

AN INVESTIGATION OF CURRENT STREET DESIGN APPROACHES:
A PROPOSAL FOR TEKİRDAĞ ÇANDARLIZADE İBRAHİM PAŞA STREETScape



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Cemre Arun

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APPROVED BY:

Assist. Prof. Dr. Zerrin İnan
(Thesis Supervisor)
(Yeditepe University)

.....

Assist. Prof. Dr. Bengi Korgavuş
(Yeditepe University)

.....

Assoc. Prof. Dr. Nilüfer Kart Aktaş
(İstanbul University- Cerrahpaşa)

.....

DATE OF APPROVAL: / / 20...

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Name, Last name

CEMRE ARUN

Signature

.....

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ABSTRACT

AN INVESTIGATION OF CURRENT STREET DESIGN APPROACHES: A PROPOSAL FOR TEKİRDAĞ ÇANDARLIZADE İBRAHİM PAŞA STREETSCAPE

Streets are a network of social, economic, and physical activities. Successful urban streets have provided various functions in addition to just transporting people and goods from place to place. The streets, which have very different functions in terms of both socio-cultural and commercial aspects, also stand out with their recreational functions. Different street design strategies are introduced as an answer to these challenges, as they can fulfill this multitude of functions; they are not only traffic infrastructures, but also lively and inclusive public places, carriers of economic development, ecological corridors supporting ecosystem services and lines of technical infrastructures including street and traffic lighting, electrical power, signalization etc. Complete Streets, Green Streets, Healthy streets are all concept ideas and initiatives that have evolved to address issues related to the planning and design of street environments that each has their own focus and the definitions.

This thesis introduces the current street design approaches and proposes to integrate principles into Çandarlı İbrahim Paşa Street in Tekirdağ that is located in new neighborhoods as the population exponentially grow selected and evaluated in terms of design criteria and landscape elements as case study. Based on the current Street design approaches and evaluation user opinion about Tekirdağ's Street use.

The change Tekirdağ has undergone from past to present has led to the formation of many innovations. Despite this, it can be said that there are still inadequacies for both pedestrians and vehicles in many regions. In order to evaluate these competencies or inadequacies with quantitative data in terms of residents perception, questions about various design and landscape elements were asked to a group of 352 participants. The answers obtained were evaluated in the SPSS analysis program. The graphics of the data obtained within the scope of the study were evaluated and design alternatives were presented.

Keywords: Street Design, Landscape Design, Complete Streets, Green Streets, Healthy Streets

ÖZET

GÜNCEL CADDE TASARIMI YAKLAŞIMLARININ İNCELENMESİ: TEKİRDAĞ ÇANDARLIZADE İBRAHİM PAŞA SOKAK TASARIM ÖNERİSİ

Caddeler bir sosyal, ekonomik ve fiziksel faaliyetler ağıdır. Başarılı şehir caddeleri, sadece insanları ve malları bir yerden bir yere taşımanın yanı sıra çeşitli işlevler de sağlamaktadır. Hem sosyo-kültürel hem de ticari açıdan çok farklı işlevlere sahip olan caddeler, aynı zamanda rekreasyonel işlevleriyle de öne çıkmaktadır. Bahsedilen çok sayıda işlevi yerine getirebilecekleri için bu işlevlere bir cevap olarak farklı cadde tasarım stratejilerinden bahsedilmektedir. Bunlar sadece trafik altyapıları değil, aynı zamanda canlı ve kapsayıcı kamusal alanlar, ekonomik kalkınmanın taşıyıcıları, ekosistem hizmetlerini destekleyen ekolojik koridorlar ve sokak ve trafik aydınlatması, elektrik gücü, sinyalizasyon vb. dahil olmak üzere teknik altyapı hatlarıdır. Bütünsel Caddeler, Yeşil Caddeler ve Sağlıklı Caddeler her birinin kendi odak noktası ve tanımı olan sokak ortamlarının planlanması ve tasarımıyla ilgili sorunları ele almak için geliştirilmiş konsept fikirler ve girişimlerdir.

Bu tez mevcut cadde tasarım yaklaşımlarını ve ilkelerini tanıtmakta ve bu yaklaşımların nüfusun giderek arttığı yeni bir mahallede bulunan Çandarlızade İbrahim Paşa Caddesi'ne entegre edilmesini önermektedir. Ayrıca Tekirdağ Caddeleri'nin öneri tasarımında kullanıcı tercihleri de değerlendirilmektedir.

Tekirdağ'ın geçmişten günümüze geçirdiği değişim birçok yeniliğin oluşmasına neden olmuştur. Buna rağmen birçok bölgede hem yaya hem de araç konusunda yetersizliklerin devam ettiği söylenebilir. Bu yeterliliklerin ya da yetersizliklerin sakinlerin algısı açısından nicel verilerle değerlendirilmesi amacıyla 352 kişilik bir katılımcı grubuna çeşitli tasarım ve peyzaj öğelerine yönelik sorular yöneltilmiştir. Elde edilen cevaplar SPSS analiz programında değerlendirilmiştir. Çalışma kapsamında elde edilen verilerin grafikleri değerlendirilmiş ve bu veriler için tasarım alternatifleri sunulmuştur.

Keywords: Cadde Tasarımı, Peyzaj Tasarımı, Bütünsel Caddeler, Yeşil Caddeler, Sağlıklı Caddeler

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LIST OF SYMBOLS/ABBREVIATIONS

%	Percentile
cm	centimeter
d	Sampling error
km	kilometer
m	Meter
N	Number of residents in Tekirdag Center,
n	Sample size
p	Probability of seeing
q	Probability of not being seen
SPSS	Statistical package for the social sciences

1. INTRODUCTION

Urbanization, is accepted as a dimension of the reflection of the relationships established between people throughout the history of humanity on physical spaces. The emergence of spaces and neighborhoods in cities in various ways has separated all cities from each other and cities have also been different from each other with their economic and demographic structures. The city does not only indicate a new economic organization, but also reveals a different social order that affects people's behavior and thoughts. Cities are becoming common living spaces of people every day, and therefore, increasing the quality of the living environment is possible with urban planning approaches. With the correct urban planning approaches, the correct use of natural resources and the formation of spatial organizations of sustainable urban designs are realized. [1].

As in the whole world, it can be said that urbanization continues rapidly in our country. Along with the cultural, social and economic imbalances in the cities, the urban appearances have gradually moved away from nature, and this has led to the emergence of ecological environmental problems. When the city plans are examined, it is observed that the area requirements planned for the roads are much higher than the other green areas of the cities. When the cities designed in a planned way are examined, it is seen that the roads are the skeleton of this city. Therefore, roads determine the development rate of cities. When the boulevards of the cities are designed well, corridors can be created that provide ventilation of the city At the same time, afforestation practices that can be carried out in the transition zones in order to establish the connection of the cities with the rural areas will ensure the integrity of the landscape. [2].

All societies live in constant contact with their environment. The places where the relations between the environment and people occur most frequently in the cities are the public spaces of the city. Environmentally protected urban open spaces are units that provide the opportunity to move outdoors. Urban open spaces can be grouped as exterior use areas and circulation channels. In the classification realized as outdoor use areas, functional spaces that provide the possibility of living outside are described. In the category put forward as circulation areas, complementary spaces such as streets, squares, streets and boulevards

that create vehicle transportation, pedestrian transportation and communication relations between various parts of the city are described [3].

It is observed that there are still many deficiencies in the practices of the design and management of urban streets. Due to the excessive focus on the traffic of automobiles, minibuses, buses and similar motor vehicles on the city streets, various investments have been made in road construction projects in order to facilitate the transportation of these vehicles more easily. However, these projects have been unsuccessful in solving the traffic congestion and bring many environmental and social problems [4]. In fact, the focus should not only be on creating areas where motor vehicles can move comfortably, but also on creating spaces where pedestrians will enjoy being in, not afraid to move, and benefit from various opportunities. The focal point of all these mentioned features is that cities have an ecologically sustainable structure. Because street and road designs built on an ecological basis bring with them more comfortable breathing areas, which helps to relax physically, socially and economically in societies. When the words avenue and street are considered, roads full of cars usually come to mind. Today, streets are considered only as a means of transportation and are characterized as places where cars, trucks and buses are considered as a priority [5]. Therefore, the main thing here is to create areas where not only vehicles but also pedestrians can move comfortably. This situation is possible with certain strategic applications.

Boduroğlu (2001) reveals in her research that all areas other than residential units are defined as roofless architecture. According to her, these areas are places where the society carries out all its activities. While open spaces, which are presented as unstructured urban exteriors, are used for certain purposes, a very small part of these spaces are evaluated functionally [3].

When the conditions of our country are evaluated, it can be said that rural and urban developments cause many environmental problems. At the root of these problems is the disconnection of the human-nature relationship with the problems that occur in the intervened environment. When the legal practices to shape living environments are evaluated, it is seen that it is very difficult to postpone the relationship between human and nature. Therefore, the basis of ecological problems here is based on the structure of societies [6].

1.1. PROBLEM STATEMENT

It is observed that there are many deficiencies in the design of streets and avenues in cities. In particular, attributing streets only to motor vehicles causes serious problems for pedestrians and causes green areas to disappear. These negativities, both ecological and social, can be eliminated with strategic landscape applications. It is of great importance for the continuity of sustainable ecological cities that the external areas, which are considered as public spaces, can become suitable for human life.

1.2. AIM AND SCOPE OF THE STUDY

In this study, first of all, successful street design examples from different cities are examined in this context, it is aimed to evaluate street recognition, types of streets and users who benefit from these streets. Afterwards, it is aimed to examine the design strategies used in the streets and to reveal various strategies both for the relaxation of the traffic and for the pedestrians to move more easily.

At the same time, current street design approaches evaluated like green healthy infrastructure, which is the most important issue here, defining green streets, evaluating the ecological design principles used in these streets, and revealing the advantages and disadvantages of streets are among the aims of the study. User perception of street design these street design approaches in Tekirdağ.

The main purpose of the study is to evaluate the existing street problems in the "Çandarlızade İbrahim Paşa" street, which is the subject of the research, and to determine the opinions of the participants about the area with the survey study. A street design alternative has been proposed for Tekirdağ in general and for Çandarlı İbrahim Paşa Street, which is a selected street in this case.

1.3. CURRENT RESEARCHES RELATED TO THE STUDY

Kweon (2016) used the principles of complete street, green street, place making and context sensitive solution in his thesis "A More Complete Street, A Street For Everyone To

Enjoy, North East Street, Frederic, Maryland – A Design Investigation Of Different Street Design Theories”. He offers suggestions for improving the performance of North East Street and plans to focus on 4 main issues in the thesis to meet the demands of the street as a main street. First, to build mixed-use blocks, second, to install bike lanes on the street, to reduce pedestrian and vehicle conflicts, to plant trees to reduce vehicular traffic volume and speed, and third, to use bioswales, living walls and rain gardens to recycle rainwater and the fourth is to try to preserve the local culture and history of the street. Finally, this thesis is expected to be an example of complete street, green street, place making and context sensitive solution applications [7].

Ing (2016) in his thesis titled “Redefining The Street As A Third Place: A Design Toolkit for Kapahulu Avenue” emphasised that in the past, streets were places where people travelled more often on foot, stopped to greet and talk each other, but today they are only used for transportation purposes. In this project, he proposes to redefine an existing street as a "third place" as a street to transform it from a space for means of transport to a place for people in the local community. While making this proposition, he examined the existing street design methods and the role of these design methods in determining the streets as a third place [5].

In his thesis “Sharing the Street: Shared Space in an American Context”, Behrens (2014) examines Shared Space, which is actually a European concept, in an American context. Bahrens identifies three shared spaces as areas of study. These are: Bell Street Park in Seattle, WA; Davis Street in Portland, OR; and Santana Row Promenade in San Jose, CA. He analyzes these areas under the headings of transportation functionality, design, activity, user experience. The results of the study show that many key communal principles—removing traffic signs and markings, removing curbs, laying consistent asphalt—help reduce traffic speeds and accommodate other modes of transportation, such as walking and cycling [8].

Shah and Jain (2014) proposed a non-motorized transportation strategy for Mumbai in their report “Street Design Guidelines for Greater Mumbai”. In this context, the National Urban Transport Policy was taken as the main focus and streets were analyzed under the headings of footpaths, traffic calming, on-street parking, median, bus stops and shelters, plot entrance, street lights, vending/ other activities, landscaping, utility boxes, bollards and as

a result, it has been tried to ensure that the road area is allocated more equitably with people rather than vehicles [9].

Zhang (2013) explores the current design approaches and development trends of urban streets in China in his work “Urban Street Design in Modern China”. After the 90s, the rapid growth in China also caused an increase in traffic, therefore, only vehicle traffic-oriented street design approaches to the streets negatively affected the urban circulation environment in terms of economic, social and public health. Based on this, a revolutionary agenda of change is proposed to achieve better design practices for urban streets in post-modern China [4].

Shishegar (2013) stated in his article “Street Design and Urban Microclimate: Analyzing the Effects of Street Geometry and Orientation on Airflow and Solar Access in Urban Canyons” that urban climate is affected by various factors such as street density and vegetation, and streets are the most effective factor in determining these conditions. It is also stated that street geometry and orientation affect airflow in urban canyons. This article discusses the current literature and evidence regarding the effects of street design on the urban microclimate, highlighting the effects of street geometry (H/W ratio) and orientation on airflow and solar access in an urban canyon. Research in this thesis has proven that the geometry and orientation of the street are key factors in maintaining a pedestrian-level microclimate in an urban canyon [10].

Baş (2016) stated in his study “Child-Friendly Street from the Perspective of Urban Design” that children's active role in the city is also very important for child development. It has been determined that the points to be considered in order to create child-friendly streets are information, conference, competition organization, mapping, exploring the city, expressing their ideas, participation, projects based on the use of public space, public space design, safe transportation to school activities. As a result, “child-friendly street criteria” were determined in order to evaluate the child-friendliness of the streets. The child-friendly street criteria determined are as follows: Safety, Walking, Cycling, Fun, Playing, Size, Arrangement, Accessibility [11].

In the article “Shaping Hamilton with Complete Streets” created by Ferguson et al. (2015), Complete street was tried to be defined exactly and its basic concepts were mentioned and the importance of these basic concepts for the city of Hamilton are explained. Streets

selected from within the city were evaluated as problem-solution. The complete street elements, which are widely mentioned in this thesis, are as follows; Regulation of Driver Behaviour, Connectivity and Access Versus Throughput, Automobility and Fears About Congestion, Cycling [12].



2. CHAPTER - LITERATURE REVIEW

2.1. THE DEFINITION OF STREET

2.1.1. Street Types

A hierarchical arrangement of traffic flow has been achieved by functional classification of streets. Traffic speed, traffic volume and level of service provided form the basis of the design criteria. However, with the classification system made here, it is seen that the right of way is insufficient for pedestrians, cyclists and public transportation. Focusing only on traffic volume and traffic speed while designing roads keeps multiple user groups away from using this area. Therefore, it becomes clear that there should be a section that should be reserved for individual areas of use such as pedestrians and cyclists [25]. Avenues define each of the main roads in settlements. However, the roads in between, where the traffic roads are less than the main roads, can also be described as Avenues. Avenues are generally larger than streets, but also represent areas predominantly reserved for vehicular traffic. Generally, there are sidewalks and buildings on both sides. Especially the streets in metropolitan cities usually have asphalt surface coating [67].

It is necessary to make a different classification method by revealing that streets do not belong only to cars and that it is necessary to go beyond this thought. The concept of street typology, which stands out in this regard, is considered as a new guide for the street design of cities. Along with the functional classification system, the street typology preferred in various regions of the cities is applied by engineers in order to ensure the safety and functionality of the system with acceptable design parameters [25]. Avenues are one of the most important alternatives used in transportation since the Mesopotamian civilization. When you evaluate history, it is known that the roads found in Ancient Greece, Rome, and China form the old avenues in the world. However, it is possible to say that the definition of avenue changes according to the ages. While all roads made of stone were used as avenues at first, with the invention of the automobile, paved roads formed the avenue standard. Along with travel technology, avenues are considered the most important transportation unit that is preferred quite frequently in daily life and serves both

pedestrians and vehicles [67]. After the Tanzimat reform era, attention was paid to the development of various areas so that Ottoman cities could be compared to European cities. The Ottoman Empire, which was developed with wide avenues, boulevards, and parks, entered a period of physical renewal. At this point, special importance was given to the avenues and innovations that were made not only in Istanbul and provincial centers but also in the whole provincial transportation network. The most important reason for this situation is that transportation is not just an arbitrary thing and commercial activities are also provided by transportation routes during the period [68].

When the streets are evaluated structurally, the first thing that stands out is the one-way streets in the city center. It is known that in the middle of the 20th century, many two-way streets in the city center were converted into one in order to facilitate the traffic structure and to provide direct access to the newly built highways [26].

Environmental conditions have a great effect on the occurrence of traffic accidents. Here, the conditions expressed as environmental conditions are formed by roads and pavements. Especially in developed cities, great efforts are made to repair the streets that have been severely damaged due to the lack of control of fast-moving trucks [69].



Figure 2.1. One-way streets in the city center [26]

Although many of these existing streets operate below their capacity, empty pavement areas occur in city centers. Most cities are converting the aforementioned streets back into two-way. However, in order to use the area more effectively, these streets can be increased with bicycle paths and public transportation strategies, and the use of the street as a public space can be optimized. Below is an image of how useful the area is for bike lanes and public transport [26].

However, the two-way streets in the city center are the most common in cities. Busy city avenues that operate in a two-way fashion are generally the most difficult avenues for cities to restructure and strengthen. Many such avenues suffer from double-parking and double-loading conflicts but offer insufficient facilities for cyclists and pedestrians. By reducing the volume of these areas, adding bike lanes will help make traffic a safer area [26].



Figure 2.2. Two-way streets in the city center [26]

The available literature on the design of urban streets indicates that two-way streets have higher economic costs. However, two-way streets are a better alternative for local businesses that are heavily dependent on existing traffic. In addition, traffic signal timing on two-way streets forces vehicles to stop more often than on one-way streets. This situation also disrupts the comfort zone of the drivers. However, it can be said that two-

way roads are safer than one-way roads for many reasons. While the intersections of two-way roads have more maneuverability, one-way streets reduce the attention level of drivers. However, one-way streets allow for a higher level of travel for drivers as they allow fewer stops in terms of signal timing. When an assessment is made for pedestrians, it can be said that they prefer to travel on two-way streets more often due to the slow speed of the driver and the predictability of vehicle conflicts [27].

The main roads in the city centers are a different type of road that is frequently encountered.

While defining the main roads, it is necessary to mention some of their features. Firstly, main roads refer to roads that help connect all international and national settlements. The traffic on these roads comes out of the settlement centers and creates traffic together with the vehicles coming from the collector roads. The average journey length on the main roads is longer, the traffic volume is higher and the cruising speed is higher than on other roads. In addition to all these, it has different qualities such as main roads, divided roads, undivided roads, express roads, and highways [81].



Figure 2.3. Main roads in the city center [26]

Main avenues running through the city center, which help connect neighborhood centers, are not a healthy alternative for pedestrians to pass, but they also reduce property value and the quality of public space. While many of these avenues have a heavy traffic volume, especially during rush hour, they become very dangerous places for pedestrians. It is very important to ensure that these areas are improved for pedestrians. The work to be carried out in this area will become healthier with the addition of new median and bicycle paths [26].

In a study, Appleyard (1991) argues that entrepreneurs and various professions try to gain control over the streets. The best-organized group in this area takes control. Unfortunately, it is not possible to meet the expectations of all individuals from the street, but the maximum benefit that most of them will provide is considered essential in this regard. Approaches are being developed in this direction, with public institutions taking care of weak users such as children, the elderly, pedestrians, and the disabled. Generally, weak community groups determine the structure of streets, avenues, traffic, and transportation. However, in the contemporary approaches used here, reaching the maximum number of users is among the targets set [28].

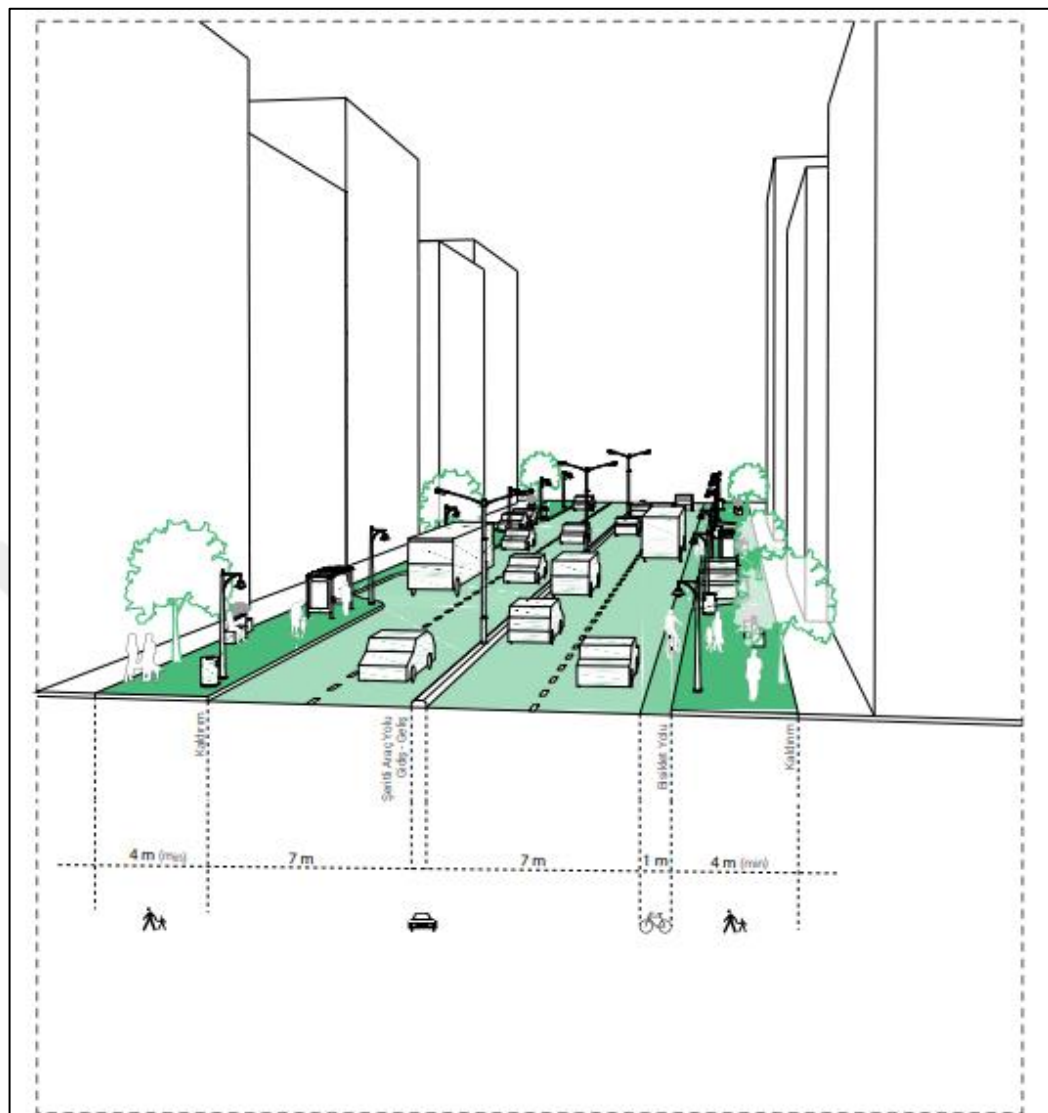


Figure 2.4. Two-way main roads representation [29]

In this respect, the main avenues of the neighborhood can be considered as the connection point of the neighborhood life with its high volume and important public transportation routes. In order to make these areas more valuable, especially a road for bicycles should be built and pedestrians should use these roads in a healthier way [26]. The example above includes Two-Way Main Roads Representation.



Figure 2.5. Neighborhood main streets [26]

Local streets in residential areas are generally not used adequately as entertainment and playgrounds. These streets are generally used to provide direct access to local shops or schools and to walk during this access. However, it is of great importance that the areas are safe and inviting during this walk. When the design of local streets includes features that encourage speed control elements, sidewalk extensions, and stormwater management features, a more comfortable and healthy transportation space will be created for both pedestrians and drivers [26].



Figure 2.6. Local streets in the residential area [26]

Boulevards in cities, on the other hand, separate very wide streets and parallel urban areas, protecting residential and commercial street edges from the high-speed passage. Many boulevards built at the beginning of the 20th century fell into disrepair and were redesigned according to highway standards. Today, many cities restore these boulevards to their former glory, and an updated boulevard design standard is applied to over-constructed urban arteries [26].

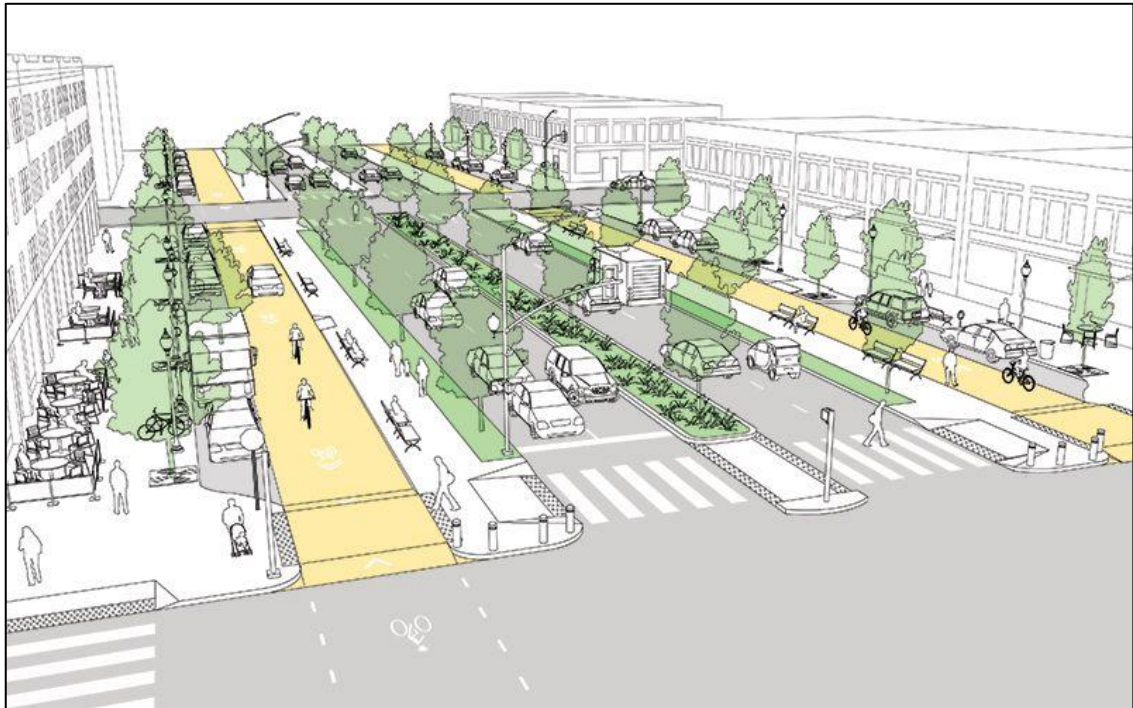


Figure 2.7. Wide boulevards in cities [26]

Although low traffic density is observed in many of the side streets of the residences, repaving cycles are experienced. These areas cause pitted and puddled back roads. Green streets use sustainable materials such as permeable pavements to create an inviting public space where people can walk and interact comfortably [26].

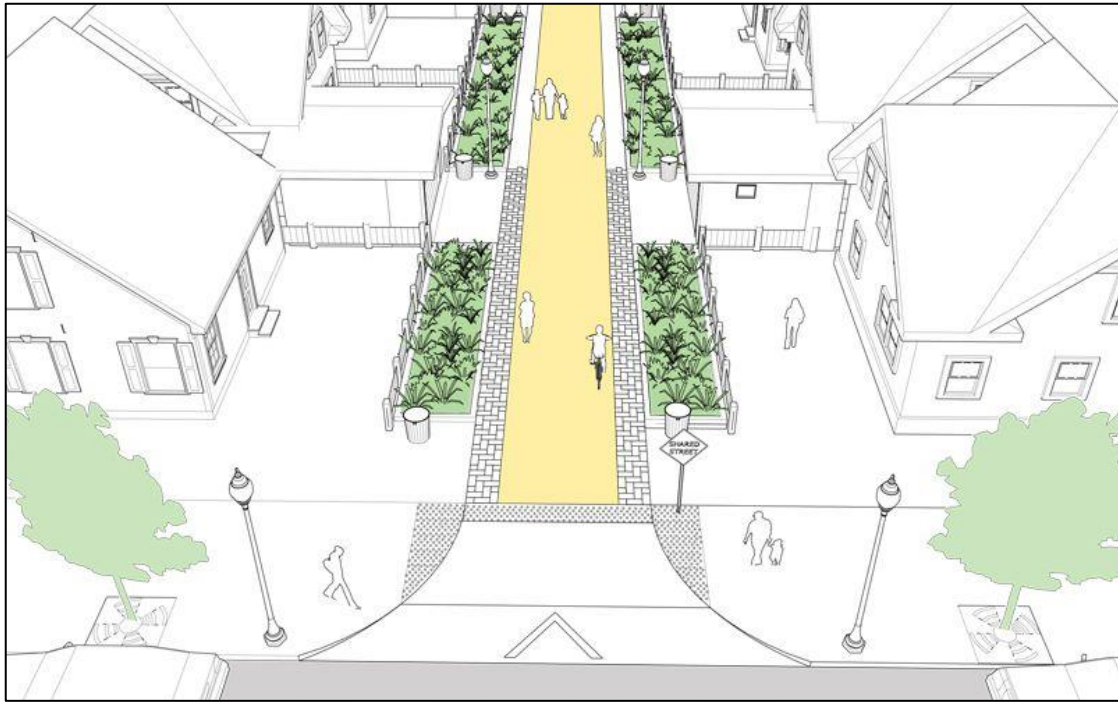


Figure 2.8. Alleys in the residential area [26]

2.1.2. Street Users

Cities have always been places where social and cultural actions take place, together with their avenues, streets, and squares. Today, cities in Turkey have the appearance of physical urban spaces, but they are areas that are stuck between uniform concretes and are faced with various environmental problems, especially in which their natural qualities cannot be preserved, and with this, they are experiencing a rapid change process. Along with the appearance of avenues, streets, and squares, rapid changes occur in the functions it undertakes. It can be said that streets, squares, and pedestrian areas, which express the common point of urban life, are the most important elements that define the character of a city. Considering that these areas provide access to all the commercial, recreational, social, and cultural needs of the urban people, it can be said that they are indispensable places. Ensuring that pedestrians can move around in cities in a safe, healthy, and comfortable way is always indispensable for accessible urban space arrangements [30].

When the transportation industry is evaluated, it is aimed to provide sustainable and environmentally friendly transportation systems that create sufficient travel alternatives for the end user. Various alternatives are produced in order to design avenues so that all users

can meet their needs safely. It is seen that factors such as vehicle speed and separation of vehicles from cyclists and pedestrians increase the level of service, but even with the increasing interest in active transportation modes, roads cannot be made completely safe [31].

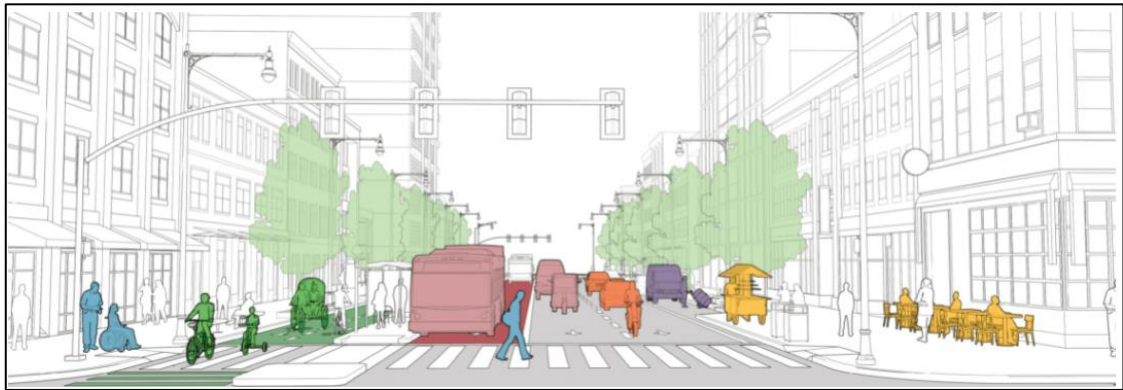


Figure 2.9. Street users representation image [26]

Many streets in cities make up the largest portion of public property. At the same time, these areas are distributed fairly among the needs of the different users of urban streets. Street and avenue designs should create a different and enjoyable environment for all individuals who cycle, walk, use public transportation, or drive a car. There are some design elements and strategies to use to support safe and healthy spaces for different groups of people using urban streets [26]. Generally, factors such as being satisfied in terms of health, transportation, economic welfare, and freedom are among the quality of life indicators. In this context, encouraging the use of bicycles and walking in urban transportation helps in constructing a healthy transportation model. In this way, accessibility will be increased and ecological values will be adopted at the same time. All these data are of great importance in terms of improving the quality of life in cities [32].

Pedestrians: When considering the active use of streets and avenues, pedestrians come to mind as the first user. Although pedestrian access is quite active, there are no extensive roads that give priority to pedestrians and are designed for their use only. It can be said that there is not enough space for pedestrians due to the inadequacy of the pedestrian sidewalks in the newly constructed areas of the cities and the thought that the existing sidewalks cannot be protected from commercial activities and car parks. In low-income residential areas of cities, most of the roads do not even have sidewalks. Pedestrians continue their transportation in an unsafe manner by sharing the entire road with all two-wheeled and

motorized vehicles [33]. Creating a safe infrastructure for pedestrians is of great importance in terms of access to public spaces. Ease of access to squares, schools, parks, or commercial public spaces will be provided with the appropriate and high-quality design of sidewalks or pedestrian paths. It is of great importance that such areas are designed in an attractive way for pedestrians [34].

