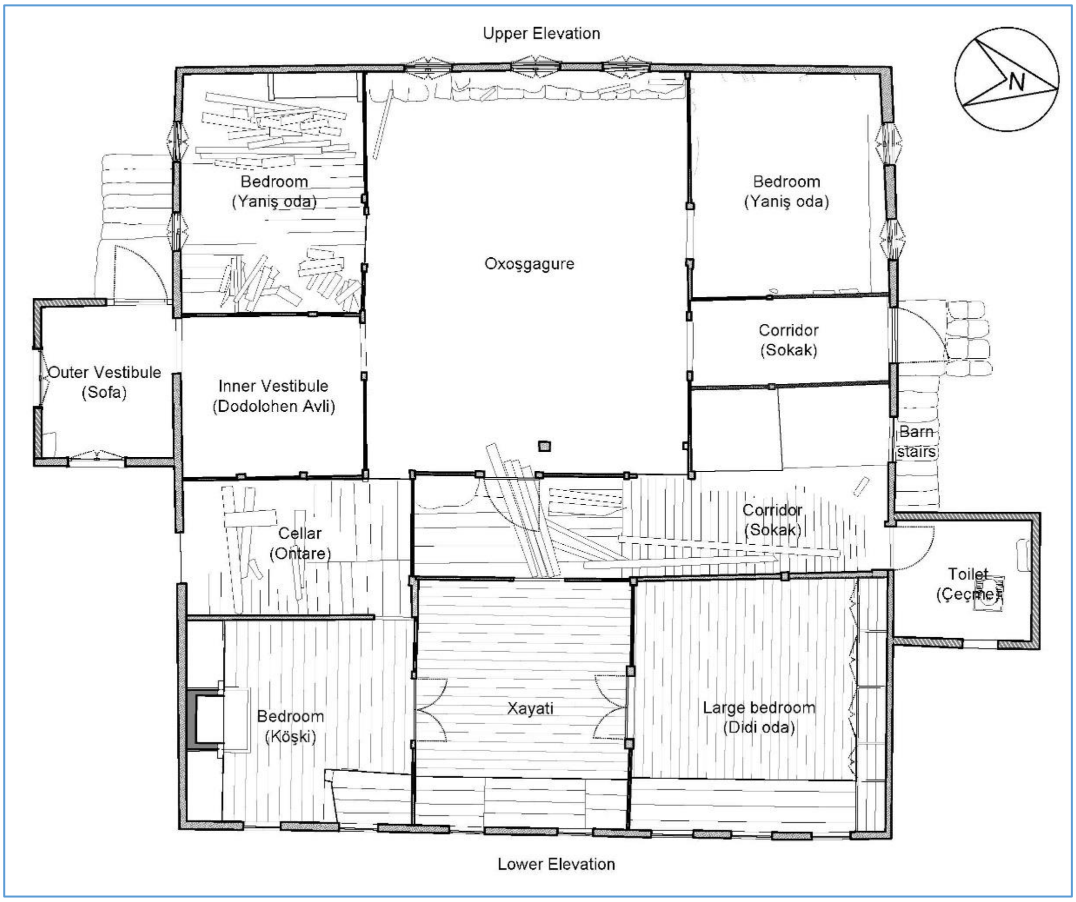

Figure 2.35. Plan Scheme of Şenköy3

To put the Arhavi house plan on a taxonomy; it can be classified as plan type with inner sofa (İç sofalı plan tipi) according to Sedad Hakkı Eldem (Eldem, 1954). Doğan Kuban classifies plans similarly, except the circulation space is named hayat if the space is open or sofa if the space is closed (Hayatlı plan tipi, sofalı plan tipi) (Kuban, Türk "Hayat"lı Evi, 1995). Orhan Özgüner differentiates this space as hayat or salon according to function and hierarchy. He classifies the plans seen in Arhavi as plan type with hayat and inner hayat (Hayatlı ve iç hayatlı plan tipi). Frankly; sofa is a meeting place for the people and a circulation element for the rooms. Hayat is the central point of the daily life, a place where the residents of the household meet, cook, eat and sit. Other rooms are accessed through this central room, sometimes through a secondary hayat. The literal meaning of the word hayat is life. In summary; sofa is an element of circulation that has activities embedded to it; whereas hayat is a space of sociality and production that also gathers and distributes movement around the house.

Arhavi traditional plan relies on two central spaces to organize circulation. One of them is Oxoşgagure, the heart of the house in Laz language. It is a large living room, kitchen, dining room and crossroads of other rooms. The ground of this room is compacted fine earth. This space is located on the upper orientation of the plan and is very close the ground level of upper elevation. The plinth wall may raise to form a stone seating platform, called *seki*. The open ceiling and the gable windows ventilate air, as open fire is used for cooking food heating. Another variation of Oxoşgagure has stone oven, cupboards and possibly a stone sink on the upper elevation. This variation has stone retaining walls due to oven and cupboard organization. A wooden cabinet covers the opposite side of exterior wall which is a storage for kitchenware and other tools. Due to its size, functions and hierarchy in the house, this space may similar to a hayat.

The timber cabinet in the Oxoşgagure has a regular door inserted in the center. It leads to another circulation space. This room is an anteroom that opens to two to four bedrooms, to a corridor of the toilet or to the backdoor of the house. It is located at the lower side of the house and has two or more windows. It is similar to the rooms it serves to in terms of size and architectural elements. The definition of sofa fits this secondary space as the discussion up to this point leads to it. Though there may be some conflict of terminology. The locals of the region name this room as Xayati, which is the word Hayat as pronounced in Laz language. Sofa is the name of the vestibule at the main entrance of the house. (Özçakmak, 2014). In summary, all these definitions do not fit the local traditional houses in Arhavi, as they exhibit out of type features in their spaces. In order to comply with the local terminology and prevent confusion; this study will adopt the local naming of the region.

Approximation of the plan scheme of a typical Arhavi house can be described as follows. Oxoşgagure and xayati divides the house on upper lower axis. Four to six bedrooms on average are organized around these spaces. Two of them are accessed through Oxoşgagure, the rest are from xayati. Xayati also has a narrow corridor leading to the secondary entrance and wet spaces of the house.

The entrance of the house is on the side elevation and reached by stairs. The rainy climate of the region requires a high and excluded access to the house. There are three solutions to divide the house and the physical conditions of the outside: outer vestibule, inner vestibule and porch. Outer vestibule is an addition to the main mass of the house. Inner vestibule keeps the transition space inside the main mass. Porch is any cantilever on the landing of the stairs that creates a transitional half open space. All three solutions are not exclusive to each other and may be seen together. The local name of this transition is sofa. However, it only serves between Oxoşgagure and outdoors as opposed to general definition of the word.

There may be single or two entrances in the houses. While the orientation of the houses is defined primarily by the slope, usually the entrances of the houses is oriented on the north - south axis. If there are two entrances, one of them is a secondary entrance, that leads to the serender and the backyard.

The vestibules lead to the oxoşgagure, the kitchen and the living room of the house. This is the largest space of the house, and the busiest in terms of circulation and function. Flooring of this room might be compacted fine earth or timber. Oxoşgagure has two bedrooms on each side and xayati at the lower side. The corridor to the wet spaces can divide the direct connection between oxoşgagure and xayati; or can be accessed through the xayati.

Another variation of oxoşgagure incorporates a stone fireplace instead of an open fireplace. This type of oxoşgagure also has a direct entrance and no vestibule. There may be a stone sink, and cabinets embedded near the fireplace. There are no timber cabinets between this and xayati. The flooring is timber boards except the stone base front of the fireplace. The light is much needed, because the upper wall has fireplace and cabinets instead of windows. Therefore, the exterior door and the windows of the oxoşgagure are on the same wall.

Ground floor is the barn of the household. The plan of this floor can be rectangular, or L shaped in reference to the slope. It is generally a large single space with makeshift custom partitions that are adjusted by the needs of the livestock. There is no direct connection between ground floor and first floor on the plan. Usually, both floors' one of the exterior doors are on the same elevation and connected by a set of stone stairs from the outside. The ground floor may have regular windows, smaller windows or just small openings.

Hierarchy of the bedrooms are expressed with different names. From most prominent to less prominent these are: *Didi oda, Köşki,* and *Yaniş oda's*. Didi oda and köşki are accessed through the xayati, while yaniş odas are on the sides of the Oxoşgagure. Didi oda and köşki may have fireplaces, timber cabinets, sekis, and hamams.

Similar to the plan scheme, the dimensions of the house and its rooms are standardized as well. A typical Arhavi house has a rectangular plan with approximately 10x10 m footprint, without the additional masses such as toilets, porches or vestibules. Oxoşgagure is 5x5 m, xayati is 3x5 m, rooms are 3x3 m, and the rest are corridors and vestibules.

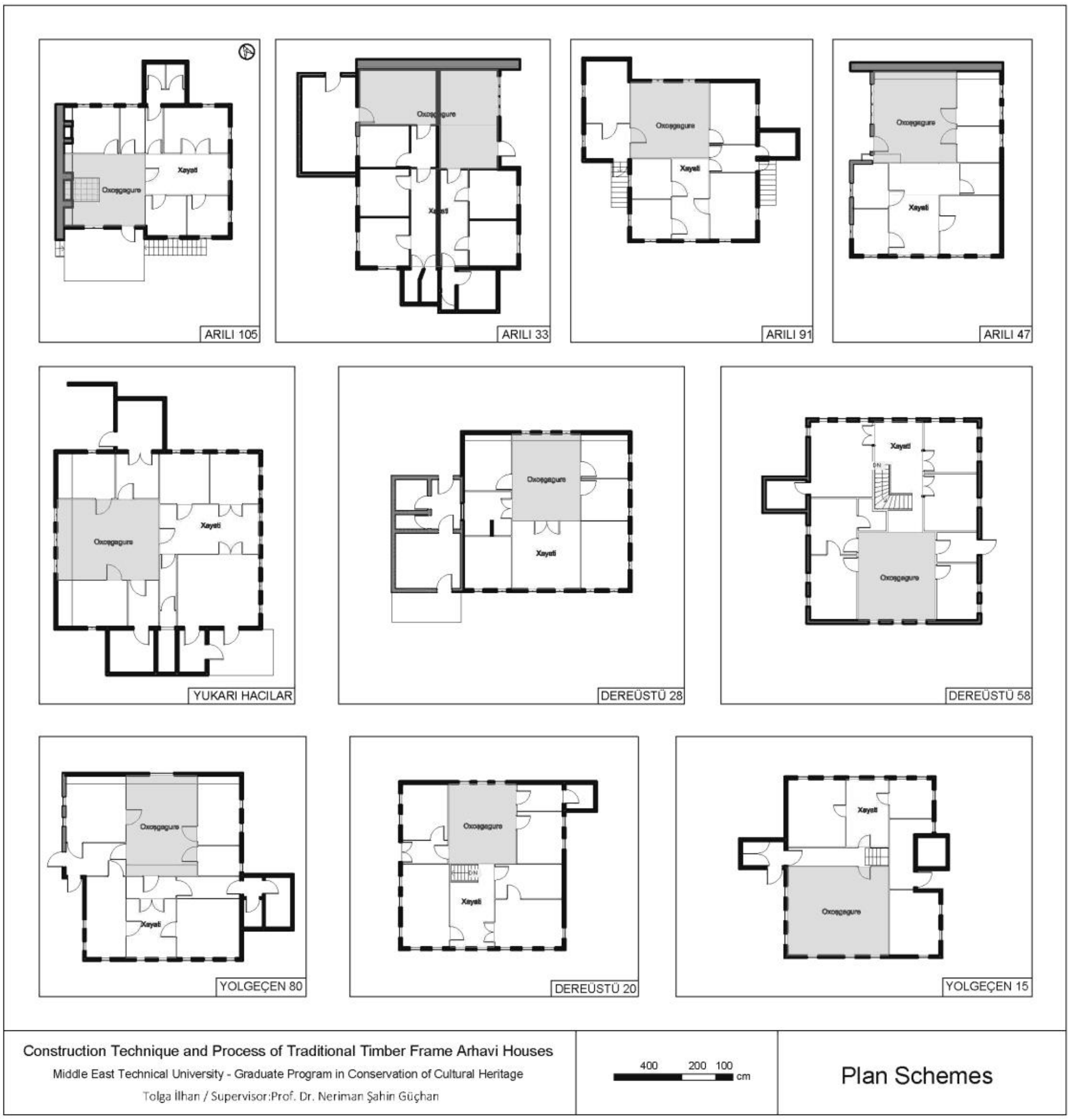

Figure 2.36. Plan schemes of the studied houses

Material

The Arhavi rural traditional houses are timber frame structures. The main materials that are used in the traditional Arhavi houses are stone and timber. Glass, metal, earth, and lime utilized as auxiliary materials.

General concept of the structure relies on post and beam systems. The connection details are done by joinery, without additional processes and elements. The wood used in the construction is needed to be easily workable, has to withstand external factors, and bear the load it has been given. The chestnut tree wood proves itself a suitable choice as it is durable, stable, workable, and rot resistant. The valleys of Arhavi hosts chestnut forests, which are selected by the builders according to size requirements and moved to building site.

Another type of wood used is the pine wood. It is softer and more susceptible to water damage than chestnut wood. On the other hand, it is more common, thus cheaper. Nowadays, in most of the interventions, pine wood is preferred due to economic reasons. State owned forests are protected by the Forest Law after 1956, and this made wood an expensive material for construction.

Use of timber starts in ground level as columns placed on stone bases and beams placed on stone masonry walls. Their barks are stripped, but they can keep their natural forms as logs in the ground floor. Other than this case timber is processed with axe, saw, and chisel. They may alternatively be sawn to 10-15-20 cm rectangle profile posts. The partition walls are made of timber posts and planks from chestnut tree wood. Timber posts define the corners and doors. Planks with 3-5 cm thickness are embedded into indentations of the posts. The roof structure is completely timber. In older times, the roof cover was timber too, which was named *hartama*. This practice was abandoned after the ban introduced in Forest Law of 1956, which made it illegal to get timber tiles from the state-owned forests.

The stone is used in masonry walls and framework infills. They are located in the foundations, the ground floor walls and the first-floor timber frame walls. The stone material is mostly taken from the riverbeds and shaped into required forms. A great range of sizes can be utilized. Big rocks can be used in the foundations and load bearing ground walls. Random shaped pebbles down to 5 cm size can be used as filling material in the framework. Cut stone is used in some parts of the building. These stones are cut with saws and chisels with varying workmanship.

Metal is used scarcely as it was a limited material and needed high workmanship at the time. Structural system involves no metal elements such as nails or plates. The flooring and the ceiling are nailed to the joists. The other metal components seen in the houses are hinges and locks on the doors, windows and cabinets.

Glass is used in the windows and cabinets. As mentioned before, glass is introduced in the last century to the region. Earlier on, timber shutters were in place of the sash windows. These shutters were closed at night and in winters. The sash windows seen today divide the glass in eight pieces. With separate smaller glass panes, it is easier to produce and maintain.

Earth and earth mortar are used as infill materials for the building site, as infill material for the timber frame wall and as flooring of the oxoşgagure in a compacted state. Lime is used in mortar for the timber frame wall and for whitewashing the wall surfaces.

2.2.1.2.2. Complementary Structures of the House

All of the 11 houses originally had serenders, yet two of them was demolished for new buildings. The plain grass areas that are near the serenders and the houses, and the haylofts if they exist; is a place of service. These empty spaces, which are called “harman”, are where the crops and agricultural products are gathered and dried. They are also spaces for social gatherings such as weddings and funerals.

Composition and orientation of these structures are almost always centered around the main structure, the house. The examples of houses this study has analyzed were all two-story structures. The house is where the life is led with social, production and other activities circles around. Thus, other structures are mostly complementary and serves the house. In order to understand lot and mass features, complementary structures must be understood.

Serender

Serender (serander, serendi, nalya) is an exclusively wooden structure elevated from the ground to dry, preserve and store food. They are carried by four, six or and rarely eight timber posts and have square or rectangular plans. They are designed to permeate air and repel water. Walls are built with single layer of wooden planks and gratings with unique patterns embedded in sections to provide airflow. Some variations incorporate weaved flexible wooden rods as floor sections to increase ventilation. Timber posts are capped by wooden or metal wheels. Also, upper floors are accessed through a ladder which is removed when it is not in use. By this way, the goods stored in the serenders are kept away from rodents.

These structures are seen throughout Central and Eastern Black Sea Regions. They vary in their techniques, sizes and names. The serenders in Arhavi are mostly smaller square structures. However, their workmanship is more detailed than their western counterparts.

A typical serender in Arhavi is built either on the ground or a stone base or occasionally a stone foundation level open on one side, that can be reached from lower side of the slope. On top of the base, joists are placed and connected as bottom tie beams. Four, six or eight timber columns are placed and fixed on joists. Columns and joists are strengthened with diagonal struts. Wooden round capitals are placed on top of the columns to prevent rodents from climbing to upper floor.

Upper floor is constructed starting by placing primary beams on columns. Secondary beams support wall plates and flooring of the first level, while smaller tertiary beams may be used to strengthen some floor sections. In general, the floor is built with wooden planks. As said before, some variations incorporate sections of the floor that have fixed rods instead of planks, which are later weaved with flexible wattles. Upper floor walls are constructed with planks which are embedded in each other with U shaped notches at the corners. Bottom planks are fixed on tie beams. There might be additional posts at doors and any intervals of the wall to support roof. All beams, posts and planks are connected to each other by joints and notches to inhibit lateral movement. Roof plates are directly put onto plank walls and posts.

Roofs of the serenders may be gabled or pyramid hipped roofs. Eaves are closed but the roof is exposed inside the serender. The roof structure is often supported by three beams. Middle beam is the bottom chord that carries the king post. Rafters are assembled according to the roof type. Superstructure is kept basic in serenders. If the roof covering is metal sheets, they can be nailed onto rafters. On the other hand, tiles and wooden shingles (hartama) necessitate battens. Nowadays, metal sheets are used due to their ease of installation and low maintenance needs. Tiles are not preferred owing to costs, and wooden shingles (hartama) are prohibited for environmental reasons.

Serenders in Arhavi have half open decks reached with the ladder as transition spaces for the door. They may be built by extending primary floor beams by 1-2 meters. Wooden posts are placed between the roof beams and floor beams at this cantilever.

Serender is an essential part of the Arhavi house. All 11 of the studied houses originally had serenders. Two of the 11 serenders has been demolished for new buildings for the household. Today, they are not fully utilized as food storages as there are better ways to accomplish their functions. Still, they are used as storages for alternative goods.

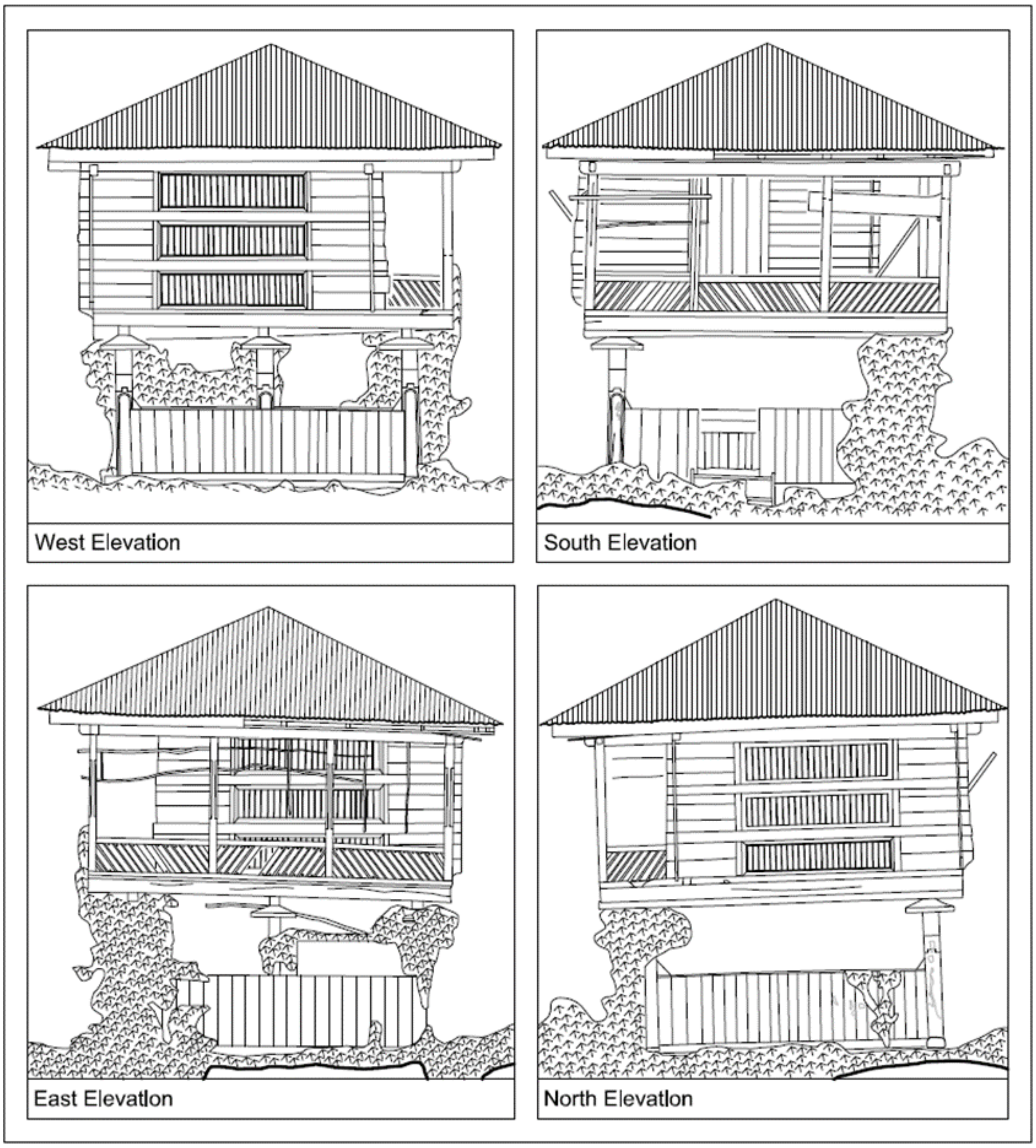

Figure 2.37. Elevations of the serender of Şenköy 3

Figure 2.38. Serender of Şenköy 3

Figure 2.39. Serender of Şenköy 3, floor details

Hayloft (Merek)

Merek is a broad term to define spaces to store hay. Unlike serender; merek refers to the function, not the structure. They may be separate structures, as well as spaces in other structures such as attics of the barns or lower floor of the houses. These spaces are basic timber structures when they are separate buildings. The examples in Arhavi are timber frameworks covered with metal roofs. Still they are very rare. The people in Arhavi used to store them in ground floors of their houses.

Figure 2.40. Haylofts and Serender in Arılı

Barn (Mandre)

Neighboring regions have hayloft-barn timber buildings, but Arhavi does not. Lower floors of the houses were used as barns for animals. This use was convenient, because body temperatures of the animals would heat the house and proximity to the barn was convenient. On the other hand, entrances of the houses and the barns are always adequately distinct. Today, animal husbandry is abandoned in the region, therefore ground floors are used for other purposes.

Water Fountain (Çeşme)

The Black Sea Region is rich in water sources. Fountains would provide clean water to every house group, at a walking distance. Single houses had their own fountains. They had compartments to provide water to livestock. In the last century, houses were donated with water and plumbing, so these fountains have dried due to redundancy.

Figure 2.41. A water fountain in Arılı

Oven (Fırın), Hearthstone (Ocaklık)

Fırın is a stone vault structure built to serve a house or several houses in the vicinity. These ovens are used for baking bread, cooking, and drying food. They are made of rough-cut stone and closed with a wooden door. This door may be sealed with mud for drying process.

Ocaklıks are open fireplaces arranged with stones. These are bigger than ocaks in the houses. They are used for preparing jams, pastries, and other preserved foods for winter.

Today these units no longer exist as there are modern alternatives in the houses.

Toilets

In some areas of the Black Sea Region, toilets are separated from the houses. In Arhavi, toilet is a smaller mass embedded into the main mass, which is placed near a secondary entrance and accessed through a corridor. Nowadays, the toilets are mostly reconstructed with reinforced concrete and modern sanitation systems.

Distance between the house and the serender changes between 2 m and 10 m. On the other hand, haylofts can be located further up to 30 m at the other and of the harman. When the lots get limited and smaller in collective settlements and sloped areas, the distances between complementary structures decrease.

Other than the harman; the half open spaces under the serenders, the spaces between houses and the serenders are places of production. At least one entrance of the house opens to this space. Fountain for the animals and the household, oven and hearthstone (ocak, ocaklık) for cooking, and mortar and pestle (*dibek taşı*) for grinding are located around this center of circulation.

Half open spaces under the serenders provide shelter from the rain. In the region with the heaviest rainfall of the country, this space serves a prominent function where the daily activities can continue, or things can be moved in to keep them dry on rainy days.

Consequently, the organization of the lot of Arhavi traditional household shows openness without the concern of privacy. Unlike its urban counterparts in Anatolia, they do not have closed courtyards or rigid borders.

2.2.2. Daily Life and Functional Distribution in Rural Houses of Arhavi

The life at the rural Arhavi region projects itself on the architectural culture. The plan, the materials, the elements, and the quality and quantity of spaces are inclusive of the local culture. The daily life is distributed between the house, the supplementary structures, the yard and the agricultural land.

The house covers most of the functions for the household, such as accommodation, production and socialization. The ground floor is the barn; where the livestock is raised, and the hay is stored. The first floor or the upper floor is the house. The house and the barn are in the same structure, but they are adequately distinguished with their level differences and entrances, at the same time connected with a set of stone stairs.

The serender is a place of storage and production. The grain and canned food are stored in it, also some tools such as stone hand mill. On rainy days the half open space under the serender could be a shelter from the rain.

The size of the household in the region is crowded compared to today's standards, with residents belonging to three generations. The number of rooms are decided with the number of the residents. The bedrooms are put around the central axis of Oxoşgagure and xayati.

There is no separate space for kitchen, as the oxoşgagure is used for cooking with its fireplace. The open fireplace is called *keya* in the Laz language. The ground of the oxoşgagure is compacted fine earth, at least partially to cover the *keya*. Some of these open fires may have stone bases. Boilers or pots are placed on the fire by hanging with chains or by putting on an iron trivet.

Oxoşgagure is also the dining room. Meals were eaten while sitting around a big round metal tray, which is elevated on a portable wooden base. Later, tables and chairs are used. The fixed timber cabinet in the oxoşgagure covers the whole length of the oxoşgagure-xayati wall. It is used for storing kitchenware, lamp oil, cleaning materials etc. The flat surface on the cabinet is used for drying and storing food. Oxoşgagure is the living room. Open fire heats the oxoşgagure, making this room a comfortable place to reside. The ceiling of the oxoşgagure is open to let the smoke out through ventilation windows. Still, the timber walls of this room are darkened with the smoke exposure.

The other variation of oxoşgagure has stone fireplace and no vestibule. Chimney does the work of the open ceiling, so there is a regular ceiling. In this type of oxoşgagure, there is no timber cabinet on the xayati wall. The timber cabinets on the sides of the stone fireplace are used similarly to the previously mentioned cabinet. Still, the function of the oxoşgagure is the same.

Xayati is used as a transition space to the bedrooms and the toilet corridor. These rooms are sometimes closer to a corridor or another bedroom in terms of shape and size. Xayatis are multipurpose spaces. They may function as a sitting room, or food drying space, storeroom, bedroom etc. Due to the activities they contain, xayatis are secondary oxoşgagures but cleaner. There is no fireplace and it is not used as a kitchen compared to the primary oxoşgagure. In recent cases, the wall between the oxoşgagure and xayati is removed, modern kitchen systems are added to the oxoşgagure, the whole axis of oxoşgagure-xayati is used as the kitchen and living room.

Bedrooms slightly differ in size and quality. The rooms may have timber cabinets, fireplaces for heating and built-in timber seating elements named *seki*. The cabinets are used as wardrobes for clothing and bed items. Hierarchy of the bedrooms are expressed with different names. From most prominent to less prominent these are: *Didi oda, Köşki*, and *Yaniş oda's*. Didi oda and Köşki are located on the lower section of the house and reached from the xayati. (Özçakmak, 2014) These rooms occasionally have timber-glass cupboards, ornated ceilings, sunken baths, and better views of the topography. The rooms in the upper half of the plan that are reached from oxoşgagure are named Yaniş oda. These rooms are less prominent and simpler. These rooms are connected to oxoşgagure, thus warmer. Through this hierarchy, the rooms around the xayati on the lower half of the plan belong to elders, parents and guests.

The sunken baths, that are named hamam, are located in either Didi oda or Köşki. These baths are reached by lifting timber cover on the floor. They are hidden under the cover, not to be seen when they are not in use. They are approximately one meter deep; built with stone, brick or timber planks and plastered. These rooms, also hamam, correspond to barn and its inner retaining wall on the ground floor.

The secondary entrance and the toilet are accessed by the corridor from the xayati. This entryway is an optional feature of Arhavi houses. It is located on the opposite side of the main entrance on the plan and serves as a direct connection between the house, and the backyard and serender.

Toilets are located on the opposite side of the main entrance. The toilet is an additional mass to the main mass and accessed through a corridor from the xayati. By this way, the smell is kept away from the house. The lavatory is built with stone slabs, and a hole left open with appropriate size to drain the wastewater. And the rest of the floor surface is plastered. This system is pretty modern for its time.

The water source for the houses is water fountains. The Black Sea region is rich in terms of water resources. Thus, every household can easily have their own water feed. In later times, water has entered the houses with the introduction of plumbing systems. Originally, water was taken with cans and moved where it is needed. Some water fountains also had basins for animals to drink. For bathing, the water was heated on the fire and taken to hamam in the rooms.

The curtilage of the house, the harman, the serender and all the space in between are a part of daily life. The day of the rural resident is always occupied. Cattle are taken to pastures to everyday and their milk is a daily need. Tea and hazelnut are sources of income. Corn is grinded to make flour, which is used for bread and meals. Numerous fruits and vegetables are picked, processed, dried, cooked, made into jams and preserves. These activities create a constant connection and circulation between the house, serender, the proximity of the house, and the adjacent agricultural lands of the household.

2.2.3. Case Study: Bilgin House in Şenköy

The Bilgin House is located in Şenköy with the door number 3, at the coordinates of "41.318310, 41.338470". As a case of this study, the Bilgin House was documented extensively. It was scanned with 3D laser scanner, drawn and documented in detail. It will be discussed as the main case study of this thesis.

