TOBB UNIVERSITY OF ECONOMY AND TECHNOLOGY
GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES

FACTORS AFFECTING UNBRANDED HOUSING DESIGN AND PRODUCTION

MASTER OF ARCHITECTURE

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Supervisor: Assist. Prof. Dr. Aktan ACAR

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ABSTRACT

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Need-based structures such as housing constitute a large part of the building density in the urban area. Residential buildings determine the aesthetics and morphology of a city due to their high density. It is possible to observe resemblance among residential buildings in Turkey. The reasons of similitude could be understood by analysing the housing procurement process. In this study, the factors affecting the unbranded housing design and production process are examined in legal, economic, cultural, technological, and sectorial context in order to understand the constraints that create the tendency towards uniformity among unbranded residential buildings.

Keywords: Regulations, Planning, Architectural design.

ÖZET

Yüksek Lisans Tezi

MARKASIZ KONUT TASARIMINI VE ÜRETİMİNİ ETKİLEYEN FAKTÖRLER

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Konut gibi ihtiyaca dayalı yapılar, kentteki yapı yoğunluğunun büyük bir kısmını oluşturur. Bu yoğunluk nedeniyle konut yapıları kentin estetiğini ve morfolojisini belirlemektedir. Türkiye'de konut yapıları arasında benzeşme gözlemlemek mümkündür. Bu durumun nedenleri konut üretim süreci incelenerek anlaşılabilir. Bu çalışmada, konut tasarım ve üretim sürecini etkileyen faktörler hukuki, ekonomik, kültürel, teknolojik ve sektörel bağlamda incelenmekte. Markasız konut yapıları arasındaki tek tipleşme eğilimini oluşturan kısıtlar anlaşılmaya çalışılmaktadır.

Anahtar Kelimeler: Yönetmelikler, Planlama, Mimari tasarım

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ABBREVIATIONS

BDDK : Banking Regulation and Supervision Agency
CMB : Capital Market Boards of Turkey
EU : European Union
IPPD : Integrated Product and Process Development
TOKI : Housing Development Administration of Turkey
TSMD : The Turkish Independent Architects Association
TSE : Turkish Standard Institute
UN : United Nations

1. INTRODUCTION

The transition to settled life after the agricultural revolution let emergence of cities (Özdemir, Özdemir Sarı, & Uzun, Kent planlama, 2017). Especially when population rapidly increased in industrialising cities after the industrial revolution. Therefore, the housing problem occurred for workers who migrated to industrialised cities. Migration to industrialised cities was happened long ago in developed countries, but it still continues for developing countries (Aydemir & Aydemir, 2004). Squatter housing around industrialised cities is a phenomenon as old as industrialisation. Especially, there has been serious rapid urbanisation and still continues in industrialized cities (Türkcan, 1993).

Housing, as a shelter, is not only a major component of human settlements but also a fundamental human right (United Nations General Assembly, 1948). The human needs settlement to maintain life. Settlements provide the infrastructure and resources for people to live. The form and structure of the built environment can vary greatly, from small, isolated communities to large multi-storey residential buildings. In addition to being a human right, housing has occasionally been mediated by consumption and revenue. Housing is an important component of the building density in cities, serving as both an investment tool and a basic human need.

In Turkey, housing problem has emerged as an economic, social, and spatial problem, especially since the 1950s, when urbanisation began in Turkey, and it has brought along squatter housing and unplanned urbanisation (Bayraktar, 2007). Therefore, it is possible to say that migrants are settling into squatter housing near the city border in developing countries, and the same situation is valid for Turkey. Those who migrated from rural areas to cities have settled in squatter housing, instead of sites near industrial zones. As a result of this development, the housing need increases. Governorships and municipalities generate new zoning areas to supply the housing need (Güneş & Uzunay, 2017). Therefore, cities are generally growing to their edges in Turkey.

Housing supply forms have been varied since establishment of the Republic as; individual, build-and-sell, cooperative, municipal, public, private, and mass housing

depending on the conditions of its period. However, almost 90% of the housing supply is provided by the private sector between 2016 and 2019 according to data from the Turkish Statistical Institute. The need and creation of new housing zones is a motivation for the construction industry. The construction industry is considered to be the leading sector in Turkey. Turkish contractors demonstrated their strength with enterprises and successes on the domestic and international course (KPMG International, 2020).

Interpretation of Kasaba & Bozdoğan (2005) on the current situation of cities in Turkey; The urban landscape was adversely influenced by the typology of housing as apartment buildings became more prevalent, because contractors were determining the organisation and quality of buildings and started to reduce the quality and aesthetic of buildings to increase profit margin in time. Since then, this process has become banalised residential buildings and has resembled housing developments to one another. What this suggests is that the share of residential buildings in the construction market is larger than other types of buildings. The density of residential buildings makes it decisive in the typology and architectural quality of a city. However, when cities are observed, there is a tendency to uniformity in residential buildings. The façades of the streets resemble each other at a great pace. It is of importance to consider these similarities as the embodiment of social, cultural, economic, and architectural encountering.

The main objective of the thesis is to examine the factors of formal similarities among unbranded residential buildings in Turkey. Dynamics of the housing production as a social, financial, and technical structure could be revealed through the examination of the building process, from definition of needs or investment idea to turnkey. Understanding the influence of these dynamics on the progress of architectural design can help to figure out the causes of uniformity among residential buildings. The dynamics affecting residential design in architecture could be understood through observation of building production progress and architectural design inputs in parallel with economic, social and cultural factors in unbranded housing.

This study may reveal the reason for the similarity among unbranded residential buildings in Tukey. With the clarity of this understanding, suggestions can be made to encourage the production of qualified and distinctive residential buildings in Turkey.

In this context, the knowledge obtained from the National Data Base of Council of Higher Education, academic articles, regulations published in the Officcial Gazzete of the Republic of Turkey, and legitimate findings on web research provided content to study. Furthermore, the doctorate thesis of Özlük on 'The Factors Determining Demand and Supply in the Housing Sector in Turkey', the book of 'Bugünün Türkiye'sinde Mimarlık?' (Architecture in Today's Turkey?) compiled by Aysev had a significant contribution to link the question of the study with practise. The following chapters critically elaborate on the stage of the procurement process, while the 'Planned Areas Zoning Regulation'[1] is the reference point of the study.

The value of making inferences and producing knowledge based on facts and incident cannot be denied. This study is the result of the mutual consideration of experience and accumulation with theory and efforts of researchers to learn and produce knowledge from the practises in the sector. Consequently, the operating codes and regulations on building production in Turkey have been researched. The building production process, as referred to and discussed in professional bodies and literature, has been elaborated in relation to the legal framework and obligations to which design and construction.

The large number of housing blocks introduced by the private construction sector are delivered by branded construction firms and generic construction firms. Most branded construction firms emerged after the Marmara earthquake under strict regulatory pressure in the construction sector and along with technological advances in construction materials and project management. Today, clients do not want only high-quality housing projects, but high-quality housing projects built by trustworthy companies. This approach from clients raises the competitive environment in the construction sector and places branding as an important element of corporate strategies (Polat & Dönmez, 2010). According to the Kapferer, branding is long-term corporate involvement, a high level of resources, and the skills to become the referent (Kapferer, 2012). Despite of increasing number of branded residential producers, the majority of housing blocks are provided by unbranded construction companies.

Officially, buildings have been categorised into a variety of groups according to size, specifications, and construction technique in the 'Declaration About Determining the

[1] It is the translation of 'Planlı Alanlar İmar Yönetmeliği' from Turkish.

Approximate Unit Cost of Buildings for Calculating Price of Architectural And Engineering Services'[2]. According to this, residential buildings that are less than 21.50 metres in height and higher than three floors are classified within group B of III (Resmi Gazete, 2019). However, residential buildings in the III-B group also cover branded housing. On a deeper level, multi-unit residential buildings with a height of 3-6 floors, built on block parcels, supplied by unbranded manufacturers and are analogous to each other in terms of structural and aesthetical quality, and finishing materials are the subjects of the study due to their majority among residential buildings.

1.1. Terminology and Background

It will not be wrong to mention that countries develop housing supply systems according to the characteristics of their housing problem and urbanisation. In Turkey, majority of apartment buildings are supplied by 'build-and-sell'[3] system. The build-and-sell system is a contract between the contractor and the landowner to construct in return for apartment. The system emerged with the urbanisation dynamics of 1950, then with the legal basis, has increased its prevalence to the present day along with unbranded housing. This led to the realisation that the components composing built environment and their background, terminology and relation with each other cannot be ignored. Urban and the factors that influence its formation are determinants of the goods of housing judgement in the urban impression. For this reason, the terminology and background of urban, urbanisation, urban planning, building regulation, housing, apartment, and unbranded housing are discussed respectively within the context of unbranded housing.

The lexical meaning of urban is to belong to or relate to a city or town. According to Mumford, urban is the most important fruit of Neolithic-age culture and older Paleolithic-age culture. This union gained an enormous ability of joint production to urban that none of its residents could have it on their own (Mumford, 2007). It is possible to say that urban areas have been managed or ruled justly in the past, making it a measure of civilisation. Therefore, they are transformed and called by different names in historical development such as; cite, polis, medine, bourg, ville, city, urban.

[2] It is the translation of 'Mimarlık ve Mühendislik Hizmet Bedellerinin Hesabında Kullanılacak Yapı Yaklaşık Birim Maliyetleri Hakkında Tebliğ' from Turkish.
[3] It is the translation of 'Yapsatçılık' from Turkish.

Later, industrialisation and capitalisation processes have led to the creation of large cities with high population density. This development widened the urban interaction area to demographic, administrative, social, and economic extents. These criteria are considered to define the urban concept. It will not be wrong to mention that miscellaneous progress of urban is urbanisation, which influences the scale and density of urban.

Urbanisation occurs as a spatial and social response to the modernisation process of industrialisation (Tankut, Çalışkan, Levent, & Zorlu, 2002). Urbanisation is a multidimensional process with economic, social, political, cultural, and ideologic extents. Therefore, urbanisation brings a series of change processes along with spatial change and population transformation. Tisdale defined urbanisation as a process of population concentration (Tisdale, 1942). However, defining urbanisation only with movement of population is a deficit. According to Keleş, the accretive development of an urban zone in social, economic, population, and administrative extend is urbanisation (Keleş, 1983). It is possible to assert that the complexity of urban interaction area necessitates using institutionalised designator instruments to create urban area and indicating importance of urban design.

The emergence of city planning as a professional occupation dates back to the industrial revolution. The population increased rapidly in a short period in industrialised cities. Therefore, those cities comprised of inhuman and unhealthy conditions that forced spatial interference to improve infrastructure and living conditions. Since then, the cities have continued to grow. Today, almost half of the world's population lives in cities. An increase in this ratio is expected in the future. The development of city planning in Turkey dates to the last periods of the Ottoman Empire. The planning was institutionalised after the proclamation of the Republic of Turkey (Özdemir, Özdemir Sarı, & Uzun, 2017).

Contemporary planning practise creates urban spaces as block and plot order. They are designed by the planner and architect, respectively. Planners have the task of determining the density, size, and shape of building blocks (Baş, 2010). Density is determined along with housing type and location choice, and it directly affects the design of residential areas. The density of housing areas determined by the proposed population and its characteristics. Cultural housing usages and habits should be

determinants of density decisions along with demographic population characteristics. On the other hand, an optimal match of cultural and demographic characteristics of the population with appropriate housing is practically impossible. The characteristics of households differ over the years, but housing units cannot provide such flexibility. Building density is a relative subject. It is not possible to mention universal and standardised densities as low, medium and high. On the contrary, the density is considered relatively.

According to the Sarıoğlu Erdoğdu et al. (2017), a variety of density indicators can be used for planning. They can be the number of houses and people per square metre, the number of habitable rooms per square metre, the 'building coverage area ratio'[4], and the 'floor area ratio'[5]. It will be meaningful to use the number of people per square metre or the number of habitable rooms per square metre in order to measure the number of people who will use common areas and transportation facilities. It will be appropriate to use building coverage ratio, the number of housing per square metre, and the number of people per square metre to understand the settlement in general, how the intensity of development will be felt and its effect on the surrounding (Sarıoğlu Erdoğdu, 2017).

There are a variety of factors that determine the value of a zoning land with respect to the limits of the possibilities of construction. These factors determine the scale, type, and design of a building. One of the prominent factors is the zoning status. The zoning status of plot is determined by related municipality according to the Planned Areas Zoning Regulation. The provisions in the zoning status determine the size of construction area, height of building, land usage, and building type. These aspects are declared in the zoning status and determine the value of plot per square metre regarding the construction possibility. It is possible to observe that the ratio of the buildable area to the land area could be the most effective factor for the land value, among others.

[4] It is translation of 'Taban alanı katsayısı' in Turkish.
[5] It is translation of 'Kat alanı katsayısı' in Turkish

Figure 1.1 is an 'Implementary Zoning Plan'[6] which is clipped from a zoning status document of a plot obtained from the website of the Çankaya Municipality. The website serves to provide information on the zoning status of lands within the boundaries of the Çankaya Municipality. It can be observed from the zoning plan that defined setback distances are determining where building will be placed. The floor area ratio, the height of building, and total number of levels above ground are determined in the map and zoning status document. Also, the type of building is indicated as residential in the zoning status document. It could be observed that these specifications of a plot are determinative for the saleable areas of a building, and thus the value of land.

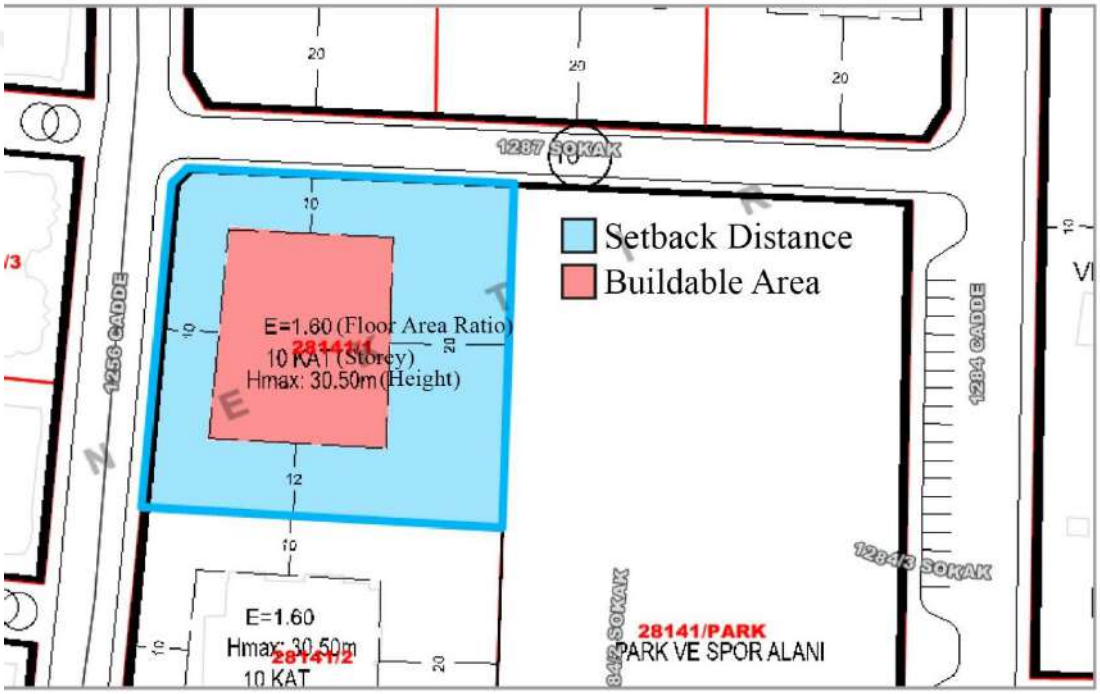


Figure 1.1: Implementary Zoning Plan

The secondary factor determining the value of a land is the constructability of the land. The form, size, and location of a plot is determinant of constructability, and these aspects are determined by city planners. When the zoning land is small or in irregular form, it strains architectural design due to the limitation in elevation line and efficiency spatial organisation. It is observed that when the elevation line of a building is not long enough to cover all zones of a floor, the remaining zones do not receive direct natural

[6] It is translated from 'Uygulama İmar Yönetmeliği' in Turkish.

light but through a light well. This situation can commonly observed in attached buildings and in floors where densely flats are placed.

Figure 1.2 is a typical floor plan of an apartment building located in Genç which is a sub-province of the city of Bingöl. The site is a corner parcel of a block. The block is in the order of detached buildings. The segments of the parcel are forming an irregular shape parcel boundary. For this reason, the cantilever of the building is recessed to create straight-edged rooms in the apartments. On the detached side of the building, four rooms are receiving indirect light through two light wells. Also, the flat halls and the corridors took more space compared to the flat size. This situation could be reasoned to the characteristics of parcel.

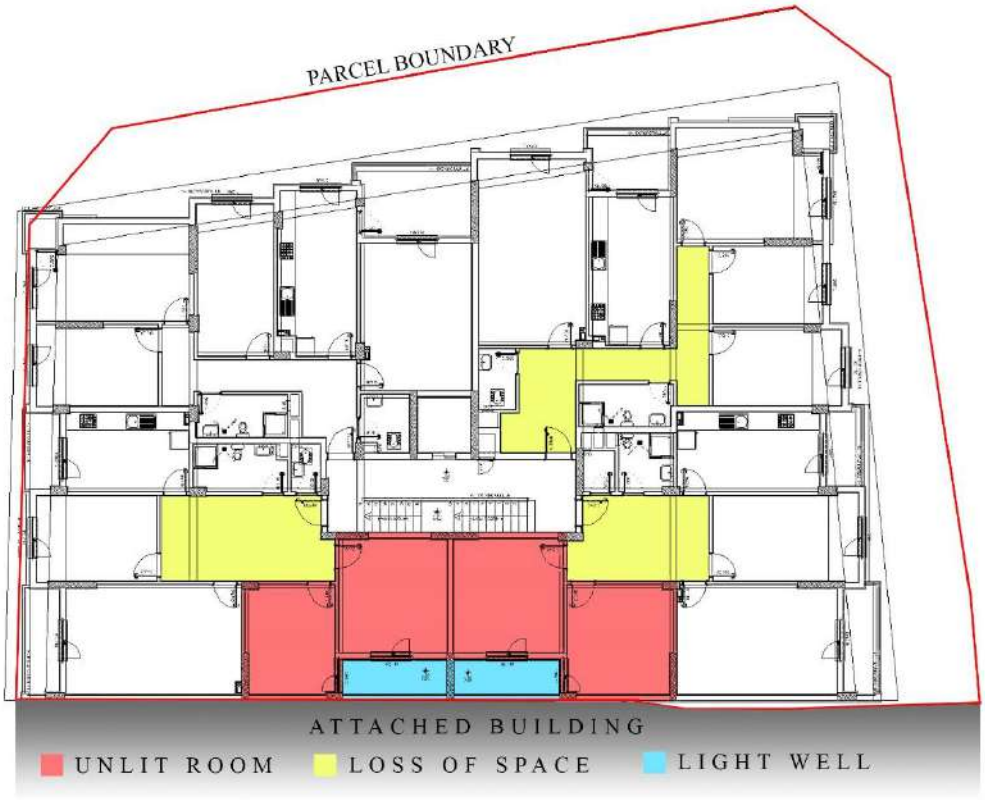


Figure 1.2: Typical floor plan.

On the other hand, the geometry of the land should not only be considered as a bird's eye view. The view from the site and the slope of the terrain could be considered another factor of land value. The elevation differences due to the sloping land could provide an extra semi-open basement level. According to the building regulation, independent saleable units (apartment or shop) could be arranged in parts of the basement that are not partially in contact with the ground. In Figure 1.3, the building model belongs to an apartment building constructed in Solhan, which is a sub-province

of the city of Bingöl. This model indicates an example in which additional basement floors provide more saleable independent units due to sloped terrain.

Figure 1.3: A building with basement floors.

It is possible to mention other extrinsic factors that influence the value of land. These factors could be listed as transportation, proximity to social and educational facilities, proximity to the city centre, distance to the coast, infrastructure, nearby buildings, and facilities. The condition and absence of a road to the land, proximity to the main road, and escape routes to highway could be considered for land valuation as means of transportation. Transportation fees, travel duration, fast access to treatment, easy access to household needs could be related to proximity to social and educational facilities. Therefore, these specifications should be considered for land value assessment.

There are social, educational, and healthcare facilities in subprovinces, but the lands in city centre are more valuable than the ones in subprovinces. This situation is related with supply and demand equilibrium that occurs with the urbanisation rate. The distance to the coast could be considered as a value influencing factor for coastal cities. It is possible to observe that the closest zoning lands are the most valuable for many cities. The lands that offer uninterrupted sea view and a swimmable coast in proximity could be considered valuable.

Availability of water, electricity, Internet, sewerage, and gas to the parcel are important advantages. Municipal services would improve quality of life. The investor would want to pay a minimum for land, when there will be deficiency of infrastructure services. Central areas generally have municipal services. The surrounding buildings and structures of a land might have disadvantages. Nearby noise and pollution could be considered among these disadvantages.

The characteristics of site and extrinsic factors influence the value of a land. The specification of a land that is determined in zoning status could be considered more effective for land value. They prescribe the mass of building, size of saleable areas which are subject of trade. It is possible to mention that the status, form, size, order, and location of parcel are the most influential factor among land evaluation criteria for land pricing.

Together, what particularly stands out is that urban planning provides predictable development of the built environment to ensure sufficient public services and areas. In a similar approach, it is possible to assert that components of the built environment should be comprised of humane conditions. For this reason, it is necessary to have binding rules to meet minimum requirements of science, art, health, environmental conditions, and technical standards. At this point, building regulations are distinguished as sanction tools of binding rules to ensure the least requirements and supervision.

Regulations are written rules of law. It is generally understood that rules and regulations are necessary to protect the interests of individuals and the public. Regulation can therefore be understood as a guideline for social action and interaction to make it predictable. However, to ensure the effectiveness of the regulation, it must be implemented. The entire regulation and implementation as ‘a means of achieving regulatory objectives’ can be referred to as “regulatory system”.

Today's construction regulations in developed countries can be traced back to 19th century urbanism, when conditions such as poor and unhealthy housing conditions and unhealthy environments led to government intervention in construction and construction business. Since the 19th century, regulations have been adjusted to meet contemporary needs, and the current building regulation covers a wide range of topics, including safety, public health, community, and sustainability.

Regulations can be categorised into two according to attitude as; prescriptive and performance-based regulations. Traditional prescriptive regulations prescribe how to comply with the regulations. A typical feature of performance-based construction regulations is as follows (Meacham et al., 2005: 92); 'The explicit statement of goals and objectives that reflect societal expectations and desires, along with functional statements, operational requirements, and, in some cases performance criteria, which are to be used to demonstrate that the goals and objectives have been met.' Many countries around the world are moving from prescriptive building regulations to performance-based building codes.

In the case of Turkey, as defined by the law, building regulations are written rules of law for the construction activities and processes of buildings according to the plan, science, art, health, environmental conditions, and standards (Resmi Gazete, 2017). Building regulations determine almost all aspects of the design of a building from the footprint to the height with numerical or ratio values. One of the prominent examples for this situation can be the floor area ratio and the building coverage ratio, which are determining density of housing areas.

The floor area ratio is the ratio of the total floor of the building to the building plot. The building coverage ratio is the ratio of building coverage to building plot (Resmi Gazete, 2017). As it is understood, urban planning is developed over density decisions to establish the required infrastructure of the planned area. It will not be wrong to mention that the built environment should be constructed under the limitations of the proposed urban design. Since it is known that urban design is based and developed on numerical values such as population and household size. Accordingly, the transformation process is controlled with numerical constraints, such as the ratio of building to land, by regulations through designers and the builders of built environment.

