T.C.
NECMETTİN ERBAKAN ÜNİVERSİTESİ
FEN BİLİMLERİ ENSTİTÜSÜ

KONUT ALANLARINDA MEKAN KALİTESİNİN DEĞERLENDİRİLMESİ: KONYA ÖRNEĞİ

Khair Mohammad HAYAT

YÜKSEK LİSANS TEZİ

Şehir ve Bölge Planlama Anabilim Dalı

Mayıs-2019
KONYA

REPUBLIC OF TURKEY
NECMETTIN ERBAKAN UNIVERSITY
GRADUATE SCHOOL OF SCIENCE
AND TECHNOLOGY

ASSESSING QUALITY OF PLACE IN RESIDENTIAL AREAS: CASE STUDY OF KONYA

Khair Mohammad HAYAT

MASTER'S THESIS

Department of City and Regional Planning

May-2019
KONYA

TEZ KABUL VE ONAYI

Khair Mohammad HAYAT tarafından hazırlanan *"Konut Alanlarında Mekan Kalitesinin Değerlendirilmesi: Konya Örneği"* adlı tez çalışması 29/05/2019 tarihinde aşağıdaki jüri tarafından oy birliği / oy çokluğu ile Necmettin Erbakan Üniversitesi Fen Bilimleri Enstitüsü Şehir ve Bölge Planlama Anabilim Dalı'nda YÜKSEK LİSANS TEZİ olarak kabul edilmiştir.

Jüri Üyeleri **İmza**

Başkan
Prof. Dr. Ümmügülsüm DAĞLIOĞLU

Danışman
Prof. Dr. Ümmügülsüm DAĞLIOĞLU

Üye
Doç. Dr. Özer KARAKAYACI

Üye
Dr. Öğr. Üyesi Seher ÖZKAZANÇ

Yukarıdaki sonucu onaylarım.

Prof. Dr. S. Savaş DURDURAN
FBE Müdürü

TEZ BİLDİRİMİ

Bu tezdeki bütün bilgilerin etik davranış ve akademik kurallar çerçevesinde elde edildiğini ve tez yazım kurallarına uygun olarak hazırlanan bu çalışmada bana ait olmayan her türlü ifade ve bilginin kaynağına eksiksiz atıf yapıldığını bildiririm.

DECLARATION PAGE

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

Khair Mohammad HAYAT

29/05/2019

ÖZET

YÜKSEK LİSANS TEZİ

KONUT ALANLARINDA MEKAN KALİTESİNİN DEĞERLENDİRİLMESİ: KONYA ÖRNEĞİ

Khair Mohammad HAYAT

Necmettin Erbakan Üniversitesi Fen Bilimleri Enstitüsü
Şehir ve Bölge Planlama Anabilim Dalı

Danışman: Prof. Dr. Ümmügülsüm DAĞLIOĞLU

2019, 84 Sayfa

Jüri
Prof. Dr. Ümmügülsüm DAĞLIOĞLU
Doç. Dr. Özer KARAKAYACI
Dr. Öğr. Üyesi Seher ÖZKAZANÇ

İçinde yaşadığımız mekanın kalitesi, yaşam kalitemizi ve refahı gösterir. Yaşam alanlarının nitelikli ve başarılı mekanlar olarak tasarlanması gerekliliğinden hareketle tez çalışmasında, konut alanlarında mekan kalitesi konusunda araştırma yapılmasına karar verilmiştir. Konut alanları, kentin en önemli alan kullanımlarındandır. Bu alanlar hayatımızın çoğunu içinde geçirdiğimiz yerlerdir. Konut alanlarının sahip oldukları mekan kalitesi, hayatımızı zevkli hale getirebilir veya arzu ettiğimiz yaşam biçimini zorlaştırabilir. "mekan kalitesi" kavramı, mekanların başarı seviyesini ve yaşanabilirliğini tanımlamak için yaygın olarak kullanılmaktadır. Bu araştırma, mekan kalitesini etkileyen fiziksel faktörleri irdeleyerek konut alanlarında mekan kalitesinin kritik parametrelerini değerlendirmeye yönelik etkin yaklaşımları ortaya koymayı amaçlamaktadır. Araştırma, daha önce mekan kalitesi konusunda yapılan çalışmalar ışığında amacına ulaşmaya çalışır. Bu amaca yönelik olarak çalışmanın yöntemi, kapsamlı bir literatür taramasına ve örneklem alan olarak seçilen Konya şehrinin kuzey koridorunda yer alan Bosna-Hersek mahallesinde gerçekleştirilen alan araştırmaları üzerine kurgulanmıştır. Çalışma kapsamında, mekan kalitesi kavramı ve mekanın duyu sistemimiz tarafından nasıl algılandığı, dış mekan aktivite türleri, konut alanlarında sosyal yaşam, kalite türleri ve mekan kalitesini değerlendirmeye yönelik ortaya konan parametrelere yer verilmiştir. Yapılan değerlendirme sonucunda örneklem konut alanın mekan kalitesi, güvenlik, konfor, erişilebilirlik, okunabilirlik, karma kullanım ve estetik parametreleri doğrultusunda ele alınmış ve bu parametreleri değerlendirmeye yönelik bir kontrol listesi oluşturulmuştur. Oluşturulan kontrol listesinde yer verilen altı parametre örneklem alanında hafta içi ve hafta sonu gerçekleştirilen doğrudan gözlem yöntemi ile irdelenmiştir. İrdeleme sonucunda Bosna-Hersek mahallesinin mekan kalitesinin artırılmasına yönelik önerilerde bulunulmuştur.

Anahtar Kelimeler: Konut kalitesi, konut alanları, mekan kalitesi, yaşanabilir mekanlar, yaşam kalitesi

ABSTRACT

MS THESIS

ASSESSING QUALITY OF PLACE IN RESIDENTIAL AREAS: CASE STUDY OF KONYA

Khair Mohammad HAYAT

THE GRADUATE SCHOOL OF SCIENCE AND TECHNOLOGY OF

NECMETTİN ERBAKAN UNIVERSITY

THE DEGREE OF MASTER OF SCIENCE
IN CITY AND REGIONAL PLANNING

Supervisor: Prof. Dr. Ümmügülsüm DAĞLIOĞLU

2019, 84 Pages

Jury
Prof. Dr. Ümmügülsüm DAĞLIOĞLU
Assoc. Prof. Dr. Özer KARAKAYACI
Asst. Prof. Dr. Seher ÖZKAZANÇ

The quality of the place in which we live indicates our quality of life and well-being. Considering the need to design successful and quality living environments, it has been decided in this thesis to carry out a research on quality of place in residential areas. Residential areas are among the most important land-uses of the city. They are places where we spend most of our lives within them. Their quality of place can make our lives pleasurable or make it difficult to live as we want. The term "quality of place" is widely used to describe the level of success and livability of places. This research aims to investigate the physical factors affecting quality of place and attempts to provide effective approaches for assessing the critical parameters of quality of place in residential areas. The research tries to achieve its purpose in the light of previously conducted studies on quality of place. To achieve the mentioned purpose, the method of the study has been built on a comprehensive literature review and case study of Bosna-Hersek neighborhood located in the north of Konya city. Within the scope of the study, concept of quality of place and how a place is perceived by our sensory system, types of outdoor activities, social life in residential areas, types of quality and parameters for assessing quality of place are explained. The quality of place in the intended residential area has been assessed using safety, comfort, accessibility, legibility, mixed-use and aesthetic parameters and a criteria checklist has been developed to assess the mentioned parameters precisely. The six parameters included in the criteria checklist have been assessed in the intended area by direct observations during the week and on weekend. At the end, a variety of recommendations are made to improve the level of quality of place in Bosna-Hersek neighborhood.

Keywords: Housing quality, livable places, quality of place, quality of life, residential areas.

ACKNOWLEDGEMENTS

I express my gratitude to my supervisor Prof. Dr. Ümmügülsüm DAĞLIOĞLU for her infinite assistance and guidance throughout the research. The thesis wouldn't be completed without her continuous support, encouragement and advice. I am also grateful to examining committee members Assoc. Prof. Dr. Özer KARAKAYACI and Asst. Prof. Dr. Seher ÖZKAZANÇ for their contribution, comments and suggestions. Furthermore, I would like to thank my educators Prof. Dr. Çiğdem ÇİFTÇİ, Asst. Prof. Dr. Sedef ERYİĞİT and Asst. Prof. Dr. Fadim YAVUZ who endured numerous difficulties during my education in department of City and Regional Planning. I express my special appreciation to my dear mother Bahar Gul HAYAT for her endless contribution, patience and encouragement.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

km	kilometer
m	meter
cm	centimeter
h	hour
sec	second

1. INTRODUCTION

People's tendency to live in cities is increasing day by day. Extensive migrations from rural to urban areas and lack of suitable housing have caused many cities not to meet the urban life criteria. Environmental pollution, inaccessibility to city facilities and poor quality of housing are the major difficulties of today's most cities. Growth in urban population has led to high demand for housing developments. Housing is the initial requirement of a community. In the past, the quality of housing was assessed according to facilities that each dwelling could provide for its occupants. But today, quality of housing covers the whole residential environment. Residential areas are places where we spend long periods of our life within them. The way that they are designed and the quality of place that they have can make our lives enjoyable or make it hard to live as we want. The success of residential areas depends on compatibility of houses with their surrounding environment. Compatibility means optimal relationship of houses with commercial centers, educational facilities, movement corridors, entertainment areas and public transportation system. Towers (2005) points out the importance of the relationship between housing and its surroundings, he states that "The critical aspects of housing design lie outside the individual homes".

The quality of the physical environment in which we live affects our quality of life and well-being. There have been many studies on how to make the physical environment more appealing and suitable for living, but few of them were exclusive to quality of residential areas. In most of the conducted studies, general concepts related to quality of place have been investigated on city scale, while the characteristics and usage of different places in a city vary from each other. Although residential areas have common points with other land uses of the city, some of their unique attributes make it necessary to study their quality of place separately. In comparison to commercial and industrial areas, residential areas are used frequently, they encompass the majority of developed land, the activities of children and elderly people are more common within them and they are places for relaxation.

Today, majority of residential areas do not have decent quality; their public spaces are not safe and comfortable for outdoor activities, public facilities do not fulfil the needs of inhabitants and are not accessible by foot, most residential areas do not provide visually appealing places for residents to enjoy and a large number of them create a confusing image in visitors' minds. To find practical solutions to the problems

associated with residential areas and to design better places for living and socializing in cities with increasing population, it has been decided to conduct a research on quality of place in residential areas. The research aims to investigate the physical factors affecting quality of place and attempts to provide effective approaches for assessing the critical parameters of quality of place in residential areas. The research tries to achieve its purpose in the light of previously conducted studies on quality of place. By attaining the mentioned purpose, a checklist of criteria can be provided to assess the quality of place in existing residential areas and it can also be used as a guide for new housing developments.

Quality of place in residential areas is significantly influenced by design quality. Furthermore, it is affected by economic, social and cultural status of the inhabitants. This research merely investigates how design can affect the quality of place in residential areas. The effect of economic, social and cultural status of residents are beyond the scope of this study. The research particularly focuses on physical structure of residential areas; components of the physical environment (e.g. dwellings, streets, intersections, parks) and their relationship with each other are analyzed in terms of quality. The study investigates the ways how to make the outdoor environment of residential estates more attractive and suitable for doing different kinds of outdoor activities.

Within the scope of the study, concept of quality of place and how a place is perceived by our sensory system, types of outdoor activities, social life in residential areas and critical parameters for assessing quality of place in residential areas are described. Parameters have been chosen according to their importance and level of impact on quality of place in residential areas. They include safety, comfort, accessibility, legibility, mixed-use and aesthetic.

As case study, the research intends to assess the quality of place in Bosna-Hersek neighborhood located in the north of Konya city within the limits of the mentioned parameters. Assessment was carried out through direct observations and in accordance with the criteria checklist obtained as a result of the study. Bosna-Hersek is one of the highly populated neighborhoods of Konya city. Existence of Selçuk University in walking distance of the neighborhood has increased its importance and has made it one of the remarkable places in the city. Due to high population of students and university lecturers, the demand for housing is increasing rapidly in Bosna-Hersek

neighborhood. Considering its importance in the city, it was deemed appropriate to selected Bosna-Hersek neighborhood as case study of this thesis.

Quality of urban areas has been the subject of many studies, while a limited number of studies focused on quality of residential areas. Conducted studies have investigated various issues related to quality of place, the most important ones can be summarized as follow:

Biddulph (2007), "Introduction to Residential Layout" describes fundamental principles for designing quality residential areas that can meet the needs and demands of residents. The book provides a comprehensive information about creating responsive living environments.

Larco et al (2014), "Site Design for Multifamily Housing" explains the problems arising from poor design of components in residential areas and offers a variety of recommendations for resolving each problem.

Newman (1972), "Defensible Space" explains the ways through which the residents of a region can take the control of their living environment by themselves without government assistance. The main theme of the book is providing social safety through housing design.

Hall and Porterfield (2001), "Community by Design" describes the ways to create sustainable living environments which can fulfil the needs for shelter, recreation, education and work.

Bentley et al (1985), "Responsive Environments" explains design approaches for improving the level of permeability, variety, legibility, robustness, visual appropriateness, richness and personalization in urban areas.

Burton and Mitchell (2006), "Inclusive Urban Design, Streets for Life" describes how familiarity, legibility, distinctiveness, accessibility, comfort and safety affect the elderly users of outdoor spaces.

Ewing and Clemente (2013), (Measuring Urban Design, Metrics for Livable Places) explains definitions and measuring methods for five perceptual qualities of urban areas (imageability, visual enclosure, human scale, transparency and complexity).

Kriken et al (2010), "City Building" describes nine design principle for creating successful cities. Principles include sustainability, accessibility, diversity, open space, compatibility, incentives, adaptability, density and identity.

2. LITERATURE REVIEW

2.1. Concept of Quality of Place

According to definitions of Oxford and Cambridge dictionaries[1], the term "quality" can have the following meanings: (1) "The degree of excellence of something" (e.g. high-quality outdoor spaces, low-quality products) and (2) The unique feature or characteristic of someone or something (e.g. safe walkways have three key qualities, what qualities a responsive place should have).

Today, the word "quality" is widely used to describe the level of excellence of products or services. In technical terms, quality can have different definitions in different industries and professions. ISO 9000: 2005 defines the quality as follow: "The degree to which a set of inherent characteristics fulfils requirements" According to Crosby (1984), "Quality is conformance to requirements". Juran and Godfrey (1999) describe two crucial meanings of quality: (1) Those features of a product that provide the needs and requirements of its users and (2) Being free from errors and deficiencies.

Quality is a multi-dimensional concept; it cannot be measured by a single parameter. Carmona and Sieh (2004) explain Garvin's eight dimensions of quality for manufactured products:

1- Performance: How well a product can perform its basic tasks (e.g. the sharpness of a hair trimmer).
2- Features: The extra abilities or "bells and whistles" of a product which help to perform the primary task better (e.g. feature of a hair trimmer to show its charge level or having stainless blades).
3- Reliability: The period of time that a product can function without failure (e.g. a hair trimmer may operate properly for six months).
4- Conformance: The extent to which a product meets the pre-established standards.
5- Durability: The length of time during which a product completely deteriorates.

[1] https://en.oxforddictionaries.com/
https://dictionary.cambridge.org/
Visited in 2019

6- Serviceability: How easily and quickly a product can be repaired after getting damage.
7- Aesthetics: The appearance, taste, smell and sound of a product.
8- Perceived quality: Customers do not usually have detailed information about quality of a product. In such situations, the brand name and advertising provide reference about quality.

Russell and Taylor (2011) explain seven dimensions of service quality identified by Evans and Lindsay as follow:

1- Time and timeliness: The period of time that customers wait for a service and on-time completion of the service.
2- Completeness: Customers receive all the services they requested
3- Courtesy: How company employees behave towards customers.
4- Consistency: The same level of service is provided for all customers.
5- Accessibility and convenience: How easily and quickly a service is obtained.
6- Accuracy: The service is always performed correctly.
7- Responsiveness: Reaction of the company to unusual circumstances.

The term "quality" is a time dependent variable, its definition and measuring standards change according to evolution of products and services. As time goes by, the standards for products change to offer better opportunities for human well-being. So, the quality product of yesterday becomes tomorrow's junk (Webber and Wallace,2007).

When we talk about quality of place, its definition becomes more complex. It is difficult to measure the quality of place of the whole city at once. To evaluate the quality of place in a city precisely, it is necessary to divide the city into manageable units (e.g. buildings, streets, recreational areas). Then the characteristics of each component and their relationship with one another can be studied in terms of quality. Quality of place is a closely related concept to place making, sense of place, place identity and quality of life. All of these concepts overlap, but they have their own contrasts and are investigated separately in urban design.

In this thesis, it is preferred to use the word "place" in the term "quality of place". In urban design, we are going to face with two expressions of "space" and "place". The notion of place is a complex issue. There have been many studies on concepts of place and space. According to Relph (1976), "Space is amorphous and intangible and not an entity that can be directly described and analyzed". In Longman

Dictionary of Contemporary English[2], the term space is explained as "An area of land that has not been built on". According to descriptions, we can say that, space is a raw material for designer. In order to change it to place, it should have clearly defined boundaries by horizontal and vertical planes and give a sense of enclosure for its users. So, place is a space that contains elements for touching, seeing and feeling in its surroundings.

Quality of a place is affected by physical, social, economic and cultural conditions. Both the users and designers of a place take part in providing quality, but it is more affected by design. The design determines which activities the people can do in a place and which activities they cannot; to what extent a place can be attractive or it can be dull; where the people can go and where they cannot; to what extent a place can be safe or it can be hazardous (Bentley et al, 1985). According to Carmona et al (2003/a), quality of place in residential areas means "Creating appealing residential environments where people will want to live". Frey (1999) evaluates the quality of a city according to the number of human needs and aspirations it can satisfy.

Considering the definitions of "quality" in previous paragraphs, we can define the quality of place as follow: Quality of place indicates the suitability of a place for activities we intend to do (e.g. to what extent a sidewalk is suitable to walk or a playground is suitable to play). In other words, if a place is visually attractive and functions in expected manner, it is called in high quality and vice versa it is in low quality. In general, quality of a place can be measured by number of its users; successful places invite more people to take part in outdoor activities (Cousins, 2009).

2.2. Perception of Place

Perception is a unique characteristic. Each individual has his/her own perceptual world. People see, understand and react differently when they visit a place (Moughtin et al, 1999). According to Carmona et al (2003/b) "Perception involves the gathering, organising and making sense of information about the environment". We sense the environment first, then perceive it. A distinction is made between "sensation" and "perception" but they are not discrete processes. It is not clear in practice when the sensation ends and perception starts. Quality of place is perceived by our sensory

2 https://www.ldoceonline.com/
Visited in 2019

system, we use our senses of touch, vision, smell and hearing to evaluate how livable a place is. Assessment may vary depending on ability of our sensory system. Sensory impairments may limit our perception of the outdoor environment. For instance, a visually impaired person will not be able to perceive the beauty of a place correctly or a hearing-impaired person will not feel the pleasing sound of water flow or singing birds properly. Perception of place also differs according to age, gender, lifestyle and the social or cultural environment in which a person lives. Urban designers are interested in common perceptual attributes of people, they design the outdoor environments according to perceptual characteristics shared or held by most people.

Vision: Vision is the most important and dominant sense which can provide more information about a place than other senses. Visual perception is a complex process, it depends on light quality, distance, texture, color and shape of the place. Vision is an active and searching sense. We acquire information about appearance of a place by looking, while smell and sound themselves come to us (Porteous, 1996). Our eyes do not always give the right information about a place. Our visual perception may vary according to color, distance or position of the objects. For example, bright-colored objects appear larger than their actual size or vertical elements look taller than horizontal elements of the same size.

Touch: Skin is the largest organ in our sensory system and it is very sensitive. We can mask the sense of vision by closing our eyes but we cannot mask our sense of touch. We are always in touch with our environment. When we walk, we can assess the quality of walkways by our feet even if the shoes are worn. We can feel how hard or soft the pavement is. When we sit on a bench, our buttocks help us to assess its quality. Tactile information about quality of a place often comes from our feet or buttocks rather than our hands. Thermal comfort of a place is also perceived by our sense of touch. We immediately feel the slight change in temperature when moving from a shady place to a sunny location (Porteous, 1996).

Hearing: Humans do not have a highly developed sense of hearing. Hearing cannot provide as much information as vision about quality of a place, but it is emotionally rich. Some sounds like music, water flow, breeze and birdsongs are pleasant while other sounds like traffic noise, sound of industrial machinery or aircraft noise can adversely affect the quality of place in outdoor spaces (Porteous, 1996).

Smell: Like hearing, smell also cannot give us much information about quality of a place but it is emotionally rich. The scent of flowers or other natural smells will be

pleasant and desirable in outdoor spaces while annoying smells like smells emitted from industrial factories or trash bins may reduce the quality of outdoor spaces.

2.3. Social Life in Residential Areas

Livable residential areas do not merely provide the inhabitation requirements of people, but they respond to a variety of expectations like work, education, entertainment and socialization. Tendency to interact with others is the inherent attribute of humans. People tend to socialize with their neighbors, friends and relatives, they need exclusive places to do this. Children need safe places in proximity of their homes to play, adults need comfortable places to interact with their friends, and families need suitable places to have fun on weekends. The ability to provide sociable places is the critical characteristics of successful neighborhoods. Socializing places are not only large parks that families use on weekends but they are streets, playgrounds and other small spaces in the vicinity of people's homes used for daily recreation (Figure 2.1). The success of a sociable place does not depend on quantity of its public spaces, but it depends on quality of them. Most public spaces are underused because of their low quality and bad maintenance (Biddulph, 2007). The structure of the living environment severely affects the human behavior and social life (Carmona et al, 2003/b). The physical environment may facilitate or impede our outdoor activities according to its design quality. The way that they are designed determines which activities we can do and which activities we cannot. As Gehl (2010) explains in his book *"Cities for Life"* that "First we shape the cities-then they shape us".

Figure 2.1 Social life in residential areas (URL 1, URL 2)

Streets are the main socializing places of a neighborhood. Over the past few decades, social life in streets has deteriorated due to prioritizing vehicular traffic in street design. In most cities, streets are designed merely for vehicles without considering the needs of pedestrians. The only activity that you can see in such cities is people coming and going in cars. Although the volume of vehicular traffic has the dominant role in determining the number of social activities in residential streets, the form of housing, the shape of street networks and the way that residential areas are developed can change its impact on the nature of social life. Biddulph (2007) explains the outcome of a research conducted by Appleyard and Mark Lintell on resident satisfaction in three San Francisco streets. They found that there were a wide range of social activities in calmer streets with less traffic. In contrast, people seldom interacted with others in busy streets. They were in a hurry to leave the street quickly. Social interactions in the streets are vital for the viability of a city. “If a city’s streets look interesting, the city looks interesting; if they look dull, the city looks dull” (Jacobs, 1961).

The public spaces of residential estates are commonly used by children and teenagers. Children can be divided into two age groups: preschool children and young children aged five to twelve. Preschool children need playgrounds close to their homes ideally within the sight of their parents. They need to be directly observed by their parents during the play. To make the observation process comfortable, sitting opportunities should be considered for parents. So that they can observe their children while possibly interacting with other parents. Young children tend to play away from their parent’s gaze. They will play in playgrounds, on walkways, streets or wherever they think it is suitable for the type of the game they want to play. Biddulph (2007) explains four reasons why the young children choose the residential streets and small open spaces around their homes as play areas: firstly, the streets and walkways provide hard surfaces for wheeled toys like cycles and skateboards; secondly, they are accessible, located in the vicinity of their homes; thirdly, they allow the children to play in a wider area than the backyard; and finally, children travel to their play areas by foot and this let them to play between destinations.