It is unoccupied at the moment, as the family it belongs to no longer lives in the village for decades. It has a serender, a water fountain, agricultural lands of hazelnut, tea and vegetables. The house had raised livestock as it was common practice of in rural areas of the Black Sea Region.

The house has oxoşgagure, Xayati, four bedrooms, a toilet, inner and outer vestibules, and two entrances. The ground floor is a single space that was used as a barn. Outer vestibule and the toilet are later additions.

The main entrance is on the outer vestibule, which is reached by stone stairs. The outer vestibule leads to the inner vestibule, and that leads to the oxoşgagure. Oxoşgagure has two rooms directly connected to it and remains of a timber cabinet. The oxoşgagure leads to two corridors. One of them is the second entrance. This entrance looks to the serender and its stairs lead to the ground floor. By this way, a direct circulation between curtilage and the ground floor of the house is generated. The other corridor divides the oxoşgagure and the xayati. This corridor leads to the toilet and storeroom. This is a rare alternative to direct relation between the oxoşgagure and xayati. Usually the toilet corridor is reached through the xayati. Still, this disengagement is miniscule as the xayati is located right across the corridor. The xayati leads to two architecturally rich bedrooms. The lower wall has a timber seki following all three rooms. The room on the right has a fireplace, the room on the left has an ornamented glass cupboard. The xayati is very similar to these bedrooms in terms of size and character. However, the circulation of the bedrooms passes through here, thus differentiates its quality. This space had social and recreational functions.

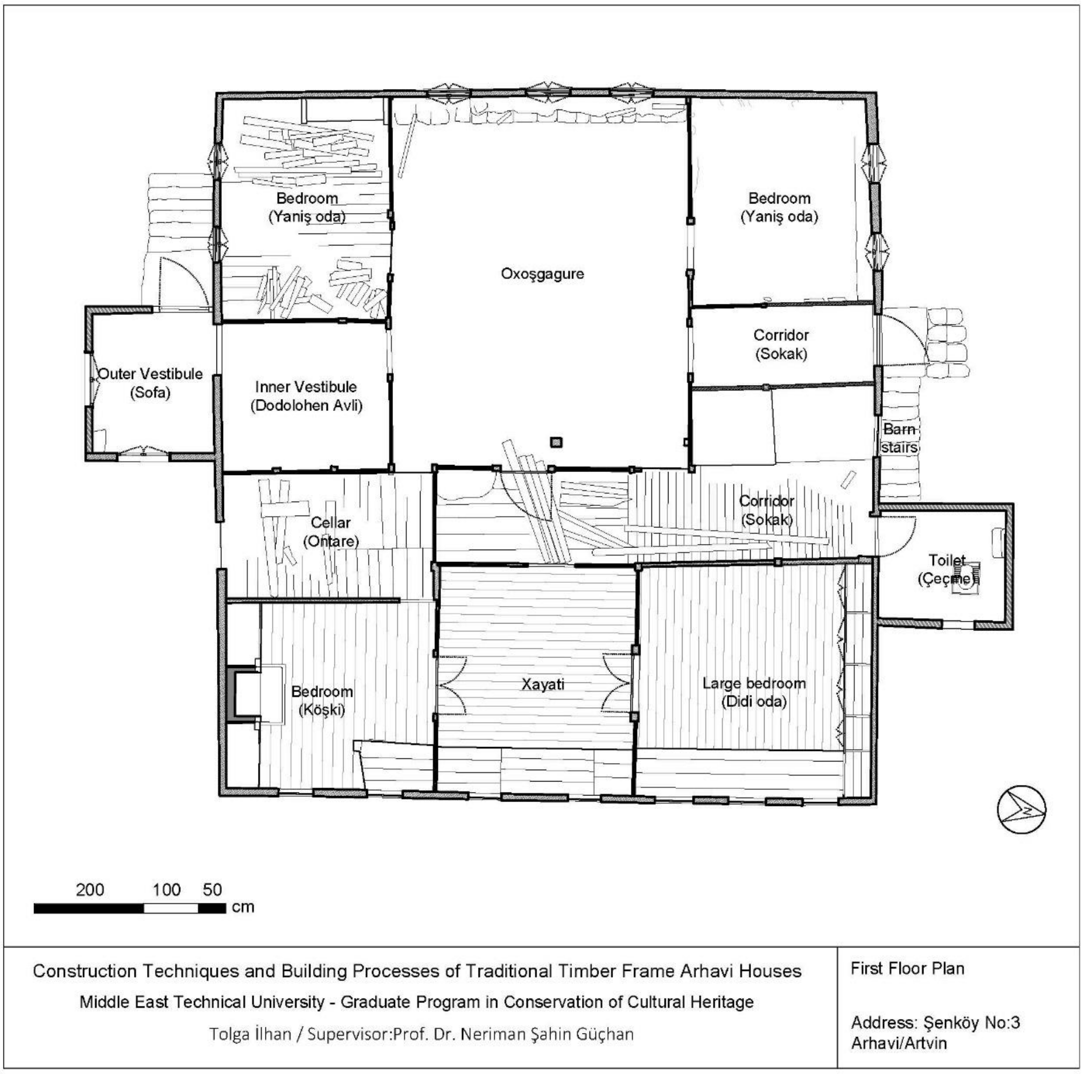

Figure 2.42. First floor plan scheme of Şenköy 3/Bilgin House

Oxoşgagure (Central Space/Hub)

The oxoşgagure space has dimensions of 4,85x6,00 m with an area of 29 m^2. The ceiling height is 275 cm. As all oxoşgagures of the Arhavi houses, this space is the central hub of the daily life. It is where the cooking, eating, production and other daily activities happened. It has an uncovered earth ground. This is a quality of open fire (*keya*) in the oxoşgagure. Later, the ground is covered with a cement layer, but it is mostly broken today. The walls are blackened due to smoke, as it still can be observed. Some of the windows are missing but they have the profiles of sash windows. Three windows on the oxoşgagure wall are double casement windows as opposed to the norm sash windows, but they are embedded in the original opening as a sign of alteration.

Figure 2.43. Panoramic photograph of the north and east walls of oxoşgagure in Şenköy 3

Figure 2.44. Panoramic photograph of the south and west walls of oxoşgagure in Şenköy 3

The timber cabinet of the oxoşgagure is removed except some planks, wooden posts and beams. It was 225 cm high as its remaining skeleton suggests. There are three doors embedded in the cabinet (see Fig. 2.24). There is a stone seki on the upper wall, which is built on top of the plinth wall. It is 45 cm high and 45 cm wide, following along the exterior wall. The exterior dolma göz wall is plastered, not covered with timber planks. The ceiling is distinctly different and newer compared to all other rooms. It is made of pinewood laths. This is a sign that the ceiling was open as it should be in the oxoşgagures, which is built later.

Sağ Yaniş Oda

Yaniş oda on the left side (the main entrance side) is transformed into a kitchen with the added kitchen cabinets, sink and stove place. This was needed at all houses after the rural lifestyle has changed. This intervention is seen all houses, mostly in one of the rooms directly accessed through oxoşgagure. The upper wall is plastered as it is continuation of the same wall from the oxoşgagure. This wall has a stove pipe vent, kitchen racks and a sink placed on. The ground is partially covered with cement, where the kitchen stove is placed.

This room has dimensions of 3,70x2,70 m and it is 275 cm high. It has windows with iron guards and shutters. Today, the windows are missing but the frame detail shows they were sash windows.

Sol Yaniş Oda

The other yaniş oda has an uncovered earth ground similarly to oxoşgagure. The upper wall is heavily plastered. The yaniş odas are theoretically bedrooms, but their direct relations with oxoşgagures have many potentials. Original wooden flooring and a section of the wall covering are most likely removed later.

This room has dimensions of 3,30x3,00 m and it is 275 cm high. It has missing sash windows, but intact iron guards and shutters similarly to the other yaniş oda.

Corridor (Sokak)

This space is reached from the oxoşgagure with three separate doors embedded in the oxoşgagure cabinet. It is an anomaly compared to typical plan scheme of an Arhavi traditional house. Xayati is separated from the oxoşgagure by this corridor shaped sofa. It is 150 cm wide and 7,20 m long. The plan is divided by this corridor except the cellar room at the south end. The north end of the sofa leads to the toilet and widens to 2,80 m.

Xayati

The xayati is the circulation space for the two bedrooms. The xayati of the Şenköy 3 is somewhat different compared to the other houses. The function of this space is more flexible. It has the same sizes and qualities of the bedrooms, köşk and didi oda, it serves. The timber seki here is a seating element and a bed. It is 40 cm high and 100 cm wide. In addition to the circulation, this space is a backup bedroom. Two doors on the sides are double-wing doors with 105 cm wide and 200 cm high openings. The Xayati has dimensions of 3,80x3,20 m and the ceiling height is 280 cm. This space has two windows on the lower elevation. But these windows are missing too.

Köşk

This room is a bedroom with a stone fireplace for heating. There are wooden cabinets on the both sides of the fireplace. The flooring is timber planks but there is a stone base in front of the fireplace as a protection against fire hazard. The double-wing doors leading to the xayati, and the doors across it leading to the didi oda means the heat from the fire could be distributed along these three bedrooms.

The dimensions of the room are 3,50x3,10 m including the fireplace and the cabinets. The ceiling height is 2,60. The room also has a door leading to the cellar space in addition to the double-wing door from the Xayati. There are two missing sash windows, with only their frame left.

Didi Oda

Didi oda is the biggest bedroom in traditional Arhavi houses, as well as in Şenköy 3. It has dimensions of 3,80x3,80 m and is 270 cm high. It has a timber and stained glass cabinet that covers the northern wall of the room. The timber seki in the xayati and köşk rooms also exist in this room. The ceiling has a square recessed tray ceiling in the middle with the dimensions of 150x150 cm. There are three windows in this room, as many as oxoşgagure. Thus, this room is clearly the most valuable room of the house. These rooms were reserved for the guests according to sources (Özçakmak, 2014).

Cellar

The cellar is used as a storeroom for dried foods. It has shelves and racks for storing containers and jars. It is the smallest room in the house except vestibules, with the dimensions of 3,40x2,00 m. It has a window that was replaced incompatibly. The cellar is reached through the oxoşgagure and has a door leading to the köşk room.

Vestibules and Entrance Corridor

Vestibules and entrance corridors are transition spaces that always lead to the oxoşgagure. There is an outer vestibule in Şenköy 3, built with cement bricks at a later date. The base of the outer vestibule is the landing of the original stair. The windows and the door on the outer vestibule are not original as the addition itself. The inner vestibule and the corridor belong to the original plan. The faces of exterior dolma göz walls in the vestibules and entrance corridor are not treated, because these rooms are not living spaces.

The main purpose of these spaces to divide mud and dirt of the outside from the house.

Ground Floor/Barn

The ground floor has two purposes; defining the plan of the first floor on the slope and structurally supporting it. They were used as barns, haylofts and storerooms. Thereby, aesthetics is not a concern. The walls are not plastered, and the ground is not treated.

Structural system is open to view and vertical structural elements pierce the plan. This is not a nuisance due to the function of the space. The ground floor walls are stone loadbearing walls that have approximately 50 cm thickness. The thickness of the interior walls increases as they act retaining walls for the earth infill. This wall is also coarser than the exterior walls. The exterior lower wall is not a fully masonry. It is around 10 cm thick and contains wooden elements. The technique is structurally in between the masonry and the timber frame walls. The stones in the frame are single row of infills. The cause of this is the need of big openings.

The window openings are framed with additional support provided by these beams. The cornerstones are bigger cut stones, while the other parts of walls are built with rough stones. On the interior side of this wall, has a 40 cm thick and 1 m high support wall. Short support walls are a common practice that will be mentioned in the next chapter, but this is a different implementation. The outer 10 cm wall is built separately with the inner support wall.

There are two doors and five windows on the ground floor. Two of the windows are as big as the sash windows of the first floor, and three of them are smaller. The small ones have timber guards instead of glass windows. These guards are timber rods that are connected to each other with corresponding holes on the vertical rods. This type of guards is called *lokmalı parmaklık* in Turkish.

The first floor is supported by 10x10 cm wooden posts and beams. The timber posts have stone and cement bases to distribute downward forces on the soft earth ground. The posts are not perfectly aligned with each other. In addition to the posts, three layers of beams does not intersect with regularly. Some of them are put in half indentations, while some are forced and put onto each other. All in all, the posts and beams are roughly processed and built, as long as it is trivial for structural system and aesthetics.

Upper half of the plan is carried by stone plinth walls. Joists and beams placed onto the ground floor and walls and plinth walls. By this way, the upper structure is carried

The construction technique of the first-floor walls is Dolma Göz. The walls are 10-12 cm thick. From down to up, the wall starts with double tie beams that also act as bottom plates. The joists are locked between the double beams. Then the flooring planks are nailed to the joists. The wall starts with wooden posts at the corners and intervals. In between the posts, smaller posts are added with 20 cm intervals. 3 cm thick sticks are put in the indentations that are carved to smaller posts. Roughly cut square stones are placed in these squares and leftover spaces are filled with lime mortar. This technique creates a grid pattern. The windows and the doors are located in this grid pattern with appropriate openings.

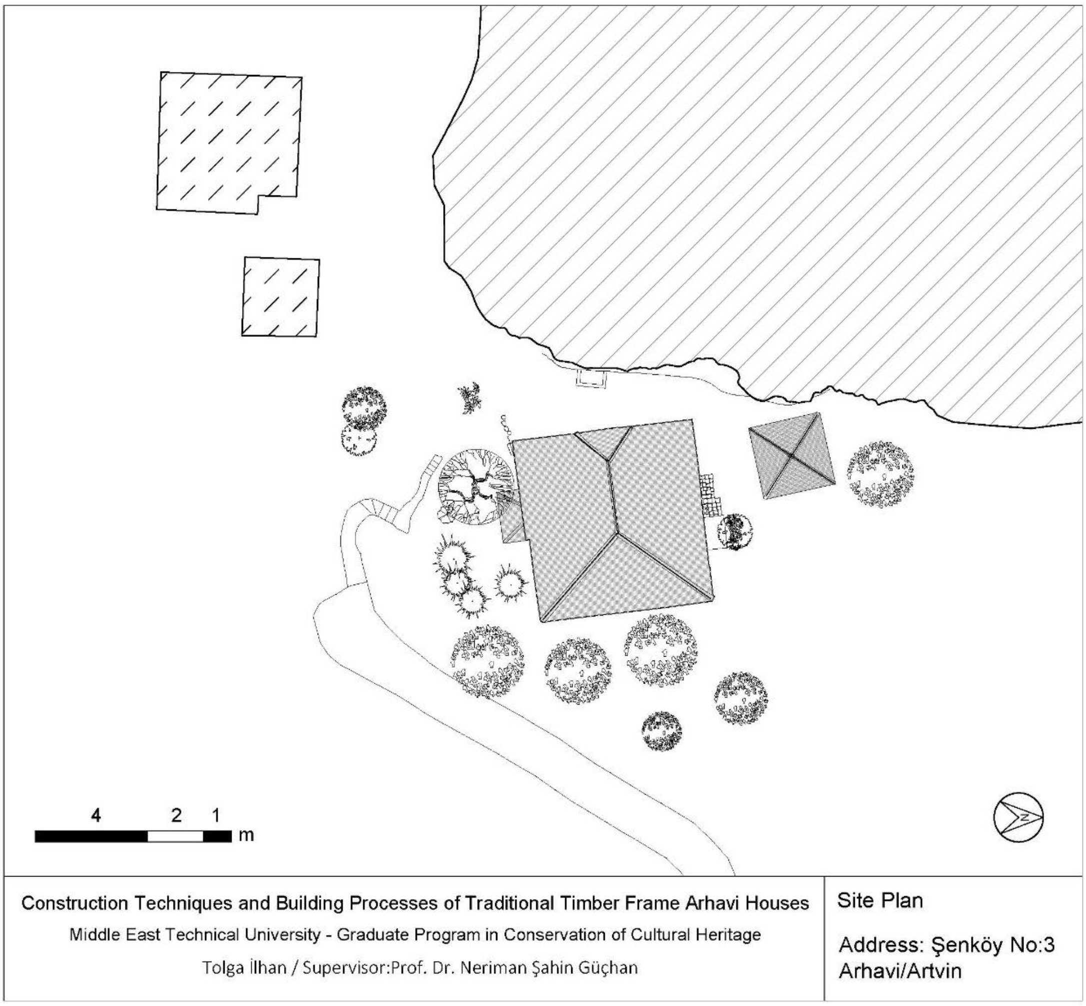

Figure 2.45. Site plan of Bilgin House and surrounding structures.

CHAPTER 3

CONSTRUCTION TECHNIQUES OF ARHAVI HOUSES

The Eastern Black Sea region has unique architectural interpretations depending upon its distinctive tradition, geography and nature. Regional characteristics of the area both share with and differentiate from each other in the local scope. In this regard, Arhavi hosts numerous examples of qualitative variations of traditional Black Sea region residential architecture.

This chapter aims to define architectural and structural features of the houses of rural Arhavi houses. For this, 11 houses are surveyed by photographs, sketches and hand measurements; while one of them was measured with a 3D laser scanner; to gather data to create the drawings buildings and especially the sections defining construction techniques. 1 of the houses, that is laser scanned, is drawn and documented in every detail. 10 of the houses are photographed and measured by hand. 4 of these buildings are in Arılı, 3 of them are in Dereüstü, 2 of them in Yolgeçen and one each in Yukarı Hacılar and Şenköy.

These measured sketches of the spaces and structural elements were used to create plan and system section drawings. These system sections are classified for changes between the transitions of the systems. The coding system in Filiz Diri's thesis was used to define a code for each of the transition details (Diri, 2010). The techniques seen in foundations, ground floors, first floors and roofs were classified separately, and given codes. To examine the features of the construction techniques and the relations between them, a table was prepared with the studied cases.

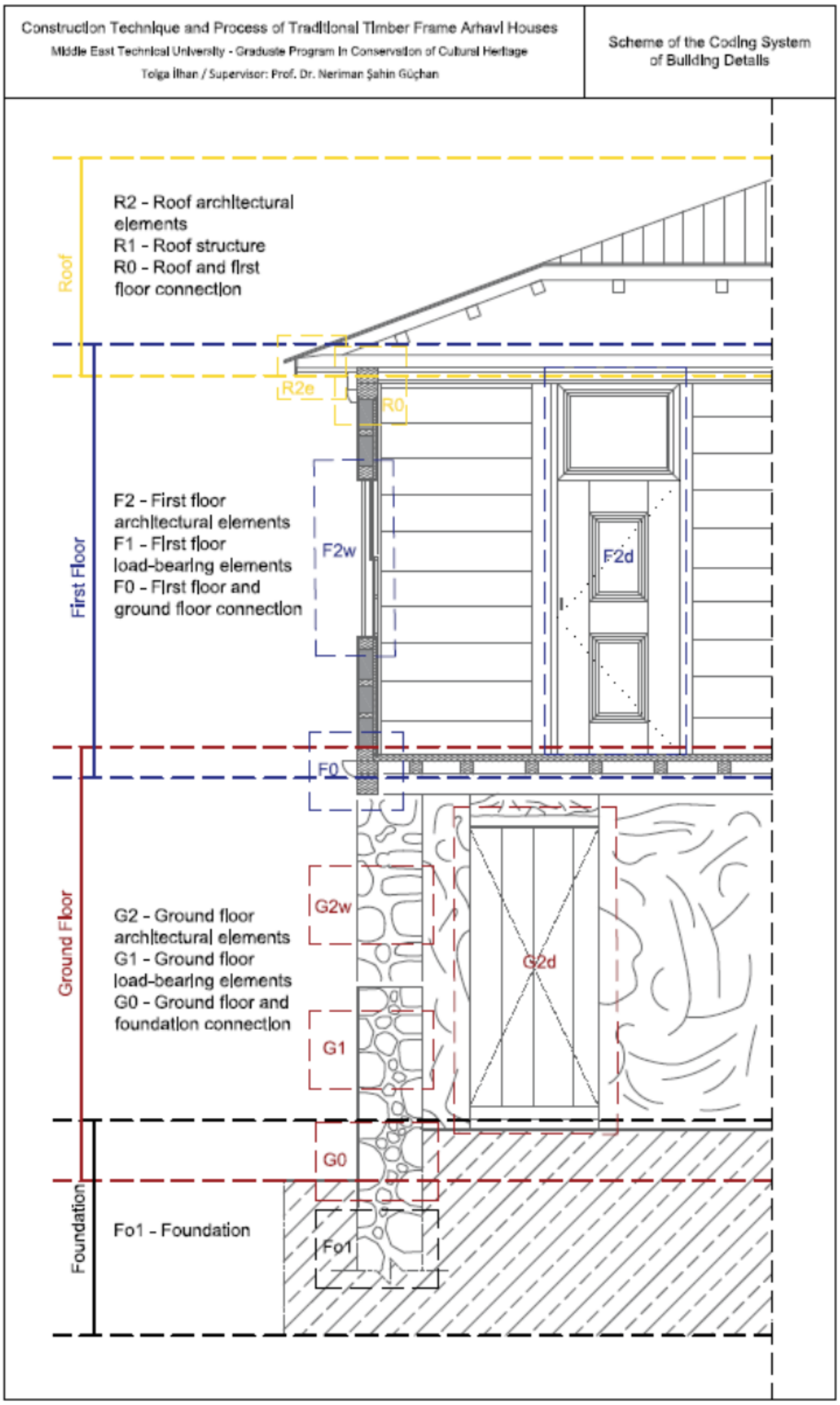

Figure 3.1. Scheme of the coding system of building details

3.1. Foundations

Traditional Arhavi houses are always located on sloped ground. This is a necessity due to the inclined topography of the region. On the other hand, some households have sufficient plain area for construction around the house, such as Dereüstü 58, Arılı 47 and Arılı 91. These houses still use the sloped ground in these cases, not the plain areas. The plains are used as agricultural fields.

There are two different reference levels for the foundations due to the dual design as a result of the slope. The plan is divided into the parts by the inner retaining wall in the ground floor. Upper half of the plan is supported by plinth walls, while the lower part is the ground floor. The inner retaining wall divides the rectangle of the plan and holds the earth infill of the upper half of the plan. The footprint of the foundations resembles a broken orthogonal "8" figure. So, the house is single story from the upper elevation, two-story from the lower elevation. Buildings constructed with sloped design is called *mezonlu bina* by the locals.

Foundations of the all 11 studied cases are continuations of the ground masonry walls. The depth of the foundations could not be observed due to lack of visibility. Still, comments of the house owners and observations point out an approximate typical foundation depth is between 50-100 cm. The foundations are built with rubble stone masonry, similarly to the inner retaining walls of the ground floor. The thickness of the foundation walls range between 50 cm and 90 cm.

3.2. Masonry Walls

All traditional Arhavi houses are built on slopes. The stone masonry walls create the bases for the upper structures and upper walls of the first floor, thus define the plan. The stones are taken from the riverbeds as it is easier and cheaper to get. Some of the walls are built with treated and cut stones, while some with rubble stones. There is no mortar use seen as it is washed away with the constant rainfall.

There are four locations that the stone masonry walls are used. Their function varies with their location.

Type 1: Ground Floor Walls

The general use of the masonry is in the ground floor walls. Their techniques differ with the workmanship of the stone and the openings on the wall. They are approximately 50 cm thick, but this increases for the inner retaining walls of the earth fill. The rubble stone walls have higher thickness up to 60 cm as the technique has a broader margin of error. The doors and the windows are supported with timber lintels that resemble a plate.

Figure 3.2. The ground floor wall of Arılı 91

Type 2: Shield Walls (Kalkan duvar)

The second use is the blank upper wall of the first floor. This type of wall is named *kalkan duvar* (shield wall). They are approximately 50 cm thick. Their outer faces are built with cut stones to provide a smooth surface on the façade and the interior. This wall covers the exterior side of the oxoşgagure and does not have any openings. They are a precaution against the physical effects of the higher side of the house such as floods and landslides.

Figure 3.3. The shield wall of Arılı 105

Type 3: Plinth Walls

The third use of the masonry is the plinth walls. These are bottom walls of the first floor where ground floors do not coincide. They cover the earth infill and provide bases for the beams and joists of the firsts floor. In some cases, these walls rise up to the windows' sill height. This creates a platform up to 1 m in the oxoşgagure and bedrooms, where they should not be confused with the support walls. Support walls are separate walls conjoined with thinner walls to support them.

Figure 3.4. The plinth wall of Şenköy 3

Figure 3.5. Enter the Figure Caption here

Type 4: Support Walls

Fourth location the use of the masonry is seen is the support walls. These are 1-1.5 m high 40-50 cm thick walls that support the thinner walls they are conjoined with. They can be in the oxoşgagure or the ground floor, together with the timber frame walls.

Figure 3.6. Support wall on the ground floor of Şenköy 3

The second feature of the masonry walls are their workmanship. The cut stones create aligned rows in the wall. The financial aspect of the construction is always a concern as the finer expensive stones are always on the exterior walls. Inner walls of the ground floor are always inferior in terms of workmanship. This approach is even seen in a single wall, as the exterior face is superior to the inner face of the same wall in terms of order.

Type A: Fine Cut Stone Walls

The most labor-intensive stone type is the fine cut stone. These are very rare and only seen at the corners of the other masonry types. As it is labor intensive, they are not preferred for economic reasons. They are left untreated at the inner side and filled with smaller stones. By this way, a finer surface is reached in a cheaper way and the wall is bonded. The masonry walls can be divided into two categories.

Type B: Rough Cut Stone Walls

Rough cut stone walls can be observed at the outer walls of the ground floor and the shield walls of the first floor. Their ends and corners have finer cut stones, as a general rule in Arhavi. The stones are coursed; have rectangular shapes aligned in rows, but their sizes widths vary. This type of wall is found in 9 of the 11 houses.

Type C: Rubble Stone Walls

This type of wall is made of rubble stone. This type of wall is built with every size from 60 cm rocks to smaller stones and pebbles. In some cases, they are supported with mortar. Still, the core of the wall does not have mortar but smaller pieces. Their thickness varies between 55 cm to 68 cm. Even in a single wall, the thickness may differ up to 6 cm. They are to be found on 2 houses of 11 on the exterior walls. On the other hand, all interior retaining walls of the ground floors are rubble stone walls.

Figure 3.7. Fine cut stone, rough cut stone and rubble stone walls

3.3. Timber Framed Walls

The timber frame walls of the traditional Arhavi houses have unique architectural characteristics. They are patchworks of wood and stone, which are expressive forms that are both part of the structure and aesthetics of the building. The first floors have heights ranging between 280 cm and 310 cm as reflected on the exterior timber frame walls. The wall thicknesses are 10 cm without counting the inner coverings and platers. This study does not cover multistory houses of the Black Sea Region with same techniques as they are rare in rural regions of Arhavi, but when there are more than two floors, the wall thicknesses increase to 15 cm.

There are four type of timber frame walls in Arhavi; Dolma göz, Muskalı, Çatma, and Timber masonry. All these types rely on similar set of principles, plans, materials and details. They are bordered by top and bottom plates and corner posts. Top and bottom plates are double beams that are locked in each other at the corners and girders. Vertical timber posts that have 10x10 cm profiles are put at the intervals and corners. The corner posts are strengthened by diagonal bracings. The window and door openings are supported by the vertical posts and the horizontal beams. The sill of the window sits on a secondary beam. A typical window opening is between the secondary posts and 80x150 cm sized. The remaining wall area is filled with secondary posts at intervals. The rest of the construction process defines the type of the wall.

Type 1: Dolma Göz Walls

This type is the most iconic style of the local techniques. Dolma göz walls have 10 cm thickness, which is defined by the timber elements. The intervals between the secondary posts are 20-25 cm. These horizontal intervals are rarely exaggerated up to 36 cm as exceptions to cover imperfections in the design. Wooden sticks that are 3-5 cm thick are put in the indentations carved in the posts. The vertical intervals are 22-30 cm. Roughly cut stones are placed in these blank spaces created by the grid frame, and 2-3 cm gaps around the stones are filled with lime mortar. The stone and the mortar around it resemble an eye in the rectangle. The openings on the wall such as the windows and the doors are aligned to the grid. By this way, visual integrity of the pattern and the elements are maintained.

This wall type is not a sufficient technique for exterior physical effects. The inner face of the wall may be plastered or covered with timber planks to withstand water and wind effects.

6 of the 11 studied houses have this type of first floor walls.