Cyclists: An approach that prioritizes pedestrian and bicycle transportation provides advantages to the community in many areas. Creating a reliable bicycle area, especially in cities, will help increase efficiency in urban transportation. At the same time, this practice, which will be beneficial to public health, will also allow the protection of the environment and the development of the economy. With an approach that gives priority to pedestrians and cyclists, conflicts between motor vehicle users and other road users can be minimized, while at the same time problems related to vehicular traffic can be reduced. In addition, it is possible to create a more accessible environment for individuals with mobility restrictions and mobility disabilities [32]. It is possible to design bicycle-friendly streets with a specially designed bicycle infrastructure. With the creation of these areas, which are especially in mixed traffic and separated from vehicle traffic, an environment can be created in which conflicts between motor vehicles and cyclists will be reduced [34]. With the increase in the share of bicycle users among the total passengers, many benefits will be provided for transportation in the city. Cycling is preferable both as the entire journey is made by bicycle and as an element that supports public transportation. The use of bicycles provides a very preferred ease of access in urban journeys, and the bus is a complementary alternative to rail systems [35].

Transit Passengers: With the rapid increase in the population in the cities and the spread of overpopulation due to migration, the increasing construction has led to the expansion of living spaces in particular. Spatial development and growth have caused the settlements to move away from each other, thus increasing the cost of transportation. In this context, the decrease in the efficiency of the transportation service causes these systems to become inaccessible, causing traffic and transportation problems. Communities living in the city suffer financial losses due to transportation problems and also encounter various negativities such as traffic density, environmental pollution, and noise [36]. Access to public transport will be facilitated, albeit partially, by creating a secure access opportunity in the corridors and stops of public transport. For this, it is of great importance to establish

safe and secure transfer points on behalf of public transport users [34]. Especially in developed countries, the use of various transportation methods as an alternative to the highway in order to reduce waiting and congestion in traffic is among the measures to increase the quality of service. At the same time, reducing the passenger capacity of public transportation vehicles is one of the measures that can be taken to increase the quality of public transportation service [37].

Drivers: Road transport is the most preferred type of transport, with the opportunity of a comfortable journey from the place of departure to the point where the individual arrives, and the confidence given by the use of private vehicles. However, in addition to all these conveniences, negative effects such as traffic congestion, accident probability, restriction of movement, and pollution are created in road transport. Depending on the terrain and climate of the city, the use of automobiles is a more preferred means of transportation rather than bicycles and motorcycles. With the use of personal cars, more convenient and comfortable transportation is provided compared to public transportation vehicles. However, it can be said that private vehicles have major disadvantages in terms of cost and environment. Especially working with energy that pollutes the environment continuously and the need for much more parking space are some of the weaknesses of private vehicles. In addition to all these, high energy consumption and large area covered in traffic are among the disadvantages of automobiles [36]. With urban design strategies that reduce motor vehicle use and promote safe vehicle speed, traffic problems can be reduced [34].

2.2. GENERAL STREET DESIGN STRATEGIES

2.2.1. Street Design Elements

The design of the streets determines how they will look and how they will function. How a avenue will be seen and how it will function depends on how that street or avenue is designed. Avenues often include travel lanes, parking signs, bike lanes, green spaces, pedestrian facilities, traffic calming devices, and green street elements. The fact that the avenue designs are different from each other causes their functions to be different from each other. For example, it can be said that the design of a two-lane street with pebbles looks very beautiful. However, this design works differently than a four-lane paved

avenue. These two avenue types also function differently from each other. While the two-lane avenue has a lower traffic volume, it can be said that it does not support travel to a safe place without pedestrian facilities. The four-lane avenue has a higher traffic volume than the two-lane avenue, but it supports safe transportation with its existing pavements. However, it can be said that these avenues do not support safe cycling without a bicycle path [38].

Lane Width: While putting forward the traffic-related strategies, the basic principle is to ensure the formation of a systematic road area. The determination of main roads, access roads, speed roads and by-roads in a road network gives clues about the amount of speed to be applied in corridor techniques. While arranging road networks, standards in Turkish standards and international general design principles are taken as basis. Ensuring lane balance is essential in order to keep the vehicle density under control [39]. The most sensitive aspect of street design is the width of the lanes reserved for buses, trucks, cars, parked cars, bicycles, and pedestrians. Lane widths should be planned within the entire avenue in order to serve all needs, including security islands, travel lanes, pedestrian paths, bicycle lanes, and sidewalks. It should be noted that each lane width has an understanding of its task of calming traffic as well as creating enough space for larger vehicles such as buses and trucks [40].

The curb should be designed not as lines parallel to buildings, but as continuous lines that determine the course of the vehicle. Along the corridor between the property boundaries and the road, planning should be made based on the number and continuity of the lanes. The continuity of the lines that define the vehicle path is a very important factor for determining the lane width standard. As stated in Turkish standards, there are some laws based on dimensioning design principles on urban roads. These state that the width of the pedestrian pavement should be at least 2 meters, and the width of the vehicle lane should be 2.75 meters at 50 km/h. At the same time, it is stated in the standards that the width of the parking pockets planned parallel to the road should be 2 meters or 2.25 meters [39].

Sidewalks: With the effect of urbanization, the increase in the number of vehicles has become a serious threat to city life. With the increase in injury and death rates, pollution has occurred and it is seen that various health problems such as cardiological heart diseases and obesity have emerged due to the decrease in physical activity in individuals. However, the narrowing of the sidewalks that allow pedestrian access due to the need for larger

avenues and the decrease in social activities such as walking, walking in open spaces, and playing games can be expressed as a few of the negative events that occurred [41]. With the claim that the pavements planned especially in residential areas slow down the traffic, the understanding that all roads are for vehicles has developed. It can be said that especially in developed cities, due to the infrastructure built on the basis of cars, the relationship between the environment and people weakens and people become unable to interact socially with the environment. This situation has become the beginning of mental as well as physical diseases of individuals. The fact that the negative effects of vehicles were so serious caused great reactions, especially between the years 1960 and 1970, and it was emphasized that the cities invaded by cars should be transformed into prominent places for people. With the public protests in America, Germany, and many countries, cities were tried to be transformed into living spaces. Thanks to the express roads, vehicle traffic was tried to be removed from the center of the city and more livable urban design guides were created under the name of humane space design. This situation has led to the development of principles that reveal the cultural and social role of avenues [42].

It is of great importance that the first feature of the pavements is accessibility. Although the required distance for a minimum of two people to walk together is taken into account as a sufficient walking distance, a design should be made by calculating that a third person will pass through the pavement at the same time. In areas where pedestrians use more intensively, it is desired that the sidewalks have a wider walking volume. However, it is of great importance that the sidewalk corridors allow pedestrians to feel safe. At the same time, the parts that can be walked along the sidewalk corridors should be designed in a distinct and open manner. Sidewalks should provide what is desired in terms of microclimate and become both a physical and visual corridor for pedestrians. Along with all these, the most important point is to design pavements that strengthen the identity of the environment [43]. Because sidewalks provide the spatial hierarchy of the avenue, they are very important interfaces for the activity, needs, and formation of a healthy society for appropriate pedestrian passage. Although sidewalks are very important for pedestrians who use the avenue primarily, they represent special areas for pedestrians that are separated from vehicular traffic. Therefore, pavements should be created in a sustainable framework with the built environment and urban design relationship [42].

Vertical Speed Controllers: When the vertical speed control elements are evaluated, the first thing that comes to mind is the speed bumps. These refer to bumps, which are expressed as bumps and run transversely along the road platform. Kassis, which are frequently preferred methods of calming the traffic in Turkey, are used in places where the traffic is heavy in the city, but the road structure is not suitable for speeding. Particularly, the areas where the movements are more intense, such as school fronts, sports, and residential areas, and children's gardens are also preferred [44].

Another speed control element is speed breaker platforms. These platforms can be expressed as a longer version of the bumps. It can also be described as a raised pedestrian crossing, with a pedestrian crossing in its middle section. In cases where it is used as a pedestrian crossing, it facilitates the passage of pedestrians from the sidewalk they are on without any other lift level difference. In this way, it is ensured that the drivers notice the pedestrians more easily, and an easier passage area is created within the pedestrian [45].

When speed control elements are evaluated, it can be said that elevated intersections also have an important place. Considering that the most important parameter to be found at an intersection is safety, it can be said that the capacity and delay values at the intersection affect each other. While capacity refers to the number of vehicles that can move at the intersection, the concept of delay refers to the time loss that occurs when all vehicles using the intersection are waiting in the queue [46]. Junctions, whose entrance is raised with a ramp and whose visibility is increased by using a different material in the style of cobblestone, can be raised as much as the pavement. In this way, it is easier for the driver to understand that she/he has entered the pedestrian zone [44].

Circular traffic islands are also a prominent element when speed control elements are evaluated. These islands refer to the islands located in the middle of the intersection and surrounded by traffic. It can be expressed as appropriate calming importance, especially for intersections where the volume, security, and speed that heavy and large vehicles cannot enter between neighborhoods are a problem. The fact that these islands are effective in normalizing speed and increasing security also requires making them aesthetically pleasing with the right design. On the other hand, the need for an extra arrangement for pedestrian crossings and roadside parking and the need for regular and continuous maintenance of the landscape can be expressed as negative aspects [44].

2.2.2. Intersection Design Elements

There are some rules that must be followed for the correct application of intersection design principles. The most important point to remember at the beginning of these is that the best intersection designs are compact intersection designs. However, a strategic system should be established to avoid unusual conflicts at intersections. Simple right-angled intersections are best for all users, but intersection problems are most common at curved or multi-leg intersections. However, free-flowing movements should be avoided at intersections. In order not to destroy travel diversity, intersection design restrictions should be prevented. At the same time, access management applications must be used to remove additional vehicle conflict points near the intersection. In order to ensure the safety and comfort of all users, signal timing is required at the traffic lights at the intersections, and it is also important to prevent excessively long waits or insufficient crossing times of users. However, it is of great importance that the intersections are fully accessible [47].

It is planned that the intersection geometric design projects, which are planned to be prepared within the scope of the traffic circulation plan, will design intersections in a way to keep vehicle and pedestrian safety at the highest level and to carry the intersection quality at the highest level. In this respect, it can be said that intersections are designed in two ways as at-grade intersections and intersections with underpasses or overpasses. When the at-grade intersections are evaluated, it can be said that they are intersections with different branches and structures, especially T-shaped, Y-shaped, four-armed or ellipsoid. The most important point to be considered here is to ensure maximum capacity or safety during the intersection type and design [48].

In parallel with the rapid increase in population in societies, road transportation also faces various problems. Road transportation becomes a serious problem in daily life, especially due to different reasons such as delays, congestion, and fatal or injury accidents caused by many vehicle owners. Considering the economic and environmental losses that arise with the continuous increase in traffic density in metropolises, it is observed that the general cause of traffic problems is junction points [49].

Therefore, at this point, it can be stated that intersections, which are the key points where traffic flows coming from different directions intersect, converge, and diverge, play an

important role. These intersections are the road elements that serve to ensure the traffic flow in a safe and healthy way. Junctions, which directly affect the features of the road such as safety, capacity, speed, and operating cost, depending on their design and types, are one of the most important elements of highways. Junction points are generally critical points where traffic encounters each other. Since these points are areas that increase the potential for accidents, they can be expressed as very strategic points [50].

When international and national traffic accident records are examined, it is seen that intersection points are potential risk factors. Statistical studies conducted in the USA show that more than 50% of fatal and injury traffic accidents occur at intersections. In European countries, this rate can be expressed as 27% injuries and 10% fatal accidents [51].

The intersections, which play a very important role in the effective and safe operation of the traffic flow, vary according to their geometric features, control types, and fields of activity and are categorized in different ways. Roundabouts, which exist in the category of at-grade intersections, can be considered as the type of intersection where the traffic flow is directed around an island and the vehicles within this island have the first pass. The warning signs in the roundabout approach not only force the drivers to reduce their vehicle speed, but also offer the opportunity to pass vehicles navigating around the island. With the passing priority rule, an environment is created in the roundabout, where the drivers act with the principle of giving way without the need for control of the traffic, which is known as the effective flow of traffic [49].

When compared to traditional at-grade intersections, roundabouts are superior in terms of reducing or eliminating conflicts. At the same time, performance features such as roundabouts' encouragement to reduce vehicle speeds at intersection entrances and exits put it in a more advantageous position compared to at-grade intersections. Central islands located at roundabouts show a great advantage in terms of security as they reduce conflicts compared to traditional intersections. The central islands used at roundabouts reduce the 32 intersections of conventional at-grade intersections to 12. At the same time, this situation greatly increases road safety by reducing the number of collisions at three-leg intersections from 9 to 6 [52].

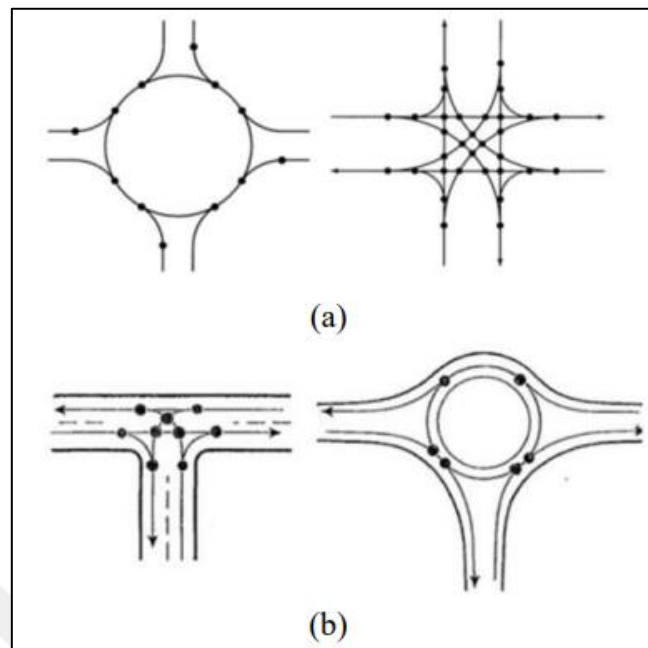


Figure 2. 10. a) Conflict points at four-leg and conventional intersections and (b) Conflict Points at three-leg and conventional intersections [49]

2.2.3. Crosssections

The cross-sectional elements of highways are as important as the alignment of the highway, but also have a huge impact on the vehicles that travel. In order to ensure the safe efficiency of the highways, it is necessary to provide the cross-section elements with care. Projects that do not aim to make the road more modern and thus do not abandon the existing widths and alignments, realize significant improvements in the overall safety of the road by addressing the cross-sectional elements [53].

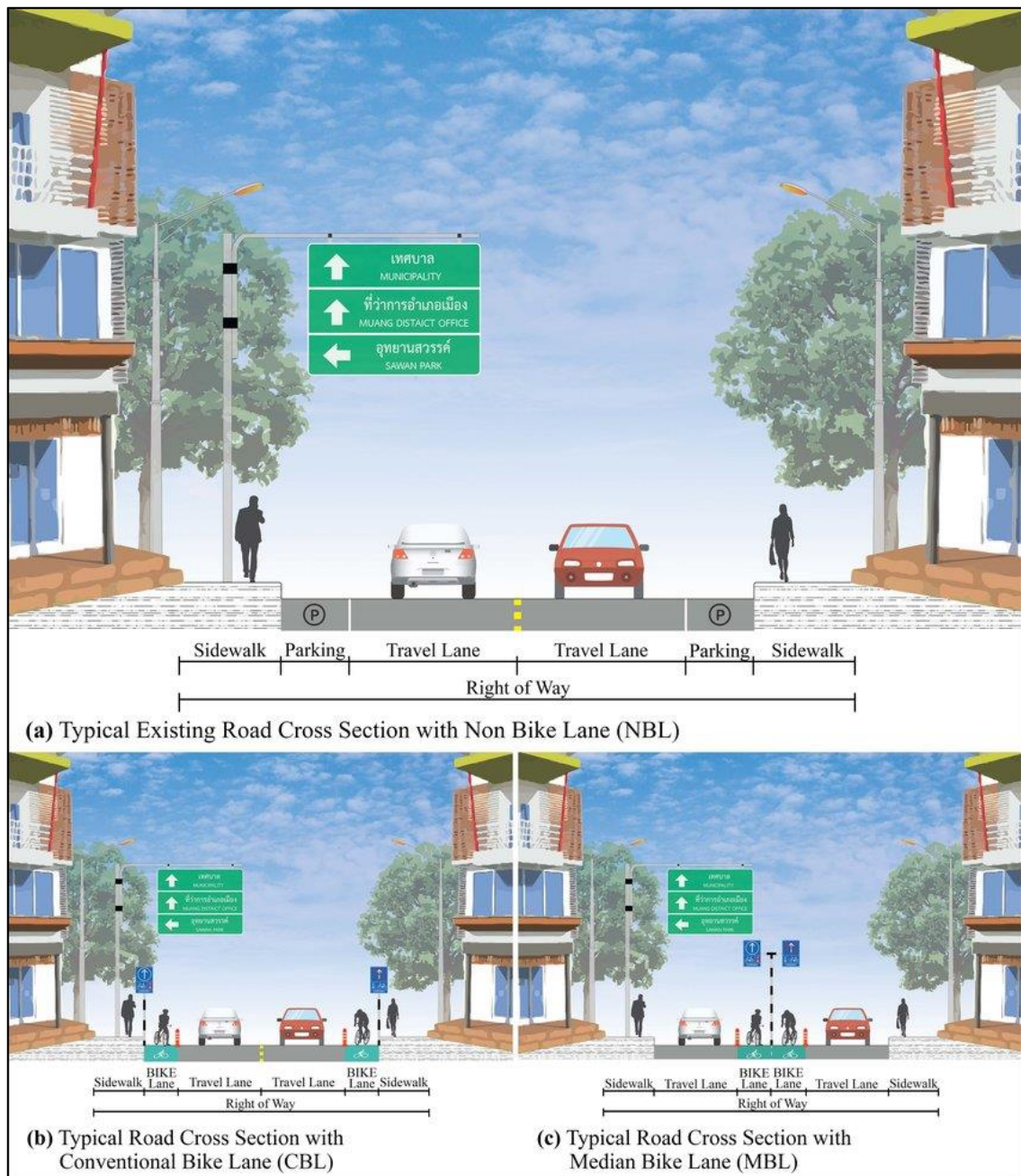


Figure 2. 11. Cross section types [54]

2.2.4. Design Control

The normal function of traffic requires more complex coordination in order for the traffic flow to be smooth and safe. Different control systems are used to achieve this. These systems can sometimes be in systems that contain complex accounts that can adjust themselves according to their location. Existing traffic controllers today continue their

work within the scope of aggregated flow directions. A simple two-way intersection has south-north and east-west directions. However, it consists of a four-way intersection in eight directions, each of which is independently controlled and has leftward deviations. Keeping the number of threads small here ensures that the processes become better in general [55].

Understanding the traffic characteristics and being able to provide all modes of transportation, choosing the appropriate design tool and design speed, as well as determining the access management strategy is the key to successfully creating a project that meets practical design goals. While each of the aforementioned design controls and criteria is a very important factor, all aspects must be considered holistically in order to obtain the best possible result [56].

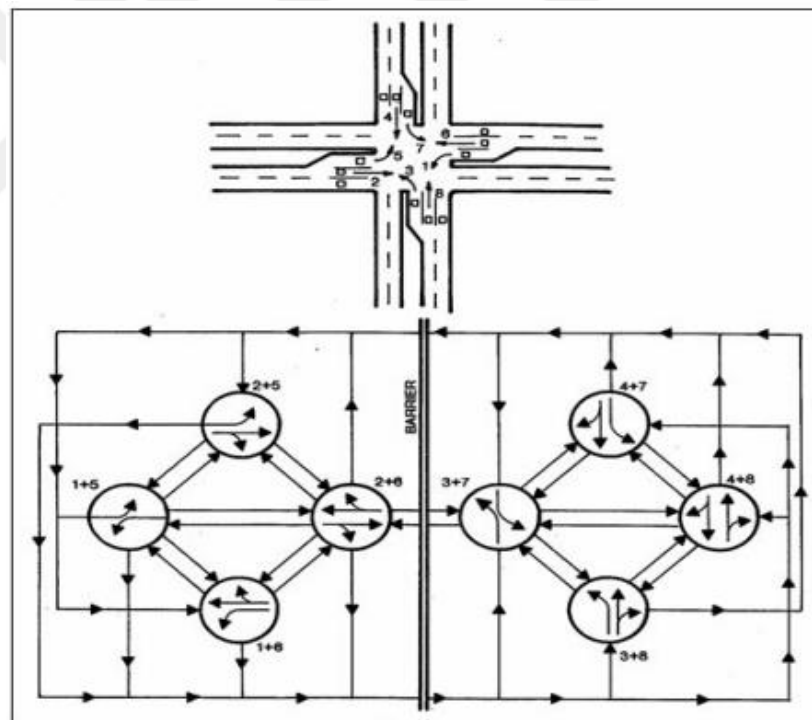


Figure 2. 12. Junction points of roads [55]

2.2.5. Traffic Calming Strategies

When an evaluation is made in the historical process, it is seen that road networks have been expanded and improved in order to adapt to more and faster vehicle traffic, as motor vehicles have become widespread. While the mentioned changes facilitate the outcome,

they generally have negative effects on pedestrians and non-motor vehicle users. The concept of traffic calming is generally a combination of physical measures that reduce the negative effects of motor vehicle use and change driver behavior while improving conditions for non-motorized vehicle users [57].

Traffic calming projects and practices range from minor changes to the restructuring of local roads and even major road networks. In this respect, it can be said that there are different applications of main road design changes from residential areas and settlement areas with low traffic speeds determined as pedestrian-priority roads [58]. When the main objectives of traffic calming measures are evaluated, the first of these is the idea of reducing the number and severity of accidents that occur in urban areas, as well as reducing the traffic flow and speed of vehicles on the street. Various guidelines have been developed so that engineers can provide guidance in terms of traffic calming measures. The measures described in these guidelines are basically evaluated under two different headings, such as controlling the traffic flow and keeping the growth in traffic volume under control. Some of the different strategies put forward are vehicle restrictions, gateways, speed bumps, warning signs, elevated intersections, elevated pedestrian crossings, or special sidewalks and signs. At the same time, making use of rough material on the road surface, radar hourly traffic speed measurements, and lane narrowing are also some of the strategies applied [58; 57].

2.2.5.1. *Lane Narrowing*

Narrow lanes generally reduce the right of way, making drivers more alert to traffic and other users. In this way, the speeds on the city streets are reduced and accidents are minimized [59].



Figure 2. 13. Lane narrowing [59]

2.2.5.2. ***Reduce the Corner Radius***

There is a direct risk between the size of the curb radius and the rotational speed of motor vehicles. Sidewalks with a wide radius are places where large fire trucks or large trucks and school buses can easily turn, but also allow other drivers to make high-speed turns. However, sidewalks with wider radii increase the pedestrian crossing distance. Drivers driving faster are less likely to stop for pedestrians, but a larger radius allows a longer transition distance for pedestrians. At this point, it should be noted that very wide curb radii are not as advantageous as the problem caused by very narrow curb radii. It is of great importance to find an optimum ratio to include the width of the parking martyrs and bicycle martyrs on both streets by determining an effective radius [82].

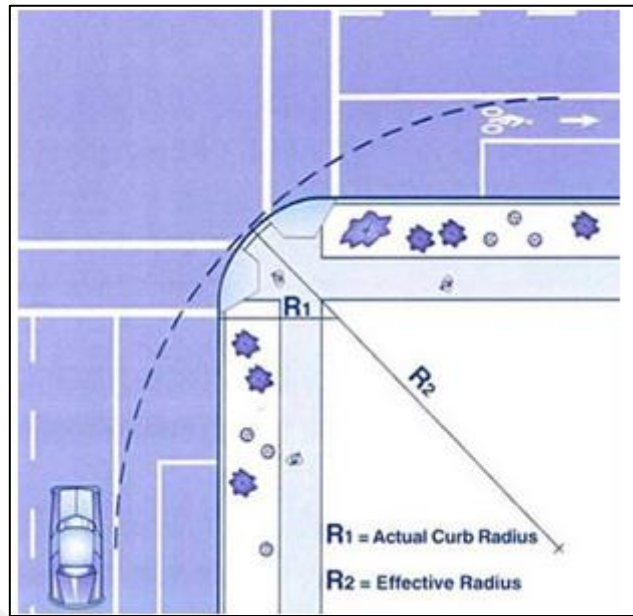


Figure 2.14. Reduce the corner radius [82]

2.2.5.3. *Gateway Treatments*

Gateway treatments warn drivers that they are entering a slower area. This includes signage, entrance portals, speed charts, elevated sections, and pavement extensions [59].



Figure 2.15. Pavement extensions [59]

2.3. ECOLOGICAL STREET STRATEGIES

2.3.1. Street Ecosystem

Strategies related to the street ecosystem have a critical role in urban planning. These strategies, which are considered the main guide of planning, help to determine the content of the building as well as to reveal the working methods. The content of the ecological strategy to be implemented eliminates the correlation problems in reaching a solution between many different strategic factors, and also helps to reconcile planning elements such as ecosystem and system theory. With the improvement of the street ecosystem, it is aimed to develop the design for pedestrians. In addition, it is aimed to increase the environmental quality in the pedestrian zone. Just as there is a desert ecosystem, a forest ecosystem, or a terrestrial ecosystem, streets form a kind of ecosystem [18].

The street ecosystem basically consists of both a natural and an artificial environment. Here, the natural environment consists of original elements created by the natural topography. The artificial environment, on the other hand, consists of many elements such as recreational streets, commercial streets, sidewalks, living spaces, historical ruins, various stations where pedestrian areas are integrated with transportation areas, and traffic areas. Here, the quality of the ecosystem is very important for the awareness of sustainability [20].

Individuals have a controllable position in the urban ecosystem. There is serious resistance to the applicability of the strategies that arise due to the decline in the quality of the urban ecosystem due to the human factor. However, at this point, it is necessary to focus on the fact that the street ecosystem should basically serve people and have a usable function [18].

2.3.2. Ecological Elements Integrated into Streets

Due to the rapid increase in population, the acceleration of urbanization causes the rapid disappearance of green areas both in and around the city. The situation where the disappearance of green areas affects individuals the most is the records that occur around

the buildings where daily life takes place. The loss of green areas, especially in the immediate vicinity of living spaces, has negative effects, especially on urban life [66].

The many specializations and disciplines involved in scenic and pedestrian zone planning make up different aspects of the urban ecosystem. Therefore, at this point, it is aimed that the urban ecosystem will guide ecological planning. It is very important that the ecosystem is harmonious and that it overlaps with the order of nature [21]. Considering the negative effects of environmental degradation and disturbances occurring today, it can be said that great efforts should be made to re-harmonize the ecosystem. Because the aforementioned environmental degradations contain many negative aspects both physical and social. These effects, which can be summarized under general headings such as environmental pollution, deterioration of the urban climate and urban technology; temperature change, the disappearance of the usual species in the environment, or the difficulty of drainage are serious negativities. Social deterioration, on the other hand, arises with the elimination of areas that are necessary for people, especially in cities. Insufficient sports fields, green areas, park areas, or playgrounds for children that should exist in cities cause social deterioration [66].

The harmonization of ecological elements in the natural environment requires that the designed pedestrian and landscape environments be realized according to certain expertise. Existing conditions constitute a group consisting of interrelated components as well as being a whole. Therefore, the emerging system here represents an organic whole [18]. The correct functioning of these systems is also possible with artificial elements that will be integrated into the existing ecological elements. The ability to integrate these elements correctly with each other develops in relation to interdisciplinary working methods [22].

2.3.3. Accessibility of Streets

One of the most important features that streets should have is accessibility. This concept means that all spaces, built areas, transportation systems, existing structures, and buildings are accessible and usable by all people. In addition, this concept characterizes a definition beyond the understanding of physical access. Accessibility also means that every element of social life is open to people. At this point, the fact that the streets have an open and

accessible location will make the aforementioned streets preferable for the communities [95].

2.3.4. Height of Sidewalks

Sidewalks on the streets are also an important factor for ecological street strategies. According to the legislation set forth for pavement heights, their height must be between 6 and 15 cm. However, it is very important that the pavements are covered with a non-slippery floor material, that is, they do not pose a danger to pedestrians. The surface of the pavement should ensure that people with walking difficulties and wheelchairs can move smoothly and that their movements are not hindered in any way. The joints between the material forming the pavement surface should be small. However, the water accumulating on the pavement must have a maximum of 1% in the training that will ensure the flow of the street. When this situation increases, it becomes very difficult to drive a wheelchair on the sidewalk. Another prominent feature is that the pavement width is at least 2 meters. It is accepted that this width is necessary for individuals who use wheelchairs and walkers to pass side by side. Ecological streets basically aim to design comfortable areas for individuals. At this point, it is possible to say that pavements are very important areas for individuals. Insufficient pavement width causes individuals to bump into each other and feel uneasy. The free walking of individuals and naturally the pavement layout have a great impact on the quality of the environment and, accordingly, the city [95].

2.3.5. Biophilic Design on the Streets

Streets have become the focal point of life in cities from the first moment they were built. Because the streets provide a space and accessibility for the realization of nearby social activities [13]. The concept of biophilic urbanism, which emerged in order to make streets better places, accepts that nature is not only for infrastructure or buildings but also for nature and people. Therefore, at this point, the understanding of biophilic urbanism helps to ensure the balance between the individual and the infrastructure, as well as to build the structure of cities in a more purposeful way [14].

Biophilic design elements seek to help integrate nature internally and externally into buildings, infrastructure, or urban spaces, and to provide contact between man and nature in a modern framework. The adoption of these design principles and strategies creates more habitable spaces for humans as biological organisms [16]. Biophilic design, which helps to reduce the urban heat island effect in addition to human-centered goals and human benefits, also provides carbon dioxide capture, rehabilitation, and restoration of lost habitats, and helps increase urban diversity. Renewal of natural systems is also ensured in biophilic design, where interrelated design solutions from multiple perspectives are encouraged [17].

2.3.6. Pedestrian Path Elements on Streets

The most defining elements of the social city are squares, pedestrian areas, public transport, and bicycle paths. Squares are ideal places to create spaces for people living in the city to come together for a reason. Pedestrian areas, on the other hand, are very important for facilitating the flow of people in areas frequently used by individuals. Over time, with the increase in automobiles, the automobiles occupying every part of the city caused the narrowing of the pavements and the squares not as often as before. This situation has caused the mentioned areas to move away from green and create an unhealthy habitat. At this point, it can be said that arranging the places with great potential in the city as a square, pedestrian areas or bicycle roads will provide ecological benefits [96].

All local crossings or paths must be carefully designed so that city walks can become continuous. With all crossings having simple and smooth structures, pedestrians will move more comfortably. For individuals with physical disabilities, this is a more important agenda item. Today, various measures are taken especially for the blind and walking disabilities within the general standards accepted by the world, but these measures are still not implemented in most regions [95].

The ecosystem in the pedestrian zones and the strategies for the design and planning of pedestrian streets develop depending on the integrated cooperation between the disciplines. Expertise in planning systems has a leading and cohesive role with a multidisciplinary approach [18]. Fields such as ecology, garden architecture, environmental engineering, and biology collect ecological information. Architects also carefully use all this information to

reach a solution [23]. In accordance with the pedestrian pathway ecosystem theory, it is very important that fields such as low-carbon transportation technology, ecological protection, restoration ecology, transportation engineering, environmental engineering, and landscape architecture work collaboratively. In this way, it will be possible to make a perfect ecological planning [18]. Making ecologically correct planning is directly related to the interdisciplinary working method and cooperation [24].

2.4. ALTERNATIVE STREET DESIGN STRATEGIES

2.4.1. Definition of Complete Street

Complete streets are designed and operated within this scope to ensure safe use for all users and to support mobility. These streets focus on providing favorable conditions for pedestrians, cyclists, or drivers. The concept of Complete Street encompasses multiple approaches to the planning, design, and operation of roads and rights of way that all users keep in mind in order to make the transport network much safer and more efficient. Complete streets policies are set at the local level but are generally supported by road design guidelines [60].

Although Complete streets is a process for street design, there is no single design plan for them. Each design plan that is revealed is unique to itself but is planned in a way that responds to its own community. In this context, various strategies such as making pavements more comfortable for pedestrians, enabling more efficient use of bicycle lanes, more comfortable travel by buses and other motor vehicle users, and optimum use of stops for public transportation vehicles are complete street strategies [61].



Figure 2. 16. Michigan municipal association [61]

2.4.1.1. *Design Principles of Complete Street*

While municipalities and local governments adopt Complete Street design principles by developing different policies, it can be said that most of the existing road design principles and standards used in the past years are rapidly getting old. In this period, when alternative transportation methods were increasingly encouraged and city planners were working extensively on Complete Street, various design principles began to be considered more warmly. Although it has a new structure that requires adherence to the Complete Street design policy, there is a significant increase in infrastructure projects on the subject. At the same time, there is a positive increase in urban road retrofit projects where existing corridors are improved and developed to meet the design requirements of Complete Street [62].