It will not be wrong to mention that unpleasant experiences had an influence on tight control mechanisms. According to Özlük (2014), the bitter experiences of the Marmara earthquake in 1999 have been a turning point for the implementation of zoning laws in Turkey. Housing construction was taken under more strict control and the squatter housing were almost ended. In the 2000s, the number of licenced houses had reached peak with the increase of inspections on unauthorised housing and zoning of new areas

(2014). The list below is regulations in force that consist provisions about design, construction, and inspection in Turkey;

- Zoning code,
- Fire code,
- Car parking regulation
- Earthquake regulation
- Shelter regulation[7]
- Codes of thermal insulation in buildings

The regulations put into force to protect the silhouette of the city from urban sprawl are one of the factors against the architect that puts under restraint the architectural design process because regulations always prescribe all aspects of the design, from inclination angle to the size of spaces before the architect (Wainwright, 2013). According to many architects, regulations are obstructing the production of authentic architecture, conservative, supporting inactive voice, and inflexible instruments. (Carmona, Marshall, & Stevens, 2006). In addition, the following characteristic have always been blind side of regulations;

- Standardised, restrictive and formulated (Carmona, Marshall, & Stevens, 2006),
- Not being successful in providing environmental quality (Street, 2006),
- Seemed as an obstacle that needs to be overcome by designers (Gann, Wang, & Hawkins, 1998),
- Considered as an extrinsic intervention (Street & Imrie, 2011),

When influence of housing over safety, health, and welfare is considered, inspecting those impacts is necessary and important (Lawson, 1975). But there is no need to hide the tension between architects and regulations (Lawson, 2005). Regulation is like a medication that controls a complicated environmental system, with endless side effects and disturbs more than the illness itself (Lawson, 1975). Therefore, architects accept the necessity of zoning codes, but they push boundaries of legal obligations to comply. In this conflict, architects are an unstoppable force, and on the other hand regulations and decision makers are a stationary obstacle. In some cases, architects see the city

[7] It is translated from 'Sığınak Yönetmeliği' in Turkish.

with a broader perspective and significantly sympathise with the restrictions (Lawson, 2005).

Three main factors can define the tension between architectural design and regulations. They are extremely defined regulations, poorly identified regulations, and expectation problem. Extremely defined rules might be necessary for some special regulations. But this situation may harm the natural design process when they impose a mandatory and precise numerical value. The design process starts with nonquantitative and uncertain measures and it comes to a state of certain and quantitative as the process progresses (Lawson, 1975).

Poorly identified regulations are tended to evaluate. They serve for inspecting parties rather than designers. As a result, an architect traps himself in a cycle of evaluation by putting himself in the shoes of inspectors (Lawson, 1975). The expectation problem is the reverse between the architectural design process and the process that regulations impose to the architect. When regulations focus on numerical values, their relation to the architectural design process is upside down. When regulations are evaluative, its relation with architectural design back to front (Lawson, 2004).

The interpretation of Erginoğlu (2018) may help to understand the characteristic of regulation in Tukey. "The rules are so defined, almost the outline of the building and its mass are prescribed. Here, you are only trying to constitute a building envelope with a façade or casement system (Erginoğlu, 2018)." It is possible to assert, based on the interpretation of Erginoğlu (2018) and from practise, that the regulations determining the mass of a building are extremely defined. At the same time, there is an expectation problem, because the building mass is prescribed before architect, which is feasible to define expectation problem.

Bayrak (2018) highlights a notable phenomenon in Turkey wherein an alternative mechanism, known as 'shadow codes'[8] has emerged in response to the highly stringent building regulations. Despite the rigorous nature of the existing building code, this additional law has been developed to accommodate sector-specific requirements. Currently, they have greater strength in comparison to existing building regulations. Primarily, the formation of the constructed environment is influenced by what can be

[8] It is translation of 'gölge yönetmelikler' in Turkish.

referred to as shadow codes (Bayrak, 2018). It is possible to observe from practise, despite regulations, together builders and designers are in effort of increasing saleable area (occupied space) in order to get more profit, through deliberate misleading drawings, alternative post-construction designs and modifications in buildings after occupancy permit. It will not be wrong to mention that, this alternative practise is derived from the prescriptive regulations, because they are extremely defined and they have expectation problem.

It is possible to assert that performance-based regulations may help to overcome the problem. Regulations should be performance-based with more general provisions and provide examples of satisfactory solutions for the designer to overcome the challenges of zoning codes (Moradi, Mohammadi, & Ahmadi, 2016). In this context, builders and designers should be encouraged to receive consultancy for constructive criticism advice through design evaluation boards (Erim, 2007). It will not be wrong to mention that when designers are not able to challenge with zoning codes, then they are drawn to a cycle of design reproduction to ensure approval.

The interaction of regulation with builders and designers manifests itself, mostly through housing, over the cityscape. Housing is a form of living and settlement with a shelter-protection function developed by individuals or families who live together and share the same space parts and do all life activities (sleeping, resting, eating, etc.) together (Arcan & Evci, 1999). In addition to being a shelter, housing is a human right and investment tool. For this reason, the share of residential buildings is higher than other type of buildings. In the case of Turkey, housing is generally apartment buildings. Therefore, apartment blocks are decisive in the typology and morphology of cities due to their high density in Turkey. It is possible to mention that housing supply variants stand out as a response to housing problems in countries.

All developing countries have a kind of housing problem and all nations executed a wide variety of housing policies regardless of being managed by open market or central planning (Harsman & Quigley, 1991). Liberal and socialist regimes define two different ends of hosing policy. Housing is considered a consumption good in a free-market economy, and it is a commodity as well as other goods. There is no need for public intervention in this sense. Turkey is close to the free-market economy and direct housing supply has been very rare in Turkey (Sarıoğlu Erdoğdu, 2017).

The type of apartment block-like residential building is first seen in Ancient Rome. The so-called 'insulae' is the type of building closest to the apartment block of nowadays. This type of building is lost after the collapse of Rome. Later, the same type of residential building emerged at Paris at the 18th century (Bilgin, 1992). However, the modern apartment building as we know it today began to take shape during the 19th century in Europe and North America. In the late 1800s, large cities in Europe and North America saw a significant increase in population as people moved from rural areas to urban centres for work. This led to a housing crisis, as there were not enough homes to accommodate the growing population. To address this, developers began building multiunit housing complexes, known as apartment buildings, to provide affordable housing for the working class (Cromley, 1990). There were two important parameters of the modern cities of the industrial revolution. They are an unexpected increase in population and speculation. Lands earn value according to location. When those two factors are met, housing as an apartment emerges regardless of culture, belief, and habit (Bilgin, 1992).

In addition, apartment blocks can be considered as a new model that transforms daily life and physical environment. The nuclear family model was revealed with the transition to flats from large family houses, and thus standardised life has occurred. Different types of people and families live in apartment buildings. Therefore, apartment blocks are introducing a collective life that comes into being with distinctive rules, standards, and habits. In addition, apartment blocks provide new interpretations on the concept of settlement, urbanity, and adjacency.

In Turkey, the first apartment buildings were built by non-Muslim traders in Galata and Beyoğlu regions of İstanbul at the beginning of the 19th century. Apartment blocks started to become common in the 1930s and were built by high-income groups at prestigious city sites until the 1950s (Gökmen, 2011). The development of housing zones is influenced by socioeconomic and political factors (Tekeli, 2000; Uzun, 2015). In this context, it is possible to mention that there had been general building progress regardless of geographic differences after the first 25 years of the Republic of Turkey (Uzun, 2015). The residential buildings dwelling multiple households have been observed since the 1940s. The emerging of squatter housing and high-density apartment block neighbourhoods with a lack of sufficient substructure is observed during the period of multiparty system between the years 1950-1980 (Tekeli, 2000).

Şenyapılı (2004) explained the apartment production process of the 1950s; local authorities were unable to provide the necessary housing zones. Land prices were high due to the lack of land. Construction materials were expensive. This situation was an obstacle for even middle-income groups to obtain a residence. Only merchants who could transfer capital from trade and those who had the financial resources were able to build apartments within the settlement area (Şenyapılı, 2004).

This crisis was ensured by the possibility of the ownership of apartments and condos. In 1954, article 26 of the law number 2644 was amended by law number 6217 and construction servitude was introduced. In this way, the trend toward high density in cities began (Tekeli & Ortaylı, 1978). In 1965, introduction of 'Flat Ownership Law'[9] no. 634 of 1965 smoothed the path for multiple households to live on a single lot, along with the build-and-sell housing supply system (Tekeli, 2012; Uzun, 2006).

After the 1950s, the spread of apartment blocks gained speed, with the transition of the land to an economic value and population increase (Bilgin, 1992). Özlük (2014) indicates that the share of the private sector in housing production has continuously increased in the historical process. Private sector housing supply is comprised of individual housing supply, build-and-sell housing supply, and squatter housing (Özlük, 2014). Today, the individual housing supply and squatter housing supply have ended to a great extent. However, the build-and-sell housing supply is still ongoing.

There are three types of land acquisition methods for build-and-sell housing supply. They are purchasing land, profit sharing with the landholder, and construction rights in return for the flat. Obtaining land through construction right in return for flat is preferred extensively by private sector housing suppliers. Generally, landowners do not have enough capital, technical competence, and organisation for construction (Uğur, Baykan, & Güneş, 2017). Therefore, housing supply with construction right in return for apartments has increased until today.

Since the 1980s, private sector housing supply has started to take shape with political and economic developments. Large-scale construction companies established in this period began to develop large-scale housing projects. The number of these projects has been limited until the 2000s. The new political developments of the 2000s were the

[9] It is translation of 'Kat Mülkiyeti Kanunu' from Turkish.

beginning of a new period for private sector housing supply. After 2012, the private sector housing supply set a record and approximately 90% of the total production was met by itself according to the TUIK data (Figure 1.4). The private housing sector, with this service capacity, can be divided into two based on the qualification of its housing production as branded housing and unbranded housing.

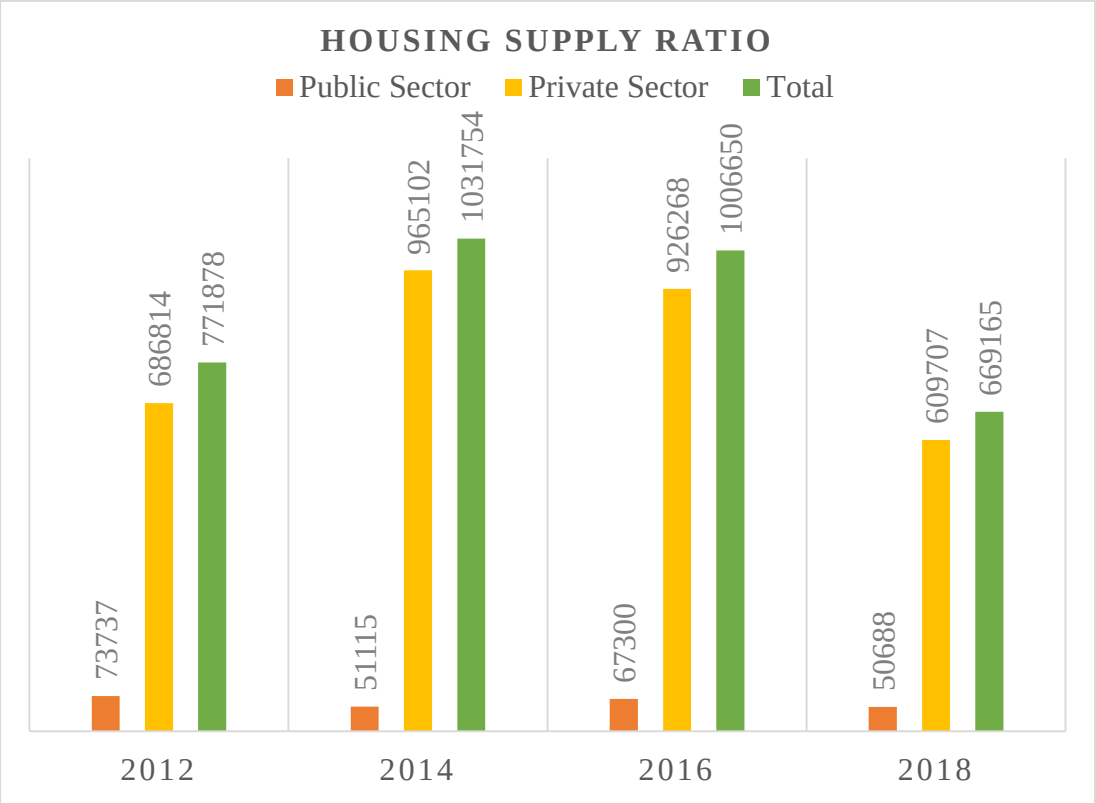


Figure 1.4: Number of houses according to the supplier (TUIK, 2023).

It would be more convenient to clarify the terms of brand, branded housing, and unbranded housing, respectively. Then the usage of unbranded term in the study. The term brand is a discussion topic in marketing discipline. In fact, this term is as old as civilisation. The Mesopotamian and Greek civilisations are used to mark their products such as; wines, ointments, pots, and metals (A.N. & Jagjit, 2005). Originally, the word brand comes from the Old Norse word ‘Brandr’. It means ‘to burn’. Also, brand still means marking livestock to identify the owner.

The term brand is considered to become distinct as an expression of an economic field. Similarly, the definition of brand, introduced by The American Marketing Association; A brand is a name, term, design, symbol, or any other feature that identifies one seller's goods or service as distinct from those of other sellers (American

Marketing Association, 2023). Such-like definitions have been criticised for dwelling on visual specifications (Arnold, 1993; Crainer, 1995). Other definitions carried out are; brand as a legal instrument, brand as a company, brand as a shorthand, brand as a reducer for consumers, brand as an identity system, brand as an image in the consumer's mind, brand as a value system, brand as a personality, brand as relationship, brand as adding value, brand as an evolving entity (Crainer, 1995; Simonin & Ruth, 1998; Jacoby, Szybillo, & Busato-Schach, 1977; Bauer, 1960; Boulding, 1956; Thrift , 1997; Kapferer J.-N. , 1992; Alt & Griggs, 1988; Duboff, 1986; John, 1986).

In the article "What is a brand? A Perspective on Brand Meaning" the authors Maurya and Mishra aimed to resolve the complexity of definitions. As a result, these definitions are classified according to the firm and consumer perspectives. Brand as a shorthand, brand as a risk reducer, brand as an image in consumer's mind, brand as a personality, brand as a relationship, brand as an evolving entity; are listed for consumer perspective definitions and others are listed for firm perspective definitions (Maurya & Mishra, 2012). The study concluded a broad definition of brand that brands are conditional, intangible, and legal assets for the firm. The concept of brand is also dynamic and changes along with the change in social (cultural), economic, political, technological, legal system and across the geography.

It can be sad that the term 'branded housing' is more commonly used compared to 'unbranded housing'. In the case of Turkey, branded construction companies tend to build large-scale projects. These types of housing project are also named 'gated communities' in the literature (Blakely & Snyder, 1997). There has not been a single sectorial definition for branded housing. However, it will not be wrong to state a definition here extemporarily: branded housing is a settlement/development or a private neighbourhood provided by one or a group of branded construction companies and occasionally 'public-private partnerships' over the Housing Development Administration (TOKİ) with the 'income (revenue) sharing model' to provide housing to the high-income groups to establish funds for housing projects for low-and middle-income groups (Serin, Smith, & McWilliams, 2020; TOKİ, 2023). Branded housing producers are significant actors and their products as well.

Branded housing is distinct from the unbranded housing in several ways, such as; the size of development, accommodation of practises that enable community interaction (Omeraki, 2010, p. 142), built by large-scale construction firms, indoor and facade design, and quality of finishes along with authenticity. The share of branded housing projects in the housing production sector is 3%. TOKİ and Emlak Konut Real Estate and Investment Company represent 10% of the housing supply in the sector (Ertem & Yılmaz, 2014). It is possible to conclude that the housing production sector is dominated by small-scale construction firms that are mainly unbranded housing producers, also commonly called build-and-sell housing suppliers in Turkey.

In summary, unbranded housing refers to housing developments that are not associated with a specific developer or builder and do not have a specific brand name associated with them. They can also be referred to as ‘generic’ or ‘non-branded’ housing. These types of housing developments are often built by smaller local builders and may not have the same level of amenities or finishes as branded housing developments. Unbranded apartments may be less expensive than branded apartments, but it is important to note that this does not necessarily mean that they are of lower quality or that they are not well-maintained. They can also be a great option for those looking for more affordable housing options or for those who do not require the extra amenities and services that come with branded housing.

Altogether, what particularly stand out is that Turkey was not prepared when the housing need based on domestic migration occurred. As a response, squatter housing and construction right in return flat had been emerged within potential of sectorial practise. Despite squatter housing, the build-and-sell housing supply system continued after finding a legal base until today and dominated the housing construction sector. Even with increasing control mechanisms and strict changes in building regulation, build-and-sell housing is continuing. However, their influence on the cityscape can be observed especially on common stand-alone apartment buildings, in other words, unbranded housing.

2. UNBRANDED HOUSING PROCUREMENT BY LAW

A building comes into being with the collaboration of partakers in the project (Gorse & Emmitt, 2007). Participants in a project can be designers and firms in different fields, public authorities, and inspection bodies. It is possible to claim that the factors that affect the design and production of unbranded housing are implicit in the building procurement process. Analysing this process may help to understand the reason of resemblance among residential buildings. The Turkish Independent Architects Association (TSMD) published a chart that illustrates the procurement process for present buildings (TSMD, 2023) after the last earthquake disaster in 2023 to announce responsible participants of an existing building (Figure 2.1). In following section of the study, unbranded housing procurement process is elaborated critically to reveal the key factors affecting unbranded housing design and construction.

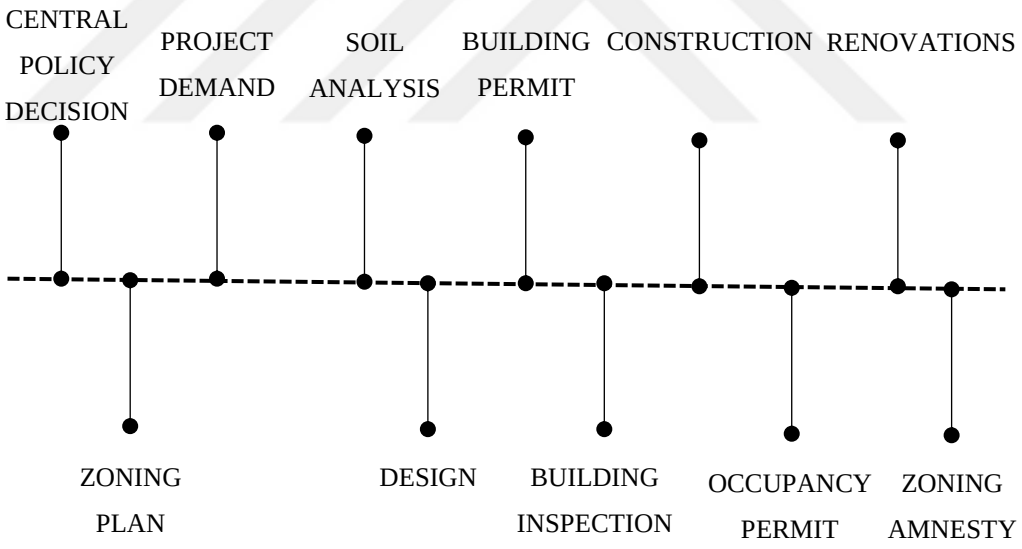


Figure 2.1: Building procurement process (TSMD, 2023).

In Turkey, zoning plans consist of a hierarchy of plans based on central policy decisions that could be taken as the first stage of the construction design process. Within the framework of spatial planning regulation, a zoning plan is defined as a document of drawings, reports and notes prepared according to the tendency of urban settlement and development, consisting of organisation, implementation, usage,

protection, determination, and decision for restriction of an area based on the demographic, social, cultural, economic, historical and physical properties of a city in order to ensure social and cultural requirements of inhabitants, increase in quality of life along with a healthy and safe environment (Çolak, 2010).

The hierarchy of the zoning plans provide the integrity of zoning development throughout the country. Zoning plans are developed in accordance with central policy decisions by related ministries, city planners of provincial and district municipalities, and 'İller Bank' (Yılmazabdurrahmanoğlu, 2012). The hierarchy of zoning plans allow subscale planning to be conducted in accordance with upper-scale planning (Güran, 2011). Thus, implementation of central policy decisions is granted for subscale planning. Item 6 of the 3149 zoning law refers to the stages of spatial planning and determines their purpose and coverage area. Accordingly, spatial planning consists of 'Environmental Plan'[10] and Zoning Plan, which are obliged to comply with the 'Strategic Spatial Plan'[11]. Additionally, the law specifies that the Strategic Spatial Plan must be implemented in accordance with the 'Regional and Country Development Plan'[12]. Zoning plans consist of two planning. These are General Development Plan and Implementary Zoning Plan, which must be prepared according to the upper-scale planning (Resmi Gazete, 1985). Therefore, central policy decisions could be made over this hierarchy in terms of zoning planning.

The content and objective of the implementation development plan are explained in the definition that is placed in the spatial planning regulation (Resmi Gazete, 2014). Accordingly, implementary zoning plans are the 1/1000 scale plans prepared on the current map with information feasible to general development plan. The Implementary Zoning Plans are prepared with the consideration of sustainability, accessibility, environmental conditions, regional properties, and purpose and requirement of buildings. The information referred to on the implementary development plan covers followings;

- Building blocks and plots for construction,

[10] It is translation of 'Çevre Düzeni Planı' from Turkish.
[11] It is translation of 'Mekansal Strateji Planı' from Turkish.
[12] Regional Development Plan is translation of 'Bölgesel Kalkınma Planı' in Turkish, and Country Development Plan is translation of 'Kalkınma Planı' in Turkish.

- Building usage,
- Settlement layout,
- Building height,
- Building's coverage area ratio,
- Building's floor area ratio,
- Approach clearance distance for buildings,
- Building front line,
- Block separation line,
- Pedestrian, bicycle, and vehicle roads,
- Parks, squares and areas of urban, social, culture, technic and substructure,
- Façade, depth, size, rear front line of parcels,
- Road level and number of floors remaining under the road level,
- Number of independent sections,
- Decisions related to construction and implementation,

It is possible to mention that under consideration of architectural practise, the content of the Implementation Development Plan predefined the formation of a building on a lot from its outline to height. As shown in Figure 5, these decisions took place before the design phase.

The next phase in the building procurement process is the formation of demand. The demand could occur in need and along with urbanisation. The rate of urbanisation, quantity of household, the increase in population, marriages and divorces, domestic and external migration are demographic factors that influence the demand for housing (Özlük, 2014). Urbanisation occurs in parallel with population increase along with quantity of household. It will not be wrong to mention that domestic migration is one of the most observed reason for rapid urbanisation.

Based on studies of Özlük and Durkay, the economic factors affecting housing demand are house prices, income, consumption, savings, housing financing systems, and return

intentional housing demand. Housing price fluctuations influence housing demand regarding ability to pay for households. The purchase power of households can be supported by savings for housing or housing financial system. The amount of housing consumption in household income determines demand of house for sale or rent. On the other hand, return intentional housing demand occurs as a consequence of housing for investment purposes (Özlük, 2014; Durkay, 2002). It is possible to conclude that when economic and demographic dynamics meet under favourable conditions, then housing demand occurs.