Figure 3.8. Dolma göz technique of Arılı 91

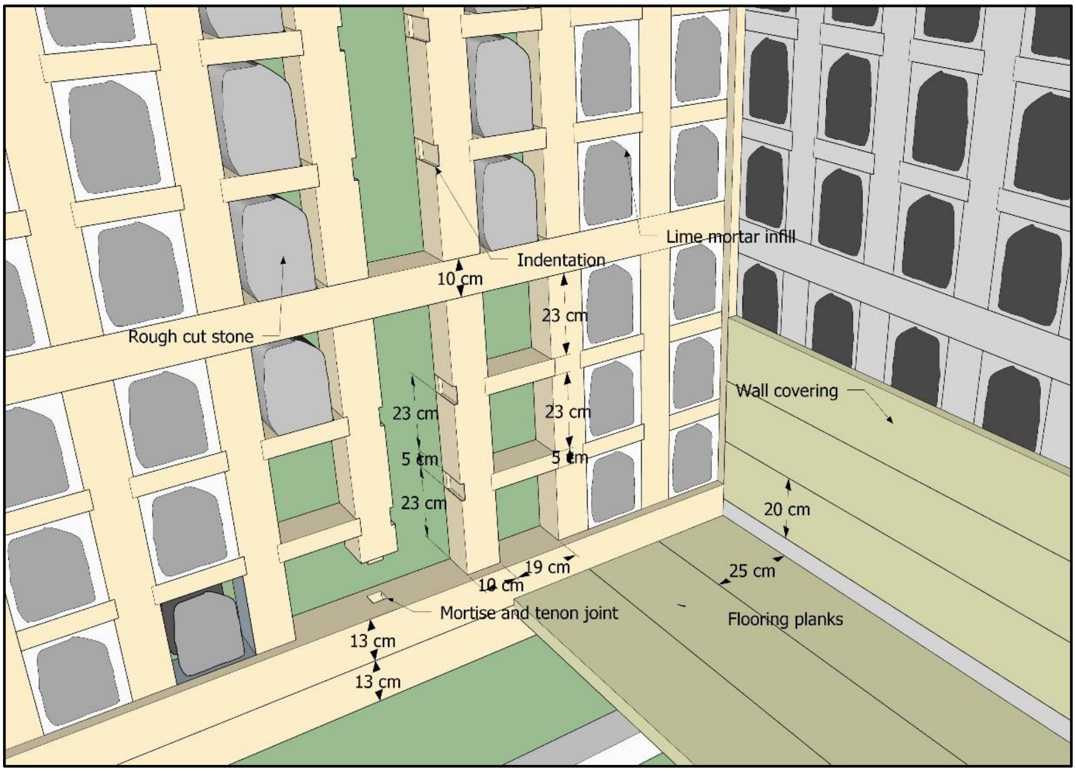

Figure 3.9. Construction model of the dolma göz technique

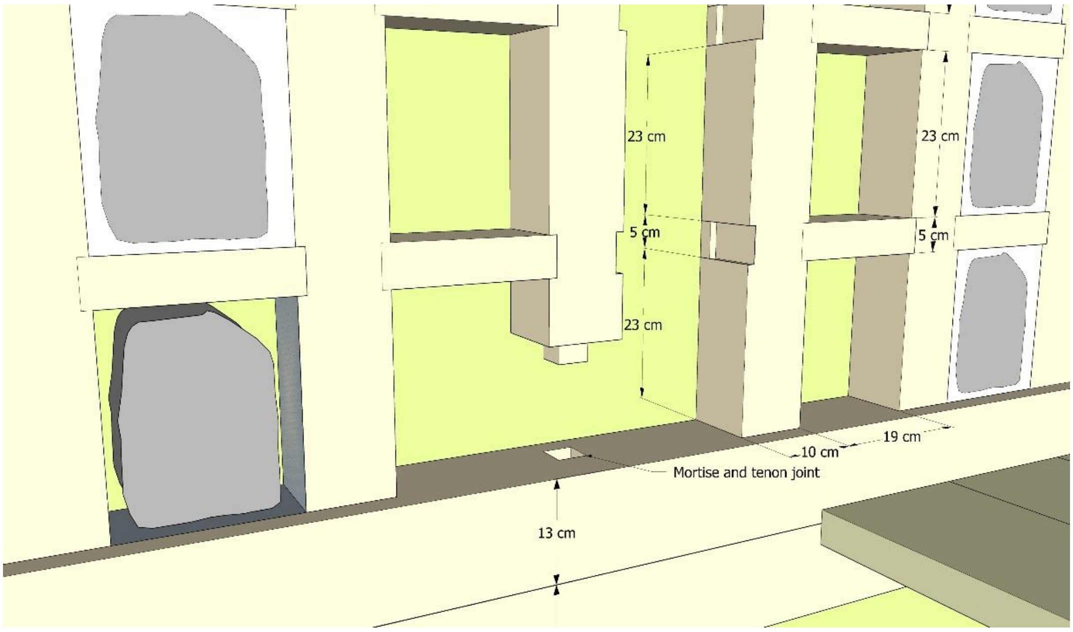

Figure 3.10. Construction detail of the dolma göz technique

Figure 3.11. Dolma göz detail of Arılı 91

Figure 3.12. Dolma göz walls of Yolgeçen 15

Type 2: Muskalı Walls

Muskalı wall technique is very similar to the dolma göz technique, except 5 cm wooden elements are embedded diagonally, approximately at 60 degrees. Zigzags created by the angled elements form triangles that are called *Muska*. 10x10 cm secondary posts that carry the pattern are placed at 15-25 cm intervals. As this technique is a similar variation of the dolma göz, the inner side of the wall should be plastered or covered with timber planks.

None of the studied houses had muskalı technique.

Figure 3.13. Muskalı technique in Arılı

Type 3: Çatma Walls

The word çatma means timber frame technique in general by definition. However, in Arhavi traditional architectural context it means the technique, in which there are no timber elements embedded between the 10x10 secondary timber posts. This is cheaper and easier than the dolma göz and muskalı techniques. The stones are not needed to be cut as they are going to be plastered with lime and will no longer be in sight. Size of the stones that are used as infill are close to the gaps they fill. By this way, a single column of stones easily fills the interval. The timber elements are not plastered. Therefore, the lime plastered infills and the timber posts generate horizontal stripes along the wall.

Figure 3.14. Çatma walls of Dereüstü 20

Figure 3.15. Çatma wall skeleton and infill material in Arılı

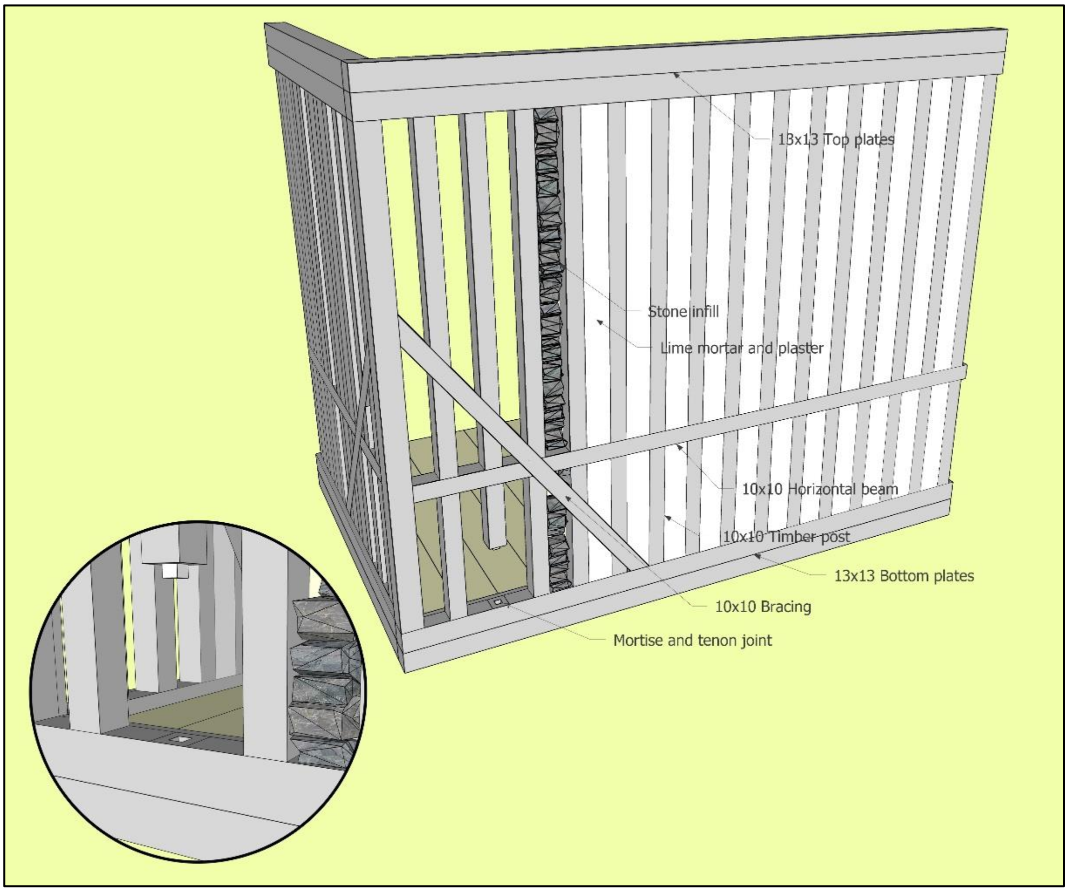

Figure 3.16. Construction detail of the çatma technique

Type 4: Timber Frame Timber Infill Walls

This type of wall is different than the previous timber frame walls. The skeleton is still timber frame, but the technique is not infill. The wall is completely made of timber materials. Timber planks with 3 cm thicknesses are the main components of the wall. Thanks to this minimal approach, the structure is considerably lighter than the infill walls.

15x15 cm T profile timber posts are placed at the corners and the places corresponding to the interior walls. 10x10 cm profile timber posts are placed onto the bottom plate of the wall at 1m intervals. Timber planks are placed at the hooks of 15x15 cm T profile posts and rest on the 10x10 cm posts that stay behind it. An inner layer of planks completes the wall similar to a sandwich with 10x10 cm posts in between.

One of the 11 studied houses is built with this technique.

Figure 3.17. Timber infill walls of Arılı 33

Figure 3.18. Timber infill wall technique in Arılı

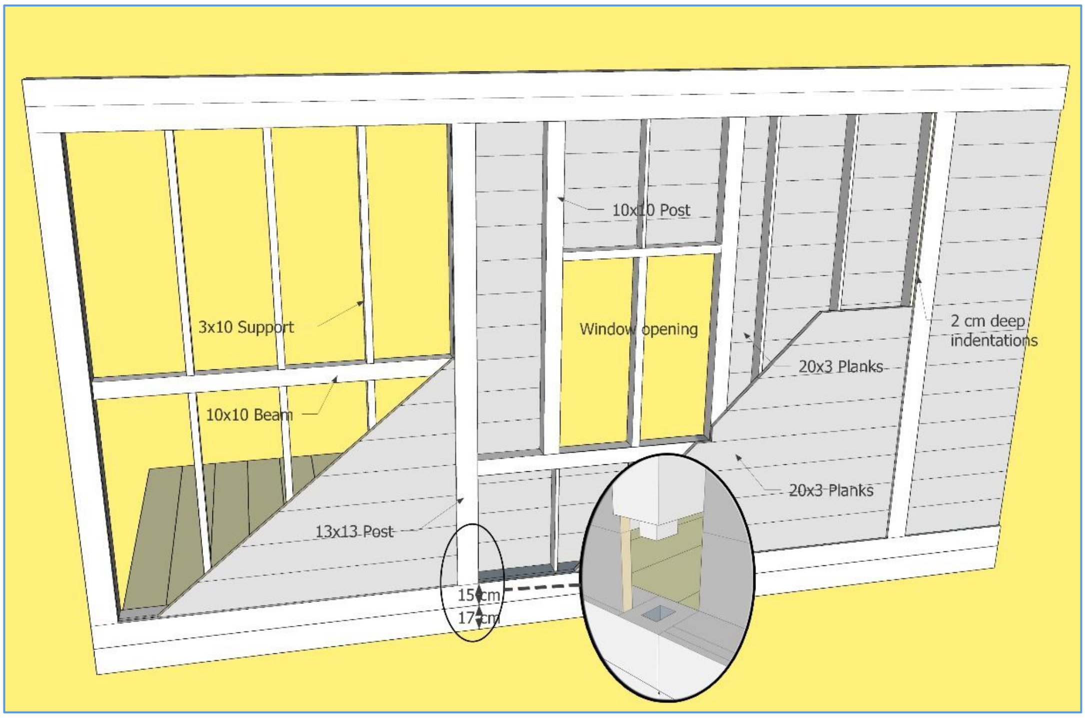

Figure 3.19. Construction detail of the timber infill technique.

Type 5: Interior Partition Walls (Taraba)

The walls in the houses are single type, that are seen in all traditional houses. The name of this wall is *taraba* or *daraba* in the local language. Timber posts with 10x10 cm profile are placed at planned intervals on floor beams, then walls are created by placing timber boards between them. The corner posts are called “armoz direği”. The others are called “orta direk” (Özgüner, 1970). This locking technique is named *geçme*. Timber boards have corresponding 3-5 cm deep drilled holes between them, which are used to put pen shaped bolts called *kumar çubuğu*. These bolts are at the ends, also in the middle if the boards are long. They secure the boards against bending and distortion.

Figure 3.20. Taraba walls of Şenköy 3

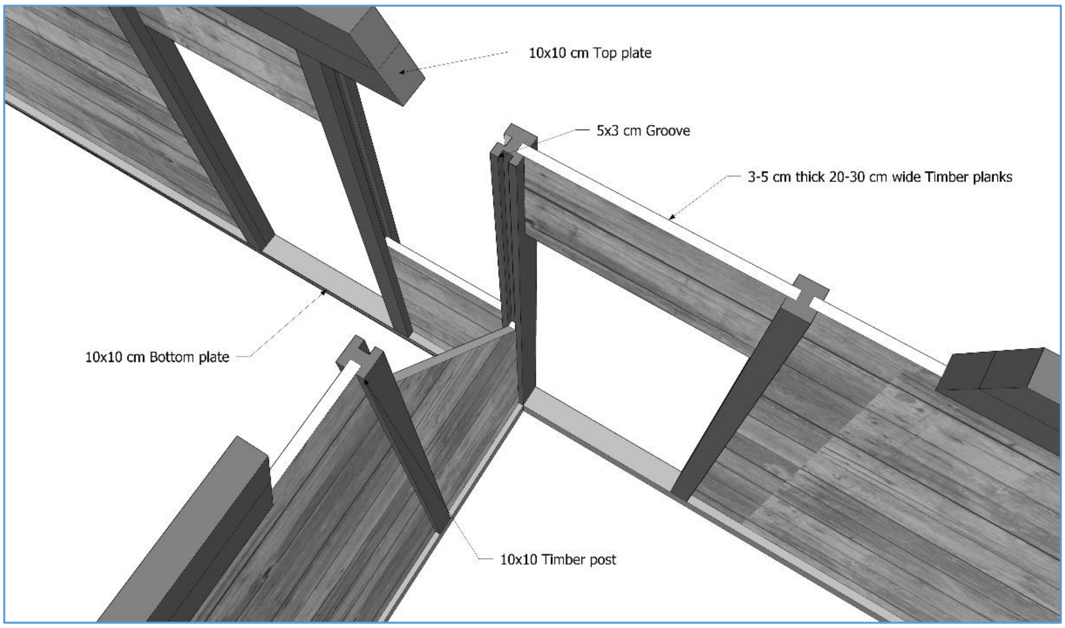

Figure 3.21. Construction detail of the taraba technique.

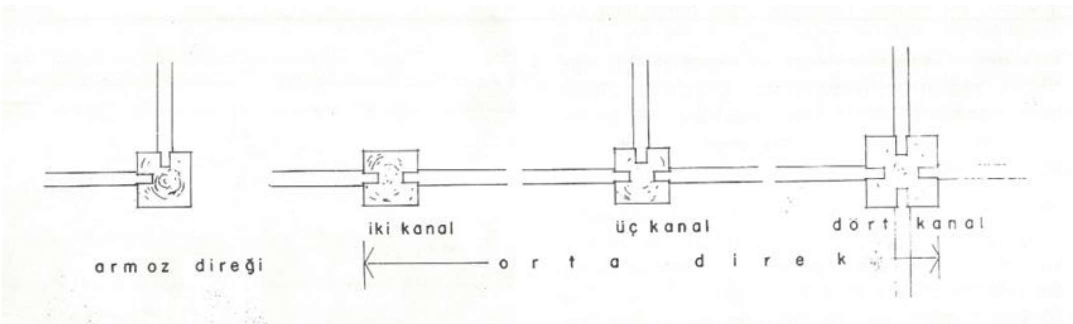

Figure 3.15. Grooving systems at timber posts (Çalma boğaz) (Özgüner, 1970)

Another classification that can be made with the timber frame walls is the type of treatments on their inner surfaces. There are three types of cases that are observed during the study; timber plank siding, plastering, and walls with no indoor treatment.

Type A: Timber Plank Siding

Timber siding is the most popular technique of the interior wall coverings. 3 cm thick timber planks are nailed onto the posts horizontally, to generate a cleaner and protective surface indoors. There is no material between the planks and the exterior walls. The width of the planks range between 20-40 cm.

Type B: Plastering

In this type lime plaster is applied on to the walls generously. There is no middle substance as the timber frame walls hold the plaster sufficiently. This method is cheaper than timber siding but requires maintenance. Still it is a better alternative for upper elevation walls and wet spaces, because timber siding is prone to water damage. For this reason, plastering is often observed together with the timber siding in the same house.

Type C: No Treatment

The walls of timber masonry walls are not treated since they already provide two layers of planks. The sandwich system provides a timber wall inside.

Another case that the interior faces of the exterior walls left untreated is be transition spaces like vestibules and corridors. The function of these spaces does not require a clean surface as living spaces.

Figure 3.22. Timber plank siding with missing elements in Şenköy 3

Figure 3.23. Plastered wall in Yukarı Hacılar

3.4. Timber Load-Bearing Elements and Connection Details

The timber posts and beams of the traditional Arhavi houses are load bearing elements located in the ground floor and transitions of the floors. They transfer the load of roof and upper floors to ground, to ground floor walls and to first floor walls.

The traditional Arhavi houses have no connection components, plates, cleats or any other materials to bond and join the structural elements other than the details. These connection details employ techniques on timber elements such as joints, mortises, tenons and grooves.

Ground Floor Post and Beam Structure

The posts in the ground floor transfer the load of the first floor to the ground. In two of the 11 studied cases there were at least one post in the ground floor. These two houses are altered and their posts in the ground floor were removed. They are 230-280 cm in length and have between 10x10 and 20x20 cm sized cross-sections.

Starting with the ground floor post and beam structure, there are two types of posts that carry the load of the first floor according to their workmanship level. In the first case the timber posts are untreated other than removal of the bark. Leaving the load bearing elements untreated is not a concern in this space aesthetically. The ground floor is used as barn. The other case is rectangular or square profile timber posts.

The timber posts have stone bases to eliminate the punching effect on the soft ground. They are around 50x50 cm in size and with 20 cm depth. These bases are half submerged into the ground. They are simple solutions to the problem and do not have notable qualities. Today some of them are replaced with concrete bases.

The beams in the ground floor transfer the load of the first floor to the posts and masonry walls. They are constructed in two or three layers. Primary and secondary beams are a must, but a tertiary layer of beams may act as floor joists. The profile of beams ranges from 20x20 cm to 10x10 cm. However, similarly to the posts, they do not always have clean rectangle profiles. There are some instances where top and bottom of the beams are cut to make a flat surface for connections, while sides of the beam are left untreated other than bark removal. The last layer of beams that act as floor joists have always uniform cross-sections that are mostly close to 10x10 cm.

As said before, the workmanship of the structural elements is not a concern in the ground floor. Similarly, the connections of these elements reflect this. The post and beam connections usually does not display the order and preciseness compared to the timber frame structure of the first floor. However, this is not a drawback for the strength of the structure.

The post and beam connections have two different types. One of them is the direct connection where the primary beam is directly put onto the post. However, this arrangement is weak against lateral forces. As a basic solution, a seat for the beam is prepared to sit on the post by removing a section on the top. By this way, a portion of the beam supports the beam from the side. Again, this is not a precise process. The portion supporting the beam from the side may be as small as 2 cm.

Beam and beam connections show the same mindset in their workmanship. The beams may clash at some points, due to imperfect elements of the structure in the ground floor. In some cases, they are bent and squeezed into other beams. Beams on the same layer may have different thicknesses, so notches are carved where thicker beams meet the lower layer, to eliminate the difference.

Another connection point is the beams and the masonry wall. The beams are connected to the bottom plate system. On the other hand, this connection is usually supported by the contact between the masonry wall and the beam. This contact may be direct, or on a stone mount, or on an additional timber post runs along the wall.

All in all, the details and the view of the structure located in the ground floor is rarely precise and delicate, but still robust. The function and economy over aesthetics is a general rule in this section of the structure of the houses.

First Floor Post and Beam Structure

The first floor's load-bearing post and beam structure consists of top and bottom plates, tie beams and joists. They frame the first wall and carry load of the roof and the first floor.

Top and the bottom plates have the biggest cross-sections of all timber elements. They consist of two timber girders jointed to each other. These girders range from 10x10 cm to 20x20 cm in size. Thus, the cross-sections of the plates vary between 10x20 cm and 20x40 cm. The width of the beams does not have to be perfectly same, as the connections at the corners rectify the size differences. The timber posts, that are same height as the story height, put into the mortises carved in the bottom plates. Then the top plates close the frame with the same mortise and tenon joints. These posts have same thickness as the wall, but their widths are between 10-15 cm.

The tie beams connect the top and bottom plates. They are located behind the floor and ceiling coverings. Tie beams have similar profiles to the plates, between 10x10 cm and 20x20 cm. They support the taraba walls, thus define the lines which the interior wooden posts and partition walls can stand between. The taraba posts both support the roof tie beams and provides a vertical platform for the interior walls. They have from 10x10cm to 15x15 cm cross-sections. The groovings in these posts are the channels the partition wall planks can slide in. This grooving joint system is named *çalma boğaz*. (Özgüner, 1970)

Another element seen in the exterior walls is diagonal bracings. These are seen mostly at dolma göz and çatma walls. They connect the corner posts to the bottom plates diagonally with mortise and tenon joints to strengthen the skeleton against lateral forces. They typically have 10x10 cm profiles.

In most cases, beams are not long enough to cover the entire wall lengths. So, two beams are used together as a single beam. This process is lengthening. There are two different styles to do it; by cutting each beam diagonally in opposite angles or making a half section joint called *lambalı* boy *uzatma*.

There are four types of connection details that are seen at the perpendicular beams.

Type 1: Kurt Boğaz Joint

In kurt boğaz joint, two perpendicular beams are connected by the indentation in one of them. The indentation is the same as the thickness of the other element. If the joint is at the end of elements, 10-20 cm of the elements projects out of the joint. So, the indented element looks like it bites the other one. The ends of the protrusions may be rounded or left as it is. Both elements can have indentations in some cases. This type may be used at the ends or in between of the elements.

6 of the 11 cases have beams that are joined with this joint.

Type 2: Kertme Boğaz Joint

In kertme boğaz joint, two perpendicular elements are removed by half, and put on each other. This type does not have protrusions seen in the kurt boğaz joint.

7 of the 11 studied cases have this type of joint.

Type 3: Single Corner Element

This is an element that is used in the right angle corners instead of a joint. It is a single piece of solid wood with a right angle itself. Instead of making a joint at a corner, this piece is put, and a lengthening technique is used. This piece has up to 100 cm long legs. However, this piece needs a wide trunk, so it is hard to produce.

2 of the 11 studied cases have this element.

Type 4: Diagonal Bonding

In this type, the ends of the elements are cut at 45 degree and put near each other. It has a clean look, but it is weak against lateral forces. There are 2 cases this was seen, in which nails were used to strengthen the bond.

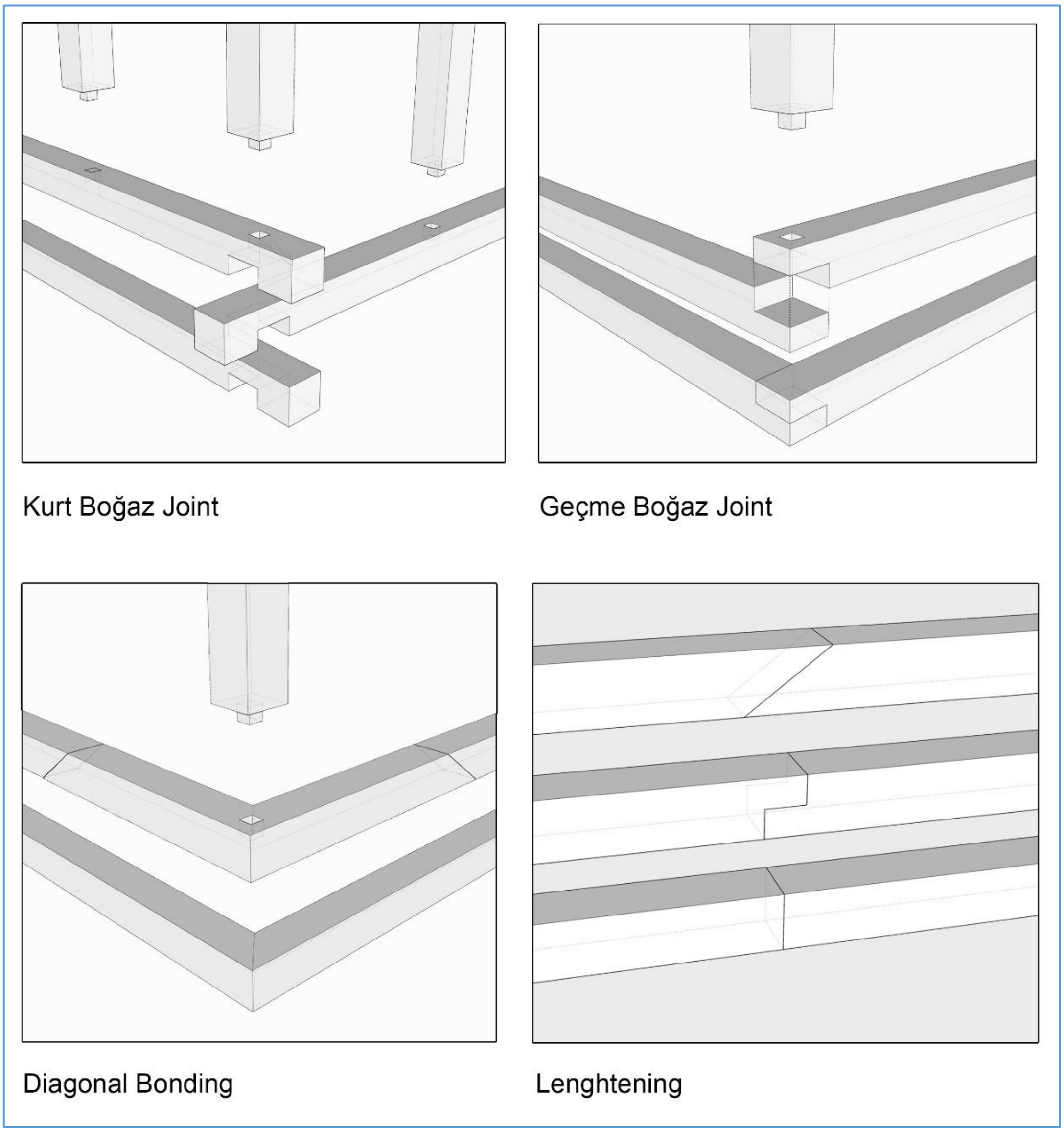

Figure 3.24. 3D representations of joint types seen in Arhavi

Figure 3.25. Kurt boğaz joint of Arılı 47

Figure 3.26. Kertme boğaz joint of Dereüstü 28

Figure 3.27. Diagonal bonding on Dereüstü 20 with a single timber element that are joined to beams at two sides similarly to the lengthening joint

Figure 3.28. Diagonal lengthening details seen on Şenköy 3

3.5. Roofs

The roofs of the traditional Arhavi houses are essential parts of the houses with unignorable duties. The county is in the region that has the heaviest precipitation rates of Turkey. The heavy rainfall and snowfall are major physical conditions the structure has to withstand and protect the inhabitants from.

The weather conditions of the region require significant slope for the roofs. High slope means bigger and higher roofs. With a 20-degree angle, a roof's height is same as a floor height.

There are three types of roofs seen at the traditional Arhavi houses: hipped roofs, hipped roofs with a half hip and hipped roofs with a gable. The hipped roofs have slopes towards the grounds at every edge of rectangular plan. The hipped roofs with gable do not make slope at one side, instead produces a triangle. There is a transition type of both roofs. Instead of producing a full triangle, the gabled side makes a half hip. The top corner of the triangle is flattened. This form is named half hip. In Turkish the name of this is *sağrıcık*.

Type 1: Hipped Roof

2 of the 11 studied houses have fully hipped roofs on all sides. The hips are more difficult to construct than gables as they require an additional surface. However, the concern is the heavy rainfall, not the ease of construction. This type of roof is the most basic approach to the problem. The problem is getting the water away from the building and a hip provides shortest travel route for the water from the top to the bottom. Thus, designing a roof with all hips with all the sides is the most efficient design approach. In this type, the roof space is exclusively accessible through the trap door from the inside.

Type 2: Hipped Roof with a Gable

5 of the 11 studied houses have hipped roofs with a gable. As said before, the hips are the most efficient technique to repel the water away. On the other hand, there is are two functions that requires a gable. The first function is access to the roof, and the other function is ventilation of oxoşgagure. The gables that are observed in the 5 buildings, are always on the oxoşgagure spaces which also means the upper walls. All the gables seen either have a ventilation opening on the gable, or a door to reach the roof space, or a chimney conjoined to the upper wall.

Type 3: Hipped Roof with a Half Hip

4 of the 11 studied houses have half hips (sağrıcık). Sağrıcık is a composite technique that shares the advantages of both hips and gables. They leave the face of the gable open but have half hips to repel water. The top corner of the gable triangle is cut with a line or rounded with an elliptical beam.

The traditional roof covering in Arhavi was *hartama*. Hartama is a wooden tile that is generally 50 cm long and 1 cm thick. These tiles are laid on top of each other from the bottom to upwards, similarly to other tiles. Hartama was a convenient practice due to material availability in the region. However, it needed frequent maintenance and renewal. The only advantage of material availability ended with the ban introduced in Forest Law of 1956, which made it illegal to get timber tiles from the state-owned forests.

In the latter half of the 20th century, firstly clay tiles, then metal roof coverings were popularized. Clay tiles are another traditional material that was available to the builders but was harder to get than hartama. It was a factory product, so they used to be bought. However, with the later production techniques metal roof coverings were introduced to the region. They were adopted quickly because they are cheaper, lighter, easier to install and more durable compared to the previous materials.

Figure 3.29. Hipped roof of Dereüstü 28

Figure 3.30. Gable of Arılı 33 on the shield wall

Figure 3.31. Gable of Arılı 105

Figure 3.32. Curved half hip (sağrıcık) of Şenköy 3

Figure 3.17. Curved half hip (sağrıcık) in Yukarı Hacılar

Figure 3.33. A curved sağrıcık gable with removed half hip in Arılı

Type A: Terracotta Barrel Tiles

The terracotta barrel tiles have many disadvantages such as higher cost, difficulty of construction and need of more frequent maintenance. There are two instances these tiles were used. First case is Yolgeçen 15. This house has been abandoned for decades and the owners have a newer house that they live in next to it. The traditional house was not in use when the other cases shifted from terracotta tiles to metal sheets. The tile roofing is in a bad shape today. The other case is Dereüstü 58, as known as Osman Ağa Konağı. This building is restored recently, so the decision makers wanted to keep an authentic view. Before the restoration the building was abandoned similarly to Yolgeçen 15.

These tiles are in around 40x15x20 cm sizes. They are placed in alternating series of upwards and downwards in each other and then next line is stacked on top of the previous line, from bottom to top. The ridge tiles protect the break lines between the hip faces.