2.4. Outdoor Activities in Residential Areas

A variety of activities are carried out in outdoor spaces every day; children play in front of their houses, pedestrians walk on the sidewalk, people wait for a bus, friends greet on the walkway or some others just watch the outdoor environment from their windows. Outdoor activities "Make communal spaces in cities and residential areas meaningful and attractive" (Gehl, 2011). Outdoor activities provide the opportunity to see other people and be among them. When people see their friends and acquaintances in publics spaces, they interact with each other. So, people attract other people and encourage them to take part in outdoor activities (Shaftoe, 2008). Quality of outdoor environment has great influence on number of activities, high-quality places invite more people to take part in outdoor activities. Gehl (2011) differentiates the living city from lifeless city by the number of outdoor activities performed within them. Lifeless cities have high-rise buildings, extensive car traffic and less pedestrian activities. Living cities have suitable outdoor spaces for pedestrian activities, they are friendly and inviting to use. Outdoor activities in public spaces can be divided into three categories (Gehl, 2011):

Necessary activities: This category includes activities that we do as our everyday task, like taking the children to kindergarten, going to work or walking up to school; or activities that become compulsory for us to do in a specific time, like waiting in traffic light to cross the road or a short walk to bus stop. Quality of place and weather conditions like raining, snowing or wind do not affect the essential activities, because they are compulsory and must be done in any circumstance (Figure 2.2).

Figure 2.2 Necessary activities (URL 3, URL 4)

Optional activities: Optional activities are done for the purpose of pleasure and enjoyment. Activities like walking for the purpose of exercise or sitting on a bench for sunbathing can be included in this category. There is no necessity in doing optional activities, it is completely related to level of interest of the person who does the activity. Optional activities are affected by quality of place and weather conditions. They are only done in favorable outdoor environments (Figure 2.3).

Figure 2.3 Optional activities (URL 5)

Social activities: Social activities take place by participation of more than one person. Activities like children playing in front of their house, greetings and conversations can be included in this category. Like optional activities, social activities are also affected by quality of place and weather conditions (Figure 2.4).

Indeed, the number of social and optional activities show the quality of place in a region and can be used as measuring standards of quality in a place. Relationship between outdoor activities and environmental conditions is shown in Table 2.1.

Figure 2.4. Social activities (URL 6, URL 7)

Table 2.1. Relationship between outdoor activities and environmental conditions (Gehl, 2011)

Quality of environment	Necessary activities	Optional activities	Social activities
Poor	●	•	●
Good	●	●	●

- **Sitting**

Successful places offer many opportunities for sitting along the walkways. Existence of adequate places for sitting increases the number of optional and social activities in public spaces. Location of sitting elements and the view they can provide is important for inviting people to sit. People usually prefer places for sitting where are protected and have a good view of streetscape. For instance, benches at the edges are more usable than those that are located in the middle of public space. At the edges, sitters feel a sense of protection in their backside. Gehl (2011) indicates that "Benches placed in the middle of open spaces look interesting on architectural drawings but are definitely less inviting than more sheltered spaces". According to Shaftoe (2008), the main reason for failure of seating plans is the wrong type and the wrong place of seating elements. Orientation of seating plays important role in quality of sitting place. Street furniture like bins, railings, public phones, flower pots and decorative objects can easily block the sight of sitters. So, in furniture plan of the city, benches should be located in places where can provide an unobstructed view of its surrounding environment. Main and Hannah (2010) explain that "Right furniture thoughtfully and appropriately placed can attract people to outdoor spaces and add to their enjoyment once they get there"

Factors like sun, shadow and time of the day also affect people's choice of place for sitting, in hot climates, people usually prefer to sit in shadow, in this case, benches located at unshaded zones will not be used during hot hours of the day. In cold climates, the sun is a benefit for people. People choose places for siting where are located directly under the sun rays (Whyte, 1980).

According to Gehl (2011), there are two kinds of seating in public places: primary seating and secondary seating (Figure 2.5). Primary seating includes benches that are mostly preferred by users and secondary seating includes boxes, stairways or edges of sculptures and flower pots. Secondary seating has multi-purpose function, in addition to providing sitting opportunity, it acts as decorative element of the city. Preference of users in seating type differs according to age, adults prefer to sit on

benches but for youngsters it doesn't matter wherever they sit. Sitting is affected by quality of outdoor environment, places with high quality invite more people to sit and take part in outdoor activities.

Figure 2.5 Primary and secondary seating (Shaftoe, 2008)

- **Standing**

Standing is the act of staying on foot. In general, standing is a short-term activity that takes place in public spaces, but it can last longer according to purpose of standing, for instance, when we wait for a bus and there is no place to sit in bus stop, we have to stand for a long time until the bus comes; or when we meet with our best friend the act of standing can last longer according to our conversation. People can stand for a moment to look for something interesting, to greet with a friend or in traffic light to cross the road.

People prefer to stand along building facades or at the edges of something, Gehl (2011) calls this the edge effect (Figure 2.6). Standing along building facades makes it possible to see the others but not be seen too much, meanwhile at the edges people feel a sense of protection in their back. According to Alexander et al (1977) "If the edge fails, then the space never becomes lively".

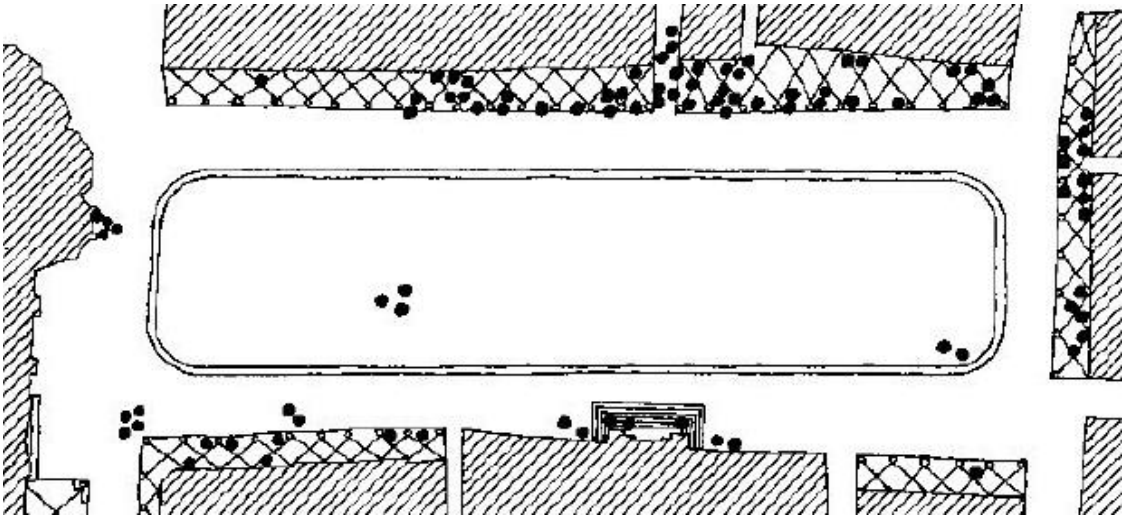


Figure 2.6 People standing at the edges (Gehl, 2011)

- **Walking**

Walking is a journey that we make by foot for the purpose of exercise, recreation or doing our necessary activities. In livable cities, walking is the common activity that takes place and makes the city friendly. Today, the main purpose of urban designers is to increase walkability of cities, because pedestrian friendly cities are calmer, safer, healthier and livelier than car dominant cities. People usually choose walking when their destinations are close and on human scale. So, for improving walkability in the neighborhood, facilities like schools, bus stops and shops should be located in walking distance of residents. The distance that a person can walk comfortably depends on topography of the land, weather conditions and age of the person. Five minutes is assumed to be the average time for a comfortable walk. According to average walking speed of pedestrians (5km/h or 1.4m/sec), we will get the optimal distance of 400-500 meters for comfortable walking (Gehl, 2011). When pedestrians walk, they usually choose the shortest way to their destination, if there is not direct walkway, they will create their own way. So, in designing public places like parks and streets there should be diagonal walkways that can provide the shortest route to reach several destinations. The geometrical structure of streets can affect quality of walking. When our destination is in sight, walking a long path will be tiring. Winding or interrupted streets will be interesting and show the distance shorter.

According to Speck (2012), a walk should fulfil four main conditions: “It must be useful, safe, comfortable and interesting”. “Useful” means that walking to

destinations is easier and more beneficial than using other types of transportation because city facilities are located close to dwellings; “safe” means that pedestrians can walk without fear of falling or being hit by motor vehicles; “comfortable” means that outdoor spaces are suitable for walking in different weather conditions and provide sense of enclosure like being in a room; “interesting” means that outdoor environment is visually attractive and there are many things to see. Walking, sitting and standing activities are shown in Figure 2.7.

Figure 2.7 Walking, sitting and standing (URL 8)

2.5. Parameters for Assessing Quality of Place in Residential Areas

The critical issue in quality of place is how to measure it. However, there is not definite criterion for measuring quality of place in a region. Architects and urban designers have explored different parameters for improving quality of outdoor environments. In his book *“Introduction to Residential Layout”,* Biddulph (2007) explains eight major design approaches that should be taken into account in housing developments:

1- Residential areas should be commercially viable.
2- Houses and street patterns should not be monotonous and dull.
3- Housing developments should be environmentally benign.
4- There should be comprehensive pedestrian and vehicular movement routes.
5- Different uses should be integrated.

6- Residential areas should be safe and easy to navigate.
7- The living environment should have attractive image.
8- Residential areas should have sociable outdoor spaces.

Bentley et al (1985) explains seven qualities of responsive environments. Parameters include permeability, variety, legibility, robustness, visual appropriateness, richness and personalization. Streets are the public spaces which provide circulation system and also act as catalyst for happening social activities. Burton and Mitchell (2006) explain six basic principles for designing high-quality streets. They describe how familiarity, legibility, distinctiveness, accessibility, comfort and safety affect the elderly users of neighborhood streets. Ewing and Clemente (2013) name fifty-one perceptual qualities of livable places (Table 2.2). They explain approaches for measuring imageability, enclosure, human scale, transparency, complexity, coherence, legibility and linkage in communal spaces.

Table 2.2. Fifty-one perceptual qualities of the built environment (Ewing and Clemente, 2013)

Adaptability	Singularity	Naturalness	Identifiability	Deflection
Distinctiveness	Clarity	Texture	Ornateness	Interest
Intricacy	Enclosure	Compatibility	Upkeep	Regularity
Richness	Meaning	Formality	Continuity	Vividness
Ambiguity	Spaciousness	Novelty	Imageability	Depth
Diversity	Coherence	Transparency	Prospect	Intimacy
Legibility	Expectancy	Complementarity	Variety	rhythm
Sensuousness	Mystery	Human scale	Contrast	
Centrality	Territoriality	Openness	Intelligibility	
Dominance	Comfort	Unity	Refuge	
linkage	focality	complexity	Visibility	

Main and Hannah (2010) explain the four key qualities of successful places found by PPS (Project for Public Spaces). According to findings of PPS, successful places are accessible, people take part in outdoor activities, they are comfortable and have a good image, and finally they are sociable places where people can meet each other. Frey (1999) recognizes the visually and functionally ordered cities as good cities.

Success or failure of a place depends on function of its components and visual appearance of the place. So, quality in residential areas can be divided into *functional quality* and *aesthetic quality* (Van der Voordt and Van Wegen, 2005). Functional quality of a place indicates the degree of its suitability for activities that take place. Aesthetic quality demonstrates the ability of a place to give visual pleasure to observers.

There are different parameters for measuring each type of quality in residential areas, the most crucial ones which constitute the backbone of this study are listed in Table 2.3.

Table 2.3. Types of quality and measuring parameters

Type of quality	**Measuring parameters**
Functional quality	Safety, comfort, accessibility, legibility, mixed-use
Aesthetic quality	Visual richness, order

2.5.1. Safety

Safety is the primary need of residents in a region and it is known as the most influential factor in quality of place. In terms of safety, the quality of a residential area is assessed according to possibilities it provides for residents to use the outdoor environment without fear of being attacked by someone, being struck by motor vehicles or falling to ground (Burton and Mitchell, 2006).

Two kinds of safety can be distinguished in residential areas: the safety against social crimes like burglary, vandalism, robbery and kidnapping which is called social safety and the safety against the hazards caused by physical features of the living environment like safe usability of streets, sidewalks, pedestrian crossings, bus stops and playgrounds which is termed as physical safety in this research. This section explains how physical features of the living environment affect our safety and how they should be laid out to achieve favorable outcomes.

- **Social safety**

Social crimes have become the major concern of people in most cities. They are worried about being attacked when they go outside and majority of them do not go out alone in the dark. Burglary, vandalism and robbery are the common social crimes that take place in residential areas. Some of these crimes happen in preplanned way, as the intruders specify a target then they make plans to commit it. Burglary can be the common example of such planned social crimes that usually occur in residential areas. In some other types of social crimes like vandalism and street robbery, the offenders do not have a specific target, the target can be anyone or anything which is available in the site and they commit the crime only if the environment provides the opportunity, opportunities can be the lack of watchman or observing eyes in a region. Although the

physical environment does not cause crime, the level of crime in a community depends on level of unemployment, poverty, criminal justice and housing management (Davies, 2006).

The police alone will not be able to solve all security problems of a neighborhood unless the residents themselves struggle to avoid social crimes. Architects and urban designers also play important role in reducing crime level, structure of the living environment that they design, building layout, street type and their relationship with each other can have significant impact on crime rate. Crime prevention through environmental design (CPTED) has been the subject of many researches. The oldest notions about CPTED come from the work of Jane Jacobs in year 1961. She explains in her book "*The Death and Life of Great American Cities"*, that active street life can minimize opportunities for antisocial activities. Later on, Newman explicated his theory of defensible space in year 1972. In defensible space method, residents take the control of their living environment by themselves without any government assistance. People from all income groups can take part in the process, it does not include any financial expenses. The following concepts are going to help us to create defensible spaces.

- **Natural surveillance**

Result of many researches shows that; social crimes usually occur in places where there is lack of surveillance. Possibility to observe activities going on outside the building helps residents to control their outdoor environment (Figure 2.8). When there are observing eyes in communal spaces like streets, walkways, parking, children's playground and other city facilities, intruders will have the fear of being caught if they commit a crime and people will have a sense of safety for being observed by others. Stollard (1991) explains that, surveillance is "The most basic and essential element of deterring crime by making intruders feel conspicuous". In her 2013 study, Armitage found that, properties that are isolated and not overlooked by neighbors will probably experience crime. People usually avoid using streets which are not overlooked, they worry about being attacked and no one will see or hear them.

Figure 2.8 Natural surveillance (Biddulph, 2007)

Building layout affects the ability of residents to observe and control the streets around them (Newman, 1972). When buildings are placed away from street, the level of surveillance declines and makes it easier for offenders to do antisocial activities. Today many of freestanding apartment buildings are laid out in this manner which shows a poor design method. Newman (1972) explains that type of the building whether it is single-family, walkup or high-rise does not have any influence on ability of residents to control the street, but its setback from the sidewalk does. 3 to 6-meter setback will help us to locate the sidewalk and street in influence circle of inhabitants.

Windows are the only elements that enable residents to see outside from inside the building. Biddulph (2007) explains that, designing windowless blank building facades will result to dead spaces. Opacity and height of walls and other barriers in front of dwellings are also important elements in natural surveillance. They may block residents' view of the outdoor environment if not controlled. So, planting any kind of tree that can block the sight and solid walls with height of more than one meter should be avoided. we can use transparent fences to make higher barriers. According to Larco et al (2014) low-height walls increase "Visual interaction with neighboring developments and decreases concealed potentially dangerous spaces"

During the night, surveillance is only possible by adequate lighting. Poor lighting systems will facilitate the activities of offenders and result to crime-prone areas. To provide natural surveillance ate night, residential areas should have a comprehensive lighting system (Brandi and Geissmar-Brandi, 2006).

- **Territoriality**

Before explaining the concept of territoriality, it is necessary to know types of residential buildings. According to density, residential buildings can be divided into single-family and multi-family units. In single-family residential buildings, each family has its own private garden in the backside of the house. Fronts of houses face the public street and their backyards face each other. Single-family buildings can be subdivided into detached houses, semi-detached houses and row houses. A detached house stands by itself not touching any other house around it; a semi-detached house is attached to another single-family house with a common wall, semi-detached houses are built in pairs usually with mirrored shape; a row house is attached to a group of single-family houses with common walls. All spaces in single-family buildings are private, they are only used by one family.

In multi-family residential buildings, some spaces like stairs, elevators, corridors and open space outside the building are shared by group of families. As a result of his study in year 1972, Newman found that, if the number of families sharing a communal space increases, it becomes difficult for them to identify the area as their property and they feel themselves less responsible to control the activities that take place. In order to solve this problem, it is necessary to provide a sense of territoriality in multi-family residential areas. Territoriality shows which space belongs to whom and who has the right to manage it. When there is sense of territoriality in a place, residents feel themselves responsible to control their outdoor environment and they perceive immediately if their territory is threatened by strangers (Gardiner, 1978). Instead of providing larger open spaces for a housing estate, it is better to design small, recognizable and identifiable parcels attached to each building, this will increase sense of territoriality and make it easier for residents to know each other better (Geason and Wilson, 1989).

- **Specific boundaries**

Within the next paragraphs, we are going to learn how specific boundaries between different types of spaces affect the safety of a region. Firstly, it is necessary to have a brief discussion about types of urban spaces. In terms of being accessible, four types of spaces are distinguishable in residential areas (Figure 2.9): Public, semi-public,

semi-private and private spaces (Newman, 1972). Public spaces refer to areas where are accessible to the public at any time of the day or night. There are no restrictions on entering or exiting in this type of spaces. Streets can be the common example of public spaces; in semi-public spaces, some restrictions are exerted to prevent misuse and vandalism, people can access these spaces for specific hours of the day or night. For instance, a park can be closed during the night to prevent antisocial activities; Semi-private spaces are accessible to particular group of residents in a region. For example, the outdoor space in a multi-family residential building can be used only by dwellers of that building; private spaces are the exclusive areas related to a single family. The owners of private spaces have full control of their property and they need privacy to prevent their activities being observed by the public. Private garden in single-family buildings can be an example of private spaces (Biddulph, 2007).

Figure 2.9 Types of outdoor spaces (Biddulph, 2007)

Existence of specific boundaries between four types of spaces will give a sense of place and warn the strangers that they are entering to the private domain of others. Transition from public to private spaces can be in different shapes, it can be low-rise solid walls, transparent fences, hedges or simply changes in level and texture. Stollard (1991) points out the importance of entrance gates in a housing estate, he explains that, entrance features in a development reinforce sense of entering from public space to a private zone and avoid non-residents to use private zone of others as their movement channel (Figure 2.10).

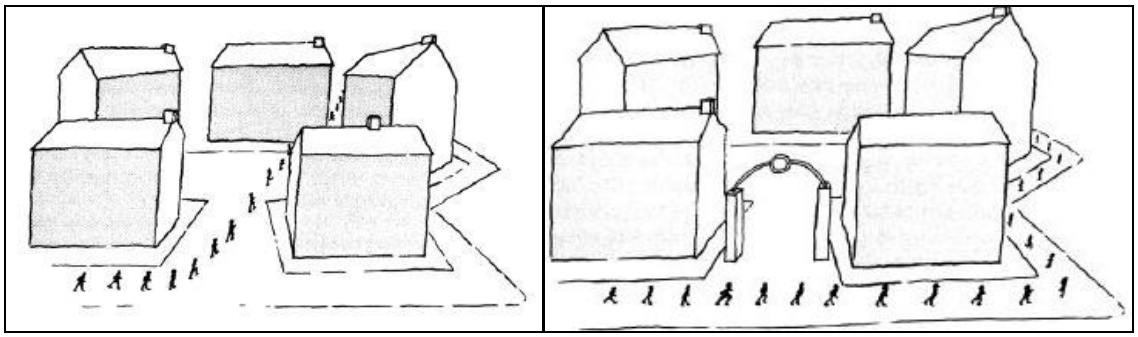


Figure 2.10 Entrance features (Stollard, 1991)

- **Hiding places**

Offenders usually choose places that allow them to commit a crime without being noticed by the public. Unused spaces and blind corners that people cannot see what is around them might result to poor quality environments and they will probably be used as hiding places for doing antisocial activities. As previously mentioned, the best way for deterring social crime is to expose the perpetrators. So, in site design of residential areas we must ensure that there is not any space which can be used as hiding place by offenders (Biddulph ,2007).

Landscaping also plays important role in safety of a neighborhood, plants used along the walkways can provide hiding places for offenders if they are not designed carefully. Stollard (1991) states that "Landscaping should not detract from pedestrians' visibility, nor should it create secluded areas for intruders to lurk".

- **Access control**

In crime-prone areas, access points from alleys and unused spaces to a residential property will make it easier for intruders to gain access to inside without being seen. Police also confirm that back alleys are often used as escape routes by intruders. Accessibility is a desired goal in residential areas, but existence of access points which are not used frequently and lack surveillance will cause serious safety problems (Biddulph ,2007).

- **Physical safety**

Safe usability of physical features in living environment plays important role in quality of place. In this section we will focus particularly on how the structure of physical features (streets, walkways, crossings, intersections and so on) affect the safety of a region and how they should be designed to achieve favorable outcomes.

- **Walkways**

Walkway is a paved surface designated for the movement of pedestrians. The aim of walkways is to provide opportunity for safe and comfortable walking from dwellings to different parts of a city. Walkways are not merely paths for walking but they are places for doing social activities as well. Today many outdoor activities take place in walkways like waiting for someone, greeting with a friend or just sitting on a bench to watch others. Ranck (1998) explains that, walkways provide paved places for the public to interact with each other. When a walkway is located parallel to a road, it is called sidewalk. In its simplest form, a sidewalk is comprised of two parts: the clear path which functions as movement corridor and the street furniture zone where benches, bins, lamps, transit facilities, trees and utility poles are located. Street furniture zone acts as buffer between clear path and the roadway.

In comparison to commercial areas, sidewalks in residential areas carry smaller number of pedestrians. Volume of pedestrians varies according to density of the area, time of the day and weather conditions. To avoid collisions between pedestrians and motor vehicles, sidewalks in proximity of schools, shopping centers, clinics and other mostly used facilities of the neighborhood should be wide enough to accommodate desired number of pedestrians. Width of walkways is designed according to people with disabilities, it means that at least two wheelchair users must be able to pass each other comfortably in a walkway. According to width of two wheelchairs (2x30 inch) and adding extra amount for mobility >10% (here 20%) we get the minimum width of 180cm for clear path (2x30x1.2= 72inch ≈ 180cm). By including space for benches, street lamps, bins and trees in the obtained value, the actual width of walkways can be obtained (NACTO, 2016). Spatial needs for clear path are shown in Figure 2.11.

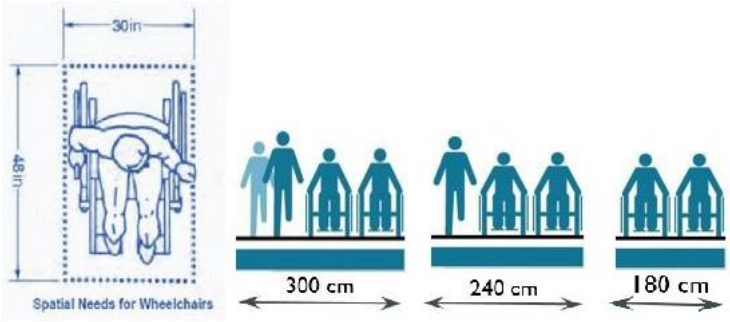


Figure 2.11 Spatial needs for clear path (Developed from NACTO, 2016 and Massachusetts Highway Department, 2006)

The important attribute of high-quality walkways is being non-slip, without barrier and comfortable for people of all ages and abilities. A survey conducted by Burton and Mitchell in year 2006 revealed the main problems of pedestrians when using the walkways. They reported uneven paving, fear of falling, bicycles on the footway and broken street furniture as major difficulties of pedestrians. Poor quality outdoor spaces affect the elderly people and disabled pedestrians more than others. Reuter (1998) classifies the disabled pedestrians into three categories: those who have mobility impairments like people who use wheelchairs, crutches or canes; those who have sensory deficits like people who have partial or complete vision loss; and people who have cognitive impairments. If there are not adequate curb cuts in sidewalks, it will be difficult for people with mobility impairments like wheelchair users to move around or it will be intimidating for visually impaired persons if there are not tactile paving to guide them. Fear of falling is a common concern among elderly persons and people with disabilities. Existence of gaps, broken parts of walkway, slippery surface and high gradient in hilly residential areas can cause pedestrians to fall. The slope of walkways in hilly regions should not exceed five percent and there should be adequate resting places for elderly people.