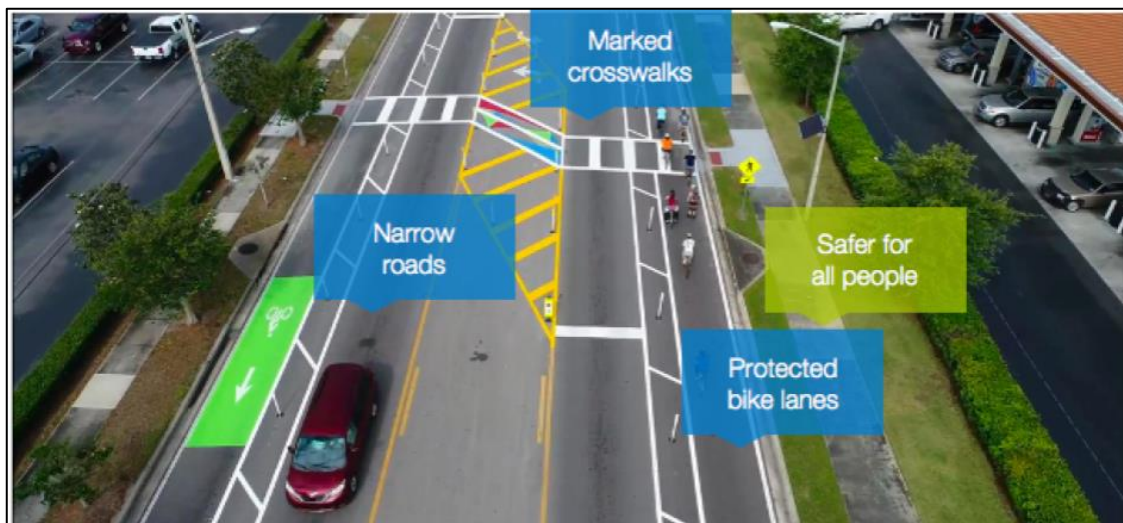


Figure 2. 17. Design principles of complete street [61]

Today, many cities accept the design foundations of Complete Street at the policy level, and at the same time carry out various studies for the acceptance and understanding of these design principles among departments. However, many risks are taken in the approval and design phase of the Complete Street corridor, which is still a newer chain of principles. The design principles that emerged against the old design guidelines become a risk factor with the applications that were not implemented before. In addition, some experts focusing on Complete Street design strategies consider this issue as a safe and efficient pedestrian movement, while another group of urban reinforcement projects can consider traffic as the leading priority. Therefore, different views on the subject become contradictory to each other. In order to develop a corridor that uses the Complete Street design tradition, municipalities must first be educated and informed. However, it is of great importance to carry out various initiatives in order to direct the authorities to the most appropriate solutions [62].

Although streets are public spaces, they can generally be considered the most important areas of city life. Streets are not only places for travel, but also play a huge role in the public life of cities and communities. Therefore, it is of great importance to design these areas as movement channels. Cities have realized that streets are an economic asset as well as a functional element. Therefore, well-designed streets provide much higher income for businesses as well as higher values for homeowners. Engineers doing research on the subject work to make the streets suitable not only for buildings but also for pedestrians and motor vehicles. Strategies implemented in this context include many strategies from

moving sidewalks to changing alignments, from lighting corners to directing traffic. Since the streets in the cities were built in many different periods, they were only changed and revised, and restructured in order to meet new needs. With these revisions and traffic calming methods, street areas are becoming safer. In addition to all this, it should not be forgotten that streets in general should be designed as ecosystems where man-made systems try to integrate with natural systems. From permeable pavements that manage stormwater runoff to street stones that provide shade to biological ditches, for example, providing an ecologically long-term and sustainable design is critical to the health of cities [63].

2.4.1.2. *Advantages and Limitations of Complete Street*

The concept of Complete Street refers to designs that include public transportation, automobile, bicycle, and walking paths, as well as nearby businesses and pedestrians. This type of street design often helps to create highly fashionable transportation systems and a more livable environment. Complete Streets also provides benefits in creating an improved environment for non-drivers. Strategic planning such as accessibility, user savings, and emission reductions also provides many benefits to increase the development level of countries. The most important benefits of the realization of Complete Street designs are the creation of street projects in which the demands of individuals will be realized, together with alternative modes [64].

When the advantages of Complete Street are evaluated, the most important of these is creating a safer driving opportunity with the designed lanes and providing a safer passage for pedestrians. At the same time, these designs make bike lanes longer, leading to an incentive for individuals to cycle. Complete Street designs, which help pedestrians to cross traffic lanes in all directions, are also of great importance for oncoming traffic flow. In this context, a more pedestrian-friendly environment is created by providing wider sidewalks [65].

2.4.2. Definition of Green Streets

The basic principle of green infrastructure includes reducing and increasing rainwater close to its source. Urban transport routes integrated with green elements are often called green streets. Green streets create significant impacts for more livable communities while

carrying out various works from the creation of rainwater used together with the natural environmental regulations they contain to improved water quality. Although the appearance and designs of green streets vary, their functional goals are the same. Among these, there are targets such as providing source control of rainwater, transporting it to the collection system, and ensuring environmental improvement by limiting pollutant transmission [70].

2.4.2.1. *Design Principles of Green Street*

Capturing, filtering, and collecting rainwater in a common area is very important in urban environments where the impermeable surface covers more than 60% of the entire land area. With sustainable rainwater infrastructure, it is possible to filter pollutants from the water and restore the hydrological cycle with the protection of water resources. Green streets are a very important part of urban design, where streets are viewed as public spaces. The inclusion of green elements in the streets helps to improve mental and physical health by helping to achieve better air quality in areas with limited access to parks, increasing natural areas. The benefits of green rainwater infrastructure are more prominent, especially in regions exposed to disproportionate air and water pollution in certain periods of history. However, it is ensured that the green street works mentioned in the poor neighborhoods are carried out quickly. Street areas are shared fairly between pedestrians and drivers in the projects of building streets with green infrastructure. To define it more accurately, it can be said that there is a suitable integration for traffic safety and mobility with people walking and cycling on these streets. Green infrastructure projects have the feature of being used in an integrated way in order to realize the existing ecological effects more effectively than the existing city projects. Strategies for stormwater management should be planned and implemented considering the potential impacts of climate change and storm events, as well as life-cycle costs. Properly designed green street elements also extend the useful life of existing gray water systems and pavement surfaces if properly operated and maintained [71].

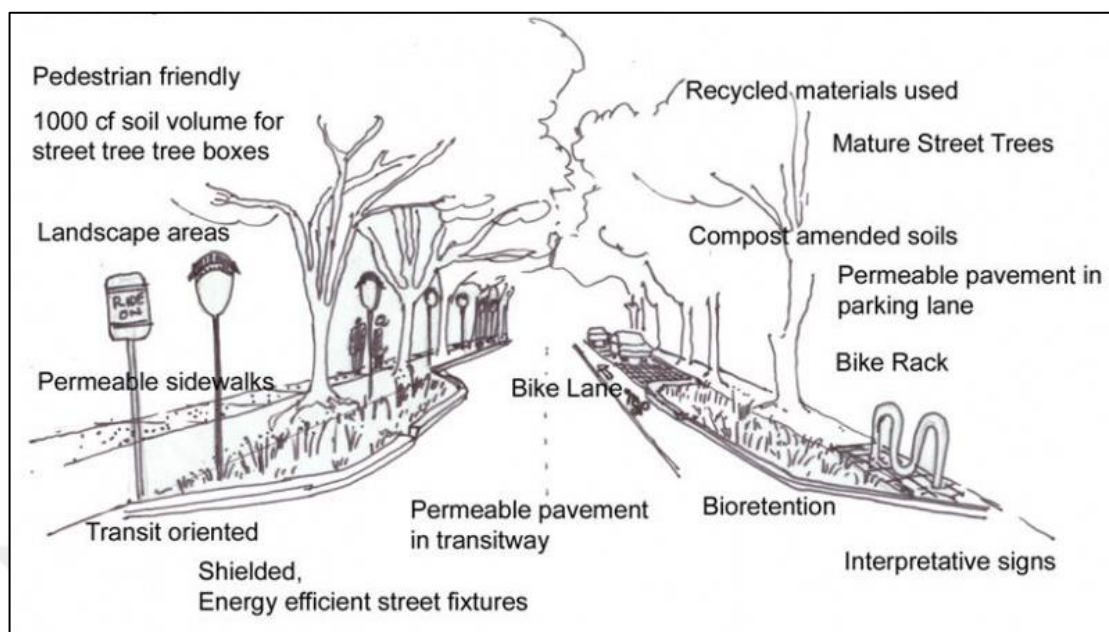


Figure 2.18. Design principles of green street [70]

Green streets provide integrated stormwater management, especially in transitional areas, and help reduce the volume of stormwater gutters by discharging water through pipes into receiving streams, rivers, or larger bodies of water. At the same time, local air quality is improved by stopping particulates in the air and providing shadows in the cooling network, along with community efforts to develop local green infrastructure networks. In addition, a better road experience for pedestrians is built with the created transit corridor [70].

2.4.2.2. *Advantages and Limitations of Green Street*

Green streets are not only a technique that improves rainwater management, but it is a very broad concept that provides different advantages to people and the environment. In addition to other techniques, pollutants are removed from rainwater, and water quality is improved. This situation causes green streets to be perceived as direct rainwater management. Green streets also reduce the risk of flooding in urban areas by reducing impermeable water surfaces. By establishing a system that allows rainwater to infiltrate into the groundwater layer, an increase in the water source and regression in the groundwater source are created. Established greenways also contribute to improved air quality by helping plants and trees remove airborne pollutants. At the same time, it is also possible to reduce the air temperature by preventing ecological destruction with vegetation and trees, increasing evaporation and shadow environments [72].

The heat island effect is greatly reduced by cutting impermeable surfaces and creating a green landscape. The use of vehicles in urban areas provides great benefits in reducing the bad effects of the heat island due to the shadows that trees will create. In addition to the shadows of the trees, the green structure is combined with the blue, and the streets become more beautiful and the comfort of the neighborhood increases. In addition to all these, increasing biodiversity with the use of trees, vegetation, and soil in urban areas is one of the benefits of green roads [72].

While greenways are generally a cost-effective technique, the hard materials used, such as pipes and concrete ponds, help reduce costs for the traditional drainage system as well as save on maintenance costs. Together with the green roads, environments, where green and blue are intertwined on the street, are created, and designs that stand out in terms of design are realized. This situation also improves the physical activities and social interaction of individuals. Other social benefits of greenways are linked to a calmer mind, mental well-being, and psychological health. A study led by the University of Delaware links green streets with a reduction in crime, which is seen as a social benefit of green streets. At the same time, according to this research, green roads increase safety as they reduce the risk of accidents [73].

Different elements are included in the greenway design in order to prevent a decrease in productivity and freezing in cold climates. For example, infiltration of water underground, which does not occur well in cold climates, raises some concerns about the freezing of the permeable pavement surface. Elimination of this situation is related to the green road design that will be created in a good way in general [74].

Yeşil yollarla alakalı ortaya koyulan bazı dezavantajlar da bulunmaktadır. Örneğin bazı toplumlar yeşil yollarda park yeri eksikliği olmasından şikayetçidir. Sokaklar yeşillendikçe daralmakta ve sonuç olarak da daha az park yeri oluşmaktadır. Aynı zamanda ağaçlar ve ağaçlardan dökülen yaprakların sokağı kirletmesi gibi çeşitli olumsuzluklar da meydana gelmektedir [73].

There are also some disadvantages related to green roads. For example, some communities complain about the lack of parking on green roads. As the streets get greener, they narrow, resulting in fewer parking spaces. At the same time, various negativities such as trees and leaves falling from trees pollute the street [73].

Another downside to green streets is that the use of chemicals that are intended to help trees and vegetation increases the risk of toxic waste spreading. Birds nesting on trees cause pollution of both cars and streets [75]. When all these are evaluated, it is necessary to analyze the positive and negative aspects of green streets correctly and to calculate the benefit-loss ratio well. If the benefits to be obtained outweigh the harms that will arise, this situation can be accepted as a highly applicable situation. Otherwise, in order to prevent minor damages, it is likely to lead to the deterioration or even extinction of very large habitats and ecological balance.

2.4.3. Definition of Healthy Street

Sokaklar genel anlamda herkesin yürümesi ve vakit geçirmesi için davetkar yerler olarak tasarlanmaktadır. Bu durum fiziksel aktivite ve sosyal etkileşim yoluyla bireylerin sağlıklı tutulması anlamını da içermektedir. Sokakların doğru bir şekilde tasarlanıp tasarlanmadığının en iyi tespiti özellikle çocuklar, yaşlılar ve engelliler olmak üzere toplumun her kesiminden bireylerin bu alanları kullanmaktan keyif alıp almadığının ölçülmesi ile gerçekleşecektir [76].

Streets are generally designed as inviting places for everyone to walk and spend time. This includes keeping individuals healthy through physical activity and social interaction. The best determination of whether the streets are designed correctly or not will be made by measuring whether individuals from all segments of society, especially children, the elderly, and the disabled, enjoy using these areas [76].

Healthy streets were a concept that first emerged in London. Within the scope of this concept, the Transport for London program was developed by public health and transport experts in 2014 and was put forward in an urban development-oriented manner. The main purpose of healthy streets designed in this context is to design a long-term plan in which people will be encouraged to walk and cycle. Although this concept is applied in a location-oriented manner in London, it mainly includes various parts such as roads where walking will be encouraged and the bicycle bridge, which is planned to increase cycling [77].



Figure 2.19. Elements to be found in healthy streets [76]

When healthy streets are evaluated, certain basic indicators can be mentioned. These are the areas where people prefer walking, cycling, and using public transportation. In this respect, it is of great importance to providing a design that will allow pedestrians from all walks to move in places that are easy to pass and make people feel safe. At the same time, people living in healthy streets feel relaxed and have the advantage of benefiting from fresh air, shade, and wetlands in a comfortable way. These areas include stopping and resting places as well as being not very noisy [77].

2.4.3.1. Design Principles of Healthy Street

Healthy streets have the potential to create a common framework and a shared vision across sectors including health, transport, spatial planning, environment, and housing. These streets have all forms of transport for walking, cycling, and driving. At the same time, it can be said that the healthy streets approach does not use the terms pedestrians, cyclists, and drivers and does not focus on them. These words are often not viewed in a positive light as they suggest three distinct groups of people fighting to take advantage of street space. Healthy streets allow the designer who designed this street to consider the effects on health and prioritize walking and cycling over accommodation only. This approach supports the development of active streets, creating more opportunities for local businesses to participate. It also supports the environment and active travel [78].

It takes a lot of people to work together to create healthy streets. Guidelines are being announced to improve the experience of using healthy streets in various regions. This guide has been prepared to assist you with very important recommendations that affect the experience of spending time and using the street. It also includes various suggestions that will help individuals develop their thoughts on healthy streets and improve the experience of being on the street. Despite the healthy street indicators, it is unfortunately not possible to measure street performance objectively [79].

The steps towards realizing the vision of healthy streets involve several factors. Chief among these factors is improving local environments by providing more space for walking and cycling and better public spaces where people can interact. Then there is the priority of safer routes for walking and cycling, along with healthier and more affordable public transport. The development of walking corridors with public transport connections so that people can go to local shops, schools, and workplaces by walking or cycling, and at the same time, making quiet road networks sustainable are among the steps towards realizing the vision of healthy streets [80].

2.4.3.2. *Advantages and Limitations of Healthy Street*

Healthy streets, which provide various advantages for pedestrians from all walks of life, primarily attract the attention of pedestrians with the shade and shelter areas they create. Afterward, the advantages of healthy streets are the creation of places to stop and rest areas without noise, and areas where people are encouraged to walk and cycle. A report by Transport for London suggests that individuals make substantial investments in their health when they walk or cycle for 20 minutes a day. If this situation becomes sustainable and continues for 25 years, it is predicted that a savings of 1,700,000,000 pounds will be achieved in health treatments. At the same time, the risk of type 2 diabetes decreases by 50% in individuals who move actively every day. The risk of coronary heart disease decreases by 35%, the risk of Alzheimer's disease by 35%, and the risk of hip fracture decreases between 36% and 68%. A physically sedentary lifestyle constitutes one of the most serious public health problems of our age. Along with healthy streets, individuals are encouraged to go out, and the phenomenon of inactivity is largely eliminated. The most sustainable way to have a healthy life is to take a walk in the area where you live daily, or at least to choose walking paths while commuting. The easiest way out of this situation is to increase healthy streets and increase the rate of curfew of humanity [80].

With healthy street works, road traffic is reduced and people can benefit more from healthy areas with road traffic rerouting. Individuals feel the desire to go out because they get more fresh air and experience less noise pollution in healthy streets. At the same time, healthy streets, which are made safer for individuals, allow people to encounter interesting and attractive parts of the city. This helps to gain direct environmental experiences and also helps to improve the level of mental health [77].

2.5. COMPARISON OF COMPLETE STREETS, HEALTHY STREETS AND GREEN STREETS

Table 2.1. Comparison of Complete Streets, Healthy Streets and Green Streets Table

	Complete Streets	Healthy Streets	Green Streets
SAFETY AND TRAFFIC PLANING			
Fewer cars overall	x	x	x
Reduction in the use of fossil fuel vehicles		x	
Development in public transport	x		x
Increase in public transport	x		x
Reduction in greenhouse gas emissions			x
Increase in walking and cycling infrastructure	x	x	x
Safer street designs for pedestrians	x		
Reduction in noise level		x	x
ECOLOGICAL			
Improved air quality		x	x
Improving the urban climate			x
LANDSCAPE DESGN			
Increase in pedestrian mobility	x	x	
Increase in quality of life	x		x
Increase in neighborhood attractiveness		x	x
Enhanced green spaces			x

When the above table prepared as a result of the data obtained in the research is evaluated, it is seen that there are some similarities and differences between completed streets, healthy streets, and green streets. According to this table, the completed streets generally aim to create easy-to-use roads for pedestrians. Healthy streets, on the other hand, are trying to create healthier spaces for people. When green street designs are evaluated, it is seen that they both provide benefits for transportation, aim to improve the health of individuals, and maintain the ecological balance in nature. It is seen that the completed streets have features such as an increase in walking and cycling infrastructure, an increase in pedestrian mobility, and a decrease in deaths and diseases due to these. Again, with the increase in the walking area for pedestrians, the decrease in the number of cars helps to increase the rate of public transportation, leading to fewer cars on the roads. When healthy streets are evaluated, items such as improved air quality and reduction in fossil fuel vehicle use are seen. At the same time, it is seen that it has features such as an increase in pedestrian mobility, a decrease in noise level, an increase in neighborhood attractiveness, and generally less driving due to the increase in walking and cycling infrastructure. Green streets, on the other hand, have features such as an increase in water and heat retention, a decrease in the urban heat island effect, and improved green areas.

3. MATERIAL AND METHODS



Figure 3.1. The surveyed area in Tekirdağ city center, prepared by the author.

The research was carried out in Tekirdağ Çandarlızade İbrahim Paşa Street. Due to the large number of factors that make up the street design elements in Tekirdağ province and the fact that these factors directly affect people's daily lives, the quantitative and qualitative characteristics of these resources are considered as materials.

Environmental plan plans were obtained from Tekirdağ Municipality in Nedcad in order to carry out survey studies for the research. In addition, various data were obtained by making use of the available plans. In addition, photographs of certain areas of Çandarlızade İbrahim Paşa Street were taken and these visual materials were evaluated in the study in order to examine the current situation correctly and to have more information about the region. Besides all these, domestic and foreign sources related to the subject, previous research data in Tekirdağ and relevant newspaper news on the subject were used as supplementary material.

In the quantitative part of the study, a survey was conducted for the people living in Tekirdağ Center. While determining the sample of the study, the total number of

individuals residing in Tekirdağ Center was taken into account and the 'random sampling method' was used to determine the sample size. In this sampling method, the ordering of the units that make up the universe is carried out in an impartial way and the sample is determined systematically by using the order in the ready lists [98]. As a result of the random sampling formula used, it was decided to conduct the survey with 352 people. The size of the sample was calculated according to the formula below.

$$n = N \cdot P \cdot Q \cdot Z_a^2 / (N-1) \cdot d^2 \quad (3.1)$$

N: Number of residents in Tekirdag Center,

n: sample size

Z_α : $\alpha = 0.05$ to 1.96

d= sampling error (0,05)

p: Probability of Seeing (0,5)

q= Probability of Not Being Seen (1-p) (0,5)

The number of participants calculated according to the total population of Tekirdağ was 352 and questions were prepared for these participants. Demographic data was also taken into account in the questionnaires in order to clearly determine the tendencies of the participants. The data obtained from the questionnaires were digitized with the SPSS analysis program and chi-square analyzes were performed.

3.1. QUESTIONARIE FORMATIONS

3.1.1. Survey Questions

With this survey, it is aimed to evaluate the street designs in Tekirdağ in terms of user satisfaction. During the application of the survey, it was stated that the names of the participants of the research would be kept confidential and the data would only be used for the research mentioned above.

A survey prepared in three section and aimed to evaluate general information about participants, level of perception of participants related to street design elements and their

opinion and proposals about changes that design in Tekirdağ were asked. In the first part of the survey (in the first seven questions), the participants were asked questions about their preferences in transportation and the design of the street within the scope of these preferences. In Question 8, the participants were asked a question about the adequacy of the complementary elements on the street. Here, options such as not enough, should be reduced, sufficient, should be increased and must be increased were presented and they were asked to make a decisive choice for each element. In the last part of the questionnaire, personal questions were included in order to determine the demographic characteristics of the participants. Participant were randomly chosed and both face to face interview and Google Forms were used. The questionnaire form is also included in Appendix A. Questionarie analysis and findings are given in Section 5, findings and discussion part of the thesis.

3.2. SITE SELECTION

Çandarlızade İbrahim Paşa Street, located in Hürriyet Neighborhood, within the borders of Tekirdağ Province Süleymanpaşa Municipality, was chosen as the study area. The most important factor in choosing this street, which is approximately 2500 m long, is that it is located in a developing part of Tekirdağ. The street is also located on an axis where many official institutions have recently moved and serves them. Therefore, with this feature, it becomes a very remarkable region.

There are residential, commercial, educational, park, official service and sports fields along the street. It is a busy street in terms of vehicle and pedestrian traffic due to the fact that the street is connected to the ring road in the North direction and has functions with a high attraction feature. This street plays a complementary role in connecting other busy districts of Tekirdağ as well. When all these data are evaluated, it can be said that there are many deficiencies due to the fact that it is in a new construction area that is open to development and needs various needs. There is enough space to make the right designs on this 2500 m long street. Therefore, the design proposals and landscape structures to be developed in order for the region to have a correct design will help this street, which has a great potential, turn into a more comfortable area. Considering that the projects to be realized on

the street will contribute greatly to the Hürriyet Neighborhood in terms of both pedestrian and vehicle traffic, this street was preferred as the study area.



4. GENERAL INFORMATION OF TEKİRDAĞ AND SITE EVALUATION

4.1. LOCATION

Tekirdağ province, located in the Northwest of Turkey between 40° 36' and 41° 31' North latitudes and 26° 43' and 28° 08' East longitudes, is adjacent to Edirne, Kırklareli and Çanakkale provinces. While Kırklareli is located in the North of Tekirdağ, Edirne is in the West of Tekirdağ and Çanakkale is also in the West. There is the Sea of Marmara in the south of Tekirdağ, and it is a region covered with plateaus, plains and mountains up to the Black Sea in the northeast. 9.3% of Tekirdağ is covered with mountains, 15.5% of it is covered with plains and 72% of it is covered with plateaus. Tekir Mountains, starting from Kumbağ and extending to Gelibolu, have an area of 6217.88 km². As you go further from Çerkezköy, it is seen that the Istranca mountains rise. Ganos mountain, reaching a height of 945 meters, constitutes the highest point of Tekirdağ. Plains and plateaus of Tekirdağ are located in the West and Northeast regions. Although the plateau in the western part has the characteristics of an old plain, the plateau in the northeast is 150 to 200 meters high. Most of the plains in Tekirdağ are formed in stream beds reaching the sea.

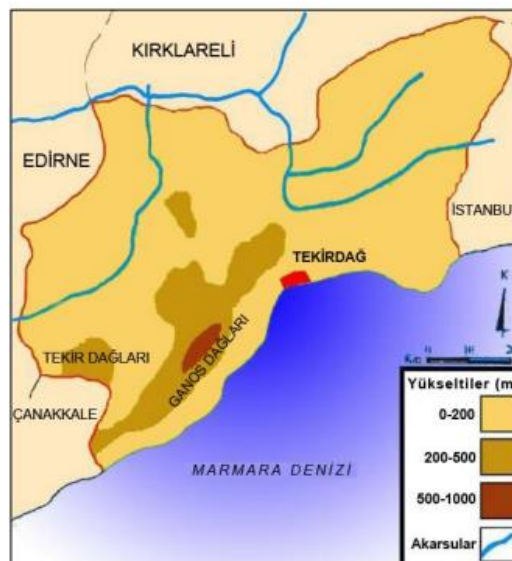


Figure 4.1. Location of Tekirdağ province [83]

4.2. TOPOGRAPHY AND CLIMATE

Tekirdağ, which is not considered very rugged when compared to Turkey in general, does not have steep aims, high mountains or high valleys. Along the coastline of the Sea of Marmara, there are coastal plains covered with alluvium brought by rivers over time. In the northern parts, in parallel with these alluviums, Tekir Mountains are located. Tekir Mountains, being the most important elevation of the province, start from Kumbağ parallel to the Sea of Marmara and stretch for 60 km in the direction of Gelibolu [83]. In terms of landforms, 75.2% of Tekirdağ province lands, located on the Thrace-Kocaeli peneplain, are covered with plateaus, 15.5% plains, and 9.3% mountains. The plateaus in Tekirdağ have the character of an erosional surface. There are Istranca in the north, Tekir Mountain and Koru Mountain and Ganos Mountains in the south [85].

Mediterranean climate is felt on the shores of Marmara. For this reason, summers are hot and dry. Precipitation occurs in winter and spring periods. Although the continental climate is dominant in the interior, the winters are colder than the coasts. The annual precipitation average is 590 mm. In some regions, it rises to 725 mm. During the year, the temperature is below 0°C for 30 days and above +30°C for 15 days. At the same time, it snows an average of 5 times a year and remains covered with snow for about 10 days. The temperature ranges between -13.5°C and +37.6°C. Most of the province has the appearance of steppe. The forest existence in Tekirdağ is low. 17% of the province's land is forest. There are pine forests in the Bahçeköy region of the Saray district and oak forests in the Istranca Mountains extension to the north of the Saray and Çerkezköy districts. 5% of Tekirdağ land is meadow and pasture, 77% is cultivated and planted areas [84].

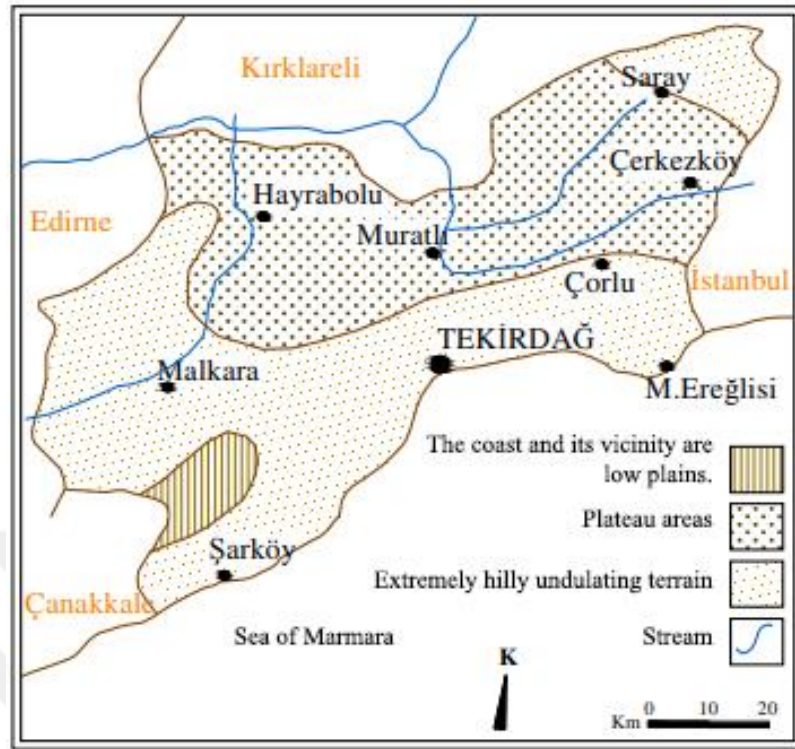


Figure 4.2. Tekirdağ province morphology map [86]

The Ergene part of Tekirdağ is located in the Ergene basin, which joins the Meriç River, which resembles a triangular shape. It can be said that the Ergene section is a plateau at an altitude of 50 and 200 meters from the sea. In the western part of the province, there are extensions of Tekir Mountains along the borders of Tekirdağ-Çanakkale and Tekirdağ-Edirne. In the eastern part of Tekirdağ, in the Saray and Çerkezköy regions, the extensions of the Istranca mountains make their first lands rough. The elevations in this section are lower than the western parts [86].

Tekirdağ is included in the semi-humid climate type from the hydrographic parts, which are generally found according to the degree of humidity. It can also be said that it is in the Mediterranean precipitation regime category in terms of precipitation regime. On the Tekirdağ coastline, where the effects of the Mediterranean climate are experienced, summers are hot and winters are mild. It can be said that in Tekirdağ, the least rainfall is seen in August and the maximum rainfall is seen in December [85].

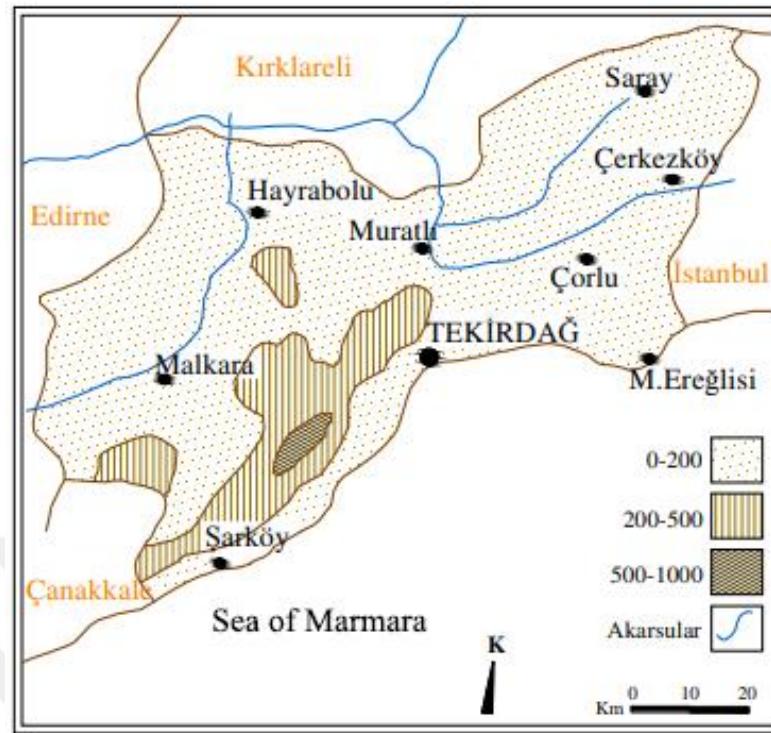


Figure 4.3. Topographic map of Tekirdağ province [86]

When the vegetation and natural life in Tekirdağ are examined, a very poor landscape appears in terms of vegetation. The most distinctive feature of Tekirdağ climate is the maquis, which develops in accordance with the climate type, on the slopes facing the Marmara Sea. In the interior, which is partially under the influence of the continental climate, oak species, linden, sycamore and elm trees are seen that lose their leaves in winter. The characteristic tree of the rivers is willow. When animal species and animal husbandry are evaluated in Tekirdağ province, it is noteworthy that 25% of the gross production values are met from animal husbandry. There is a numerical decrease in pasture-based livestock, but an increase in the number of cattle is observed [85].

When the geological structure of Tekirdağ is evaluated, a very young structure draws attention. Over time, sediments have occurred in the terrestrial parts of the province, which is covered by the sea. It is known that in the first time period, Tekirdağ was covered with seas and with the erosions that occurred in this time period, terrestrial sediments were formed. It is known that the province is still under water with the rising and falling movements in the second time period. In the third time period, Tekir Mountains were formed together with the North Anatolian Mountains with the effect of alpine institutions. It is known that at the end of the third period, Tekirdağ descended and flattened again in

the Neogene. It can be said that Grey and Marls accumulated on the plateau extending to the north of the Koru, Gölcük and Galoş mountains during this period [86].

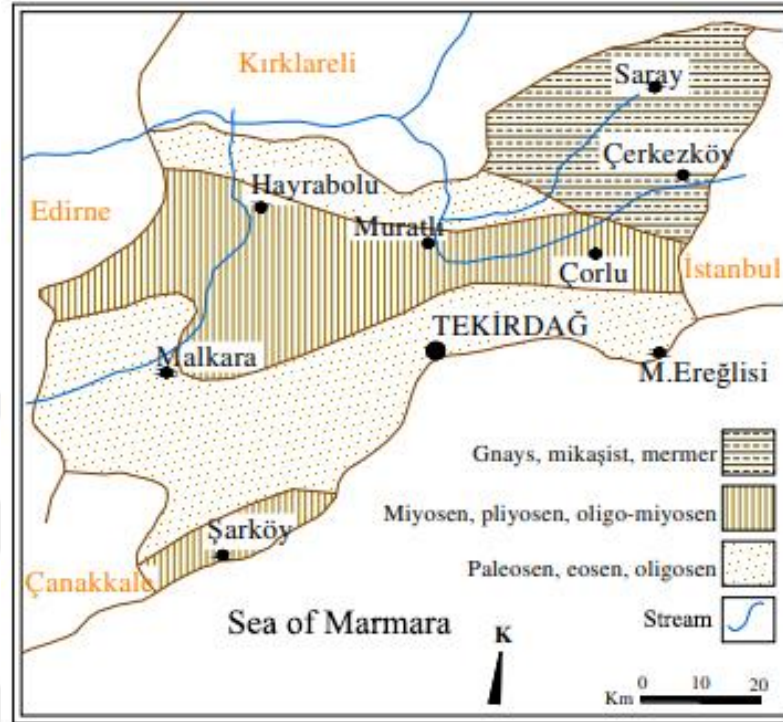


Figure 4.4. Geological map of Tekirdağ province [86]

The geological structure of Tekirdağ took its present appearance in the fourth time period. It is noteworthy that while Thrace and Anatolia are rising, the Black Sea, Marmara and Aegean basins are lowering. It can be said that Tekirdağ is among the earthquake-sensitive regions, since three fracture lines were formed between the Marmara Pit and Ganos Bay, starting from Çorlu and Muratlı and extending to the Southwest, during this time period. There are also some faults that can cause earthquakes within the borders of Tekirdağ province. Saros and Gaziköy faults are the leading ones among these, and the segments located on the edge of the depressions in the Marmara Sea can also be considered as fault fragments [86].