Type B: Corrugated Metal Sheet Coverings

The metal sheets used as roof coverings differ from one case to another. They are made of rust-proof materials such as stainless aluminum and galvanized steel. These sheets are nailed to the battens with waterproofed nails. By this way, the roofing is strengthened against wind forces.

9 of the 11 houses have metal sheets and they are still in a good shape even in the abandoned buildings.

Eaves

The eaves are significant components of the roof as the heavy precipitation in the region requires the walls to be protected against the water exposure. The eaves of the traditional Arhavi houses project between 75-140 cm.

According to the visibility of the rafters, two different eaves types may be observed; open eaves and closed eaves.

Type 1: Closed Eaves

Closed eaves are cladded with boards covering the internal components of the overhang. The soffit is built by 20 cm width planks parallel to the wall. This type of eaves does not have more than 100 cm width.

Type 2: Open Eaves

Open eaves do not have any coverings such as soffits and fascia boards. The roof cover extends 5-10 cm more than the rafters, so they are protected from the water exposure. Openings around rafters and ceiling joists are covered at the face of the wall with timber boards. These timber elements come out of the closed section. So, the roof space is still not visible, even if the rafter and joists are open.

Chimneys

The original chimneys of the Arhavi houses are found in the houses with the original fireplaces. They made of various type of stones. The base of the fireplace starts with bigger stones, but the chimneys are made of river stones.

Figure 3.34. Closed eaves of Arılı 105

Figure 3.35. Open eaves of Yolgeçen 15

3.6. Architectural Elements

3.6.1. Windows

Windows are sources of light and ventilation in the houses. The lightness and modularity of timber frame walls allow high number of windows in the first floors. The masonry walls of the ground floors do not always permit similar openings. In addition, the function of the ground floor does not require light as much as the first floors.

The masonry walls of the ground floor have two types of openings.

Type 1: Openings on Masonry Walls

The masonry walls have two types of openings. The first variation can be defined as small irregular openings that provides ventilation. They have less than 40x40 cm sizes. No casings are used in these openings. There are three reasons to prefer this type. The structural masonry is not disturbed with big openings, light is not needed significantly in the ground floor, and a balance between ventilation and heat loss is ensured with a small opening. 4 of the 11 studied cases have these openings.

Figure 3.36. Openings of Arılı 91

Type 2: Timber Sash Windows

Regular windows on the masonry walls have same size openings of the first-floor windows. 3 of the 11 studied cases have these openings, while the frame and windows exist only on one case. These openings are topped with the bottom plates of the first floor or have timber lintels. The heights of the masonry windows are between 120-150 cm and the widths are between 80-90 cm.

Figure 3.37. Timber sash window on Arılı 91

Timber sash windows are the typical traditional windows of Arhavi houses. They have two wings with four glass sections. The upper wing is fixed while the lower wing moves up on it in groovings. A metal lock is rotated under the lifted wing to hold it in place.

11 of the 11 studied houses have this type of windows.

The timber frame walls of the ground floors and first floors have four type of openings.

Type 3: Double Casement Windows on Timber Frame Walls

The timber double casement windows are seen on the houses with sash windows. The traces show they are later alterations. They are same size as the sash windows.

Type 4: Timber Shutters on Timber Frame Walls

Timber shutters are located at the exterior face of the window openings. When glass was not common in previous times, timber shutters was used only. During cold days and nights, the shutters were kept closed. They are same size as the sash windows.

Figure 3.38. Shutters of Şenköy 3

Type 5: Openings on Gables

Openings on gables are used for ventilation of the roof space. These expel the smoke released by the open fires of hearths in the oxoşgagure spaces. They can be small vents as seen at Yukarı Hacılar, or shutters with 80x55 dimensions as seen at Şenköy 3. These ventilation openings are always found on gables, where the oxoşgagure is located.

Figure 3.39. Gable openings with lokmalı parmaklıks of Şenköy 3

Type 6: Lokmalı Parmaklık

Some of the openings on the ground floor timber frame walls have timber guards instead of glass windows. These guards are timber rods that are connected to each other with corresponding holes on the vertical rods. This type of guards is called *lokmalı parmaklık* in Turkish.

Figure 3.40. Lokmalı parmaklık of Şenköy 3

3.6.2. Doors

The doors of the traditional Arhavi houses are made of timber elements. They do not have glass components in any of the studied cases. They can be classified in two groups: exterior doors and interior doors. The exterior doors provide the transition between the outside and the house and lead to the vestibules, oxoşgagures or corridors. The interior doors provide transitions between interior spaces. In addition to this classification, interior doors can be divided into two subgroups according to their wing number and type: single-wing plank doors, single-wing panel doors and double-wing panel doors.

Type 1: Exterior Single-wing Plank Doors

The exterior doors are located on the entrance doors of first floors and the ground floors. They are made of 4-5 cm thick wooden panels that are held together with timber elements on the interior side. The doors' widths range between 86-105 cm. While an approximate panel has a width of 20 cm, they are not uniform in size in a single door. It does not matter as long as the timber connector binds them together in a seamless way. There may be 2 or 3 wooden elements that connect the wooden panels together with chamfered endings. These elements cover all the planks, with widths ranging between 5 cm to 14 cm and depths ranging between 5 cm to 10 cm. The heights of the exterior doors change due to their location.

The heights of the exterior doors range between 185 cm to 210 cm. Exterior doors of the first floor are located on the upper section of this range between 192 cm to 210 cm. Due to fact that, the door openings on the ground floors may be smaller down to 185 cm. Because the ground floor doors generally are higher than the floor levels by one or two steps.

Today, out of the 11 studied houses, 6 of them have both the ground and first floor exterior doors are traditional type. 4 houses have the first-floor doors replaced with newer doors and one house has both doors replaced.

Figure 3.41. Exterior plank wall of Arılı 91

Type 2: Interior Single-wing Plank Doors

The interior doors are similar to the exterior doors by size and construction. Their widths range between 85 and 102 cm while heights range between 190 to 210. Vertical 4 or 5 planks are connected with two or three horizontal wooden elements near the top and bottom of the planks. Doors leading to oxoşgagures and toilets are mostly this type.

Figure 3.42. Interior plank door of Yukarı Hacılar

Type 3: Interior Single-wing Panel Doors

Single-wing timber panel doors are more complex and lighter than timber plank doors. They are used in the later periods of the 20th century. Lighter and precise build and better lock systems are advantages of this type compared to previous ones.

Panel doors require industrial and precise machining. The planks are cut for the outer frame of the wing, and inner boards are worked on and all components are joined together. All of the studied houses employ this type of door.

Type 4: Interior Double-wing Panel Doors

Double-wing panel doors are used at the xayati for the biggest bedrooms, köşk and didi oda, of the house. They can be seen as, 90 cm, standard size double wings; or 60 cm narrower double wings.

Figure 3.43. Double-wing panel doors in Şenköy 3

3.6.3. Fireplaces

There are two types of fireplaces in the traditional Arhavi houses: hearths and stone fireplaces. The hearths were archaic but still effective methods of containing fire while cooking and heating. Stone fireplaces are more effective in terms of expelling smoke.

In the later stages of the 20th century, the fireplaces are replaced with metal kitchen stoves. These stoves are better than the fireplaces for cooking and heating. They are portable, cleaner and more economical in terms of fuel use. Thus, people quickly adopted these stoves.

Today, none of the original fireplaces are used. Their chimneys were removed during the roof repairs or altered to fit the stoves. The stove pipes are mostly taken out from the holes made in the walls.

Type 1: Hearths

The hearths are open fireplaces that are located in the oxoşgagure. The oxoşgagure has no timber flooring and ceiling, at least partially. The ground of this space is compacted earth. A cauldron was hanged from a beam; or put on the hearthstone or a metal base. The smoke of the fire would move to the open roof space and expelled through the ventilation openings on the gable.

There were two functions of the open fire, heating and cooking. The hot would rise to the roof space together with the smoke. The heat would disperse in the roof space and heat other rooms from their ceilings. The faces of hartama walls looking at the oxoşgagure spaces are darkened with the constant smoke released by the fire.

In the later stages the earth floors of the oxoşgagures are covered with timber flooring. The roof spaces are closed with ceilings are closed as well. Only one case out of the 11 studied houses has uncovered ground today; Şenköy 3.

Type 2: Stone Fireplaces in Oxoşgagures

Stone fireplaces that are mainly used for cooking. They are located on the upper walls of the oxoşgagures, conjoined to the stone masonry upper wall (kalkan duvarı). They are built all by stone. The base and the lower cubic space are constructed with cut stones. The chimneys start with receding cross-section, built with oblate river stones. Only 4 of the 11 studied houses have stone fireplaces in oxoşgagures.

Figure 3.44. Oxoşgagure Fireplace in Arılı 105

Type 2: Stone Fireplaces in Bedrooms

These fireplaces are located mostly in the köşk and didi odas of the houses. A house has at most two bedroom fireplaces. On the other hand, 2 of the 11 studied houses have fireplace in bedrooms and they have only one. They are built similarly to the oxoşgagure fireplaces, but they are smaller since their only function is heating. with the bigger stones on the base and smaller stones with shrinking smoke channel opening to the chimney.

Figure 3.45. Fireplace of Şenköy 3

3.6.4. Cabinets

There are three types of cabinets in the traditional Arhavi houses: oxoşgagure wall cabinets, oxoşgagure fireplace cabinets and bedroom cabinets.

Type 1: Oxoşgagure Wall Cabinets

Oxoşgagure wall cabinets are found in the oxoşgagures with open fire. These cabinets are main components of the houses they exist in. They are located in oxoşgagures, covering the timber partition wall between the oxoşgagure and the xayati spaces. The door leading to the xayati is located in the niche of these cabinets. Oxoşgagure cabinets are used for storing for food, kitchenware, tools, and daily consumables such as lamp oil.

Their skeleton is constructed with wooden bars that have cross-sections ranging from 5x5 cm to 10x10 cm. The top of the cabinet does not reach to the ceiling, as this part acts as a platform to store dried foods.

Figure 3.46. Oxoşgagure wall cabinet with the door leading to the xayati in Yukarı Hacılar case

Type 2: Oxoşgagure Fireplace Cabinets

Oxoşgagure fireplace cabinets are found in the houses with the stone fireplaces in the oxoşgagures. These fireplaces are always conjoined to the upper wall (kalkan duvarı). These walls are blank masonry walls and do not have any openings. The fireplace is located in the middle of the wall length. The leftover spaces near the fireplace are used as cabinets. This space serves as the kitchen of the house, so the cabinets have kitchenware and daily consumables similar to the previous type of oxoşgagure cabinets.

Figure 3.47. Cabinets near the fireplace in the oxoşgagure of Arılı 47

Type 3: Bedroom Cabinets

The cabinets in the bedrooms are built around the fireplaces or singly. They are similar to the oxoşgagure fireplace cabinets but used as wardrobes. If there is a fireplace, cabinets are located at the two sides of it. They are built into the walls and supported with 5x5 cm profile timber supports. In some cases, there are luxurious cabinets in köşks or didi odas with glazed windows and ornamented doors.

Figure 3.48. Cabinets near the fireplace in bedroom in Yukarı Hacılar case

3.6.5. Floors

Floor coverings in the traditional Arhavi houses that are in use today are timber plank flooring in the first floor and earth in the ground floor. However, in the first floors of some unoccupied buildings there is a traditional variation. As mentioned before, some oxoşgagures were places of production, they had open fires, sometimes wet functions. So, timber flooring was not suitable for this space. The grounds of the oxoşgagure spaces in the unaltered cases are compacted earth. Another case of flooring is the sections in front of stone fireplaces in the bedrooms and oxoşgagures, where a stone base is constructed for against fire hazard of timber flooring.

Type 1: Compacted Earth Ground

The only case of earth ground is seen in Şenköy 3, out of the 11 studied buildings. Even Şenköy 3 case is altered as its oxoşgagure was covered with cement in later periods. However, the cement covering is mostly broken and partially missing today. In addition, in some cases, this type is seen in oxoşgagures from the older photographs and statements of the residents. The compacted earth ground is made by ramming red soil as a precaution against the fire as stated by Özçakmak (Özçakmak, 2014).

Figure 3.49. Ground of oxoşgagure in Şenköy 3

Type 2: Timber Plank Flooring

This type is the generic flooring of the traditional Arhavi houses. They are used in first upper floors of every house, in every room. The only exception is the compacted earth ground of the oxoşgagures, which are still later covered with timber plank flooring. In this type, 2-3 cm thick timber planks are nailed to the floor joists perpendicularly. They are 15-30 cm wide and 100-200 cm long.

Figure 3.50. Timber plank flooring of Şenköy 3

Type 3: Stone Cladding for Fireplaces

There are stone covers that could be a single stone piece base or stone pavement. They are located in front of the fireplaces in the bedrooms and oxoşgagures. However, the type found in the bedrooms is only protective shield that is put on the timber flooring. So, this is not a flooring type. The base of the floorings in oxoşgagures are earth infills, which is a suitable fundament for the stone pavement. This pavement type is seen in 3 of the 11 houses. However, they all are covered with ceramic tiles today.

3.6.6. Ceilings

The ceilings are mostly basic timber boarding. 15-25 cm wide timber boards are nailed to the timber joists from the roof space. The boards are 2-3 cm thick and may have engravings for decorative purposes. The rooms are defined by tie beams on the partition walls. The ceiling boards end at the top of these tie beams.

Another case is ornamented ceilings. They have recessed portions that are usually painted. Master bedrooms near the Xayatis of Şenköy 3 case and Yukarı Hacılar case both have one. These are the most valuable rooms of the houses, and this is

Another case is seen at the ceiling of the oxoşgagure of Arılı 105. The roof joists are under the ceiling planks instead of hidden on top.

Some of the ceilings are alterations. The ceilings on top of the oxoşgagure spaces were open, at least partially. Today these can be easily identified because they are built with materials that belong to later periods, such as 5 cm pinewood laths.

Type 1: Basic Plank Ceiling

Plank ceiling is the default ceiling in traditional Arhavi houses. The planks are 2-3 cm thick and 15-25 cm wide. Some ceilings have engraved boards for aesthetical purposes.

Some of the plank ceilings have timber strips that are 2-5 cm wide embedded between the boards for better insulation.

Type 2: Inverted Plank Ceiling

This is an upside-down design compared to the basic plank ceiling. The technique is still same except the ceiling stays on top of the tie beams/joists of the roof. By this way, a higher floor height, up to 20 cm more, can be achieved. There are 2 cases that have plank ceilings on the tie beams out of 11 studied houses. Both Dereüstü 20's and Arılı 105's ceilings' planks are perpendicular to the tie beams.

Type 3: Ornamented Ceiling

There are 2 cases that have ornamented ceilings out of 11 studied houses. Şenköy 3 has a square recessed tray ceiling in the Köşki room. The tray is in the middle of the ceiling and have the dimensions of 150x150x25 cm. A generic lighting fixture comes from the center of a small ceiling rose in the recess.

The ceiling of the bedroom of the Yukarı Hacılar case has a ceiling that follows a 30 cm offset from the ceiling borders in the Köşki room. However, this ceiling is not recessed, but only have a timber element that resembles an ornamented fascia board attached to it.

These ceilings are still basic plank ceilings except their additional ornaments.

Figure 3.51. Plank ceiling in Şenköy 3

Figure 3.52. Inverted plank ceiling in Dereüstü 20

Figure 3.53. Recessed tray ceiling in Şenköy 3

3.6.7. Sekis

Sekis are seating elements that are built-in with the house. They define the usage of the spaces they are located in. Sekis are conjoined to the exterior walls, not the partition walls. They are not common, only found in Şenköy 3 case, due to the fact that building a portable seating element is easier and more favorable than constructing a built-in seki. There are two types of cabinets in the traditional Arhavi houses: stone sekis and timber sekis.

Type 1: Stone Masonry Seki

The stone sekis only exist in the oxoşgagure. They are built with whatever stone is available. The final rectangular prism form is plastered. On top of the sekis, rugs and cushions were placed to create a comfortable sitting element. Only stone seki is found in Şenköy 3, the height of it is around 60 cm and the width of the top surface is 45 cm.

The stone seki of Şenköy 3 is built on foundation and plinth wall. It is a support wall that happens to be designed as a seating element. As an interior support wall, it does not project itself on the façade. As discussed within the masonry walls, the plinth walls may rise up to the windows sill level in some cases. They rise up to 100 cm height and functions as interior windows ledges.

Type 2: Timber Seki

Timber sekis are also very rare. Only stone seki is found in Şenköy 3, the height of it is around 52 cm and the width of the top surface is 75 cm. They can be in any of the rooms. As they are built-in elements; the section of the face of the exterior wall which stays behind the seki is not cladded, unlike the rest of the wall.

This seki is carried by a timber skeleton consists of 5x5 cm bars. It runs along the lower exterior wall following bedroom-xayati-bedroom spaces. The wall divides the seki, so it is not a uniform structure.

Figure 3.54. Timber seki in Şenköy 3

Figure 3.55. Stone seki in Şenköy 3

3.6.8. Stairs

As mentioned before, traditional Arhavi houses are elevated from the ground level by plinth walls and ground walls. This design feature creates a level difference of at least 40 cm between the first-floor level and the ground level. In some cases, the entrance of the house is reached through a lower part of the slope. In most cases, a set of stairs are required to connect the ground and the floor levels.

Traditional Arhavi houses have no stairs or any kind of connection between the first floor and the ground floor. The movement between the barn and the living floor is through outside of the house. Thus, only stairs that are seen in two story houses of Arhavi are exterior stairs leading to the entrance doors.

The stairs are all built with roughly cut stone. The only difference they have is the form of the stair flight. There are mainly three types of forms seen in the stone stairs; parallel to the exterior wall, perpendicular to the exterior wall and oval stairs.

The landings of the stone stair provide platforms for the entrances. The ground floors are used as barns, but the first floors are living spaces. So, a bigger landing that serves as an open vestibule space, a preparation platform before stepping in and out of the cleaner living space can be seen.

Type 1: Straight Flight Stone Stairs

These are the basic stairs that connect different levels. A generic stone stair has approximately 100 cm width, 30 cm tread depth, and 17 cm riser height. These stairs are not perfectly uniform, so dimensions differ even in a single flight.

The stairs parallel to the wall are more favorable due to their proximity to the house. The ground levels are at the highest points at the upper walls and the entrances are at the side walls in most cases. So, constructing a parallel wall to the exterior side wall serves the shortest route and uses the cover of the eaves against weather conditions.

Straight flight stone stairs often connect the house entrance and the barn entrance. The slope on the side of the barn door is managed by stairs that are next to the exterior wall.

Type 2: Oval Stone Stairs

These stairs are arranged mostly in a half-circle footprint. The flights of the stairs are not on a straight line, so the circulation is not affected by the orientation of the stairs. This type of stairs is seen in Dereüstü 58. The diameter of the top landing is around 150 cm.

Figure 3.56. Oval stairs of Dereüstü 58

CHAPTER 4

THE PORTRAYAL OF CONSTRUCTION PHASES AND PROCESSES

In this chapter, the phases and processes of constructions of Arhavi rural traditional houses will be discussed. The tools, techniques, processes and functions will be analyzed and combined to see whole story of the houses.

4.1. Analysis and Description of Construction Phases and Processes

The traditional Arhavi house is constructed through a set of techniques and systems that arrange main materials of the house, the wood and the stone, to a structure. These techniques and systems are products of the architectural culture which is created by locals of the region through the centuries. This culture has been in interaction with the lifestyle, conditions, requirements, beliefs and history of the region.

Materials

There are two main materials that dictate the architectural culture of the region; stone and timber. The rich forests of the Eastern Black Sea Region offer timber generously. Unlike stone, timber is malleable and has more flexible physical characteristics. The locals of the region have experimented with different treatments and processes to use timber; so, as a widely available material, it is used in every possible aspect of life such as furniture, tools, vehicles, bridges, and buildings. The timber workmanship is quite advanced, and the techniques that come with it are embedded in the local culture.

The main type of wood used in the construction is chestnut wood. Other than this some components are built with beech wood and pine wood. The height of chestnut tree can reach up to 25 m, but usable trunk length is between 5-10 m. It is durable against water and humidity damage, and woodworms (Özgüner, 1970). But it is expensive compared to pinewood and beech wood. This is why today's interventions utilize the alternatives.

Stone is clearly appreciated as a material as seen in the workmanship of it in the architecture of the region. The stone mostly available in Arhavi is hard type river stones. These stones proved themselves against the physical conditions of nature by simply existing in their forms. Compared to the softer stones that are used as building materials in the other parts of Anatolia, the river stones of the region show persistence against shaping and forming but have stronger qualities. The workmanship and the structures seen in the stone bridges of Arhavi are demonstrations of the durableness of the local stone.

The tools that are used for working the timber are adze (keser), axe (balta), framed saw (hızar), mallet (varyoz), gimlet (el matkabı), planer (rende, planya), and miter (gönye).

The production of the timber elements of the buildings starts with lengthy processes and treatments. The trees are cut with axes and branches/snags are cleared at the forest. Then they are brought to site with oxen, horses or mules, whatever was available at the time. The logs are cut with framed long saws, with at least two people on each end, to the required profiles. During this process the log and the profiles are dried at each step. When the timber is dried it is processed with hand planers and checked with miter to reach a precise flatness. Smaller timber elements are worked on workbenches. They are cut with handsaws, drilled with gimlets and smoothed with planers.

The stone types that are seen in Arhavi are magmatic based. The dominant color of the stones is close to gray/black as they are granitic. They are taken from the riverbeds, rarely from quarries and shaped by hammers and chisels. Due to the hardness of the stones of the region, the effort is kept at minimum. Stones that are used in the masonry walls are mostly unshaped but selected according to their sizes.

Phase 1: Building Site

The building site is selected at a slope, mostly at the upper level or between the agricultural lands of the household. The selection of the house site is more liberal than the other parts of the Anatolia. The abundance of the water sources, and the need of security of precious agricultural lands pushes the building density down in the Eastern Black Sea Region. Still, flatlands of the valleys and plains on the hilly areas are valuable enough to form denser village centers.

Arhavi houses are always built on slopes. The slope of the building site is a characteristic feature of the Arhavi house. The buildings that adopt this feature is named "*mezonlu yapı*" by locals (Özçakmak, 2014). Due to the slope, the ground level covers half of the first floor plan. The rest of the first floor is supported by foundation and plinth walls.

The building footprint is excavated with shovels. The plan is divided into two halves according to the slope. At this level the lower half becomes the ground floor, while the upper half gets filled with earth infill.

Phase 2: Foundation

After the building footprint is leveled, rubble stones are put into the 50-80 cm thick lines, that form the foundation and the ground floor walls. The borders of the rectangular plan of the house is defined in this stage. The site is divided in two parts, the higher infill section and the lower ground floor section. The retaining wall that will carry the lateral load of the upper infill and will be the back wall of the ground floor marks this division.

Phase 3: Ground Floor

In this phase, the foundation walls turn into the ground floor walls. The wall techniques may remain same or better cut stones may be employed on the exterior walls for aesthetical purposes. Corner stones are bigger and better cut compared to the rest of the masonry. Inner retaining wall carries the same workmanship of masonry with the foundation, as it is not seen from outside. The thickness of exterior walls range between 50 cm and 60 cm, while inner retaining wall is up to 80 cm.

On the other hand, not all ground floor walls are masonry. In some cases, the lower wall is timber frame with 10 cm thickness. Due to the fact that, timber frame wall has two advantages; it is lighter and allows bigger openings such as windows compared to the masonry. The timber masonry of ground floors is built on a 100 cm high support wall or plinth wall. This type of ground floor walls is seen in 2 of the 11 cases.

In another case the lower wall can be a composite style. For instance, in Şenköy 3 and Yolgeçen 15, the wall is masonry, but it is supported with timber posts and bond beams. The thickness of the wall is 10-12 cm.

In this phase the inner retaining walls are built with rubble stone, while side walls are constructed with rubble or cut stones up to 270-320 cm high. The entrance door of the ground floor is supported with timber lintel on top. There are no windows on side walls. The lower wall is constructed either with the same masonry technique, with timber bond beams to support openings, or with the same timber frame technique of the upper wall.

If the lower wall is timber frame or with timber bond beams the process differs. A masonry support or plinth wall is built up to 100 cm. 10x10 cm bond beams and posts are used for window and door openings in a thinner wall profile. The thickness of the support wall is 50-55 cm and the timber frame wall’s is 10-12 cm. This leaves a 40-45 cm difference between wall thicknesses that is left in the ground room creating a platform under the windows.

There are other corner details that are not exactly joints. One of them is a single piece of timber element that placed on corners. This piece is L shaped with 80-100 cm perpendicular arms. The beams are joined at the ends of these arms with lengthening joints. This detail gives corner a seamless transition.

Another corner detail is done by cutting the ends of beams at 45 degree angles and placed perpendicularly. By this way, there is only a single vertical line at the corner angle.

Figure 4.1. Masonry walls of the ground floor and foundation of Arılı 105

Figure 4.2. Interior of the ground floor of Arılı 105

Figure 4.3. Timber frame section of the ground floor walls of Dereüstü 28

Phase 4: Constructing Beams and Plates of the First Floor

The bottom plates are put onto the masonry walls and tied to each other with joints. These plates generally consist of two beam components each have cross-sections around 20x20 cm. First set of beams put and tied at the corners. The tie beams that will carry the partition walls (taraba) are put on to first set. On the ground floor, post and beam system is constructed with 10x10 cm to 20x20 cm timber elements. The longer axis of the ground floor is passed on with a primary beam and supported with 2-5 timber posts. The posts are supported with stone bases, in order to prevent punching effect on the soft ground. The primary beams in this space are connected to the bottom plates of the first floor as well. On top of all the tie beams, other 20x20 cm plates are put and the bottom structure is completed.

The joints of the top and bottom plates have two different variations. *kurt boğaz* and *kertme boğaz*. Kurt boğaz are tenons that are cut out 10-20 cm before the ends of the beams, Perpendicular beams fit into each other's tenons thus creating a joint without extra bonding elements. In kurt boğaz joint type, 10-20 cm long excess parts of the beams are left out. As a side effect of this joint, 5-10 cm level difference between the perpendicular beams may be seen. Kertme boğaz joint does not have this bulge. The beams are cut out in their cross-sections from their halves with the depth of each other's thickness. Some of the joint lines may be angular resembling a dovetail joint. They are put onto each other thus creating a joint without extra bonding elements.

Sometimes, the lengths of the beams are not enough to cover the length façades. It is difficult to carry and process 10 m long logs or beams to the site. In this case, the two different timber elements are joined at the ends of each other, thus reaching the required size by lengthening. This is called lengthening joint (*boy uzatma*). The elements are joined with a diagonal line or with a kertme boğaz joint but with parallel elements.

Figure 4.4. Post and beam system in Yolgeçen 80

Figure 4.5. Beam joints on Arılı 91

Phase 5: Framing of the First Floor

The frame of the first floor starts carving mortises in the bottom plate. Then primary posts are placed on the corners and intervals with mortise and tenon joints. These posts have cross-sections ranging from 10x10 cm to 15x15 cm. The corner posts are supported with diagonal braces. 10x10 cm beams are placed at the top and bottom levels of window openings. The frame is closed on top with the top plate. The top plate is similar to the bottom plate. Two 20x20 cm beams are placed with either kurt boğaz joint, kertme boğaz joint, diagonal joint or corner piece at the ends. All of the assembly is done with joints. The rest of the wall construction differs according to the wall technique.

Göz Dolma: 5x5 cm profile timber posts are placed at 25-30 cm intervals. These posts have 1-2 cm deep indentations carved at every 25-30 cm. 3-5 cm wide wooden elements are slid into these indentations. The wall takes a grid form with 10 cm thickness. The stones are shaped into 20x20 cm rough squares and put into the holes. The extra spaces are filled with lime mortar. Inner faces of the wall are mostly cladded with timber planks or rarely plastered.

Muskalı: 5x5 cm profile timber posts are placed at 25-30 cm intervals. 3 cm wooden elements are placed at 60 degree angles which forms triangles along in between columns. The triangles are filled with crushed stones or pebbles and with mortar. Then it is plastered with lime. Muskalı is stronger against lateral forces compared to the other types, so diagonal bracings are not needed (Özgüner, 1970).

Çatma: The definition of the word çatma is timber frame. timber posts with profiles ranging from 5x10 to 10x10 cm are placed at 20-30cm intervals. In this type, no supplementary wooden elements are used to create patchworks the other types have. The empty vertical spaces are filled with pebbles and rubble stones. Lime mortar and plaster is applied to give the wall a clean look.

The dimensions given in these instructions are approximate for a typical house in Arhavi. The sizes and dimensions may differ from building to building, even in a single technique wall. But these differences are not too excess, so they do not change visual composition.

Figure 4.6. Göz dolma technique on Arılı 91

Figure 4.7. Taraba walls of Şenköy 3

Phase 6: Construction of Timber Partition Walls

The timber partition walls form the rooms by dividing the first floor plan. The name of this wall is *taraba* or *daraba* in the local language.

The first floor plan is defined by tie beams on the top and bottom plates. Timber posts with 10x10 cm profiles that are placed at the floor tie beams with mortise and tenon joints at planned intervals. Later, the roof tie beams will lock these posts in place. Thus, the skeleton of the structure also forms the interior partition walls. The corner posts are called *armoz direği*. The others are called *orta direk* (Özgüner, 1970). The timber partition walls are built by placing 3-5 cm thick, 20-30 cm wide timber boards in between. This joint technique is named *çalma boğaz*. The posts are named according to the number of channels the boards slide in, such as two channel post or three channel post. To secure the wall better, timber boards have corresponding 3-5 cm deep drilled holes between them, which are used to put pen shaped bolts called *kumar çubuğu*. These bolts are at the ends, also in the middle if the boards are long. They secure the boards against bending and distortion.

Alteration of the plan is easier with this technique. Posts are added or removed at the ends of the walls or on the sides of the doors. However, an alteration of plan seen in Arılı 33, does this by joining new planks directly to existing planks. Similarly to kertme boğaz, halves of the new planks are put in the holes made on the corresponding existing planks.