The occurrence of housing demand attracts housing producers to supply demand for profit. However, this process is carried out within the framework of the series of steps determined by law. According to 21. And 26. items of the Zoning Law, all buildings must obtain approved building licences from municipalities or governorships regardless of a present zoning plan (Resmi Gazete, 1985). The landowner or deputy of the landowner must meet the rules, requirements, and principles of the items 55. and 57. of Planned Areas Zoning Regulation in order to obtain building licence. The purpose of the Planned Areas Zoning Regulation is to determine the procedures and principles for building, construction, design, and supervision. This regulation covers areas with the Implementary Development Plan. This regulation has been prepared on the basis of the provisions of the Development Law no. 3194 dated 03/05/1985 and Law No. 644 Delegated Legislation About Organisation and Duties of the Ministry of Environment and Urbanisation dated 29/06/2011 (Resmi Gazete, 2017).

Construction of any building cannot be started without obtaining a building licence, except for the exceptions brought by the law and the Planned Areas Zoning Regulation. The building owner or their representatives should apply to the related institution with a letter of application and supplements of boundary survey, certificate of ownership to obtain the zoning status, road elevation record of the sewage, the sewage elevation record, approved geological and geotechnical survey report of the parcel section based on the zoning plan to carry out construction, additional construction, and substantial renovation. The status of the zone, the elevation record of the road, the elevation record, and approved geological and geotechnical survey reports are the bases of the building design. All construction projects must correspond to documents and reports obtained from the related institution, Planned Areas Zoning Regulation, related laws,

Turkish standards, environmental conditions, rules of engineering, art and health, and all related legislation (Resmi Gazete, 2017).

According to the Planned Areas Zoning Regulation, an architectural project should consist of the layout sheet, the share table of construction servitude and property ownership, the area sheet for the gross area of independent units and common areas, the additions and the total construction area, all floor plans of the building, the roof plan, at least two section drawings related to floor plans and roof plans, one of the section drawings should show the common stair, the excavation account, when needed the system detail drawings, construction drawings, and the concept project, calculations of car parking, shelter, and tree. Additionally, the related institution can request a preliminary elevator project, a project or report on water and thermal insulation, a project or report on noise protection, a landscape project suitable to the specification of location and building (Resmi Gazete, 2017).

In addition to the architectural project, the static project, the mechanical project, and the electrical project are necessary for the application of the building permit. These projects should be designed and approved by engineers from related engineering disciplines. All construction projects must be in alignment with the architectural project and each other. Six copies of the architectural project and five copies of other projects, images, accounts, reports, and an electronic copy of all should be submitted to the building inspection authority for approval. As the building inspection authority approves the projects and attachments, they are submitted to the related institution to obtain a building permit. The project inspection time is 15 days. If there are any irregularities or faults, designers are notified within fifteen days. Once projects are approved by a related institution, the building permit must be issued within 30 days after the application date (Resmi Gazete, 2017).

Buildings over 200 m² floor area with the exception of the basement floor are obliged to be inspected by 'Building Inspection Corporations'[13] (Resmi Gazete, 2001). Building Inspection Corporations are legal entities in charge of construction inspection to which are appointed by the Ministry of Environment and Urbanisation (Resmi Gazete, 2008). Buildings less than 200 m² are inspected by the supervisor architect and engineers with the approval of the related institution (Resmi Gazete, 2001; Resmi

[13] It is translation of 'Yapı Denetim Şirketleri' from Turkish.

Gazete, 1985). Building inspection corporations are licenced for construction inspection by Ministry of Environment and Urbanisation, and all shareholders or partners of these corporations can be only architects and engineers (Resmi Gazete, 2008). According to the implementary building inspection regulation, inspectors are responsible for the minimum feasibility of projects, reports, calculations, materials, and construction with each other, along with rules, principles, standards, and regulations (Resmi Gazete, 2008). The duties and responsibilities of building inspectors are explained in the building inspection implementary regulation as follows;

- Inspection of accuracy and convenience in construction projects, calculations and reports,
- Correction of faults and discords in construction projects, calculations and reports,
- Approve construction projects, calculations, and reports for submission to related authority,
- Taking a statement down with the landowner or construction supervisor on behalf of the landowner for construction site delivery in order to start construction,
- Execute necessary observations and inspections of foundation works; record for formwork and reinforcement of foundation, record of concrete pouring, approval of executed works,
- Taking a statement down for formwork, reinforcement, and other required installations of the load bearing system,
- Approval to pass concrete pouring work and record the process for each concrete pouring situation in construction,
- Recording works of roofing, nonbearing walls, door and window casement instalment, and fittings,
- Record of inspections on all interior and exterior walls of the building, from the basement to the roof attic,
- Record of electrical installations and wall tubes,

- Record of electric cabling and secondary board,
- Record of roof structure, water insulation, thermal insulation and roofing,
- Record of hydraulic pressure test for clean water pipe fittings,
- Record of leak test for waste water piping,
- Taking a statement down when the building is ready for plaster work,
- Record of inspection of the main electric board,
- Record of mechanical installations,

All inspections, records, and other construction work statements must be maintained by inspectors or supervisors relevant to subject. Building Inspection Corporation is required to take a statement for completion of work in accordance with construction projects, standards, and regulations and submit it for approval to the related institution when the construction is completed. Engineers or architects of the related institution conduct inspections on site to verify and approve the completion of construction (Resmi Gazete, 2008).

It is mandatory to request permission to use the building from the related institution that gave the building permit after the construction is completed partially or completely. To obtain an occupancy permit, the application letter should have the attached reports from the building inspection authority on whether the construction is completed or not according to the projects, rules of health and science, with convenient construction materials. Additionally, an approved energy performance certificate and building images must be included in the attachments to the occupancy permit application letter. The authorised authority to issue the building permit shall determine the convenience of the building. If the building is found to be appropriate, the occupancy permit is issued within 30 days. Otherwise, the authority would request the completion the deficiencies of the building and the improvement of the building in compliance with the legislation. The date of the occupancy permit is the completion date of the construction. It is necessary to obtain an occupancy permit within 5 years of the building permit duration. Otherwise, the construction would be considered unauthorised. Buildings without an occupancy permit shall not have services such as electricity, water, sewage, or communication. Authorities providing such services for unauthorised buildings take responsibility (Resmi Gazete, 2017).

The owners can renovate or expand the building or parts of the building. It will not be wrong to mention that renovations and expansions are barely conducted under the supervision of experts. It has been observed that zoning amnesty applications are made from time to time, which legalises such dubious changes. There are two types of renovation works, which are referred to in the Planned Areas Zoning Regulation. They are 'elementary renovations'[14] and 'essential renovations'[15]. Elementary renovations do not require building licence, official permission. They can be listed as; hinged glass panel installation in balconies, railings, pergolas, partition walls, garden wall, wallcoverings, changing windows, chimney repair, eaves, etc. (Resmi Gazete, 2017).

Essential renovation is defined in Planned Areas Zoning Regulation; the alterations that affect the load bearing element of the building, the changes that influence the building area, floor area ratios, the building coverage area, the number of independent units, the number of common areas, the intended purpose, and projects in the attachment of the building licence. As mentioned in item 58 of Planned Areas Zoning Regulation, the essential renovation of a building can take place, if qualified for this legislation, the zoning law, and current legal provisions. However, it is mandatory to obtain a licence for essential renovation from a related institution. The reconstitution of an architectural project is mandatory for essential renovation. When an alteration in architectural design has influence on engineering projects in the attachment of a building licence, those projects must be in compliance with altered architectural design in order to obtain a building licence for essential renovation. New projects are approved by a related institution (Resmi Gazete, 2017).

Altogether, what particularly stands out is that the housing constructions are subject to have building permit and architectural and engineering projects and reports are supplement of building permit. Therefore, all construction projects must be approved by Inspection Corporation. Designers are responsible for the feasibility and accuracy of their projects. Inspection Corporation is considered responsible for the execution and completion of the construction according to the design. The occupancy permit is granted when the construction is approved for completion according to the approved projects. After that, the responsibility of the building belongs to its owners. The

[14] It is translation of 'basit tadilatlar' in Turkish.
[15] It is translation of 'esaslı tadilatlar' in Turkish.

occupant of the building may do alterations to the building, but no regular inspection is mentioned to observe situation of building. When zoning amnesties come into force, the illegal alterations may easily become legal.

Once the building license is acquired, the relation between designers and the construction is detached. There is no legal ground to provide such a relation. Additionally, disconnection of designer from the construction prevents receiving feedback of design faults from inspection parties, clients, and users. For this reason, this process constrains the designer from self-development and experience from drawing to building. Reviewing the building design procurement process provided awareness of the gap between the designer and construction along with the client, the occupants and the construction inspection authorities. In addition, it is exposed that regularly supervision of the building is necessary to ensure that it is maintained as designed.

3. FACTORS AFFECTING UNBRANDED HOUSING DESIGN AND PRODUCTION IN TURKEY

The analysis of the building procurement process has led to the understanding that, construction projects have to be prepared in compliance with the effective legislations in order to be approved to obtain a building licence. It has been mentioned that building regulations and zoning codes determine the mass of the building. For this reason, they are prominent factors in the design and production of unbranded housing. After that, as mentioned earlier in the study, demand starts the housing design and production process, and supply must correspond with demand. Because it is a situation of meeting expectations; as a commodity, supplied housing should meet expectation of a potential client. It can be achieved by understanding the properties of demand through economic and demographic concerns.

Housing is an indicator of the social, economic, and cultural identities of societies. Individuals reflect their own physical and spiritual characteristics as well as the cultural characteristics of their group, to space in which they live, and the way that space is used (Ertürk, Keleş, & Usta, 1992). It is possible to mention that the properties of a house may change according to the cultural and social situation of its user. Therefore, cultural and social properties of the region are important factors in housing design and production.

The construction process is interrelated with many other activities, materials, and professions. The availability and practicability of these particulars are essential for construction work. For this reason, it is possible to consider these aspects as technological factors that affect housing design and production process. Finally, all above-mentioned subjects may get before architect as design considerations. Proper evaluation and feasible association of these requirements within legal framework is critical to fit the purpose of housing in terms of architectural design. Therefore, the practise of an architect under sectorial conditions is an important factor in the design and production of housing.

The factors affecting the design and construction of unbranded housing can be divided into four groups. They are building regulations, economic factors, cultural and social

factors, technological factors, and practise of architects. Under the following titles, these factors are discussed in context with legal framework.

3.1. Building Regulations

Regulations are written norms of law, a guide to social action and interaction in industrialised countries. Originating from 19th-century urban planning practises, they outline guidelines and requirements for architects to design structures. Building codes play a crucial role in shaping architectural design and ensuring compliance with legal and safety requirements. Regulations can be classified into prescriptive and performance-based regulations. Prescriptive rules focus on prescribing specific compliance measures, while performance-based regulations include clearly defined goals, objectives, functional statements, operational standards, and performance criteria.

The Ministry of Environment and Urbanisation implemented a classification and registration system for construction contractors in 2019, allowing them to construct projects that meet their requirements. Building regulations ensure that unbranded housing adheres to standards, such as structural integrity, fire safety measures, and accessibility. Enforcing these regulations helps mitigate risks and protect residents from substandard housing. In Turkey, regulatory requirements for architectural design must comply with various regulations; the planned area zoning regulation, car park regulation, shelter regulation, thermal insulation regulation in buildings, energy performance regulation in buildings, and Turkey building earthquake regulation.

3.1.1. Planned areas zoning regulation

The purpose of the Planned Areas Zoning Regulation is to determine the procedures and principles for building, construction, design, and supervision. This regulation covers areas of Implementary Development Plan. This regulation has been prepared on the basis of the provisions of the Development Law no. 3194 dated 03/05/1985 and Law No. 644 Delegated Legislation about Organisation and Duties of the Ministry of Environment and Urbanisation dated 29/06/2011 (Resmi Gazete, 2017).

The legislations related to the building about disaster, earthquake, fire, parking, energy efficiency, shelter, elevator, building materials, noise protection, heat and water

insulation, building supervision, work safety, scaffolding, accessibility, and environment are also complied with the projects where a construction permit is requested. It is mandatory that the projects must first comply with the Planned Areas Zoning Regulation, provisions cited in this regulation, and standards of the Turkish Standard Institute (TSE).

The building coverage area and floor area are calculated by the clear area of the zoning lot. If the zoning parcels are subject to change and contain areas that need to be left to the publici and if there are provisions in the zoning plan regarding the free cancelation of these areas to the public. The building coverage area and floor area calculation can be made according to the provisions specified in the zoning plan (Resmi Gazete, 2017).

In places with discrete and block order, the building coverage area may not exceed 40% unless it is clearly stated in the Implementary Development Plan. However, in parcels where the setback distances and floor area ratio are given and the building coverage ratio is not given, the application is made according to the provided setback distance and under the condition of not exceeding 60% of the building coverage area (Resmi Gazete, 2017).

The floor area is all usable areas of the building. The floor area is determined by the floor area ratio over the net zoning parcel area. Usable areas are the housing, commercial spaces, entertainment, and recreation areas. The building coverage area is determined by joining the outer surfaces of the columns with the shortest straight segments in structures constructed on columns without closure on natural or level ground. The coverage area of the basement floors, which are completely or partially exposed, cannot exceed the building coverage area determined by the building coverage ratio, with the exception of parts completely below the ground. The building coverage area is determined by the Implementary Development Plan over the clear area of a zoning parcel. If it is not specified in the Implementary Development Plan, it can be determined by provisions of the Planned Areas Zoning Regulation.

If there is no contrary provision for garden distances in the implementary development plan; the setback distances at the front yard, the roadside yards and the yards neighbouring public areas are at least 5.00 m, side yard and backyard setback distances are at least 3.00 m. The setback distance increases by 0.50 m for each floor for

buildings that are higher than 4 floors, including disclosed basement floors. This provision does not apply to the facades adjacent to the parking area.

The sizes of the buildings are determined in proportion to the size of the plot. These ratios are indicated in the Implementary Zoning Plan. In Figure 3.1, an Implementary Zoning Plan shows two blocks. The block on the left is made up of 8 lots and the other one a single block island. On the left, A-4 is a symbol indicating the formation of detached buildings (A) and the maximum number of floors (4) for the lots in the block. The next symbol of this indicates 0.30 for the building coverage area ratio and 1.20 for the building floor area ratio. The dashed line inside the block indicates setback distance; in this case it is 5m. In some cases, the presentation and information given in the implementation zoning plan may differ, as the block on the right in Figure 3.1. There, the building coverage ratio and the number of floors are not given. But E = 1.20 is the ratio for the floor area and Hmax=17.00m is the maximum height of the building. As mentioned in the study, where setback distances are given and the building coverage ratio is not provided, the building coverage ratio could be taken into account as up to 0.60 (%60). By the end of this assessment, it is possible to conclude from the practise that the footprint, height and placement of buildings are prescribed without interference of their architect.

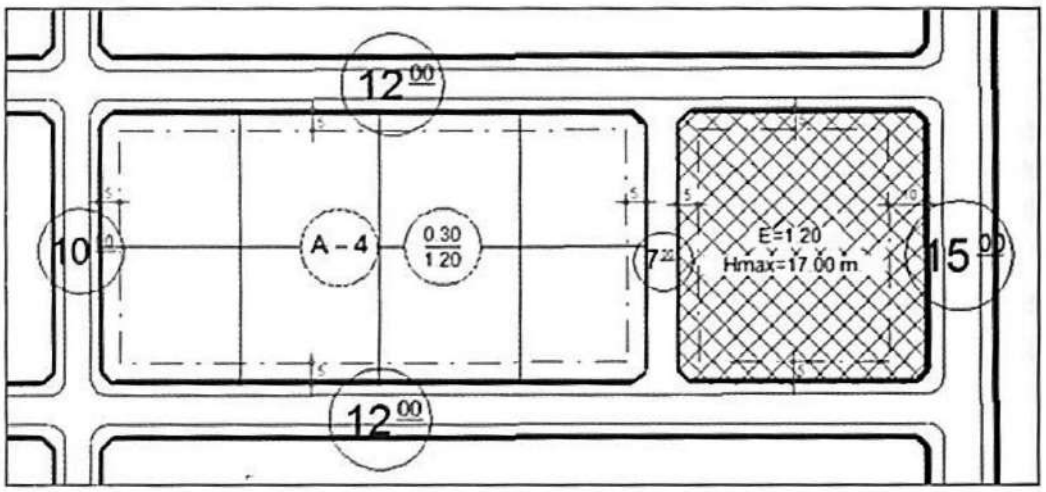


Figure 3.1: An example for Implementary Zoning Plan (Armağan, 2018)

There are some exceptional usages for the calculation of floor area. They are the areas not included in the building coverage area, open seating places, 70 m² of the mandatory housekeeper's flat, atrium and gallery spaces, outhouse and masjid as common areas, playgrounds and child care units that are not commercialised, car parking areas, mandatory installation storeys and areas, basement floors with all facades completely underground, board room, sports and social areas that are not commercialised and an independent unit or extension of an independent unit, storage areas that are extension of an independent unit and not bigger than 50% of clean area of the independent unit it belongs to, the balconies that are not larger than 10% of the independent unit that it belongs to and that comply open cantilever conditions and open or closed staircase and floor hall.

The sum of all areas out of the floor area ratio that is introduced by Article 22 of the Planned Areas Zoning Regulation or the zoning regulations of the related administrations cannot exceed 30% of the total floor area ratio of the parcel. But; fire escape stairs outside the normal staircase with or without protection and minimum area of the protected corridor and 6 m² of fire safety hall, which are obliged to be made in accordance with the regulation about fire protection of the buildings, which were put into force by the council of ministers decision dated 27/11/2007 and numbered 2007/12937, terrace roofs, which are not subject to any use above the last floor, open car parks in the garden for the needs of the building, voids that must be regulated in public buildings, such as conferences, sports, cinemas and theatres and the spaces required to be arranged in the shopping centres, the minimum size of the atrium spaces in shopping centres on each floor and the spaces planned in the basements of buildings;

- Mandatory car parking spaces,
- Shelter, elevator shafts, stairs, chimneys, shafts, skylights, heat and plumbing areas, fuel and water storages, generators and energy rooms, minimum areas of the housekeeper's flat and coal bunker, which are calculated according to the relevant legislation, standard or planned area zoning regulation,
- 150m² of the masjid and outbuildings as common areas in housing, and 300m² of them at the nonresidential buildings,
- Car parking areas and common areas under the condition of being fully buried underground, as specified in Article 22,

- A total of 100 m² of children's playgrounds and child care units, which are not commercial purposes and which are common areas,

are excluded in the calculation of the floor area ratio. It is possible to assert that the aim of this article is to prevent the loss of occupied space, which is a commodity, while forming the mandatory spaces of a building. The same situation is valid for the building coverage area; the courtyards and inner gardens at the natural or even level, the minimum dimensions and numbers of stairs and fire safety halls, which are determined in the regulation on fire protection of buildings, the minimum dimensions of elevator shaft, skylights, garbage and waste separation chimneys, air chimneys, shafts that start from foundation, and building marquise are not calculated within the building coverage area.

However, as the block on the right in Figure 3.2 is given, the building coverage area (TAKS = 0.30) and floor area ratio (E=1.20) is given, but the height of the building is not determined. Then, the height of the building is unrestricted under the condition of not exceeding the floor area ratio.

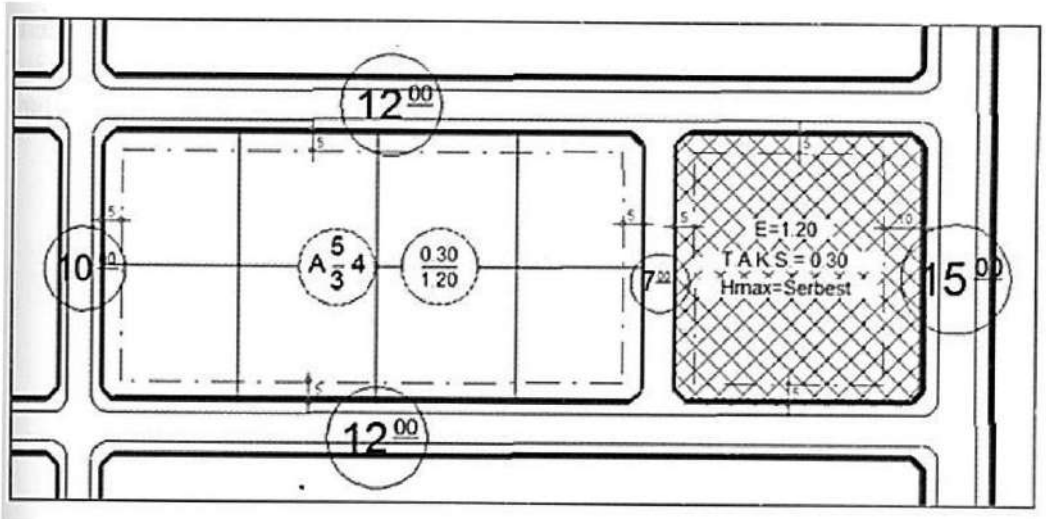


Figure 3.2:An example of block with unrestricted height (Armağan, 2018)

If and when the number of floors and the height of building are not determined in the previous Implementary Zoning Plan before Planned Areas Zoning Regulation entered into force, then the height or number of floors can be determined according to the width of the street (Table 3.1). The elevation base of the building is generally determined according to the street level. The point where the elevation would start is located with the consideration of the street silhouette. The buildings are elevated at the highest level of travertine at the level of the corners of the street front where the parcel is elevated. The level is 0.18m above the street.

Table 3.1: Elevation of building based on the width of street (Resmi Gazete, 2017).

Street Width according to the Zoning Plan (meter)	Maximum Number of Floors (except basement floors)
Street width ≤7m	2
7m<Street width≤10m	3
10m<Street width≤12m	4
12m<Street width≤15m	5
15m<Street width≤20m	6
20m<Street width≤25m	8
25m<Street width≤35m	10
35m<Street width≤50m	14
50m<Street width	18

The implementary zoning plan in Figure 3.3 shows a trade block. In Figure 3.3, the floor area ratio (E=1.25) is indicated, but the height of the building is not determined. In this case, the height of the building is calculated according to the width of the road next to it, as shown in Table 3.1. As in Figure 3.3, when the height of the building is not determined in the Implementary Zoning Plan, then then the number of floors would be calculated by dividing the floor height value (3 m) by width of street (12.50 m);

$$\frac{12{,}50}{3} \cong 4 \text{ floors.} \qquad (3.1)$$

It is possible to mention that these assessments expose the existence of a default option of building templates within bounds of possibilities.