4.3. EXISTING CULTURAL CONDITIONS

4.3.1. Demographics and Housing

According to the general census carried out in 2021, Tekirdağ city center has a population of 176,848 people. 90,594 people of this population are men and 86,254 are women. Although it is known that the population is less in the villages, the population density is generally in the districts [97].

Unemployment information was compiled in accordance with the censuses carried out in 2000. According to this information, it can be said that the unemployment rate in Tekirdağ is 6.3%. While this ratio is 6.2% for men, it is 6.5% for women. It is also stated that the unemployment rate is higher in the city center than in the district centers. It is seen that the unemployment rate, which was 13.3% in the center of Tekirdağ, decreased to 11.5% in the district center. In villages, this rate is 0.8%. While it is seen that the unemployment rate of women is higher than the unemployment rate of men in provincial and district centers, it is noteworthy that the unemployment rate of men is higher than women in villages. When the gender unemployment situation in the city center is revealed, it is seen that this rate is 22.3% for women and 10.8% for men. In district centers, these rates are 17.1% for women and 9.8% for men. As stated above, this rate is 0.7% for women and 0.9% for men in villages. A large part of the unemployed population consists of the young population. In other words, at this point, it is possible to say that 58% of the unemployed population is younger than 30. The most important feature of Tekirdağ is that it receives a lot of immigration from other provinces. The largest of these migrations was carried out by individuals from the Balkan Countries between 1935 and 1957, but migration from different provinces of Anatolia continues at an increasing rate every year. Although it is seen that the population increase rate was 4% between 2000 and 2001, the population increase is experienced especially due to migration. It can be said that as of 2011, the provinces in Tekirdağ are among the top ten in order of socioeconomic development. The biggest reason for this situation is the industrial developments in the Organized Industrial Zones in Çorlu and Çerkezköy districts in Tekirdağ [88].

Both the touristic features and the commercial and industrial development of Tekirdağ are suitable for a rapid population accumulation. Although there is no school and teacher

problem in Tekirdağ, the schooling rate is much better than in Turkey. It is known that in Tekirdağ, there are 30 students per teacher in the city and 22 students in the villages. There are two faculties and ten higher schools in Tekirdağ. Although there are two state hospitals in Tekirdağ, one of them is located on Muratlı Street and the other on Atatürk Boulevard. One of the private hospitals is located on Muratlı Street, while the other is on the Tekirdağ and Istanbul highways. It can be said that pharmacies are generally located around Government Street and Muratlı Street. In addition to all these, there are seven health centers and one tuberculosis dispensary in Tekirdağ [87].

4.3.2. Current Transportation Situation in Tekirdağ

4.3.2.1. Lane Width

All of the existing ribbon developments in the world are structured according to a certain standard. According to world standards, these dimensions are 3.5 meters wide. Although 3.25 meters is taken in some challenging conditions in the city, it is seen that 3 meters is taken in terms of topographic necessity in some regions. Especially in some regions of Turkey, due to topographical and historical difficulties, it is seen that some of the two-lane main connection roads between the settlements are considered main arteries. In accordance with the law numbered 3030, roads with a width greater than 7 meters are considered main arteries [89].

Table 4.1. Widths by Road Classes (m) [89]

ROAD CLASS	GROUP	UNDIVISIONED ROAD TOTAL TRAFFIC LANES IN BOTH WAYS			DIVIDED ROAD TOTAL TRAFFIC LANES IN BOTH WAYS		
		Each Lane on a Two-Lane Road	Each Lane on a Three-Lane Road	Each Lane on a Four or More Lane Road	Each Lane on a Two-Lane Road	Each Lane on a Three-Lane Road	Each Lane on a Four or More Lane Road
I.RING ROAD	1st GRADE ROAD			3,60 (3,50)*	3,50	3,25	3,25
	2st GRADE ROAD			3,25	3,25	3,00	3,00
II.CITY REGION CONNECTION ROAD	1st GRADE ROAD	3,60 (3,50)*	3,50 (3,25)*	3,25 (3,00)*	3,50 (3,25)*	3,25 (3,25)*	3,25 (3,00)*
	2st GRADE ROAD	3,50 (3,25)*	3,25 (3,00)*	3,00	3,25 (3,00)*	3,00	3,00
III.URBAN REGIONAL RECOVERY ROAD	-	3,50 (3,00)*	3,25 (3,00)*	3,00	3,25 (3,00)*	3,00	3,00
	-						
IV.CITY REGIONAL ROAD	-	3,25 (3,00)*	3,00 (2,75)*	3,00 (2,75)*			
	-						
V.CITY SERVICE ROAD	-	3,00 (2,75)*	2,75				
	-						

In the planning studies carried out in cities in Turkey, the use of existing roads is analyzed in detail by using some functional classification procedures in the formation of the road network or the realization of transportation plans. In addition, it is of greater importance to reveal the road types and geometric features in areas of the city with different functions. It is of great importance that values such as traffic counts and vehicle counts are constantly updated for future traffic forecasts and that the new development areas shown in the zoning plan are evaluated. It is also known that the standards of road types may differ according to the functional, spatial, and traffic-creating characteristics of the regions existing in the city [89].

4.3.2.2. Public Transportation

Tekirdağ is one of Turkey's lucky cities in terms of transportation, but it has very good opportunities. European Transit Roads pass within the borders of Tekirdağ. Being close to Istanbul, which is a very big metropolis today, creates great advantages for Tekirdağ. Although it is known that the highway network of Tekirdağ province is quite good, these roads are well-structured and of good quality. Although Tekirdağ is on the Greece and Turkey highway, the Istanbul-Bulgaria road again passes through Tekirdağ. The central district of Tekirdağ is connected to all parts of Thrace by asphalt roads going in five different directions. The D-100 and D-110 highways and the TEM highway pass through the borders of Tekirdağ province, which are the most frequently imported and exported in Turkey. The D-100 highway reaches Greece from the İpsala Border Gate. TEM highways via D-110 land reach from the Kapikule border to Bulgaria [90].

It is possible to say that the most important transportation routes in Tekirdağ province are highways and seaways. The important highways in Tekirdağ are Istanbul and Tekirdağ in the East, Muratlı, and Tekirdağ in the North, Hayrabolu, and Tekirdağ in the Northwest, Çanakkale and Tekirdağ Highways in the Southwest. The Istanbul - Çanakkale highway, which is used as a coastal road, forms the main transportation axis between the cities and consists of four lanes, two going and two returning. Tekirdağ is a region where freight transportation is carried out quite intensively. Due to its location in the Thrace region, Tekirdağ is located at the most important connection point in Europe. E-80, D-100, and E-84 highways also pass through the province and the total length of the mentioned roads is 430 km. There is a total of 669 kilometers of highway in Tekirdağ, consisting of 378 km of state roads and 282 km of provincial roads [88].

4.3.2.3. *Parking and Inefficient-use Spaces*

In the region subject to the study, there are generally parking lots in the center, but there are not enough parking spaces in the areas that are encountered as you go out of the center. The most important reason why the parking lots away from the center are not sufficient is the newly built settlements in the province, which is developing out of the center. In these areas, there are only parking lots of the buildings in accordance with the parking regulations, but even this is not enough. As can be seen from the Google maps image below, the parking lots are mostly located in the central area.

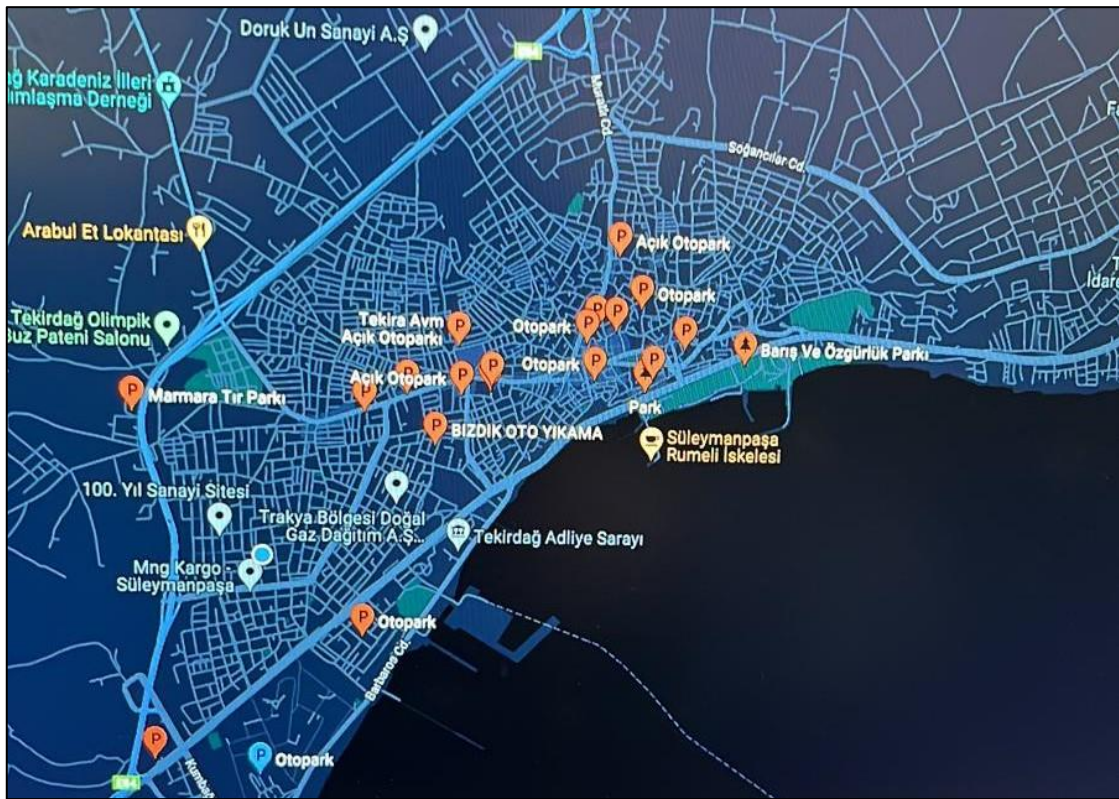


Figure 4.5. Distribution of parking areas in Tekirdağ Center (Google Maps view)

However, at this point, even if there is parking in the center, it is very insufficient and people are constantly parking their vehicles on the side of the road. This situation causes traffic congestion and serious congestion.

Inefficient-use spaces, attention can be drawn to the following regions.;



Figure 4.6. Inefficient-use spaces in Tekirdağ coastal region – 1, determined by author.



Figure 4.7. Inefficient-use spaces in Tekirdağ coastal region – 2, photographed by author.

While it can be used very efficiently after the coastal arrangement in the Tekirdağ coastal region, this area is quite useless due to reasons such as not enough facilities, the useless facilities, and not including all the needs of people in the open air.



Figure 4.8. Inefficient-use spaces in Hürriyet Mahallesi Fatih Sultan Mehmet boulevard area - 1, determined by author.



Figure 4.9. Inefficient-use spaces in Hürriyet Mahallesi Fatih Sultan Mehmet boulevard area - 2, photographed by author.

Similarly, Hürriyet Neighborhood, the area where Fatih Sultan Mehmet Boulevard and Teachers Street intersect, is located in the area where Hürriyet Neighborhood has the highest number of people, where food and beverage venues are concentrated. Due to the inability to provide the parking demand in this region, an idle area emerges where only cars are parked. The aforementioned area creates an ugly appearance as it is next to one of the main arteries of the city. Due to the location of the region, it has the potential to provide the socialization needs of people such as parks and activity areas. Therefore, the

correct evaluation of this potential is very important for increasing the productivity of the region.



Figure 4.10. Inefficient-use spaces in Baykallar territory - 1, determined by author.



Figure 4.11. Inefficient-use spaces in Baykallar territory - 2, photographed by author.

Another inefficient region is the Baykallar region. Although this area is a place that separates residential areas from the main street, a buffer zone can be created in the area. At the same time, with the right landscape work to be done in this region, the region can be made more productive.



Figure 4.12. Inefficient-use spaces located at the intersection of Kanuni Sultan Süleyman boulevard and Hayrabolu street - 1, determined by author.



Figure 4.13. Inefficient-use spaces located at the intersection of Kanuni Sultan Süleyman boulevard and Hayrabolu street - 2, photographed by author.

The intersection of Kanuni Sultan Süleyman Boulevard and Hayrabolu Street, located above, is the point that separates the ring road and Çınarlı District, which is a residential area. This area can separate the Çınarlı Neighborhood with vehicles that will transit from the city. However, the area was left idle in a very neglected way.



Figure 4.14. Inefficient-use spaces on both sides of Çandarlızade İbrahim Paşa Street - 1, determined by author.



Figure 4.15. Inefficient-use spaces on both sides of Çandarlızade İbrahim Paşa Street - 2, photographed by author, photographed by author.

The area above, which is another inefficient area, is located on both sides of Hürriyet Neighborhood and Çandarlızade İbrahim Paşa Street. The area is located right next to the area where official institutions and residential areas are located. A common use area can be built for the people living in this neighborhood by carrying out improvement works.

4.3.2.4. *Cycling*

It is known that Tekirdağ Metropolitan Municipality attaches great importance to bicycle path projects and tries to integrate bicycle paths into zoning plans and intersection solutions. In the first phase of the studies on the implementation of bicycle paths, the 200-meter bicycle path application on the Tekirdağ coast was implemented. It is stated that with the completion of the road, there will be a bicycle path of a maximum of 800 meters. The municipality officials, who have shown that Tekirdağ city has made progress, also state that the topography has become a serious problem in the implementation and planning of bicycle paths. In this respect, it is also stated that the bicycle path projects implemented on the beach are more suitable for the use of people and that the project, which was carried out for recreation in the first place, can be developed for transportation purposes. Municipal officials also stated that they adopted the bicycle path project planned in the filling area much earlier than the Metropolitan Municipality and in this respect, they made official correspondence with the Ministry of Environment and Urbanization. It is emphasized that it is very important to determine which of the purposes such as recreation, urban transportation, and sports will serve during the realization of the bicycle paths, and to realize a design application accordingly [91].

4.3.2.5. *Pedestrian and ADA Accessibility*

Tekirdağ Metropolitan Municipality has taken action in this regard, with the announcement of 2019 as the 'pedestrian priority year' in Turkey. Tekirdağ Metropolitan Municipality Transportation Department Traffic Branch Directorate teams enabled written warnings to be activated on the roads in order to raise awareness about pedestrian priority in traffic and to draw attention to pedestrian priority. While the application is carried out on all roads throughout the province of Tekirdağ, it can be said that the practice of posting 'pedestrian first' warning signs on all roads has been implemented in order to draw attention to the priority of roads in traffic and to contribute to drivers paying more attention to this issue [92].

In Tekirdağ Malkara District, a 'safe traffic in five steps' application was also carried out for pedestrians. District Governor Kerem Süleyman Yüksel, in his statement during the practice he carried out in the government square, stated that the students were given training and stated that he would have conversations with the citizens in the district center and that the citizens would try to understand what their views were. However, the District Governor also stated that vehicle drivers will be warned about this issue and that it will allow pedestrians to use their rights more consciously with hand brochures [93].

4.4. SITE EVALUATION FOR SELECTED STREET (ÇANDARLIZADE İBRAHİM PAŞA STREET)

4.4.1. Current Building Types

When the location of Çandarlızade İbrahim Paşa Street is examined, it is seen that it is located at latitude 40.984276 and longitude 27.544882. The height of the street above sea level is 96 meters. The map of Hürriyet District and Çandarlızade İbrahim Paşa Street, which is connected to Tekirdağ Merkez district as a district, is given below.



Figure 4.16. Çandarlızade İbrahim Paşa Street, drawn by author.

All hospitals, social areas, schools, cafes, etc. on the map. places can be seen. The street, which had not been fully asphalted until 2014, was examined by the Head of the

Department of Science Affairs and it was predicted that the street should be asphalted in order to get rid of dust and mud [94].

4.4.1.1. The Hospitality and Catering Industries

There are 8 food businesses on the street. There is also 1 health center.

4.4.1.2. Industrial Businesses

There is no industrial building on the street.

4.4.1.3. Retail, Health Care and Professional Services

There are businesses providing services in various fields, including a psychologist clinic, dietitian, hairdresser, real estate agent, florist, tattoo studio, tax office, dry cleaning, language course, stationery, and two kindergartens on the street.

4.4.1.4. Residential Buildings

Since Çandarlızade İbrahim Paşa Street is a long street, it can be said that there are approximately 100 residences on it. Although the residences are generally 5-6 story buildings, most of them are a collection of buildings brought together as a site.



Figure 4.17. Çandarlızade İbrahim Paşa avenue street view from north, photographed by author.



Figure 4.18. Çandarlızade İbrahim Paşa avenue street view from intersection to the south, photographed by author.



Figure 4.19. a. and b. Çandarlızade İbrahim Paşa avenue street views showing the residential buildings, photographed by author.

4.4.2. Current Street Space and Building Facads

The study area covers an area of 3.2 km in length and approximately 25 m in width. Although there is no suitable pavement structure for pedestrians to walk in the region, uncontrolled grass growth and rubble heaps are striking in the parts where there is no construction. Along the road, the sites formed by 2- or 3-story structures stand out. At the

same time, in the center of the street, the residences are 4-5 stories, but there are villa-type houses with 2 floors towards the end of the street.



Figure 4. 20. Çandarlızade İbrahim Paşa avenue street view from southern part, photographed by author.

The lack of street design elements such as street paving, lighting elements, and even garbage containers at the beginning and end of the street, that is, in the parts where the density of people is less and the residences are less, is striking.



Figure 4.21. Çandarlızade İbrahim Paşa avenue street view from northern part, photographed by author.



Figure 4.22. Çandarlızade İbrahim Paşa avenue street view from residential, photographed by author.



Figure 4.23. Çandarlızade İbrahim Paşa avenue street view from residential area, photographed by author.



Figure 4.24. View of the northern part of Çandarlızade İbrahim Paşa street, photographed by author.



Figure 4. 25. Çandarlızade İbrahim Paşa Avenue Street View from residential area, photographed by author.

4.4.3. Current infrastructures (stormwater, natural gas, electric, fiber optic cables etc.)

It is seen that the lighting elements on the street, which is the subject of the research, are arranged in an orderly manner, but these poles are more scattered in the connected streets. It has been determined that the manhole covers on the street are insufficient and it is predicted that this deficiency creates a deficiency in heavy rainy seasons.



Figure 4.26. Çandarlızade İbrahim Paşa Avenue electric lines view - 1, photographed by author.

In the middle parts of the street where the population is denser, power lines and warning signs are used in a more modern way.



Figure 4.27. Çandarlızade İbrahim Paşa Avenue electric lines at the intersection - 2, photographed by author.

4.4.4. Current urban furnitures (lighting,seating,bus stops, bollards etc.)

It is seen that the garbage bins in the area subject to the research are insufficient and this situation creates a serious deficiency for the people living in the region. In addition, it is seen that there is a lack of bus stops on the street.



Figure 4.28. View of Çandarlızade İbrahim Paşa avenue bus stop, photographed by author.

With a decision taken by the Tekirdağ Metropolitan Municipality Transportation and Traffic Regulation Commission in 2019, a geometric arrangement was carried out at the intersection of Çandarlızade İbrahim Paşa Street and Bağlar Yurdu Street. In accordance

with the decision taken, it was decided that the road from the intersection of Şehit Gökmen Yavuz Street to the intersection of Çandarlızade İbrahim Paşa Street would be made one-way and the line 13 of Tetaş would be connected to its current route using the route specified in the sketch below.



Figure 4.29. Route to public bus, drawn by author.

5. RESULTS AND DISCUSSION

5.1. QUESTIONNAIRE ANALYSES AND FINDINGS

5.1.1. Participants general demographics

When the age of the participants is considered, it is seen that 4% of the total 352 participants are above the age of 18. However, 12.7% of them are between the ages of 18 and 25. The largest group of participants is between the ages of 25 and 35 with a ratio of 43.1%. Again, the majority of the participant group consists of the 35 and 45 age group with a rate of 27.8%. While the 45 and 60 age group participating in the study constitutes 9.3%, the participants over the age of 60, which constitute the least participant group, constitute only 3.1%.

When the genders of the participants are evaluated, it is seen that more than half of them are women with a rate of 56.9%. On the other hand, men make up 43.1%.

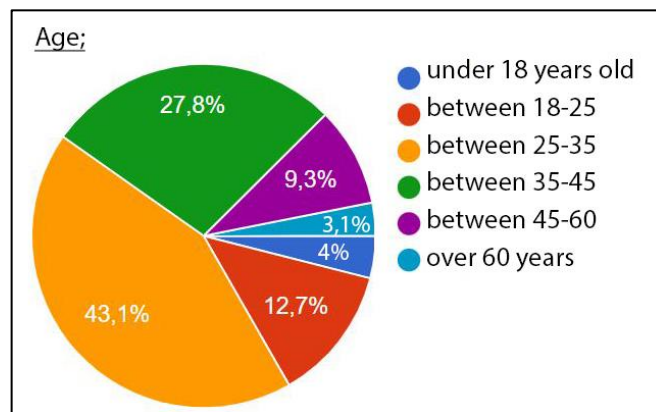


Figure 5.1. Age Chart of Participants

When the marital status of the participants is examined, it is seen that 61.2% of them are married and the remaining 38.8% are single.

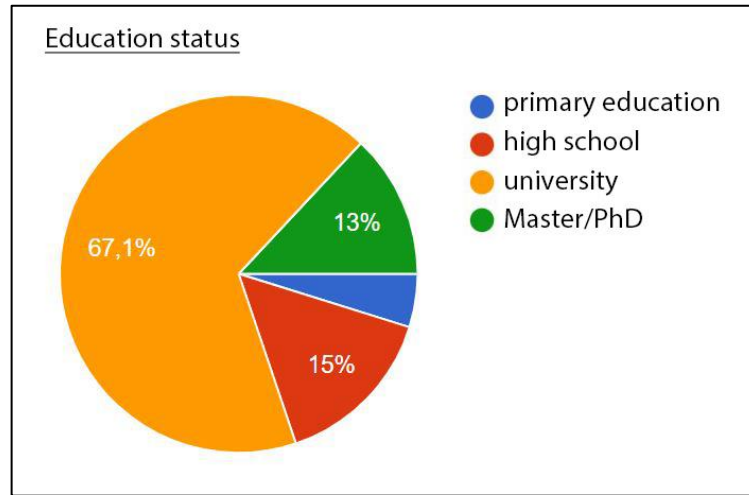


Figure 5.2. Education Level Chart of Participants

Considering the education level of the participants, it is seen that 4.9% of the participants received education at primary school level, 15% received education at the higher school level, 67.1% received university education and finally 13% received master's education. . Considering the education levels, it is noteworthy that the majority of the participant group has a university level education.

5.1.2. Responses of Participants to Questations

5.1.2.1. *Answers to preference of transportation.*

“How do you provide transportation in Tekirdağ?” The graph prepared based on the answers to the question is given below. This question, which was asked to the participants, was asked in order to understand which means of transportation they generally preferred.

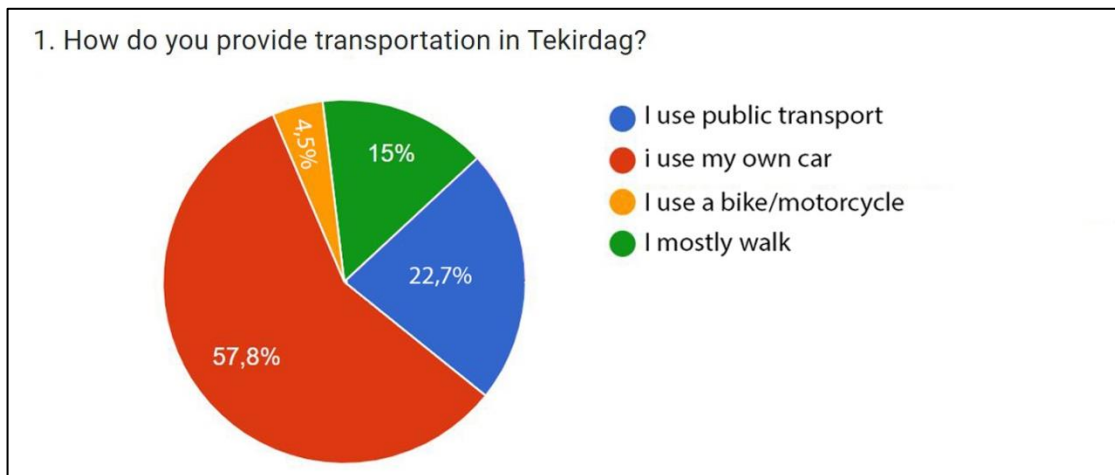


Figure 5.3. Transportation preference of participants chart

As seen in the graph, the largest part of the participants stated that they use their own car with a rate of 57.8%. In addition, 22% of them stated that they prefer public transportation, 15% of them walk and 4.5% of them, which make up a very small part, use a bicycle or motorbike. The answers given show that the use of cars is common in Tekirdağ and accordingly, the traffic problem may come to the fore. The high number of car users and those who prefer public transportation also increases the use of fossil fuels in the region. This can lead to an increase in environmental pollution, air pollution and a decrease in living species over time. At this point, the low number of pedestrians indicates that the roads reserved for people in the surrounding area are not created carefully, the plans of the sidewalks are not made properly and even appropriate ecological elements are not included.

5.1.2.2. Answers to the level of satisfaction with the streets.

“How satisfied are you with the street designs in Tekirdağ?” The graph prepared based on the answers to the question is given below. The purpose of this question directed to the participants is to understand how satisfied they are with the street designs. It is thought that preparations for the applications to be carried out can be started when a clarity on this issue is provided.

The answers given were categorized as 1. I am not satisfied at all, 2. I am not satisfied, 3. I am undecided, 4. I am satisfied, and 5. I am very satisfied.



Figure 5.4. Satisfaction level of participant for street design in Tekirdağ

As can be seen in the graph, the majority of the participants expressed their indecision about street designs. Afterwards, the most frequently given answers were I am not satisfied at all and I am not satisfied. When the positive responses of the participants are evaluated, it shows that less than half of them are satisfied and very satisfied. When the participant answers are evaluated, the street designs in Tekirdağ are not at a level to provide the expectations. When evaluated in terms of both pedestrian and vehicle, the data obtained show that there are many deficiencies.

5.1.2.3. Answers to the safety level of streets, pedestrian crossings and intersections.

The participants were asked “How safe do you think it is to use the streets, intersections and pedestrian crossings in Tekirdağ?” Statistical data on the answers given to the question are given in the graphic below. With this question directed to the participants, it is aimed to make an inference about the safety of streets, intersections and pedestrian crossings. It is thought that studies can be carried out to increase security with the findings obtained.

The answers given were categorized as 1. Not safe at all, 2. Not safe, 3. I am undecided, 4. Safe and 5. Quite safe.

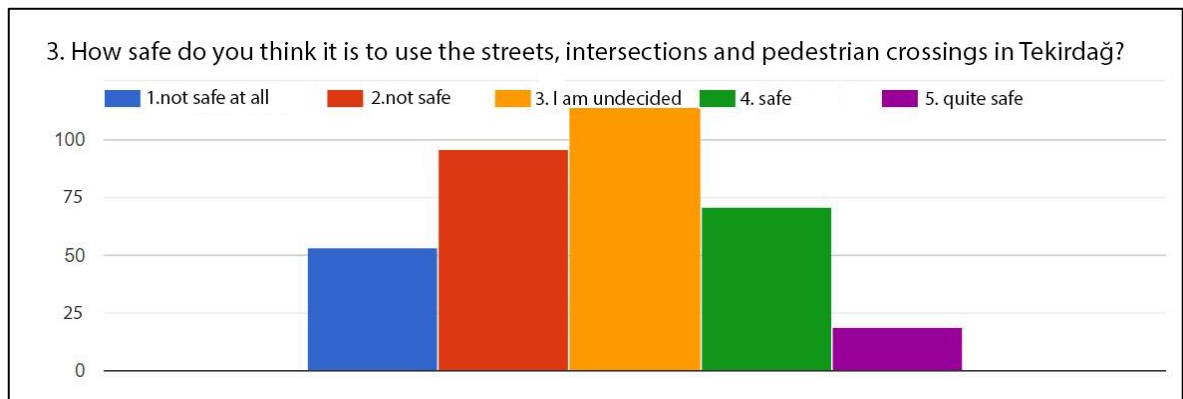


Figure 5.5. Safety perception levelor participant about use of the street design in Tekirdağ

As seen in the graph, the majority of the participants were undecided about the security of the mentioned regions. Again, the vast majority of the participants claim that these regions are unsafe and very unsafe. The group, which makes up less than half of the participants, shows that it is safe and very safe. Considering the multiplicity of the answers given, it is possible to say that the streets, intersections and pedestrian crossings in Tekirdağ are unsafe. It is thought that the existing insecurity will disappear with the design of these areas in a way suitable for both pedestrians and vehicle users. In order to achieve this, it is of great importance to provide pedestrian roads, traffic lights and pavement width that pedestrians need.

5.1.2.4. *Answers to how bike-friendly the streets are.*

“How bike friendly and suitable for bikers do you think the streets in Tekirdağ are?” The graph of the answers to the question is given below. With this question directed to the participants, it is thought that the conditions for cyclists will be understood. As a result of the answers obtained, street conditions will be improved for cyclists.

The answers given were categorized as 1. Not suitable at all, 2. Not suitable, 3. I am undecided, 4. Suitable, and 5. Quite suitable.



Figure 5.6. Bike friendless perception of participant related to streets in Tekirdağ

When the data in the graph is evaluated, it is seen that a large part of the participants stated that Tekirdağ is not suitable for bicycle users. Again, less than half of the participants stated that it was suitable, and a very small part said that it was very suitable. Based on this graph, it is possible to say that the streets of Tekirdağ are not suitable for cyclists. The most important reason for this situation is insufficient bicycle paths. At the same time, there is no room for movement for cyclists due to lack of traffic lights, narrow sidewalks, etc. This means that the use of bicycles is largely avoided. It is thought that more comfortable roads will be prepared by including bicycle paths in the existing regions and making the car path-pedestrian path-bicycle path separation.

5.1.2.5. *Answers to the usefulness of sidewalks.*

“How convenient and useful do you think the sidewalks in Tekirdağ are for the use of pedestrians?” When the answers given to the question were evaluated, the following answers were obtained. With this question directed to the participants, it is thought that necessary work can be done to make the pavements safer. Considering that pavements are the most important factor in ensuring the safety of pedestrians, it can be said that they are an indispensable structure in street design. Therefore, it is a great necessity to make the sidewalks safer for pedestrians.

The answers given were categorized as 1. Not convenient at all, 2. Not convenient, 3. I am undecided, 4. Convenient, and 5. Quite convenient.

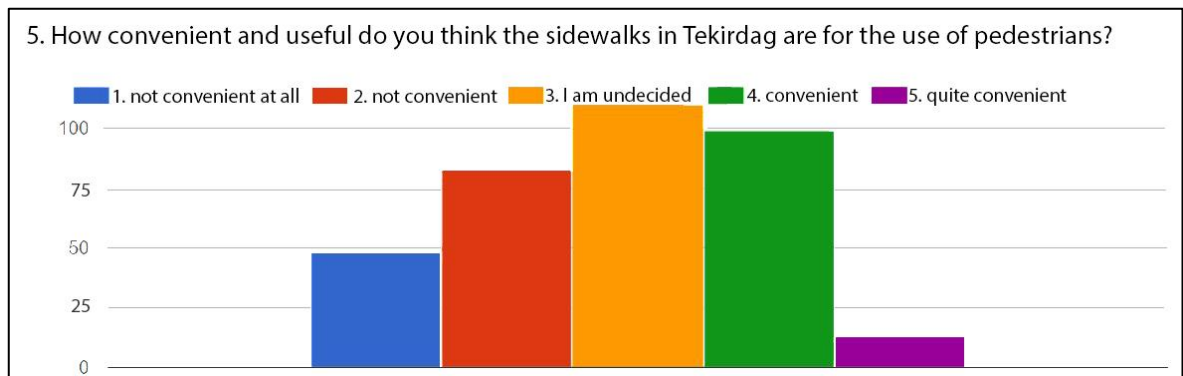


Figure 5.7. Perception of convenience level of participant about the sidewalks in Tekirdağ

When the graph is examined, it is seen that most of the participants are undecided about the adequacy of the pavements. Again, some following this group stated that the sidewalks are safe. The majority of the participants agree that the sidewalks are not safe. This situation shows that there is a difference of opinion about the adequacy of the sidewalks in Tekirdağ province. This situation basically differs in how often the users use the sidewalks or which route they choose.

5.1.2.6. *Answers to the usefulness of streets for wheelchairs and strollers.*

“How suitable and safe do you think the sidewalks in Tekirdağ are for wheelchair/stroller use?” When the answers given to the question are evaluated, the graphic below is reached. With this question directed to the participants, it was aimed to understand how safe the roads are for individuals with special needs and families with babies. With the obtained data, the roads can be made safer.

The answers given were categorized as 1. Not suitable at all, 2. Not suitable, 3. I am undecided, 4. Suitable, and 5. Quite suitable.