Phase 7: Roof Construction

The roof structure starts on the 20x20 cm double beam top plates of the timber frame walls and the tie beams connecting the top plates. Ceiling joists are put on the plates and tie beams. The truss posts are put on the middle points of the joists. They may be supported by bracings. The truss posts are connected to each other with the ridge beam. Rafters are put on the ridge beam and at the ends of the joists, completing the triangles of the trusses. The ends of the ceiling joists and rafters, hence the bottom corners of the trusses, overhang by 80-150 cm from the exterior walls to form eaves. Purlins are added as additional ties connecting rafters, thus trusses. Then battens are put onto rafters perpendicularly to carry the roof cover. The roof cover is put on the battens. There are three types of roof covers.

Hartama: The traditional roof covering in Arhavi was *hartama (hardama, harduma, pedavra, padavra)*. Hartama is a wooden tile that is generally 50 cm long and 0,5-1 cm thick. These tiles are laid on top of each other from the bottom to upwards, similarly to other tiles. After the ban introduced in Forest Law of 1956, which made it illegal to get timber tiles from the state-owned forests.

Hartama is produced from mostly fir or spruce wood. The tree trunk should be straight and has to be knot free. The tree is cut with frame saw (hızar) or axe. The log is cleaned from branches and snags with axes and left to dry for weeks or months. After the log is dried, it is divided in 50-100 cm long pieces. These pieces are split into 0,5-1 cm hartamas with the hartama knife and hammer. The hartama knife is a custom built tool to divide the logs along their grains, with hammer hits.

The hartamas are taken to the roof and nailed to the battens at their upper parts, where the next hartama will cover. By this way, the nail will be protected with the water. From bottom to top the roof will be covered partially covering each other. The water will drip from the top tile to the bottom tile, without leaking into the roof space.

Terracotta Barrel Tiles: These tiles are produced in factories within kiln furnaces. The clay is mixed with water to the proper consistency and pressed into the barrel shape. The shaped clays are baked in the kilns to reach required hardness. They have around 40x15x20 cm dimensions. They are placed in alternating series of upwards and downwards in each other laterally and then next line is stacked on top of the previous line, from bottom to top. The ridge tiles protect the break lines between the hip faces.

Corrugated Metal Sheets: The metal sheets do not have standard procedures or dimensions. With the industrialized production methods, older roof cover materials are replaced with cheaper and more durable metals. They are made of rust-proof materials such as stainless aluminum and galvanized steel. These sheets are nailed to the battens with waterproofed nails. By this way, the roofing is strengthened against wind forces.

Figure 4.8. Terracotta tiles of Yolgeçen 15

Figure 4.9. Corrugated metal roof covering of Arılı 105

Figure 4.10. Corrugated metal roof covering of Arılı 91

Phase 8: Flooring and Ceiling Construction

The generic flooring and ceiling construction techniques are very similar. 15-30 cm wide timber boards are nailed to the floor and ceiling joists. The thicknesses of the planks are 2-5 cm for ceiling, while 4-5 cm for the floors. The joists are mostly orientated to the shorter span of the room. The orientation of the boards is perpendicular to the joists, meaning cover in the longer span.

The ground of the oxoşgagure space is compacted earth. Özçakmak points out that the ground material is a red colored earth (Özçakmak, 2014). The top of the ground must have been treated with clay like layer for extra durableness against water and other physical conditions.

Figure 4.11. Flooring planks of Yukarıhacılar case seen from the ground floor

4.2. Hypothetical Construction Process for Bilgin House

The Bilgin House is located at the village of Şenköy and its door number is 3. It is located at the coordinates of “41.318310, 41.338470”.

The Bilgin House is selected as a main case and studied extensively. It is scanned with 3D laser scanners; detailed plans, sections and other drawings are drawn. In this topic, its construction process will be discussed in detail.

The house is unoccupied at the moment, as the family it belongs to no longer lives in the village for decades. It has a serender on the north, a water fountain on the west, tea field on the east, and road on the south. On a larger scale, the north and west of the house is surrounded by hazelnut trees. The house overlooks to the east, the village center of Şenköy and to the east to the river and the village road.

The foundation of the house could not be observed as it is not open to view. On the other hand, the stone masonry walls of the ground floor hint the continuation under the ground level as foundations. The hypothetical construction process is as follows.

The slope of the site is on east-west axis. The building footprint is excavated down to 1 meter deep at the middle point and the lower point of the slope for the two halves of the plans. The ground masonry walls are built, whose top level is 260 cm high from the ground floor base level. The thicknesses of the walls are; 60 cm of the south side wall, 50 cm of the north side wall, 70-80 cm of the retaining wall and 50 cm of the plinth wall. These thicknesses are not perfectly uniform as the walls are built with rubble stone. The masonry walls are heterogenous. The outer faces are coursed, and the sizes of the stones are steady with a range of 20-30 cm in heights and 15-40 cm in widths. The inner faces of the walls are built irregularly with unequal sized stones.

The lower wall of the ground floor is a masonry wall but has timber elements embedded in it. These timber elements support two 100x65 cm window openings. This section of the wall resembles a timber frame with the timber supports, but the rest of the wall is still masonry. It is 15 cm thick but have a support wall on the inside.

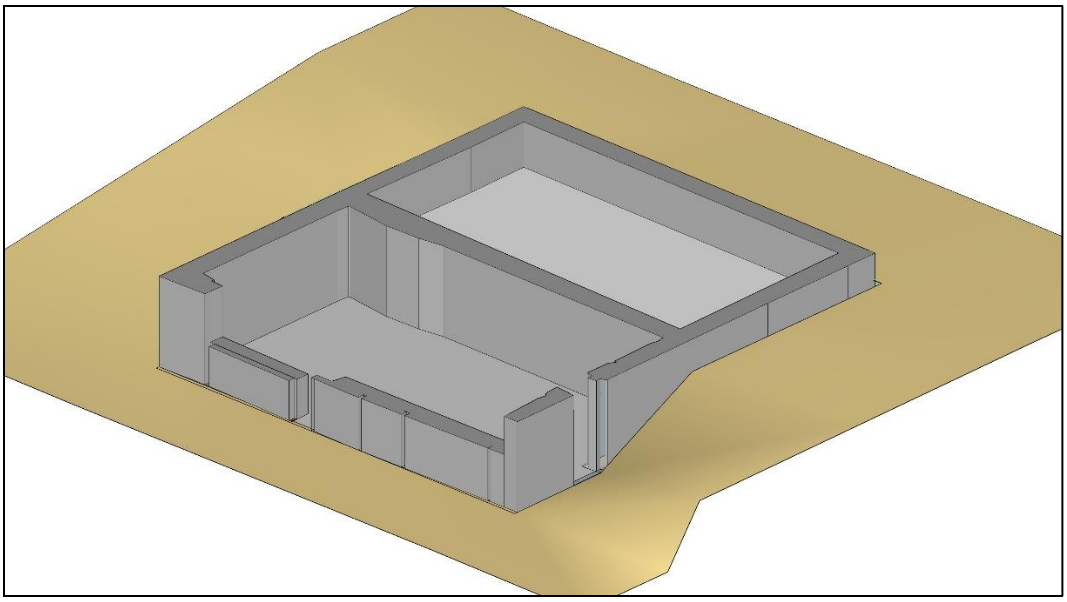

Figure 4.12. Masonry walls of the ground floor and foundation of Şenköy 3

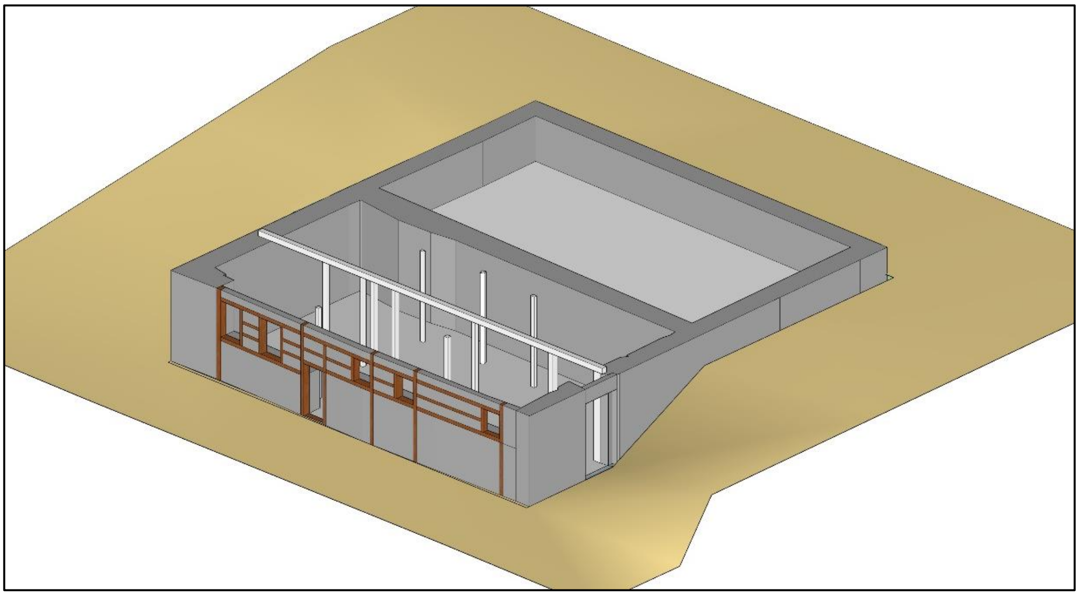

Figure 4.13. Timber frame lower wall of the ground floor of Şenköy 3

Figure 4.14. Ground floor of Şenköy 3 (Güliz Bilgin Altınöz, 2015)

Figure 4.15. View of Şenköy 3 from the southeast

The support wall is 100 cm high and 40-50 cm thick. There is a door on this wall with 140 cm height and 60 cm width. There are three other openings, but these are not windows. They have timber guards that is named lokmalı parmaklık. The dimensions of these openings are 65x55 cm.

Figure 4.16. Ground floor of Şenköy 3

The main door of the ground floor is on the northern side. The 50 cm masonry wall is omitted here, so the door is embedded into a 15 cm thick wall. Both doors of the floor are timber plank doors. It has 182x90 cm dimensions.

All in all, the masonry walls are blank except the main door, which is still located in a 15 cm thick wall section. They are built with roughly cut stones in a quasi-coursed style, but the inner faces and the retaining wall is irregular rubble stone masonry. The lower wall is built in a coursed and thinner profile, but it is supported with a 100 cm high support wall and bond beams.

The plinth walls that support the upper half of the plan are coursed and built with roughly cut stones. The stones have 25 cm heights and 15-30 cm (rarely 50 cm) widths. These walls are built up to the plate height as well.

Later, the bottom plates of the first floor are put on the masonry walls including the inner retaining wall. They consist of two beams. The beams are 13x13 cm sized in their cross-sections, making the whole plate 26x13 cm. These plates are connected with kurt boğaz joints. The primary and secondary beams in the ground floor are put in between these plates.

The post and beam system in the ground floor has a workmanship that is not precise, but it is strong. There are 13 timber posts that support the beams, with cross-section dimensions ranging from 10x10 cm to 13x13 cm. Also, there are posts embedded in the wall which supports the ends on the beams. The primary and secondary beams are 15x15 cm sized in cross-sections and they are connected to the bottom plates of the first floor. The floor joists are 10x10 cm sized in their cross-sections and put as the third layer of beams.

Figure 4.17. Section under the seki from ground floor in Şenköy 3

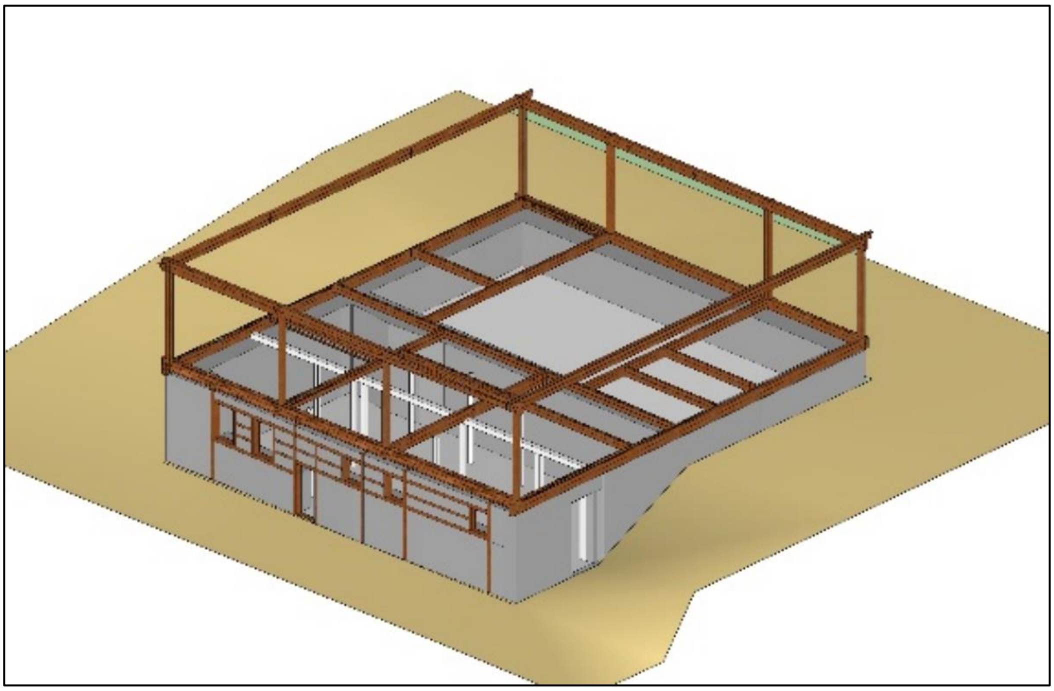

Figure 4.18. Post and beam system of the first floor

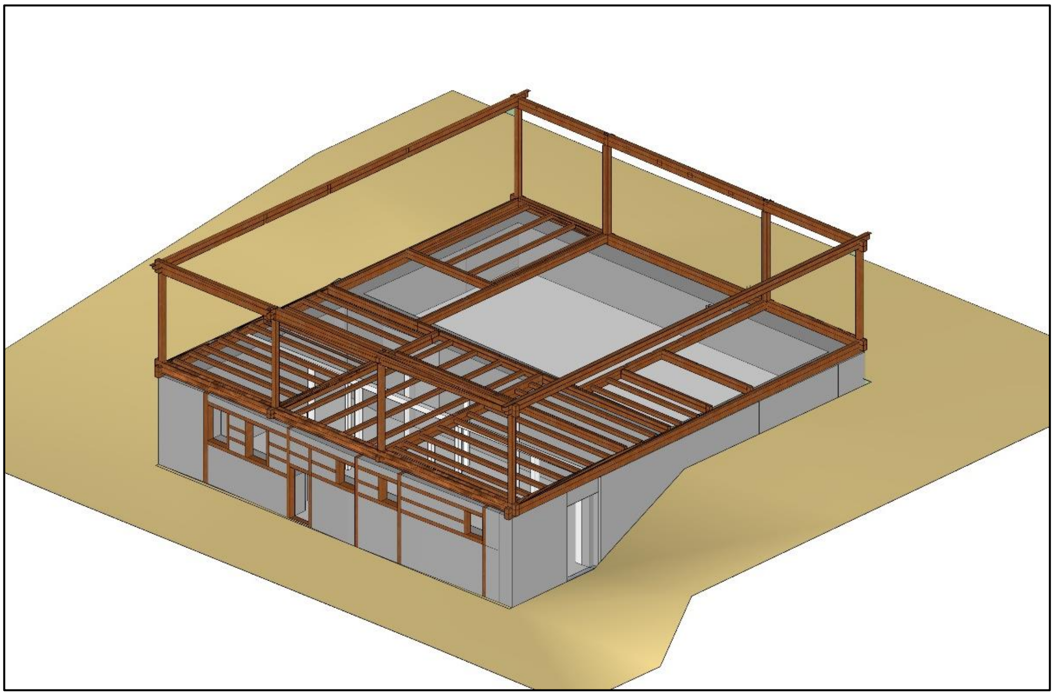

Figure 4.19. Placement of the floor joists

Figure 4.20. Wall plates with kurt boğaz joints

Figure 4.21. Post and beam system in the ground floor supporting first floor

The upper half of the plan is constructed separately in this phase. There are four double 13x13 cm sized tie beams with the combined size of 26x13 cm, that are supported by the bottom plates with kurt boğaz joint. Two of them divide the upper half of the plan by north-south axis, while the other two divide in east-west axis. Thus, the part of the first floor on the upper part of the partition wall is divided into 9 rectangles by tie beams. These beams will act as the bases of the partition walls later. At this stage a stable skeleton is required for the next stages. So, to start with 13x13 cm posts are placed on the bottom plates and floor tie beams, where the interior timber partition walls and exterior doors correspond. The inner partitions walls, or locally named as taraba, is constructed between 13x13 cm posts that are placed on the beams. 20 cm wide 3 cm thick planks are slid into the channels from top. This joint is named çalma boğaz. These planks have holes corresponding to each other in which timber rods are placed to bond the planks. The name of this pieces is kumar çubuğu or kavela in Turkish. When the walls are built up to the ceiling level, the top plates and ceiling tie beams are put on the posts, to stabilize the walls. All elements are joined with mortise and tenon joints.

Figure 4.22. South and west elevations of Şenköy 3

The next stage is constructing the timber frame of the walls. The Bilgin House is built with dolma göz technique. Some mortises are channels where the tenons are slid into from the interior face of the walls. To start framework, 10x10 lateral elements are placed at the bottom of window openings. Then, 10x10 cm profile posts are placed 25-29 cm intervals. At last, the 5x10 cm wooden elements are slid into the mortises in the 10x10 cm posts. The end result creates the grid timber frame with 22x15 cm to 25x25 cm rectangles. In the south elevation there is a distorted section that has 36 cm width, but it is an exception that only repeats at two columns of the grid. The window and door openings are left blank during this framework.

There is a stone fireplace in the köşk room that is supported by a 10 cm thick wooden element put on the stone protrusions in the ground floor. The fireplace is built with round rubble stones. Exterior face of the fireplace does not have a timber frame, but built with coursed rubble masonry, similarly to the ground floor wall under it. The fireplace has no chimney on the roof. It was probably demolished in a later stage.

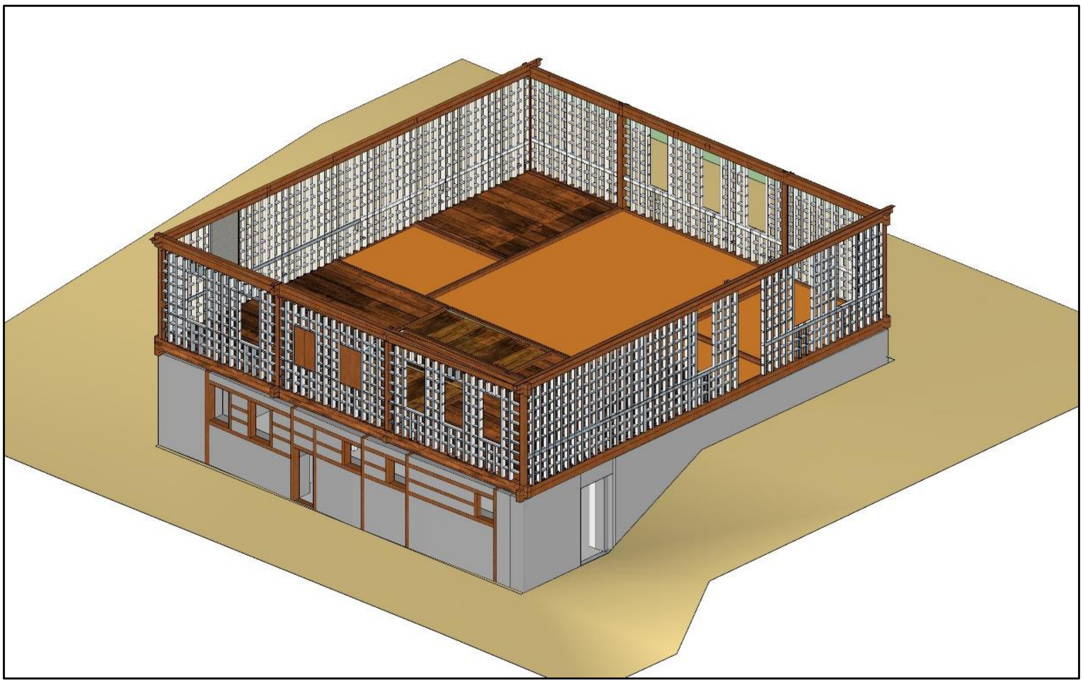

Figure 4.23. Construction of the dolma göz framing and floor coverings

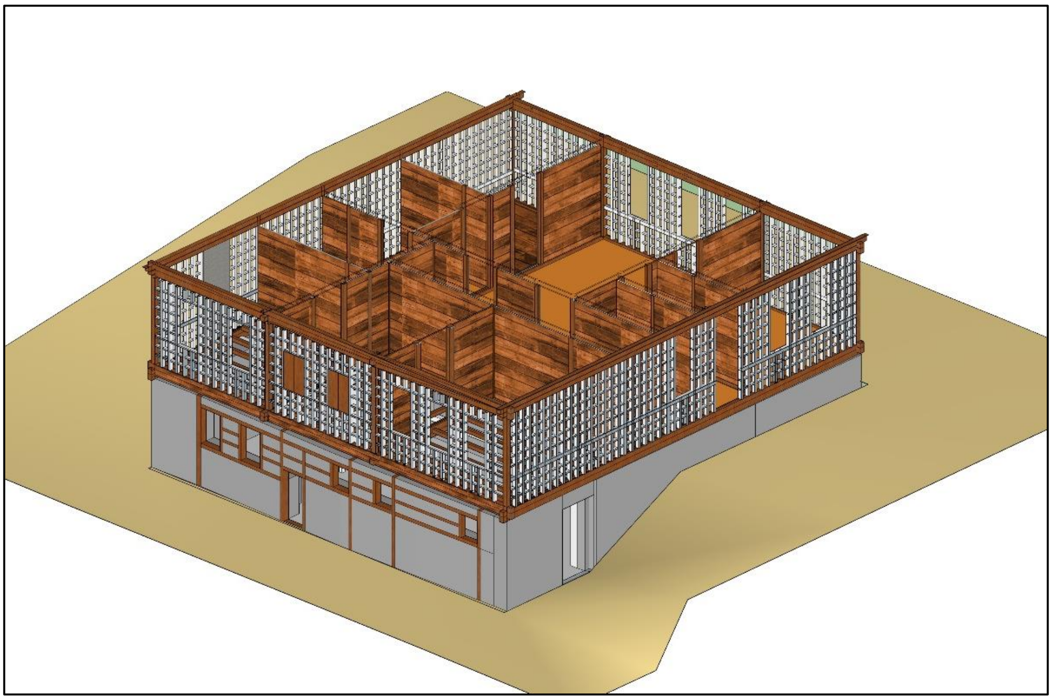

Figure 4.24. Construction of interior partition walls (taraba)

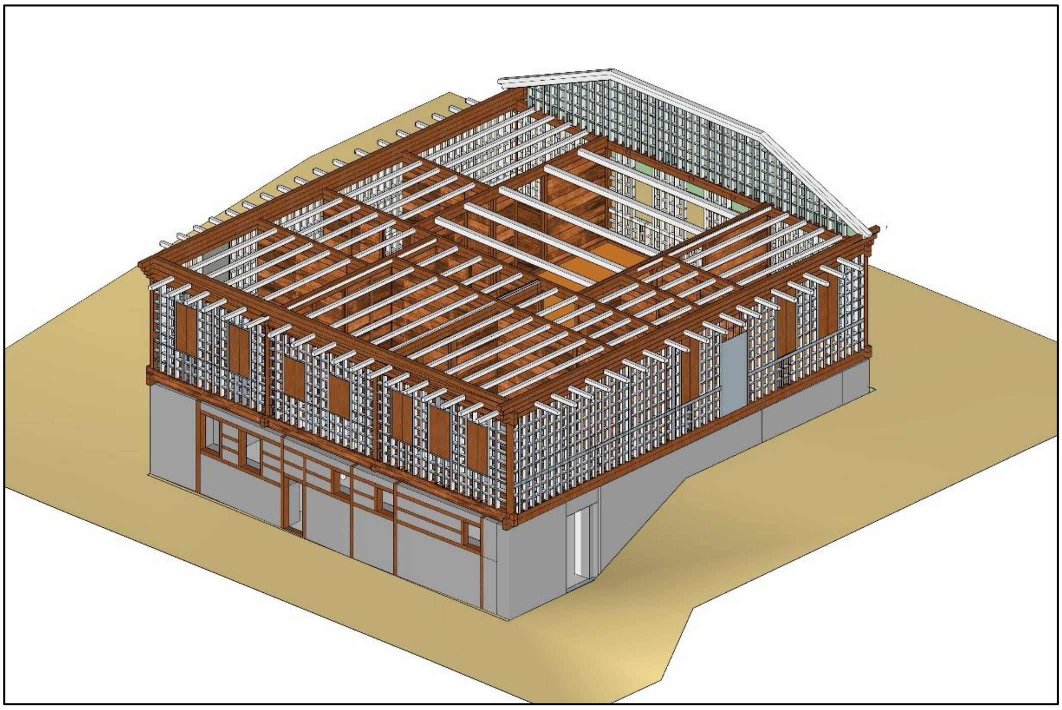

Figure 4.25. Placement of top plates of walls and ceiling joists, and construction of gable wall

Figure 4.26. Taraba wall dividing oxoşgagure and vestibule

Figure 4.27. Oxoşgagure of Şenköy 3 (Güliz Bilgin Altınöz, 2015)

The stones shaped beforehand with chisels and hammers into the 20x13 cm or 23x23 cm rough squares are put into the holes of the grids. They leave 1-2 cm gaps around them in the grids but sit on the bottom. The gaps are filled with lime mortar mixed with clay. The white color of the lime seeps onto the stones, covering them in the grids.

The roof construction is an urgent phase as the timber structure needs to be protected from the rain and water as soon as possible. The roof of the Bilgin House is 3 hipped and one half hipped. The half hip is named sağrıcık in Turkish. The roof structure starts on the 16x12 cm and 13x12 cm double beam top plates of the timber frame walls and 13x13 cm tie beams connecting the top plates. This cropped gable on the sağrıcık façade is built with dolma göz technique. Top of the sağrıcık wall is framed with double 12x12 cm profile beams. 10x10 cm profile roof joists are put on the plates and tie beams at 50 cm intervals. The roof tie beams are double 12x12 cm beams, but they are supported by the taraba walls and timber posts. The hanger posts are put at the intervals of the joists. On top of the hangers, the collar ties and the middle of the collar ties the ridge posts are placed. The ridge posts are connected to each other with the ridge beam. 3x10 cm rafters are put on the ridge beam and on the purlins connecting the ends of the joists, completing the triangles of the trusses. Purlins are added as additional ties connecting rafters, thus trusses. The ends of the ceiling joists and rafters, hence the bottom corners of the trusses, overhang by 90 cm from the exterior walls to form eaves. The overhang on the sağrıcık is 70 cm. The eaves are open but closed at the façade with four or five 12x12 beams that support rafters and close the roof space. Then battens are put onto rafters perpendicularly to carry the roof cover.

Today, the roof is covered with corrugated metal sheets. The sheets are nailed to the battens with custom sealed nails. The ridges are covered with additional 20 cm wide sheets.

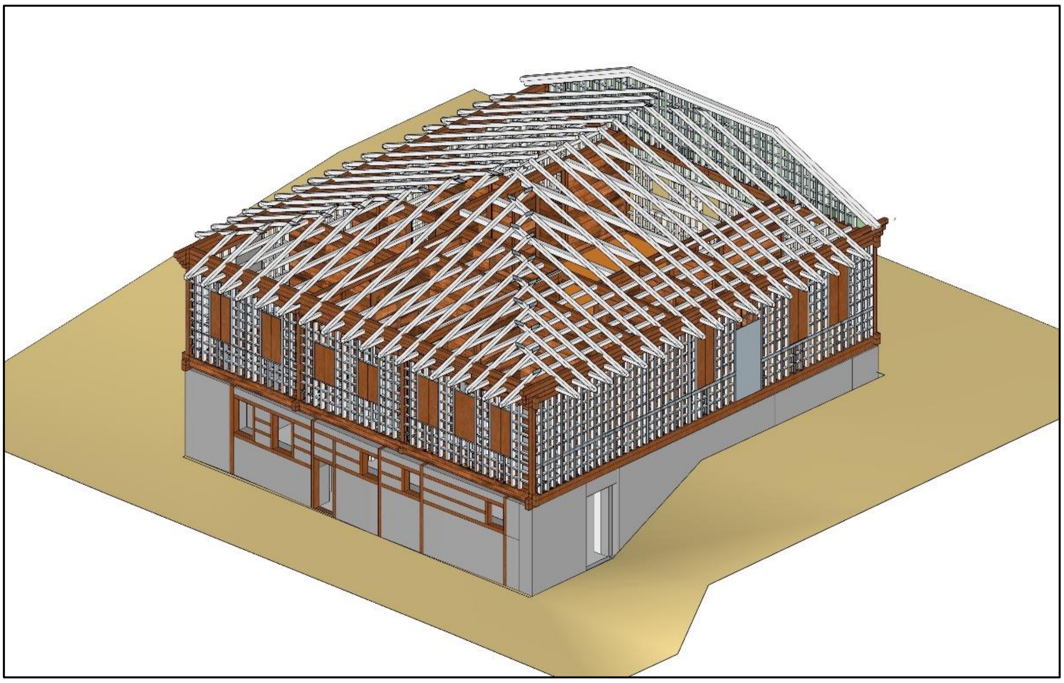

Figure 4.28. Construction of the roof structure

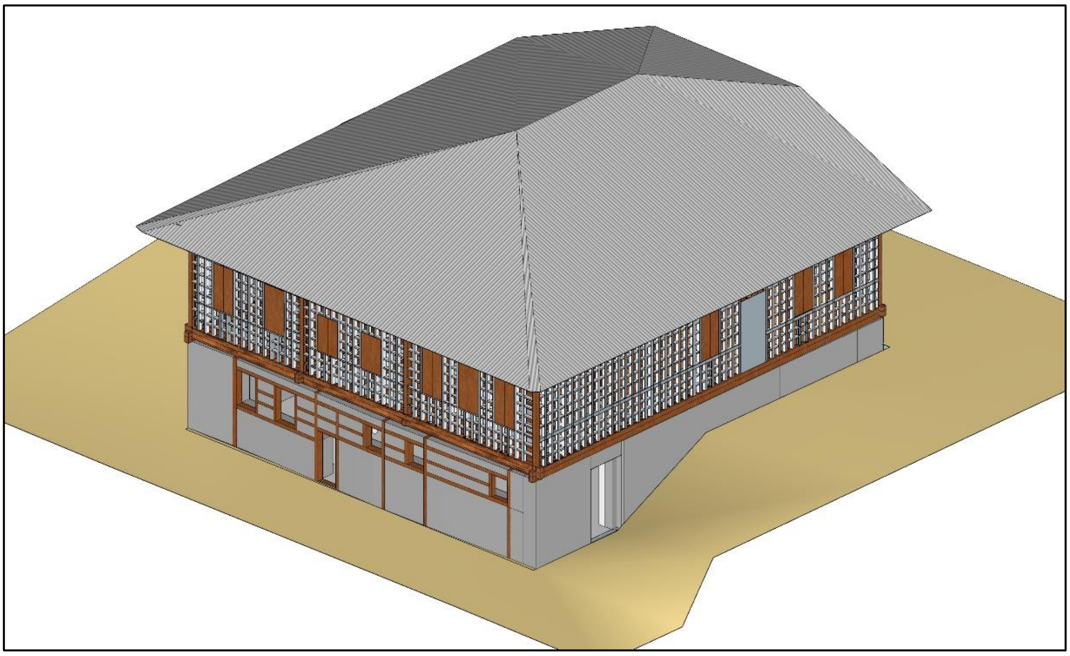

Figure 4.29. Placement of the corrugated metal sheet roof covering

Figure 4.30. Fireplace and cabinets in the Köşk room of Şenköy 3 (Güliz Bilgin Altınöz, 2015)

Figure 4.31. Northwest corner of Şenköy 3

The next phase is building the flooring and the ceiling. The oxoşgagure space originally have no ceiling and flooring cover. 10x10 cm floor joists are placed in the other rooms, where timber plank flooring will be built. Timber planks with 5 cm thicknesses and widths ranging from 12 cm to 25 cm are put on the joists and nailed. Ceiling is constructed with the same technique under the 10x10 ceiling joists.