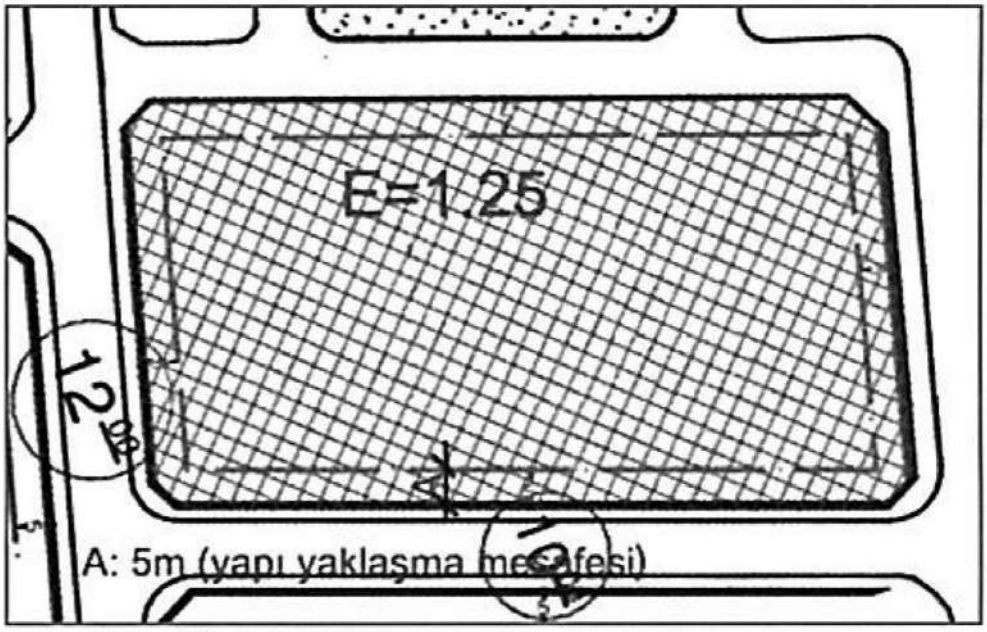


Figure 3.3: An example for block where floor area ratio indicated in the implementary zoning plan (Armağan, 2018).

Buildings must have the minimum size of units that are mandatory according to the regulation about fire protection of buildings, the regulation about shelter published in the official gazette dated 25/8/1988 and numbered 19910, the regulation of car parking published in the official gazette dated 22/2/2018 and numbered 30340, the regulation of building energy performance published in the official gazette dated 5/12/2008 and the numbered 27075 and earthquake regulation published in the official gazette dated 18.03.2018 and numbered 30364.

Buildings must have an electrical room with dimensions foreseen in the relevant legislation, a boiler room or cascading system or heating centre in buildings with central heating system and woodshed, coal bunker, or storage for the buildings using solid fuel-fired heating stoves. These are some of the mandatory spaces mentioned in the Planned Areas Zoning Regulation that are should be provided in the architecture project of a building in compliance with the mechanical project.

The height of the floor is measured from the top of the slab to the top to the upper slab top according to the Planned Areas Zoning Regulation. The height of the storey cannot be greater than 3.60 m for residential buildings. If the ground floors are designed for commercial use, then the height of the ground floor can be 4.50 m or 5.50 m with

mezzanine. On the other hand, if 3/4 of a parcel has been built, the existing formation is considered to determine the height of building. The clear height of a storey cannot be less than 2.60 m except for the mezzanine.

The Planned Areas Zoning Regulation has provisions for spaces and their size. Every separate house should comply with the specifications mentioned in Table 3.2. According to provisions, the residences with three rooms or less can arrange the bathroom, shower, and toilet in the same place. If a built-in kitchen and living room or bathroom and toilet are designed at the same place, then a total of provided minimum clear area should be kept. The ventilation shaft of the kitchen, room and toilet/bathroom ventilation cannot be mutual. However, the ventilation shaft of the bathroom and the toilet can be mutually used. The electrical room cannot be organised below the cistern and wet volumes.

Table 3.2:The minimum size and area of the loci for separate houses (Resmi Gazete, 2017).

SPACE	LENGTH OF THE NARROWEST EDGE	MINIMUM CLEAR AREA
1 Living room	3.00 m	12.00 m²
1 Bedroom	2.50 m	9.00 m²
1 Kitchen or built-in kitchen	1.50 m	3.30 m²
1 Bathroom or shower	1.50 m	3.00 m²
1 Toilet	1.00 m	1.20 m²

The width of the hallways and corridors should not be less than 1.20 m. But the width of the building entrance cannot be less than 1.50 m, as well as being at least in the width of the outer door, until it reaches the main staircase and elevator. The width of the landing and flight stairs cannot be less than 1.20 m for common staircases of residential buildings as shown in Figure 3.4. These measurements are applied to common stairs and service stairs that reach the roof and basement floors. These stairs cannot be wooden. The width of stairs cannot be less than 1.00 m inside a residence. It is imperative that the staircase houses receive direct light from the facade, roof, or skylight of the building and at least one of the common stairs must reach the roof and basements. It will not be wrong to mention that the necessary height on the top of the

staircase should be resolved within the roof attic and, accordingly, within the roof structure of the building.

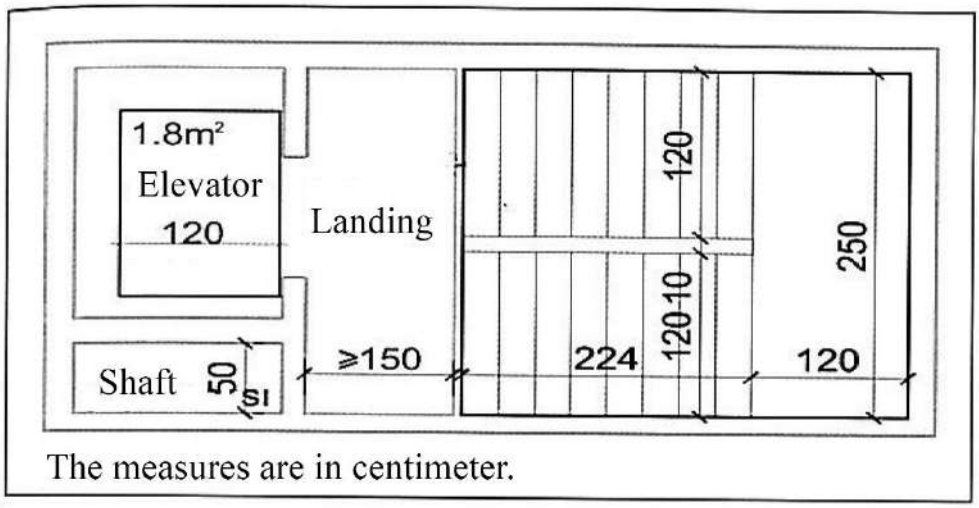


Figure 3.4: Minimum dimensions for a staircase and elevator shaft (Armağan, 2018).

At least one of the living rooms and/or bedrooms must receive direct natural light and air in every separate apartment. The other bedrooms and kitchens may have the benefit of skylight as well as showers and toilets, but toilets and showers should not be opened to the same skylight as the other rooms and kitchens. The narrowest edge of skylight cannot be less than 1.50 m and 4.50 m² in buildings between one and six floors high. It is possible to conclude that access to natural light in a room is directly related to the layout of the floor plan. In adjacent buildings, the location of the skylight and the placement of the rooms around it are important for the efficiency of the design. In addition, skylights must exceed the roof level at a certain height. This situation causes an aperture on the roof, which makes it an important element in roof design.

The minimum size of ventilation shafts is equal to the area of 0.60x0.60 in all kinds of building, and these areas cannot be narrowed by any structural member. Ventilation shafts should not be organized as branched chimneys. The maximum four locus can have the benefit of a minimum size of skylight or shaft. The size of the skylight or shaft is to be increased by the same rate for each locus over the four loci, with the exception of the loci that already receive direct natural light and air. Electrical wiring and installation of natural gas should not be installed in ventilation shafts.

In apartments that are centrally heated, it is mandatory to have a chimney in at least one of the living and sleeping spaces. Also, kitchens and bathrooms without hot water installation must have chimneys. In stove-heated apartments, it is mandatory to install a chimney in all rooms except toilets and corridors. At least one aspirator shaft must be placed in the kitchen of independent units. Electric, communication, mechanic, and natural gas installations cannot be together in an installation shaft. It is possible to mention that the shafts are creating a hole in every slab and on the roof top. Therefore, they should be carefully considered carefully within the structural system of the building and the roof design.

According to the Planned Areas Zoning Regulation, it is mandatory to leave the elevator shaft for three-storey apartment buildings. Buildings higher than three floors, including the basements, must install an elevator. Also, an elevator can be installed in less-storied buildings. The narrowest edge of the elevator cabin should not be less than 1.20m, the cabin area should not be less than 1.80m², and the clear width of the door should not be less than 0.90m. The depth of the landing in front of the elevator door should not be less than 1.20 m for sliding elevator doors and it should not be less than 1.50 m for swing elevator doors. Elevators must reach all floors of the building, including basements. Installation and maintenance of an elevator should be done in compliance with the provisions of the Planned Areas Zoning Regulation, Elevator Regulation, and TSE.

It is possible to assert that the location of the elevator and its integration with other vertical circulation elements and the counterbalance of horizontal circulation areas with them are challenging and mandatory by law. It is possible to observe from practise that vertical circulations are placed at the core of the building for two reasons. Equal partition of a layout for flats of the same size and organising wet areas close to installation shafts around the staircase is efficient in terms of cost, maintenance, and space usage. Structurally, the central placement of the elevator shaft is more efficient in order to be close to the centre of rigidity because elevators are surrounded by reinforced concrete walls. The elevator shaft creates an elevation difference at the foundation of the building, and generally its machine room is located in the roof attic. In most cases, it exceeds the roof height, and the structure and design of the roof should be resolved accordingly.

The roof slope is calculated from the eaves as shown in Figure 3.5. Roofs cannot be placed on a parapet wall. Under the condition that the roof ridge not exceeds 5.00m height, the roof form is determined as a hipped roof for detached buildings, a hipped roof in common with its block for double block building, a forward and backward inclined gabble roof for adjacent buildings. Stair enclosures, skylights, ventilation chimneys, eaves walls, and gable wall should not exceed roof covering more than 0.60 m. The minimum height of the elevator tower and the stair enclosure planned with the elevator tower can exceed the roof cover.

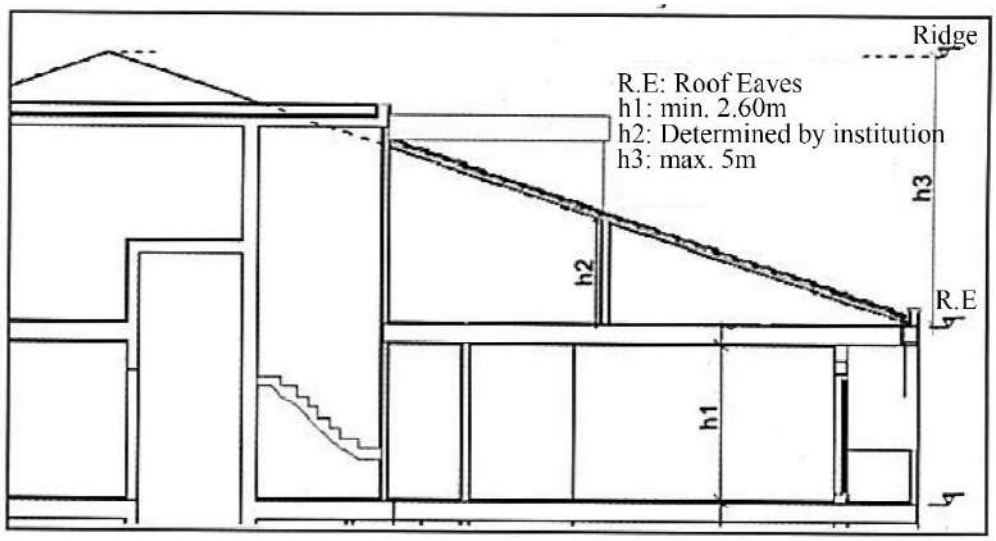


Figure 3.5: Roof section (Armağan, 2018).

Roof eaves may be up to 1.00m if any legislation is not determined in the implementary development plan. They should not exceed the boundary of the parcel. Also, the roof eaves should not exceed 0.50m where the building has cantilevers. Terrace roofs may have a 1.10 m high parapet wall or railing. The 1.10 m high parapet wall or railing is mandatory for used terrace roofs. Roof space should not be planned for independent units. Only installation rooms and loci connected to independent units on the top floor can be planned in the roof space. If there are more than one terrace of more than one independent unit on the roof, a distance of at least 3.00 m must be maintained between those terraces (Resmi Gazete, 2017). The roof is an important component of the building that determines the form of the mass in the building scale and the silhouette of the city on an environmental scale (Özkaptan Alptekin & Kasapoğlu, 2015). It is possible to suggest that definitive legislation on roof design and usage may cause a similarity between the design and production.

The building may have an open and closed cantilever under the condition of not exceeding the yard boundaries. The open and closed cantilever can be provided within the parcel. They may have a depth of 1.50 m starting from the setback distance on the street side of the parcel. The open and closed cantilever may lie beyond the sides and back yards, but they should not approach the boundary of the parcel more than 3.00 m. The cantilever must not approach the adjacent building more than 2.00 m in terms of the attached buildings system. The elevation of the open and closed cantilever should be at least 2.40 m from the ground level to the bottom of the slab.

It is possible to assert that cantilevers could be a key instrument for architects to achieve authentic design by staging the façade of the building. Such a design option requires renunciation of occupied space that is subject to the trade. Since estates are priced over the value per square metre, unbranded housing producers would not renounce any occupied space. The variants of the building boundary determinant in the mass of the building are on the decrease as the plots and blocks subject to the design are getting smaller. This situation causes a resemblance among unbranded residential buildings and influences the cityscape due to the high density of unbranded residential housing.

The motif cantilever is used to increase the aesthetic quality of the façade of the building. They should not be more than 0.20 m deep and this space should not be used to enlarge open and closed cantilevers. Also, the motif cantilever should not exceed the parcel boundary. The entrance canopies are not considered cantilevers provided that they do not exceed 2.50 m height above the ground level. Up to 0.50 m sunshades can be installed on the building façade under the condition of considering light material, with the aesthetic and design in the architectural project, and providing detail drawings.

Unlike enclosed cantilevers, motif cantilevers are excluded from the occupied space. It would not be wrong to mention that they are not subject to trade and they have a lesser influence on the cost of a building compared to enclosed cantilevers. Motif cantilevers are generally used to create a railing base in front of full-length openings and visual improvements on the façade of the building. It would not be wrong to mention that motif cantilevers are commonly used and are determinant of the

morphology of unbranded residential buildings. Their influence on the cityscape increases with the influence of popular building materials on the market.

It is possible to conclude that the impact of the regulations on the production of unbranded housing, implementation development plans have defined the size of buildings, especially on single-building parcels, by means of tools such as the ratio of the building coverage area and the ratio of the floor area. In cases where the Implementary Zoning Plan does not provide these ratios or building height, it is understood that this gap is filled by the Planned Areas Zoning Regulation. The density of zoning lands that can accommodate a single block, highly defined zoning codes, and building regulations allow for similitude among unbranded residential buildings.

3.1.2. Car park regulation

All buildings must have the required parking lots according to the provisions of the parking regulation. Car park regulation is a separate legislation. The Planned Areas Zoning Regulation refers to the car park regulation about the rules and procedures of the car parking areas. Car park regulation manages the dimensions, quantity, and other circumstances of buildings and facilities where a building permit will be issued to solve traffic and car parking problems (Resmi Gazete, 2018).

The items of the Car Park Regulation related to the residential building can be listed, respectively. The parking area for a car including the manoeuvre space is 20.00 m². It is mandatory to indicate the car parking space with the space and shape of manoeuvre in the floor plan. In case of vehicle lift and mechanical systems being used, the unit area could be less under the condition of being clearly shown in the projects and being approved by the related institution. It is essential to provide a zoning plan and parcels of adequate size to provide parking for cars.

When the car parking requirement could not be supplied partially or completely in a parcel due to the provisions of the car park regulation. A technical report must determine that the required car parking space cannot be provided within the boundary of the parcel and on the basement floor despite the vehicle lift and mechanical systems. In that case, the parking space shall be provided by a common car parking space for cars with neighbouring parcels or other inter-island practises. When it is not provided by inter-island practises, car parking spaces shall be supplied from a parking space of

another building within walking distance which is not subject to expropriation and under the condition of indefinite easement and 'registration to the declaration section of the book of real estate registry'[16]. If these two options could not provide the required car parking spaces, the related institution shall assign the required car parking space of the building for the parking fee.

The 1% of the parking area at any kind of car parking space shall be reserved for bicycles and motorcycles. Car parking can be constructed below the sides and back yards of the building when required car parking could not be provided on the basement floors of the building. In addition, it can be constructed below the front yard under the condition of keeping a 3.00 m distance from the parcel boundary at the road side. Car parking may be provided in the front yard of the parcel. But the ramp of the car park cannot begin on the outside of the parcel boundary.

A parking lot may be established on the sides and backyards of the parcel with materials that are suitable to the green texture and water permeable, when a car park cannot be provided below the natural ground level or above the ground level. To provide a parking lot in the backyard of the parcel, the side yards distances must be at least 3.00 m or 2.75 m wide, and a passage should be provided inside the building. If required car parking could not be provided at the back and side yards and under ground level, then related institutions are authorised to give permission for a parking lot in front yards at the parcels that have 7.00 m or more front yard depth.

Car park, circulation areas, and ramps have to provide the minimum width of the ramp after furnishing. The clear size of the car park entrance must not be less than 2.75 m wide and 2.00 m high. The clear height of the car parking area must not be less than 2.10 m including the beam soffit. The slope of the ramp cannot be higher than 20%, except for public buildings. The clear width of the car park ramp cannot be less than 2.75 m and the ramp height at turns should be provided at 2.75 m at minimum. The total width of the two-way road with 90° turning should not be less than 6.00 m for private buildings and 6.50 m for public buildings. Dimensions of 2.40 m x 4.90 m are taken as basis for cars except room for manoeuvre. The minimum length of the long

[16] It is translation of 'tapu kütüğünün beyanlar hanesinde belirtme yapılması' in Turkish.

segment of the car park unit is 4.90 m. The minimum length of the narrow segment of the car park unit is 2.40 m and 3.50 m for people with disabilities.

The projects cannot have a building permit as long as required parking is not provided according to the rules of car park regulation. Additionally, buildings cannot have an occupancy permit as long as the parking is not constructed according to the car park regulation. It is mandatory to show the number of parkings, including those for people with disabilities, the furnishing and layout of the parked cars, ramps, traffic flow, and parking capacity in the approved architectural project of the building with numerical values.

Generally, the number of parking spaces intended in the regulation requires one or more basement floors as parking areas of the building. In this situation, the height of the building structure is increasing. In buildings, when basements are used as car parking areas, it affects the size of the structural components of the building. Based on the information provided on the official website of the Sözcü (2023) newspaper, it has been reported that urban transformation projects had the ability to acquire building permits without requirement of installing car park space. In situations where it is not practicable to provide car parking spaces at the basement levels or within the parcel, an alternative option is to use municipal car parking options at a specified fee. The objective of this arrangement is to reduce the cost of construction with the intention of increasing the supply of housing (Süzer, 2023). According to the aforementioned news report, it is possible to assert that parking facilities have a substantial impact on overall expenses associated with construction projects. Therefore, the addition of car parking spaces can potentially lead to financial savings and a decrease in the general standard and visual aspects of the building.

3.1.3. Shelter regulation

Shelter regulation determines the rules and procedures of the shelters regarding the type, qualification, construction, usage, and conservation. Shelters are constructed with the intention of providing protection for mandatory living and inanimate assets against natural disasters, the effect of biological and chemical warfare agents along with nuclear weapons and conventional weapons in order to carry on human life and

the war power of the country. The shelters are divided into two according to the users and the purpose of usage.

The types of shelters for users are general shelter and private shelter. General shelters are structures to protect the community where there is a high density of population and traffic. Private shelters are constructed with the intention of providing protection against effects of nuclear fallout, biological and chemical warfare agents, effects of weakened heat and pressure of nuclear weapons, and effects of conventional weapon cluster. Private shelters may build primarily at the basement floors of private and public buildings, or on the ground, or in the yards contrary with the setback distances provision of the Planned Areas Zoning Regulation (Resmi Gazete, 1988).

The shelters are divided into two according to the purpose as pressure shelters and fallout shelters. Pressure shelters are constructed by the state to provide protection against the effects of weakened heat, light, pressure, and initial radiation from nuclear weapons, nuclear fallout along with the conventional weapons cluster, and biological and chemical warfare agents. Fallout shelters are constructed to provide protection against the effects of radioactive fallout. Also, they protect from the effects of biological and chemical warfare agents, the weakened heat and pressure of nuclear weapons, and the conventional weapon cluster.

Fallout shelters are included in the building coverage calculation when they were built at ground level or partially below ground level. It is not calculated with the building coverage area if it is built completely blow the ground level and separate from the building. Shelters are not included in the occupancy area calculation. Fallout shelters must be constructed in all buildings. But there are exceptions according to the purpose and scale of the buildings. The buildings that are not obliged to have shelter are; residential buildings with twelve or lesser independent units, nonresidential buildings with less than 1,500.00 m² occupancy area, residential buildings and non-residential buildings with less than twelve independent units and 1,500.00m² total occupancy area.

The required shelter is calculated separately for each building in the case of constituting more than one building in a parcel with different purposes. In that case, there may be separate shelters for each building and one or more than one common shelter with the condition of providing the required shelter space for the parcel. Private

shelters were required to comply with the provisions of the shelter regulation. There should be at least 1.00 m² per person in a shelter. The toilet, shower and built-in kitchen area are not included in the calculation. The number of people is determined as; two for one bedroom houses, three for two bedroom houses, and four for three and more bedroom houses. The area of non-residential areas divided into 20 to determine the number of people to include in the calculation of shelter area. The total number of people for residential and non-residential areas is the mandatory shelter space of the parcel.

The shelter must not be less than 9.00 m² when the toilet, shower and built-in kitchen is not included. The male and female sinks and toilets should be reserved separately for every 100 people. If the remaining fraction is greater than 50, one more sink and toilets will be added. Number of people calculated according to the architectural project that is subject to the building permit.

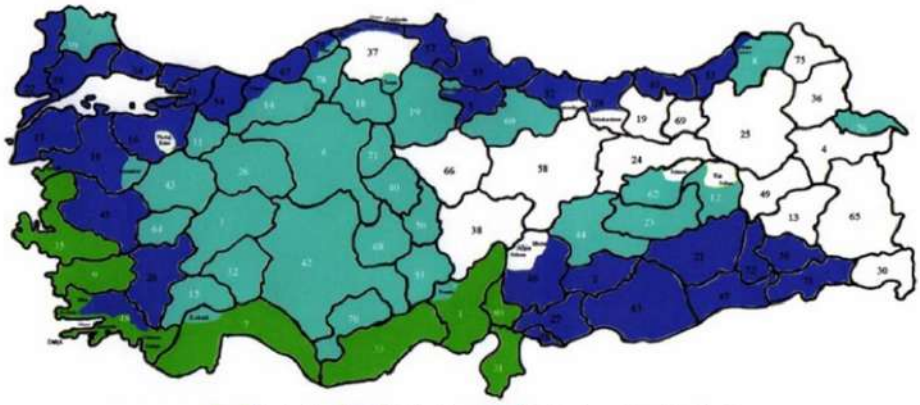
The clear height of the shelter must not be less than 2.40 m. The thickness of the wall and ceiling that surround the shelter on the exterior face of the building should be at least 0.60 m thick concrete, 0.75 m thick brick or stone, or 0.90 m compacted earth. These materials can be used alone or together considering the ratio of these measures with respect to radiation permeability. The entrance to the shelter must have an iron door and at least one 90° turn. The shelters bigger than 100.00 m² except built-in kitchen, toilet and shower area must have two separate exits. Every shelter must have mechanical ventilation. The ventilation duct, number, and placement of the vent hole should be designed by mechanical engineers.

It is possible to mention from practise that shelters are generally organised in the basement. It might be challenging to design a shelter that is among a column system of a completely different layout and provides a connection with vertical circulation. It generally results in a loss of space that could be accounted for as occupied space. It might force the contractor to balance cost and sale with an increase in price or a decrease in quality. On the other hand, the news report on the website of the Sabah (2011) newspaper supports that shelters have been converted into saleable areas by joining the shelter space to an independent unit next to it, especially in buildings where the basement level partially remains at ground level (Uğur N. , 2011). This situation indicates that contractors can take illegal actions to increase saleable areas.