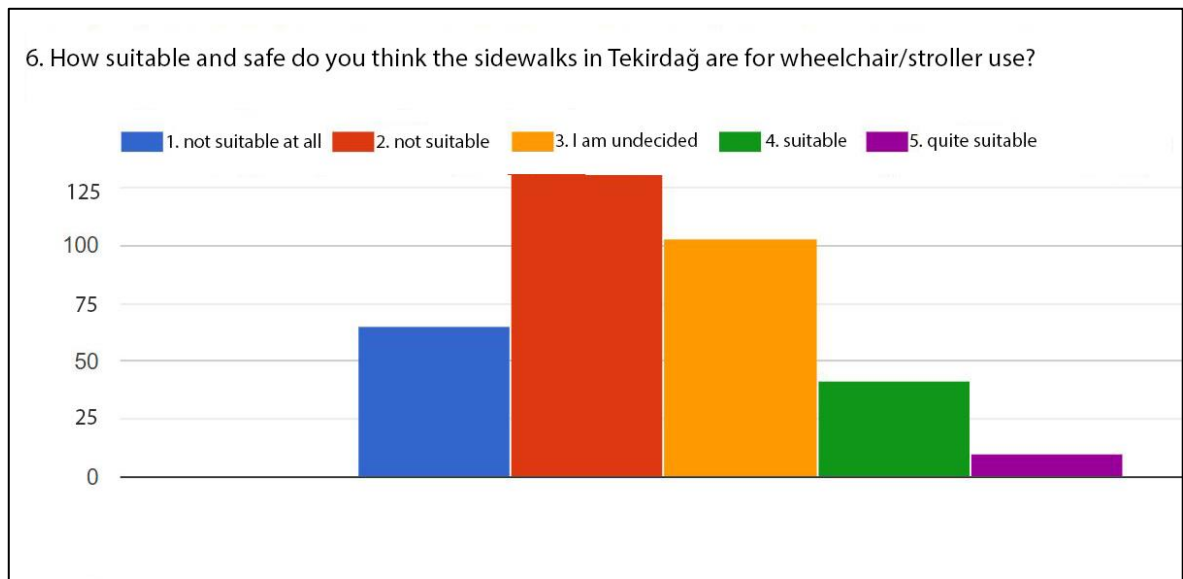


Figure 5.8. Perception of suitability and safety of sidewalks of participants

When the data in the graph is evaluated, the inadequacy of the pedestrian roads draws attention. A very large part of the participants expressed the inadequacy of the pedestrian roads. Again, it was agreed that the participant density was undecided. A very small part of the participant group stated that the pedestrian roads are quite suitable. This situation stated that the existing pedestrian roads can only be suitable in certain regions. It is thought that pedestrian ways can be brought to a sufficient level with various arrangements to be made on the roads.

5.1.2.7. Answers to the adequacy of parks and car parks.

When the answers given by the participants to the question "What do you think about the adequacy of the parks/car parks in Tekirdağ" are evaluated, the following conclusions are reached. With this question directed to the participants, it was aimed to understand how adequate the parks and car parks are. In the light of the data obtained, it is thought that it will contribute to the organization of new parking spaces for more vehicles.

The answers given were categorized as 1. Quite inadequate, 2. Inadequate, 3. I am undecided, 4. Sufficient and 5. Quite sufficient and useful.

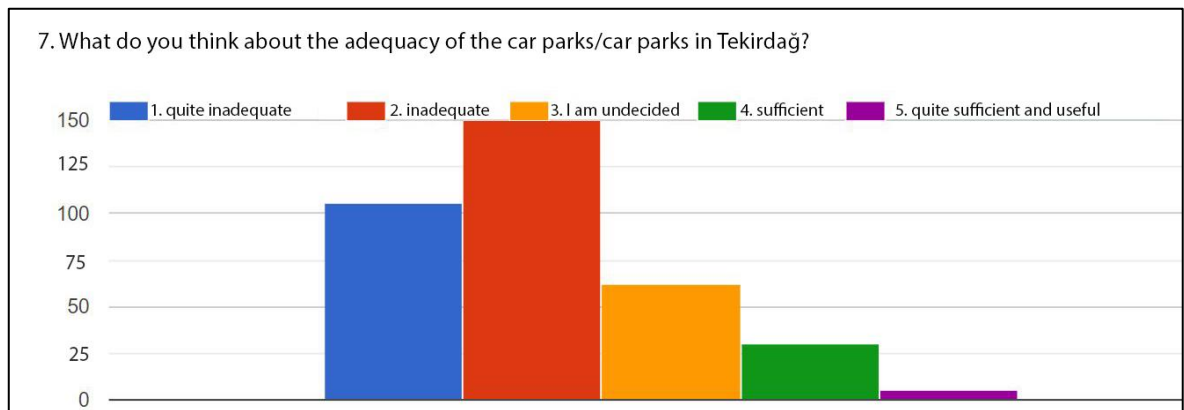


Figure 5.9. Perception of adequacy level of car parking in Tekirdağ

The majority of the participants stated that the car parks were inadequate. Just like pedestrian roads, areas where vehicles can be parked are also quite inadequate in Tekirdağ. The fact that less than half of the participants gave an sufficient answer to this question supports this opinion.

5.1.2.8. *Answers for the changes that need to be made about Streets and Sidewalks.*

“What kind of changes do you think should be made to make the streets and sidewalks in Tekirdağ safer and more useful?” Their answers to the question are shown in the graphs below. With this question directed to the participants, it was tried to get an idea about how the streets and sidewalks could be improved.

The answers given were categorized as 1. Quite inadequate, 2. Shoul be reduced, 3. Enough, 4. Should be increased and 5. Should be greatly increased.

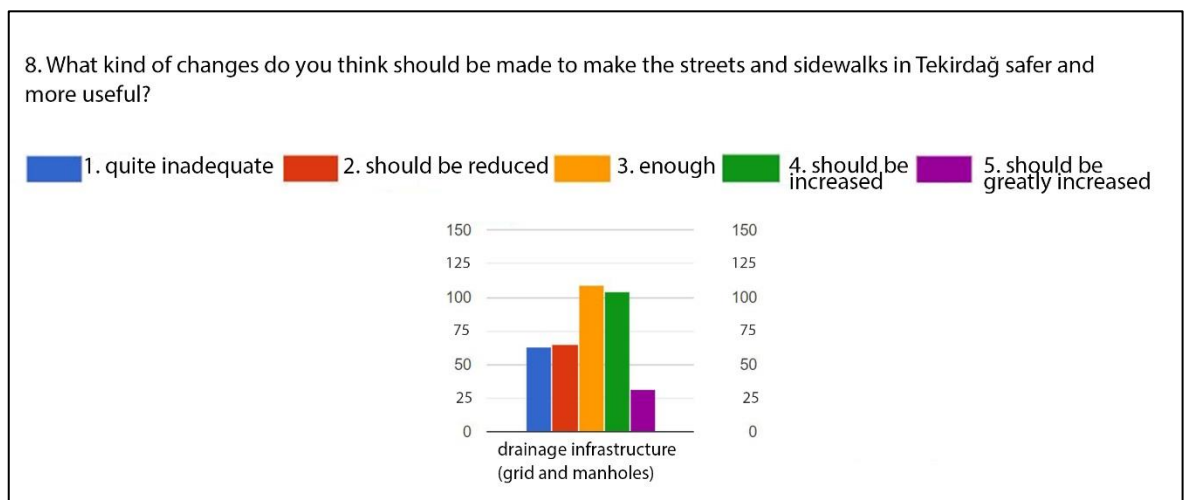


Figure 5.10. Adequacy of drainage infrastructure on streets and pavements

It was observed that less than half of the participants answered “insufficient” to the question asked about the reliability and usefulness of the drainage infrastructure on streets and sidewalks. While some of the participants thought that the reliability and usefulness of the drainage infrastructure was sufficient, the same percentage of the participants stated that these areas should be developed. Finally, a minority of the participants stated that the drainage infrastructure should definitely be increased. Considering that the drainage infrastructure is a very important factor for streets and pavements, it can be said that the answers given by the participants are very important in terms of street safety and in this context, the drainage infrastructure is insufficient. The development of drainage infrastructure will have positive effects for the street in the long run, so it is a factor that needs attention and improvement.

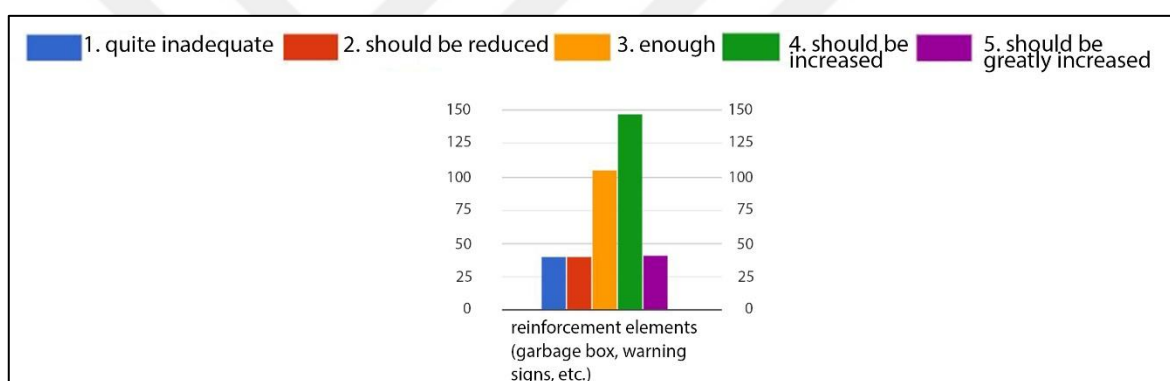


Figure 5.11. Strengthening elements adequacy in streets and pavements

When the adequacy of garbage bins, warning signs, street lamps and similar reinforcement elements is evaluated, it is seen that a small part of the participants stated that these elements are insufficient. Again, a small part of the participants stated that these elements should be reduced. It is seen that less than half of the participants stated that the reinforcement elements were sufficient, while the largest group stated that these areas should be developed. Finally, a very small percentage of the participants draw attention to the fact that these areas definitely need to be developed. When the data obtained are evaluated, it can be concluded that reinforcement elements such as garbage cans and warning signs are insufficient in streets and avenues. A more comfortable living space will be created for those who use these areas, especially with the improvement of the reinforcement elements, which are among the most important factors for the completed streets.

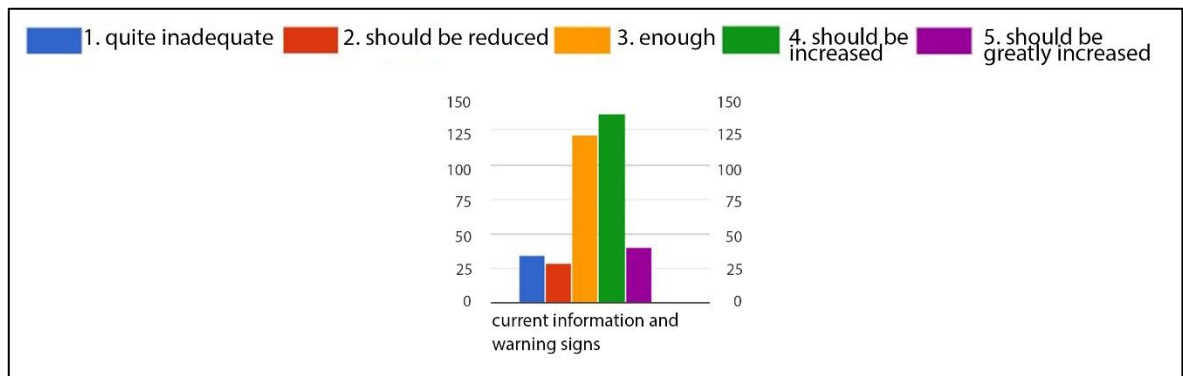


Figure 5.12. Adequacy of warning signs on streets and sidewalks

When the warning signs on the streets and sidewalks and the current information adequacy are evaluated, a small part of the participants stated that they are insufficient. Again, it is seen that a very small part of the participants said that these areas should be reduced. Nearly half of the participants stated that the warning signs and up-to-date information were sufficient. Again, most of the participants drew attention to the need to develop these areas. Warning signs are among the most important factors for streets and sidewalks to become healthy living spaces. It is a very important requirement to have warning signs so that pedestrians, cyclists and automobile users can benefit from the streets and sidewalks in a healthy way. Therefore, at this point, it can be said that warning signs and updated information needed on streets and pavements should be included.

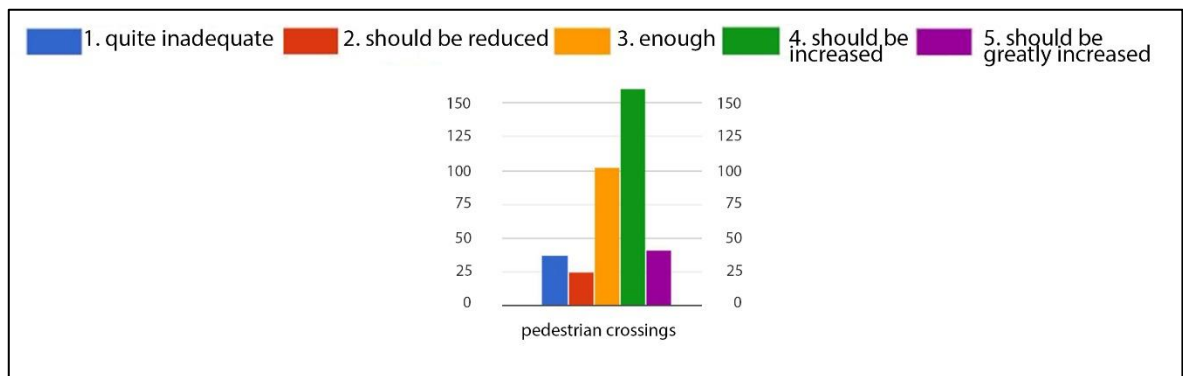


Figure 5.13. Pedestrian crossing adequacy on streets and sidewalks

When the adequacy of pedestrian crossings on streets and sidewalks is evaluated, it is seen that most of the participants say that these areas should be developed. However, very few of the participants stated that these areas should be reduced. There are also participants

who think that pedestrian crossings are sufficient. It is very important that pedestrian crossings are sufficient for a street to become both a healthy street and a completed street.

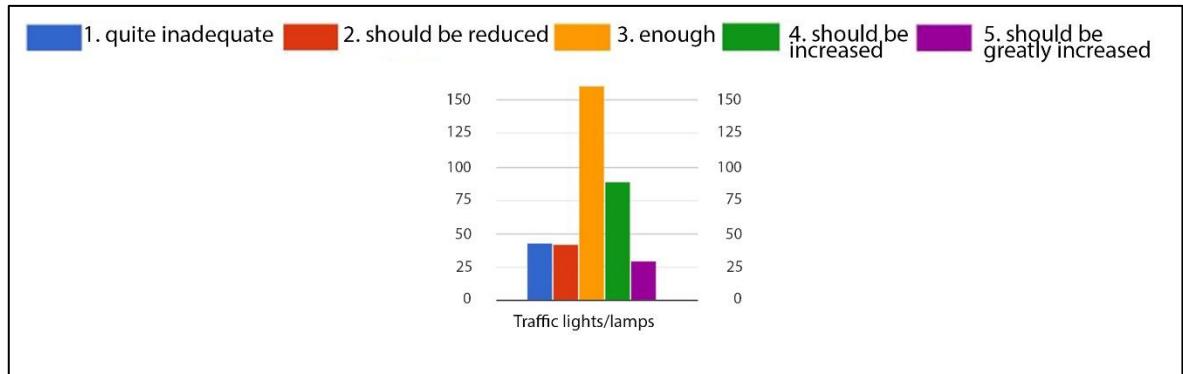


Figure 5.14. Traffic light adequacy on streets and pavements

When the graph on the adequacy of the traffic lights on the street is examined, it is seen that the majority of the participants stated that the traffic lights are sufficient. However, a large part of the participants argue that traffic lights should be increased. However, when the obtained data are evaluated, it is concluded that the traffic lights are sufficient.

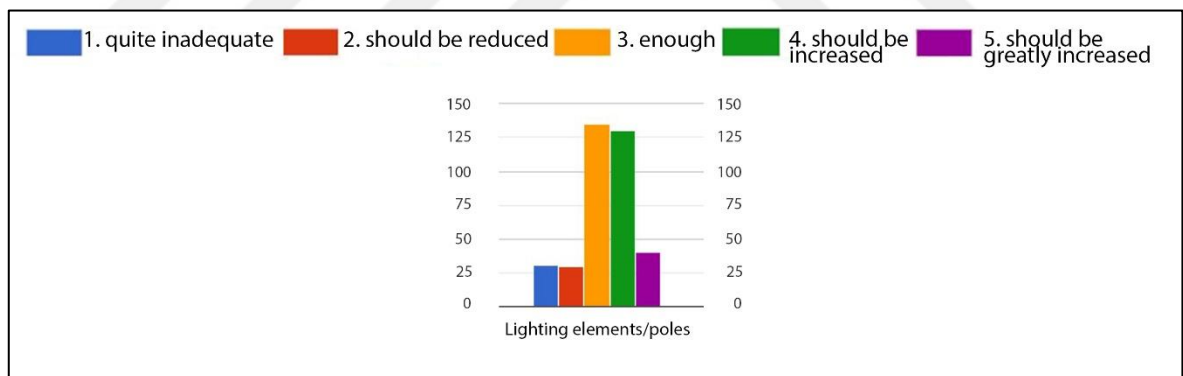


Figure 5.15. Adequacy of lighting elements on streets and pavements

When the answers given about the adequacy of lighting elements in streets and pavements are evaluated, it is seen that the number of participants who come to the opinion that these elements are sufficient is quite high. However, similarly, most of the participants stated that lighting elements should be developed. It is very important that the lighting elements are sufficient in order to create a comfortable driving and walking environment on the streets. In this context, it is concluded that these elements should be developed in the street.

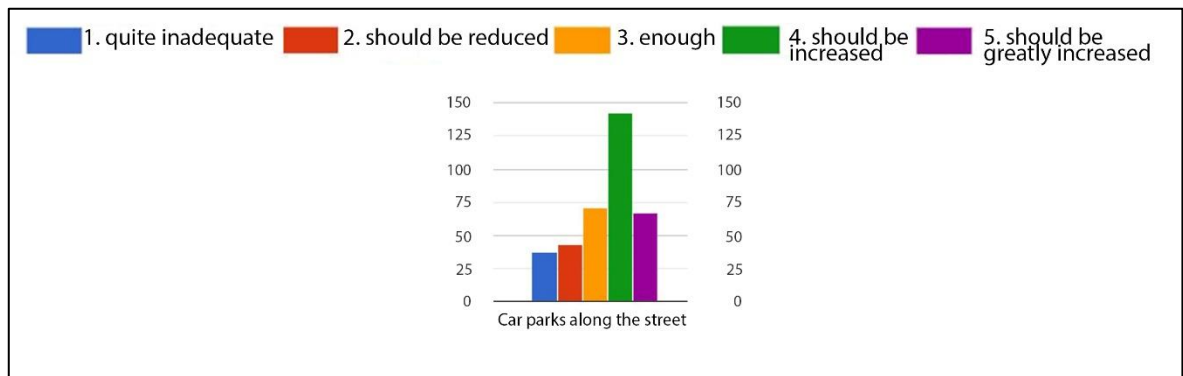


Figure 5.16. Adequacy of parking along the street

When the answers related to the adequacy of parking along the street are evaluated, it is concluded that the parking lots must be developed. Because while some of the participants stated that these areas were insufficient, most of them suggested that parking lots should be developed. The number of participants who think that the parking lots are sufficient is quite low.

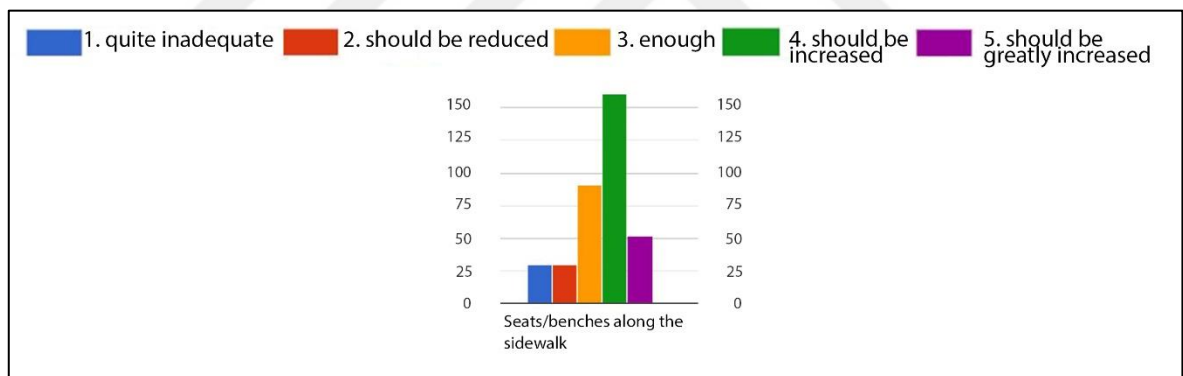


Figure 5.17. Adequacy of seating on streets and sidewalks

When the adequacy of the sitting areas on the street and pavement is evaluated, it is seen that the number of participants who think that these areas are sufficient is average. However, most of the participants stated that the seating areas should be improved. Sitting areas constitute a very important comfort area, especially for individuals who are over a certain age and have a disability.

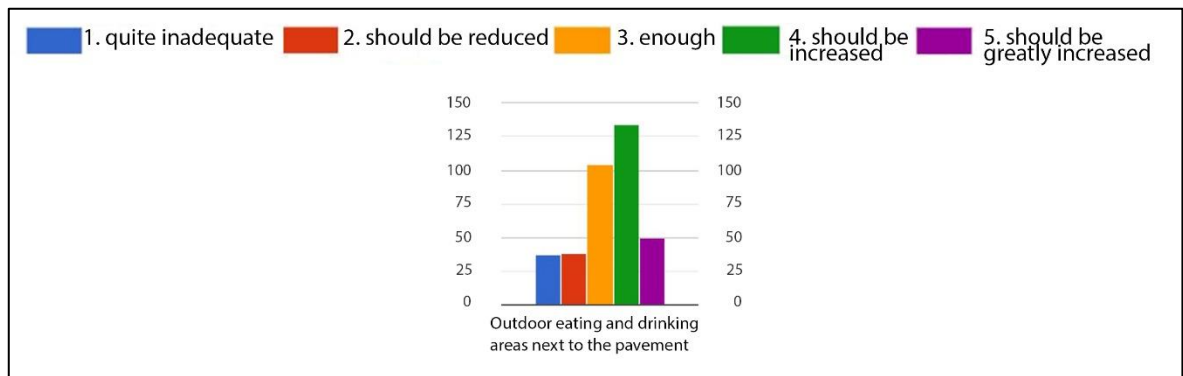


Figure 5.18. Adequacy of eating and drinking areas on the street

When the adequacy of the eating and drinking areas on the street is evaluated, it is observed that some of the participants stated that these areas are sufficient, while the majority of them said that these areas should be developed. The number of participants who think that the eating and drinking areas are insufficient is quite a minority. In order for the street to become a livable place, it is necessary to make more adequate eating and drinking areas, which are very important for the socialization of individuals.

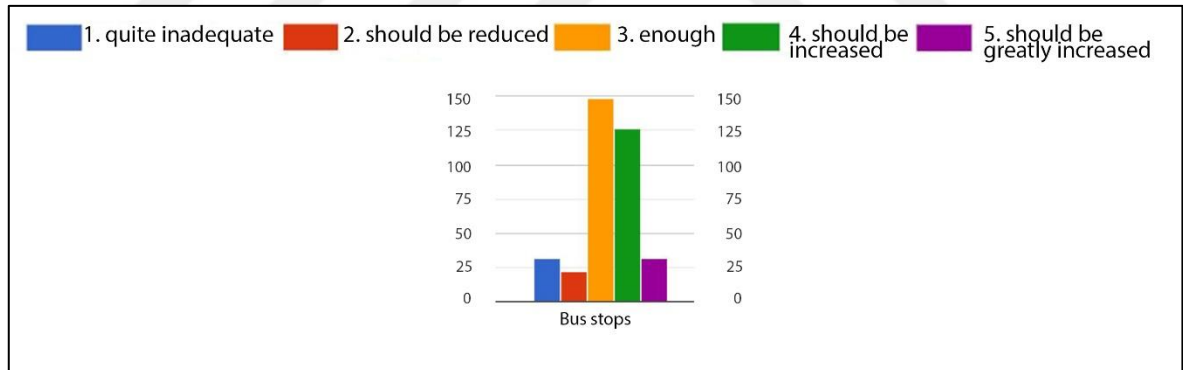


Figure 5.19. Bus stop adequacy on the street

When the adequacy of the bus stop on the street is evaluated, it is seen that the majority of the participants stated that the bus stops are sufficient. However, it is noteworthy that half of the participants stated that these areas should be developed. The number of those who think that the bus stops are insufficient is quite a minority. When the data obtained are evaluated, it is concluded that the bus stops are not very sufficient and the number of bus stops should be increased especially in the busy parts of the commercial areas.

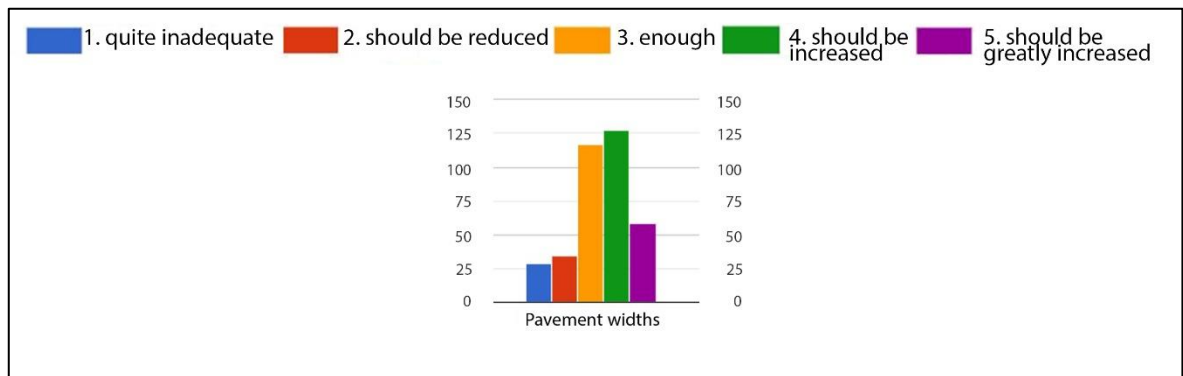


Figure 5.20. Adequacy of pavement height along the street

When the answers given about whether the pavement height along the street is sufficient or not, it is seen that most of the participants concluded that it is sufficient. However, most of the participants stated that the pavement height should be improved. When an evaluation is made within the scope of universal design principles, the height of the pavement is a very important factor for the streets to be complete and healthy streets. It is noteworthy that the height of the pavement should be at an optimum level and certain standards should be observed, especially for the disabled and the elderly.

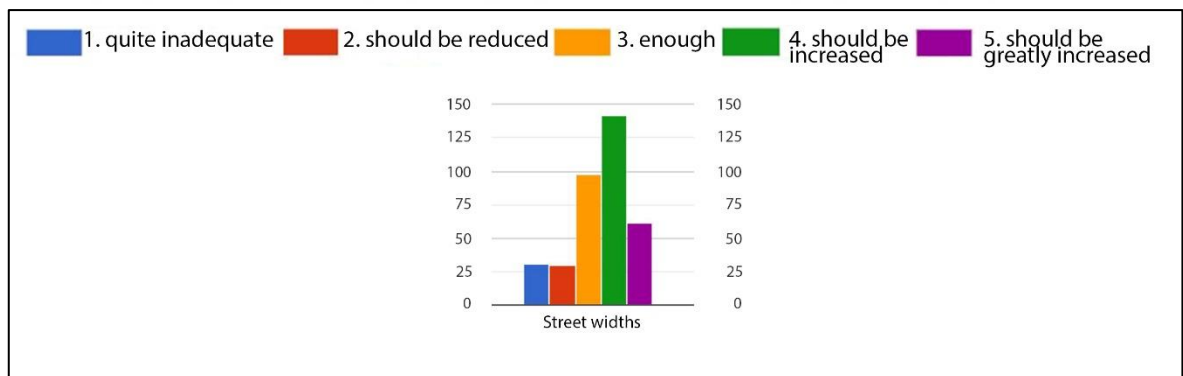


Figure 5.21. Width adequacy along the street

When the street widths were evaluated, the majority of the participants concluded that they should definitely be improved. Street width is a very important factor for both pedestrians and drivers, just like pavement height. Accordingly, it can be concluded that the street width should be developed in accordance with the standards.

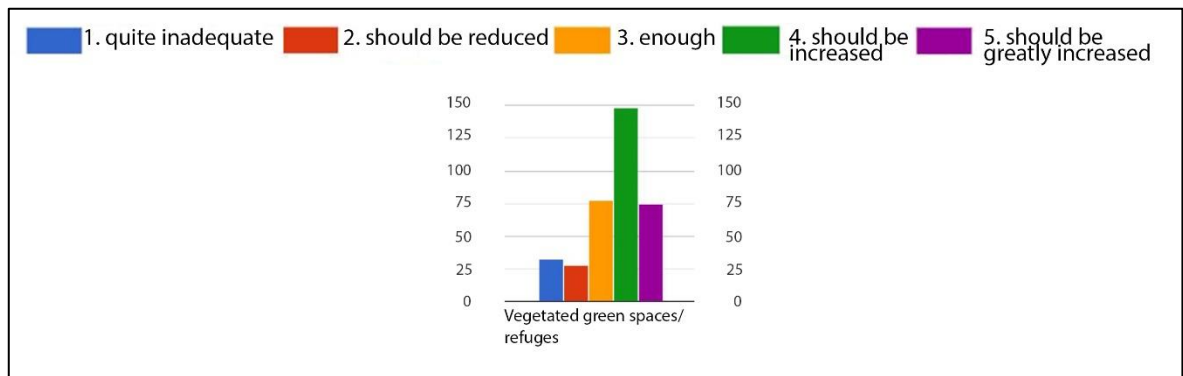


Figure 5.22. Green space adequacy along the street

When the adequacy of green space along the street is evaluated, it can be said that the number of participants who answered that it must be developed is quite high. When it is thought that the number of green areas on the sidewalks and on the side of the street should be increased for green streets, it is foreseen that the necessary studies should be done to make the selected street a green street. According to both the survey results and the study carried out in the field, it is concluded that the green areas on the street are insufficient.

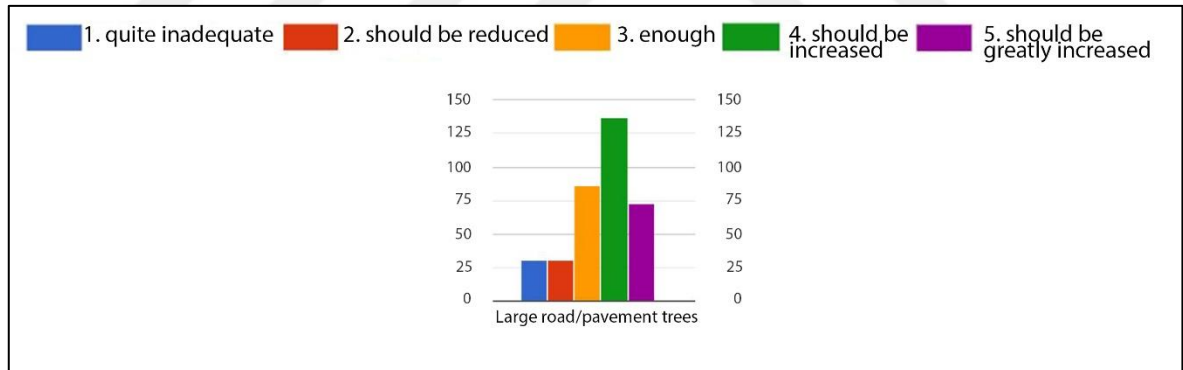


Figure 5.23. Tree adequacy on wide roads and pavements along the street

When the adequacy of wide roads and trees along the street is evaluated, it is seen that a large part of the participants stated that these areas should be developed. However, a very small part of the participants answered that these are insufficient. Similarly, the number of participants who think that wide road and tree proficiency is appropriate is quite low. Therefore, it can be said that the efficiency of trees on the pavements should be increased in order to create a comfortable environment.

At this stage, the participants were asked questions about whether they were sufficient about various design elements. The answers given are indicated one by one in the graphs above.

When the answers of the participants about whether the drainage infrastructure is sufficient or not, it is seen that the majority of them commented that it was sufficient. In addition, many participants commented on the need to improve drainage infrastructure. Accordingly, it can be said that the drainage infrastructure in the city is insufficient and in the long term, rainwater retention, overflows in the sewerage or disturbances in the urban landscape will be caused. The graphic on the adequacy of design elements such as trash cans and warning signs in the second graphic shows that these elements need to be developed. The majority of the participants stated that there is a deficiency in this issue as well. The participants commented on the adequacy of the information and warning signs that they were sufficient and needed to be developed. The answers show that the warning and direction signs are not sufficient, but if they are improved, a more efficient street will be created.

The answers given for the adequacy of the pedestrian roads show that the pedestrian roads are insufficient. The majority of the participants commented on this question for the development of pedestrian roads. When the findings regarding traffic warning signs and traffic lights are evaluated, it is seen that these warnings and lights are sufficient. Most of the participants stated that these items were sufficient. Again, when the data on the adequacy of lighting elements and electricity poles are evaluated, it is seen that a large part of the participants commented that it is sufficient, and a large part of them stated that it should be improved. Participants commented that parking areas along the road, sitting and resting areas for pedestrians and eating and drinking areas on the pavement should be similarly developed. There are more comments that the bus stops, which are one of the most important elements for public transportation, are sufficient. However, it is seen that almost half of the participants stated that the bus stops should be developed.

When the participants were asked about the adequacy of the height of the pavement, the height of the street, the green areas, the wide roads and the trees on the sidewalks, it was seen that they commented that these elements should be developed. It is also possible to say that the participants for these elements meet on a common ground. When all the

statistical information given is evaluated, it is possible to say that there is no consensus on whether the above items are too inadequate or too sufficient. Generally, adequacy comments have been made about these areas, but it can be said that these areas should be redesigned in order to create greener and more useful areas.