The window openings were left blank during the framework. There are two types of elements; shutters and sash windows. These are built in specialized workshops, not in situ. They are installed in the reserved spaces with their frames. The shutters are panels that are swing action elements connected to the frame by metal hinges. The sash windows are three piece wooden elements where the glass is sandwiched in between on their edges. The sash windows have one fixed on top half and one vertically moving part on bottom half. The bottom half moves in its channel upwards and locked in place with a metal hinge lock. Each half is square with four glass panels. In addition to the windows and shutters, the openings have metal bars. These join into the frames.

The doors are similarly built and put in their places between the taraba posts. They are installed with the hinges within their frames. The xayati space has double-wing panel doors, while the others are single-wing panel and single-wing plank doors.

When all the elements of the structure are built interior elements such as cabinets and fireplace are constructed. The oxoşgagure cabinet is missing today. But its 5x5 cm timber supports stand in place. The skeleton of the oxoşgagure cabinet is built with these 5x5 cm timber supports. The shelves and the doors seen on the other oxoşgagure cabinets are built with solid wood panels carried by the timber supports. The other glass cabinet in the didi room is supported with similar technique, but its stained glasses and extreme detail shows it was built by a skilled craftsman in a workshop.

Figure 4.32. Remains of the oxoşgagure cabinet

Figure 4.33. Timber shutters and metal guards

4.3. Evaluation of The Study Through 11 Studied Houses

The aim of this chapter is to blend all the information on the 11 studied houses that was presented above and to evaluate the results by interpreting the data. For this, traditional structural and architectural elements are studied, classified grouped together in Chapter 3. A comparison of the forms, techniques, functions, and material use were made. A table was created from the gathered data (see figure 5.1, 5.2).

The assessments are derived from the site surveys, case studies, written sources, and general research on the subject. Recent alterations and additions are omitted during the data collection and process phases. Evaluations and notes obtained from the study are as follows:

- Plan configuration of traditional Arhavi house differs from the Turkish house classifications of Eldem (1954) and Kuban (1995). Spaces of oxoşgagure and xayati do not fit the definitions of those in Anatolia in these sources.
- While the structural configuration fits the definition, structural elements defined in the Anatolian house by Şahin Güçhan (1997), such as bond beams (*hatıl*), braces (*payanda*) and lath technique (*bağdadi*), do not exist in rural traditional Arhavi houses.
- The traditional rural houses of Arhavi are generally two story with just a few exceptions. This rule is established by the rural lifestyle, which is close to the ground and in relation with the outside.
- Today, most of the population of the region has migrated to bigger cities. The villages and the houses are vacated seasonally. This and other factors led to the abandonment of the livestock raising. The ground floors were all used as barns. So, the grounds of the ground floors were mostly earth. In 4 cases, the ground floors have been converted to living spaces from barns, and they are covered with timber flooring due to the function change.

- The two floors of the Arhavi houses are not connected from the indoors due to strict barn/house relationship. The only route between these spaces are through outside. With the function change in the ground floor, timber stairs are added between the floors in 4 cases.
- The materials used in the constructions of traditional Arhavi houses are dictated by availability, properties and economic conditions. Hartama was replaced by metal sheets on roofs after the use of state forests was banned. Wood was a common material for the locals, then it became a valuable trade commodity. Today, the metal sheets are more economical than terracotta tiles and hartama, in terms of initial cost and upkeep. Thus, 9 of the 11 studies cases have metal sheets (Type B) as roof covering.
- All of the inner retaining walls of the ground floors are built with rubble stones. They are not in view, so aesthetics is not a concern.
- All of the upper halves of the plans of the houses are elevated from the ground level with plinth walls (Type B). These walls rise up to the window levels in some cases creating 40-50 cm platforms in first floors.
- When the upper walls of the first floor are masonry (kalkan duvar, Type 2), It is always accompanied by a fireplace in the oxoşgagure (Type 2). Three cases that have this wall has conjoined fireplaces, and all three oxoşgagure fireplaces are located at the masonry upper walls.
- All of the coursed and cut stone walls (Type 1,2) of the ground floors are uncoursed and built with rubble stones (Type 3) in the interior faces.
- The houses with dolma göz (Type 1) and timber plank (Type 4) exterior wall techniques always have kurt boğazı joints on their top and bottom plates (Type 1).
- In four cases, the wall thickness of the lower wall of the ground floor is between 10x15 cm. In three of the cases the technique of the first floor, çatma

or masonry with a section of çatma, is repeated on a 100 cm high masonry plinth wall (Type 3). All of the ground walls that have these thinner frame walls have, or had at some time, sash windows (Type 2).

- All of the interior walls are timber partition/taraba walls.
- When there are open fire/hearth in the oxoşgagures, inner faces of the exterior walls at the oxoşgagures are plastered, not cladded. Despite this, the other three walls of the same oxoşgagures are still tarabas/timber partition walls.
- Untreated exterior walls are seen only in vestibules and toilets. The functions in these spaces dispense the need for surface treatment unlike in living spaces.
- The ground floor doors are always located at the side elevations, while openings and windows are generally located on the lower elevations.
- If there are windows on the upper walls of the oxoşgagure, there is a full size cabinet at the opposite wall, that is between the oxoşgagure and xayati.
- In four of the cases the timber partition walls between oxoşgagure and xayati and oxoşgagure cabinets are removed. The oxoşgagure-xayati rooms are merged into single living rooms.
- The gable walls on sağrıcıks/half hips always have openings that are darkened due to smoke. These are the signs of the open fire in the oxoşgagures. All of these cases have windows at the upper walls of oxoşgagures. The houses with sağrıcıks also have oxoşgagure cabinets, except Dereüstü 58. This house is recently restored and the partition walls and oxoşgagure cabinet was removed.
- The roofs on the elevations of shield masonry walls are always gabled. One of the shield walls cover the gable, while two of them are covered with the same timber frame technique of their first floor walls.
- Shutters are not removed even if the window casings are replaced with new models.

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Detail classification with coding system and distribution in studied houses

	Masonry Walls							Timber Frame Walls								Joints				Roofs					Eaves	
Houses/Types	1	2	3	4	A	B	C	1	2	3	4	5	A	B	C	1	2	3	4	1	2	3	A	B	1	2
1 Şenköy 3	G1w	x	F0w	F1w G1w	x	G1we F0w	Fo1 G1wi	F1we	x	x	x	F1wi	F1we	F1we	F1we	F0b R0b	x	x	x	x	x	R1	x	R2c	x	R2
2 Arılı 105	G1w	F1w	F0w	x	G1we	x	Fo1 G1w F0w	x	x	F1we	x	F1wi	F1we	x	x	x	F0b R0b	x	x	x	R1	x	x	R2c	R2	R2g
3 Arılı 33	G1w	F1w	F0w	x	x	x	Fo1 G1w F0w	x	x	x	F1we	F1wi	F1we	x	x	F0b R0b	x	x	x	x	R1	x	x	R2c	x	R2
4 Arılı 91	G1w	x	F0w	x	x	G1we	Fo1 G1wi F0w	F1we	x	F1we	x	F1wi	F1we	F1we	x	F0b R0b	x	x	x	x	R1	x	x	R2c	x	R2
5 Arılı 47	G1w	F1w	F0w	x	x	x	Fo1 G1wi F0w	F1we	x	x	F1we	F1wi	F1we	x	x	F0b R0b	x	x	x	x	R1	x	x	R2c	x	R2
6 Yukarı Hacılar	G1w	x	F0w F1w	x	x	x	Fo1 G1wi F0w	x	x	F1we	x	F1wi	F1we	F1we	x	R0b	F0b	x	F0b	x	x	R1	x	R2c	R2	x
7 Dereüstü 28	G1w	x	G1w F0w F1w	x	x	G1we F0w F1w	Fo1 G1wi	x	x	F1w G1we	x	F1wi	x	F1w	x	x	F0b R0b	x	x	R1	x	x	x	R2c	R2	x
8 Dereüstü 58 (Osman Ağa Konağı)	G1w	x	F0w	x	x	G1we F0w	Fo1 G1wi	F1we	x	x	x	F1wi	x	F1we	x	x	R0b	F0b	F0b	x	x	R1	R2c	x	R2	x
9 Yolgeçen 80	G1w	x	F0w F1w	x	x	G1we F0w F1w	Fo1 G1wi	F1we	x	F1we	x	F1wi	x	F1we	x	F0b R0b	F0b R0b	x	x	R1	x	x	x	R2c	x	R2
10 Dereüstü 20 (Berona)	G1w	x	G1w F0w F1w	x	x	G1we F0w F1w	Fo1 G1wi	x	x	F1we G1we	x	F1wi	F1we	G1we F1we	x	x	F0b R0b	F0b	F0b	x	R1	x	x	R2c	R2	x
11 Yolgeçen 15	G1w	x	G1w F0w	x	x	F0w	Fo1 G1w F0w	F1we	x	G1we	x	F1wi	F1we	G1we	x	F0b R0b	x	x	x	x	x	R1	R2c	x	x	R2
Total Counts	11	3	11	1	1	7	11	6	0	7	2	11	8	8	1	7	6	2	3	2	5	4	2	9	5	7

Figure 4.34. Detail classification and distribution in the studied houses

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Detail classification with coding system and distribution in studied houses

	Windows and Openings						Doors				Fireplaces			Cabinets			Floors			Ceilings			Sekis		Stairs	
Houses/Types	1	2	3	4	5	6	1	2	3	4	1	2	3	1	2	3	1	2	3	1	2	3	1	2	1	2
1 Şenköy 3	x	G2w F2w	F2w	F2w	R2w	G2w	G2d F2d	F2d	F2d	F2d	F2fi	x	F2fi	F2ca	x	F2ca	G2f F2f	F2f	F2f	F2c	x	F2c	F2se	F2se	G2s F2s	x
2 Arılı 105	G2w	x	F2w	F2w	x	x	G2d	x	F2d	F2d	x	F2fi	x	x	F2ca	x	G2f	F2f	F2f	F2c	F2c	x	x	x	G2s F2s	x
3 Arılı 33	G2w	x	F2w	F2w	x	x	G2d F2d	F2d	x	F2d	x	F2fi	x	x	x	x	G2f	F2f	x	F2c	x	x	x	x	G2s F2s	x
4 Arılı 91	G2w	F2w	x	F2w	x	x	G2d F2d	F2d	x	x	F2fi	x	x	x	x	x	G2f	F2f	x	F2c	x	x	x	x	G2s F2s	x
5 Arılı 47	G2w	F2w	x	F2w	x	x	G2d F2d	F2d	F2d	x	x	F2fi	F2fi	x	F2ca	F2ca	G2f	F2f	x	F2c	x	x	x	x	G2s F2s	x
6 Yukarı Hacılar	x	G2w F2w	x	x	R2w	x	G2d F2d	F2d	x	F2d	F2fi	x	F2fi	F2ca	x	F2ca	G2f	F2f	x	F2c	x	F2c	x	x	G2s F2s	x
7 Dereüstü 28	x	G2w F2w	x	x	x	x	x	x	F2d	F2d	x	x	F2fi	x	x	x	x	G2f F2f	x	F2c	x	x	x	x	G2s F2s	x
8 Dereüstü 58 (Osman Ağa Konağı)	G2w	F2w	x	x	R2w	x	G2d F2d	F2d	F2d	F2d	F2fi	x	x	x	x	x	G2f	G2f F2f	x	F2c	x	x	x	x	x	G2s F2s
9 Yolgeçen 80	x	G2w F2w	x	F2w	x	x	G2d F2d	F2d	F2d	x	x	x	F2fi	F2ca	x	x	G2f	F2f	x	F2c	x	x	x	x	G2s F2s	x
10 Dereüstü 20 (Berona)	x	G2w F2w	F2w	x	x	x	G2d	F2d	F2d	F2d	x	x	x	x	x	x	x	G2f F2f	x	F2c	F2c	x	x	x	G2s F2s	x
11 Yolgeçen 15	x	G2w F2w	x	F2w	R2w	x	G2d F2d	G2d F2d	F2d	x	F2fi	x	x	F2ca	x	x	x	G2f F2f	x	F2c	x	x	x	x	G2s F2s	x
Total Counts	5	9	4	7	4	1	10	9	8	7	5	3	5	3	2	2	8	11	2	11	2	2	1	1	10	1

Figure 4.35. Detail classification and distribution in the studied houses (continued)

CHAPTER 5

CONCLUSION

The construction techniques and architectural features of the traditional Arhavi houses are studied and examined in detail, by gathering and documenting comprehensive data. Sociological and economic changes in the region are threatening the architectural culture and tangible cultural heritage. Recent interventions that are results of modern lifestyle and new techniques and materials, both harm the existing traditional structures and render functional elements redundant. This thesis follows an individual to holistic approach to substantiate the traditional construction techniques and determine the relations between the construction systems and elements, which has not been done before in the region. The findings and deductions are evaluated in Chapter 5. The conclusion that may be derived from the of the study are as follows:

- Traditional rural Arhavi house share general structural principles of Ottoman house; however, differ from it in terms of structural details and plan configuration.

- This study mainly focuses on documenting the construction details and their relations; however, a great effort on inventory studies and revitalization actions is needed to conserve the buildings. The main problems seen in the buildings emerge from abandonment and incompatible interventions such as alterations and additions.

- This thesis focuses on 11 buildings in Arhavi locality and misses other construction techniques and variations such as çakatura, timber masonry and muskalı, which are scattered around rural regions of Rize and Artvin. A mountain village differs from a coastal village and a river village. In addition to the single building studies, more comprehensive studies focused on the relations of the techniques and settlement patterns located at different scenarios can be done.

- In a further research, the exact locations of the sources of the materials used in the constructions could be determined through interviews with the masons and houseowners. It is known that most of the stones were taken from the riverbed and most of the timber was taken from the state forests from the valley. However today all of the building materials are taken from market, where whatever types of wood available are sold. This leads to incompatible interventions. For example, Dereüstü 58 was completely restored recently, but the timber partition walls are built with cheaper pinewood instead of chestnut wood. A detailed inventory of the sources of the construction materials could help to organize a better and economical solution to protect authenticity of the buildings.
- Another potential of research can be through interviews with the local builders. While modern structures have been replacing the traditional techniques, the traditional techniques and processes are still alive in their existence and in the know-how of the local builders.
- This study paints a hypothetical picture of the traditional construction techniques in the region. However, each building has a different story and unique qualities that are too specific to cover in document of this scale. On the other hand, similar techniques and components are used throughout the Eastern Black Sea Region. The complementary structures such as serenders are found at a greater area, from Sakarya to Artvin. Inclusionary studies are needed to define subgroups of the architectural culture in the Black Sea region, which will identify the similarities and contrasts and create an extensive classification

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APPENDICES

A. Drawings of Şenköy 3 and Documentation of the Cases

Detailed plans, elevations and sections of Şenköy 3 are provided in this appendix from A.1 to A.16. The documentation posters of the 11 studied houses provided from A.17 to A.27.