3.1.4. Thermal insulation regulation in buildings and energy performance regulation in buildings

The thermal insulation regulation in buildings was introduced on 8 October 2008 by the Ministry of Public Works and Settlement. The purpose of the regulation is to determine the procedures and principles to prevent heat loss, energy savings, and implementation. This regulation must be applied to all settlements, with the exception of the individual buildings that do not need to be heated.

In Figure 3.6, Turkey is divided into four regions in terms of heat insulation applications according to the thermal insulation regulation in buildings. The indoor temperature of the houses is determined at 19°C. Therefore, thermal insulation calculations are reported by mechanical engineers according to regional characteristics and the architectural project. The required amount of thermal insulation in the building envelope must be included in the architectural project, as supervised in the thermal insulation report.



01- ADANA	16- BALIKESİR	19- ÇORUM	28- GİRESUN	37- KASTAMONU	46- K.MARAŞ	55- SAMSUN	64- UŞAK	73- ŞIRNAK
02- ADIYAMAN	11- BİLECİK	20- DENİZLİ	29- GÜMÜŞHANE	38- KAYSERİ	47- MARDİN	56- SİİRT	65- VAN	74- BARTIN
03- AFYON	12- BİNGÖL	21- DİYARBAKIR	30- HAKKARİ	39- KIRKLARELİ	48- MUĞLA	57- SİNOP	66- YOZGAT	75- ARDAHAN
04- AĞRI	13- BİTLİS	22- EDİRNE	31- HATAY	40- KIRŞEHİR	49- MUŞ	58- SİVAS	67- ZONGULDAK	76- IĞDIR
05- AMASYA	14- BOLU	23- ELAZIĞ	32- ISPARTA	41- KOCAELİ	50- NEVSEHİR	59- TEKİRDAG	68- AKSARAY	77- YALOVA
06- ANKARA	15- BURDUR	24- ERZİNCAN	33- İÇEL	42- KONYA	51- NİĞDE	60- TOKAT	69- BAYBURT	78- KARABÜK
07- ANTALYA	16- BURSA	25- ERZURUM	34- İSTANBUL	43- KÜTAHYA	52- ORDU	61- TRABZON	70- KARAMAN	79- KİLİS
08- ARTVİN	17- ÇANAKKALE	26- ESKİŞEHİR	35- İZMİR	44- MALATYA	53- RİZE	62- TUNCELİ	71- KIRIKKALE	80- OSMANİYE
09- AYDIN	18- ÇANKIRI	27- GAZİANTEP	36- KARS	45- MANİSA	54- SAKARYA	63- ŞANLIURFA	72- BATMAN	81- DÜZCE

Figure 3.6: Map by degree day zones (Resmi Gazete, 2008)

The energy performance regulation in buildings was introduced 5 on December 2008 by the Ministry of Public Works and Settlement. The purpose of this regulation is to estimate the measurement of all energy uses of new and existing buildings for the evaluation, taking into account the external climatic conditions, indoor specifications, local conditions and costs, to ensure the spread in terms of primary energy and gas

emission (CO2) emissions. It regulates the determination of minimum energy performance requirements for buildings, the evaluation of the feasibility of energy expenditures for house, heating and cooling rooms, the limitation of greenhouse gases, the regulation of performance criteria and application principles in the building, and the protection of the environment.

The energy performance regulation and the thermal insulation regulation in buildings refer to TS-825. TS-825 is the codes of the Turkish Standard Institution for thermal insulation in buildings. The TS-825 standards are used to calculate the net heating energy in buildings and determine the highest allowable heating energy values in buildings. As mentioned above, the indoor temperature is determined by the regulation of thermal insulation in buildings, and Turkey is divided into four regions according to the climate conditions. The maximum allowable energy usage for heating is determined by the legislation, and this value cannot be exceeded. At this point, thermal insulation in the building envelope is crucial for energy savings. When unbranded housing is observed, polystyrene foam, extruded polystyrene, and mineral wool are the main materials used to prevent heat loss and save heat energy.

There are details on heat insulation in the attachment of legislation on thermal insulation in buildings as a guide for architectural projects. The thickness of the wall and the slab of a project cannot be drawn with a heat insulation membrane. The heat insulation membrane should be shown separately. When the architectural project of a building is prepared. Buildings designed and built according to legislation and the report on heat insulation must obtain an energy performance certificate for the occupancy permit.

To quote briefly from the interview of Tuna (2010) with the Mimarlık magazine; the architectural design details and criteria are important in terms of practicality of the energy performance regulation. It is obvious that saving more energy with a proper design is possible. Today, it seems to be the subject of mechanical and electrical engineering disciplines that is more than a necessity for the discipline of architecture to be in control. The reason is that the energy performance of an incorrectly designed building will be inefficient at best. It is among the priorities of the architectural profession to create the design according to the climate and direction, to design it to use the most daylight, to give importance to natural ventilation, and to produce the

details that will minimise the heat losses of the building. In addition, effective use of energy can only be achieved when it is designed as a process starting from urban planning (including transportation, etc.) to building production and even use. In the parcel-based structures we currently produce, it may be possible to achieve only a certain degree of success in the context of the regulation (Tuna, 2010).

These codes determine the minimum size and the amount of mandatory technical volumes in a building. They regulate the materials and joint details used on the facade, slab, and roof. The heat insulation calculation is made by mechanical engineers, and architectural projects must comply with it. It is possible to assert that the mass, layer, and appearance of the building envelope are designed by the architect. However, the implementation of the design depends on the decision of the mechanical engineer. This situation might be associated with banalised residential buildings. This may be a reason for standardisation of the use of insulation materials among designers to accelerate approval processes.

3.1.5. Regulation on fire protection of buildings

It has been observed that many buildings become unusable, people lose their lives, settlements, and even cities are destroyed as a result of fires when necessary precautions are not taken and timely intervention is not taken (Kuligowski, 2016). The evacuation period has also extended and reached limits that will endanger lives of the users due to the needs of society and the increase in population, number of residents, building area and even the height. Arrangements were needed to differentiate fire risks and strategic evacuation based on the function of the building and the number of users (Şimşek, 2020). The regulation on building fire protection was introduced on 19 December 2007 by the Ministry of Public Works and Settlement. The purpose of the legislation is to prevent loss of property and life due to fire and determine procedure and principles for precautions, organisation, training, and inspection before and during a fire. The regulation on fire protection of buildings covers the principles of design, construction, use, maintenance, and operation to minimise hazardous situation, loss of life, and property against possible fire for all types of building and indoor and outdoor facilities.

The legislation expects a building capable of protecting load bearing capacity for a while, to resist spread of fire and smoke between different sections in a building, prevent spread of fire to surrounding buildings, provide opportunity to escape the building, and consideration of security of fire-fighting and rescue crew. Buildings, with the exception of residential buildings, must have an approved fire protection project to obtain a building permit. Evacuation projects of residential buildings are allowed to be shown in the architectural project of the building for approval. Fire detection and fire extinguishing system projects must be separated from other mechanical projects for approval.

According to fire protection regulation, the length of the attached buildings cannot be greater than 75 m. The block formation that extend for more than 75 m with attached buildings must take the necessary precautions for fire safety and access control. The horizontal distance from the last point where the fire truck could access and the façade of the building cannot be more than 45 m. The internal access roads provide access from the main road. The usual width of the internal access road is 4 m. It should not be less than 8 m when the internal access road is blind. The inner radius of the turn is 11 m, and the outer radius of the turn is 15 m. The slope of the internal access road cannot be greater than 6% and the radius of the vertical curve cannot be less than 1m. The free height should be 4 m and the load carrying capacity of the internal access road should be considered 15 tone at least.

As introduced in the legislation, the mutual walls of two or more should be fireproof walls at least for 90 minutes. The walls and slabs of indoor areas with fire hazards, such as the transformer station, the mid-voltage station, and the generator set rooms, should be the feature of the fire compartment. Buildings higher than 21.50 m non-residential and residential buildings higher than 30.50m must provide each storey as a fire compartment with the exception of the atrium.

The legislation determines the fire resistance feature of the materials used in buildings according to height and type. The waste and technical shafts of buildings that are greater than 30.50 m must be fireproof for 120 minutes and the opening must be covered with a fire-proof and smoke-proof shutter. Floor coverings must be at least normally flammable and at least hardly flammable for high buildings. The ceiling of the attic and the ceiling of mezzanine material should be at least hardly flammable

with the exception of detached houses. It is not allowed to install heat insulation with easily flammable material, unless at least 2 cm thick screed concrete is poured.

The elements of the facade should be at least normally flammable and at least hardly flammable for high buildings. The elements of the facade and the edges of the slab must be insulated against fire spread between floors. The base of the roof should be considered as a horizontal fire-retarding. The roofing and insulation materials on the roof of attached buildings cannot be easily flammable or normally flammable materials. Natural or artificial stone or concrete roofing tiles and at least hardly flammable materials are recommended for use on roofing. Easily flammable materials can be used after they have been converted to a normally flammable condition in a composite.

The principles and procedures for escape are widely described in the legislation. Escape routes are defined as the entire continuous, unobstructed path from any point on a building to the street at ground level. The exits of room and other independent units, corridors, floor exits, stairs leading to ground floor, the routes from stairs step to building exit on ground floor level and final exit are extend of escape routes. The elevator is denied as an escape route. In the determination of escape routes, the building type, occupant load, floor area, the way to the exit, and the capacity of the exits are taken into consideration. On each floor, exit possibilities are provided according to the load of the occupant of that floor and the escape distance. The escape stairs provided above the ground floor must be continuous to the ground floor. Also, the escape stairs provided under the ground floor must be continuous to the ground floor. All measures of escape routes, doors, and stairs are determined in the attachment of the legislations. Once the occupancy load is determined, escape routes can be designed according to the charts provided in the legislation.

It is not possible to provide effective protection unless the maintainability of the fire protection system is ensured. For this reason, regular inspections are needed and raising awareness of users is important. For this purpose, fire regulation, provisions regarding responsibility of fire safety, teams, training, supervision, cooperation, allowance, and internal regulations are included in the last section of fire regulation. In the design of fire-safe buildings, it is necessary to handle the regulations on fire protection as a whole and to be implemented by architects (Şimşek, 2020).

In the article ‘The Problems Faced by Architects in the Design and Implementation of Fire Safety and Application of Fire Regulations’ author Şimşek (Şimşek, 2020) observed that the participant architects did not have enough knowledge about fire regulation, active fire proof systems, smoke control, façade, roofing, and curtain wall, and they claimed that fire regulations are insufficient. Şimşek (Şimşek, 2020) concluded that participants consider fire regulations compelling and directory about subject. It is possible to mention that, this situation indicates that architects may not use provisions of fire regulation as a design consideration, but they compel design to be in compliance with regulation.

3.1.6. Building earthquake regulation in Turkey

Turkey is located on the Alpine-Himalayan seismic belt and has frequently encountered serious and major earthquakes. The 1939 Erzincan earthquake in 1939, the Kocaeli and Düzce earthquakes in 1999, the Van earthquake in 2011 and the last earthquake at Kahramanmaş and Hatay in 2023 reveal the gravity of danger. Architectural design decisions are determinants of the earthquake performance of a building (Arbabian, 2000). Contrary to general opinion, earthquake resistant design does not depend only on calculations of civil engineers. The response to earthquake in a building is started with the architectural design process, and the design flaw cannot be corrected by calculation (Ersoy, 1999).

Earthquake regulation is implemented for the design of new buildings under the force of the earthquake along with the evaluation and reinforcement of existing buildings. This regulation is used to design cast concrete, pre-cast concrete, steel, wooden, and masonry structures under the force of an earthquake (Resmi Gazete, 2018). The regulation states that the structural system of a building should be simple and symmetric as much as possible in order to ensure a predictable earthquake response for the building. It is possible to assert that the organisation of structural elements is important, especially in residential buildings, to increase the practical usage of spaces and prevent off-budget expenses related to the structural design of residential buildings.

The reinforced curtain walls must be 6 times longer than their thickness and the thickness of the reinforced curtain walls cannot be less than 0.25 m. Consequently, it

would not be wrong to mention that the shortest length of a reinforced curtain wall is 1.50 m. The minimum width of beams are 0.25 m and the minimum heights of beams are 0.30m. The thickness of reinforced slabs cannot be less than 7 cm. These are the minimum dimensions mentioned by the legislation. Practically, they are determined with a calculation on the mechanical properties of the soil by civil engineers.

It is possible to conclude that the dimensions of the slabs and beams influence the clear height of a floor. Therefore, their thicknesses have an influence on the height of the building mass. Also, the dimensions of column, beam and slab are forming joints of façade system that constitutes building envelope and have influence on façade modulation system.

The findings of Tekeli and Turkmen (2005) indicate that the share of cost of load-bearing structure to the complete building is around 23% and 27% for the buildings four and eight floors high. When a building is designed according to the earthquake regulation, the share of its cost to the complete building is around 4% and 8% (Türkmen & Tekeli, 2005). The earthquake-resistant design is mandatory to obtain a building licence. However, the Ministry of Environment and Urbanisation reported that 50% of buildings, almost 13 million, were not constructed according to the building regulations (Horton & Armstrong, 2023). It is possible to mention that the construction of an earthquake-resistant building is considered costly among contractors. Unfortunately, contractors have always been the subject of news about the diminishing quality or quantity of structural materials.

3.2. Economic Factors

Economic factors can be listed as house prices, income and consumption, saving to obtain a house, house financing systems, and return intentional housing demand (Özlük, 2014). Price is an influencing matter on the quantity of the requested goods and services. Housing price fluctuations are affecting housing demand. The increase in housing prices decreases the amount of housing demand, and the drop in housing prices increases the amount of housing demand (Durkay, 2002). In Turkey, according to the Hürriyet (2023) news centre, the housing price is increased by 35,6% in April 2023 compared to the same month of the previous year (Hürriyet, 2023). Similarly, the housing sale figure decreased 7.7% in April 2023 compared to the same month of

the previous year (Cumhuriyet, 2023). This situation indicates an influence of price on demand.

Income reveals the ability to pay as a widely influencing factor on the level of living of households. The share of consumptions in household income for housing reveals the importance of income and consumption in the process of obtaining a house as rental or ownership (Durkay, 2002). Housing consumption increases as household income increases, although the share of housing consumption in household income decreases. The decrease in the share of housing consumption generates a demand for luxurious housing in high income groups (Özlük, 2014).

Saving is the non-expendable part of income. The savings amount is important for housing demand, because the banking regulation and supervision agency determined that who wants to obtain a house has to pay 20% earnest money of the price of the house (BDDK, 2020). It is possible to assert that the consumption of income is decreasing the saving ratio along with housing demand.

Low income is the primary concern to supply the housing need. Therefore, housing finance systems are essential to transfer potential housing need to effective housing need (Topaloğlu, 2011). The modern housing finance system in Turkey began by replacing the 3794th law of Turkey's Capital Markets Board (CMB) in 1992 (Adıgüzel, 2008). Hereafter, Turkey's housing finance system was wanted to be created as in developed countries. However, these attempts were not enough. The reason is that interest rates were not at reasonable levels. This situation is one of the major obstacles to the housing finance sector in Turkey. Turkey has a high potential demand for demographic reasons. Therefore, the establishment of an effective housing finance system would provide support for many people in obtaining a home.

A house could be considered as an investment tool rather than a shelter. It is possible to list increasing factors of housing demand for return purposes in four items. First, investing in housing does not require as much proficiency as other types of investment. Housing is preferred as an easy investment tool. Second, investment opportunities are less for different financial return tools in Turkey. Therefore, investors tend towards housing investment. Third, Turkey has inflation. Savers choose to invest in housing to protect their savings from inflation (Coşkun, 2016). In addition, it is more attractive for the investor to obtain housing in an environment where real incomes are low,

employment security is low, and rents are high (Bora, 2011). The housing demand for return purpose is orientated to obtain rental or urban unearned income.

Rental income ensures that the housing is used as an investment instrument in addition to the appreciation of the value of the property. Rental of residential property has always been the most popular investment instrument in Turkey. The determinant factors in house prices are also determinants of rent rates. The increase and decrease in the number of sold homes can cause a change in rental income.

The benefits of being a tenant and a home owner could be compared in the 'Home Ownership Model' developed by Hood (1999). According to this assumption, being tenant is more profitable in the first years, but in long-term housing ownership becomes more profitable as shown in Figure 3.7 (Hood, 1999). It is possible to assert that housing ownership can be more profitable in Turkey than in developed countries due to high inflation rates.

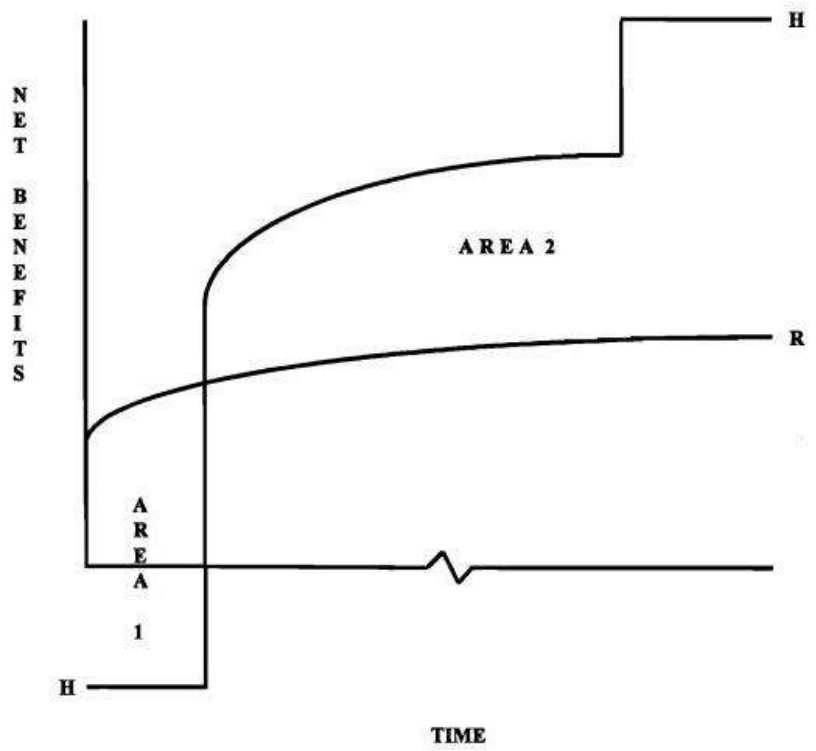


Figure 3.7: Rental and Home Ownnership Profiles (Hood, 1999)

The report of Voa (2023) news agency is an example of the influence of economic factors on housing demand. The news report continues as follows; the decrease in housing sale is reasoned to increase of mortgage rates in June 2022. In fact, the rate of

home ownership has decreased by 21% since 2002. Because the sighted housing sale rates are regarding to investment to protect savings from inflation. Therefore, the home ownership rate has been decreasing for a long time in Turkey. In terms of low-and-middle-income groups, the home ownership rate is decreased by 20%, but it was 9% in high-income groups. Between the years 2010-2014, there was an increase in home ownership rate due to purchasing power, despite of the increasing housing price. Later, the home ownership rate began to decrease again (Kızılkaya, 2023).

3.3. Cultural and Social Factors

Urbanisation rate, quantity of household, increase in population, marriages and divorces, domestic and external migration are demographic factors that influence housing demands. Urbanisation occurs as a spatial and social response to the modernisation process of industrialisation (Tankut, Çalışkan, Levent, & Zorlu, 2002). Urbanisation is a multidimensional process with economic, social, political, cultural, and ideologic extents. Therefore, urbanisation brings a series of change processes along with spatial change and population transformation.

The urbanisation rate increases in parallel with the urban population (Keleş, 1983). Migration from rural areas to industrialising cities was increased and, relatively, the urbanisation rate gained momentum. The demand increases in parallel with the rate of urbanisation. Urbanisation along with industrialisation has led to the creation of squatter housing in Turkey. Squatter housing was built and used until the 1980s. However, after the 1980s, squatter housing was used as an income instrument (Çetin, 2013). After 1980, the basic influencing factors of urbanisation are neoliberal policies, industrializations, tourism, large migrations regarded as security concerns (Kara & Palabıyık, 2009).

Öztürk et al. (2009) point out that the increase in population has a variety of economic and social consequences. Population growth increases demand for all goods and services, as well as housing. Therefore, an increase in housing demand is expected while population is growing (Öztürk & Fitöz, 2009). The population of large households decreases housing demand and small households increases (Gürlesel, 2012). The size is small in cities with a high urbanisation rate compared to cities with a low urbanisation rate. This situation shows the effect of the size of the household on

housing demand. According to Gürlesel (2012), the number of households is increasing rapidly in Turkey and their share in society is growing. This trend is expected to continue over the next few years. The size is decreasing and the share of single families and childless couples increases. These developments emerge as determinant factors in housing demand (Gürlesel, 2012).

A house is one of the first needs after a marriage decision. Nuclear family culture is common in Turkey, but extended families show a particular presence in rural areas. Newly married couples prefer to share the same residence with the husband's family, especially in rural areas. Sometimes, sharing the same residence takes a long time (Kubiš, 2010). Nuclear families can meet their housing needs through rental housing in the first period of marriage, and they can purchase a home later depending on their savings. The amount of housing demand that will arise through marriage and divorce can be foreseen by looking at the rates of marriage and divorce and the rates of housing ownership and tenancy. It is possible to mention that mutual analysis of the marriage-divorce rate and home ownership tenancy may suggest the number of rooms and the size of an apartment for the housing producers.

The increase in the number of single households due to divorce affects the demand for housing. For example, the number of divorced couples and after renting separate residences led to an increase in rental housing demand in Germany. Due to this, housing ownership rates remained low in Germany (Kubiš, 2010). The divorce rate has increased in recent years in Turkey (Euronews, 2022). It is possible to conclude that the demand for housing through divorce can be foreseen, and housing producers may supply accordingly as the number of single households and the rate of divorce are evaluated together.

According to McCrone et al. (1994), there has been an increase in the migrant population all around the world due to the enlargement of the European Union (EU), obtaining visa easily between countries, and the increase in the labour mobility. Especially, employment and education opportunities in EU countries have increased external migration to these countries. This migration has caused an increase in housing demand in EU countries (McCrone & Stephens, 1994).

According to the International Migration Report (2017), the number of people who do not live in the country of birth is increasing rapidly in the world as a result of

globalisation. 258 million people live in a country other than the country of birth. A 45% increase is observed based on 2010 data (United Nations, 2017). The regions where social, economic, and cultural opportunities are more common and available generally take immigrants. Turkey has a major internal migration. This situation can be attributed to the diversity of economic, social, and cultural opportunities in major cities such as Ankara, İstanbul and İzmir. It is possible to conclude that population exchange due to migration is affecting housing demand. It is possible to assert that the housing producer can determine the location of the project based on the rate of migration and urbanisation.

Turkey has different climatic regions. It has been observed that regional aspects affected the form and technique of building. It is possible to observe the style of housing production depending on the culture of each region and environmental factors. The conditions of northern Anatolia revealed wooden building, mud-brick and stone building for central Anatolia, stone building for eastern Anatolia and wooden-stone building for southern Anatolia (Yıldırım, Uzun, & Kahraman, 2009). In time, the housing typology of the past had been gradually decreased. Nowadays, apartments are generally assembled with similar spatial order. This situation can be attributed to the common usage of developed construction technologies. The separation of private and living areas with a corridor from the vestibule is an example of uniformity in apartment layout (Görücü, 21-51).