Cars parked on half of the sidewalk is another problem that pedestrians usually face with (Figure 2.12). This situation compels them to change their path and use the street. Blocking the sidewalk in busy streets can be very hazardous and can lead to fatal accidents. Two solutions can be applied to discourage drivers from parking their vehicles on the sidewalk: if the street is wide, we can separate the sidewalk from roadway with a landscaped area; if we don’t have enough space to make wider sidewalks, we can use bollards and other barriers to separate them.

Figure 2.12 Cars parked on sidewalk (URL 9, URL 10)

- **Crosswalks**

Crosswalk is a clearly marked place on the road which enables pedestrians to cross the road safely. Crosswalks are installed at intersections or mid-blocks and they can be marked using different patterns. The typical pattern used in marking is white lines parallel to the road. A stop line is used to prevent motor vehicles from encroaching into the crosswalk. Stop line is a white line perpendicular to the road which indicates the optimal stopping point for drivers approaching a crossing (Cynecki, 1998).

In general, crosswalks are designed as wide as sidewalk (minimum 180 cm), but at intersections of high-density areas, it should be wide enough to protect pedestrians from lateral flowing traffic. Studies on the causes of pedestrian collisions demonstrate that most of the accidents occur when pedestrians cross the road. Zegeer (1998) found that, children are at greater risk of colliding in residential areas, collisions happen when they dart into the street. There are many reasons for pedestrian crashes, but the main ones can be width of the roadway, invisibility of pedestrians, lack of traffic calming strategies and insufficient number of crosswalks along the road. It is difficult for pedestrians especially for elderly people to cross wide roads easily and quickly, therefore they are often struck in the middle of the road. Crosswalks should be short enough to enable pedestrians to cross the road easily and safely. Sidewalk extension and pedestrian islands can be used to shorten the crossings. Crosswalks must be installed in all crowded areas of the neighborhood like schools, health centers and other places where there is greater number of pedestrian activities.

There are two types of crosswalks: Conventional crosswalks which are installed at street level and raised crosswalks which are installed at sidewalk level (Figure 2.13).

Conventional crossings are usually used at signalized intersections or mid-blocks. Raised crossings increase pedestrian visibility and reduce speed of motor vehicles, they can be used at non-signalized intersections or mid-blocks.

Crossings should be provided at street level as much as possible, Underpasses and overpasses increase the walking distance and, in most cases, underpasses may not be appropriate in terms of social safety in residential areas, as we discussed before that these kinds of places can be the center of social crimes if they are not overlooked and used frequently.

Figure 2.13 Conventional and raised crosswalks (URL 11, URL 12)

- **Bikeways**

Bikeway is defined as a portion of the street which has been designated for the movement of cyclists. Many people are interested in cycling but they are concerned about being hit by motor vehicles. Existence of exclusive paths for cycling encourage people from all age groups to cycle to their destinations. To offer multiple modes of transportation for residents, there must be a comprehensive bikeway network covering all busy roads of the neighborhood. Motorists and cyclists can share the road in areas with low-speed and low-volume traffic. Cycling is considered as healthy, affordable and sustainable mode of transportation. To provide better opportunities for cycling, cycle networks must be safe, continuous and it should cover all the neighborhood including schools, parks, transit stations and community centers (NACTO, 2016). Safety of cyclists is the critical issue in bikeway design. The majority of cyclist crashes occur at intersections and driveways. Collisions usually happen when cyclists or motorists try to

exit or enter onto the roadway. In some other cases, crashes occur when motorists fail to yield at intersections.

There are two kinds of bikeways: cycle lanes and cycle tracks. Cycle lane is a portion of the roadway that has been designated by pavement markings for exclusive use of cyclists. On streets with car parking, cycle lane is located at left side of parking but on streets with no car parking it is located adjacent to the curb. There are three types of cycle lanes: (1) conventional cycle lane which is located adjacent to motor vehicle travel lane without any physical barrier and it flows in the same direction with motor vehicles, (2) buffered cycle lane which is separated from adjacent motor vehicle lane by a buffer space, and (3) contra-flow bike lane which allows cyclists to ride in two directions (NACTO, 2014). Types of cycle lanes are shown in Figure 2.14.

Figure 2.14 Types of cycle lanes (NACTO, 2014)

Bikeways should be provided in both sides of the road or there should be contra-flow bikeways to enable cyclists to ride in two directions. 4 ft (1.2 m) is the minimum width that enables two cyclists to pass each other in conventional cycle lanes (AASHTO, 2012). The shy distance from parallel objects like railings, walls or parked cars is not included in the given value.

Cycle tracks are exclusive paths for cyclists which are physically separated from adjacent moving vehicles by medians, bollards or curbs (Figure 2.15). Cycle tracks can be one-way or two-way. The minimum width for one-way cycle track is 4 feet (1.2 m) and for two-way cycle tracks it increases to 8 feet (2.4 m). Cycle tracks provide a higher level of safety than cycle lanes.

Figure 2.15 Cycle tracks (NACTO, 2014)

- **Intersections**

Intersections are the meeting points of streets. They are places where the needs of different street users are provided. All street users including pedestrians, cyclists and motorists are affected by physical structure of intersections. Intersections play a key role in safety, legibility and aesthetics of public spaces. As most crashes occur at intersections, the accurate design of them will help us to reduce the collision rates and improve the quality of public spaces in terms of safety. Intersections must be as compact as possible, large ones will elongate the crossing distance of pedestrians and will also make it difficult for other street users to use them safely and comfortably. The size of intersections as well as crossing distance can be reduced by applying curb extensions and medians. Curb extensions not only minimize the length of crossings but they increase the capacity of sidewalks and improve visibility of pedestrians. Another crucial issue that threatens the safety of street users is the radius of the corners. Intersections with larger corner radius enable motorists to turn at high speeds and increase the probability of pedestrian car crashes. In terms of safety, intersections can be evaluated according to possibilities provided for safety of different street users. Possibilities include existence of medians to shorten the crossing distance of pedestrians, speed reducing humps, tight corner radius to decrease speed of turning motor vehicles and suitable ramps for wheelchair users to easily enter the intersection from sidewalk. (NACTO, 2016).

The number of intersecting streets can be three, four or more. The angle between them is important factor in visibility of objects. At intersections containing three to four legs, the angle is commonly 90 degrees, but it should not be less than 60

degrees to provide a perfect sight distance. Intersections vary in type and size; the type of intersection is selected according to volume of traffic and speed of motor vehicles. In general, four types of intersections are distinguishable in residential areas (Massachusetts Highway Department, 2006).

Simple intersections: Simple intersections are used in low volume traffic locations. In this type of intersection, number of lanes remain constant and provide the shortest crossing for pedestrians.

Flared intersections: In flared intersections a left-turn lane is added to increase the capacity of intersection. Adding left-turn lane is usually performed by narrowing the median of street while approaching the intersection.

Channelized intersections: Channelized intersection is created by raised islands to provide right-turn channel in the intersection. This type of intersection is used in places where there is a significant demand for right-turn. Channelized intersection elongates the pedestrian crossing, therefore considering the safety of pedestrians is important while designing this type of intersection.

Roundabouts: Roundabouts are safer than other intersection types, because all traffic flows counterclockwise in a single direction around a circular shape, this avoids T-bone and head-on collisions. Roundabouts have a speed-reducing effect on motor vehicles, they are the most appropriate and the commonly used type of intersection in small-scale streets of residential areas. With an architectural decoration or planting in the middle of roundabout, we can provide aesthetically appealing streetscape in the city (AASHTO, 2004). The most prevalent intersection types are shown in Figures 2.16. and 2.17.

Figure 2.16 Simple intersection and roundabout (URL 13, URL 14)

Figure 2.17 Flared and channelized intersection, Konya (Personal archive, 2018)

2.5.2. Comfort

Comfort is a prerequisite for friendly and inviting places. The length of time that people stay in a public space is the indicator of its comfort and suitability for outdoor activities (Carmona et al, 2003/b). In Cambridge dictionary, the word comfort means "Feeling of being relaxed and free from pain". The level of comfort in a place is assessed according to the degree to which it enables its users to enjoy themselves and feel physically and mentally relaxed (Burton and Mitchell, 2006). In a narrow sense, comfortable residential areas are places where dwellings and communal spaces around them are free from traffic noise, movement corridors are suitable for use in different weather conditions, outdoor spaces are well-lit for nighttime use, walkways are convenient for walking and seats are appropriate for sitting.

- **Traffic noise (acoustic comfort)**

Traffic noise is one of the annoying pollutants in residential areas. It has adverse effects on wellbeing and quality of life. In most cases it makes it difficult to sleep comfortably at night or stay outside in a calm environment. Miedema (2007) distinguishes four routes by which noise adversely influences the people:

Sound masking (communication disturbance): Traffic noise masks the speech and reduces the comprehension of communications in outdoor spaces. When the level of noise is higher, the speaker tries to speak louder or reduces his/her distance from the listener. This status is uncomfortable or sometimes impossible to make a conversation. People may refrain from long conversations in noisy environments or they will limit

their conversations to shorter and simpler messages. Thus, the social activities and interactions in outdoor spaces will reduce to its minimum level.

Arousal (sleep disturbance): A comfortable sleep during the night is the requirement of every inhabitant. Sometimes, the high level of traffic noise can prevent residents from falling asleep or decrease their sleep quality. Even though, there are many factors like social stress or other mental problems that interrupt the sleep, but high level of traffic noise remains the dominant factor affecting the quality of sleep. The impact of low levels of traffic noise may not be noticed in residential areas, but its higher levels may lead to depression and various kinds of mental disorders.

Attention (concentration disturbance): Attention is the state when people become sensible of something for its interesting appearance, sound or mental representation. Traffic noise has a distractive impact on processes required for concentration. For example, noise reduces the comprehension of texts read by someone in a noisy environment or noise may lessen the concentration of someone doing mathematical calculations.

Affective/emotional responses (fear/anger): Many sounds are neutral to people, they are perceived naturally without causing any emotional responses. Traffic noise may cause to negative affective/emotional responses in two ways: (1) Traffic noise disturbs communication, concentration and sleep. Some people may show anger and emotional reactions if these disturbances are intense or continue for longer periods of time. (2) Traffic noise may lead to fear reactions when it is unusual and perceived threatening by the individuals. For instance, the sound made in sudden braking of cars may lead to fear reactions or noise produced by overflying aircrafts may cause to fear in some persons.

The level of traffic noise depends on density of transportation and population of the region. Noise reduction strategies are more related to site selection of residential estates. Dwellings close to main roads are more vulnerable to unpleasant noises. Plants have the quality of absorbing sound, but they will not be as beneficial as locating dwellings away from main roads.

- **Sense of enclosure**

People psychologically feel themselves comfortable when they engage in outdoor activities in an enclosed room-like space. Sense of enclosure in outdoor spaces are provided by buildings, trees, walls or other vertical elements. The height-to-width ratio of vertical elements and public spaces determines the degree to which an outdoor space can look visually enclosed. Designers recommend a value of 1:2 as optimal ratio. Places with a value of less than 1:6 will not give a sense of enclosure. Type of the street network can influence the sense of enclosure. Long and continuous streets will look visually undefined and reduce the sense of enclosure created by buildings and trees. Short and irregular street networks may create visual termination points and give a sense of enclosure (Ewing and Clemente, 2013). When buildings are laid out in free-standing scheme, they do not enclose the space due to gaps between them (Figure 2.18). In this case, trees play the dominant role in giving sense of enclosure, and they will enclose the space only if they are located close to each other (Bentley et al, 1985).

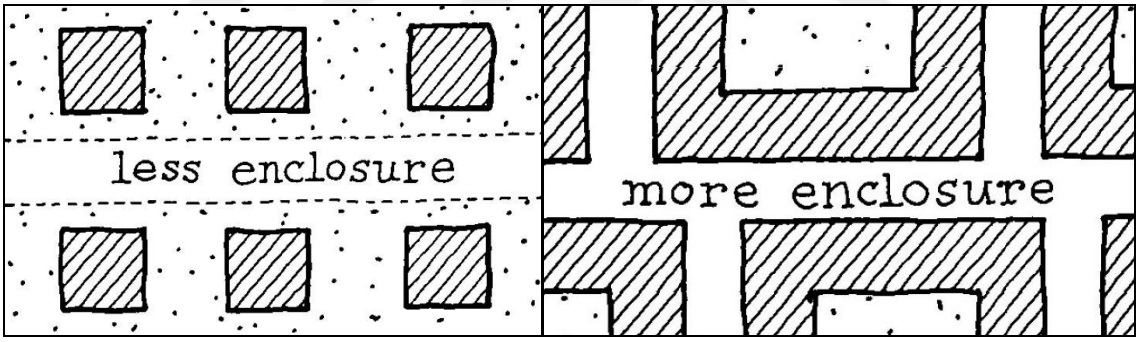


Figure 2.18 Effect of building layout on enclosure, (Bentley et al, 1985)

- **Waste management**

Garbage and waste materials resulted from consumption of products are the main pollutants of environment. They can have adverse effect on overall quality of the living environment if they are not collected and stored regularly. When wasted materials are scattered over public spaces, they emit unpleasant smells and cause the area to look unappealing. This situation will dramatically reduce the level of comfort and endanger the public health of community. Trash bins are placed in different parts of a residential neighborhood to provide a temporary place for storing and collecting of waste material.

Trash bins are produced in different shapes and sizes. As they are the highly visible elements of a publics space, their design and shape will reflect the image of the place they are located in. Trash bins have different capacities, the small ones are placed along walkways and other gathering places to store smaller amount of wastes. Large ones are installed close to dwellings to store larger amount of garbage generated by families (Figure 2.19).

Figure 2.19 Low and high capacity trash bins, Konya (Personal archive, 2019)

Visibility, usability and accessibility of trash bins are quite important. If they are not close enough to places where people sit or paths that people walk, people will throw their trash to public spaces. They will do the same thing when trash bins are not insight or the nearest one is overflowing. Most users do not want to touch the trash bin for sanitary reasons. So, trash bins with lid or cover over them may not be comfortable to use. Lids can be used in high-volume trash bins to conceal the contents inside them and prevent annoying smells. Trash bins should be resistant to long-term uses and they should prevent the contents from leaking and falling out. In many areas people withdraw the contents of trash bin to look for valuable things that can be sold. In order to prevent the seekers from scattering the trash, residents should keep an eye on trash bins around their habitat. Municipalities should empty the trash bins regularly before they overflow or the contents smell and annoy the residents. Sufficient number of small-capacity trash bins should be placed along the walkways and areas where there is the probability of generating trash like areas where people sit, eat and socialize or transition zones like bus stops that people want to shed the trash rather than taking it with them. The number of trash bins required in a place depends on density of the area and level of activities that take place. Overflowing of bins in short periods of time and trash dropped at a distance from existing bins may indicate the need for more trash bins. Trash bins

should not be placed near substations or other ignitable areas, catastrophic incidents may occur in the case that bins are ignited (Main and Hannah, 2010).

- **Pavement surface conditions**

We use our sensory system to assess the level of comfort in a place. When we walk on a walkway or sit on a bench, our sense of touch helps us to evaluate how comfortable they are. Particularly we use our feet and buttocks to do this (Porteous, 1996). The paving material and walkway surface conditions have significant impact on quality of outdoor spaces. Pedestrians are quite sensitive to surface conditions of the pavement they walk on. According to Gehl (2011), "Cobblestones, sand, loose gravel and an uneven ground surface are in most cases unsuitable, especially for those who have walking difficulties". In some cases, undesirable surface conditions arise due to large gaps between stones or other materials used in paving. Walking on such surfaces will be annoying for pedestrians particularly for elderly people and parents with baby carriages (Figure 2.20).

Figure 2.20 Gaps between paving materials, Konya (Personal archive, 2018)

Rainwater is a serious problem for most cities in rainy seasons. It obstructs the ways that people walk and makes it difficult to reach their destinations by foot. To control the rainwater effectively in outdoor spaces of residential areas, there must be a sustainable drainage system. The guidelines to provide such a system is beyond the scope of this research. Biddulph (2007) suggests to minimize the amount of paved areas inside a residential estate and increase permeable grassed surfaces. So that rainwater can be drained naturally by ground. All walkway surfaces must be even and should have a

slight gradient to let the rainwater flow down the pavement. In uneven surfaces rainwater gathers in some points of the walkway and makes it hard to use.

Openings around trees in paved areas may make it difficult for pedestrians and wheelchair users to move comfortably. People may accidentally walk on them and hurt themselves. The openings around tree trucks are covered by tree grates to protect both pedestrians and trees. Tree grate is a metal object with holes which is installed around a tree truck at pavement level (Figure 2.21). The holes allow the water to flow into the pit. Sometimes the wheels of wheelchairs and baby carriages can get caught in tree grate holes. To minimize this problem, the holes should be small enough to let the wheeled objects to pass comfortably. Tree grates come in many shapes and sizes. The prevalent shapes are circular, rectangular and square (Main and Hannah, 2010).

Figure 2.21 Tree grates, Konya (Personal archive, 2019)

- **Seating**

Existence of comfortable seating along the walkways provide good opportunity for resting and staying for a long time in outdoor spaces. The users of seats may vary in age, gender and physical ability. They may use the seats for resting, eating, socializing or any other activity. People choose the type of seating according to their needs and the type of activity they want to do. Elderly people will search for seats with backrest, teenagers may prefer to sit on steps and groups will look for seats which can provide a face to face conversation opportunity. Movable seats are flexible and appropriate to use for socializing purposes. People can arrange them according to their needs and demands, but they are difficult or almost impossible to maintain in practice. They can be used in semi-public spaces like parks where there is a high degree of control. To

provide the expectations of different users, there must be both individual benches and circular tables with seats in public spaces. The location of seating is quite important, the people really care about "what they see and by whom they are seen". In most cases benches are located and arranged without regard to users' expectations. As described earlier in previous sections, people usually prefer the seats that can provide a good view of the environment and protect the back of the user. Shaftoe (2008) explains the main reason why some outdoor seats are rarely used. He states, in most cases, designers of public spaces not only provide the wrong type of seats but they put them in wrong places.

The geometrical structure of benches and the type of material that they are made determine the extent to which they can be comfortable for sitting. The wooden seats with backrest and arm are more comfortable to sit than concrete or metal seats that conduct heat or cold. Seats with backrest enable its users particularly the older people to relax their muscles more than they can in seats without backrest. Backless benches allow the users to sit in two directions depending on which side the activities are taking place or there are views to see (Figure 2.22).

Figure 2.22 Backless seat (URL 15, URL 16)

Outdoor seating is extremely influenced by sunlight. Sitting on an overheated bench can damage our skin. The amount of heat absorbed by the surface of seats depends on their color, material and location. Light colors reflect heat and dark colors absorb it. Wood is known as the most suitable material for outdoor seating, because it does not conduct as much heat as metals. To provide comfortable places for sitting, it is essential to choose the color and material of seats according to their thermal characteristics (Main and Hannah, 2010).

Another crucial issue that should be considered in furniture plan is compatibility of seating location with climate conditions. In hot climates, protecting the seats from direct sunlight and locating them in shaded areas will improve their comfort and usability. In cold climates adverse settings will be comfortable to sit. In rainy climates, canopies are installed over seats to provide seating opportunity protected from intermittent rainfalls (Shaftoe, 2008).

- **Thermal comfort**

Thermal comfort indicates the satisfaction of human body with thermal conditions of the living environment. “To be thermally comfortable one must not feel too hot or too cold” (Watts, 2006). Thermal comfort is one of the critical indicators of quality of place not only in indoor spaces but also in outdoor spaces. When residential areas are designed compatible with local climate conditions, buildings can avoid a significant amount of energy loss and outdoor facilities will be comfortable to use. Thermal comfort inside the building as well as outside the building is influenced by a number of factors like building layout, construction materials and amount of existing green space. It is always attempted to seek the natural ways for providing thermal comfort in residential areas. One of the efficient methods to achieve this purpose is controlling the amount of sunlight received by buildings. A large amount of energy is consumed to provide thermal comfort in buildings every day. According to Barton et al (2003), “The energy used in buildings equals that consumed by transport and industry combined”. If residential buildings are cooled and heated naturally in winter and summer, consumption of conventional fuels will be significantly reduced.

Sun is the biggest source of energy in our solar system, it not only gives us light but also a valuable source of heat energy. Mankind has always sought the ways to take the advantage of sun in buildings. In cold climates, sun is a benefit for heating the building but in hot climates receiving too much sunlight will cause overheating. Understanding the relationship between the sun and earth will help us to position the buildings according to behavior of the sun and control the amount of radiated heat energy. The amount of light received from sun varies according to geographic location of the place and clearness of the sky. The areas located on both sides of equator up to 23.5 degrees latitude receive the maximum amount of sunlight during the year, but locations after 23.5 degrees toward the north or south pole receive less sunlight. This

situation is caused by the tilt of the earth's axis. The sunrise and sunset also vary at different times of the year. At equinoxes the sun rises due east and sets due west; in winter solstice the sun rises from south-east and sets in south-west; in summer solstice the sun rises from north-east and sets in north-west. According to above descriptions, north exposure does not receive much sunlight during the year. So, north-facing facades will be cold in summer and winter. Olgyay (1963) explains the findings of Felix Marboutin about intensity of sunlight on different building facades as follow:

1- South-facing facades receive less sunlight in summer and more sunlight in winter. So, south is the optimal direction for better living conditions.
2- Facades facing the east and west directions are colder in winter and warmer in summer.

Receiving much sunlight in cold climates: In cold climates, it is better to position the main façade of the buildings to south direction. South-facing façades receive sufficient amount of sunlight during the day in winter (Dekay and Brown, 2014). Sunlight may warm the building in two ways, it may directly come from the sun and penetrate through the windows or it may be reflected from surrounding pavement surfaces into the building. Hence, the thermal characteristics, color and reflectiveness of construction materials used in buildings and the surrounding environment play a crucial role in thermal comfort. Dark colored materials with high thermal capacity are recommended in external surfaces of buildings. Using light colored reflective materials in pavements close to windows is a perfect consideration for increasing the efficiency of sunlight. In addition to explained factors, building shape, existence of overhangs in building mass or evergreen tree around the building may block the sunlight and adversely affect the thermal comfort (Watson and Labs, 1983). Trees are the vital elements of the living environment, they reduce the speed of undesirable wind in cold climates, absorb air pollutants and regulate temperature in hot climates. Deciduous trees are the suitable type of plants in cold climates that lose their leaves in winter and provide shade in summer (Biddulph,2007).

In residential developments, some buildings may restrict the sunlight to adjacent buildings if they are not laid out with regard to local altitude angle of the sun. The angle between the horizon and sun rays is called altitude angle. It differs according to latitude of the place and time of the year. More than 90% of the countries in the world are located in northern hemisphere, the lowest altitude angle in north hemisphere occurs on December 21st (winter solstice) and the highest altitude angle occurs on June

21st (summer solstice). The difference between altitude angles in summer and winter is 47 degrees (Figure 2.23).