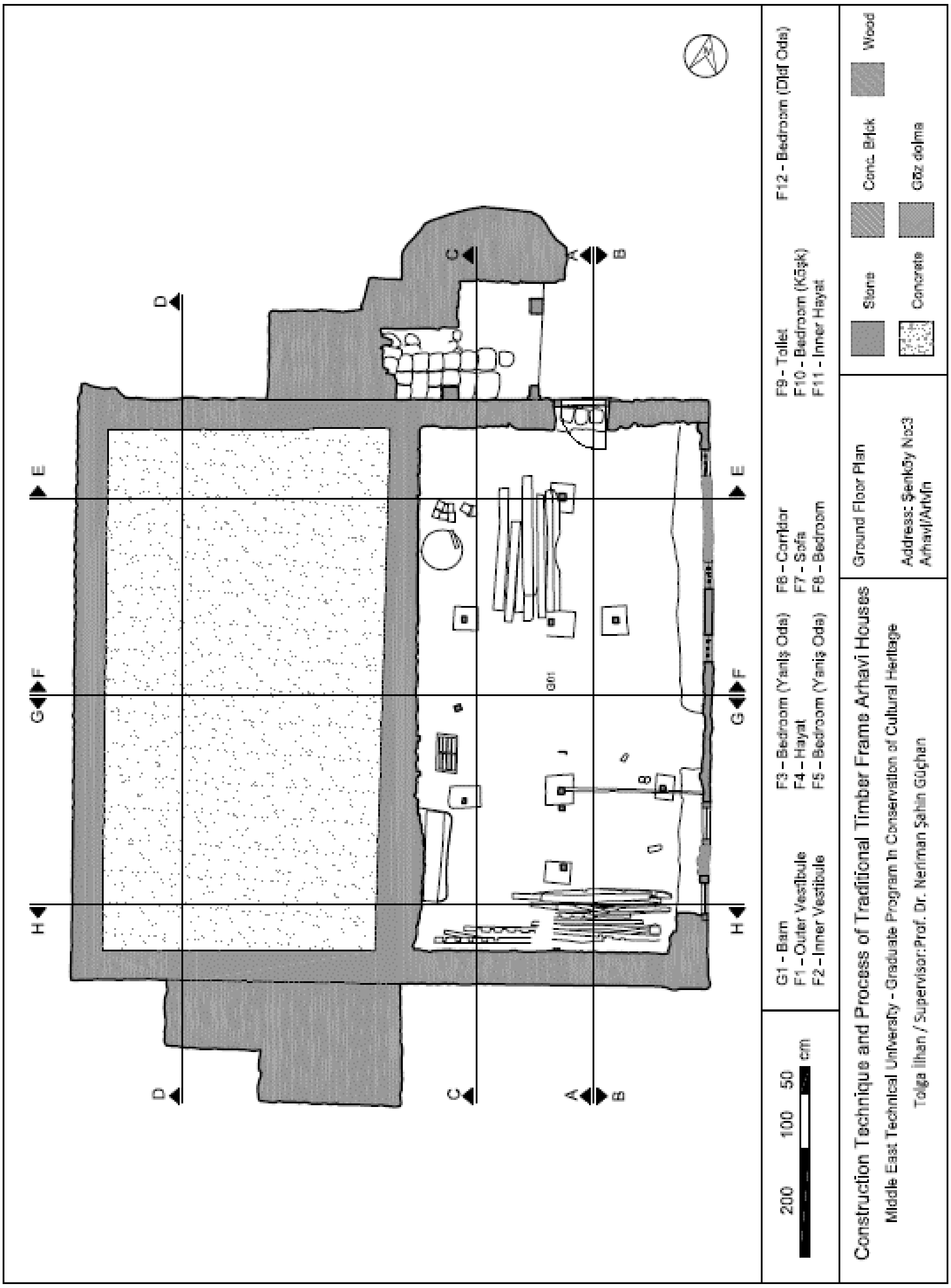

Figure A.1. Ground floor plan of Şenköy 3

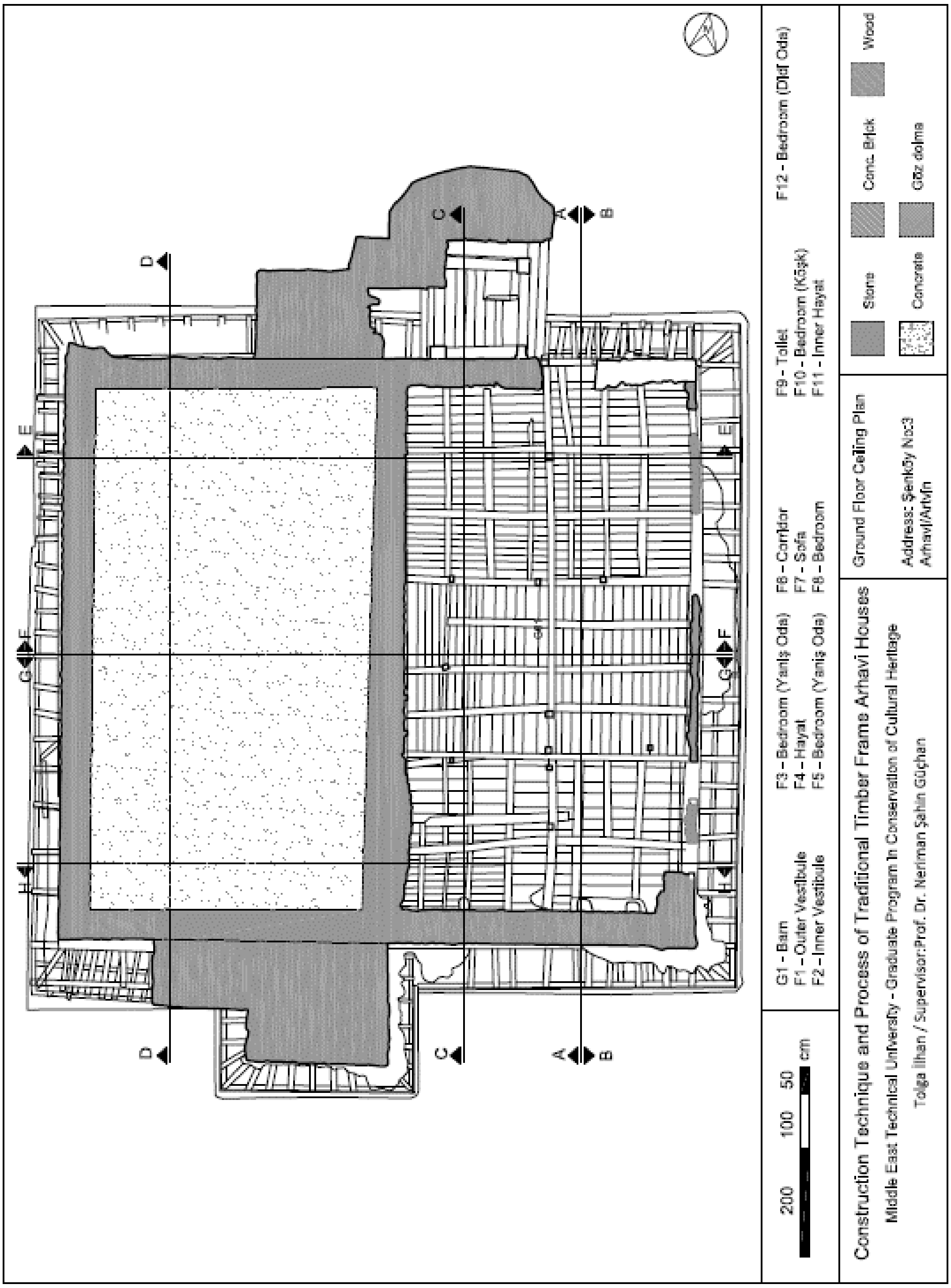

Figure A.2. Ground Floor Ceiling Plan of Şenköy 3

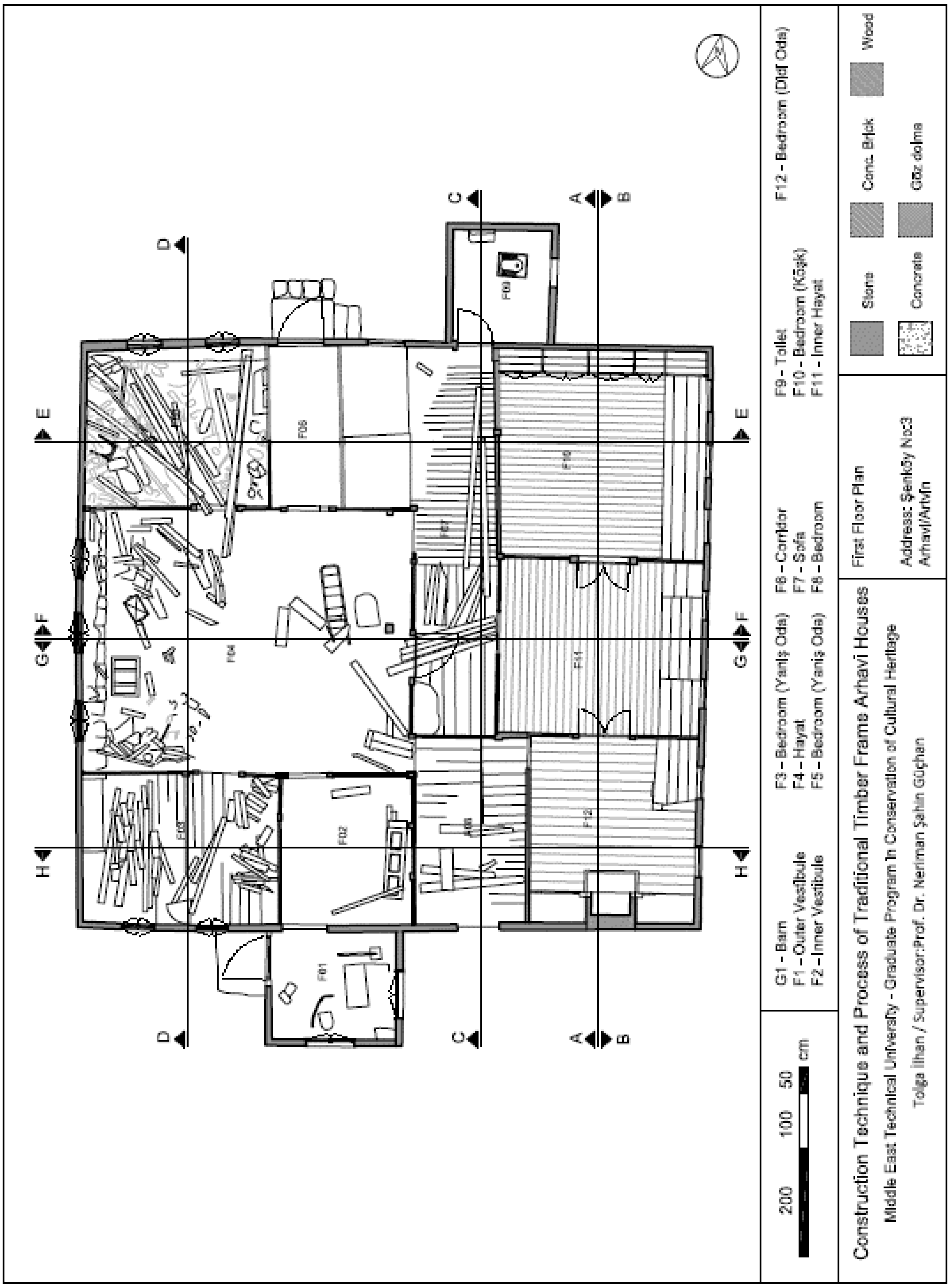

Figure A.3. First Floor Plan of Şenköy 3

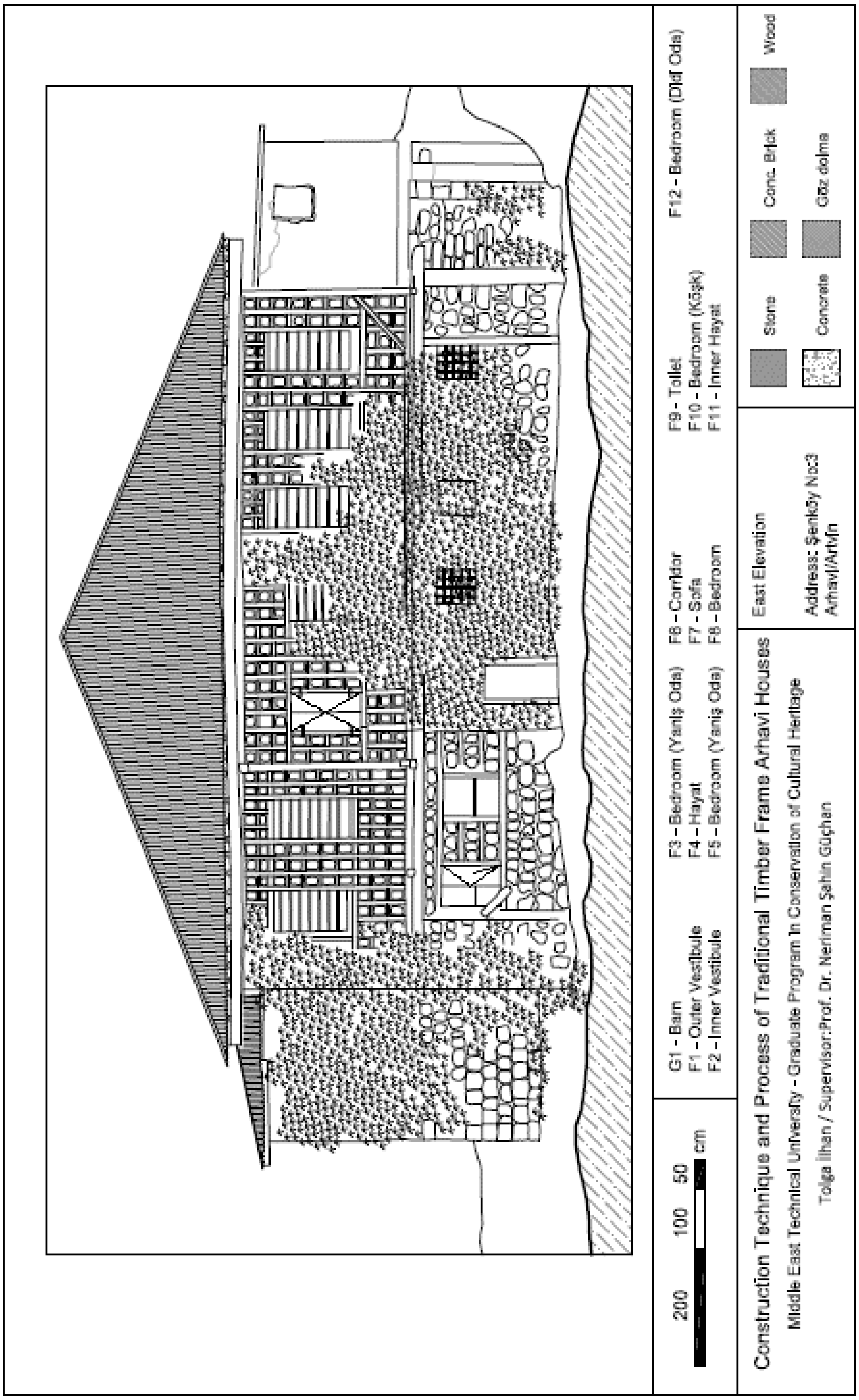

Figure A.4. East Elevation of Şenköy 3

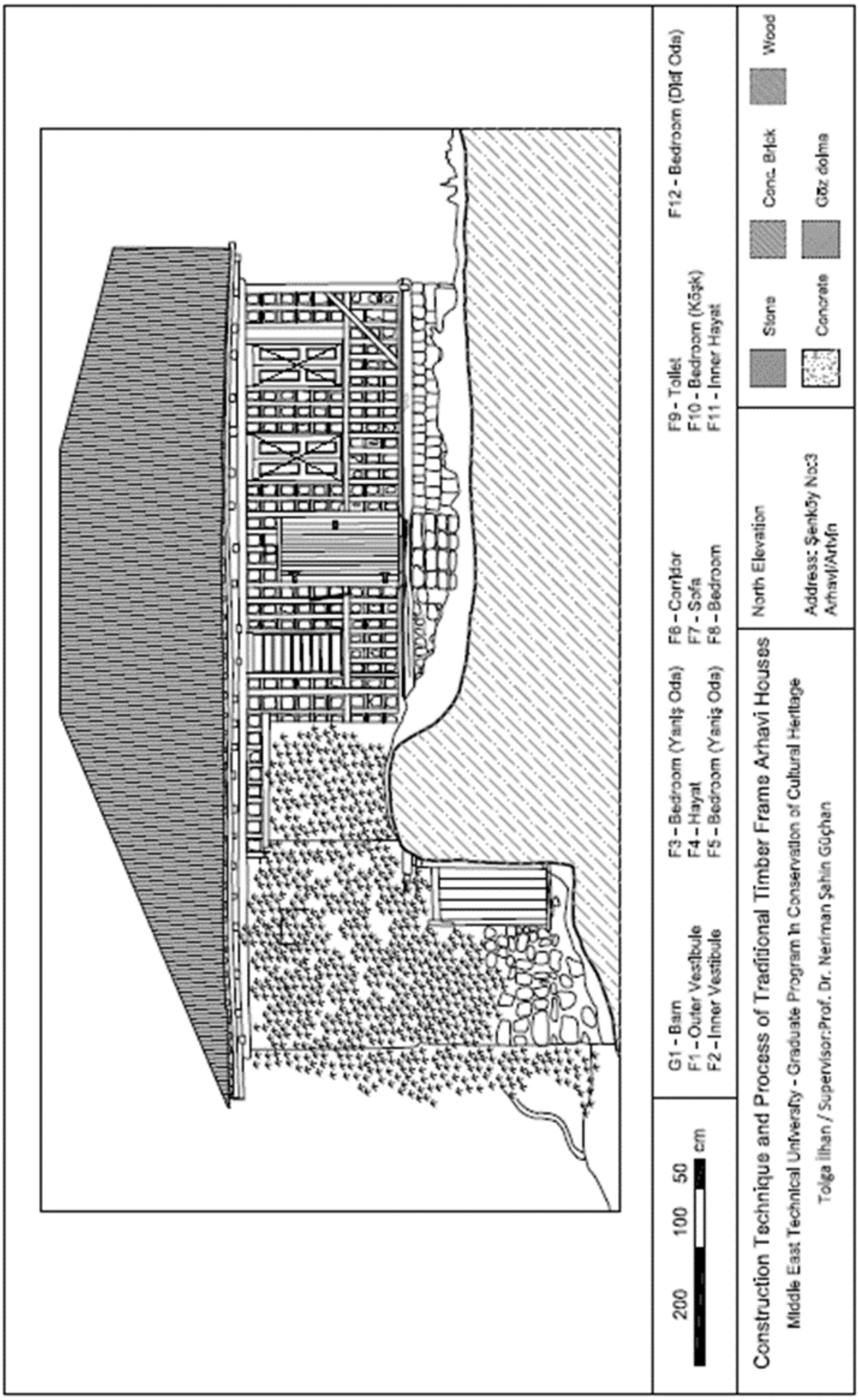

Figure A.5. North Elevation of Şenköy 3

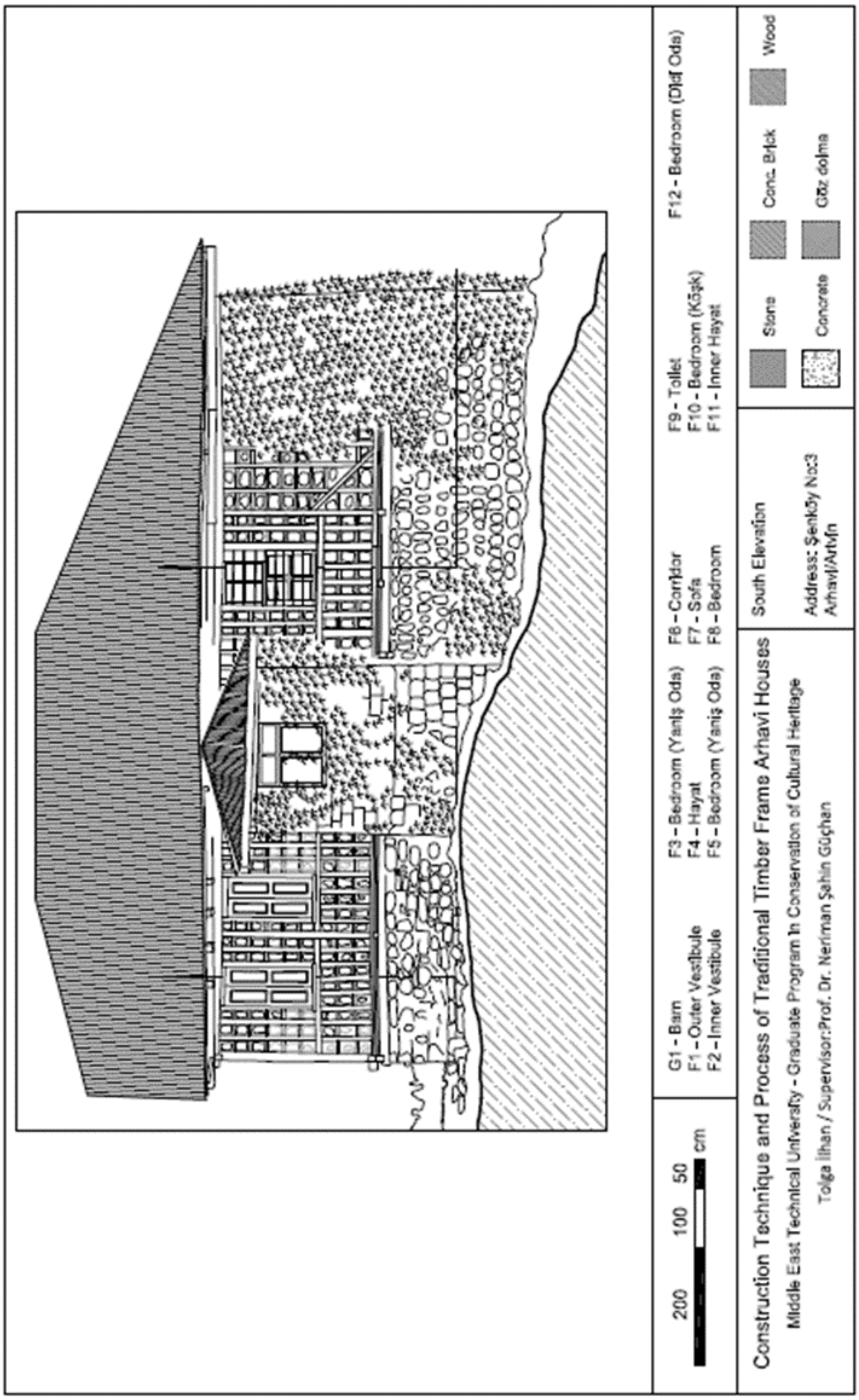

Figure A.6. South Elevation of Şenköy 3

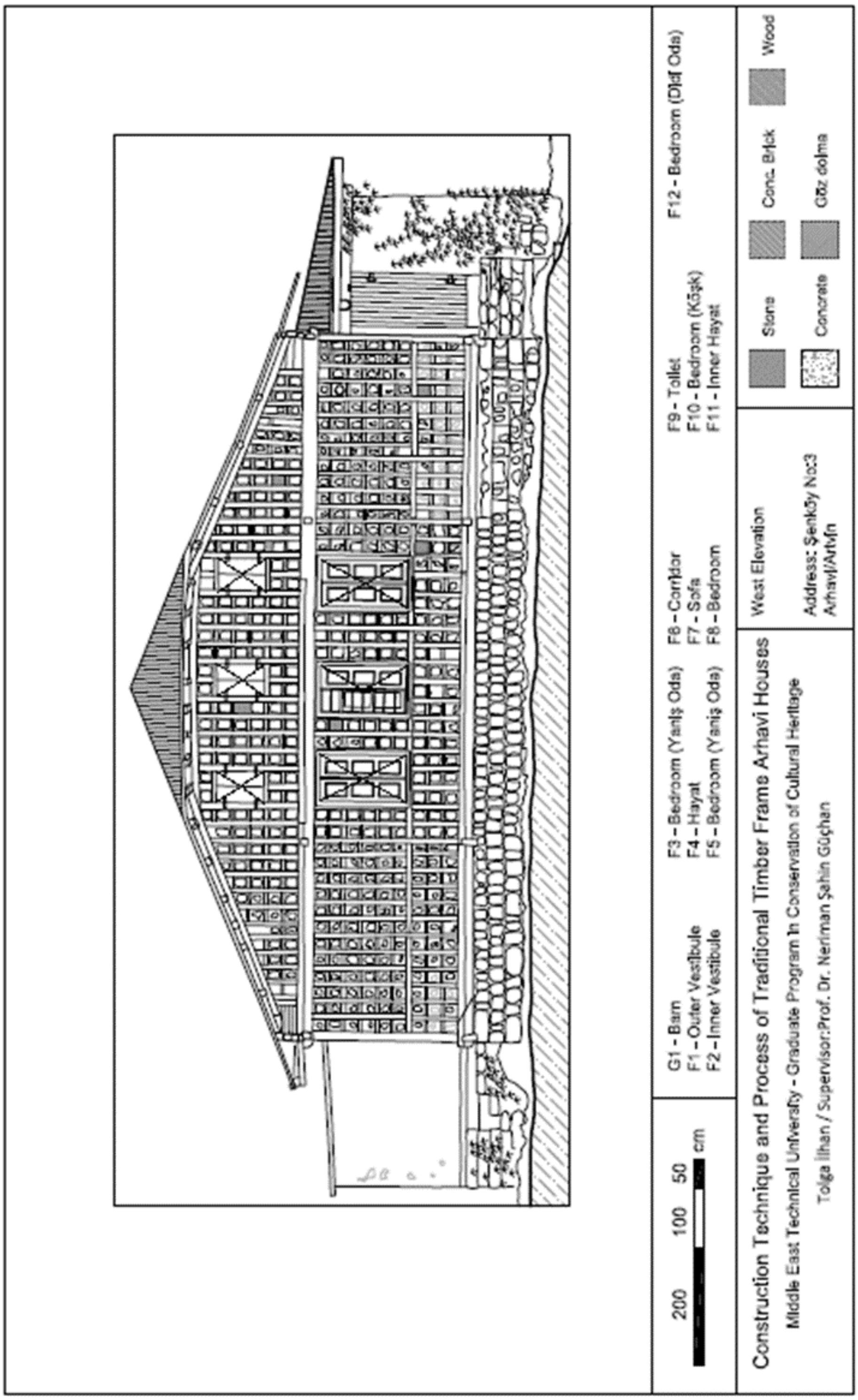

Figure A.7. West Elevation of Şenköy 3

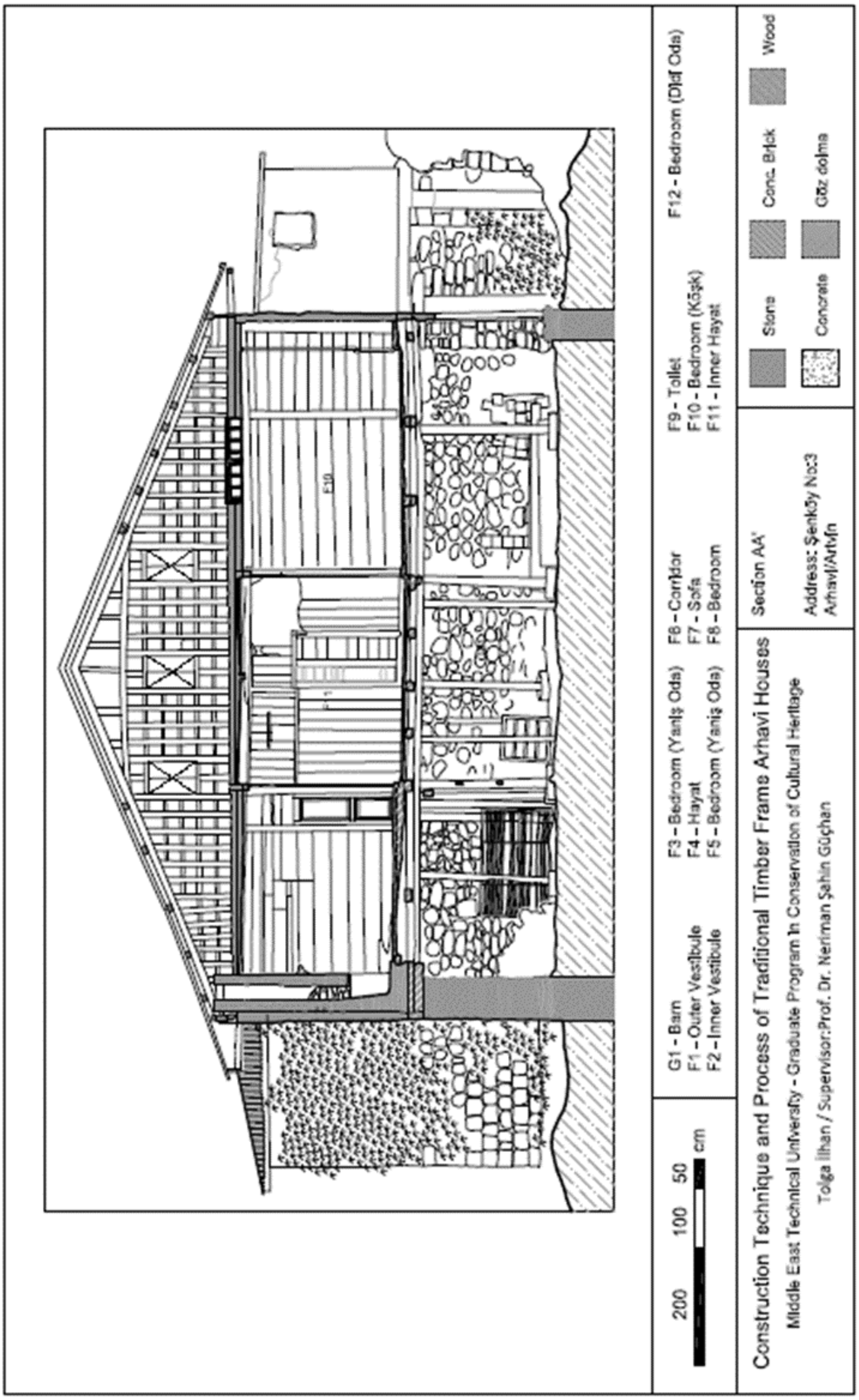

Figure A.8. Section AA’ of Şenköy 3

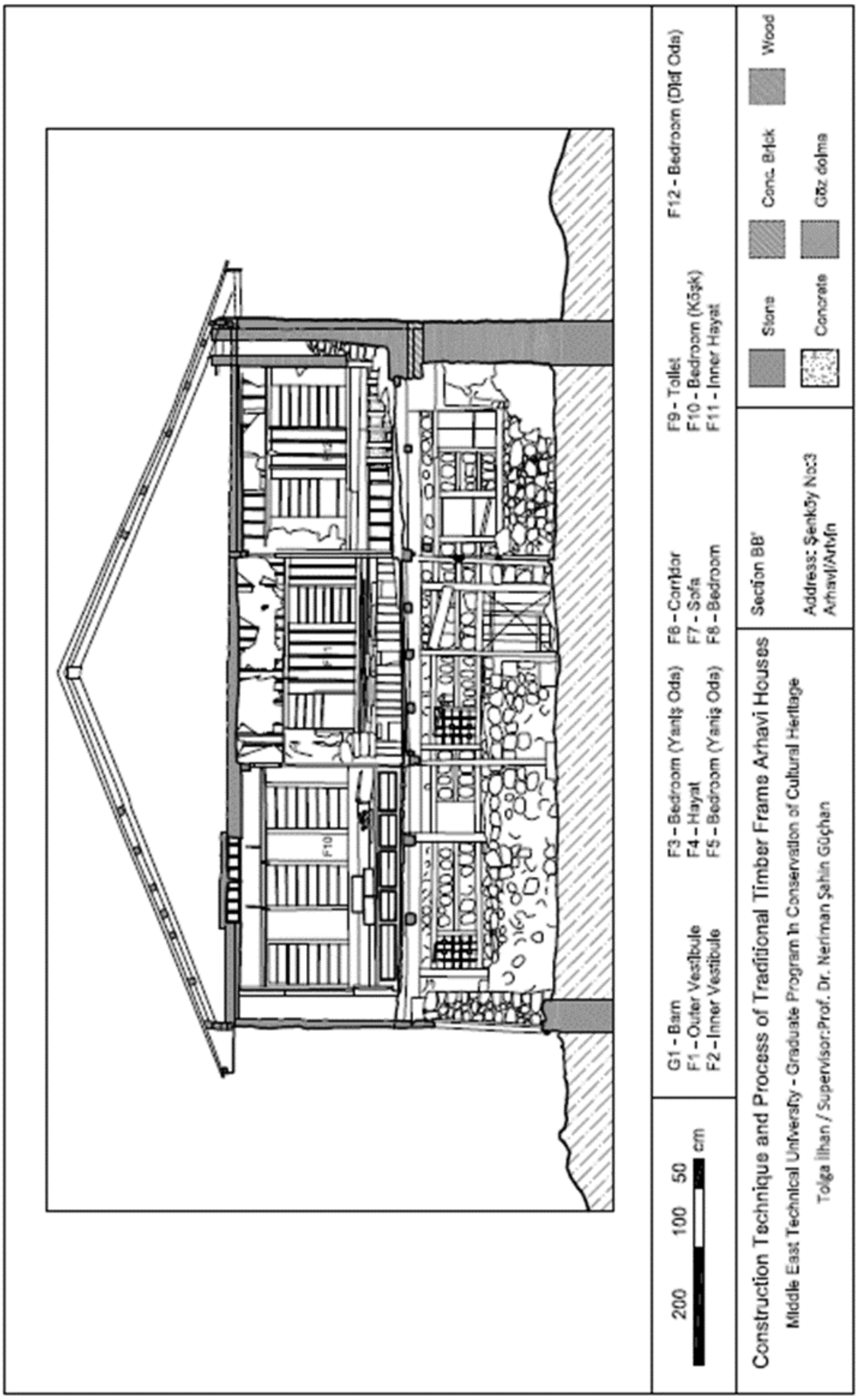

Figure A.9. Section BB’ of Şenköy 3

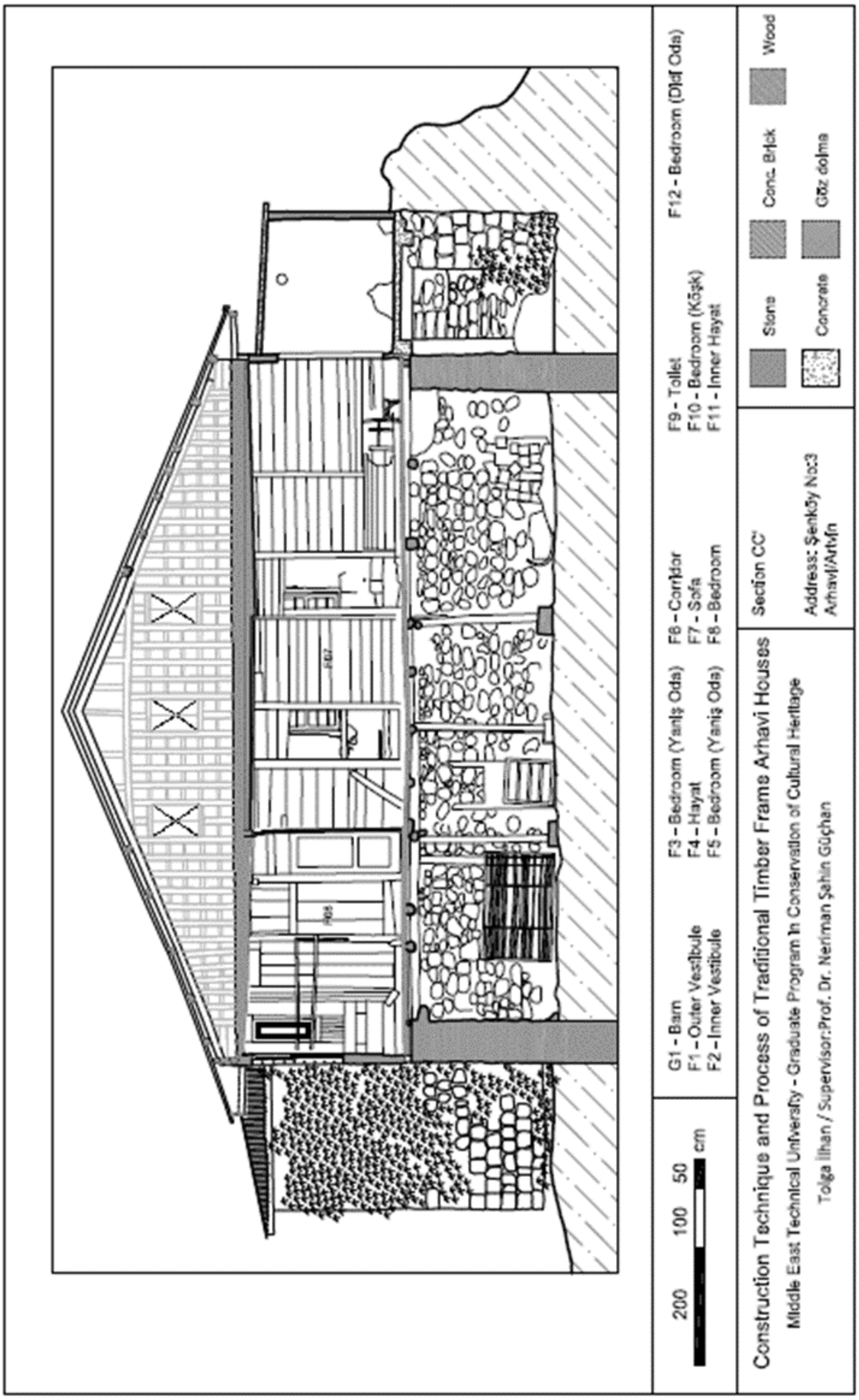

Figure A.10. Section CC’ of Şenköy 3

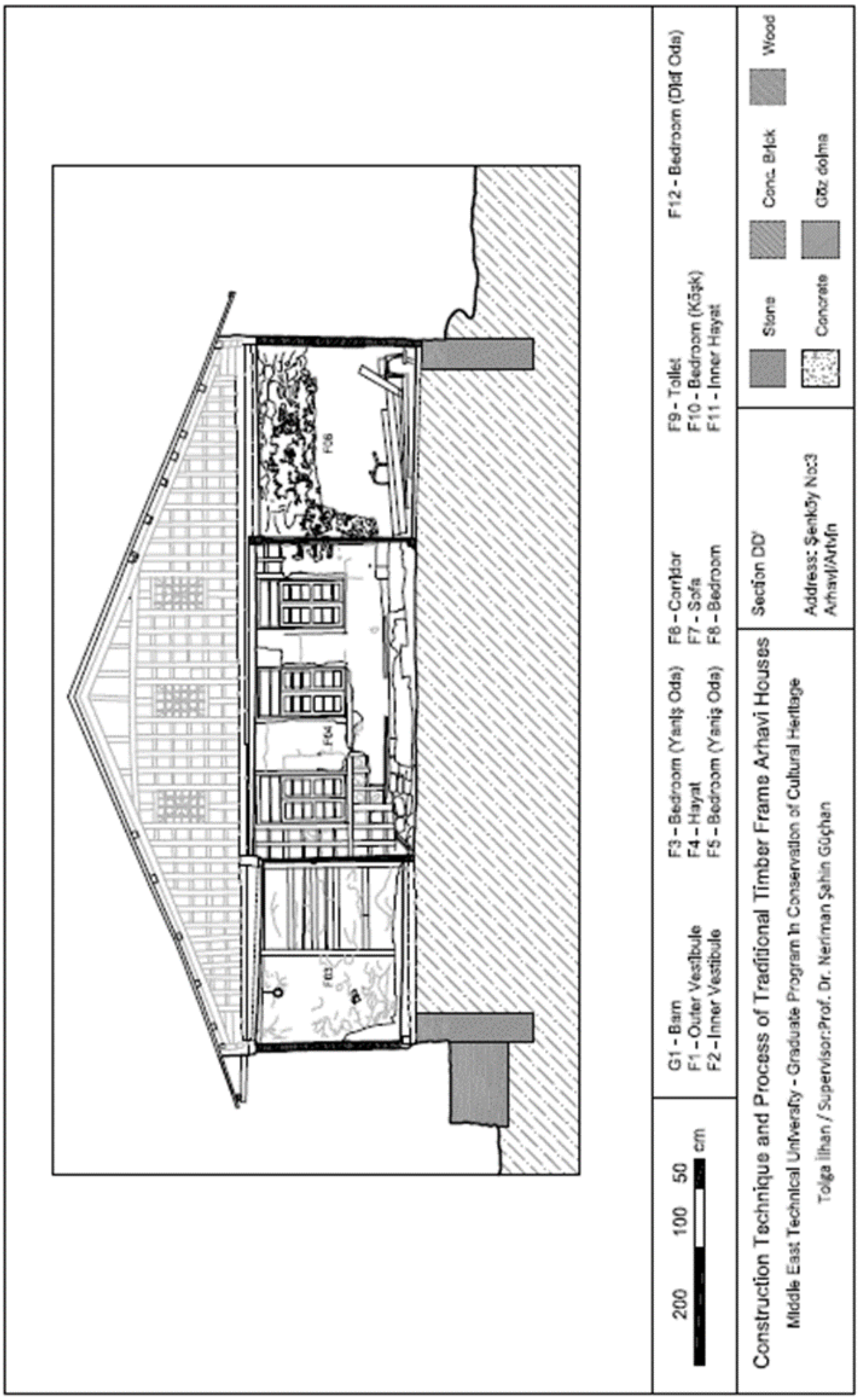

Figure A.11. Section DD' of Şenköy 3

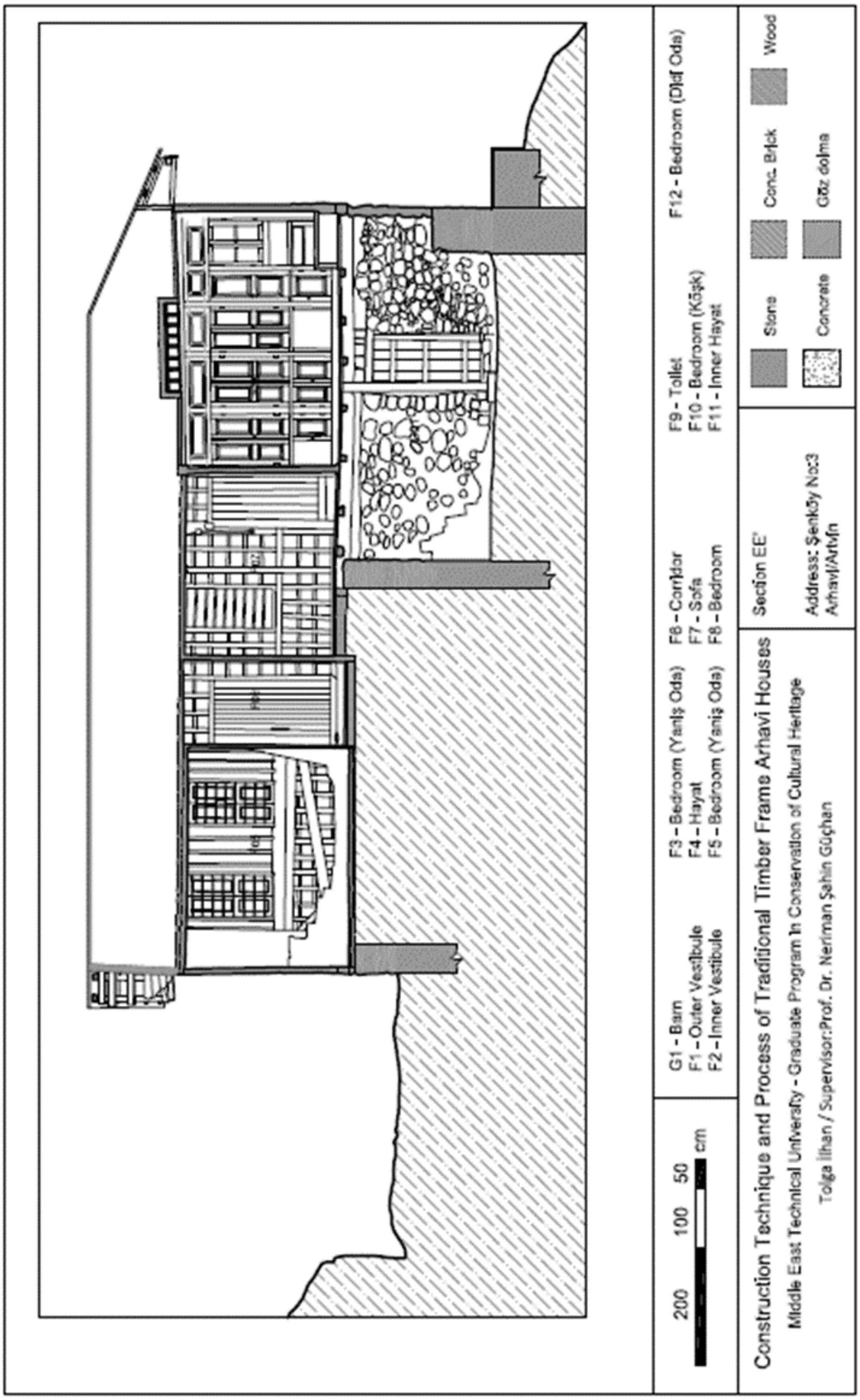

Figure A.12. Section EE' of Şenköy 3