3.4. Technological Factors

There have been technological developments in the fields of construction, architecture and housing, as well as all others. Technology helps improve construction design, material, technology, and management. The effect of technology in the construction industry could be more efficient when decision makers follow and implement new technological opportunities in their field. The technological factors affecting design and production of unbranded housing could be examined in design tools, construction materials, and technologies.

When it comes to unbranded housing design and production, design, draugthing, and presentation tools and construction materials could be narrowed down. Despite the diversity of resources, there is conservatism and commitment to customary

construction materials (Algın & Alkan, 2019). Generally speaking, this situation makes the use of developed design, draughting, and presentation tools unnecessary for unbranded housing design. These instruments are generally used to create fancy visual media for advertising purposes.

Construction progress is interrelated to many other activities that are not driven by construction companies. Production, design and management of material, system, and equipment have been considered separate areas of activity rather than a sectoral activity. The development of information and communication technologies is expected to close the gap between these activities. However, the relationship of the unbranded construction industry with technological development is weaker than expected. It would not be wrong to mention that branded construction companies are making the most of the technological developments.

Nowadays, architects and other designers are using computer-aided design software or building information modelling software to enhance design collaboration over a project. These software enable all aspects of design to be ideally placed in a project. While designers keep pace with these kinds of technological developments to increase the feasibility of design and improve representation tools, unbranded housing contractors could not show a relative level of compatibility. This situation can create a gap between design and construction.

When the sectoral practises are observed closely, construction technics, materials, and design processes of unbranded housing resemble each other. This situation was banalised and caused duplicative production progress. This interpretation may find correspondence in numbers. In Tukey, the number of residences that received a building permit was 647.951 in 2022. Among these, 642.538 residences are in reinforced concrete buildings (TUIK, 2023). Approximately 99% of houses are built with reinforced concrete. This situation shows that most of the residential buildings are made of the same structural system. It can be noted that the high usage of the reinforced concrete system is due to accessible labour force, material, and developed design knowledge of reinforced concrete.

The conservatism in the construction material can be observed in the façade and interior finishes of the building. This situation can be attributed to two reasons. Lack of detail drawings in the architectural project can be one of the reasons that leave the

contractor to decide on the materials. The other reason could be attributed to building regulations, because, they do not make the use of architectural detail drawing or architectural visualisations mandatory as a supplement for building licence.

3.5. Practise of Architects

A building comes into being with the collaboration of partakers in the project (Gorse & Emmitt, 2007). The constant changing development of information and accumulation and the substantial increase in specialities increase the quality of the design process along with its duration and complication (Colin & Hughes, 2001). The design process requires the collection of information obtained from all design professionals (Bogus , Molenaar, & Diekmann, 2006). According to Walter, the design process is the documentation process for the production of taskmaster requests and needs (Walters, 2003). A design team may consist of different occupational and disciplinary groups or firms from different geographic locations. In addition, public authorities, inspection bodies, and local authorities can interfere with the project.

The design phase is the process in which design documents are created in order to transform the expectations and the reserved resources of entrepreneurs into building products under technological, environmental and legal constraints (Özkaptan Alptekin & Kanoğlu, 2007). The quality of design could be classified into four dimensions, such as the quality of the input, the quality of the design process, the quality of the output, and the other subsystems that use design. Therefore, the reliability of the inputs of the design process, the accuracy of the information obtained and the accuracy of the information used in the design process, the reliability of the cost estimate as specifications, quantities, costs, and their corresponding for the employer constitute the quality of the architectural design (Atkinson, 1995).

The construction industry works on a project basis. Compared with other sectors, unique specialities and abilities must be developed (Warszawski, 1984). All partakers of a project should share apprehensible financial and technical details with each other (Songer & Molenaar, 1997). Adequate communication between the participants should be ensured. A high level of cooperation must be established. Mutual considerations of the project should be shared. The ability to resolve conflicts should be developed (Mo & Ng, 1997; Ashley , Lurie , & Jaselskis , 1987; Cheng, 1995). This situation increases

the significance of architects. Because architects are system integrators. Architectural design is an underlay for all participants, where all information is put there, resolved, and coordinated by the architect for feasibility and integrity (Gümüşburun Ayalp & Öcal, 2016). According to Sey, the services are expected from an architect can be listed as (Sey, 1995);

- Communication with clients and contractors,
- Budget management,
- Conceptualisation of client requests and needs,
- Provide a requirement analysis,
- Graphic representation of ideas,
- Marketing survey,
- Gathering information about building materials and techniques,
- Building formation,
- Construction management.

The directives 85/384/EEC of the European Communities Council of the Commission determine the essentials of a competent architect as follows (Avrupa Topluluğu Konseyi, 1985);

- Ability to meet aesthetic and technical requirements in architectural design,
- Having enough knowledge about theory and history of architecture and related humanities, technology, and art,
- Having enough knowledge about fine arts to influence the quality of architectural design,
- Having enough knowledge about city planning and the required abilities for the process,
- Understanding the relation among humans and buildings, buildings and their surroundings, the void between buildings with human needs and scale,

- Understanding the role of the architecture profession and the architect in society, especially due to the preparation of an offer with social implications,
- Understanding research and offering preparation methods in the architectural design process,
- Understanding structural design, construction, and engineering projects related to a building,
- To have enough understanding of the functions of building along with physical problems and technologies in order to provide comfort and climate protection,
- Having enough design skills to meet the demands of building users within budget and constraints of zoning legislation,
- Having enough knowledge about industries, organisations, legislations, and procedures in order to change design ideas to buildings and integrate them with general planning decisions.

It was learnt from the explanations that architects are expected to have comprehensive design knowledge and to participate from the beginning of the design stage until project completion. Accordingly, simultaneous engineering is necessary for all engineering fields, but it is more important that the construction industry be dominated by this approach.

Öcal et. al. studied mistakes in the architectural design process and their influence on building production in Turkey. These errors are listed as follows (Gümüşburun Ayalp & Öcal, 2016);

- The majority of architects work in different fields along with architectural design and projects (such as furniture manufacturing and decoration),
- Requirement analysis preparations are not considered enough,
- The technical drawings prepared by architects do not have enough detail drawings,
- There are serious and common incompatibilities between projects,

- Architects do not run the design process from a simultaneous engineering perspective.

Determined design process mistakes cause project renovation, arbitrary treatments, and conflicts, which negatively affect the building safety, aesthetic, cost, and project duration. Additionally, in the study, the reasons for architectural design process errors are listed as below (Gümüşburun Ayalp & Öcal, 2016),

- The lack of legal regulations on detail drawings,
- The subjects of preparation of requirement analysis and detail drawing are underemphasised during graduate education,
- Most architects are not institutionalised and are individual enterprises,
- Drafters and technicians do not have enough knowledge in architecture firms.

Hill (2002) states the architectural practise of today as; architectural practise can be criticised in two different ways. One is drawing related architecture, and the other one is building related architecture. In other words, architects simulate the building to the real one and simulate the drawing to the image. Each one is a respective reality. Drawings are real for architects as well as buildings. Because architects design the drawing rather than the building. Additionally, architects have a lot of control over the drawing rather than the building. Finally, architects design drawing before building, and this situation is more appropriate to the creative thinking process of architects (Hill, 2002).

Furthermore, as observed in the regulations and practise, building designers are not involved in construction processes. As construction drawings are approved, building inspection corporations assume responsibility for execution. For this reason, the building designer does not receive any feedback. The gap between design and building processes prevents the architect from being notified of the faults that occur during the construction and utilisation processes. Providing information flow between designer, inspector, and contractor may prevent design-based fault repetition. Thus, architectural design can be more than mere perfunctory for contractors. In this context, contractors and designers will receive a positive feedback service from design evaluation boards.

It is possible to assert that since architects are interested in design, the gap between building production and architect is filled with the representation tools, and architects started to form a contract with their clients over those representation tools rather than the buildings they designed. However, available control mechanisms do not guarantee the drawing turn to building due to the lack of detailed drawings in construction projects and the absence of the aforementioned representation tools in the hands of the approving authority. It is possible to provide an example from practise for this situation. The following images (in Figures 3.8 and 3.9) belong to the same building. The building is located in Genç which is a sub-province of Bingöl city. The project was designed and approved in 2018. The first image is an architectural visualisation which was delivered to the contractor during the building permit process. The second image shows the appearance of the actual building after construction.

Figure 3.8: An architectural visualisation of the project.

Figure 3.9: Actual image of the project in Genç, Bingöl.

High-grade design can improve the lives of people, enable higher values in built areas, create better public spaces, and provide respect to property owners in a region (Erim, 2007). Kamara et al. determined the relationship of requirements for a construction project as in Figure 3.10 (Kamara, Anumba, & Evbuomwan, 2000). Figure 3.10 illustrates the concurrent engineering of design process. Concurrent engineering is a concept that is widely used in manufacturing (Syan, 1994). It is the concept of "Integrated Product and Process Development" (IPPD). IPPD is a structured and collaborative approach to product development that takes into account all aspects of the product's life cycle, from its initial concept to its final disposal, while at the same time designing the product and its related manufacturing and support processes. The goal of IPPD is to ensure that developers take into account various factors, such as quality, cost, schedule, and user requirements, right from the beginning of the development process (Winner, Pennelland, Bertrand, & Slusarczuk, 1988).

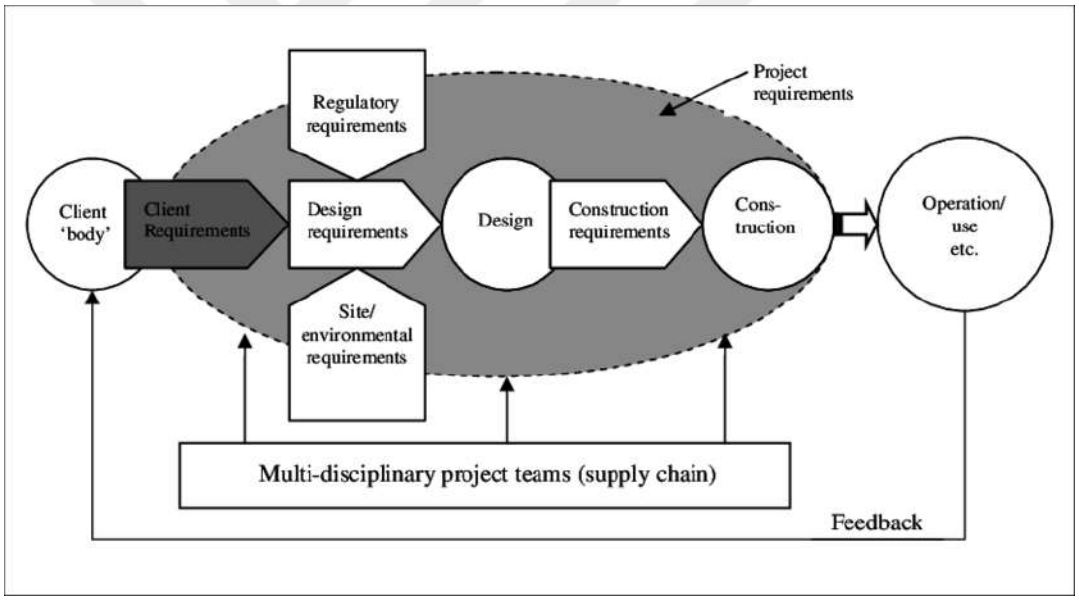


Figure 3.10: Relation of requirements for a construction (Kamara, Anumba, & Evbuomwan, 2000).

Kamara et al. explained the definition of requirements; client requirements are a description of the content for a facility that satisfies business need along with user need and other interest groups. Site requirements are properties of the site where the design will take place, such as; available services, and soil survey. Environmental requirements are the surrounding characteristic (e.g., climate conditions) of the proposed location for design. Regulatory requirements are regulations on building, planning, health, safety, and other legal obligations that affect the acquisition,

existence, operation, and demolition of a facility. Design requirements are the translation of client needs, regulatory, site and environmental requirements. Construction requirements are for construction that follow from the design phase (Kamara, Anumba, & Evbuomwan, 2000).

The size, load-bearing system, and interior equipment of a building are determinant of the cost, duration of construction, and comfort of the building. Decisions about these determinant factors are made during the design process. Therefore, a well-conducted design process comes into prominence in order to have a precise design decision and provide feasible projects with different branches of engineering. Otherwise, incompatibilities, mistakes, and deficiencies may emerge among projects. This situation may cause rebuilding, waste of time and budget. Client requests and needs are another important input into the design process. A good relationship and constant communication with the client is a determinant factor for a successful project. To ensure this, designers should provide a requirement analysis based on the needs and request of the client.

4. CASE STUDY

Architecture is perceived as the concretisation of certain special or elite situations, demands, and desires. Besides that, architecture can be a simple building practise in the perspective of law, which is not considered as an architectural work in the sense of architectural literature (Uluoğlu, 2018). Tuna's (2018) expression provides better understanding of the differentiation of two architectures. 'While wandering the city streets, observing buildings dated to different years, see traces of different architectural styles, feeling architectural trends of their time. Now that discrepancy, the enriched cityscape with the aesthetical emotions of its time is rapidly destroyed, replaced by almost monotype buildings that are jammed in zoning code arithmetic (Tuna, 2018).' The reason for the situation Tuna (2018) has mentioned is that need-based productions make up the majority of the urban fabric, particularly housing (Piker, 2018).

As mentioned in this study, the unbranded housing producers are the main suppliers of residential buildings process. It will not be wrong to mention that the findings in the sections of the building procurement process and factor affect housing production and design could be observed in an approved architectural project. Observing the factors affecting the design and production process of residential buildings that are mentioned in the study through an approved architectural project would help to understand how these factors are reflected in practise.

The location of the sample project is in the city of Bingöl. Bingöl is a city in the eastern Anatolia region of Turkey. The site is located in Recep Tayyip Erdoğan neighbourhood on the north edge of the city. As it is indicated in Figure 4.1, the site is close to a mass housing of TOKI, University of Bingöl, and a shopping mall. Mass housing was constructed as disaster housing after the earthquake in 2003. Then the University of Bingöl was established in 2007 and a shopping centre opened in 2018. These three developments are within walking distance of the project site. In the region, mass housing and University of Bingöl are increased urban development due to the

increase in the land vale on the outer edge of the city. It is possible to mention that this situation is providing motivation for housing supply.

Figure 4.1: Recep Tayyip Erdoğan Neighborhood in Bingöl.

It is a corner parcel of a block and is 649m². The ratio of building coverage area is determined as 0.40 in zoning status. The setback distances are 5 m from the street sides and 4 m from the rear back sides indicated in the Figure 4.2 as a dashed line. The height of the building is determined to be four storey above the road level. These conditions of zoning status determine the mass of the building. According to the zoning status, when setback distances are excluded, the remaining buildable area is 310 m². The permitted construction area of the building could be calculated according to the given data in the zoning status. Accordingly, 40% of the zoning land is the building coverage area, which is;

$$649\ m^2\ x\ 0{,}40\ m^2 = 259{,}60 m^2 \qquad (4.1)$$

259,60 m² is the building coverage area and also refers to the construction area of the basement floor and the ground floor.

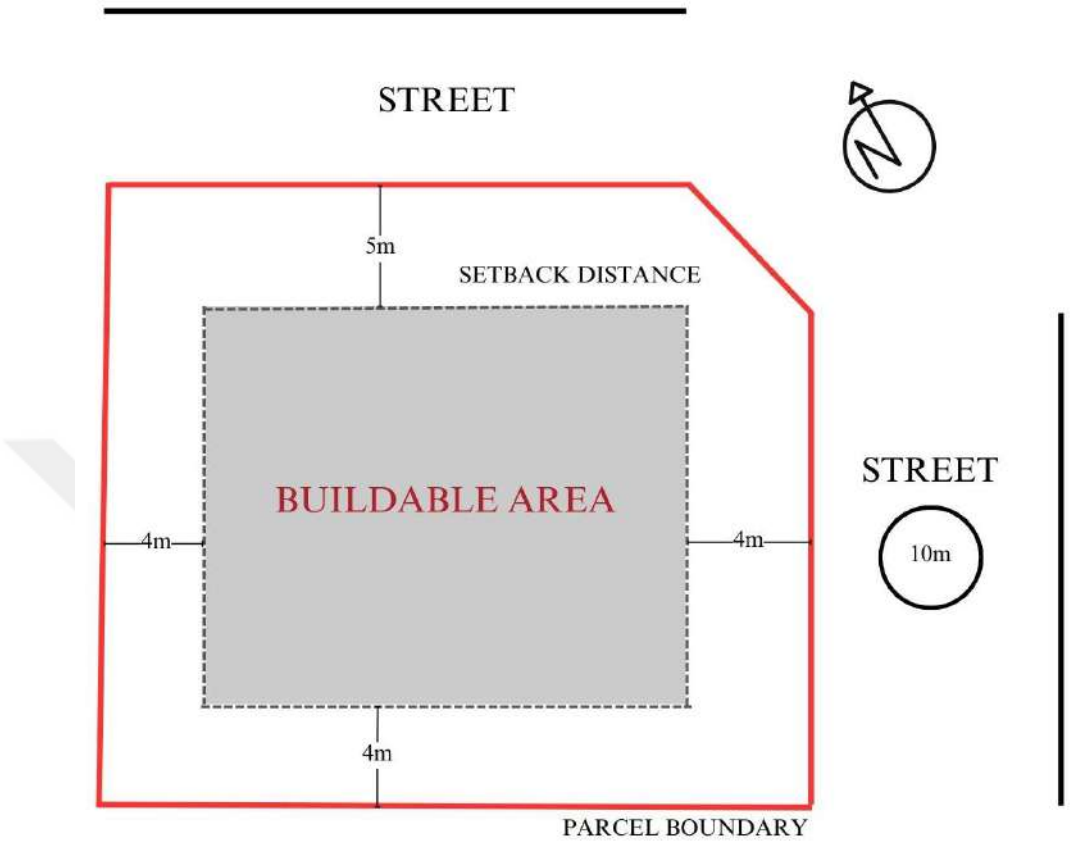


Figure 4.2: The parcel of the project.

The floors above ground level are different in size due to the cantilever. The Planned Areas Zoning Regulation determine the 1.50 m of cantilever length above 2.40m from the natural ground level. Since Bingöl is an earthquake-prone region, this length is determined as 1,00 m by the Municipality of Bingöl. The Radix of the building coverage area could provide an estimated length for a segment of the building. This would help to estimate the area of cantilevered levels. Accordingly, the radix of 259,60 is equal to 16,11 m. Each segment of the building could have a 1,00 m length cantilever. Therefore, it is possible to calculate the typical floor area of the building as;

$$18{,}11\ m\ x\ 18{,}11\ m = 327{,}9m^2 \qquad (4.2)$$

According to the calculations, the estimated construction area of the building;

$$(327{,}97\ m^2 x\ 3\ \text{floors}) x\ (259{,}60\ m^2 x\ 2\ \text{floors}) = 1.503{,}11\ m^2 \qquad (4.3)$$

The Planned Areas Zoning Regulation allows to occupy the roof attic when they are internally connected with the apartment unit below. The client had requested to have the same layout as the typical floor plan, as much as possible, in the roof attic. The Municipality of Bingöl grants permission to occupy as much of the building coverage area, excluding the cantilever area as the balcony at the roof level under the condition of having a concrete roof. Consequently, the roof floor area is the same size as the typical floor area.

$$1.503{,}11\ m^2 + 327{,}97 m^2 = 1.831{,}08\ m^2 \qquad (4.4)$$

1.831,08 m² is the total construction area of the building. It would be a five-storey building including a basement. Considering the square trace of the buildable area, it is possible to assume that the size of the building would be approximately 18,00 m by 18,00 m. The calculation regarding the zoning status reveals how the mass of building is prescribed before any architectural design-related interruption. As discussed in the thesis, this calculation is also a determining factor for the value of land. On the other hand, the estimated construction area is used to determine the area distribution among spaces, size, and number of flats in a residential building by defining the maximum gross usable area.

In practise, the type and specifications of flats are generally provided by the contractor to the designer, or it could be a mutual decision of both parties. In fact, as has been discussed in the study, the factors determining the properties of housing are defined by cultural and demographic impacts. In Bingöl, the household size is 3.6 people and is in trend to decrease according to the Turkish Statistical Institute. In this project, the client requested 3+1 flats. The number of rooms is in line with the household size.

In Turkey, the term '3+1 flat' refers to flats with two bedrooms, a family room, a living room, and a separate kitchen. The flat layout in the Figure 4.3 is obtained from a brochure of a project in Ankara that is published on the project website for advertising. Figure 4.3 belongs to a 4+1 flat. The 4+1 flat differs from the 3+1 flat by having one more bedroom. This approach to flat layout in figure is commonly applied in residential units. The flat in figure has a master bedroom suit, two bedrooms, a family room, a kitchen, and a living room. The kitchen and living room share the same

balcony. The common and private spaces of the flat are separated with the night hall to provide privacy. Separation of common and private spaces is the most common feature of apartments in Turkey.

Figure 4.3: An example for flat plan in Turkey (Kassa Yapı, 2023).

The residential building layout planning generally starts with a typical floor plan, because the continued elements of building, such as columns and shafts, must be aligned with the typical floor plan which constitutes the largest part of a building. Since, the placement, direction, coverage, and height of building is determined. Also, the type and properties of the flats are provided by the client. At this point, the vertical circulation of building should be arranged in the layout. The terms related to stairs and elevators are prescribed by the Planned Areas Zoning Regulation. According to the legislation, the minimum width of stair flights and landings should not be less than 1.20 m as shown in Figure 4.4. The dimensions of threads and rises of a stair should be calculated according to the formula;

$$2a + b = 60 \text{ or } 64 \qquad (4.5)$$

In the formula 'a' stands for height of rise and 'b' stands for depth of tread. This formula provides a convenient stairslope to climb. The height of a raise cannot be higher than 16 cm in buildings without elevator and it cannot be higher than 18 cm in buildings with elevator. Also, the depth of a thread cannot be less than 27 cm. The staircase of a building should be continuous from the basement to the roof. The minimum clear width of the entrance should not be less than 1.50 m to staircase.

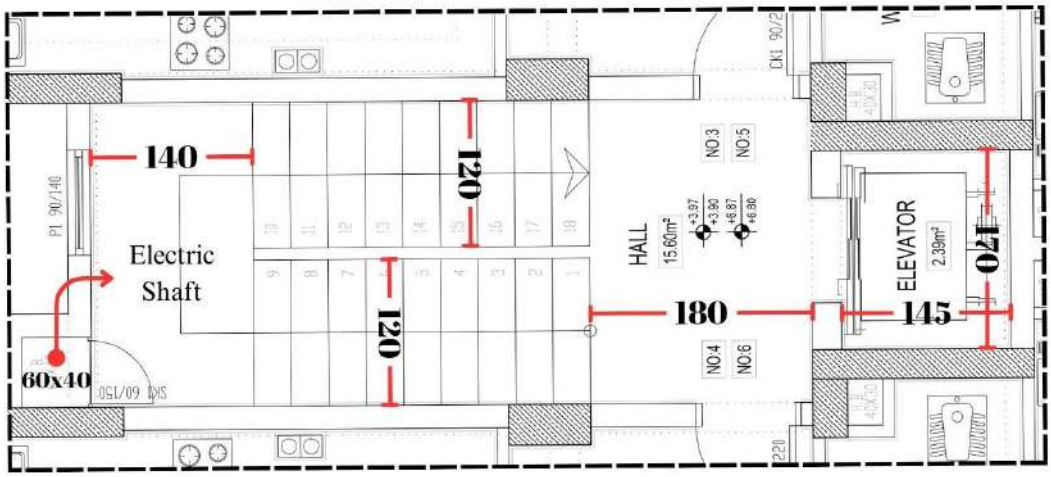


Figure 4.4: Vertical circulation area of building.