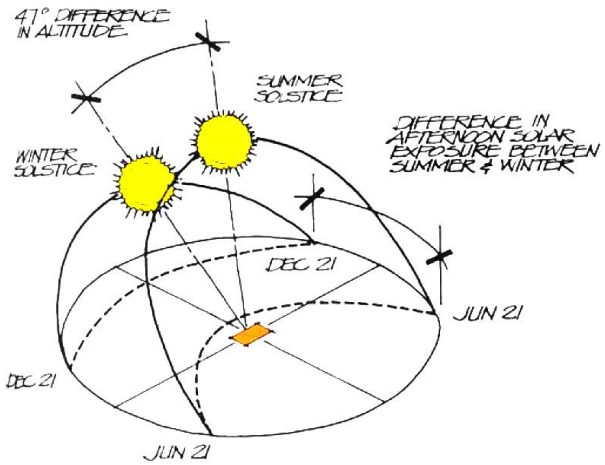


Figure 2.23 Position of the sun in winter and summer (Watson and Labs, 1983)

To receive sufficient amount of sunlight from south facade during the year, residential buildings should be laid out according to the lowest altitude angle on December 21st (Littlefair, 1998). For instance, the lowest altitude angle in Konya city with geographic coordinates of 37.87°N and 32.48°E is 28.63 degrees (please refer to "Appendix-7" for altitude angle calculations). By using the tangent law (L=H/tgα), we can calculate the space between buildings in north to south axis as shown in Figure 2.24. Along east to west axis, space between buildings does not matter in cold climates. In countries with high latitude, it will be difficult to take the advantage of the sun at all times of the year.

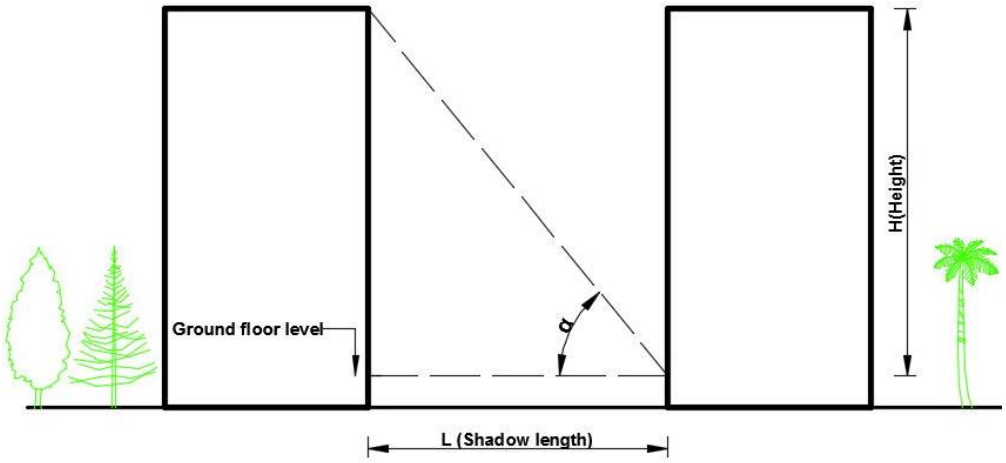


Figure 2.24 Calculation of space between buildings

With regard to altitude angle of 28.63°, space between buildings for different building heights in Konya city can be obtained as shown in Table 2.4.

Table 2.4. Space between buildings along north to south axis in Konya city

Number of floors	Height (m)	Altitude angle in winter	tg 28.63°	Space between buildings (m)
1	3	28.63°	0.54589	5.5
2	6			11
3	9			16.5
4	12			22
5	15			27.5
6	18			33

Avoiding sunlight in hot climates: Countries that are located up to 23.5 degrees latitude in both sides of equator do not have four seasons in a year and the sun usually shines at high angle. We need to avoid overheating caused by sunlight in these climates. The common approach for casting shadow on buildings and outdoor spaces in hot climate countries is using plants and shadow casting elements. Trees are the most efficient element to regulate the temperature in hot climates. Furthermore, trees absorb the sound and air pollutants (Biddulph, 2007).

North is the most desirable direction in hot climates. North-facing facades do not receive much sunlight during the day and people may prefer to do their outdoor activities in north side of the buildings that cast shadow. To prevent unwanted sunlight in hot climates, deep balconies and overhangs are considered in west, east and south facades. Thermal characteristics of construction materials and their color also play important role in thermal comfort. Pavements with high reflection ratio will reflect the sunlight into the building through windows and cause overheating (Watson and Labs, 1983). For preventing reflections, bush and grass are usually used in front of windows.

Breeze in hot climate is a basic requirement in providing thermal comfort. For getting the advantage of wind in hot climates buildings should be laid out carefully. So that the wind can easily penetrate into public spaces. Turbulent wind is unappealing and, in some cases, it adversely affects the quality of outdoor spaces. Buildings should be arranged so as not to be affected by turbulent winds (Figure 2.25).

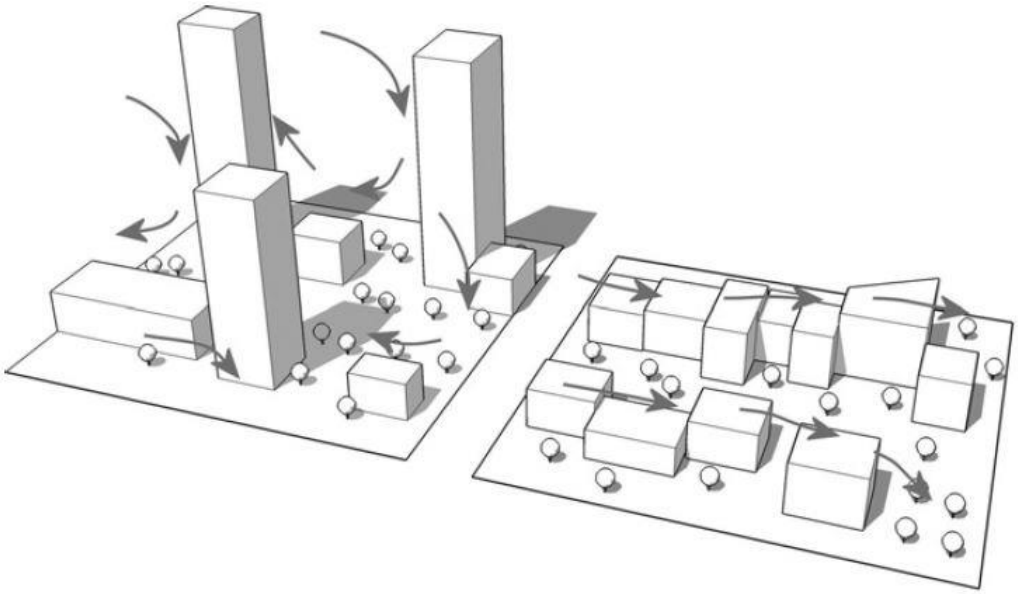


Figure 2.25 Building layout and behavior of wind (Biddulph, 2007)

2.5.3. Accessibility

Facilitating movement in outdoor spaces is one of the fundamental approaches for improving quality of place in residential areas. The ease of access to intended destinations is called accessibility. In other words, accessibility is the characteristic of a place where can be reached easily and quickly without harming the living environment. In residential areas, access to services and facilities can be provided through locating them in walking distance of inhabitants. On a larger scale, access to farther locations of the city will merely be possible by a comprehensive transportation system. "The most desirable residential neighborhoods are similarly walkable, defined by a density above 15 dwellings per acre, and are characterized by convenient walks to schools, shopping, and transit connections" Kriken et al (2010). There are different factors affecting the accessibility of city facilities, the major ones include structure of street networks, layout of city facilities and types of existing transportation system. According to Kriken et al (2010), five distinct methods can help to increase accessibility.

Compact development: The best way for improving accessibility in the city is applying compact development and minimizing distance between facilities. In compact development, medium amount of population is accommodated in small area of the land, public transportation is enhanced and people are encouraged to walk or cycle. In dense cities distance between residential areas and city facilities decreases and residents spend

less time to go to their work or get access to other city services. The aim of compact development is to use the allocated land for city facilities in maximum level and accommodate medium amount of population in small area of land. For instance, schools are the mostly constructed educational facilities in the city, gymnasiums and recreational areas inside the school can be used by the public in the evenings, on weekends and vacations for different purposes. By this manner we will use the allocated land for schools in maximum level and decrease the need for building new gymnasiums and recreational areas in the city. Multi-family residential areas also show the maximum use of land because they accommodate high level of population in small area of land (Frey, 1999).

Concentrated destinations: when work destinations are dispersed over a large area, it will be difficult to provide access by public transport, because the population will not be enough to support the service. The use of motor vehicles will increase and streets will never be wide enough to accommodate the vehicles. Concentrated work destinations in proximity of each other served by public transit will increase accessibility.

Small blocks and streets: Large blocks are inappropriate for pedestrian use. They limit the ability of pedestrians to penetrate easily in public spaces. Small blocks at human scale will improve walkability and accessibility in the city. Burton and Mitchell (2006) state that "Successful neighborhoods are those where the design of buildings, streets and spaces is based on the needs of all users at a human rather than vehicular scale".

System redundancy: Existence of many alternative routes for pedestrians and drivers to reach from one destination to another improves permeability as well as accessibility of facilities. When the capacity on one street is reached to its highest level or a traffic breakdown occurs in the system, the alternative routes can be used to disperse traffic and avoid congestion. The physical structure of street network severely affects the available routs for traffic flow. So, in designing the movement corridors of a region the right type of street network should be used. Streets with dead-end generally reduce the permeability and accessibility.

Multiple modes: Providing adequate movement corridors for all types of traffic including pedestrians, cyclists, private motor vehicles and public transportation makes it possible to get access a destination with different modes of traffic. Bentley et al (1985) also recommend not segregating the users of streets. Confining the streets for the use of

a specific mode of traffic reduces the ability of people to reach their destinations by their desired type of transport.

- **Pedestrian networks**

Pedestrian network is an interconnected system of walkways and crosswalks that pedestrians use to reach from one destination to another. The aim of pedestrian network is to provide direct connections between dwellings and other parts of the neighborhood. Well-planned networks enable the people to move around easily and discourage them to use automobile for short-distance trips. Connectivity of walkways plays important role in quality of place. Disconnected walkways elongate the walking distances and make the environment uninteresting for walking. This condition is particularly challenging for wheelchair users, elderly people and parents with strollers (Larco et al, 2014). Successful residential areas have a comprehensive and interconnect system of walkways which connect the dwellings to all parts of the neighborhood.

- **Street networks**

"In terms of the public realm, no element is more important than streets" (Ewing and Clemente, 2013). If we have a look to the structure of a city, the city is physically formed by street networks. Streets are the important part of a city which provide circulation system and also act as catalyst for happening social activities. Most of our daily activities like driving to work, going to school, walking along the sidewalk for the purpose of exercise or traveling to other cities take place on streets, so streets are part of our life and they are the common factor in shaping our cities. In urban design street can be defined as follow: Street is a multi-functional public space where is used for moving, stationary, meeting and trading.

Streets are designed according to their function, some of them are designed as movement channels for high speed motor vehicles and some are designed as access routes to city facilities and residential areas. Providing sustainable mobility in the city is directly connected to the structure of the roads and transportation system, therefore choosing the correct type of street network in the structure of the city is important in creating livable and sustainable cities (Dover and Massengale, 2014). According to

Burton and Mitchell (2006) accessible streets are those that are physically connected to each other, have clear views and simple junctions.

Geometry of streets can have significant impact on accessibility, wayfinding, safety, mobility and legibility of cities. Understanding qualifications of each of them will be a benefit for designing successful neighborhoods (Boarnet and Crane, 2001). Collection of streets connected to each other is called street network. Street networks are generally divided into four main categories: linear, branching, radial and cellular. According to junctions, street networks can be divided into T junctions or X junctions. A residential area can have any of these street patterns or combination of them (Marshal, 2005). All types of street networks and junctions are illustrated in Figures 2.26. and 2.27.

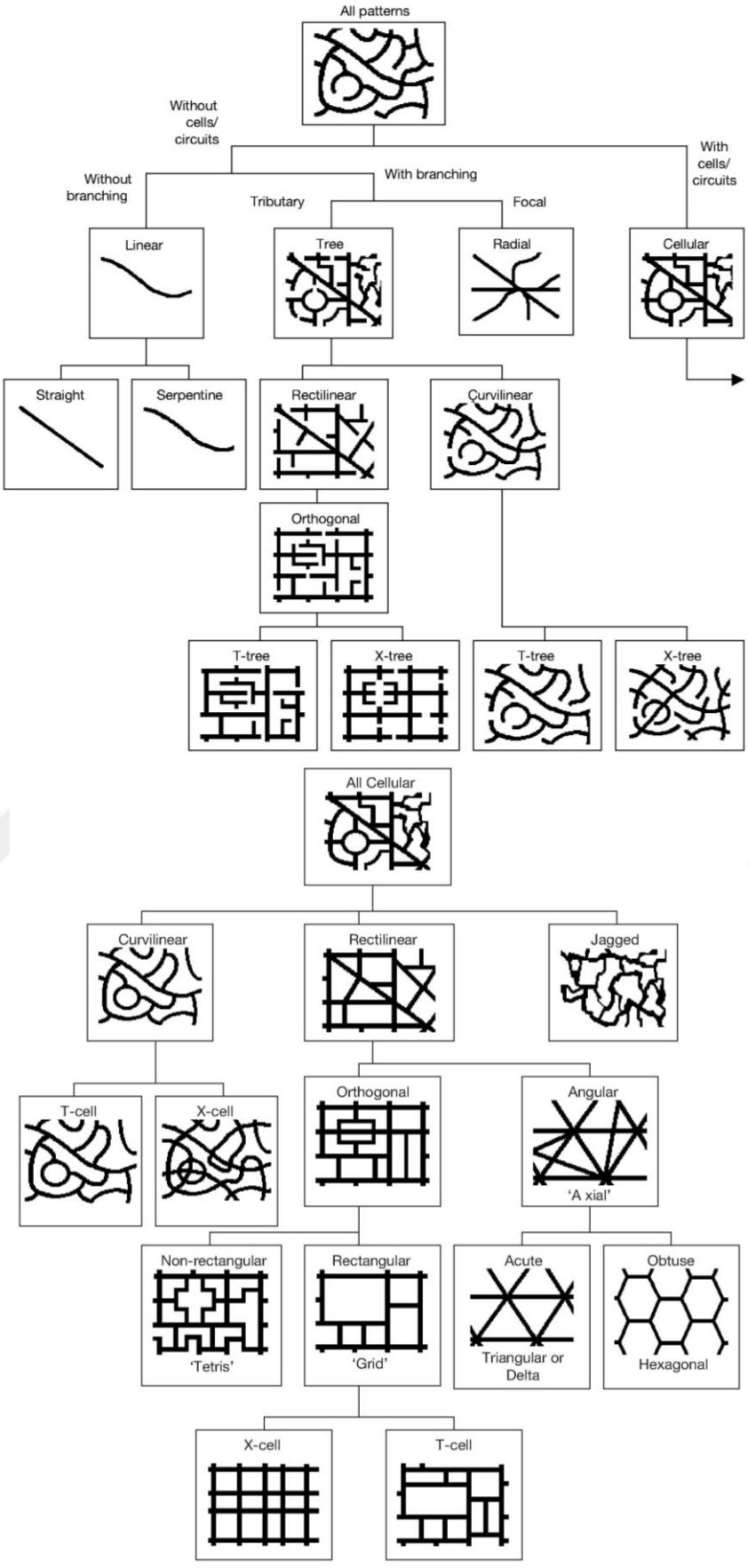


Figure 2.26 Street network types (Marshal, 2005)

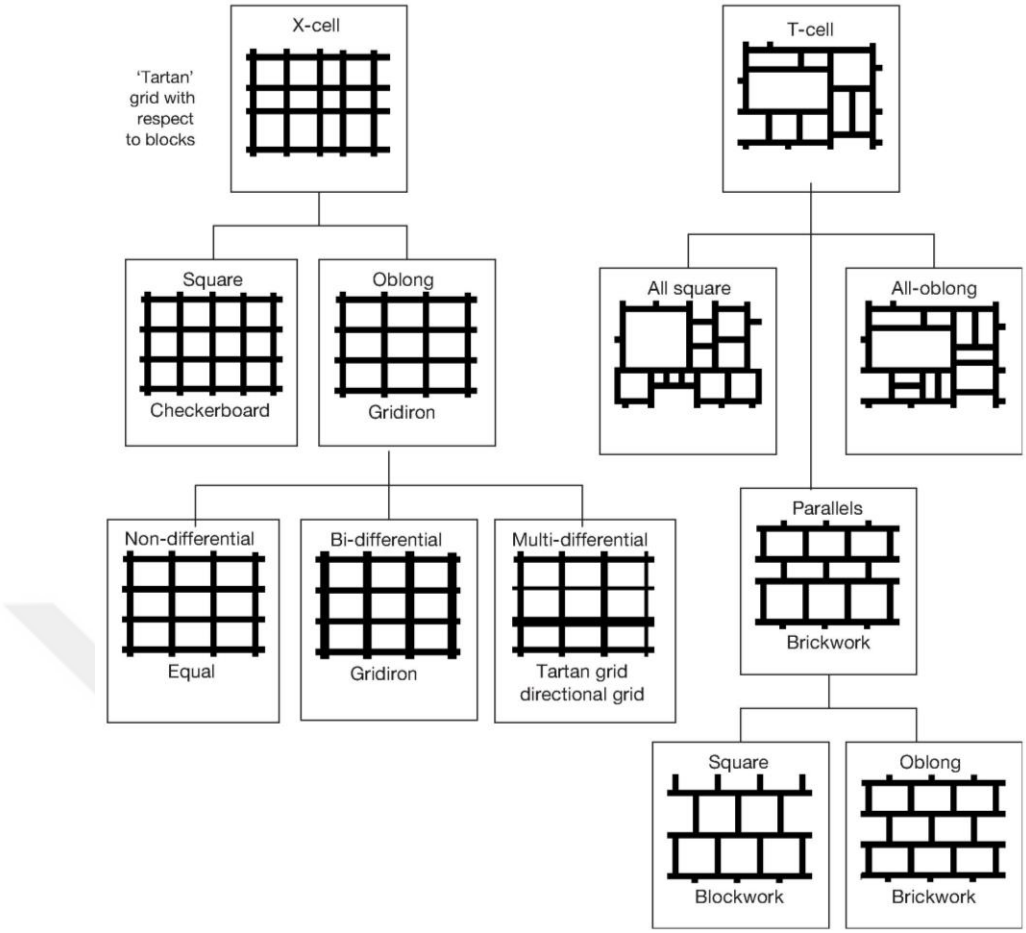


Figure 2.27 Street junction types (Marshal, 2005)

- **Grid system**

In the beginning the grid system was created for defensive purposes in cities of Greece. Because of its benefits, it became one of the mostly used street networks in shaping cities of twenty first century. "The grid system is designed to disperse traffic as uniformly as possible by providing multiple options for both pedestrians and vehicles" (Hall and Porterfield, 2001).

The grid system is formed by intersecting horizontal, vertical and diagonal roads. Grids can be regular or irregular as illustrated in Figure 2.28. The positive and negative characteristics of grid system can be explained as follow:

- In grid system, blocks can be easily divided into rectangular lots which help to design usable, economical and aesthetically appealing living environments. In cities with grid system, street furniture, sidewalks, curbs and buildings are built

and installed with low cost, because they are straight and don't need complex construction techniques.

- Grid systems have regular geometrical shapes which facilitate maximum use of land. For instance, we can build rectangular buildings in a rectangular lot, this results to rectangular rooms in building, thus we will be able to use every space of the room efficiently in maximum level, and place furniture like chairs, beds, wardrobes and tables easily wherever we want, while this is not possible in curved or irregular shaped rooms.
- Grid system has maximum level of connectivity, accessibility and walkability than any other street pattern. It represents many alternatives to pedestrians and motor vehicles to reach from one destination to another.
- Grid system scatters the traffic equally in the city and avoids congestion.
- In the case of blockage at any point of the grid, alternative streets can be used instead, while this is not possible in branching or cul-de-sac streets.
- By changing block sizes and shapes we can avoid monotony in grid system and create beautiful townscape.
- Grid system is more useful in wayfinding for travelers who are not familiar in the city, as it is created only with horizontal, vertical and sometimes diagonal lines.
- Area of lots are easy to calculate and understand in grid system.
- High speed of traffic declines the safety of pedestrians in grid system, but we can consider traffic calming strategies like narrowing the road at pedestrian crossings, changing material type of the street in high density areas and installing speed humps.
- Due to equally distribution of traffic, grid system will be much noisier.
- In grid system we need more street length in a small area of development. In other words, more space of city is occupied by streets.

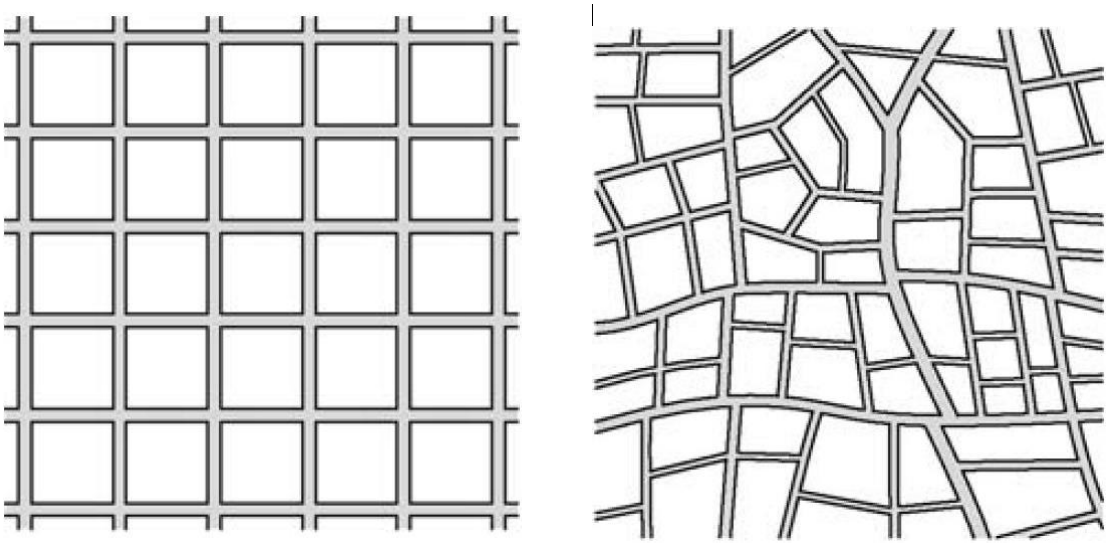


Figure 2.28 Regular and irregular grid patterns (Burton and Mitchell 2006)

- **Branching system**

Branching system is much similar to a tree, it is formed from main streets, collector streets and minor streets with dead end. The system relies on cul-de-sac or dead-end streets and it works well in small scale residential areas, islands and water sides. Branching system is not recommended in large scale residential neighborhoods, because it reduces permeability and limits the ability of people to move around on foot (Burton and Mitchell, 2006). It also makes it difficult for emergency service providers to circulate easily and quickly (Larco et al, 2014). In branching system there is only one way in and one way out for motor vehicle traffic but we can consider connection routs at the end of the street for pedestrians and cyclists (Figure 2.29). Due to high level of amenity, branching system is preferred by the most land buyers, this results to increase the value of land (Hall and Porterfield, 2001). Advantages and disadvantages of branching system can be described as follow:

- Cul-de-sac streets are much safer, calmer and has the maximum level of amenity than any other street pattern.
- Low speed of traffic in branching system provides safe environments for playing children and walking in the site.
- Lower burglary and vandalism rate in cul-de-sac streets make it possible to live in a secure and pleasant environment.
- Branching system has the lowest connectivity and accessibility level, therefor it is not recommended in high scale residential areas.

- Newcomers will face difficulties in wayfinding because they look all the same.
- In the case of blockage there won't be alternative streets to reach from one destination to another.