SPSS spreadsheets that provide all these data are also included below;

Table 5.1. Level of satisfaction with transportation preference and street design

			2. How satisfied are you with the street designs in Tekirdag?					Total
			I am not satisfied at all	I am not satisfied	I am undecided	I am satisfied	I am very satisfied	
1.How do you provide transportation in Tekirdag?	I use public transport	Count	16	20	24	18	1	79
		Expected Count	16,2	21,3	25,6	12,8	3,1	79,0
		% within 1.How do you provide transportation in Tekirdag?	20,3%	25,3%	30,4%	22,8%	1,3%	100,0%
	I use my own car	Count	43	59	65	28	9	204
		Expected Count	41,7	55,1	66,1	33,0	8,1	204,0
		% within 1.How do you provide transportation in Tekirdag?	21,1%	28,9%	31,9%	13,7%	4,4%	100,0%
	I use a bike/motorcycle	Count	3	1	6	5	1	16
		Expected Count	3,3	4,3	5,2	2,6	0,6	16,0
		% within 1.How do you provide transportation in Tekirdag?	18,8%	6,3%	37,5%	31,3%	6,3%	100,0%
	I mostly walk	Count	10	15	19	6	3	53
		Expected Count	10,8	14,3	17,2	8,6	2,1	53,0
		% within 1.How do you provide transportation in Tekirdag?	18,9%	28,3%	35,8%	11,3%	5,7%	100,0%
Total		Count	72	95	114	57	14	352
		Expected Count	72,0	95,0	114,0	57,0	14,0	352,0
		% within 1.How do you provide transportation in Tekirdag?	20,5%	27,0%	32,4%	16,2%	4,0%	100,0%

When the level of satisfaction with transportation preference and street designs is examined, it is seen that those who use public transportation are undecided. However, it is seen that those who prefer their own car for transportation are undecided about street design. It is noteworthy that motor or bicycle users constitute the largest group in indecision. Individuals who generally prefer to walk also expressed their indecision about street design. It is noteworthy that the level of satisfaction with street designs is quite low. However, the participant group who is most satisfied with the street design is usually bicycle and motor users. However, their rate is quite low compared to the dissatisfied ones.

Table 5.2. Transportation preference and intersection - pedestrian crossing satisfaction level

			3. How safe do you think it is to use the streets, intersections and pedestrian crossings in Tekirdag?					Total
			not safe at all	not safe	I am undecided	safe	quite safe	
1.How do you provide transportation in Tekirdag?	I use public transport	Count	8	21	32	14	4	79
		Expected Count	11,9	21,5	25,6	15,7	4,3	79,0
		% within 1.How do you provide transportation in Tekirdag?	10,1%	26,6%	40,5%	17,7%	5,1%	100,0%
	i use my own car	Count	33	62	56	43	10	204
		Expected Count	30,7	55,6	66,1	40,6	11,0	204,0
		% within 1.How do you provide transportation in Tekirdag?	16,2%	30,4%	27,5%	21,1%	4,9%	100,0%
	I use a bike/motorcycle	Count	4	2	4	5	1	16
		Expected Count	2,4	4,4	5,2	3,2	0,9	16,0
		% within 1.How do you provide transportation in Tekirdag?	25,0%	12,5%	25,0%	31,3%	6,3%	100,0%
	I mostly walk	Count	8	11	22	8	4	53
		Expected Count	8,0	14,5	17,2	10,5	2,9	53,0
		% within 1.How do you provide transportation in Tekirdag?	15,1%	20,8%	41,5%	15,1%	7,5%	100,0%
Total	Count	53	96	114	70	19	352	
	Expected Count	53,0	96,0	114,0	70,0	19,0	352,0	
	% within 1.How do you provide transportation in Tekirdag?	15,1%	27,3%	32,4%	19,9%	5,4%	100,0%	

When the transportation preference and the satisfaction level of the intersection-pedestrian crossing are evaluated, it is seen that those who prefer public transportation are undecided. It is seen that the participants who prefer to walk are undecided with a similar rate. However, it can be said that the indecisiveness rates of the participants who drive their own vehicle, use a motorbike and use a bicycle are similar to each other. When the data obtained are evaluated, it is noteworthy that the pedestrian crossings and intersections are insufficient and the majority of the participants are not satisfied with them.

Table 5.3. Transportation preference and bike path satisfaction level

			4.How bike friendly and suitable for bikers do you think the streets in Tekirdag are?					Total
			not suitable at all	not suitable	I am undecided	suitable	quite suitable	
1.How do you provide transportation in Tekirdag?	I use public transport	Count	22	25	18	14	0	79
		Expected Count	23,8	25,1	19,8	9,9	0,4	79,0
		% within 1.How do you provide transportation in Tekirdag?	27,8%	31,6%	22,8%	17,7%	0,0%	100,0%
	I use my own car	Count	67	68	46	21	2	204
		Expected Count	61,4	64,9	51,0	25,5	1,2	204,0
		% within 1.How do you provide transportation in Tekirdag?	32,8%	33,3%	22,5%	10,3%	1,0%	100,0%
	I use a bike/motorcycle	Count	5	4	4	3	0	16
		Expected Count	4,8	5,1	4,0	2,0	0,1	16,0
		% within 1.How do you provide transportation in Tekirdag?	31,3%	25,0%	25,0%	18,8%	0,0%	100,0%
	I mostly walk	Count	12	15	20	6	0	53
		Expected Count	16,0	16,9	13,3	6,6	0,3	53,0
		% within 1.How do you provide transportation in Tekirdag?	22,6%	28,3%	37,7%	11,3%	0,0%	100,0%
Total	Count	106	112	88	44	2	352	
	Expected Count	106,0	112,0	88,0	44,0	2,0	352,0	
	% within 1.How do you provide transportation in Tekirdag?	30,1%	31,8%	25,0%	12,5%	0,6%	100,0%	

When the transportation preference and the satisfaction level of the bicycle path are evaluated, the answers given by the bicycle users are particularly remarkable. Accordingly, the vast majority of cyclists stated that the bike path was not suitable at all. More than half of the participants stated that the bicycle paths were insufficient. However, it is seen that the participants who prefer to use their own car are not satisfied with the bike paths. The most important reason for this situation is that bicycle lanes are not designed properly, but cyclists prefer the car road. With cyclists driving on the roadway, a very unsafe driving environment occurs.

Table 5.4. Transportation preference and convenientless level perception of sidewalks

			5. How convenient and useful do you think the sidewalks in Tekirdag are for the use of pedestrians?					Total
			not suitable at all	not suitable	I am undecided	suitable	quite suitable	
1.How do you provide transportation in Tekirdag?	I use public transport	Count	8	22	21	26	2	79
		Expected Count	10,8	18,6	24,7	22,0	2,9	79,0
		% within 1.How do you provide transportation in Tekirdag?	10,1%	27,8%	26,6%	32,9%	2,5%	100,0%
	i use my own car	Count	28	44	67	57	8	204
		Expected Count	27,8	48,1	63,8	56,8	7,5	204,0
		% within 1.How do you provide transportation in Tekirdag?	13,7%	21,6%	32,8%	27,9%	3,9%	100,0%
	I use a bike/motorcycle	Count	4	4	3	5	0	16
		Expected Count	2,2	3,8	5,0	4,5	0,6	16,0
		% within 1.How do you provide transportation in Tekirdag?	25,0%	25,0%	18,8%	31,3%	0,0%	100,0%
	I mostly walk	Count	8	13	19	10	3	53
		Expected Count	7,2	12,5	16,6	14,8	2,0	53,0
		% within 1.How do you provide transportation in Tekirdag?	15,1%	24,5%	35,8%	18,9%	5,7%	100,0%
Total		Count	48	83	110	98	13	352
		Expected Count	48,0	83,0	110,0	98,0	13,0	352,0
		% within 1.How do you provide transportation in Tekirdag?	13,6%	23,6%	31,3%	27,8%	3,7%	100,0%

When the transportation preference and the suitability level of the pavements are evaluated, the answers given by the participants who prefer to walk attract attention. Here, the participants with the highest indecision rate are those who prefer walking. Similarly, individuals who prefer to use their own cars are also undecided about pavements. However, the vast majority of cyclists and motorcyclists agree that the pavements are insufficient.

Table 5. 5. Transportation preference and safety perception of sidewalks for wheelchair

			6. How suitable and safe do you think the sidewalks in Tekirdağ are for wheelchair/stroller use?					Total
			not suitable at all	not suitable	I am undecided	suitable	quite suitable	
1.How do you provide transportation in Tekirdağ?	I use public transport	Count	12	35	20	11	1	79
		Expected Count	14,6	29,6	23,1	9,4	2,2	79,0
		% within 1.How do you provide transportation in Tekirdağ?	15,2%	44,3%	25,3%	13,9%	1,3%	100,0%
	i use my own car	Count	36	79	63	19	7	204
		Expected Count	37,7	76,5	59,7	24,3	5,8	204,0
		% within 1.How do you provide transportation in Tekirdağ?	17,6%	38,7%	30,9%	9,3%	3,4%	100,0%
	I use a bike/motorcycle	Count	5	3	5	3	0	16
		Expected Count	3,0	6,0	4,7	1,9	0,5	16,0
		% within 1.How do you provide transportation in Tekirdağ?	31,3%	18,8%	31,3%	18,8%	0,0%	100,0%
	I mostly walk	Count	12	15	15	9	2	53
		Expected Count	9,8	19,9	15,5	6,3	1,5	53,0
		% within 1.How do you provide transportation in Tekirdağ?	22,6%	28,3%	28,3%	17,0%	3,8%	100,0%
Total		Count	65	132	103	42	10	352
		Expected Count	65,0	132,0	103,0	42,0	10,0	352,0
		% within 1.How do you provide transportation in Tekirdağ?	18,5%	37,5%	29,3%	11,9%	2,8%	100,0%

When the transportation preferences and the level of adequacy of the sidewalks for wheelchair users are evaluated, it is seen that the majority of the participants stated that the sidewalks are insufficient. Those who use public transport and individuals who use their own cars stated that the sidewalks are definitely not sufficient for wheelchair users.

Table 5. 6. Transportation preference and opinion about adequacy level of car parking

			7. What do you think about the adequacy of the car parks/car parks in Tekirdağ?					Total
			quite inadequate	inadequate	I am undecided	sufficient	5. quite sufficient and useful	
1.How do you provide transportation in Tekirdağ?	I use public transport	Count	21	37	14	7	0	79
		Expected Count	23,6	33,7	13,9	6,7	1,1	79,0
		% within 1.How do you provide transportation in Tekirdağ?	26,6%	46,8%	17,7%	8,9%	0,0%	100,0%
	I use my own car	Count	64	92	30	16	2	204
		Expected Count	60,9	86,9	35,9	17,4	2,9	204,0
		% within 1.How do you provide transportation in Tekirdağ?	31,4%	45,1%	14,7%	7,8%	1,0%	100,0%
	I use a bike/motorcycle	Count	6	4	3	2	1	16
		Expected Count	4,8	6,8	2,8	1,4	0,2	16,0
		% within 1.How do you provide transportation in Tekirdağ?	37,5%	25,0%	18,8%	12,5%	6,3%	100,0%
	I mostly walk	Count	14	17	15	5	2	53
		Expected Count	15,8	22,6	9,3	4,5	0,8	53,0
		% within 1.How do you provide transportation in Tekirdağ?	26,4%	32,1%	28,3%	9,4%	3,8%	100,0%
Total	Count	105	150	62	30	5	352	
	Expected Count	105,0	150,0	62,0	30,0	5,0	352,0	
	% within 1.How do you provide transportation in Tekirdağ?	29,8%	42,6%	17,6%	8,5%	1,4%	100,0%	

When the transportation preferences and the level of parking adequacy are evaluated, it is seen that those who prefer public transportation, those who use their own cars, and those who use bicycles or motorbikes, state that the parking lots are insufficient. It is noteworthy that individuals who use public transport in particular agree that parking lots are definitely insufficient.

Table 5.7. Gender and street design satisfaction level

			2. How satisfied are you with the street designs in Tekirdag?					Total
			I am not satisfied at all	I am not satisfied	I am undecided	I am satisfied	I am very satisfied	
How is your gender?	kadın	Count	44	55	65	32	4	200
		Expected Count	40,9	54,0	64,8	32,4	8,0	200,0
		% within How is your gender?	22,0%	27,5%	32,5%	16,0%	2,0%	100,0%
	Erkek	Count	28	40	49	25	10	152
		Expected Count	31,1	41,0	49,2	24,6	6,0	152,0
		% within How is your gender?	18,4%	26,3%	32,2%	16,4%	6,6%	100,0%
Total		Count	72	95	114	57	14	352
		Expected Count	72,0	95,0	114,0	57,0	14,0	352,0
		% within How is your gender?	20,5%	27,0%	32,4%	16,2%	4,0%	100,0%

When the gender and street design satisfaction level is evaluated, it is seen that most of the women are not satisfied with the street design. Looking at the male participants, it is noteworthy that the level of satisfaction is low with a smaller percentage. However, the majority of the participants stated that they were undecided about street design.

Table 5.8. Gender and level of satisfaction at intersections and crosswalks

			3. How safe do you think it is to use the streets, intersections and pedestrian crossings in Tekirdag?					Total
			not safe at all	not safe	I am undecided	safe	quite safe	
How is your gender?	kadin	Count	32	61	60	37	10	200
		Expected Count	30,1	54,5	64,8	39,8	10,8	200,0
		% within How is your gender?	16,0%	30,5%	30,0%	18,5%	5,0%	100,0%
	Erkek	Count	21	35	54	33	9	152
		Expected Count	22,9	41,5	49,2	30,2	8,2	152,0
		% within How is your gender?	13,8%	23,0%	35,5%	21,7%	5,9%	100,0%
Total		Count	53	96	114	70	19	352
		Expected Count	53,0	96,0	114,0	70,0	19,0	352,0
		% within How is your gender?	15,1%	27,3%	32,4%	19,9%	5,4%	100,0%

When the gender and level of satisfaction at the intersection-pedestrian crossing are evaluated, it is seen that most of the women do not find the intersections and pedestrian crossings safe. It is seen that the majority of men are undecided about the adequacy of these areas.

Table 5.9. Gender and level of cycling friendliness

			4.How bike friendly and suitable for bikers do you think the streets in Tekirdag are?					Total
			not suitable at all	not suitable	I am undecided	suitable	quite suitable	
How is your gender?	Kadın	Count	63	71	44	22	0	200
		Expected Count	60,2	63,6	50,0	25,0	1,1	200,0
		% within How is your gender?	31,5%	35,5%	22,0%	11,0%	0,0%	100,0%
	Erkek	Count	43	41	44	22	2	152
		Expected Count	45,8	48,4	38,0	19,0	0,9	152,0
		% within How is your gender?	28,3%	27,0%	28,9%	14,5%	1,3%	100,0%
Total		Count	106	112	88	44	2	352
		Expected Count	106,0	112,0	88,0	44,0	2,0	352,0
		% within How is your gender?	30,1%	31,8%	25,0%	12,5%	0,6%	100,0%

When the gender and the level of bicycle friendliness of the street are evaluated, it is seen that male and female participants have similar results. The vast majority of female participants answered that the street is not suitable for the subject of being bicycle friendly. This rate is less for male participants.

Table 5.10. Gender and walkway usability level

			5. How convenient and useful do you think the sidewalks in Tekirdag are for the use of pedestrians?					Total
			not suitable at all	not suitable	I am undecided	suitable	quite suitable	
How is your gender?	kadin	Count	28	58	54	53	7	200
		Expected Count	27,3	47,2	62,5	55,7	7,4	200,0
		% within How is your gender?	14,0%	29,0%	27,0%	26,5%	3,5%	100,0%
	Erkek	Count	20	25	56	45	6	152
		Expected Count	20,7	35,8	47,5	42,3	5,6	152,0
		% within How is your gender?	13,2%	16,4%	36,8%	29,6%	3,9%	100,0%
Total		Count	48	83	110	98	13	352
		Expected Count	48,0	83,0	110,0	98,0	13,0	352,0
		% within How is your gender?	13,6%	23,6%	31,3%	27,8%	3,7%	100,0%

When the gender and the level of usefulness of the walking path are evaluated, it is seen that the walking paths are more useful for men. However, it is noteworthy that male participants were more undecided than females.

Table 5.11. Usefulness of gender and walking paths for wheelchair users

			6. How suitable and safe do you think the sidewalks in Tekirdağ are for wheelchair/stroller use?					Total
			not suitable at all	not suitable	I am undecided	suitable	quite suitable	
How is your gender?	kadın	Count	39	88	47	24	2	200
		Expected Count	36,9	75,0	58,5	23,9	5,7	200,0
		% within How is your gender?	19,5%	44,0%	23,5%	12,0%	1,0%	100,0%
	Erkek	Count	26	44	56	18	8	152
		Expected Count	28,1	57,0	44,5	18,1	4,3	152,0
		% within How is your gender?	17,1%	28,9%	36,8%	11,8%	5,3%	100,0%
Total		Count	65	132	103	42	10	352
		Expected Count	65,0	132,0	103,0	42,0	10,0	352,0
		% within How is your gender?	18,5%	37,5%	29,3%	11,9%	2,8%	100,0%

When the gender and the level of usefulness of the walking paths for wheelchair users are evaluated, it is seen that the majority of the participants gave the answer that it is not suitable at all. Again, the level of indecision of male participants remained higher than female participants.

Table 5.12. Gender and opinion about adequacy level of car parking

			7. What do you think about the adequacy of the car parks/car parks in Tekirdağ?					Total
			quite inadequate	inadequate	I am undecided	sufficient	5. quite sufficient and useful	
How is your gender?	kadın	Count	63	90	30	15	2	200
		Expected Count	59,7	85,2	35,2	17,0	2,8	200,0
		% within How is your gender?	31,5%	45,0%	15,0%	7,5%	1,0%	100,0%
	Erkek	Count	42	60	32	15	3	152
		Expected Count	45,3	64,8	26,8	13,0	2,2	152,0
		% within How is your gender?	27,6%	39,5%	21,1%	9,9%	2,0%	100,0%
Total		Count	105	150	62	30	5	352
		Expected Count	105,0	150,0	62,0	30,0	5,0	352,0
		% within How is your gender?	29,8%	42,6%	17,6%	8,5%	1,4%	100,0%

When the issue of gender and parking adequacy is evaluated, it is concluded that women see these areas more inadequate than men. The number of participants who think that the parking lots are sufficient is quite low.

Table 5.13. Age and satisfaction level of street design

			2. How satisfied are you with the street designs in Tekirdağ?					Total
			I am not satisfied at all	I am not satisfied	I am undecided	I am satisfied	I am very satisfied	
How old are you?	18'den az	Count	2	5	4	1	2	14
		Expected Count	2,9	3,8	4,5	2,3	0,6	14,0
		% within How old are you?	14,3%	35,7%	28,6%	7,1%	14,3%	100,0%
	18-25 arası	Count	6	12	19	7	1	45
		Expected Count	9,2	12,1	14,6	7,3	1,8	45,0
		% within How old are you?	13,3%	26,7%	42,2%	15,6%	2,2%	100,0%
	25-35 arası	Count	27	39	52	23	10	151
		Expected Count	30,9	40,8	48,9	24,5	6,0	151,0
		% within How old are you?	17,9%	25,8%	34,4%	15,2%	6,6%	100,0%
	35-45 arası	Count	28	22	28	19	1	98
		Expected Count	20,0	26,4	31,7	15,9	3,9	98,0
		% within How old are you?	28,6%	22,4%	28,6%	19,4%	1,0%	100,0%
	45-60 arası	Count	6	14	8	5	0	33
		Expected Count	6,8	8,9	10,7	5,3	1,3	33,0
		% within How old are you?	18,2%	42,4%	24,2%	15,2%	0,0%	100,0%
	60 ve Üstü	Count	3	3	3	2	0	11
		Expected Count	2,3	3,0	3,6	1,8	0,4	11,0
		% within How old are you?	27,3%	27,3%	27,3%	18,2%	0,0%	100,0%
Total		Count	72	95	114	57	14	352
		Expected Count	72,0	95,0	114,0	57,0	14,0	352,0
		% within How old are you?	20,5%	27,0%	32,4%	16,2%	4,0%	100,0%

When we look at the age of the participants and street design competence, it is seen that the level of satisfaction is higher for the participants between the ages of 35-45. Despite this, it

is noteworthy that the participants, especially between the ages of 45 and 60, gave very negative answers according to the street design.

Table 5.14. Age and bike friendly suitable level of bikers

			4.How bike friendly and suitable for bikers do you think the streets in Tekirdag are?					Total
			not suitable at all	not suitable	I am undecided	suitable	quite suitable	
How old are you?	18'den az	Count	3	3	6	2	0	14
		Expected Count	4,2	4,5	3,5	1,8	0,1	14,0
		% within How old are you?	21,4%	21,4%	42,9%	14,3%	0,0%	100,0%
	18-25 arası	Count	15	16	11	3	0	45
		Expected Count	13,6	14,3	11,3	5,6	0,3	45,0
		% within How old are you?	33,3%	35,6%	24,4%	6,7%	0,0%	100,0%
	25-35 arası	Count	34	51	40	24	2	151
		Expected Count	45,5	48,0	37,8	18,9	0,9	151,0
		% within How old are you?	22,5%	33,8%	26,5%	15,9%	1,3%	100,0%
	35-45 arası	Count	37	27	22	12	0	98
		Expected Count	29,5	31,2	24,5	12,3	0,6	98,0
		% within How old are you?	37,8%	27,6%	22,4%	12,2%	0,0%	100,0%
	45-60 arası	Count	12	12	9	0	0	33
		Expected Count	9,9	10,5	8,3	4,1	0,2	33,0
		% within How old are you?	36,4%	36,4%	27,3%	0,0%	0,0%	100,0%
	60 ve Üstü	Count	5	3	0	3	0	11
		Expected Count	3,3	3,5	2,8	1,4	0,1	11,0
		% within How old are you?	45,5%	27,3%	0,0%	27,3%	0,0%	100,0%
Total		Count	106	112	88	44	2	352
		Expected Count	106,0	112,0	88,0	44,0	2,0	352,0
		% within How old are you?	30,1%	31,8%	25,0%	12,5%	0,6%	100,0%

When evaluated in terms of age of the participants and bicycle friendliness, it is noteworthy that the negative responses of the participants between the ages of 35 and 45 and those between the ages of 45 and 60 are higher. Participants under the age of 18, on the other hand, have a higher level of indecision about the subject.

Table 5.15. Age and convenient and usefullness level of sidewalk for pedestrians

			5. How convenient and useful do you think the sidewalks in Tekirdag are for the use of pedestrians?					Total
			not suitable at all	not suitable	I am undecided	suitable	quite suitable	
How old are you?	18'den az	Count	1	5	6	2	0	14
		Expected Count	1,9	3,3	4,4	3,9	0,5	14,0
		% within How old are you?	7,1%	35,7%	42,9%	14,3%	0,0%	100,0%
	18-25 arası	Count	6	11	14	11	3	45
		Expected Count	6,1	10,6	14,1	12,5	1,7	45,0
		% within How old are you?	13,3%	24,4%	31,1%	24,4%	6,7%	100,0%
	25-35 arası	Count	15	34	53	45	4	151
		Expected Count	20,6	35,6	47,2	42,0	5,6	151,0
		% within How old are you?	9,9%	22,5%	35,1%	29,8%	2,6%	100,0%
	35-45 arası	Count	19	20	28	25	6	98
		Expected Count	13,4	23,1	30,6	27,3	3,6	98,0
		% within How old are you?	19,4%	20,4%	28,6%	25,5%	6,1%	100,0%
	45-60 arası	Count	5	10	8	10	0	33
		Expected Count	4,5	7,8	10,3	9,2	1,2	33,0
		% within How old are you?	15,2%	30,3%	24,2%	30,3%	0,0%	100,0%
	60 ve Üstü	Count	2	3	1	5	0	11
		Expected Count	1,5	2,6	3,4	3,1	0,4	11,0
		% within How old are you?	18,2%	27,3%	9,1%	45,5%	0,0%	100,0%
Total		Count	48	83	110	98	13	352
		Expected Count	48,0	83,0	110,0	98,0	13,0	352,0
		% within How old are you?	13,6%	23,6%	31,3%	27,8%	3,7%	100,0%

When the use of pavements for age of the participants and pedestrians is evaluated, it is seen that the level of indecision of the participants under the age of 18 is higher than the

others. However, participants who think that these areas are sufficient are generally between the ages of 25 and 35 and between the ages of 45 and 60.

Table 5.16. Age and suitable and safeness level of sidewalks for wheelchair/stroller use

			6. How suitable and safe do you think the sidewalks in Tekirdağ are for wheelchair/stroller use?					Total
			not suitable at all	not suitable	I am undecided	suitable	quite suitable	
How old are you?	18'den az	Count	3	3	6	2	0	14
		Expected Count	2,6	5,3	4,1	1,7	0,4	14,0
		% within How old are you?	21.4%	21,4%	42,9%	14,3%	0,0%	100,0%
	18-25 arası	Count	6	22	11	3	3	45
		Expected Count	8,3	16,9	13,2	5,4	1,3	45,0
		% within How old are you?	13.3%	48,9%	24,4%	6,7%	6,7%	100,0%
	25-35 arası	Count	26	49	52	17	7	151
		Expected Count	27,9	56,6	44,2	18,0	4,3	151,0
		% within How old are you?	17.2%	32,5%	34,4%	11,3%	4,6%	100,0%
	35-45 arası	Count	21	37	24	16	0	98
		Expected Count	18,1	36,8	28,7	11,7	2,8	98,0
		% within How old are you?	21.4%	37,8%	24,5%	16,3%	0,0%	100,0%
	45-60 arası	Count	6	16	8	3	0	33
		Expected Count	6,1	12,4	9,7	3,9	0,9	33,0
		% within How old are you?	18.2%	48,5%	24,2%	9,1%	0,0%	100,0%
	60 ve Üstü	Count	3	5	2	1	0	11
		Expected Count	2,0	4,1	3,2	1,3	0,3	11,0
		% within How old are you?	27.3%	45,5%	18,2%	9,1%	0,0%	100,0%
Total		Count	65	132	103	42	10	352
		Expected Count	65,0	132,0	103,0	42,0	10,0	352,0
		% within How old are you?	18.5%	37,5%	29,3%	11,9%	2,8%	100,0%

When the age of the participants and the suitability of the sidewalks for wheelchair users are evaluated, it is seen that the level of indecision of the participants under the age of 18 is higher than the others. However, the participant group aged 60 and over emphasizes that the pavements are quite inadequate.

Table 5.17. Age and adequacy level of the car parks

			7. What do you think about the adequacy of the car parks/car parks in Tekirdağ?					Total
			quite inadequate	inadequate	I am undecided	sufficient	5. quite sufficient and useful	
How old are you?	18'den az	Count	4	6	2	2	0	14
		Expected Count	4,2	6,0	2,5	1,2	0,2	14,0
		% within How old are you?	28,6%	42,9%	14,3%	14,3%	0,0%	100,0%
	18-25 arası	Count	9	21	11	3	1	45
		Expected Count	13,4	19,2	7,9	3,8	0,6	45,0
		% within How old are you?	20,0%	46,7%	24,4%	6,7%	2,2%	100,0%
	25-35 arası	Count	39	62	35	11	4	151
		Expected Count	45,0	64,3	26,6	12,9	2,1	151,0
		% within How old are you?	25,8%	41,1%	23,2%	7,3%	2,6%	100,0%
	35-45 arası	Count	37	38	10	13	0	98
		Expected Count	29,2	41,8	17,3	8,4	1,4	98,0
		% within How old are you?	37,8%	38,8%	10,2%	13,3%	0,0%	100,0%
	45-60 arası	Count	11	18	4	0	0	33
		Expected Count	9,8	14,1	5,8	2,8	0,5	33,0
		% within How old are you?	33,3%	54,5%	12,1%	0,0%	0,0%	100,0%
	60 ve Üstü	Count	5	5	0	1	0	11
		Expected Count	3,3	4,7	1,9	0,9	0,2	11,0
		% within How old are you?	45,5%	45,5%	0,0%	9,1%	0,0%	100,0%
Total		Count	105	150	62	30	5	352
		Expected Count	105,0	150,0	62,0	30,0	5,0	352,0
		% within How old are you?	29,8%	42,6%	17,6%	8,5%	1,4%	100,0%

When the age of the participants and the adequacy of the parking lot are evaluated, it is seen that the largest group of participants who think that the parking lots are insufficient is 45, 60 and over 60 years old.

5.2. DESIGN ALTERNATIVES TO THE SELECTED STREET

A bird's-eye view of Tekirdağ is given in the map image below. In Tekirdağ, which generally dominates the coastline, settlements are also more concentrated on the coastline.

The location of Çandarlızade İbrahim Paşa Street is shown in the map image below. The street, which is a little further inland from the coastal area, is between the coastal areas where settlements are concentrated and the inner section where new settlements are emerging.



Figure 5.24. A bird eye view of Tekirdağ Center and Çandarlızade İbrahim Paşa Street.

[109]

In the map image in Figure 5.2 below, the view of Çandarlızade İbrahim Paşa Street in 2010 is given. When the image is examined, it is noteworthy that the settlements are

clearly demarcated and there are no settlements in the interior. However, it is seen that the urbanization is more irregular and the structuring is broken.



Figure 5.25. The view of Çandarlızade İbrahim Paşa Street in 2010. [109]

When viewed in Figure 5.3, the state of Çandarlızade İbrahim Paşa street in 2022 is seen. While it is noteworthy that the settlements have become more frequent, it is also seen that the location of the streets is arranged in a more strategic way. In addition, it is seen that the residential areas are concentrated in a certain region, and it draws attention that the areas in the outer parts are used infrequently. With the planning carried out over time, a certain amount of improvement has been achieved on the street. However, it can still be said that adequate regulation has not been made and it is an incomplete avenue in many respects.



Figure 5.26. The view of Çandarlızade İbrahim Paşa Street in 2022. [109]

5.2.1. Alternatives for safety and traffic planning

With the designs to be realized on Çandarlızade İbrahim Paşa Street, increasing the parking areas, developing the sports areas and increasing the commercial areas will help people to spend their time in a more useful way and will contribute positively to both their physical health and their psychology. In addition, new living spaces to be created on the street, together with new design strategies, will allow people from different identities to be intertwined here. The works carried out will make the region more suitable for living and will also allow cultural diversity.

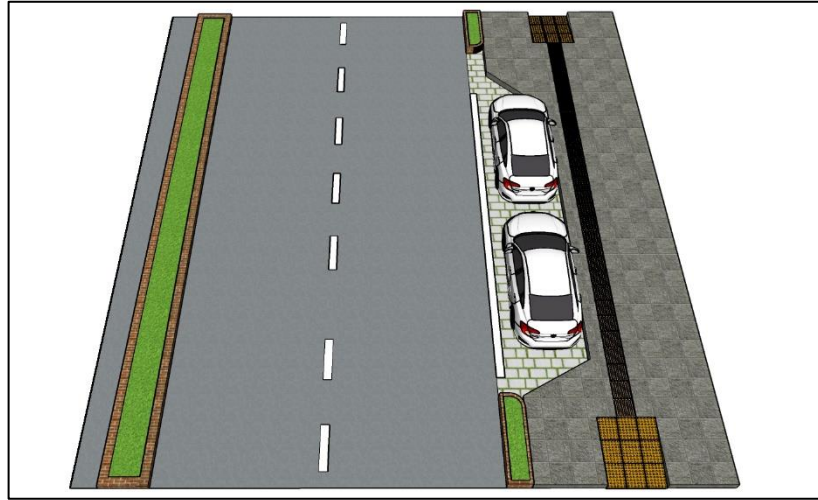


Figure 5.27. The pocket parking example, suggested by the author

It can be said that in order to make a green design on the street, impermeable surfaces and infrastructure should be changed depending on the street type. Especially rain water control and permeable surfaces are among the very important factors for green streets. Rainwater control will be ensured with the increase in the presence of green areas together with green parking lots and environmentally permeable surfaces. Accordingly, green parking lots will first have a structure that collects or slows down rainwater, and then greener landscape areas will emerge with the increase in planted areas [111].

Looking at the newly arranged parking lots on Çandarlızade İbrahim Paşa Street, it is seen that they are generally concentrated in commercial areas. Having parking spaces in these areas creates a very advantageous situation for the user. Those who prefer to travel with their personal vehicle can easily park in these areas and access the alternative of getting their work done quickly.

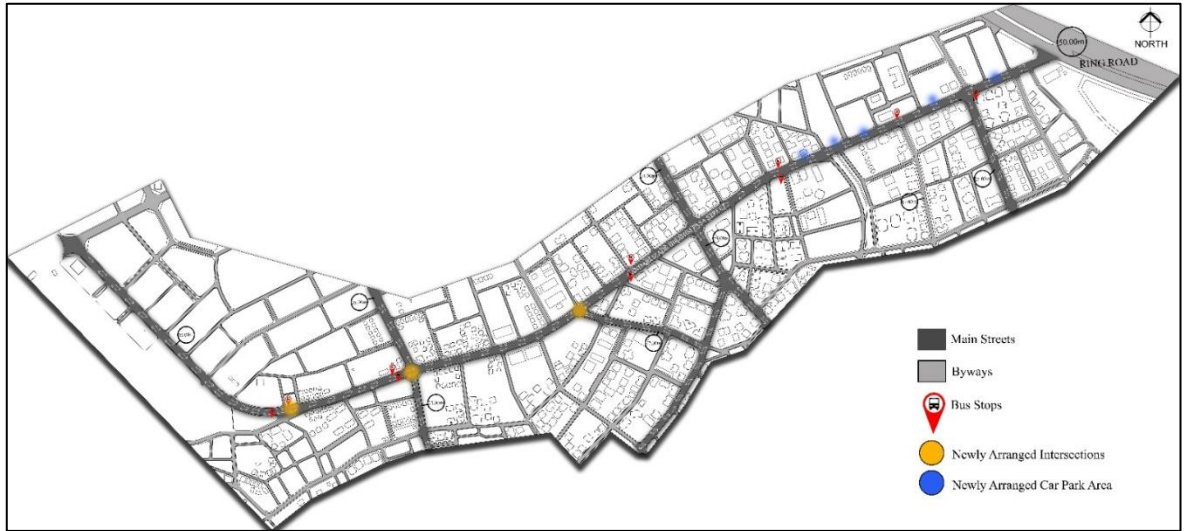


Figure 5.28. The parking areas arranged on Çandarlızade İbrahim Paşa Street, suggested by the author.