When it comes to elevator, it is mandatory to provide an elevator in the building that is four-storey or higher. The regulation determines the minimum size of elevator shaft and cabin. According to the regulation, buildings with a single elevator should provide a cabin with minimum 1.20 m narrowest edge and 1.80 m² area. The measures indicated in the legislation provide technical competence to design. However, it is possible to mention that designers use these provisions in design directly, and they are not taken as only references. Because exceeding the minimum size of a stair, an elevator, or any other prescribed mandatory space would cause loss of saleable area, which is disadvantage to client.

The building hall is a common area of the apartment building. According to the regulation, it is mandatory to install an electric shaft in three-storey or higher buildings that is accessible from common spaces and continues all the way up starting from electrical panel room. The minimum dimensions of the electric shaft must not be less than 20 cm depth and 50 cm width. The electrical panel room cannot be installed under wet spaces such as water storage and bathroom. When the Figure 4.4 is observed, it

comes to the attention that the width of landing and building hall are wider than the dimensions indicated in regulation.

The hall of the building is widened because the entrance to the building is through the landing as shown in the section drawing in Figure 4.5. Because of that, the stair flight from basement to ground floor is longer to accommodate entrance to the building. Therefore, the size of the staircase is adjusted accordingly on the upper floors. Besides this, the provisions regarding electrical installations, stairs and elevator are implied to plan with the least of requirements to fulfil technical competence for building permit.

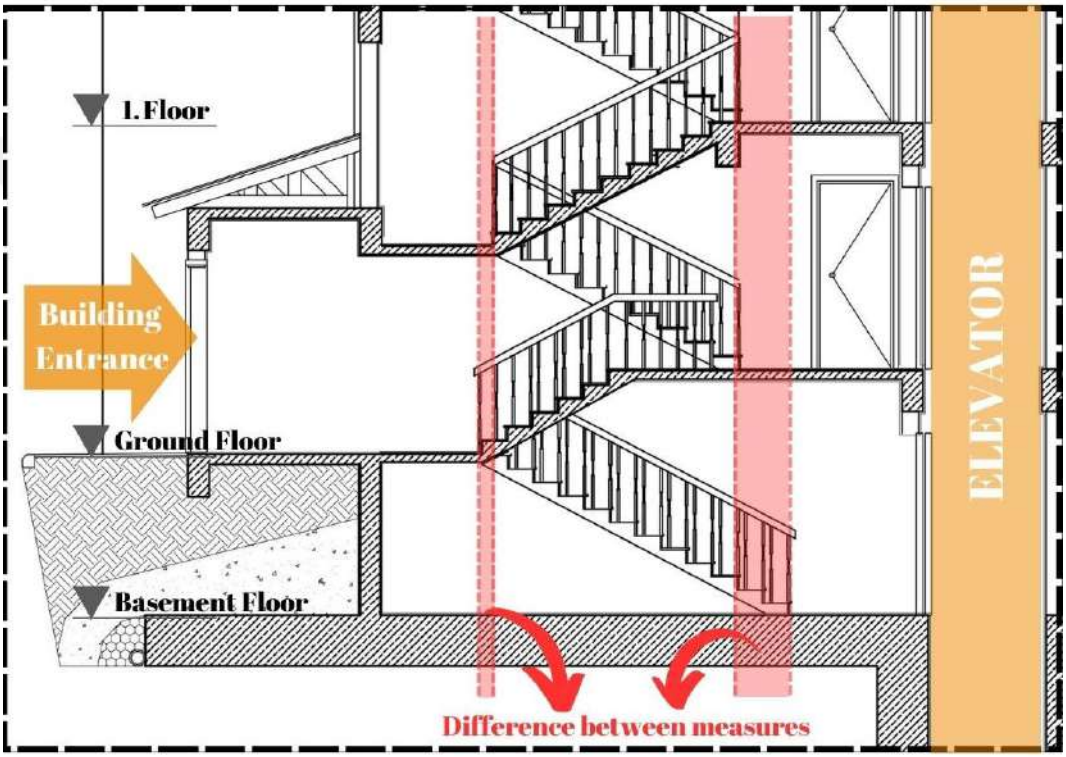


Figure 4.5: Section of apartment hall showing difference in stairflight.

The layout of flats are identical to each other and they are placed on both sides of the staircase. Each apartment has two bedrooms, a family room, a living room, a kitchen, a bathroom, and a restroom. As a frequently applied design approach, common and private spaces are separated from daily areas with a corridor to provide privacy. The flats are mirrored copies of a layout. The Planned Areas Zoning Regulation determine the minimum size and number of rooms for an apartment as indicated in the Table 4.1. In Figure 4.6, the layout of a flat can be examined. The flat layout corresponds the minimum size and number of rooms that are projected by legislation. The wet areas

are organised back to back for efficient use of ventilation shaft, sanitary, and wastewater system.

Table 4.1: Mandatory space requirements for housing (Resmi Gazete, 2017).

Room	Narrow Edge	Clean Area
1 family room	3.00 m	12.0 m^2
1 bedroom	2.50 m	9.00 m^2
1 kitchen or cooking place	1.50 m	3.30 m^2
1 bathroom or shower place	1.50 m	3.00 m^2
1 restroom	1.00 m	1.20 m^2

The Planned Areas Zoning Regulation provides conditions for the installation of a chimney and ventilation shaft. According to the regulation, the minimum clear dimension of a ventilation shaft is 60 cm x 60 cm. Each ventilation shaft of this size could ventilate four spaces at a floor level. Any additional space to the ventilation shaft requires enlargement of the ventilation shaft in the same ratio. When it comes to chimney, apartments with radiant heating must have a smoke chimney in one of the living or sleeping rooms. This building is designed to provide a central heating system. The smoke chimney for the central heating system is indicated in the Figure 4.6. The dimension of this chimney is determined by the mechanical engineer as 40 cm x 40 cm.

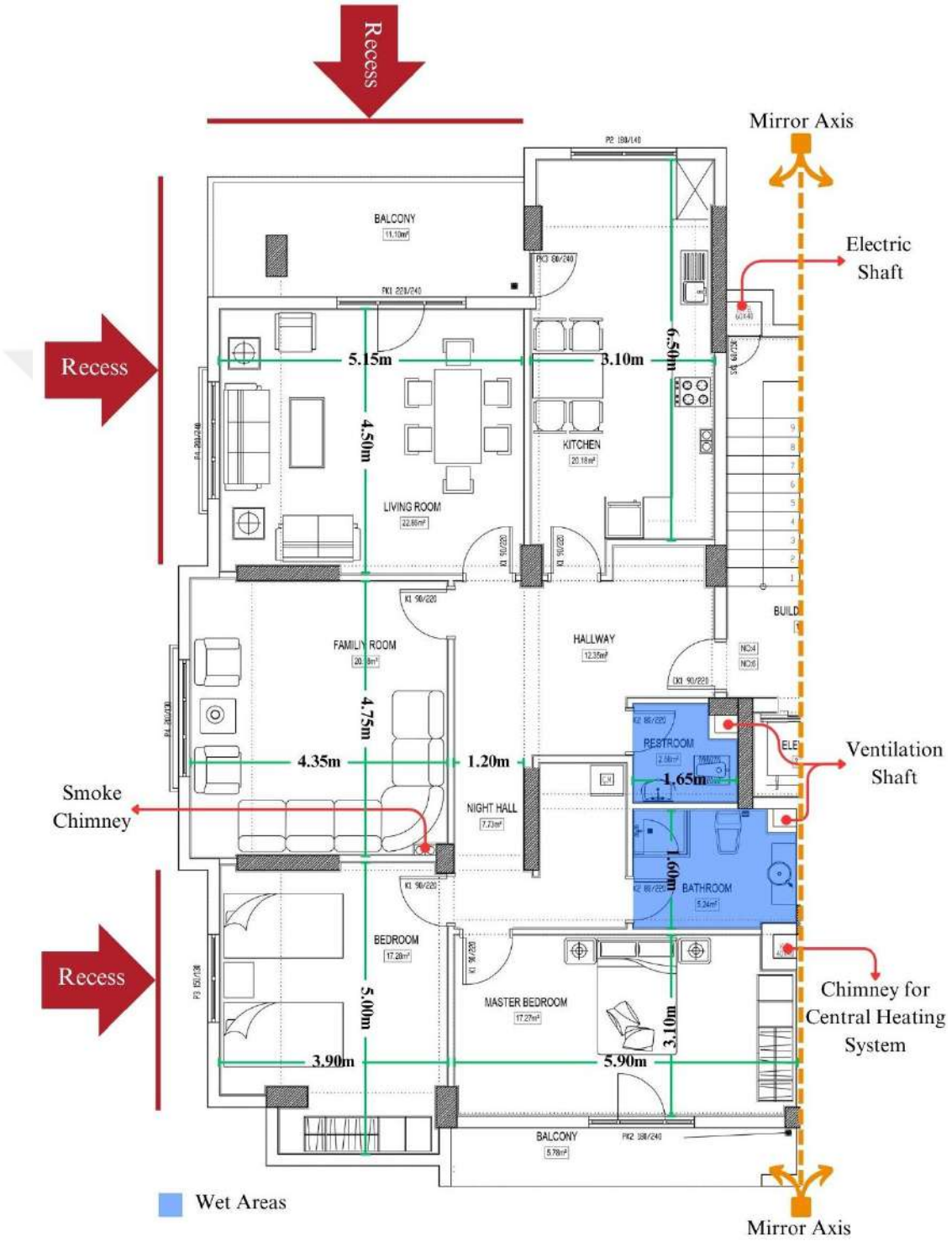


Figure 4.6: The plan of flat in the building.

There are recesses in the perimeter of the building that are shown in Figure 4.7. They are designed with the consideration of the structural system and the buildable area of the parcel. The buildable area of the parcel is 289 m² and the building coverage area is calculated as 259 m². There is a 30 m² difference which provides additional space to create extrusions at the boundary of the building coverage area. Therefore, it is possible to mention that the designer used recesses in the building perimeter to increase the efficiency and functionality of the flat layout. In the architectural project the building coverage is indicated as 257 m², because the void that is continuous from the foundation to the roof is not included in the calculation of the building coverage area based on the Planned Areas Zoning Regulation.

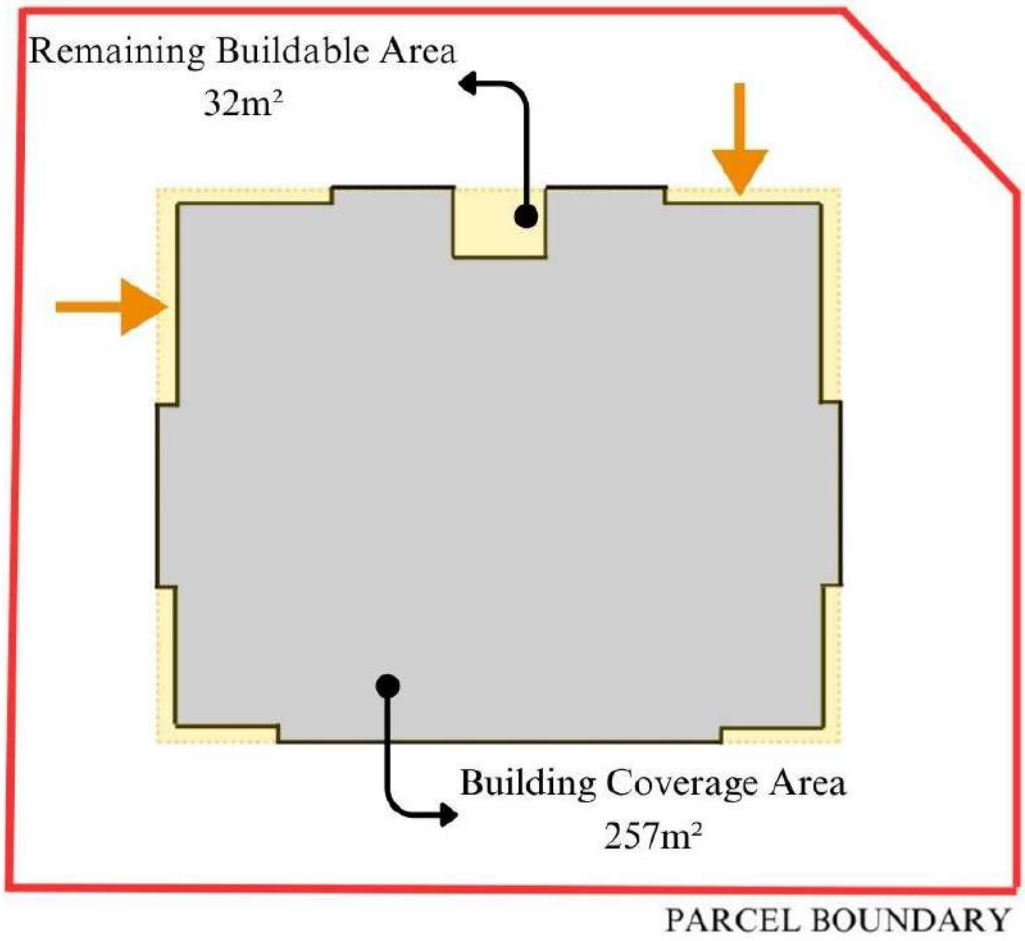


Figure 4.7: Building boundary and placement in the parcel.

On the other hand, there are provisions for structural elements in the earthquake regulation, which could be considered as an influencing factor in determining the depth of recesses in the building perimeter. The sample project is a reinforced concrete

building. The basement of the building is under the natural ground floor, and the outer walls of the basement are reinforced concrete load bearing walls. There is a 1 m cantilever above ground floor level on all sides of the building. The structural system of the building is a beam-and-slab structure, but the cantilever is designed with a filler-joist slab. This is so because all segments of a cantilever should be connected to columns with structural beams. This provision of earthquake regulation creates elevation differences on the ceiling of a space at cantilever with beam-and-slab as shown in Figure 4.8. It is possible to mention that designers may prefer a filler-joist slab structural system for cantilever due to aesthetic and functionality concerns.

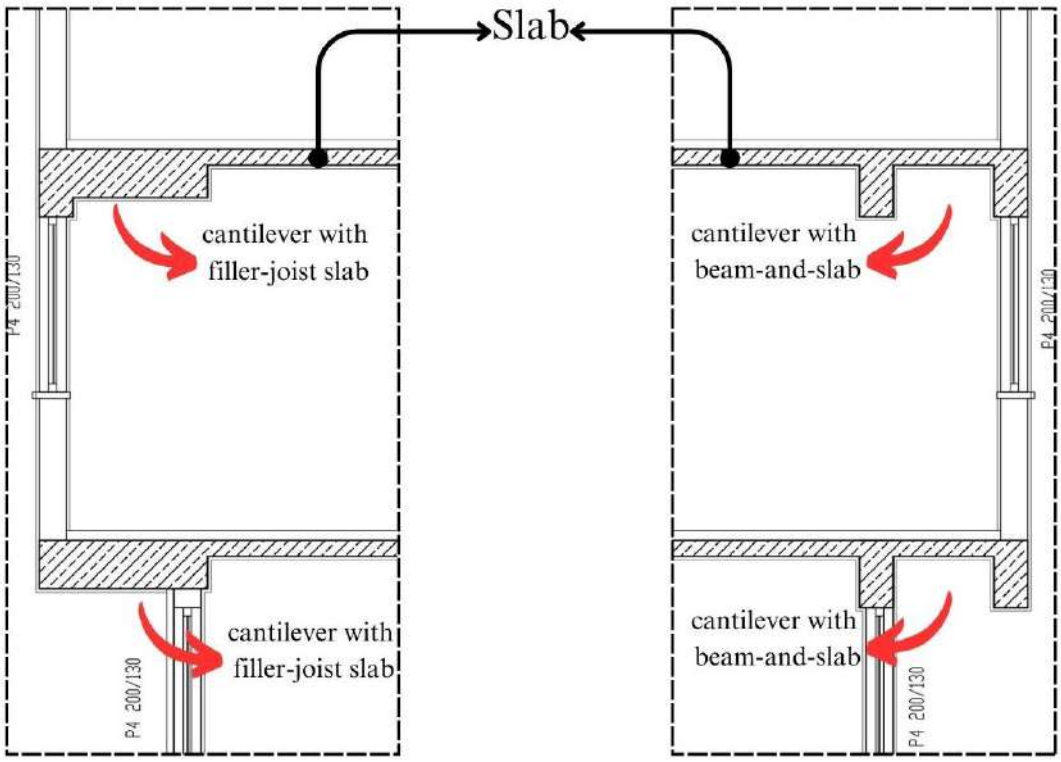


Figure 4.8: The influence of slab structure in the cantilever.

On the other hand, the recesses at the perimeter of the building are related to the dimensions and joints of the structural elements. The calculation of building coverage area is determined as the area of respectively enclosed straight segments between corners of building. As a reinforced concrete building, the corners of the building have load bearing columns connected to other columns with beams to make up a slab among them. Therefore, the provisions used to calculate the size of these structural elements

by a civil engineer are also crucial to determine the depth of the recesses in the perimeter of the building.

According to the earthquake regulation, reinforced curtain walls must be 6 times longer than their thickness and the thickness of the reinforced curtain walls cannot be less than 0.25 m. Unnecessary oversizing of structural elements would increase the cost of construction, and it would not be in the benefit of the contractor. Therefore, as shown in Figure 4.9, the designer arranged the recesses in the building perimeter without causing enlargement of structural elements regarding the design decision in

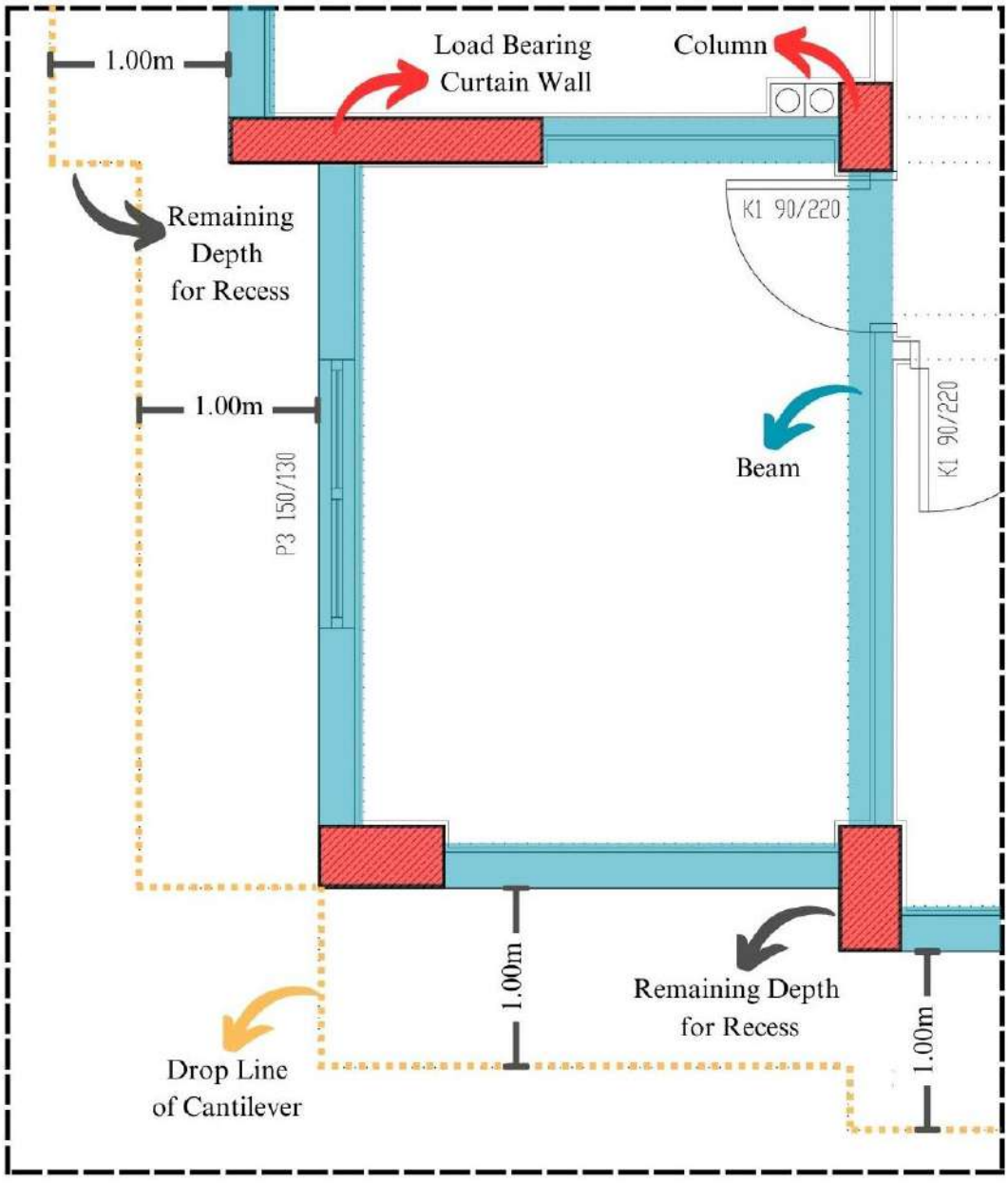


Figure 4.9: The structural joints of the building.

coordination with the civil engineer. The earthquake regulation determines the minimum dimensions of structural elements and necessary methods and directives to calculate and simulate the earthquake response of a structure based on the mechanical properties of soil for civil engineers. The final dimension of a structural element is determined by calculation of civil engineer.

The Planned Areas Zoning Regulation provides a 20 cm decorative cantilever. Decorative cantilever cannot be used to enlarge occupied area, with the exception of semi-open spaces such as balconies. It is possible to observe that decorative cantilevers are frequently used to create a base for railing in front of the full-size windows and decorative elements on the façade to improve the visual appearance of buildings. The Municipality of Bingöl does not allow addition of decorative cantilever to semi-open spaces within the context of earthquake precautions. Therefore, decorative cantilevers used in this project to create a base for railings in front of full-size openings. When the project is observed, there is no decorative installation on the façade mentioned in the project. Figure 4.10 illustrates a complete typical floor plan and the usage of decorative cantilevers in the project.