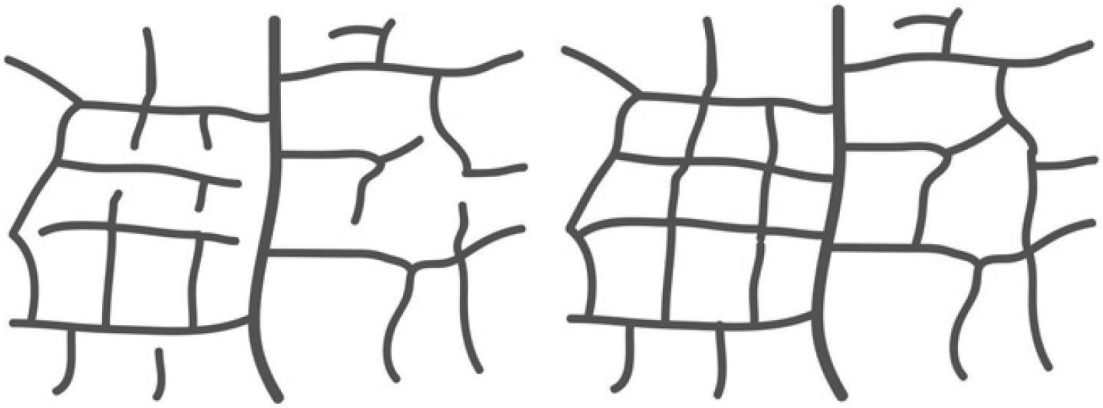


Figure 2. 29 Left: vehicular network, Right: pedestrian and cyclist network (Biddulph, 2007)

- **Radial system**

Radial street pattern is a series of streets emanating from a central point or focusing to a central point with concentric circles. The aim of this street pattern is to create a community focal point. Radial system facilitates the shortest access route to a focal point. We can see the examples of this system in Paris and Washington DC. Like grid system, radial system can also be used in large scale areas, but city blocks will not be as much regular as grid system (Hall and Porterfield, 2001).

- **Looping system**

Like branching system, looping system also works better in small scale residential areas specially located on the hillsides. If looping system is used with branching system in flatlands its efficiency in terms of amenity will increase. Looping system is better than branching system in terms of connectivity and equally distribution of traffic (Hall and Porterfield, 2001). Sketch of radial and looping street network are shown in Figure 2.30.

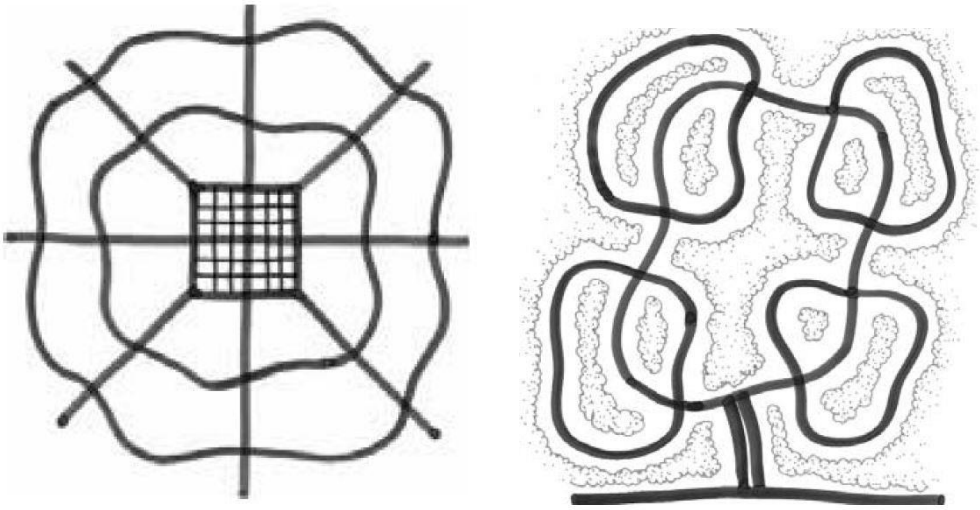


Figure 2.30 Radial and branching system (Hall and Porterfield, 2001)

2.5.4. Legibility

Legibility and imageability are the two similar concepts used to describe the extent to which people can navigate easily and make a clear image of the places they pass through. A legible residential neighborhood helps its users especially the elderly people and newcomers to understand where they are and to know which way they need to go (Burton and Mitchell, 2006). In other words, a place is called legible when its physical features are easily grasped by their unique shape, size or activities around them (Bentley et al, 1985). Legible and illegible places are shown in Figure 2.31.

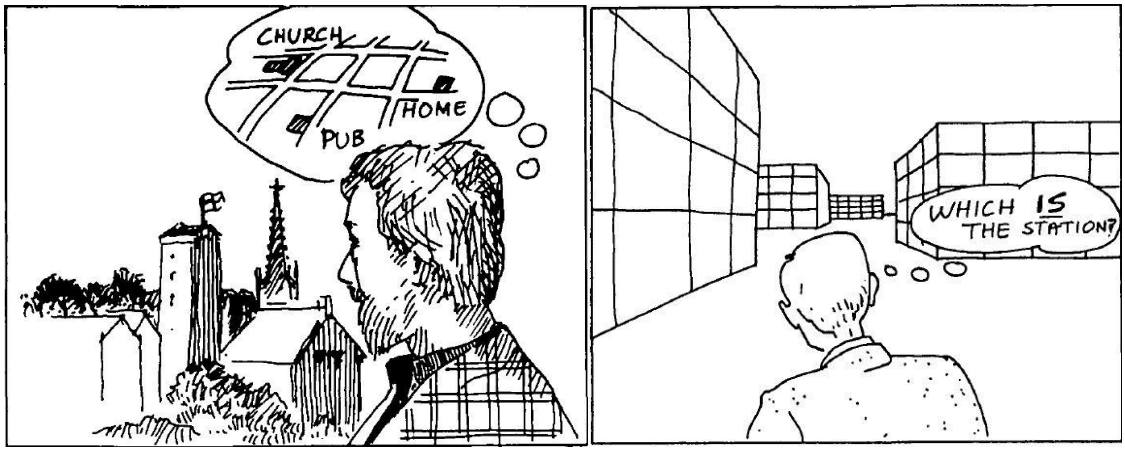


Figure 2.31 Legible and illegible places (Bentley et al, 1985).

According to Lynch (1960), "A legible city would be one whose districts or landmarks or pathways are easily identifiable and are easily grouped into an over-all

pattern". When people pass through a place, they create mental maps from physical features and activities around them and use these maps to find their ways. If these features are unique and have distinctive characteristics, the place will be more legible and people won't be concerned about getting lost. Distinctiveness plays the key role in legibility of places. Identical buildings, paths or other objects will make the outdoor environment confusing and hard to grasp. Biddulph (2007) explains that "A place is created when a person can get within a distinctive space created between a group of buildings". According to explanation of Burton and Mitchell (2006), distinctive areas "Have a variety of uses, built form, features, colours and materials that give the streets and buildings their own identity within the overall character of the neighbourhood". In addition to distinctiveness, visibility of features or visual permeability is also important factor in legibility of outdoor spaces (Figure 2.32). Visual permeability indicates how easily a place can be seen from different locations. It is more related to structure and layout of streets. If every place in residential areas were visually permeable, there would be no privacy. Here, the aim of visual permeability is the visibility of public facilities to the observer.

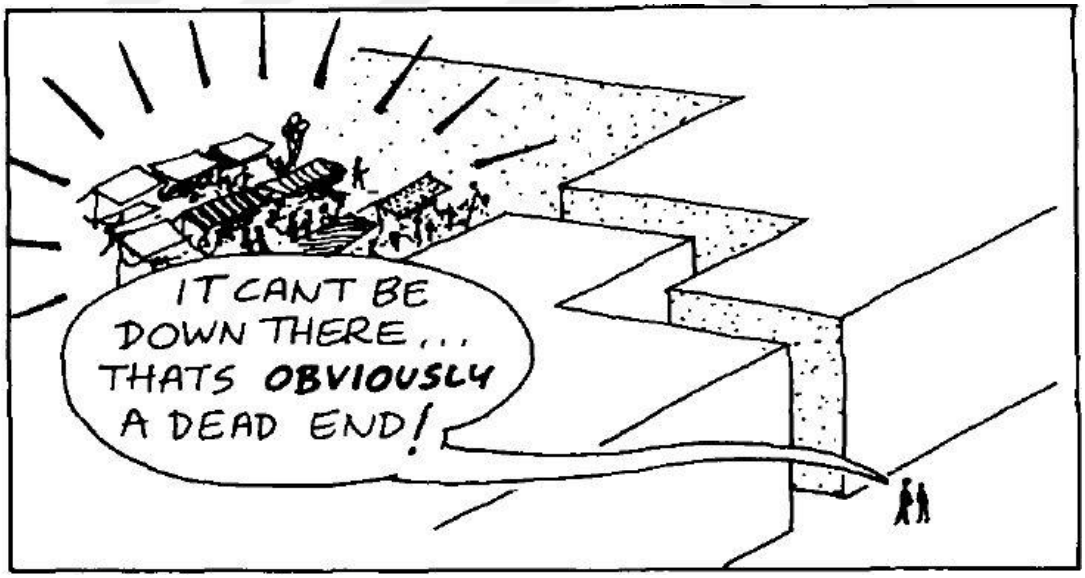


Figure 2.32 Visual permeability (Bentley et al, 1985).

Every city has a public image which is formed by many individual images. The physical objects that create the overall image of a city or on smaller scale a residential neighborhood can be classified to five types: paths, nodes, edges, landmarks and districts (Lynch, 1960).

Paths: paths are the movement corridors along which the observer moves. They can be streets, alleys, walkways, canals, railroads and so on. For most people paths are the dominant element in creating the image of a place. When we ask a person to define the place we want to go, he/she will immediately start sketching the paths or movement corridors of that place. If these paths have a clear layout, it will be easier to create the mental maps of them.

The activity patterns that people encounter along the paths will also guide them where they are and which way they should go. Food markets, jewelry stores and many other activity patterns can be used as reference points for wayfinding. Lynch (1960) found that pavement textures and details of planting are less important in legibility of paths. Burton and Mitchell (2006) explain that people usually lose their ways in neighborhoods with complex and unconnected street layouts. They note that, streets laid out in deformed and irregular patterns are the most legible paths. Irregular grid patterns create interesting and diverse scenes which are easily grasped. Enclosure and the ability to see the end of streets were also reported as important characteristics of legible paths.

Nodes: Nodes are the points that observers can physically enter them. They can be path intersections, squares or any other enclosed space. Intersections can be the simplest and most prevalent type of nodes in residential areas. Among all types of intersections, roundabouts play the key role in legibility of the area. Roundabouts can be legible when they are designed and constructed with distinctive shapes, sizes and decorations.

Edges: Edges are the linear elements used as lateral references. They are either not used as paths or they are seen from a position where obscures their path nature. Walls and building facades can be an example of the first type, while the second type includes rivers, elevated roadways and so on (Bentley et al, 1985). Lynch (1960) notes that, the strongest edges are visually noticeable and continuous in form, they may be less or more penetrable.

Landmarks: Landmarks are natural or manmade objects used as reference points by the observer. In residential areas, the common types of landmarks can be sculptures, fountains, domes, antennas and so on. The important characteristics of landmarks are their visibility from different angles and distances. Burton and Mitchell (2006) divide landmarks into five distinctive groups:

a) Historic buildings and structures such as mosques, churches, monuments memorials and so on.

b) Civic buildings such as libraries, hospitals, schools and so on.
c) Distinctive structures such as bridges, towers, steeples and so on.
d) Places of interest and activity such as parks, playgrounds, tennis courts and so on.
e) Unusual places, buildings or usages such as inverted or upside-down houses and so on.

They name other landmarks as environmental features and divide them into two groups:

a) Aesthetic features such as fountains, planters, hanging baskets and so on.
b) Practical features such as bus shelter, telephone boxes and so on.

Districts: District is an area of the city which has unique characteristics in terms of form, texture, color, topography, building type and use which make it distinctive from other areas. A residential estate can be an example of district, because all buildings and their surrounding environment reflect the same mode of use. They may also have the same form of houses or other common characters which differentiate them from other places. None of the explained elements can exist in isolation. All of them combine to provide the overall image of a city or neighborhood (Figure 2.33).

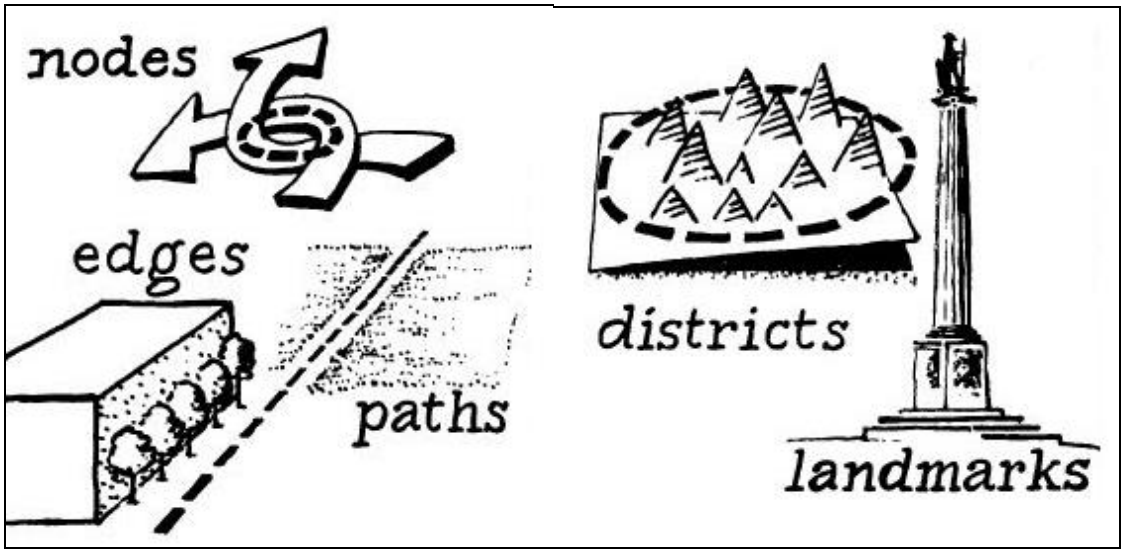


Figure 2.33 Elements of city image (Bentley et al, 1985).

2.5.5. Mixed-use

Many residential estates are developed without regard to their surroundings. House builders only build houses, they do not pay more attention to mixing other uses. This state has caused to economic, environmental and health problems in the community. When the needs and requirements of inhabitants are not provided in proximity of their houses, they try to use motor vehicles to access services located far away from their dwellings. Increase in car use pollutes the air and causes to many fatal diseases in the community. A residential area will not be livable merely by providing dwellings. But there is need for entertainment areas, shopping centers, educational facilities, health clinics, worshiping places and so on. Existence of various types of facilities in the vicinity of residential areas will offer more opportunities for residents to get access what they need. Meanwhile mixed-use residential developments will encourage the inhabitants to reach their destinations by walking or cycling. Biddulph (2007) explains the benefits of mixed-use as follow:

- Mixed-use residential developments increase the variety in form, shape activities and overall image of the city.
- Mixed-use enables the inhabitants to get access to their needs and requirements without depending on car.
- Interest in walking and cycling encouraged by mixed-use improves the public health in the community.

According to Bentley et al (1985) variety of use is the key element for providing other types of variety in a place. When there is variety of use, there will definitely be varied building forms and types being used by varied people for varied purposes at varied times. Mixed-use development is known as one of the critical characteristics of high-quality residential areas. Burton and Mitchell (2006) state that “People living in relatively compact, mixed use areas with a combination of civic, commercial, leisure, and residential properties should, in theory, find it easier to access facilities and services than those living in single use residential areas”

Jacobs (1961) distinguishes two types of uses: (1) Primary uses which provide the initial requirements of people. They can be dwellings, office buildings and other employment centers. (2) Secondary uses like food markets, restaurants, hairdressing salons are supported by primary uses. They need continues pedestrian flows to survive. Mixed-use development can be vertical or horizontal as shown in Figure 2.34. In

vertical mixed-use, the ground floor is allocated for commercial use and upper floors are designated for residence. In horizontal mixed-use, commercial, educational and other city facilities are located in proximity of residential buildings.

Figure 2.34 Horizontal and vertical mixed use, (Biddulph, 2007)

The number and type of facilities in residential areas are provided according to inhabitants' demands and frequency of visits. The mostly visited facilities like supermarkets and other services are located closer to residential buildings. According to Kriken et al (2010) four design methods can help to increase mixed-use:

1. ***Affordability:*** The first step to provide different services for inhabitants of a residential area is offering the properties at affordable prices. So that, people will be able to do various kinds of business.
2. ***Proximity:*** Facility and services are located according to frequency of visits. For instance, supermarkets are the frequently visited places during the day, so it is necessary to locate them closer to dwellings. Other uses such as tailor shops or hairdressing salons can be placed farther from houses.
3. ***Critical mass:*** The number of services and population of the region and/or vice versa must be compatible with each other. For example, the amount of retail services must be adequate to support the population of the area or the population density of a place should be high enough to support a transit service.
4. ***Type of mix:*** Uses can be mixed horizontally or vertically. In buildings located along the streets, ground floor can be used for commercial purposes and upper floors for residential purposes; or buildings with different uses can be placed horizontally in proximity of each other.

We discussed the importance of connectivity and width of the streets in terms of safety and accessibility in previous sections. Now it will be beneficial to understand their impact on visibility of available uses. Interconnected streets let more people to flow in different parts of a place and see the uses available for them. Narrow streets do the same function, they enable the people to easily see the uses available in both sides of the street. In addition to connectivity and width of streets, direction of traffic flow also plays crucial role in visibility of available uses. People using motor vehicles will not be able to see the available uses in their opposite direction at intersections of one-way streets. Whilst the uses located at or near corners of two-way streets will be visible to the public from both directions. Visibility of uses will be more useful for newcomers or strangers passing through a residential area.

2.5.6. Aesthetic

The origin of the word aesthetic comes from Greek *aisthetikos*, from *aistheta* "perceptible things", from *aisthesthai* "perceive" (Oxford dictionary[3]). From the origin of the word we can understand that aesthetic in a place has relationship with the perception and sense of the viewer. Aesthetic is the quality of a place where is visually pleasing and beautiful. The purpose of aesthetic is to provide a variety of visually appealing vistas for observers to enjoy. This quality is called visual richness. Visual richness means that there are many things to see in a place. When a composition comprises too many identical elements, it is read as a single object and bores the viewer. Diversity in landscaping and building height, mass, shape, ornament and color is important factor for the aesthetic of the place, meanwhile it increases legibility of the area. In residential areas, aesthetic can be provided through architecture by accurately using and placing architectural elements or naturally, by using plants in landscaping. The main ornaments of a residential area are its parks, streets, waterways, civic buildings, green areas, fountains, sculptures and even street furniture. By arranging these elements in a suitable way, we can make pleasing and beautiful environments for living. Beautiful places have the power "to unleash feelings, trigger reactions, feed the memory and stimulate the imagination" (Moughtin et al, 1999). The quality of a place is influenced by its visual appearance, people will enjoy their living environment if it has a

[3] https://en.oxforddictionaries.com/
Visited in 2019

visually appealing townscape. Biddulph (2007) identifies two types of residential townscape:

Informal residential townscape: The gradual development of residential areas in older cities and villages has caused informal townscapes to come into existence. They have various building forms, open spaces, materials and colors. The diversity of components often emerged for functional reasons rather than aesthetic purposes. Buildings in informal residential townscapes reflect a complex and informal appearance in street scene.

Formal residential townscape: The beauty of contemporary residential areas is provided by paying particular attention to rhythm, contrast, balance, proportion, symmetry, scale and unity of components (Figure 2.35). Although individual buildings in informal residential townscapes may have some of these qualities, their overall image will not look like formal residential townscapes on larger scales. Planning and development of formal residential townscapes require excessive attention and detailed knowledge. Some principles of design will help us to plan aesthetically appealing residential areas (Moughtin et al, 1999).

Rhythm: Repetition of any element at regular or irregular intervals is called rhythm (Ching, 2015). We can see repetitive elements in almost all buildings. Columns, beams, archs, windows or other decorative elements are repeated for different purposes. In outdoor spaces, repetition of lamps, benches, planters or other elements along the streets can be examples of rhythm.

Balance and symmetry: Balance is the equal distribution of elements on both sides of an axis. It can be symmetrical or asymmetrical. Symmetrical balance is the reflection of elements according to an axis. It is the commonly used balance type in architecture and urban design.

Unity and contrast: Unity shows the wholeness and oneness in a composition. But applying too much unity in a built environment can be boring. Contrast shows distinctiveness of elements in a composition. Contrast is a good approach for attracting attention of the viewer. In cities, we can provide the contrast by different building forms, textures, colors and landscaping.

Harmony and proportion: Agreement of color, texture or shape of elements in a composition is called harmony. Components in harmony with each other will increase attractiveness and beauty of the place. Agreement of size of elements used in a composition is called proportion.

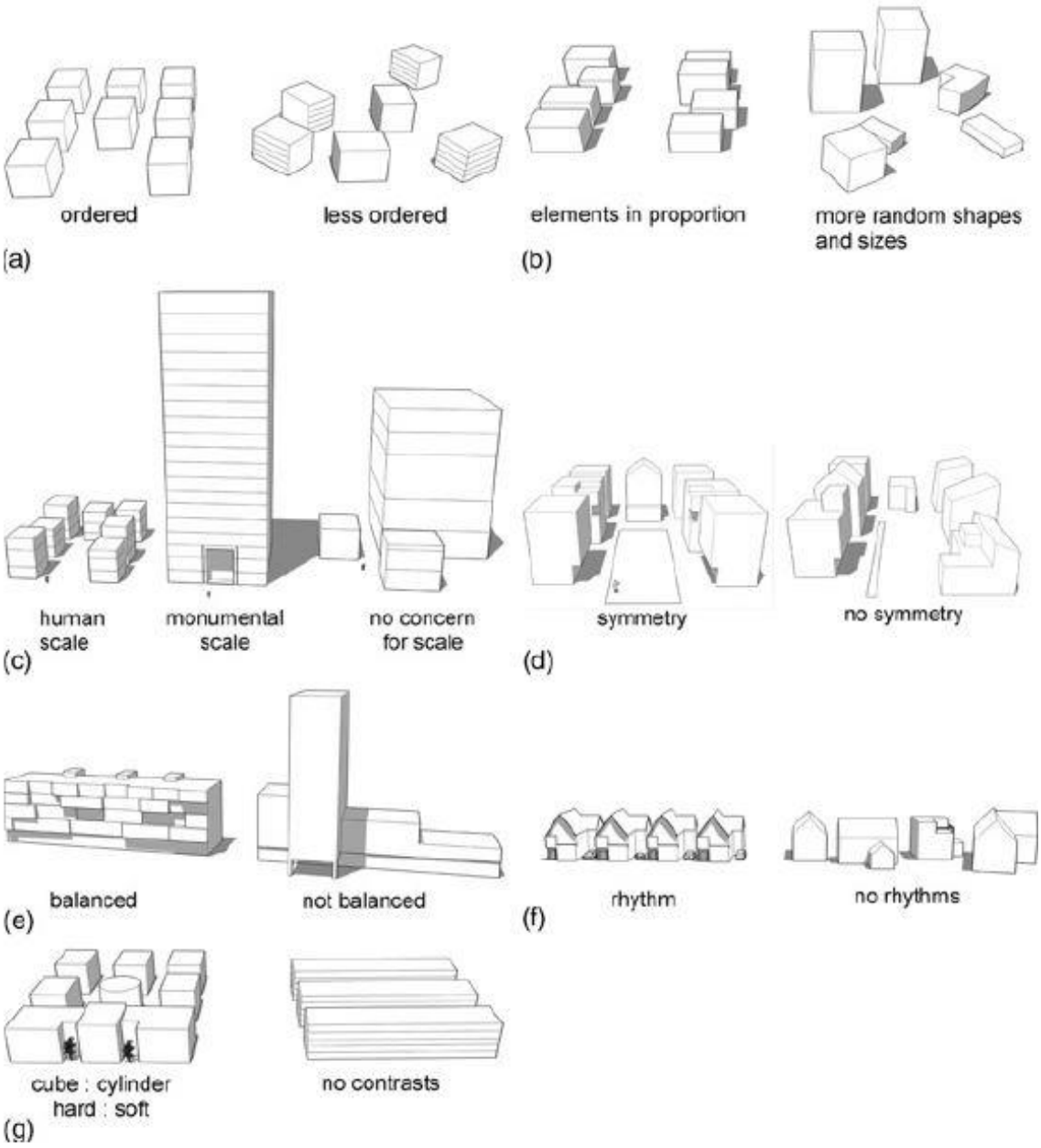


Figure 2.35 (a) order and unity (b) proportion (c) scale (d) symmetry (e) balance (f) rhythm (g) contrast (Biddulph, 2007)

- **Building Façade**

Building facades play a key role in the aesthetic of outdoor environments. Architectural decorations on building facades help us to provide attractive vistas for users of outdoor spaces. The beauty of buildings depends on contrast, the contrast of doors, windows, walls and the contrast of building materials, their texture and color. But

too few elements despite strong contrast will not provide visual richness, here the facade will look boring and dull. Today, most of planned multi-family residential developments contain identical buildings which are laid out along identical streets (Figure 2.36). This is because municipalities do not pay much attention to the aesthetic of residential areas. They design a single building, then use it in all residential development. Identical housing developments have adversely affected the aesthetic of our cities. They not only create boring places for inhabitants but make the overall image of cities look dull.