5.2.2. Alternatives for walking and biking

When Çandarlızade İbrahim Paşa Street is evaluated in terms of pavement and bicycle paths, many shortcomings draw attention. First of all, it is seen that the width of the sidewalks on the street varies between 1 meter and 2.2 meters. The unsteady progression of the width of the sidewalks and the narrowing of the sidewalks in some sections create major problems in terms of pedestrian accessibility. In order to ensure the comfort of the pavements, the width of the pavement has been brought to standards where at least two people can pass side by side. Considering that not only healthy individuals live in society, it should not be forgotten that suitable conditions should be prepared for disabled individuals as well. Accordingly, the pavement designs required for disabled individuals are given in figure 5.6 below. Considering that these minimum dimensions should be provided, the pavement widths are designed as 4 meters. This measure creates a comfort zone where both disabled people and pedestrians can walk comfortably.

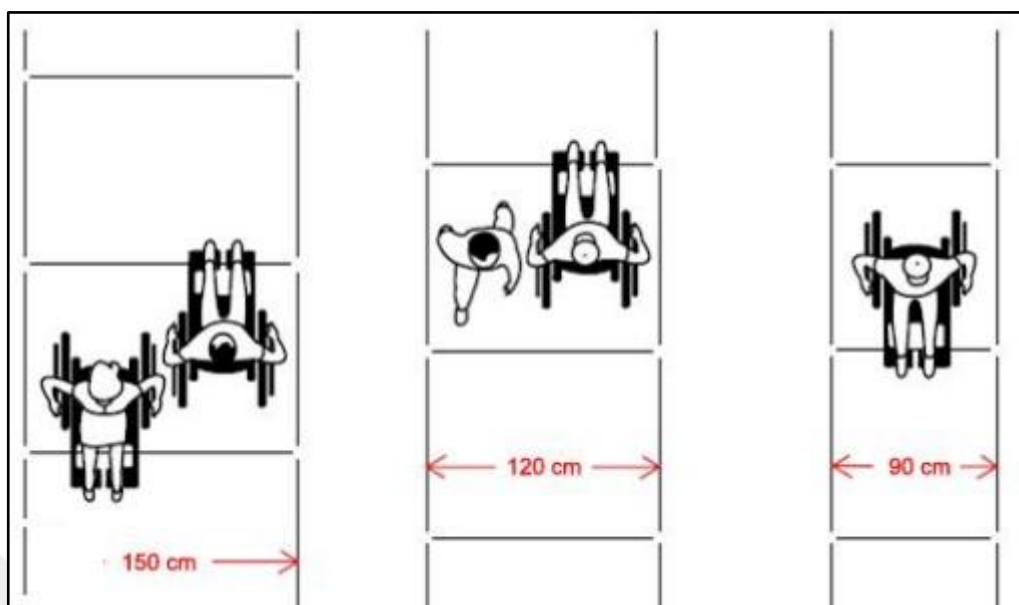


Figure 5.29. Required pavement design for disabled people [108].

At the same time, ramps have been placed at the beginning of the sidewalks in order to facilitate the access of the disabled. The slope of the ramp was determined according to the Turkish Standards Institute and the required slope was given accordingly. Again for visually impaired individuals, visually impaired paving stones are laid on the sidewalks. The designed pavements are inclined at a rate of 1% for drainage. The sidewalks are also separated from the bike path and the vehicle road by vegetation. Looking at the figure 5.7 below, the pavement part separated by the planted area can be seen.

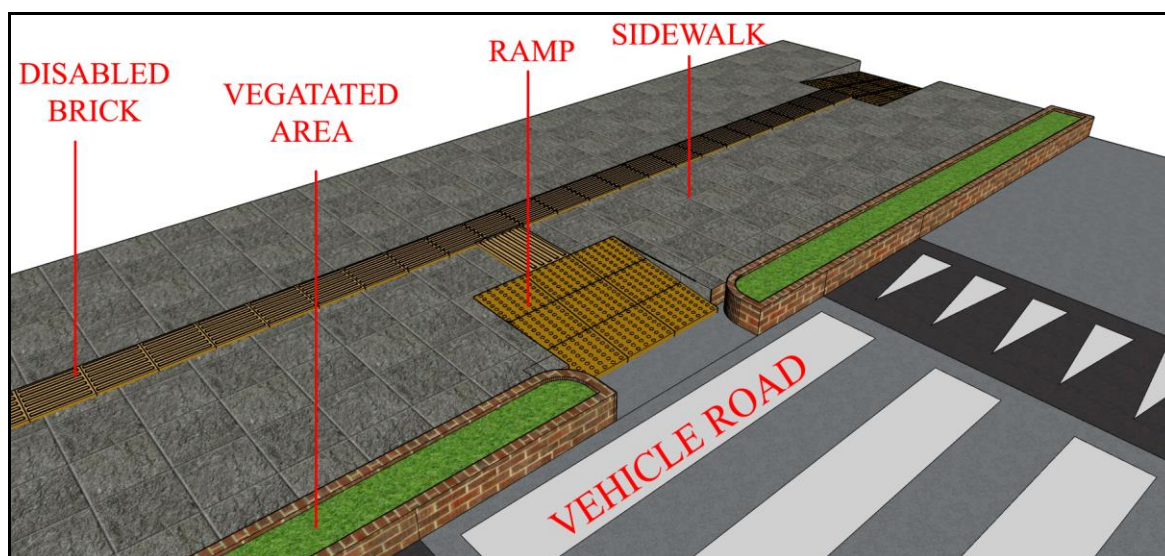


Figure 5.30. Sidewalk design separated by a planted area, suggested by the author.

Sidewalk safety has been greatly increased in the design, which is based on completed streets, healthy streets and green street features. At the same time, the sidewalks have been turned into comfort areas where pedestrians can walk comfortably. In accordance with the results obtained in the survey study, garbage bins and benches for pedestrians to rest were placed at certain points on the sidewalks in the street design. An example of a garbage can and a bench is shown in figure 5.8 below.



Figure 5.31. Bench and garbage can design placed on the sidewalks. [107]

In addition to all these, in the design made, areas such as warning signs, information signs, traffic lights, lighting elements and poles, seating elements along the pavement, open-air eating and drinking areas next to the pavement have been increased in number, especially on the West side of the street, which is a residential area.

However, the bicycle paths required for the streets to be healthy streets are not available in the sample street. It is necessary to separate the bike paths as a special area, usually with the use of signs and signboards. These areas should also be located adjacent to the driving lanes of motor vehicles and flow in the same direction as motor vehicle traffic. Cycle lanes should usually be located on the right side of the street, between the sidewalk, roadside or parking lane. It is appropriate to use these areas on streets with an average of 3000 motor vehicle traffic per day. However, bicycle lanes are a suitable application for streets with higher transit vehicle volume. With the construction of these bike paths, driver comfort and confidence increase on crowded streets. Cycling lanes, which also create a kind of trust environment for automobile users, create a distinction between cyclists and automobiles. At the same time, in this way, drivers visually remember that bicycles have the right to go out on the street [99]. In the design prepared based on this information, a bicycle path was added to the flow direction of the traffic. This bike path is designed according to the Cycle Path Regulation and is separated from the road by a median. When the figure below is examined, the design of the median, separated bicycle path and pedestrian pavement can be seen. The bicycle path, which is separated from the vehicle road by a refuge, is very important for a safe ride.

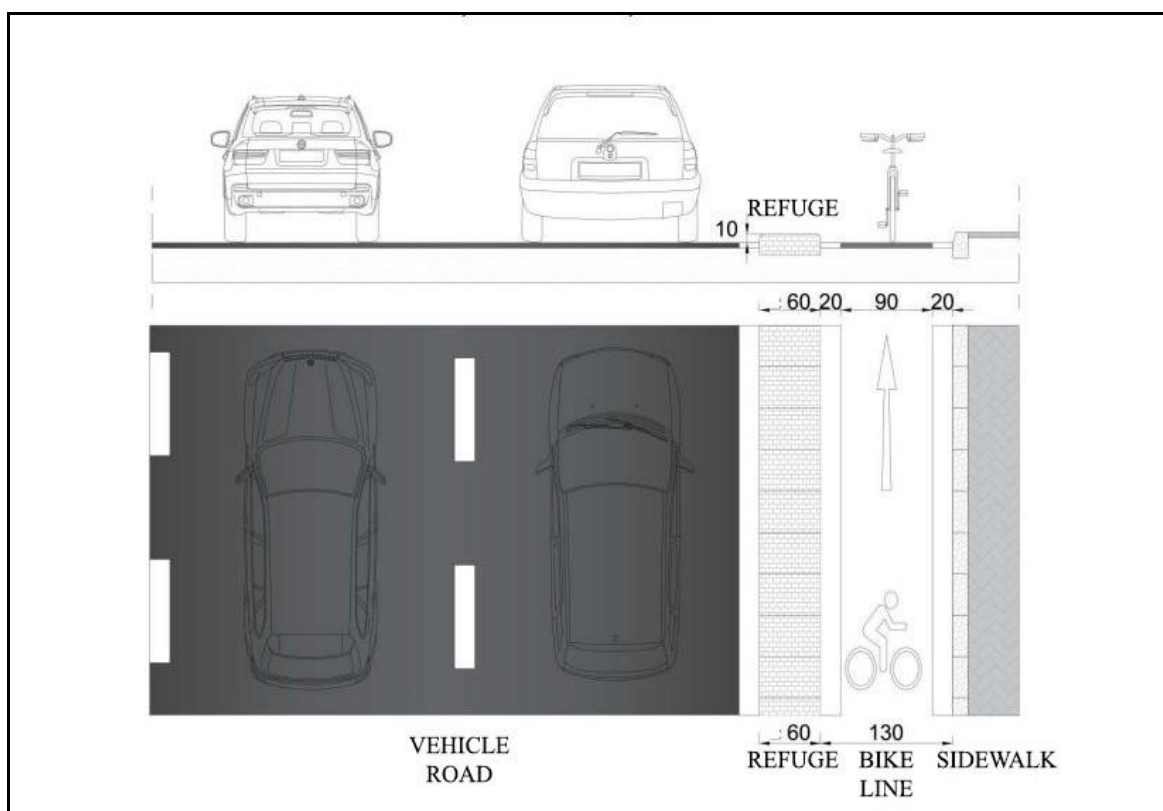


Figure 5.32. Bicycle path separated by a refuge at the same level as the vehicle with a maximum speed limit of 50 km/h for the car. [100]

In addition, relevant warning signs have been added to places where bicycle paths intersect with other roads. At the same time, a safer driving area has been created by adding speed limiting elevations to the places where these roads intersect with other roads. When the figure 5.10 below is examined, the deceleration features can be seen.

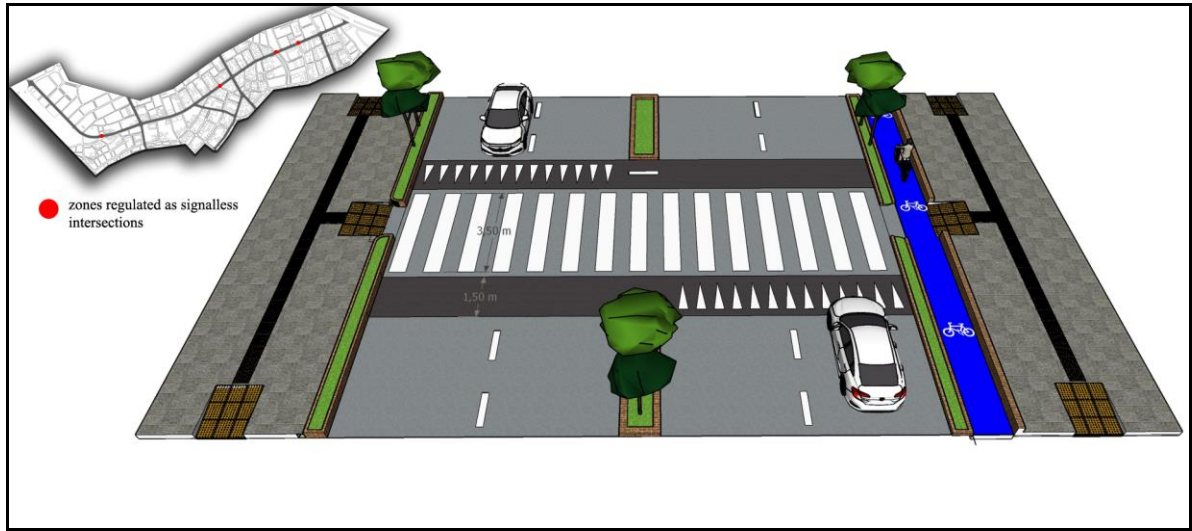


Figure 5.33. Signalless pedestrian crossing design with speed limiter feature, suggested by the author

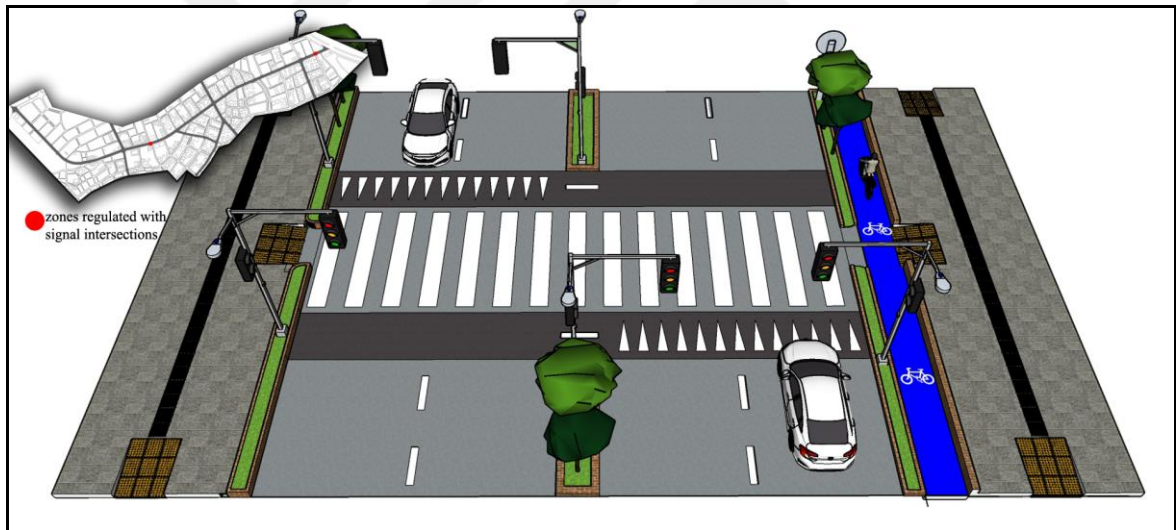


Figure 5.34. With signal pedestrian crossing design with speed limiter feature, suggested by the author.

Bicycle lanes designed exclusively for pedestrian use are not sufficient for these streets to be healthy streets. For this reason, various elements such as floor material, drainage, lighting and coating must be carried out in accordance with sustainability. The bike line areas on Çandarlızade İbrahim Paşa Street are clearly seen on the figure below.



Figure 5.35. Bike line areas on the selected street, drawn by the author.

In the design seen in Figure 5.13, a 2% training was given for the drainage of bicycle paths. The transverse slope of the bicycle paths constructed at the level of the vehicle road was carried out in accordance with the rainwater drainage direction and also the slope of the vehicle road.

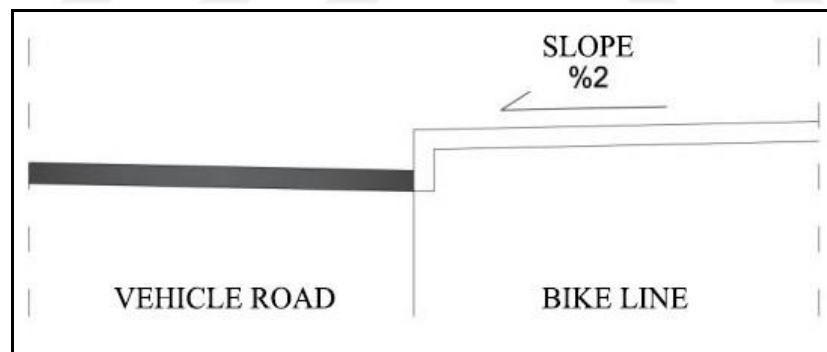


Figure 5. 36. Transverse slope on bike paths. [101]

When the figure 5.14 below is examined, it is seen that a suitable bus stop and bicycle path design has been made. In terms of security, the bus stop enters from the bicycle path and thus the bicycle path is ensured to continue uninterrupted. Again in the design, with the warning signs placed at the starting point of the bus stop, cyclists can realize that any bus will enter this area, thus providing a safe driving environment.

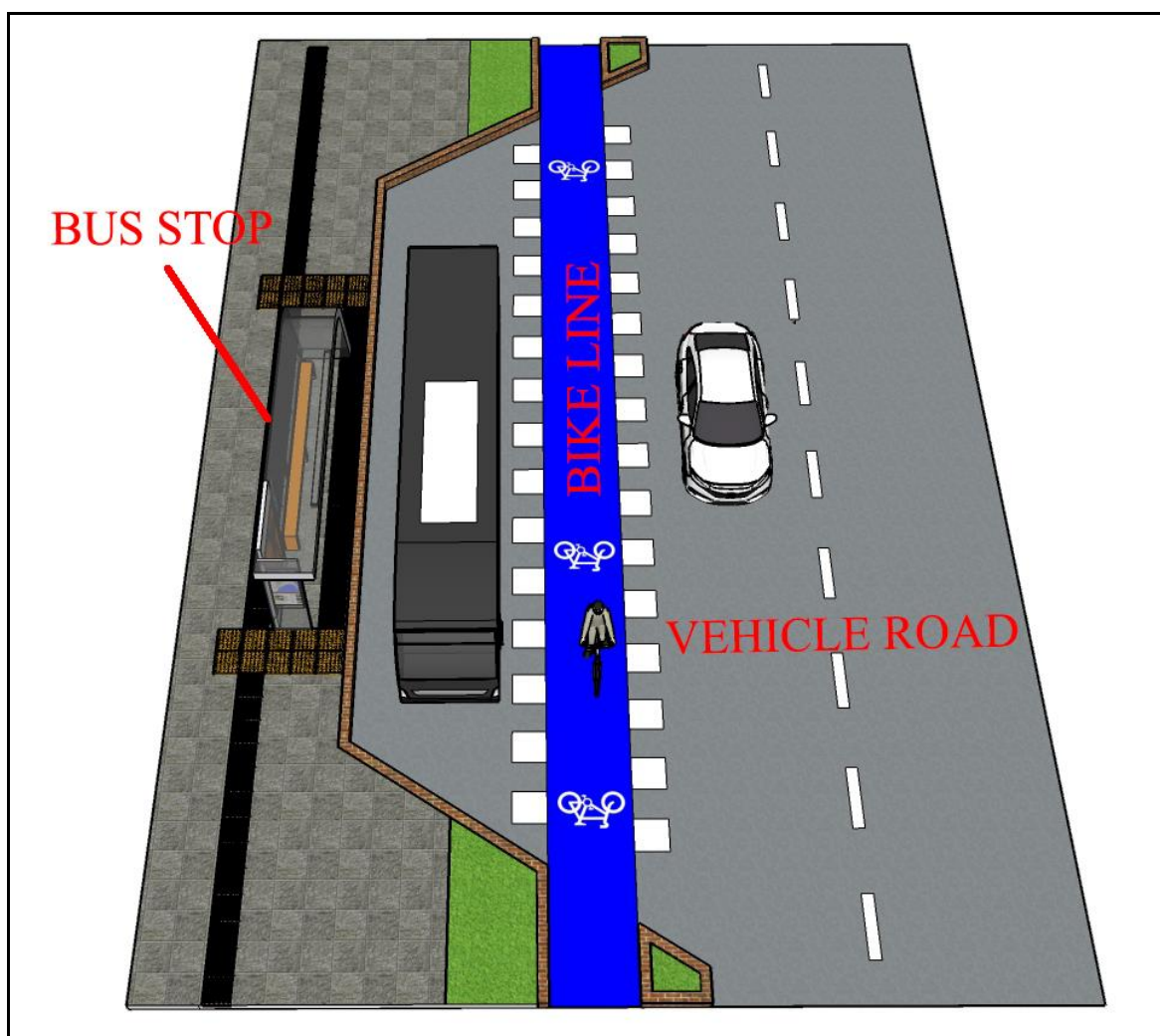


Figure 5.37. Suggested bus stop and bike path crossings, suggested by the author.

In the figure 5.15 below, the design of the intersection of the bicycle path and the uncontrolled intersection is seen. It is stated here that the bike path is reached with dashed lines so that the drivers can notice it. In addition, warning signs and bicycle stop lines are included so that cyclists can notice this area when they come to the road. The area where the bicycle can pass is marked with the appropriate color and a vehicle stop line is drawn at a certain distance from this area. Thanks to this design, possible accidents are prevented.

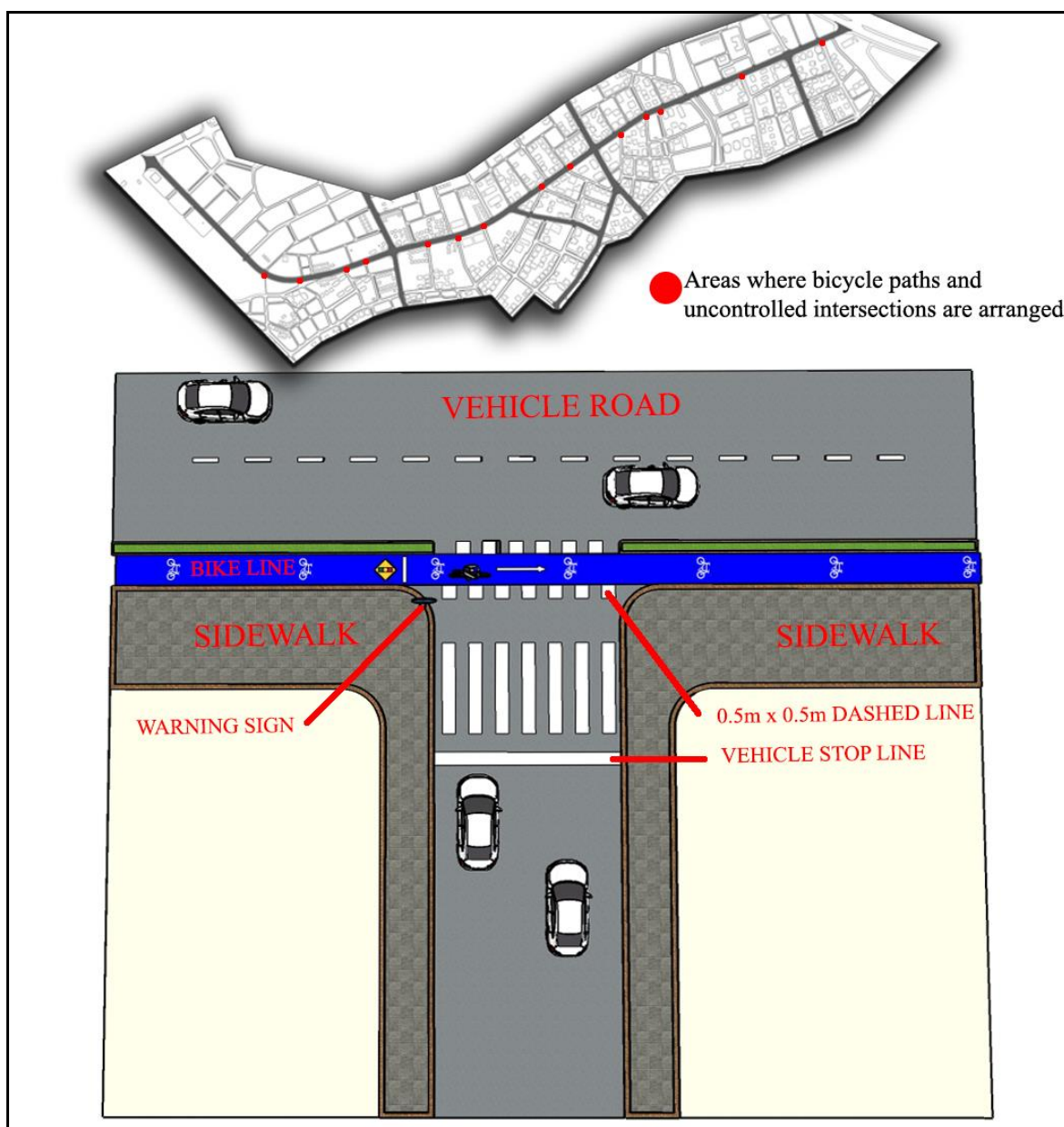


Figure 5.38. Bicycle path and uncontrolled intersection, suggested by the author.

Figure 5.16 below shows the intersection of the bicycle path and the controlled intersection. In the controlled intersection intersection design, unlike the uncontrolled intersection intersection design, traffic lights are added. In order to allow the cyclists to pass in front of the cars, they are warned and stopped by traffic lights. With the illuminated traffic light located just in front of the vehicle stop line, a much safer riding environment for bicycles emerges.

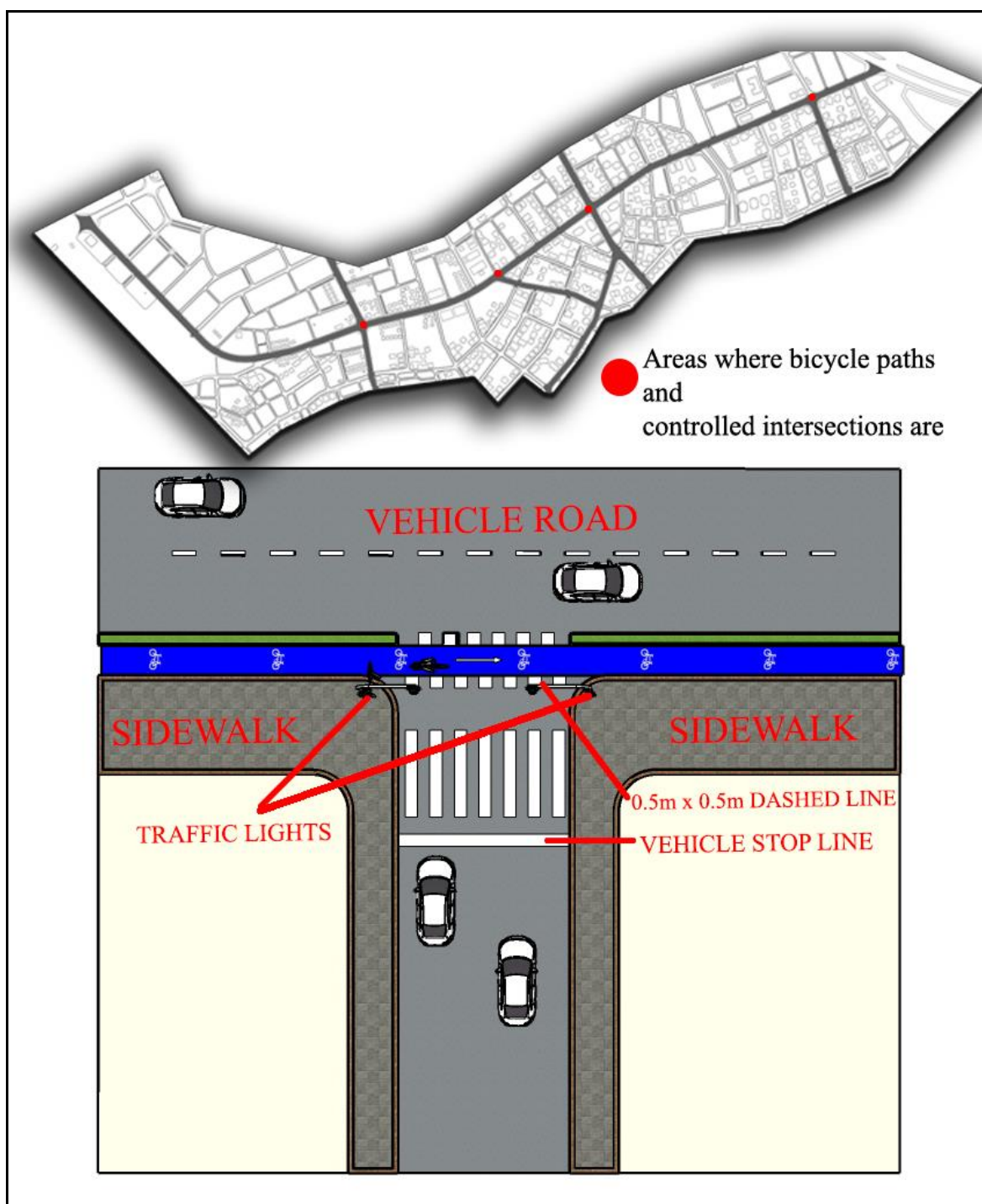


Figure 5.39. Cycle path and controlled intersection, suggested by the author.

When the figure 5.17 below is examined, the design of bicycle paths indicated with warning signs on a two-way street can be seen. Active warning signs used represent signs that attract attention by users at unsigned intersections and pedestrian crossings in the middle of the block. Warning signs are used in places where bicycles have the right of way when crossing a road and where drivers must be warned to give way.

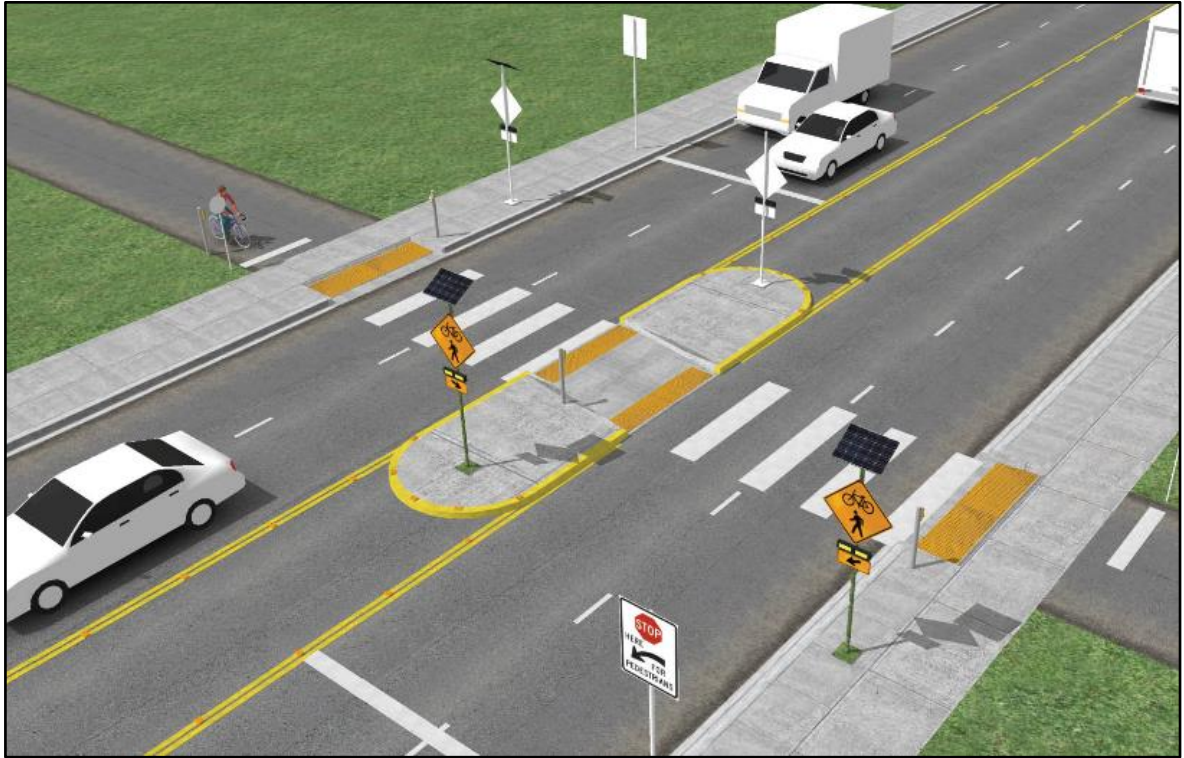


Figure 5. 40. Warning signs for the bike line. [102]

The way of marking the bicycle path, which is widely used in Turkey, is to paint blue and mark it with white stripes. As can be seen in the prepared design (Figure 5.18), a 2 mm high marking was made using a long-lasting and permanent paint. In order to indicate that the road is a bicycle path, a template was printed at 10 m intervals and an arrow sign was placed in front of the template in order to determine the direction.



Figure 5.41. Bike line signs. [103]

5.2.3. Alternatives for public transportation

Due to the inadequacy of the intersections on Çandarlızade İbrahim Paşa Caddesi, three new intersections were arranged and the number of traffic lights at the intersections was increased in accordance with the answers given in the survey studies. In addition, pedestrian crossings were designed in appropriate design standards, taking into account the answers given to the inadequacy of pedestrian crossings. Again, necessary traffic lights adjustments were made at the specified times. In addition to all these, "stop" signs have been hung at intersections, places where bicycle paths intersect or where pedestrians are likely to pass.