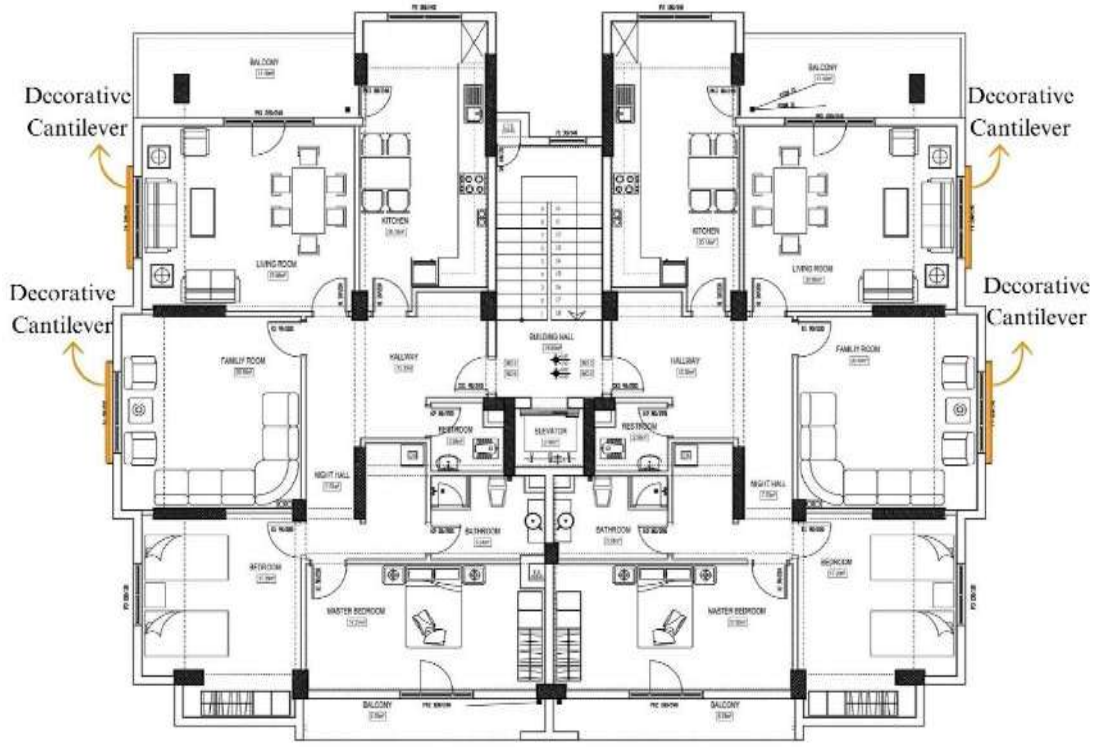


Figure 4.10: The typical floor plan of the building.

In the architectural project of building, the materials are explained with broad definitions. Building construction materials are mostly remarked in section drawings. Materials are generally defined with an expression of product line rather than a technically descriptive definition of the product. For example, exterior wall is defined as brick wall in the project. However, there are a variety of materials that could be used for brick wall construction such as gas concrete blocks, pumice concrete blocks, and perforated bricks. The lack of well-defined material could be interpreted as the obligation of the contractor to use the materials defined in the approved projects. It is possible to consider that designers provide broad definitions of materials on purpose of leaving material decision to the construction parties. In this project, the architect did not provide a detailed explanation of the heating insulation membrane. Whether it is mentioned in the architectural project or not, the heating insulation material is determined in the heating insulation report that is prepared by the mechanical engineer. Inspection authorities are expecting the execution of heating insulation according to that report. The partial system section in the Figure 4.11 indicates the level of detail of an approved architectural project.

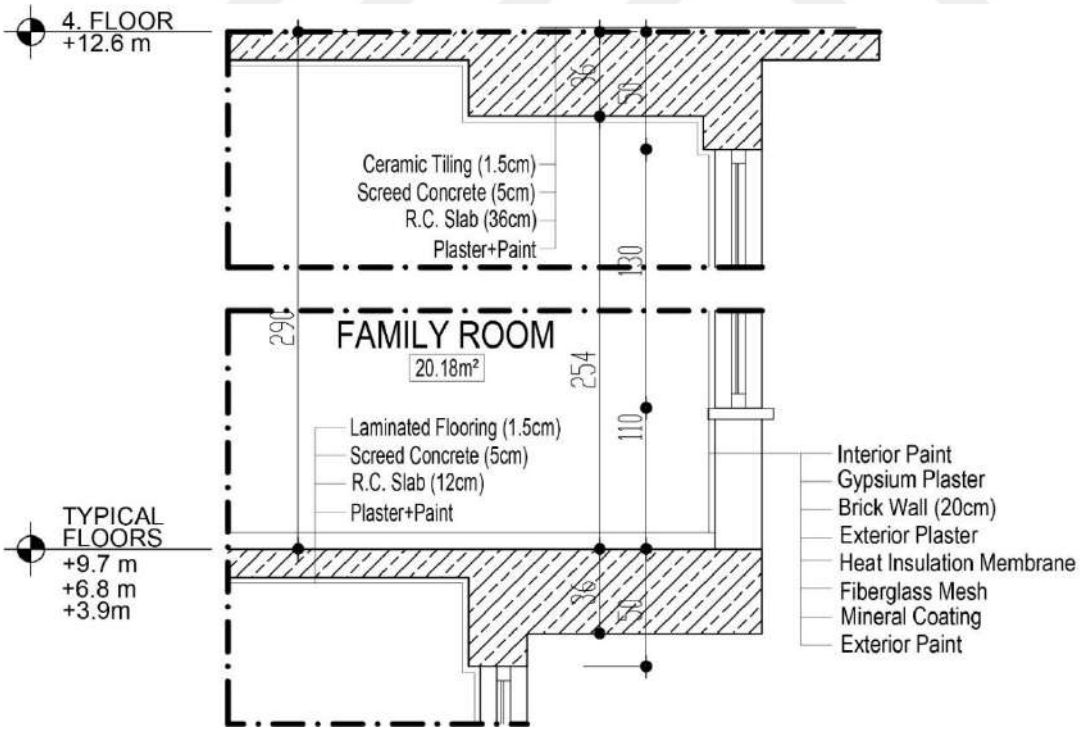


Figure 4.11: A partition of system section of building.

Elevation drawings are necessary to provide the vertical dimensions, features, and appearance of a building. They help builders and inspectors visualise the design and understand the scope, scale, and context of the work. When the elevation drawing in the sample project is observed, it is understood that they provide information related to the openings, short walls, roofing, and other descriptive measures that are necessary for the construction. The materials of the façade are explained with broad definitions as in the system section drawing. Similarly, this situation could be attributed to the obligation of the contractor to execute according to the materials indicated in the approved architectural project. Figure 4.12 shows the level of detail in the elevation drawing of an approved project.

Figure 4.12: Front elevation of the building.

The ground floor of the project is different from the typical floor plan by the absence of cantilever and the creation of the building entrance space. The building entrance is provided across the staircase with a 1.50 m double-wing door and the designer protected 1.80 m clean width from the entrance to the staircase because of the regulation because the width of space from the building entrance to the staircase must be at least 1.50 m according to the planned areas zoning regulation. The spatial organisation of flats is the same as the flats at typical floors with the exception of the flat size. The flats are smaller in the ground floor due to the absence of cantilevers. The elevation of any cantilever cannot be less than 2.40 m above the natural ground level as according to the Planned Areas Zoning Regulation. Therefore, it was not permitted to expand the ground floor area with cantilevers. Figure 4.13 shows the ground floor plan of the sample project.

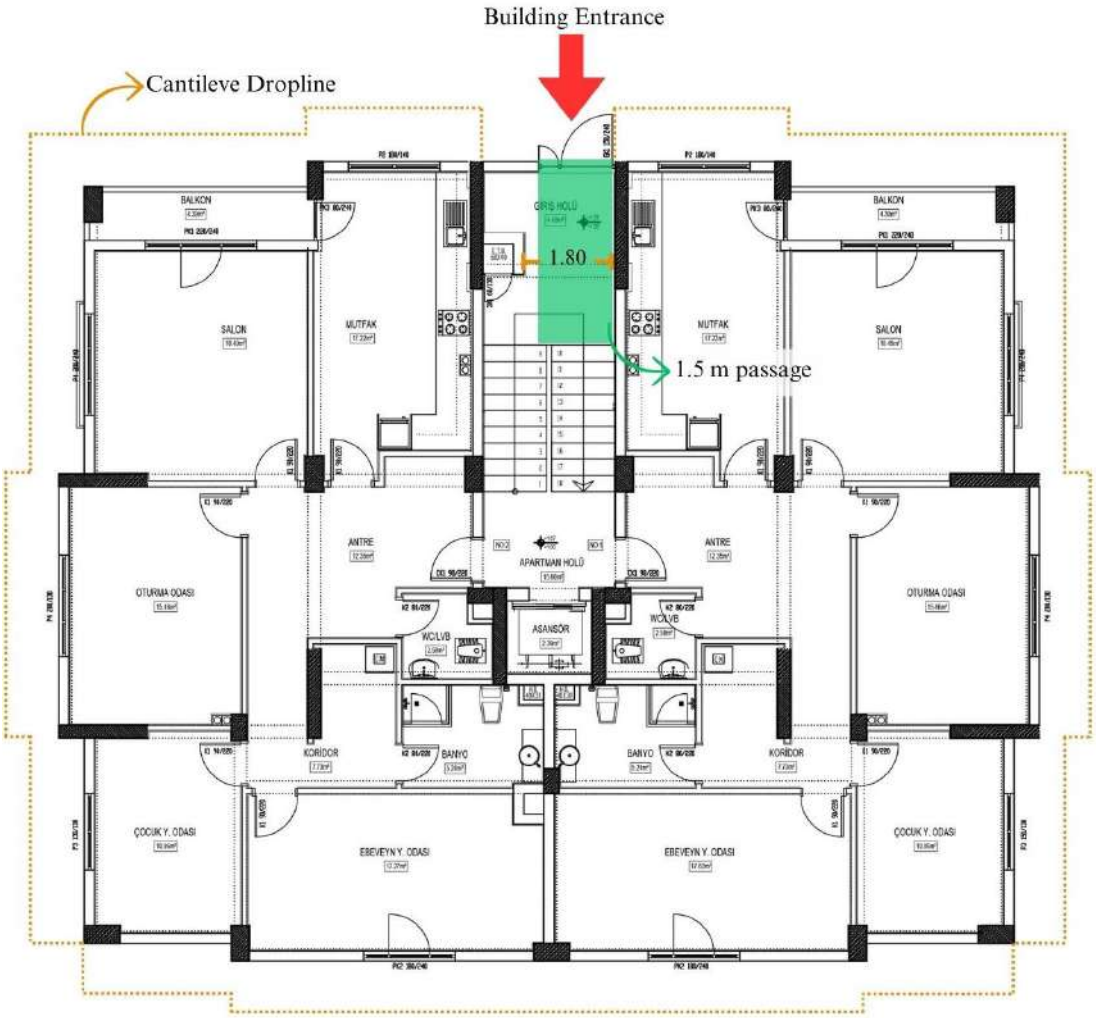


Figure 4.13: Ground floor plan of the building.

All construction projects must correspond to each other. Therefore, it is mandatory to provide technical and service spaces that are projected by other engineering disciplines. Electrical design projected electrical panel room, and mechanical design projected a boiler room, water storage room for the sample project. The area of the water storage room could be determined according to the size of the water storage and its instalments. There are provisions related to the size of the water storage. Accordingly, buildings up to 10 residential units must have 5 m³ of water storage. When the number of residential units is more than 10 units, a water storage capacity of 0,5 m³ must be provided for each residential unit. Also, the designer could determine the size of the water storage room and electrical panel room in collaboration with the mechanical and electrical engineer. Figure 4.14 shows the basement floor plan of the sample project where mandatory spaces are arranged.

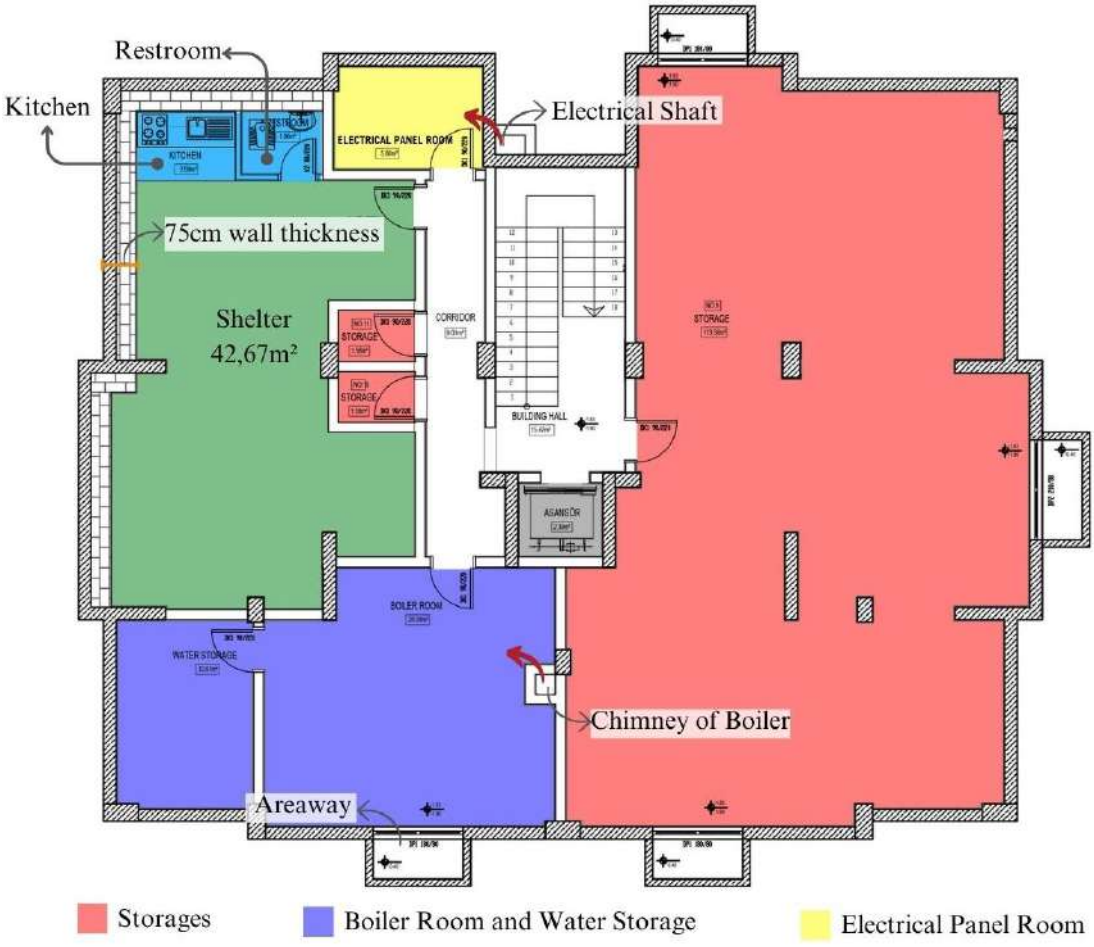


Figure 4.14: Basement floor plan of the building.

There are three mandatory spaces that should be arranged in the basement floor. They are shelter space, electrical panel room, and water storage room. The shelter area is

calculated according to the provisions of the shelter regulation by the architect. The number of users and the area of commercial spaces are used to calculate the shelter area of the building. Accordingly, the sample project has 8 residential unit and 3 storage room. But, occupancy area of the project is 1.600,19 m². According to the shelter regulation, the building with 12 or more flats and with 1500 m² occupancy area must provide a shelter space within the parcel of building. Therefore, it is mandatory to provide a shelter space for the sample project. The apartments have 3 rooms and 1 living room. One of the rooms is the master bedroom of a flat. Therefore, the number of users per flat is 4 people. The calculation of the shelter area is 1 m² per user;

$$4\ x\ 8 = 32 \qquad (4.6)$$

32 m² is required for the clean area of the shelter. There must be enough restroom and kitchen space as determined in the shelter regulation. The area of restroom and kitchen space cannot be included in the calculated shelter area.

The Project deliverables of a building are plotted on one single sheet that consists of all drafting sheets and calculations related to the construction. According to the Planned Areas Zoning Regulation, an architectural project should consist of the followings;

- General layout plan,
- Share table of construction servitude and property ownership,
- Area sheet for gross area of independent units and common areas,
- Additions and total construction area,
- All floor plans of the building,
- Roof plan,
- At least two section drawings related to floor plans, and roof plans, one of the section drawings should show common stair, and excavation account,
- The system detail drawings,
- Construction drawings,
- Conceptual project,
- Calculations of car parking, shelter, and landscape.

The designer met the requirements mentioned above in the architectural project according to the provision of the Planned Areas Zoning Regulation. Although, the

quality and efficiency of them are questionable. In addition to the drawings mentioned above, there is a design sheet of construction details in 1:20 and 1:5 scale. When the detail sheet is observed, it is possible to mention that the detail drawings were not prepared specifically for this project. The most important reason for reaching this conclusion is that there is no detail mark to establish a relation between point-detail drawings and plan or section drawings. It is not shown where the given detail will be used. Also, it is possible to observe discrepancies between the detail drawings and the project. It is possible to set an example for this situation, the roof of the building is a concrete structure and roof attic is in connection with the housing at down-stairs. However, the construction detail sheet has a detail drawing of the roof, where the roof is illustrated with a wooden structure and a blind attic. It is possible to assert that the approval of architectural project with such errors could be attributed to lack of standards and legal provisions related to architectural detailing.

It is possible to mention that two important situations could be observed as a result of examining the sample project;

- Zoning codes and building regulations prescribe building design,
- Detail drawings are not intrinsic to the project and are not descriptive enough.

As has been tried to be mentioned in this section with calculations and illustrations, zoning codes determine the mass and placement of a building in a parcel. At the same time, building regulations are determining standards with certain numerical values, dimensions, and formulas. When regulations and zoning conditions together become mandatory inputs of the design process, they can become guidance that creates the design rather than inputs that increase the performance and technical competence of the design. This situation could be observed more clearly, where the parcel of project is as small as to bear only a single block of residential building, just like in the sample project.

It would not be wrong to mention that architectural detailing is essential to ensure the transition from design to construction. Also, it would help to reduce error and improve the accuracy of the construction. The detail level of the plan, section, and elevation drawings indicates an inspection deficiency, which could be related to the lack of sufficient regulations on architectural detailing. As mentioned in the study, designers are not involved in the construction processes. Therefore, complete and descriptive

preparation of architectural documentation gains importance in converting the documented design into construction. Otherwise, missing architectural details could be replaced by the contractor's choices and popular practises in the construction market. It is possible to claim that these two situations could be interpreted as a cause of similitude among unbranded residential buildings.

5. CONCLUSION

A variety of housing supply systems could be observed in the historical development. Among these, the build-and-sell housing supply system dominates the housing construction sector. It is possible to assert that this situation could be attributed to the urbanisation rate of Turkey as a developing country. The creation of new zoning areas, the growth of cities, accordingly investment in land and construction to receive profit through the increase in urban land value could be considered the major factors in the development of the build-and-sell housing supply system. It is possible to differentiate build-and-sell housing suppliers as branded and unbranded housing suppliers. The study findings suggest that unbranded housing suppliers provide majority of the housing in Turkey. The density of residential buildings is an important factor for the formation and architectural quality of a city. But it is possible to observe a tendency toward uniformity among residential buildings. Since it came to knowledge that unbranded housing producers are the main housing suppliers, it would not be wrong to assert that their productions cause the similitude among residential buildings. Based on this approach, the objective of this study is to examine formal similarities in the design and production processes of unbranded residential buildings in Turkey, to understand the reason of similitude.

In this respect, the building procurement process is examined. Building procurement process reveals decision makers of a building. Central policy decisions determine the zoning codes. In Turkey, housing is subject to trade and a constitution of demand is necessary in the market to create motivation for construction. As project demand is present, all projects must have a building licence to start construction. Construction projects and reports are the supplement of the building licence. They have to be prepared according to the legal provisions of the building regulations. The building regulations are providing minimum technical, safety, and legal competence for buildings. Once the building licence is obtained, the Inspection Corporations are responsible to inspect execution and completion of the construction in compliance with the supplements of building licence. Then, an occupancy permit could be granted if the construction is approved for completion by Inspection Corporation and the related

institution. All together what particularly stands out is that the factors determining housing demand, zoning codes, the provision of regulations, and building design process are prominent factors affecting unbranded housing procurement process.

From this point of view, the factors affecting architectural design and construction were analysed under five titles. These are building regulations, economic factors, cultural and social factors, technological factors, and the practise of architects. The findings of the study suggest that building regulations determine all aspects of building components and mandatory spaces with formulas and measures. Also, building regulations refer to the zoning codes to determine the mass and placement of buildings in the building coverage area ratio, the floor area ratio, and the maximum height or the maximum number of floors for a zoning land.

Analysing economic factors helped to understand the influence of price, income and consumption, savings, housing finance system, and return intentional housing demand over the constitution of housing demand. The findings of the examination of economic factors suggest that the return intentional housing demand rate has been high for a long time in Turkey. This situation could be attributed to two reasons. These are the presence of high inflation rates and getting unearned income. Housing is used as an investment tool for both situations to protect savings from inflation and to make profit from increasing value of housing.

Examination of cultural and social factors helped to understand the influence of demography, geography, and preferences on the determination of housing type and design. All together what stands out is that the type and size of a house could be determined according to the demographic characteristics of the region. Household size can be used to determine the number of rooms in a house. Rate of marriages and divorces determine the need for rental house. The urbanisation rate indicates the the trend of housing demand. Demographic data can help to establish supply-demand equilibrium in order to meet demand by designer or contractor during preconstruction of a building. On the other hand, the geography and culture of a region has influence on the housing design preferences in terms of material usage and spatial planning. In the context of the study, the resemblance in the spatial organisation of apartments can be considered an important factor for the design and production of unbranded housing.

The technological factors affecting unbranded housing design and production are examined over design tools, construction materials, and techniques. The findings in the study suggest that unbranded housing producers do not have the benefits of technological developments in construction management, materials, and communication tools as much as branded housing producers. There is a conservatism in the construction materials, building technique, furnishing and finishing that could be observed among unbranded housing buildings. This situation can be considered as a trace of similitude among unbranded housing buildings that can be noticed at first glance.

As a supplement of building licence, construction projects and their procurement play a crucial role in the constitution of unbranded housing. Among them, the architectural project is where all design input from the client, legal provisions, and other engineering and design disciplines are added to the drawing, analysed, and managed for feasibility and integrity. Therefore, the architectural design process is examined to understand the factors that affect resemblance among unbranded housing. According to the findings of the study, the architectural practise is limited to render the drawing to image rather than the building. Because architects are under contract to obtain approval of the architectural drawing to grant the building permit rather than to ensure transition of the drawing to the building. Additionally, the lack of legal provision about architectural detailing and the high density of non-corporate architectural firms resulted with the perception to architectural services as legal obligation for construction rather than an area of work to achieve high-grade design.

The findings in this work are used to examine the case study, which is an approved and constructed architectural project on zoning land. The study of factors that affect architectural design and production of unbranded housing buildings in the context of law helped to understand the influence of these factors on the similitude among unbranded residential buildings through the sample project. The study reveals that the practise of architects and building regulations are two key factors that could be argued for the resemblance among unbranded housing buildings.

Extremely defined building regulations force the design process to start with mandatory and precise numerical values, where the design process should start from non-quantitative and uncertain measures to certain and quantitative state as the process

progresses. Therefore, architects do not manage a design process but fill inside a prescribed mass with client requirements in the guidance of the provision of regulations. Under these constraints, the pursuit of designers to achieve authentic design finds correspondence with undescribed, uncalculated, or illegal codes. Since the 20 cm decorative cantilever is not calculated in the occupancy area of a building, it became a frequently applied tool to improve the appearance of the buildings. However, the lack of legal provisions on architectural detailing and deficiencies in architectural projects banalise the architectural design process. It is possible to claim that the banalization of the architectural design process caused similitude among the unbranded housing design with the use of popular façade materials.

This study focusses on the factors that affect the design and production of unbranded housing to understand the resemblance among the facades of the streets in the housing zones. The findings of study could be used to increase awareness of the effect of regulatory requirements on the architectural design. The emergence of this awareness could help to improve a variety of design strategies to achieve authenticity without the impression of legal obligations. Thus, the similitude among unbranded residential buildings may diminish with time. In addition, this study may help to understand how legal obligations prescribe building mass and motivate the transition to performance-based regulations. Lastly, factors that affect the design and production of unbranded housing can be used for further studies to provide a guidance to determine specifications and considerations related to the design, investment, and construction of residential buildings.

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