Figure 2.36 Identical housing development (URL 17)

Building façade can be divided into three main parts: the base or ground floor, the middle zone or main floors and the roof or attic. The ground floor which connects the building to the pavement is commonly noticed by the observer. Because it is closer to viewer than other parts of the building. (Moughtin et al, 1999) state that "The closer the viewer is to a building the greater the opportunity to see and appreciate intricate detailing". Ground floor needs accurate architectural details to make the environment more attractive. The importance of ground floor increases especially when the building is located along the street and its ground floor is used for commercial purposes. The beauty of middle zone is enhanced by balconies, decorations around the windows or other architectural treatments. Changes in roof and balconies keep the building from looking like a single mass (Larco et al, 2014). Another important element that should be carefully designed is the corner. In some cases, buildings on the corners of the street

have a blank façade (Figure 2.37). Lack of architectural elements on such facades make the street scene unattractive and boring.

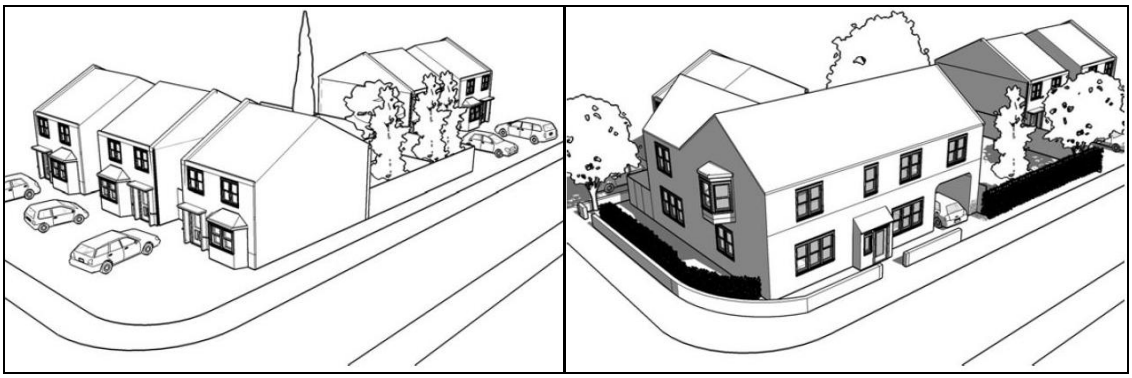


Figure 2.37 Good and bad facades at corners (Biddulph, 2007)

Decorating the corner is the effective way of improving aesthetic in public spaces. At street intersections, building corners can be grouped into three main types (Moughtin et al, 1999): angular corner, curved corner and towered corner. The first two types are widely used in residential areas, but the third type may be less common. All corner types are shown in Figure 2.38.

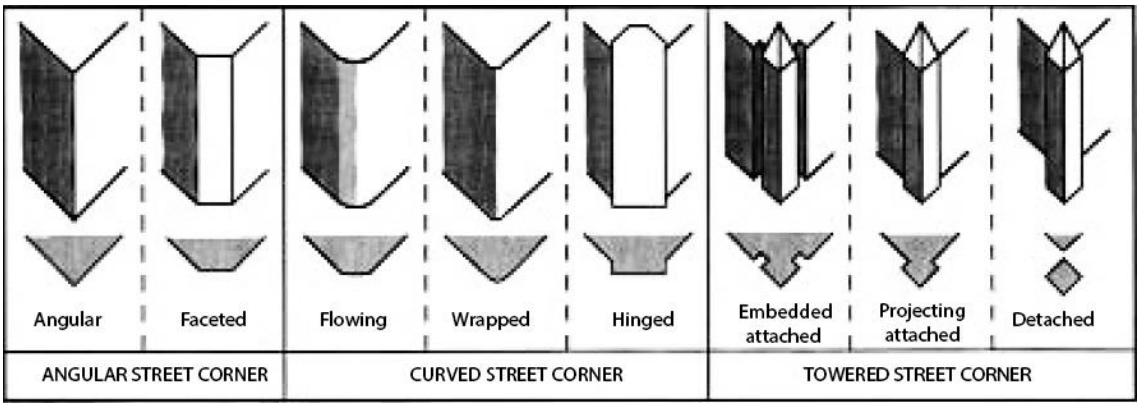


Figure 2.38 Building corner types, (Moughtin et al, 1999)

Angular corner: Angular corner can be simple or faceted. Simple corner is formed when two building facades meet at an angle and create a sharp edge. The angle between facades may or may not be 90 degrees. Simple corners are less important in terms of aesthetic, they cannot be decorated by architectural features. Shops located at simple corners need two entrances in both façades and they do not provide suitable sight distance for motorists; the angle is chamfered in faceted corner. It is the commonly used

corner type at intersections. It resolves the difficulty of shop entrance and provides a good sight distance for motorists.

Curved corner: In curved corners, building facades do not meet at an angle, they are connected with a curve to each other. The curvature of corner can be very smooth, tight or hinged. Flowing corner is formed with a gentle and soft curve. The corner is almost imperceptible and can be decorated with architectural features; When the curvature is tight it is called wrapped corner; The third type is hinged corner; it is formed by inserting a curved element that is quite distinct from building facades forming the corner.

Towered corner: Towered corner is the most beautiful and attractive corner type. It is achieved by extending the façade beyond the eaves. Towered corners can be attached to the building or detached. Attached tower can be embedded within the building fabric or extended outward the building façade. Towered corners create useful reference points in the neighborhood. Some common types of corners are shown in Figures 2.39. and 2.40.

Figure 2.39 Left: Simple corner Right: Faceted corner (URL 18, URL 19)

Figure 2.40 Left: Curved corner Right: Hinged and towered corner (URL 20, URL 21)

- **Hard and Soft Landscaping**

The ground plane of public spaces is another element for decorating the living environment. There are two main types of floor planes in outdoor spaces: the hard pavement and the soft landscaped area (Moughtin et al, 1999). Landscaping significantly affects the quality of outdoor spaces both in terms of aesthetic and function. Barton et al (2003) state that "The quality of the greenspaces in and around the neighborhood is central to the quality of life for the residents. That quality is measured in terms of natural beauty, wildlife diversity, cultural heritage and recreational value". The function of soft landscaped area is to display the nature in the built environment (Figure 2.41). It includes planted green areas in the middle or sides of the street, farmlands, gardens and so on. By planting different kinds of flowers and trees in residential areas, we can create pleasant and livable environments. According to Shaftoe (2008) "Well-considered planting can: soften the hardness of surrounding buildings, frame views and vistas, provide boundary treatments, moderate population, have a calming effect on users, introduce variety and seasonal difference and offer a more comfortable microclimate".

Figure 2.41 Soft landscaped area (URL 22, URL 23)

Hard pavements include walkways, roadways and surface of other gathering areas. Their main function is to carry vehicular and pedestrian loads without early disintegration. Hard surfaces must be dry, nonslip and decorated. In terms of aesthetic, hard surface decoration can bring desirable changes in outdoor spaces (Figure 2.42). Moughtin et al (1999) state that "The floorscape has the potential to become a language which can be read, memorized and can impart meaning". In addition to aesthetic purposes, changing material type can give different messages to the user. It can indicate ownership or give warning to pedestrians. For instance, when the pedestrian zone ends, the material of pavement is changed to warn the pedestrians, meanwhile it acts as a decorative element for pavement. Another example is changing material of pavement in front of hotels and banks to show ownership for pedestrians that public realm ends and private area starts.

Figure 2.42 Hard pavement (URL 24, URL 25)

- **Sculptures, Fountains, Walls, Street Furniture**

There are two approaches to provide aesthetic in a place: (1) decorating the two-dimensional planes like ground plane or building facades and (2) using three-dimensional objects like sculptures, fountains and street furniture. When an ornament is used as decorative element in a place, its visual appearance in terms of aesthetic depends upon four factors Moughtin et al (1999): the first is the quality of space in which the ornament is placed. The quality of space affects the ornament and meanwhile is affected by it; the second is the physical form of the ornament; the third is the conditions under which the ornament is seen, for example, the light quality and weather conditions; and the fourth relates to the perception and mood of the observer.

Sculptures have been used as decorative elements since long time ago. In addition to their decorative quality, they are used as landmarks in wayfinding and they may also demonstrate an event or the history of a place. Sculptures can be divided into three types: the single figure, the group and the equestrian statue. Each of them has their own impact on aesthetic of a place.

Water is another element for decorating a place. When we see the water, it reminds us the nature and gives us strength and vitality. Water is used as decorative elements of a place in different ways, it can be used as pools, waterfalls, fountains or with sculptures (Figure 2.43). The visual quality of water increases with lights at night. Light gives special visual effects to water and creates visually attractive vistas in the dark.

Street furniture includes seating, street lamps, planters, bollards, bins, phone boxes, traffic lights and so on. In addition to their primary function, street furniture items act as decorative elements of the street and provide visual interest in the street scene. The way that they are arranged and maintained can have a significant impact on aesthetic of streetscape. Appearance of entrance features and boundaries such as walls, hedges and fences that Larco et al (2014) call them edges is also important in terms of aesthetic. They enhance the street scene and provide a significant level of visual richness in the region.

Figure 2.43 Fountains and sculptures (URL 26, URL 27)

3. MATERIALS AND METHODS

Method of research in this thesis is based on a literature review and case study of Bosna-Hersek neighborhood. The research aims to investigate the physical factors affecting quality of place and attempts to provide practical methods for assessing the crucial parameters of quality of place in residential areas. To achieve this purpose, a wide range of issues related to quality of place have been investigated in literature review section; crucial parameters for assessing quality of place in residential areas have been identified and required information relevant to each parameter has been collected from previous studies on quality of place. Parameters have been chosen according to their importance and level of impact on quality of place. They include safety, comfort, accessibility, legibility, mixed-use and aesthetic. In case study section, the research intends to assess the quality of place in Bosna-Hersek neighborhood. Bosna-Hersek is one of the densely populated neighborhoods located in the north of Konya city (Figure 3.1). New Istanbul highway and Aliya İzzet Begoviç highway form the majority of the neighborhood's boundary as shown in Figure 3.2.

Figure 3.1 Location of Bosna-Hersek neighborhood (Google Earth, 2019)

Figure 3.2 Neighborhood boundary (Google Maps, 2019)

The proximity of the neighborhood to Selçuk University has increased its importance and has made it the focal point of the city. The high population of students and university lecturers in Bosna-Hersek neighborhood has dramatically increased the demand for housing. Realizing its importance in the city, it was deemed necessary to assess the quality of place in Bosna-Hersek neighborhood. The study intends to assess the quality of place in the mentioned location within the limits of six critical parameters (safety, comfort, accessibility, legibility, mixed-use and aesthetic). Assessment is carried out by direct observations during the week and on weekend. To assess the quality of place in Bosna-Hersek neighborhood precisely, a criteria checklist for each parameter has been developed using the findings of literature review section. References used in preparing the contents of the checklist are shown in Table 3.1.

Table 3.1. References related to criteria checklist

Parameters	References
Safety	(Armitage, 2013), (AASHTO, 2004), (AASHTO, 2012), (Biddulph, 2007), (Brandi and Geissmar-Brandi, 2006), (Burton and Mitchell, 2006), (Cynecki, 1998), (Gardiner, 1978), (Geason and Wilson, 1989), (Jacobs, 1961), (Larco et al, 2014), (Massachusetts Highway Department, 2006), (Newman, 1972), (NACTO, 2014), (NACTO, 2016), (Reuter, 1998) and (Stollard, 1991).
Comfort	(Bentley et al, 1985), (Biddulph, 2007), (Dekay and Brown, 2014), (Ewing and Clemente, 2013), (Gehl, 2011), (Littlefair, 1998) (Main and Hannah, 2010), (Miedema, 2007), (Olgyay, 1963), (Shaftoe, 2008) and (Watson and Labs, 1983).
Accessibility	(Biddulph, 2007), (Burton and Mitchell, 2006), (Bentley et al, 1985), (Frey, 1999), (Hall and Porterfield, 2001), (Kriken et al, 2010) and (Larco et al, 2014).
Legibility	(Burton and Mitchell, 2006), (Bentley et al, 1985), (Biddulph, 2007) and (Lynch, 1960)
Mixed-use	(Bentley et al, 1985), (Biddulph, 2007), (Burton and Mitchell, 2006), (Jacobs, 1961) and (Kriken et al, 2010)
Aesthetic	Barton et al (2003), (Biddulph, 2007), (Ching, 2015), (Larco et al, 2014), (Moughtin et al, 1999) and (Shaftoe, 2008).

Criteria checklists for assessing six crucial parameters of quality of place are available in (Appendices 1-6). They can be used for assessing quality of place in any residential area. Five expressions are used in criteria checklist: fully conforms, mostly conforms, partially conforms, does not conform, and N/A. When a criterion is taken into account in all parts of the area (100%), the blank under the "*Fully conforms"* is marked; when a criterion is taken into account in most parts of the area (≥50%), the blank under the "*Mostly conforms"* is marked; when a criterion is taken into account in some parts of the area (<50%), the blank under the "*Partially conforms"* is marked; when a criterion is not taken into account in any part of the area (0%), the blank under the *"Does not conform"* is marked; when a criterion is not suitable to the characteristics of the area, the blank under the "*N/A"* is marked.

To facilitate the assessment process, the study area is divided into four zones (Figure 3.3). Zones have been marked according to their distinctive characteristics. Zone-1 is the area where most of commercial centers are located, zone-2 and zone-4 contain the majority of dwellings, and zone-3 is the area where main parks of the neighborhood are located.

Result of the assessment is described by illustrations and problems affecting the quality of place in the neighborhood are identified in each zone. Technical information about physical structure of the site like length of blocks and space between buildings are calculated using "Ruler" tool in Google Earth Pro application. After assessing the

quality of place in Bosna-Hersek neighborhood, a variety of recommendations are made to improve the level of quality of place in the neighborhood.

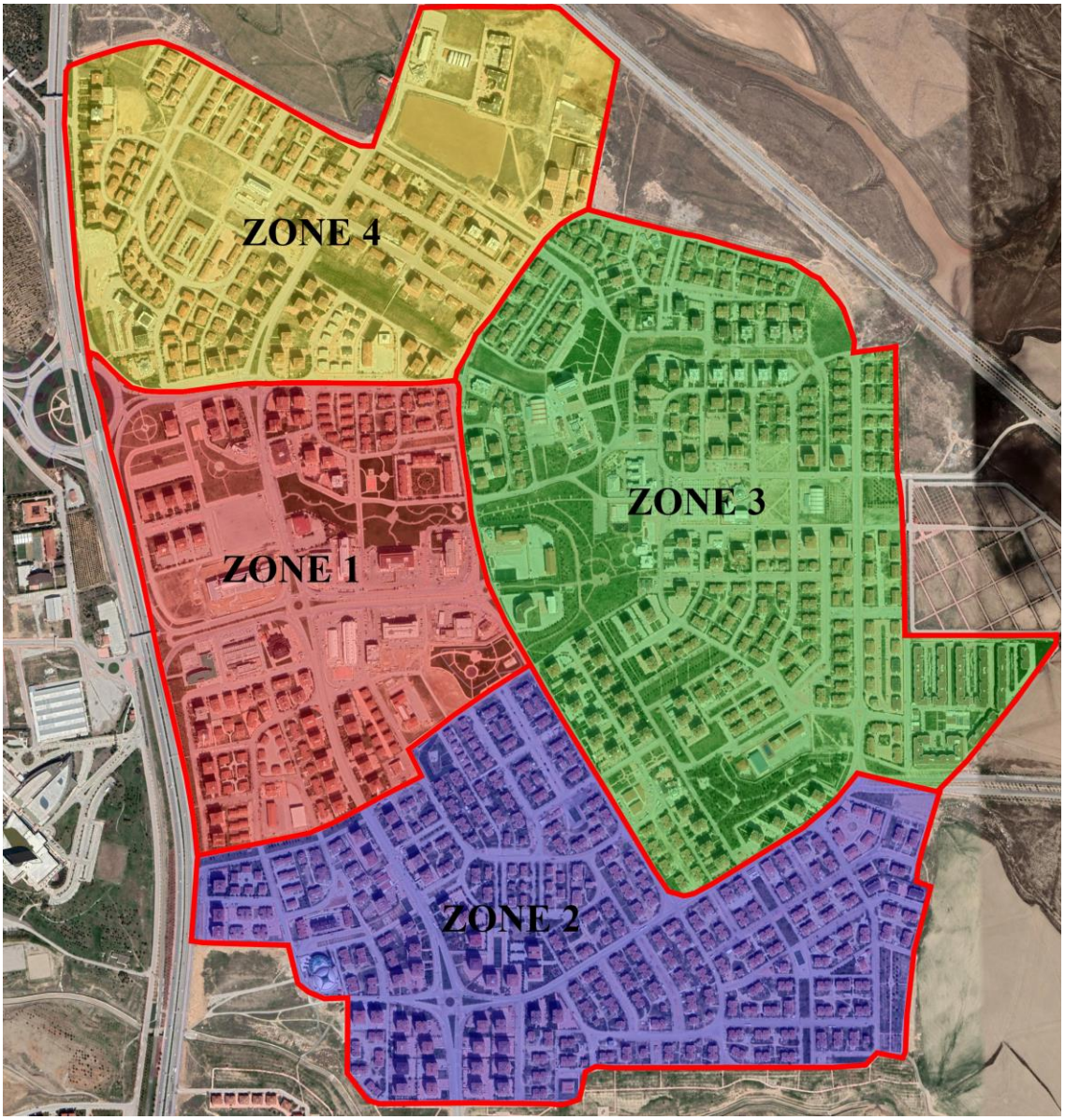


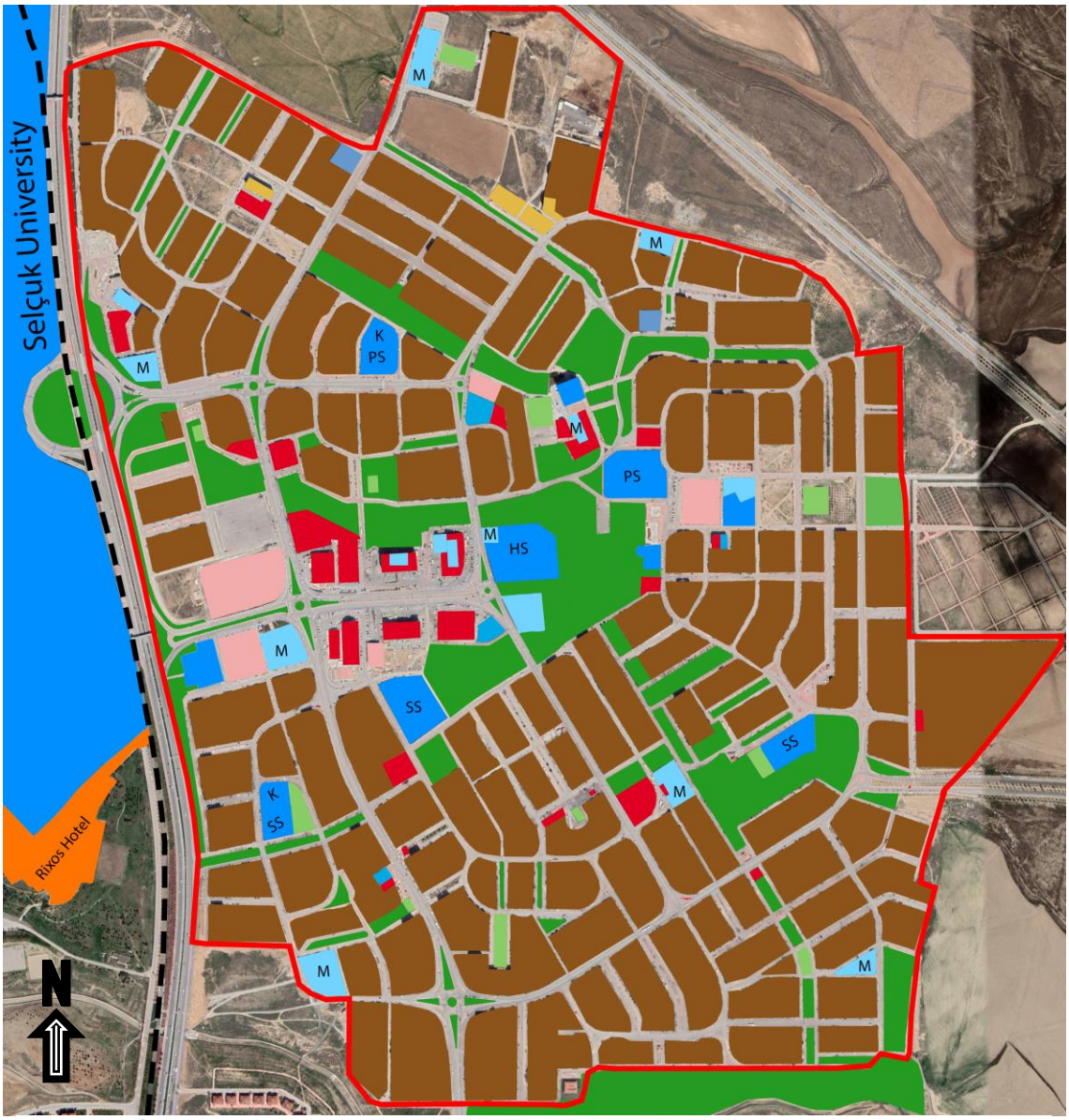
Figure 3.3 Study area (Google Earth, 2019)

4. RESEARCH FINDINGS

4.1. General Information About Bosna-Hersek Neighborhood

Bosna-Hersek is one of the densely populated neighborhoods in Selçuklu district of Konya city. Its population was declared 40809 in 2017 (TÜİK). Structure of the neighborhood is composed of a center and multi-family dwellings laid out around it. Almost all of the dwellings in the neighborhood are multi-family residential buildings ranging from 3 to 10 stories. Majority of the commercial centers of the neighborhood are located in zone-1. Dwellings located in zone-2 are generally old and of poor quality. Zone-3 has a massive green space, two large parks of the neighborhood (Bosna park and Cumhuriyet park) are located in this zone. The neighborhood is developing rapidly towards the zone-4. Public spaces in zone-4 are of lower quality than other zones specified in study area. Bosna-Hersek neighborhood experienced a rapid growth in the last decade. Figure 4.1 shows that the neighborhood did not have desirable number of public facilities in 2004. Bosna-Hersek neighborhood is located adjacent to Selçuk University campus. People can access the university by walking or cycling. Due to its convenient location to the university, the demand for housing is increasing rapidly in the neighborhood. Figure 4.2 shows the distribution of uses in Bosna-Hersek neighborhood.

Figure 4.1 Bosna-Hersek neighborhood in 2004 (Google Earth, 2019)



Legend

- Residential properties
- Residential-commercial mixed use
- Commercial centers (restaurants, stores, pharmacies, wedding halls, banks)
- Green spaces
- Cemeteries
- Gymnasiums and pitches
- Educational facilities (HS "high school", PS "primary school", SS "secondary school", K "kindergarten" universities and training centers
- Government offices
- Places of worship "M" and dormitories
- Health centers
- Hotel
- Buildings under construction
- Light rail transit system

Figure 4.2 Schematic illustration of land use in Bosna-Hersek neighborhood

4.2. Assessment of Quality of Place in Bosna-Hersek Neighborhood

Assessment of quality of place in Bosna-Hersek neighborhood has been carried out by direct observations during the week and on weekend. Considering the scope of the study, problems arising from poor quality of the physical structure of the components are explained. The effect of economic, social and cultural status of inhabitants on quality of place of the neighborhood has not been considered in assessment process.