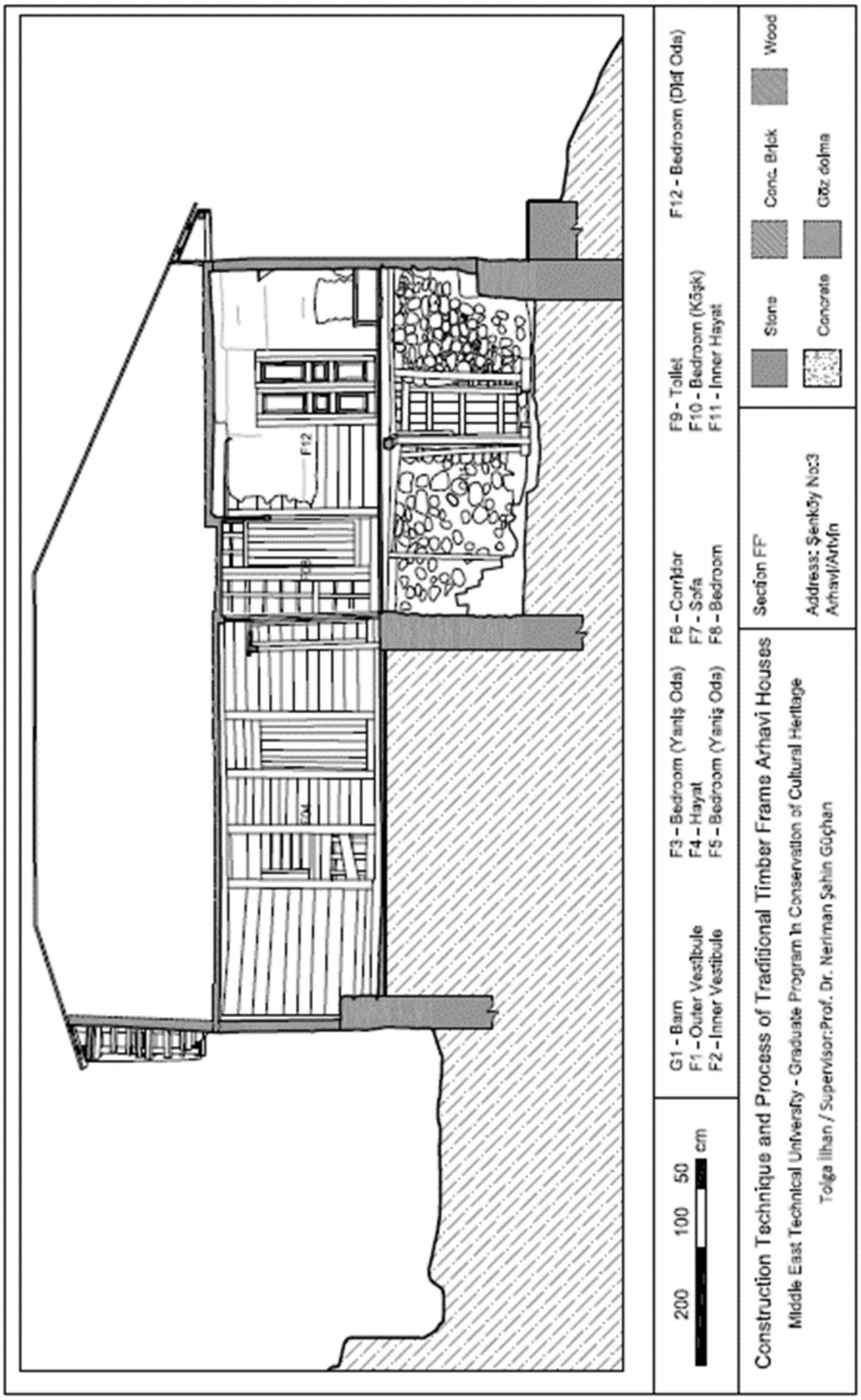

Figure A.13. Section FF’ of Şenköy 3

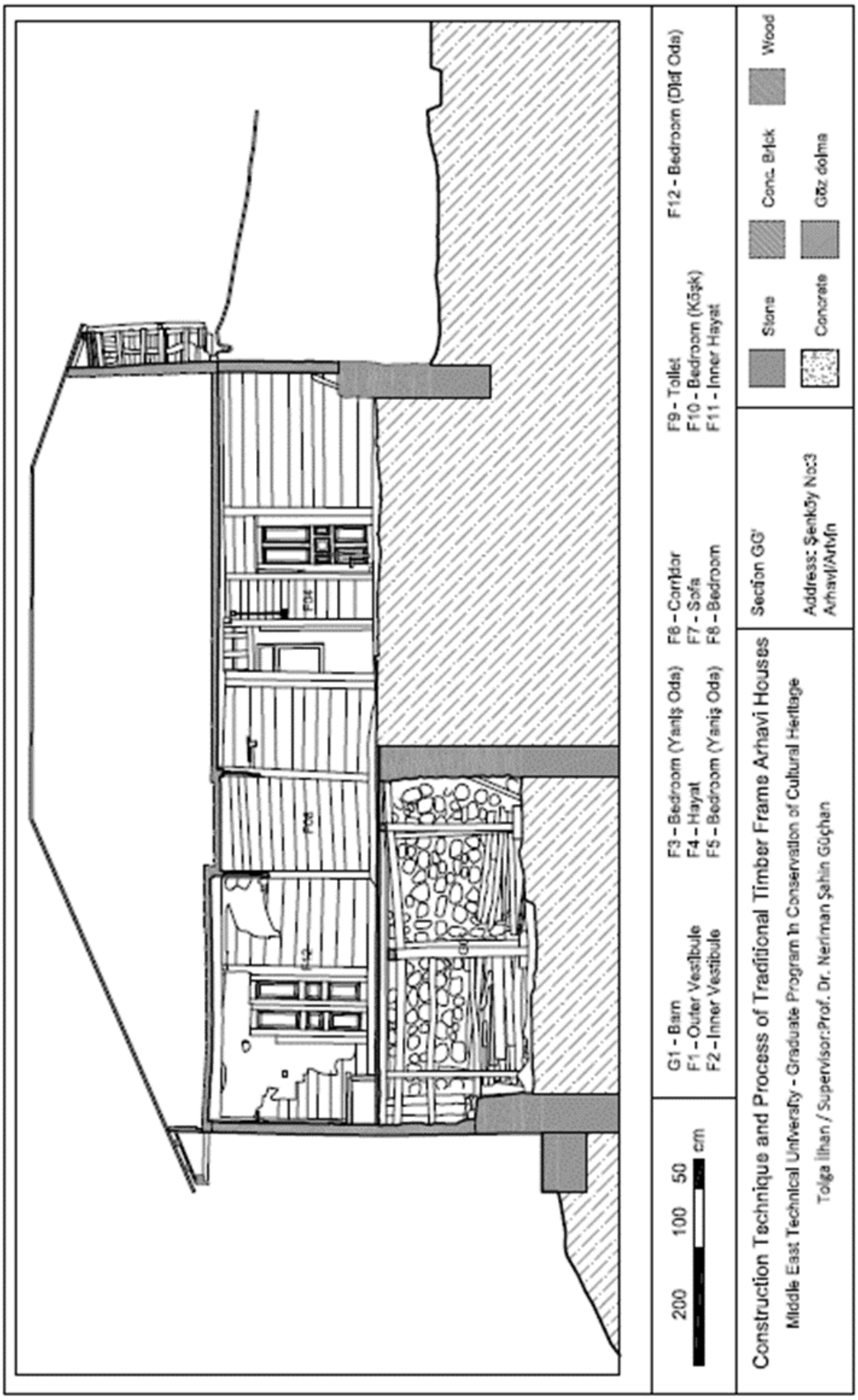

Figure A.14. Section GG' of Şenköy 3

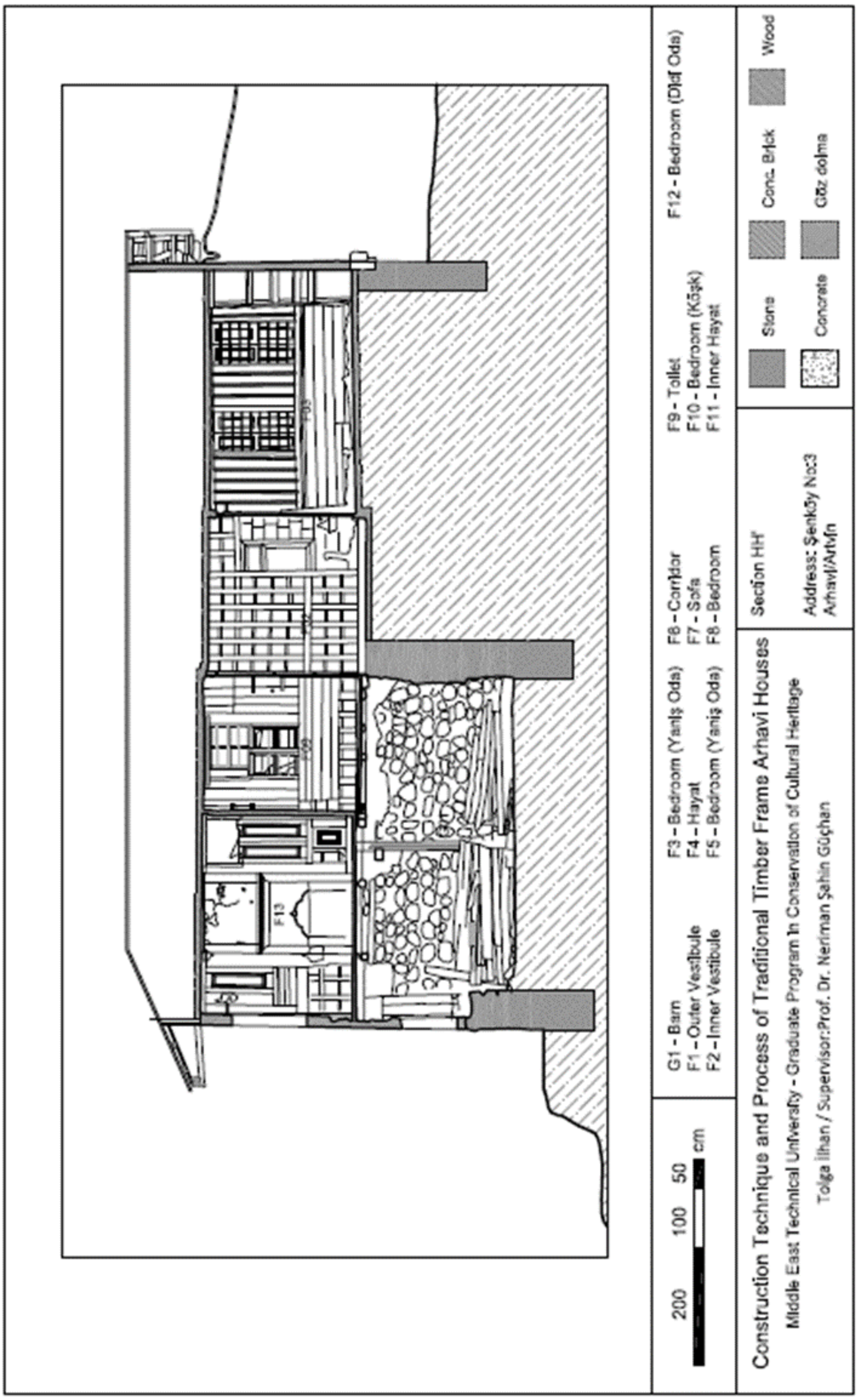

Figure A.15. Section HH’ of Şenköy 3

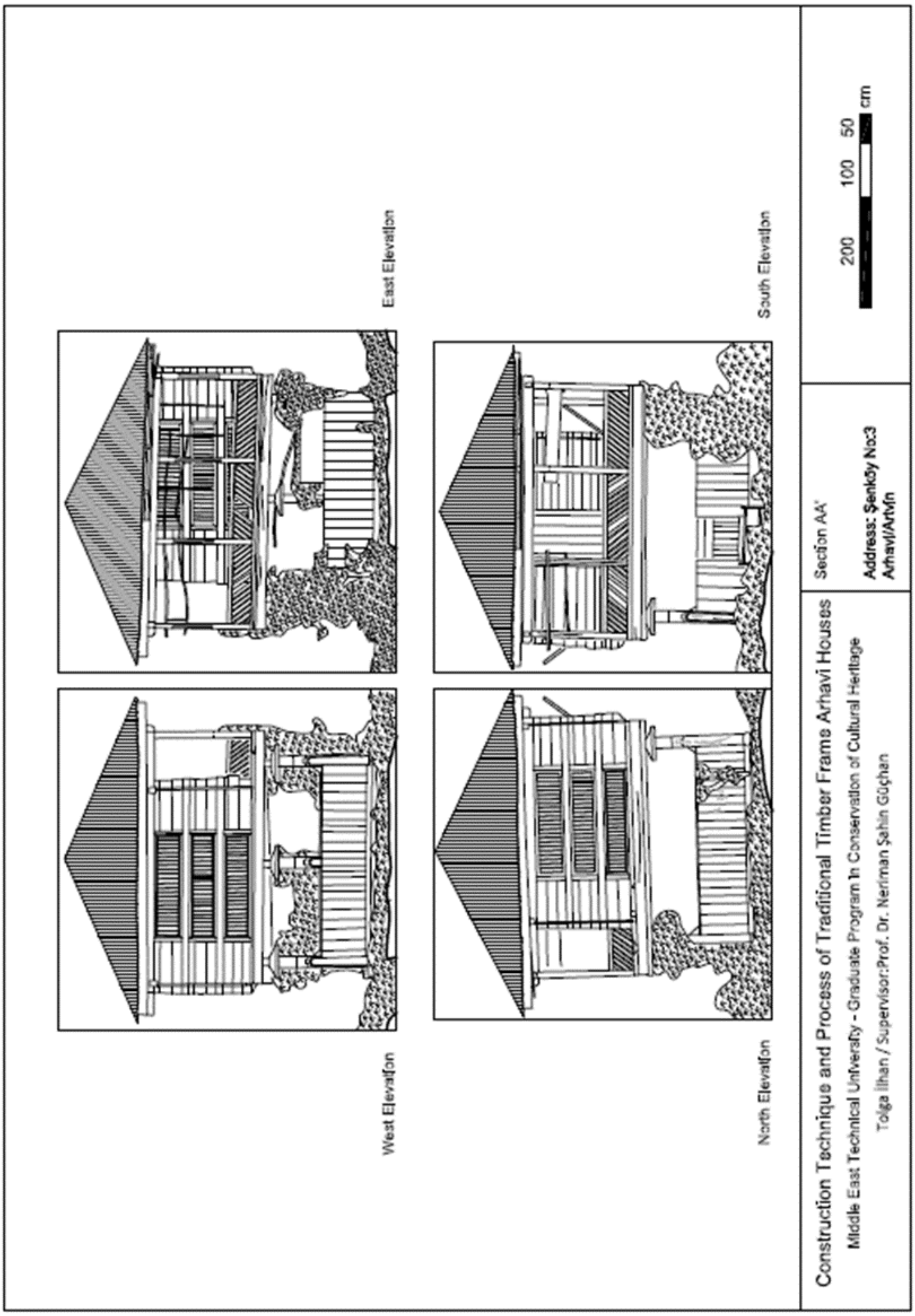

Figure A.16. Serender Elevations of Şenköy 3

Figure A.17. Documentation of Şenköy 3 case

Figure A.18. Documentation of Arılı 105 case

Figure A.19. Documentation of Arılı 33 case

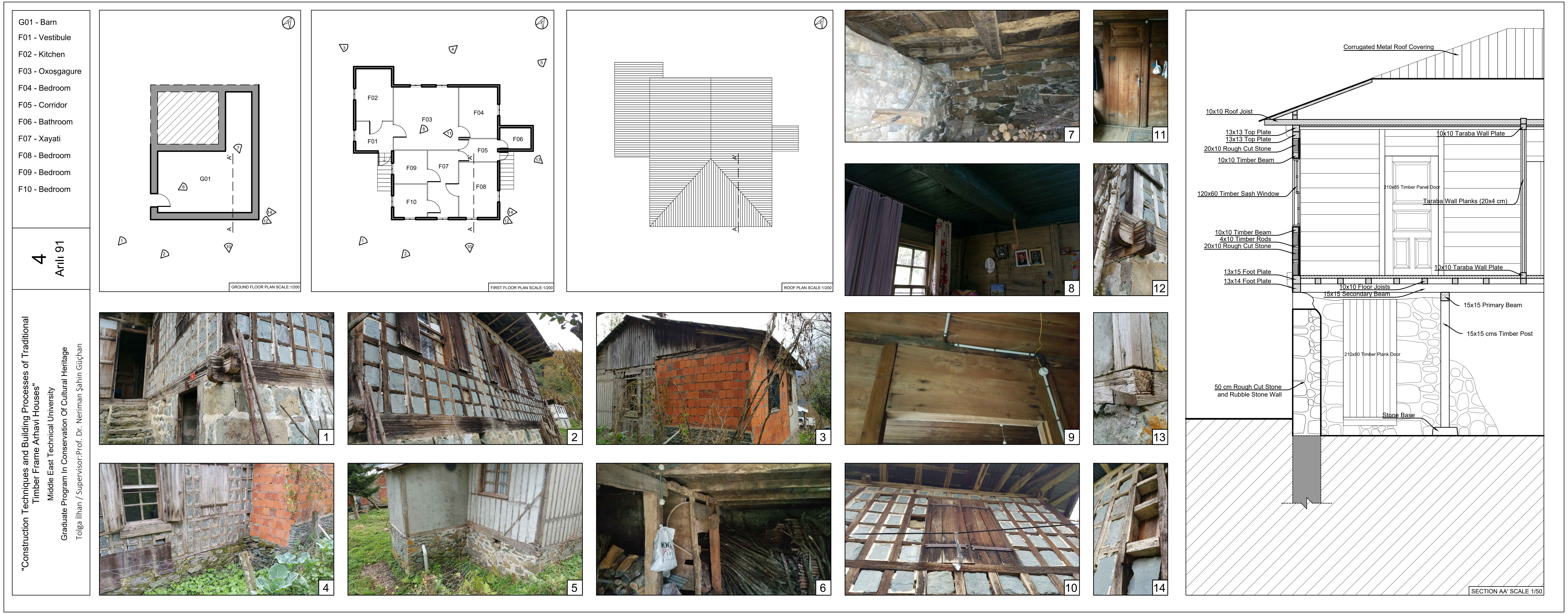

Figure A.20. Documentation of Arılı 91 case

Figure A.21. Documentation of Arılı 47 case

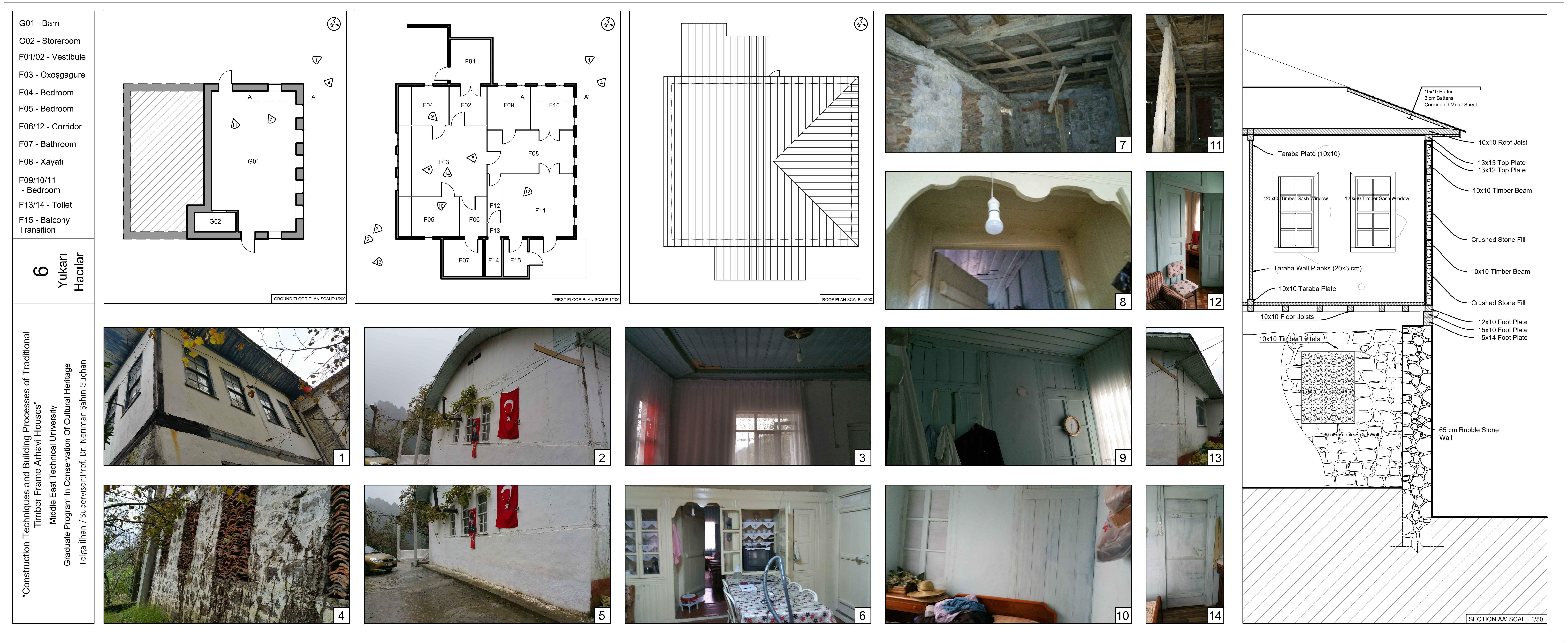

Figure A.22. Documentation of Yukarı Hacılar case

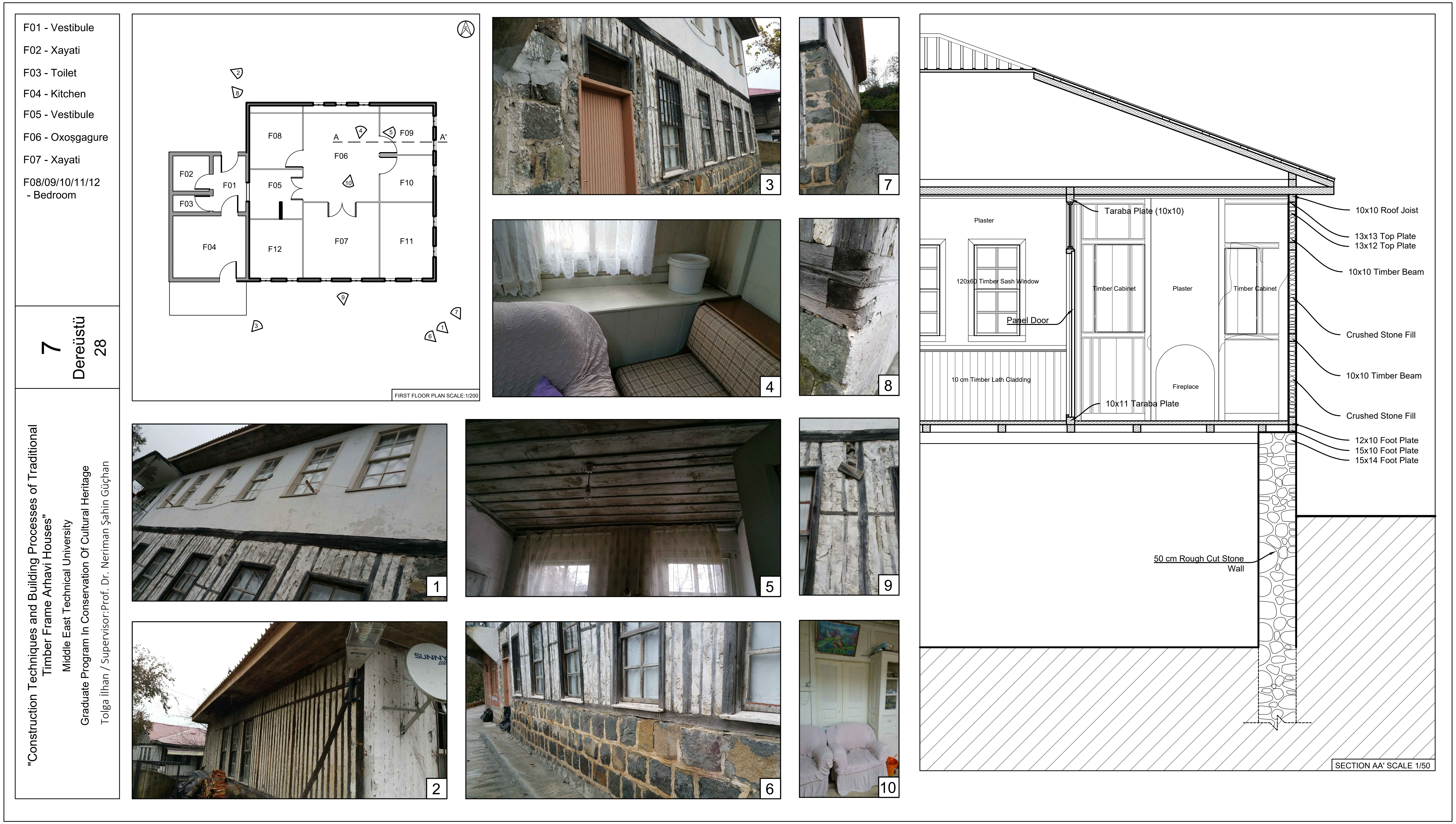

Figure A.23. Documentation of Dereüstü 28 case

Figure A.24. Documentation of Dereüstü 58 case

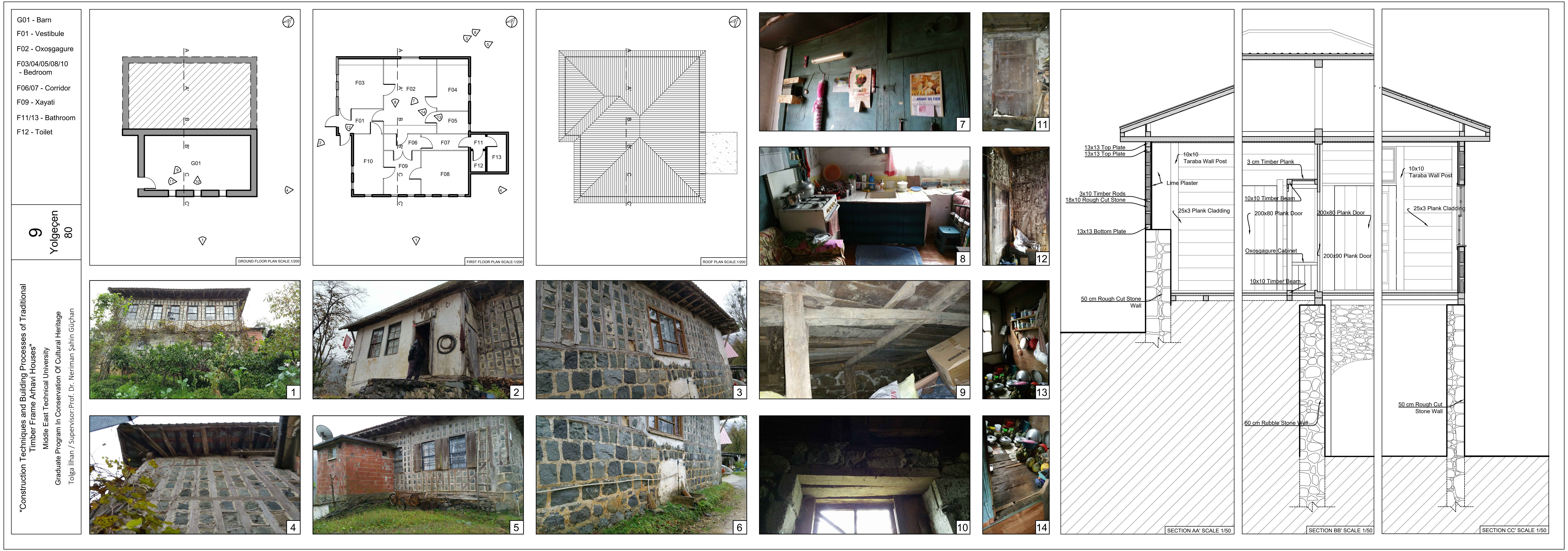

Figure A.25. Documentation of Yolgeçen 80 case

Figure A.26. Documentation of Dereüstü 20 case

Figure A.27. Documentation of Yolgeçen 15 case