The assessment started by exploring the activities taking place in the neighborhood. On weekend, the number of people engaging in optional and social activities was considerably high in well-maintained and high-quality areas of the neighborhood like large parks and other green spaces between dwellings. Poor-quality public spaces were not used in most parts of the neighborhood. During the week, necessary activities were more common than optional and social activities.

The research investigated the suitability of public spaces for outdoor activities. To facilitate the assessment process, study area is divided into four zones as explained in *Materials and Methods* section. Strengths and weaknesses related to each zone of the neighborhood are described as follow:

- **Assessment of safety**

In terms of social safety, most characteristics of the site conform with the criteria specified in the checklist. There are clear boundaries between public and private spaces in all over the neighborhood. The territory of families sharing a communal space was generally defined by walls in zones 1, 3 and 4, but in most parts of zone-2 it was defined by level change and bushes. Each plot has exclusive parking and separate entrances for vehicles and pedestrians. The parking and entrance gates are under the observation and control of inhabitants. The number of families sharing a communal space is generally low in newly built dwellings but it is high in some formerly built dwellings located in zone-2. The walls surrounding the dwellings are low in all regions of the neighborhood and do not block the street view. In most places, transparent fences were installed on the walls (Figure 4.3).

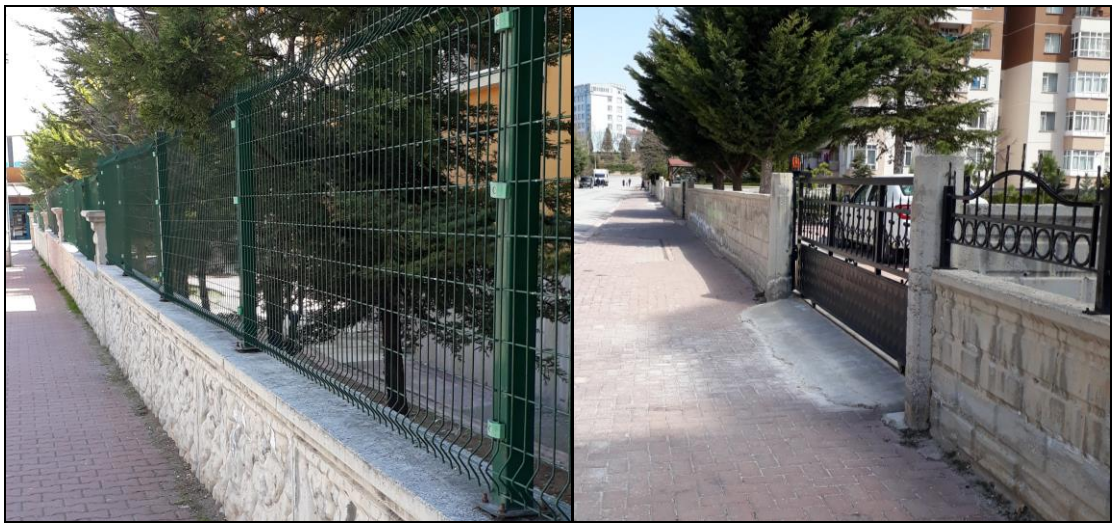


Figure 4.3 Walls defining the territory of dwellings, zone-3 (Personal archive, 2019)

Most of the dwellings were located close to street with 3 to 6 m setback. Their short distance to the street provides a good natural surveillance in public spaces. Some newly built high-rise buildings have about 10-15 m setback which can adversely affect the natural surveillance. There are sufficient number of small green spaces and playgrounds all of which are directly observed and controlled by inhabitants. The neighborhood has two big parks in zone-3 (Bosna park and Cumhuriyet park) which are continuously observed and controlled by the persons responsible for them. No blind corners or blank building facades that can affect the social safety were visible in the neighborhood.

In terms of physical safety, the main problem was the cars parked on the sidewalk. There were numerous parked vehicles obstructing the sidewalks near schools and on busy roads of the neighborhood. In some other places especially in sub-streets, sidewalks were blocked by bus shelters, trash bins and utility poles. Obstructions on sidewalks of busy roads have seriously endangered the pedestrian safety in the neighborhood (Figures 4.4-4.5).

Figure 4.4 Cars parked on the sidewalk, zone-3 (Personal archive, 2019)

Figure 4.5 Obstructions on the sidewalk, zone-3 (Personal archive, 2019)

Most of the sidewalks in busy roads are wide enough to walk comfortably and they have nonslip surfaces, but narrowness of sidewalks in some sub-streets and existence of obstructions have restricted the mobility of people with disabilities. Existence of curb cuts at intersections and near entrance gates have made it easier for wheelchair users to move around. Crosswalks and speed humps were installed on busy roads near schools, healthcare centers, at intersections and other pedestrian crowded areas (Figure 4.6). They were short and defined by clear markings. Curb extensions and medians were used to shorten the crossing in wide streets of the neighborhood.

Figure 4.6 Crosswalks near healthcare center and school, zone-2 and zone-4 (Personal archive, 2019)

Roundabouts with right-turn channels were widely used in busy roads of the neighborhood. There are exclusive paths for pedestrians and cyclists at intersections (Figure 4.7). Existence of refuge islands have shortened the crossings and have made the intersections compact. The right angle between intersecting streets provides a good sight distance for drivers. The negative point of intersections was their large corner radius. There are cycle tracks in some points of the neighborhood, but they are not interconnected and do not cover all busy roads of the neighborhood.

Figure 4.7 Exclusive paths for different users at intersections, zone-4 (Personal archive, 2019)

- **Assessment of comfort**

New Istanbul highway defining the edge of the neighborhood is the noisiest road. To reduce the effect of annoying noise, dwellings located at the edge of the neighborhood were separated from the highway by a green space. Buildings have about

45m distance from the highway (Figure 4.8). Dwellings along the busy roads inside the neighborhood have about 10-15m setback from the street.

Figure 4.8 The edge of the neighborhood along New Istanbul highway, zone-1 (Personal archive, 2019)

The neighborhood has an irregular street pattern. Most of the streets are short and create a visual termination point at their end. There are sufficient number of high capacity trash bins in every location. They are easy to use and visible from different points. None of the trash bins were overflowing. Although there were people searching for valuable things in trash bins located in zone-3, contents inside the bins were not scattered around them in most places. Adequate number of small trash bins were placed in parks, along busy sidewalks, near bus stops and other gathering areas. They do not have lid over them and are easy to use (Figure 4.9).

Walkways do not have large gaps on their surfaces. Majority of them in busy roads of the neighborhood are even and comfortable to walk, but lack of tree grates in some walkways have made it difficult for wheelchair users to move comfortably.

The neighborhood has a wide range of places to socialize. There are playgrounds, parks, places to do sport and other small open spaces in all over the neighborhood. Most of these spaces are of satisfactory quality, but some small green spaces in zone-2 and many spaces in zone-4 are of poor quality, poorly maintained and are not used by residents. Most of the public spaces have individual benches and seats for groups, but some small open spaces lack sitting opportunities. All seats are made of wood and metal, they have backrest and are comfortable to sit (Figure 4.10).

Figure 4.9 Trash bins in the neighborhood, zone-3 (Personal archive, 2019)

Figure 4.10 Outdoor seats, zone-1 (Personal archive, 2019)

In terms of thermal comfort, the distance between high-rise buildings along south to north axis does not comply with the values obtained in the research. So, some buildings may restrict the sunlight to adjacent building in winter. Building form, color and landscaping characteristics are compatible with local climate conditions.

- **Assessment of accessibility**

The structure of Bosna-Hersek neighborhood is formed by an irregular grid system. There is no dead-end street in the neighborhood. The street network is interconnected and permeable. There are many alternative routes to reach a destination. The neighborhood is dense and compact, it has a radius of about 1350m from the farthest point of developed land to the center of the neighborhood. At an average walking speed of 5km/h, residents can walk this distance in 16 minutes. Public facilities are accessible by multiple modes of transport. Inhabitants can reach their destinations by walking, cycling or using public transit bus. All facilities are connected to dwellings by a continuous and interconnected pedestrian network. Facilities and services such as commercial centers, educational facilities and health centers concentrate towards the neighborhood center, but they are insufficient in areas farther away from the center.

Educational facilities (kindergartens, schools and public education centers) are the basic requirements of residents in a region. Primary and secondary schools should be located within walking distance of children. Children can walk 400-500m comfortably (Gehl, 2011). Figure 4.11 shows the accessibility of primary and secondary schools in Bosna-Hersek neighborhood within the radius of 400m. It is obvious from Figure 4.11 that accessibility of schools from zone-2 and zone-4 is low. Places of worship are accessible from every location of the neighborhood. There are sufficient mosques every 500m. Accessibility of pitches and playgrounds are satisfactory; they are located close to dwellings and in accessible locations. Retail services are the basic need in a region. They should be located in close proximity of residents. Although there are a large number of retail services in and around the neighborhood center, they are not adequate in areas close to edges of the neighborhood.

Accessibility of city center from Bosna-Hersek neighborhood is very low. The neighborhood is connected to the city center by bus and light rail system. Getting to the city center takes about 45 minutes by bus or tram.

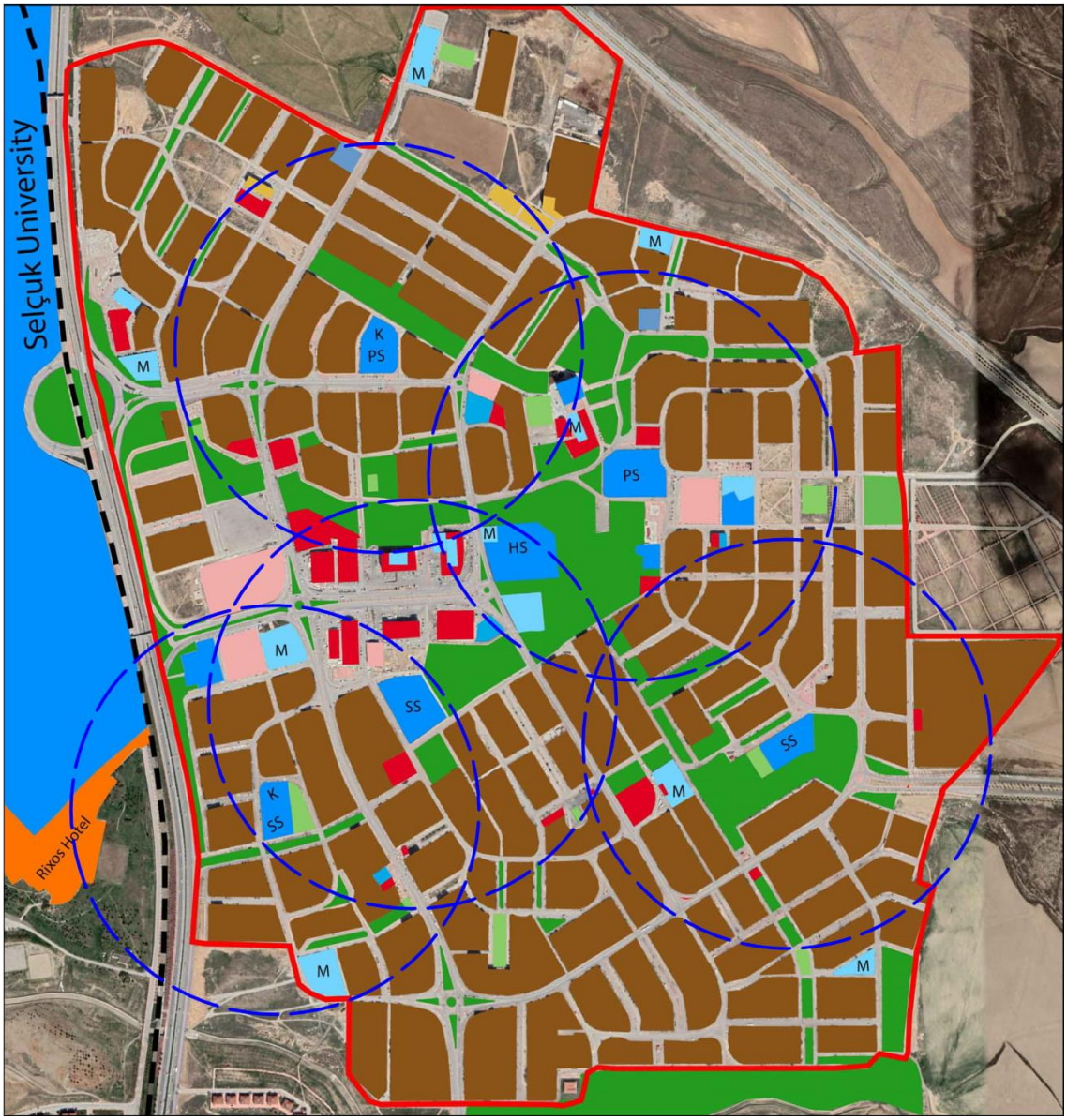


Figure 4.11 Accessibility of primary and secondary schools

- **Assessment of legibility**

Places are like a book which can be read. Legible places help us to understand the function of each component according to its distinctive shape, material and color. In terms of legibility, Bosna-Hersek neighborhood has many problems and deficiencies; majority of dwellings are identical and monotonous. They have the same form, shape and material, they are only different in color. All of the newly built 10 story dwellings are identical. Distinctiveness can merely be seen in some low-rise dwellings. The monotony of dwellings has made the most parts of the neighborhood confusing and difficult to create a clear mental map. There are still some distinctive buildings that can

be used as landmarks. They include masques, dormitories and buildings used for commercial purposes. Street network is deformed and irregular, but streets creating the network are partially illegible due to identical buildings defining them. The legibility of nodes has not also been considered. None of the intersections have sculptures, fountains or any other distinctive decorative elements. They are identical and create a confusing image in the neighborhood. Roundabouts were built with the same shape, material and even landscaping plants. Roundabouts located on main roads of zones 1, 2, and 4 are landscaped, but they are similar to each other. All roundabouts located in zone-3 are identical and were built with the same paving materials (Figure 4.12).

Parks, supermarkets, shopping centers and health clinics are the useful features of the neighborhood for way finding. Most of them are visible from different locations and can be used as landmarks.

Figure 4.12 Identical roundabouts, zone-3 (Personal archive, 2019)

- **Assessment of mixed-use**

Primary and secondary uses were generally mixed horizontally. The vertical mix of primary and secondary uses can only be seen in zone-4. Places of worship and recreational centers were provided within walking distance of inhabitants, while other uses like retail services, educational facilities and health centers are concentrated in and around the neighborhood center. They are not sufficient in places far from the center (refer to Figure 4.2 for land use illustration). Rarely used facilities such as petrol stations, banks and wedding halls were provided in neighborhood center.

Facilities offer reasonable prices for their services which shows the affordability of property in the neighborhood. The neighborhood is developing rapidly. The construction of many new shopping centers is about to finish in the near future which will provide better opportunities for inhabitants. Figure 4.13 shows a mixed-use area in the center of the neighborhood.

Figure 4.13 Mix of uses, zone-1 (Personal archive, 2019)

- **Assessment of aesthetics**

In terms of aesthetic, dwellings lack diversity and visual richness. Their simple facades do not create visual interest in the neighborhood. Majority of dwellings look alike. They have the same form, shape and material, they merely differ in color. Windows do not have decorations around them. Roofs, balconies and other parts of dwellings were not decorated with distinctive and visually appealing elements (Figure,

4.14). Almost all buildings located at street intersections have simple angular corner. Towered corners or any other decorative elements were not used at street corners.

Hard surfaces are undecorated. They do not play any role in making the outdoor environment attractive. Instead, soft landscaped areas play the key role in the aesthetic of street view. Trees, flowers, grass and plants covering the walls have created attractive vista in the neighborhood. Most of the walls surrounding the properties are decorated or covered by plants (Figure, 4.15). Three-dimensional objects like sculptures, fountains or other decorative elements were not used at intersections or other parts of the neighborhood. Instead, visual richness in streets were provided by street furniture like seating, lights, bins, bollard and so on.

Figure 4.14 Identical building facades, zones 2 and 3 (Personal archive, 2019)

Figure 4.15 Decorations of walls and plants covering the walls, zones 2 and 3 (Personal archive, 2019)

5. CONCLUSION AND SUGGESTIONS

Our cities are growing rapidly in size and density while lacking in quality. Quality of place plays a key role in livability of cities. In the physical dimension, our quality of life is directly related to the quality of the place we live in. Quality of place is the important attribute of urban spaces which shows the suitability of the living environment for activities we intend to do. High-quality places guarantee a healthy and sustainable community. In this research, quality of place has been studied in physical dimension. The research investigated how design can affect the quality of place in residential areas. The result of the study demonstrates that quality of place does not only depend on design quality, but is also influenced by how it is maintained and how it is used by its users. The way that the users use the elements of a place, their behavior towards public spaces and their sense of responsibility to protect the living environment all affect the quality of place. So, in addition to physical factors, the quality of a place is also influenced by social, cultural and economic status of the users.

The quality of place of Bosna-Hersek neighborhood was assessed in accordance with the contents of literature review and criteria checklist available in the appendices section of the thesis. Assessment was carried out by direct observations during the week and on weekend. The research found the following results:

Safety: In terms of social safety, most of the characteristics of the site conform with the standards stated in criteria checklist. In terms of physical safety, some parts of the neighborhood have weaknesses and problems. The following recommendations will help to resolve the problems related to physical safety in the neighborhood:

- In busy roads of the neighborhood, installing bollards along the sidewalk will prevent drivers from parking their cars on the sidewalk.
- Some bus shelters and high capacity trash bins obstructing the sidewalks on busy roads need to be transferred to suitable locations. Curb extensions can be used in the case that the obstructions are impossible to move to a new location.
- Installing humps in right-turn channels of intersections will increase the safety of pedestrians.
- Considering an interconnected cycle network covering all busy roads of the neighborhood will increase the safety of cyclists.

Comfort: The level of comfort in the neighborhood is satisfactory. Many desirable schemes were taken into account to improve the level of comfort. In terms of comfort, the neighborhood has strengths and weaknesses. The following modifications will help to resolve the weaknesses:

- Residents should prevent the people from searching valuable things in trash bins.
- Providing seats in small green spaces of the neighborhood will increase the opportunity for socializing.
- To facilitate the movement of wheelchair users, tree grates need to be installed in sidewalks of busy roads in zone-1.

Accessibility: Accessibility of playgrounds, sports fields and places of worship is satisfactory in the neighborhood. The number of schools is insufficient, two primary and secondary schools are required in zone-2 and zone-4. Furthermore, retail services are inaccessible from the edges of the neighborhood. Further retail services are needed in areas close to the edges. Another problem of the neighborhood is inaccessibility of city center. It takes too long to access the city center by bus or tram. Connecting the neighborhood to city center with rapid transit system (metro) will improve its accessibility.

Legibility: Lack of distinctive elements has made the most parts of the neighborhood confusing and illegible. It is impossible to change the appearance of existing buildings. The logical modifications will be using decorative three-dimensional objects at intersections, streets and other open spaces of the neighborhood. The identical intersections of the neighborhood particularly intersections located in zone-3 can be decorated with distinctive sculptures, fountains or other decorative elements.

Mixed-Use: There are various mix of uses in and around the center of the neighborhood. Residents close to the neighborhood center can get access to their needs and requirements easily, but the number of uses is insufficient in areas close to edges of the neighborhood. Further retail services are needed at locations away from the center. Furthermore, two schools are required in zone-2 and zone-4.

Aesthetic: Monotony of building facades and lack of diversity have reduced the attractiveness of public spaces. Decorating the hard surfaces and landscaping can be effective ways to improve the level of aesthetic in the neighborhood. Furthermore, sculptures, fountains and other decorative elements will provide visual interest in public spaces.

REFERENCES

AASHTO, 2004, Geometric design of highways and streets, Washington.

AASHTO, 2012, Guide for the development of bicycle facilities, Washington.

Alexander, C., Ishikawa, S. and Silverstein, M., 1977, A pattern language, Vol 2, Oxford university press, New York.

Armitage, R., 2013, Crime prevention through housing design, Palgrave Macmillan publishing, UK.

Barton, H., Grant, M., and Guise, R., 2003, Shaping neighborhoods, Spon press, London.

Bentley, I., Alcock, A., Murrain, P., McGlynn, S. and Smith, G., 1985, Responsive environments, Elsevier Ltd, England.

Biddulph, M., 2007, Introduction to residential layout, Elsevier Limited, Great Britain.

Boarnet, M. G. and Crane, R., 2001, Travel by design, Oxford university press, Oxford.

Brandi, U. and Geissmar-Brandi, C., 2006, Light for cities, Birkhauser-publishers for architecture, Berlin.

Burton, E. and Mitchell, L., 2006, Inclusive urban design, streets for life, Elsevier Ltd, UK.

Carmona, M., Carmona, S. and Gallent, N., 2003/a, Delivering new homes, Routledge publishing, London.

Carmona, M., Heath, T., OC, T., Tiesdell, S., 2003/b, Public place-urban spaces, The dimensions of urban design, Architectural press, Great Britain.

Carmona, M. and Sieh, L., 2004, Measuring quality in planning, Spon press, New York.

Ching, F. D. K., 2015, Architecture, form, space & order, John Wiley & Sons, New Jersey.

Cousins, M., 2009, Design quality in new housing, Taylor & Francis publishing house, USA.

Crosby, P. B., 1984, Quality without tears, McGraw-Hill, New York.

Cynecki, M. J., 1998, Crosswalks and stop lines. In Zegeer, C. V. editor, Design and safety of pedestrian facilities, ITE publications, Washington DC.

Davies, G., 2006, Edited by, McShane, M. and Williams III, F. P., Crime, neighborhood and public housing, LFB Scholarly Publishing LLC, New York.

Dekay, M. and Brown, G. Z., 2014, Sun, wind & light, John Wiley & Sons, New Jersey.

Dover, V., and Massengale, J., 2014, Street design, The secret to great cities and towns, John Wiley & Sons, New Jersey.

Ewing, R. and Clemente, O., 2013, Measuring urban design, Metrics for livable places, Island press, Washington.

Frey, H., 1999, Designing the city, Spon press, New York.

Gardiner, R. A., 1978, Design for safe neighborhoods, National institute of law enforcement and criminal justice, USA.

Geason, S. and Wilson, P. R., 1989, Designing out crime, Australian institute of criminology, Canberra.

Gehl, J., 2010, Cities for people, Island press, United States of America.

Gehl, J., 2011, Life between buildings, using public space, Island press, United States of America.

Hall, K. B. and Porterfield, G. A., 2001, Community by design, McGraw-Hill, United States of America.

Jacobs, J., 1961, The death and life of great American cities, Vintage books, New York.

Juran, J.M. and Godfrey, A. B., 1999, Juran's quality handbook, McGraw-Hill, New York.

Kriken, J. L., Enquist, P. and Rapaport, R., 2010, City building, Nine planning principles for the twenty-first century, Princeton Architectural Press, New York.

Larco, N., Kelsey, K. and West, A., 2014, Site design for multifamily housing, creating livable, connected neighborhoods, Island press, Washington.

Littlefair, P., 1998, Passive solar urban design: ensuring the penetration of solar energy into the city, Building research establishment, UK.

Lynch, K., 1960, The image of the city, M.I.T press, England.

Main, B. and Hannah, G. G., 2010, Site furnishings, John Willy & Sons, New Jersey.

Marshall, S., 2005, Streets and patterns, Spon press, New York.

Massachusetts Highway Department, 2006, Project development & design guide. USA.

Miedema, H. M. E., 2007, Adverse effects of traffic noise. In Garling, T. and Steg, L., Editors, Threats from car traffic to the quality of urban life, Elsevier Limited, UK.

Moughtin, C., Oc, T. and Tiesdell, S., 1999, Urban design ornament and decoration, Butterworth-Heinemann publishing house, Great Britain.

NACTO (National Association of City Transportation Officials), 2014, Urban bikeway design guide, New York.

NACTO (National Association of City Transportation Officials), 2016, Global street design guide, New York.

Newman, O., 1972, Defensible space, Macmillan Pub Co. UK.

Olgyay, V., 1963, Design with climate, Princeton university press, New Jersey.

Porteous, J. D., 1996, Environmental aesthetics, ideas, politics and planning, Routledge publishing, London.

Ranck, F. N., 1998, Sidewalks and paths. In Zegeer, C. V. editor, Design and safety of pedestrian facilities, ITE publications, Washington DC.

Relph, E., 1976, Place and placelessness, Pion Limited, London

Reuter, R. C., 1998, Pedestrians with disabilities. In Zegeer, C. V. editor, Design and safety of pedestrian facilities, ITE publications, Washington DC.

Russell, R. S. and Taylor, B. W., 2011, Operations management, John Wiley and Sons, USA.

Shaftoe, H., 2008, Convivial urban spaces, Earthscan publishing, UK.

Speck, J., 2012, Walkable city, How downtown can save America one step at a time, North point press, New York.

Stollard, P., 1991, Crime prevention through housing design, Taylor & Francis publishing house, UK.

Towers, G., 2005, An introduction to urban housing design, At home in the city, Elsevier publishing, Great Britain.

Van der Voordt, T. and Van Wegen, H., 2005, Architecture in use, Elsevier Limited, UK.

Watson, D. and Labs, K., 1983, Climatic design: Energy-efficient building principles and practices, McGraw-Hill, New York.

Watts, B., 2006, Comfort, health and environmental physics. In Thomas, R. and Fordham, M. editors, Environmental design, an introduction for architects and engineers, Taylor & Francis, UK.

Webber, L. and Wallace, M., 2007, Quality control for dummies, Wiley publishing, Indiana.

Whyte, W. H., 1980, The social life of small urban spaces, New York.

Zegeer, C. V., 1998, editor, Design and safety of pedestrian facilities, ITE publications, Washington DC.

LIST OF URLs

URL 1: http://www.guildford-dragon.com/2018/04/27/children-in-woodland-avenue-have-a-great-time-playing-in-their-own-street/
(Visited on 29.03.2019)

URL 2: https://www.newkidscenter.com/ball-games-for-kids.html
(Visited on 30.03.2019)

URL 3: https://www.usatoday.com/story/weather/2014/02/13/winter-storm-hits-south-moves-north/5446019/

URL 4: https://www.irishmirror.ie/news/irish-news/irish-weather-met-eireann-issues-10839020
(Visited on 29.03.2019)

URL 5: https://gsworldphoto.com/2016/05/10/sitting-on-a-park-bench-santiago-chile/
(Visited on 29.03.2019)

URL 6: http://www.parkhomelife.com/our-homes/compare-the-alternatives/
(Visited on 30.03.2019)

URL 7: http://www.fuzzytravel.com/froukandmichelle/pictures/homecoming/238360-people-playing.html
(Visited on 30.03.2019)

URL 8: http://kidskunst.info/46/06773-people-walking-down-sidewalk.htm
(Visited on 30.03.2019)

URL 9: http://docmaureen.blogspot.com/2013/05/sidewalk-parking-crusade.html
(Visited on 31.03.2019)

URL 10: https://www.riveroaksedgewater.com/rules-policies/parking-towing/
(Visited on 31.03.2019)

URL 11: http://www.mcmahonassociates.com/projects/tedesco-street-crosswalk-study-design
(Visited on 31.03.2019)

URL 12: https://sf.streetsblog.org/2010/11/30/eyes-on-the-street-raised-crosswalk-installed-at-stonestown-galleria/
(Visited on 31.03.2019)

URL 13: http://www.mcmahonassociates.com/projects/tedesco-street-crosswalk-study-design
(Visited on 31.03.2019)

URL 14: https://ggwash.org/view/32706/notes-from-seattle-neighborhood-greenways
(Visited on 01.04.2019)

URL 15: https://www.huntoffice.ie/contemporary-backless-wood-bench-sy389893.html
(Visited on 31.03.2019)

URL 16: https://www.escofet.com/en/products/urban-life/backless-benches/box
(Visited on 31.03.2019)

URL 17: https://www.toki.gov.tr/uygulama/illere-gore-uygulamalar/canakkale#images-4
(Visited on 27.03.2019)

URL 18: https://www.halifaxtoday.ca/remember-this/remember-this-downtown-dartmouths-sterns-corner-950653
(Visited on 27.03.2019)

URL 19: https://www.atlasobscura.com/articles/what-do-you-call-the-corner-store
(Visited on 27.03.2019)

URL 20: https://www.thetimes.co.uk/article/make-the-move-to-a-house-on-a-corner-plot-dcbdw03d5
(Visited on 27.03.2019)

URL 21: https://www.hotelnewsresource.com/article95005.html
(Visited on 27.03.2019)

URL 22: http://www.chathamlandscapes.com/Multi-Family-HOA/slideshows/show35/
(Visited on 27.03.2019)

URL 23: http://sanseigardens.com/apartment-complexes.html
(Visited on 27.03.2019)

URL 24: http://www.adventureflair.com/calcada-the-portuguese-pavement/
(Visited on 27.03.2019)

URL 25: https://www.skyscrapercity.com/showthread.php?t=624479&page=171
(Visited on 27.03.2019)

URL 26:
https://hiveminer.com/flickr_hvmnd.cgi?method=GET&sorting=Interestingness&search_domain=Tags&photo_number=50&textinput=funchal,statue&tag_mode=all&noform=

t&sort=Interestingness&originput=funchal,statue&photo_type=250&page=1&search_type=Tags
(Visited on 01.04.2019)

URL 26:
https://hiveminer.com/flickr_hvmnd.cgi?method=GET&originput=funchal,statue&page=6&search_type=Tags&photo_type=250&sorting=Interestingness&photo_number=50&search_domain=Tags&sort=Interestingness&noform=t&tag_mode=all&textinput=funchal,statue
(Visited on 01.04.2019)

APPENDICES

Appendix-1 Criteria checklist for assessing safety in Bosna-Hersek neighborhood

No	Criteria	Fully conforms	Mostly conforms	Partially conforms	Does not conform	N/A
1	Public and private spaces should be defined by clear boundaries	✓				
2	Dwellings should be located close to streets with 3 to 6 m setback		✓			
3	There should be observing eyes in communal spaces		✓			
4	Walls or opaque barriers around the buildings should not block the street view		✓			
5	Building facades should not be designed blank and windowless	✓				
6	The number of families sharing a communal space should be as low as possible		✓			
7	The territory of families sharing a communal space should be defined by specific boundaries	✓				
8	Restrictions should be exerted on the enclosed recreation and gathering areas at night		✓			
9	Each residential site should have entrance features	✓				
10	All entrances to residential site should be under the observation and control of inhabitants	✓				
11	There should not be blind corners or any other hiding places in the area		✓			
12	Plants used in landscaping should not create hiding places		✓			
13	Outdoor spaces should be well lit at night			✓		
14	The clear path of walkways should not be less than 180 cm		✓			
15	Sidewalk surface should be non-slip and without broken parts		✓			
16	Walkways should be free from obstacles and barriers			✓		
17	There should be adequate number of curb cuts along the sidewalks (near entrances and turning points)	✓				
18	Sidewalks should have interconnected tactile paving				✓	
19	Both ramps and stairs should be used in level changes		✓			
20	The gradient of sloping areas should not exceed five percent		✓			
21	There should not be cars parked on the sidewalks			✓		
22	Sidewalks should be separated from busy streets by landscaping, bollards or any other barriers			✓		
23	Crosswalks and stop lines should be	✓				

	defined by clear markings					
24	Crosswalks should be as short as possible	✓				
25	Medians should be used to shorten the crossings in wider roads	✓				
26	Underpasses should be observed and controlled by the residents (if exist)					✓
27	There should be an interconnected bikeway network covering all busy roads of the neighborhood			✓		
28	Intersections should be compact	✓				
29	Curb extensions should be applied to shorten the crossings at intersections			✓		
30	Refuge islands should be used at large intersections	✓				
31	Speed reducing humps or traffic calming strategies should be applied on high-speed roads	✓				
32	Radius of the corners should be as tight as possible at intersections			✓		
33	Angle between legs of intersecting streets should not be less than 60 degrees	✓				

Appendix-2 Criteria checklist for assessing comfort in Bosna-Hersek neighborhood

No	**Criteria**	**Fully conforms**	**Mostly conforms**	**Partially conforms**	**Does not conform**	**N/A**
1	Dwellings should be located away from main roads that produce much noise	✓				
2	Street networks should be irregular	✓				
3	Streets should be short and create visual termination points	✓				
4	Trees should be placed close to each other in wide streets that are not visually enclosed by surrounding buildings			✓		
5	Adequate number of high-capacity trash bins should be placed close to dwellings	✓				
6	There should be sufficient trash bins along the walkways, in transition zones and places where people engage in activities	✓				
7	Trash bins should be usable, visible and accessible	✓				
8	There should not be garbage and waste materials scattered over public spaces		✓			
9	Small trash bins should not have lid or cover over them	✓				
10	Trash bins should be emptied regularly before they overflow	✓				
11	Residents should prevent the people form scattering the contents of trash bins				✓	

12	Trash bins should be resistant to long term uses and prevent the contents from leaking and falling out		✓			
13	There should be public toilets in gathering places			✓		
14	There should not be large gaps between stones or other materials used on pavements	✓				
15	Pavement surfaces should be even and unobstructed		✓			
16	Rainwater should not gather on pavement surfaces in rainy seasons		✓			
17	Tree grates with small holes should be installed in all tree pits				✓	
18	Both primary and secondary seating should be provided in outdoor spaces		✓			
19	Benches should be located in places where can provide a good view of the environment		✓			
20	All types of benches including benches with or without backrest and benches that can provide a face to face conversation opportunity should be placed in public spaces		✓			
21	Wooden benches should be used widely in outdoor seating	✓				
22	There should be seats for families to sit in playgrounds	✓				
23	Seats should be laid out according to local climate conditions of the region	✓				
24	Material and color of seats should be compatible with thermal conditions of the area	✓				
25	In cold/temperate climates space between dwellings should be calculated according to lowest feasible altitude angle of the sun in winter			✓		
26	The main façade of dwellings should face the south direction in cold/temperate climates	✓				
27	Buildings should not have overhangs and deep balconies in cold/temperate climates	✓				
28	Evergreen trees should not be placed close to windows in cold climates					✓
29	External surfaces of buildings should have dark color and high thermal capacity in cold climates					✓
30	The main façade of dwellings should face the north direction in hot climates					✓
31	Buildings should have overhangs and deep balconies in hot climates					✓
32	Light colored materials are used in		✓			

	external surfaces of buildings in hot/temperate climates					
33	Trees and green spaces should be as much as possible in hot/temperate climates		✓			
34	Buildings and outdoors should benefit from breeze in hot/temperate climates		✓			

Appendix-3 Criteria checklist for assessing accessibility in Bosna-Hersek neighborhood

No	Criteria	Fully conforms	Mostly conforms	Partially conforms	Does not conform	N/A
1	All pedestrian networks should be continuous and interconnected	✓				
2	There should be direct routes connecting all destinations	✓				
3	Facilities within the neighborhood should be accessible on foot or by bike	✓				
4	Street networks should be permeable and interconnected	✓				
5	There should be many alternative routes to access a destination	✓				
6	People should be able to travel to their destinations by their desired traffic mode	✓				
7	Blocks should be small and on human scale		✓			
8	Grid system should be used widely in shaping residential areas	✓				
9	Cul-de-sacs or dead-end streets should be avoided in large scale residential developments	✓				
10	If dead-end streets exist, they should be connected with each other by pedestrian and cyclist routes at their end					✓
11	The residential neighborhood should be dense and compact with a moderate population	✓				
12	Residential estate should be connected to the city center by a sustainable transportation system			✓		

Appendix-4 Criteria checklist for assessing legibility in Bosna-Hersek neighborhood

No	Criteria	Fully conforms	Mostly conforms	Partially conforms	Does not conform	N/A
1	Facilities and services should be clearly visible from different locations		✓			
2	Buildings, streets and other physical features of the built environment should have different forms, shapes, materials and colors			✓		
3	Street networks should be			✓		

	straightforward and comprehensible					
4	Street patterns should be deformed and irregular	✓				
5	Roundabouts should be decorated with unique and distinctive objects				✓	
6	There should be distinctive sculptures, fountains, towers and other elements that can be used as landmarks				✓	
7	Intersections, building facades and other elements defining public spaces should not be identical and monotonous			✓		
8	There should be various uses and activities		✓			
9	A residential estate should have a clear overall image			✓		

Appendix-5 Criteria checklist for assessing mixed-use in Bosna-Hersek neighborhood

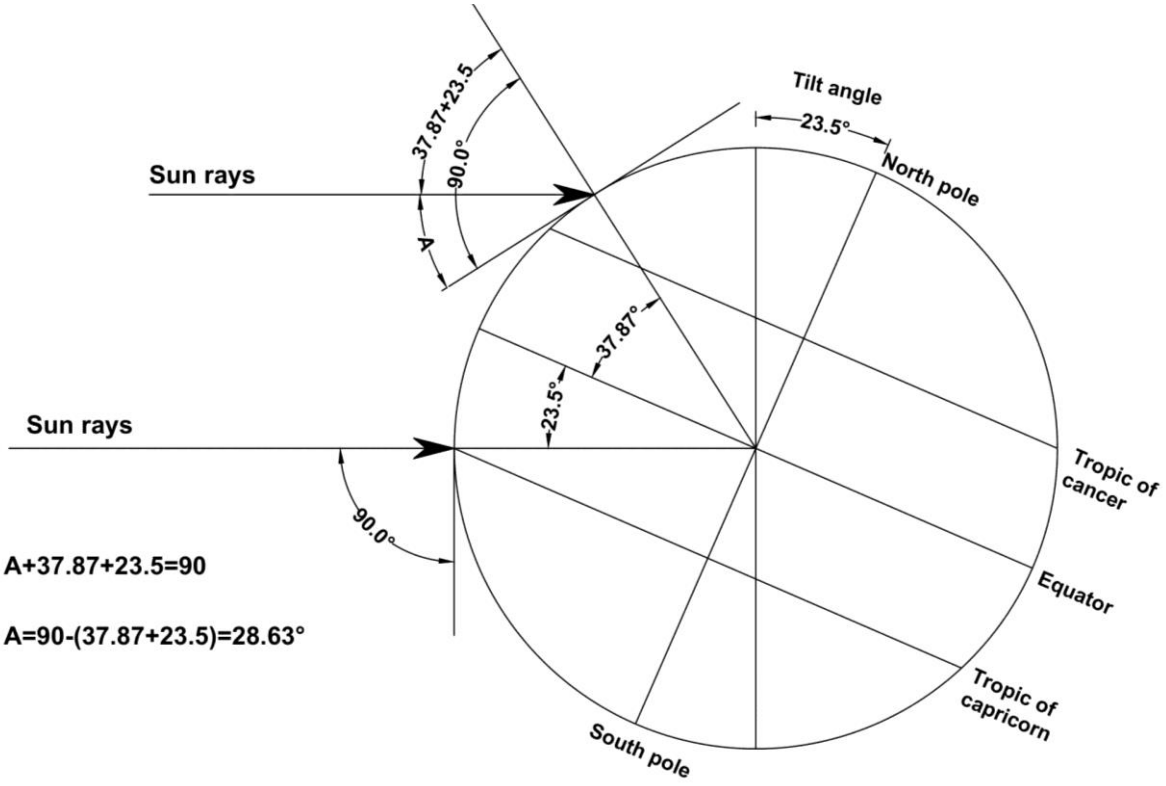
No	Criteria	Fully conforms	Mostly conforms	Partially conforms	Does not conform	N/A
1	Properties should be offered at affordable price		✓			
2	Available uses should be clearly visible to the passersby		✓			
3	There should be horizontal or vertical mix of uses	✓				
4	The amount of retail services should be compatible with population density	✓				
5	Type of facilities should be provided according to people's demand	✓				
6	Frequently visited facilities should be placed close to dwellings	✓				

Appendix-6 Criteria checklist for assessing aesthetic in Bosna-Hersek neighborhood

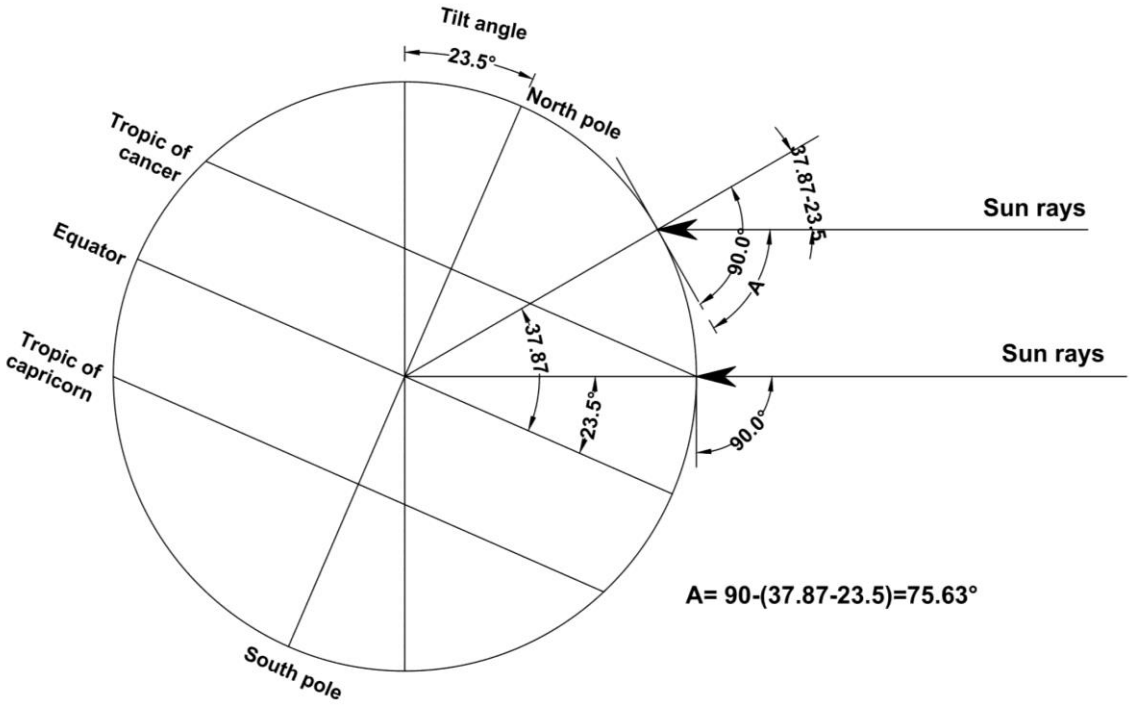
No	Criteria	Fully conforms	Mostly conforms	Partially conforms	Does not conform	N/A
1	Principles of art like rhythm, symmetry, contrast, harmony and proportion should be considered in buildings and landscape design		✓			
2	There should be many attractive and beautiful things to see in outdoor spaces			✓		
3	Buildings should be different in height, size, ornament, color and texture			✓		
4	Various plants and decorative elements should be used in landscaping			✓		
5	The form, shape, size, texture and color of buildings and other elements should be in harmony with		✓			

	each other					
6	Hard surfaces should be decorated with visually appealing paving materials				✓	
7	Building facades should not contain too many identical elements			✓		
8	Sculptures, fountains, towers and other decorative elements should be used in outdoor spaces				✓	

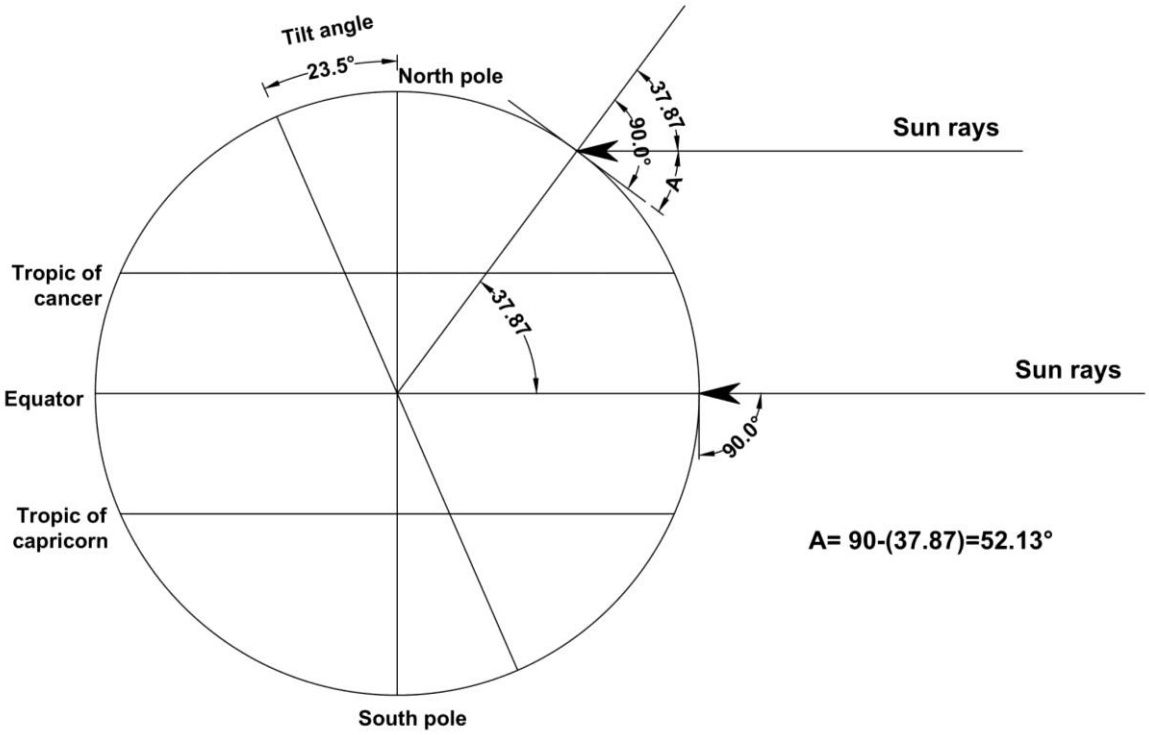
Apendix-7 Altitude angle calculations for Konya



Altitude angle in Konya city on December 21st (winter solstice)



Altitude angle in Konya city on June 21st (summer solstice)



Altitude angle in Konya city on March/September 21st (equinoxes)

CV

PERSONAL INFORMATION

Name/Surname:	Khair Mohammad Hayat
Nationality:	Afghanistan
Place and date of birth:	Jowzjan 01.06.1991
Telephone:	05522037740
E-mail:	hayat.ctplanner@gmail.com eng.hayat@hotmail.com

EDUCATION

Degree	Name, Province	Graduate year
Master's degree:	Necmettin Erbakan University, City and Regional Planning Department, Konya	2019
Bachelor's degree:	Balkh University, Building Engineering Department, Balkh	2014
High school	Ibn-e-Yamin high school, Jowzjan	2009

WORK EXPERIENCE

Year	Institution	Responsibility
2015-2016	Sadat University	Research Assistant
2014-2016	Metropol International Institution	Trainer

FIELD OF PROFESSION: Building Engineering and City Planning

LANGUAGE SKILLS: English, Turkish, Persian, Turkmen, Uzbek

COMPUTER SKILLS: AutoCAD, 3Ds Max, V-Ray, Primavera, SAP 2000, SAFE, ETABS, Adobe Photoshop, WinWord, Excel, PowerPoint, Windows, Internet.

PUBLICATIONS:

MOHAMMADY, K. M. and TER, Ü., 2018, Quality of place in residential areas, 4. International Academic Research Congress, 30 Nov-03 Oct 2018, Abstract book, P: 256, (Prepared from Master's thesis).
MOHAMMADY, K. M. and TER, Ü., 2018, Aesthetics and the city, 4. International Academic Research Congress, 30 Nov-03 Oct 2018, Abstract book, P: 257, (Prepared from Master's thesis).