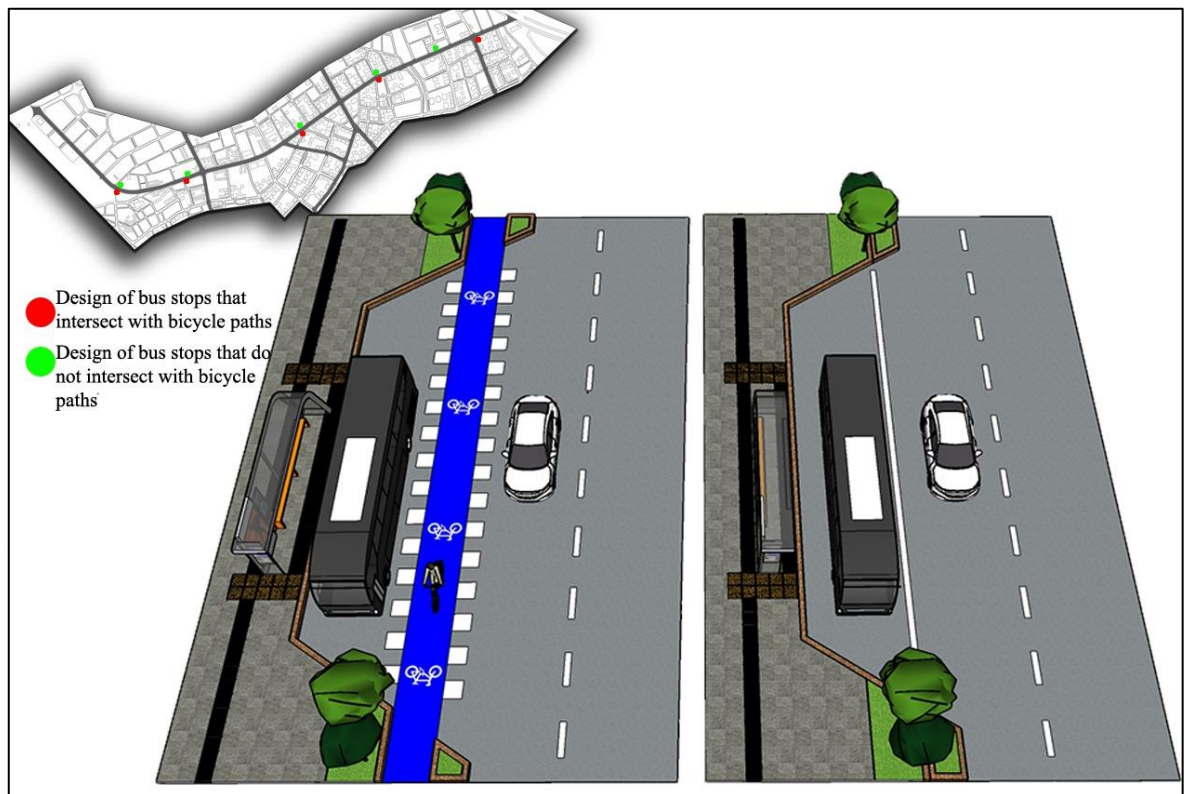


Figure 5. 42. Bus stop design for streets with and without bike paths, suggested by the author

When the figure below is examined, it is seen that the order of pass for vehicles at an intersection without a bicycle path is seen. In order to prepare a healthy driving environment at intersections, vehicles must act in accordance with the rule of passage. There must be sufficient traffic lights and warning signs for a healthy driving environment.



Figure 5.43. Traffic lights and warning signs that should be at the intersections on the completed streets. [110]

The neglect of public transport on completed streets is an issue that cannot be taken into account. Accordingly, it has been considered that one of the most important modes of transportation that will reduce the density of motor vehicle traffic is public transportation, and the number of bus stops has been increased. Three more stops have been added to the existing bus stops, which are thought to be incomplete as seen in the layout plan. However, the existing stops have been adapted to the design and become safer. In particular, pockets were made for bus stops in order not to disrupt the traffic, and a more convenient flow was created thanks to these pockets. Considering that the fact that the stops are in pockets does not create a completely safe environment, increased speed breakers without signal were placed next to the stops for safe passage. At the same time, in the design prepared, the above-mentioned disabled pavement design was applied in order for the disabled to access the stops.

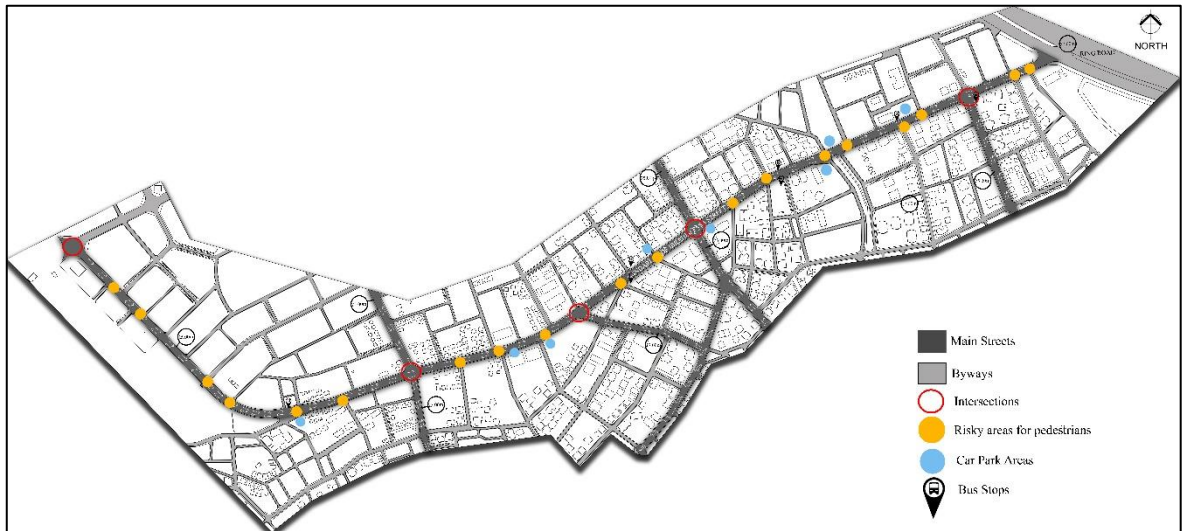


Figure 5.44. The design of the existing parking areas on the selected street, drawn by the author.

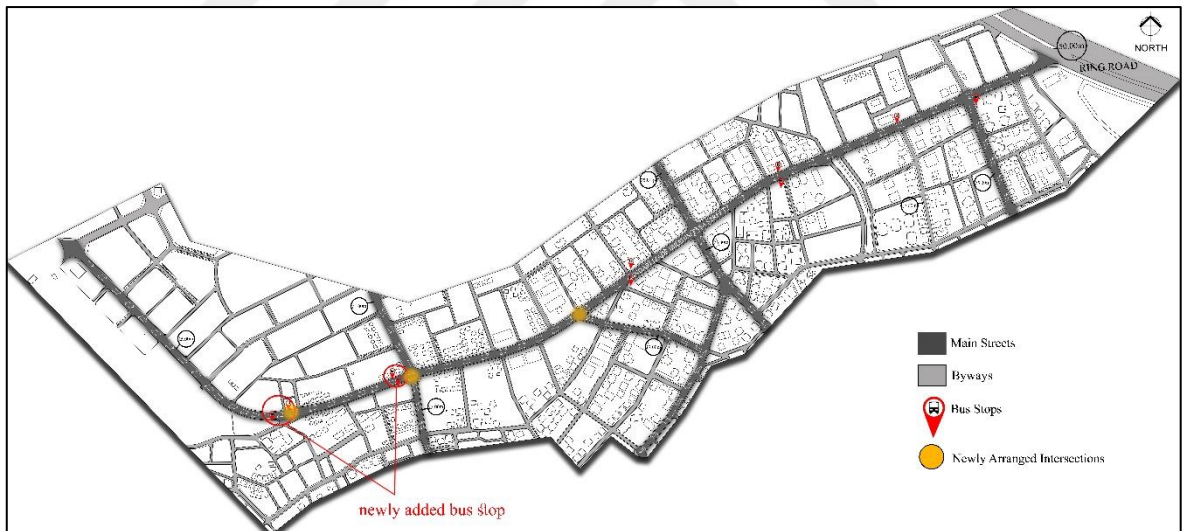


Figure 5.45. The public transport site plan on the selected street drawn, by the author.

The lack of parking lots on Çandarlızade İbrahim Paşa Street is also noteworthy. With the pocket parking lot, the parking problem in the region is solved to a great extent. However, pocket parking lots, which are made common in commercial areas, are very useful to provide an easy access to the area.



Figure 5.46. Example of an intersection on a completed street [106]

The parking lot was not arranged in the part where the residential areas were dense, because it was taken into account that the settlements consisted of detached houses. Since there are generally sites in this region, the parking needs have been solved within the site.

5.2.4. Alternatives for street trees and planting areas

In order to develop green areas, which is one of the biggest shortcomings in Çandarlızade İbrahim Paşa Street, first of all, green bands were created on the refuges and sidewalks. The trees planted in these green bands were chosen in a way that would not affect the field of view in traffic and were placed accordingly. Again in these areas, plants that are easier to care for rather than plants that are difficult to care for were preferred. With the design, these areas were fed with rain water and thanks to this method, no extra care was given to the plants.



Figure 5.47. Green band design on curb edges. [105]

It is essential to use well-developed tall sapling material in urban road afforestation. As stated in the "Urban Road and Square Afforestation Rules Standard" of the Turkish Standards Institute, morphologically, the sapling material to be used in urban alle afforestation; 2 - 2.5 m unbranched trunk height, single and smooth trunk, symmetrical and vertically branching crown developed, trunk diameter thicker than 5 cm, rooted at least 3 times with staggering or transplantation processes, preferably covered, or soil type seedlings must have the characteristics [112].



Figure 5.48. A newly created exemplary alle on the side of the boulevard [112].

As seen in the site plan, arrangements were made in qualified areas such as sports fields and parks, which are located around the street and are not used. With this arrangement, new parking areas were created and these parking areas helped the street to become a healthier street.

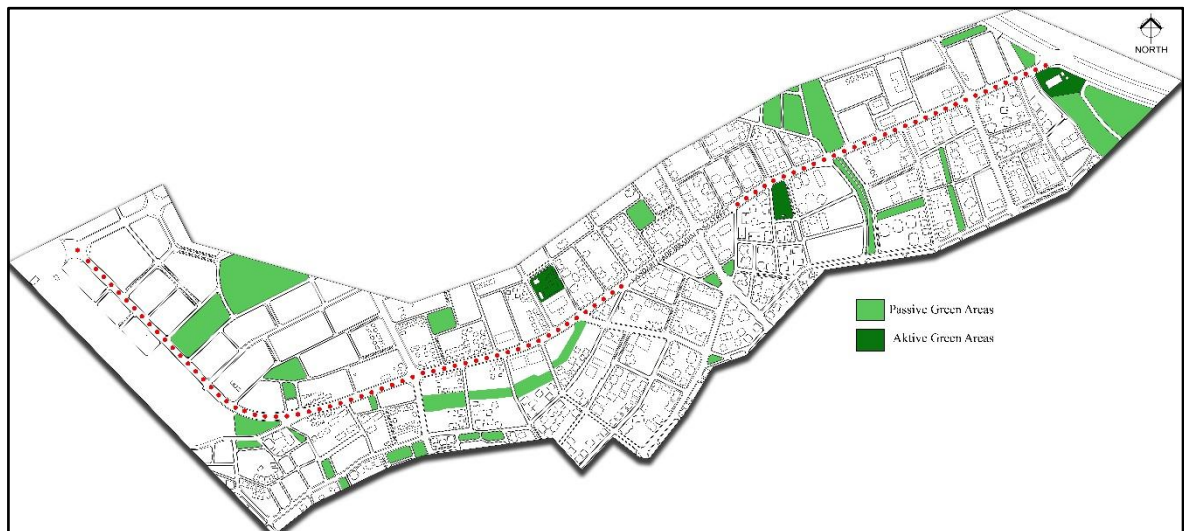


Figure 5.49. The active and passive green areas on the selected street, drawn by the author.

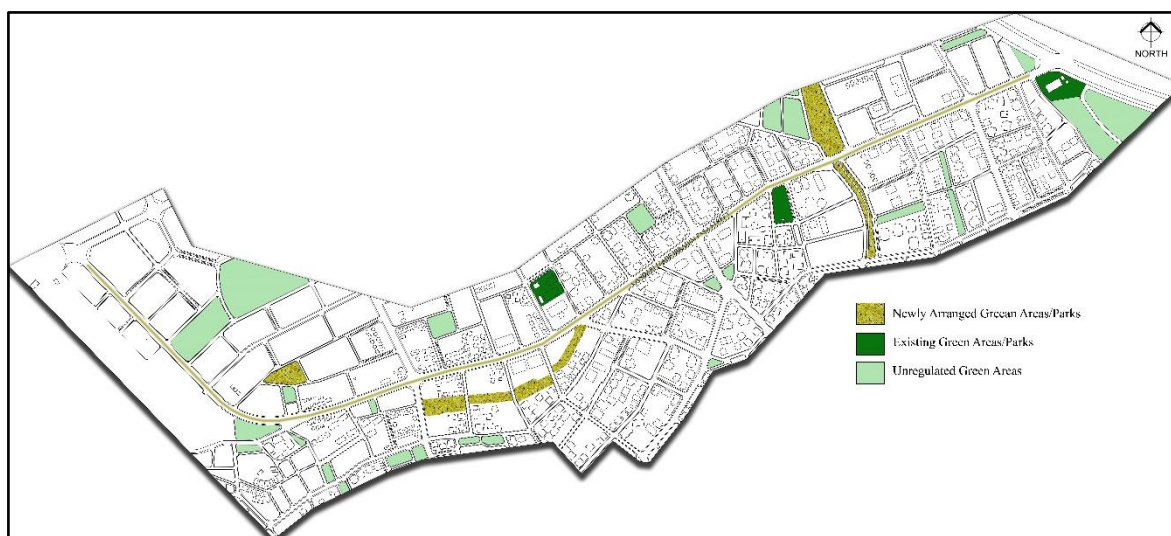


Figure 5.50. The green area design on the selected street, drawn by the author.

Increasing the green park areas regionally also allows socialization. Therefore, great attention was paid to green areas in the design. The creek, which appears to be a creek but is not used, has been rehabilitated and turned into a park around it. In addition, parking arrangements were made in the parcels with park characteristics located in the middle of the residential areas and in the areas close to the education areas. A parking area was also designed in the area where the sites are located towards the west side of the street.

5.2.5. Alternatives for storm water management

Climate change, population growth, increase in water consumption and water pollution due to urbanization and industrialization, and the gradual decrease of clean water resources are the most important harbingers of the fact that water scarcity will emerge in the near future. In urbanization, excessive concreting and asphaltting, the urban heat island effect intensifies, makes it difficult for rainwater to meet with the soil, and the transformation of rainwater into a flood disaster is exacerbated. Water retention techniques have been developed for the purpose of capturing, using and reintroducing rainwater into the life cycle; Two different techniques are used, from roofs and surfaces. Rain gardens are simple landscape features used for slow collection of rainwater, for sedimentation, infiltration, filtration, and adsorption. These systems generally refer to systems for slowing down the flow of storm water, improving the quality of storm water and reaching its destination [113].



Figure 5.51. Example of a roadside structured rain garden [114].

Rain ditches, which can be preferred for street designs, refer to linear, vegetation-filled and low-sloping gutters generally found in urban areas close to roads in order to reduce the risk of flooding in heavy rains or after rains. The plant rain ditch absorbs, retains and transmits water leaks that occur on the surface. However, as water seeps through the vegetation and soil layer, it has the ability to remove contaminants and sediments. The vegetation option for the plant rain ditch may also differ. However, deep rooted native plants are commonly preferred [104].

Vegetated ditches are defined as strips that are used to collect rainwater and direct the movement of rainwater, slow it down during routing, and direct this water instead of being thrown away and collected in a pond. The main function of rain ditches is to act as a filtering device while reducing the velocity of the current. At the same time, it has filtering and absorption features. Using turf channels in vegetated trenches is less costly than installing a floodwater drainage pipe system with curbstone and corrugated floodwater inlets. Periodic cleaning of sediments and mowing is one of the most important maintenance needs. The longer the vegetated ditches, the longer the residence time for rainwater to slow down and be filtered [19].



Figure 5. 52. Example of a rain ditch [15].

The width of the rain water ditches, whose depth is around 15 cm, is 60 cm in areas such as private gardens and 1.2 m in large areas such as city parks. Studies conducted in the USA state that they are very effective in both removing pollutants and reducing the size of the flow velocity. In general, the performance of vegetated trenches is not only dependent on channel length. It also allows for better filtration with the use of longitudinally sloping barrier selections to slow the flow. Trenches or turf channels are suitable for many terrain conditions and are also adaptable to design. At the same time, implementation costs are relatively low [19].

5.2.6. Alternatives for business/economy

As seen in the site plan below, commercial and educational points are widely seen on the selected street. The focal points, which are generally on the east side of the street, were formed near the main axis of the street. When the points where health-related services are provided are evaluated, few buildings draw attention. By increasing these focal points on the West side of the street, a more lively street in economic and social terms can be created. Based on all these, it is thought that with the new pavement design on the street, a more attractive environment will be created for pedestrians and, in parallel, it will provide

economic benefits. As pedestrians continue their lives in a safe walking environment, the rate of shopping on the street will increase and the economy will be activated accordingly.

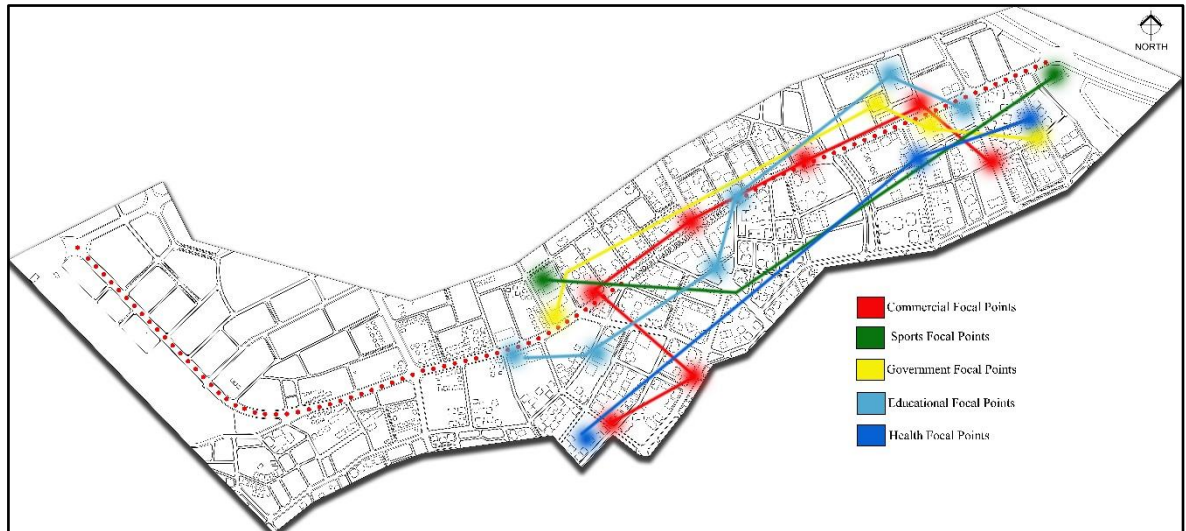


Figure 5. 53. The focal points on the chosen street, drawn by the author.

Again, according to the site plan seen in Figure 5.30, it is seen that the occupancy rate on the street is more intense in the Eastern regions. In the design, the diversity of the commercial spaces on the street has been increased and the public spaces on the street, which are felt to be lacking, have been arranged. This allowed people to spend more time on the street and at the same time revive the economy.

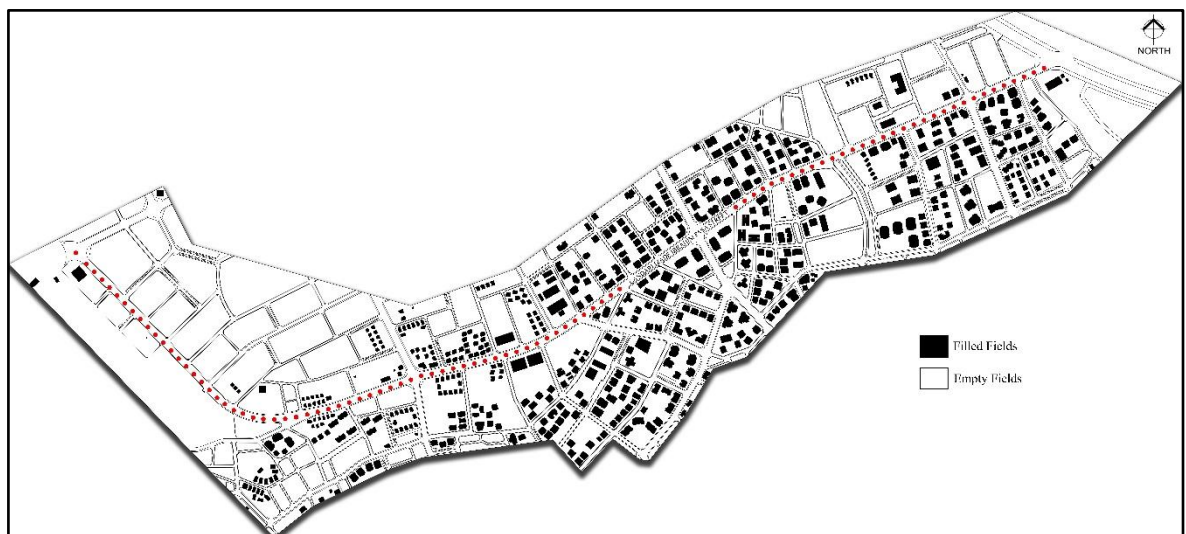


Figure 5. 54. The occupied and empty areas on the selected street, drawn by the author.

The development of commercial areas that are not used on the street is a very important element for the increase of economic vitality. In addition, the desire of individuals to live in the street where the arrangement is made increases and the real estate housing values increase in parallel. When the site plan below is examined, the floor plans of the settlements on the street draw attention. It is noteworthy that the eastern part of the street is a wider region in terms of residential areas. Accordingly, the attractiveness of the street, which has been developed in terms of design, increases to a great extent and the street becomes more attractive for both local people and foreigners. Eating and drinking places on the street are also reviving with the availability of adequate parking spaces and safe sidewalks for pedestrians. The increase in usage diversity on the street provides great benefits to the economy.

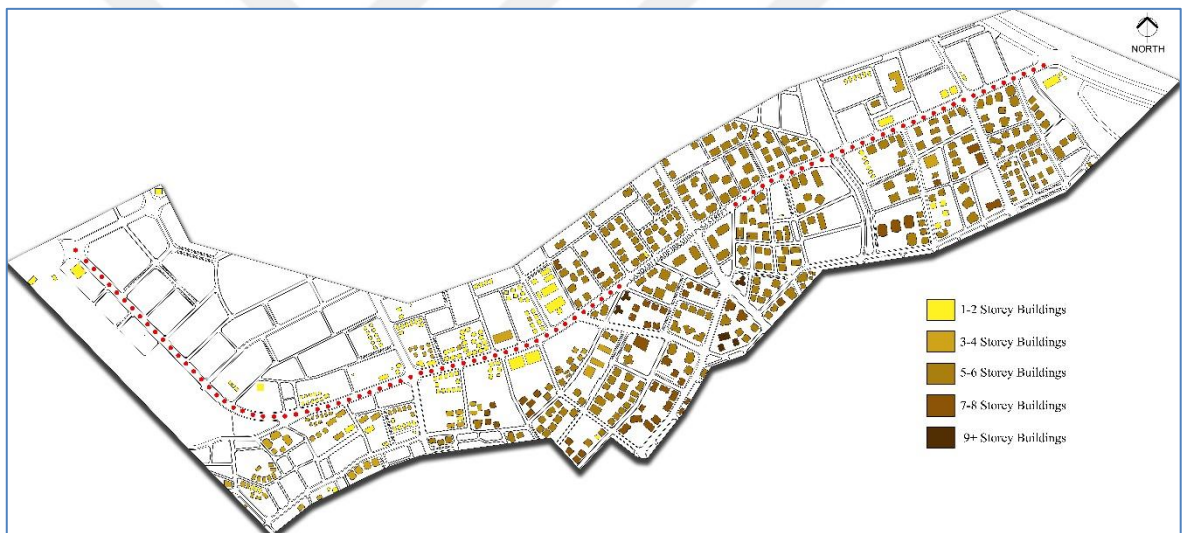


Figure 5. 55. The floor plans of the settlements on the selected street, drawn by the author.

6. CONCLUSIONS

In order to eliminate the negativities that occur as a result of the changing ecological balance in the world, it is necessary to provide both individual comfort and ecological elements in a balanced way with sustainable projects. One of the most important studies on this subject is the complete street strategy. These streets not only provide a safe environment for people of all ages and conditions, but also support both local land use and natural environments with the connections they establish with natural areas. Complete streets is a highly strategic approach that aims to provide benefits in underserved areas. Transportation options on complete streets offer a convenient, reliable and safe alternative regardless of age, ability or living condition. It is aimed to create a safe and comfortable area for cyclists and vehicle drivers as well as creating a safe environment for pedestrians on complete streets. In addition, green areas, which are the most important elements of the complete streets, are also very important factors for the protection of natural areas. Various studies are carried out to collect rain water, to clean the vegetation, and to make the air fresher at the same time with green streets.

Considering that streets constitute a very significant percentage of public lands, it is seen that the improvement of streets will not only protect the environment but also have the potential to increase public health and well-being.

Therefore, the green streets emerging at this point allow the combination of very different design elements such as permeable pavements, trees on the street and biological areas. Here, various gains are provided with the successful application of green techniques. Although the design and appearance of green streets change, it is possible to say that their functions are the same. Green streets basically protect the water quality of both rivers and streams by removing up to 90% of pollutants. At the same time, green streets help to renew groundwater resources, reduce carbon emissions, improve air quality and beautify neighborhood aesthetics. At the same time, green links are established between parks and open spaces with green streets. Green streets help to use local resources and recycled materials whenever possible, minimizing the energy cost for the community. Green streets also provide healthier alternatives to cycling, running and walking. Streets that contain all these elements are called complete streets. These streets generally aim to create a system to

provide energy efficiency and make the most of environmental factors. At the same time, it is very important to increase the filtration of rainwater, to reduce the flows and to improve the health of the basin. Pedestrian and bicycle access is also encouraged, along with complete streets. At the same time, local flooding is reduced and the aesthetics of the street is improved. When all factors are evaluated, the practices that increase the livability of the society and increase the welfare level draw attention.

When the data obtained in this study is evaluated, it is noteworthy that there are no completed streets in Çandarlızade İbrahim Paşa Street, which is the subject of the study, and there are missing elements in many aspects. The data obtained in the survey study reveals that many measures should be taken to improve these streets.

Çandarlızade İbrahim Paşa Street is a working area with many deficiencies due to its green and healthy street designs. The designs developed accordingly aim to make the aforementioned street both a completed street, a green street and a healthy street. Determining the priority areas on the streets is of great importance for the city to breathe in a healthy way. Therefore, first of all, the deficiencies on the street were identified and the necessary design plan was put forward for these deficiencies.

With the lack of active green space on the street, the people living in the area spend time in areas outside the street and the livability of the street is greatly reduced. Accordingly, the unused areas on the street should become usable in a way that does not disturb the integrity of the street. Since the region has the potential to develop in terms of urban design, a greener and healthier street structure has been tried to be revealed with various design alternatives. Areas such as recreational areas, bicycle paths and parks planned in alternative design proposals have greatly increased the quality of life of the street. On the other hand, with the addition of unused open areas to green areas, common areas where individuals can coexist have been created. These emerging areas will strengthen the street belonging by supporting social integration. However, although there is a diversity of public space typologies in the open spaces on the street, it is seen that the quality of the space is low. Street usability will increase drastically when different public spaces on the street are developed. It is foreseen that sustainability will be ensured with the afforestation and planting works carried out to improve the green texture on the street. In the alternative design prepared for the green areas on the street, ecological solution suggestions have been developed and the plant material has been enriched. This ensures the sustainability of the

street to a great extent. The fact that the selected area becomes a healthy and green street also contributes to the social development and cultural development of the region. Especially the arrangements made in the middle of the residential areas and in the parts close to the education areas allow individuals to spend more time in the region.

With the new designs realized on the street, it is thought that the mental health of the local residents will improve, health expenditures will decrease, diseases will decrease because people breathe clean air, a more peaceful environment will be created due to the prevention of noise pollution, the immune system will be strengthened, odor pollution will be absorbed and biodiversity will be protected. In addition, the green areas created will reduce the heat island effect and energy consumption, as well as provide fresh and clean air. Together with the created rainwater drainage areas, the soil will be filled with water, which will be greatly beneficial in ensuring the continuity of green areas.

When the transportation system on the street is evaluated, some deficiencies regarding its accessibility draw attention. Although many areas can be reached by walking on the street, the lack of materials related to transportation creates a restrictive situation in terms of design. Although it seems that the arrangements regarding the street design or the structural situation were carried out in accordance with the standards, some deficiencies were observed, especially in public transportation. With the developed design principles, especially the bus stops have been replicated and at the same time, these stops have been designed to have a safe area that will not disturb pedestrians and cyclists.

Considering that the use of vehicles is dominant throughout the street and approaches to the transportation system are of great importance, it is possible to say that increasing the bus stops is important for the development of the structural system that will reduce the use of private vehicles. In order to improve the accessibility on the street, a transportation planning including pedestrian, public transportation and bicycle was carried out. The automobile-focused development system on the street has been put in the background, with a focus on walkable areas, bike paths and rest areas. In this sense, the parking lot areas, which are distributed on all axes on the street, have been expanded to various regions, and it is aimed to eliminate the vehicles parked on the side of the street. For the future of a healthy and completed street, it is of great importance to reduce traffic density and to develop strategies that are not dependent on cars.

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APPENDIX A: SURVEY QUESTIONS IN TURKISH

CEMRE ARUN YÜKSEK LİSANS TEZİ ANKET SORULARI

Bu anket çalışması

Yeditepe Üniversitesi Kentsel Tasarım ve Peyzaj Mimarlığı Yüksek Lisans

Programında Mimar Cemre Arun tarafından hazırlanan "Cadde Tasarım

Stratejilerinin Uygulanması: Tekirdağ Çandarlızade İbrahim Paşa Caddesi Örneği"

konulu araştırmanın bir parçası olarak tasarlanmıştır ve Tekirdağ'daki Cadde Tasarımlarının Kullanıcı

memnuniyeti açısından değerlendirilmesini amaçlamaktadır. Araştırmaya

katılanların isimleri saklı tutulacak ve veriler sadece yukarıda belirtilen

araştırma için kullanılacaktır. Katılımınız ve değerli katkılarınız için

teşekkür ederiz.

* Gerekli

1. Tekirdağ içinde ulaşımınızı nasıl sağlıyorsunuz? *

Yalnızca bir şıkkı işaretleyin.

- ☐ toplu taşıma kullanıyorum.
- ☐ kendi arabamı kullanıyorum
- ☐ bisiklet/ motosiklet kullanıyorum
- ☐ çoğunlukla yürüyorum

2. Tekirdağ'daki Cadde tasarımlarından ne kadar memnunsunuz? (Lütfen aşağıdaki ölçekte 1'den 5'e kadar seçtiğiniz puanı daire içine alınız. 1 en düşük puanı, 5 en yüksek puanı ifade etmektedir) *

Her satırda yalnızca bir şıkkı işaretleyin.

	1. hiç memnun değilim	2. memnun değilim	3. kararsızım	4. memnunum	5. çok memnunum
1. Satır	☐	☐	☐	☐	☐

3. Tekirdağ'daki Cadde, kavşak ve yaya geçitlerini kullanmanın ne kadar güvenli olduğunu düşünüyorsunuz? *

Her satırda yalnızca bir şıkkı işaretleyin.

	1. hiç güvenli değil	2. güvenli değil	3. kararsızım	4. güvenli	5. oldukça güvenli
1. Satır	☐	☐	☐	☐	☐

4. Tekirdağ'daki caddelerin ne kadar bisiklet dostu ve güvenli olduğunu düşünüyorsunuz? *

Her satırda yalnızca bir şıkkı işaretleyin.

	1. hiç uygun değil	2. uygun değil	3. kararsızım	4. uygun	5. oldukça uygun
1. Satır	☐	☐	☐	☐	☐

5. Tekirdağ'daki kaldırımların yayaların kullanımı için ne kadar uygun ve kullanışlı olduğunu düşünüyorsunuz? *

Her satırda yalnızca bir şıkkı işaretleyin.

	1. hiç uygun değil	2. uygun değil	3. kararsızım	4. uygun	5. oldukça uygun
1. Satır	☐	☐	☐	☐	☐

6. Tekirdağ'daki kaldırımların tekerlekli sandalye/bebek arabası kullanımı için ne kadar uygun ve güvenli olduğunu düşünüyorsunuz? *

Her satırda yalnızca bir şıkkı işaretleyin.

	1. hiç uygun değil	2. uygun değil	3. kararsızım	4. uygun	5. oldukça uygun
1. Satır	☐	☐	☐	☐	☐

7. Tekirdağ'daki araç parkları/otoparkların yeterliliği konusunda ne düşünüyorsunuz? *

Her satırda yalnızca bir şıkkı işaretleyin.

	1. oldukça yetersiz	2. yetersiz	3. kararsızım	4. yeterli	5. oldukça yeterli ve kullanışlı
1. Satır	☐	☐	☐	☐	☐

8. Sizce Tekirdağ'daki caddeler ve kaldırımların daha güvenli ve kullanışlı olması için ne tür değişiklikler yapılmalıdır? Aşağıda sıralanan her madde için artırılması, azaltılması ya da aynen korunmasına dair düşüncelerinizi işaretleyiniz. Lütfen hazırlanan ölçek sisteminde uygun gelen numarayı daire içine alınız.

Uygun olanların tümünü işaretleyin.

	1.büyük oranda azaltılmalıdır.	2. azaltılmalıdır	3.yeterlidir	4.arttırılmalıdır	5.büyük oranda arttırılmalıdır
drenaj alt yapısı (ızgara ve rögarlar)	☐	☐	☐	☐	☐
Donatı elemanları (çöp kutusu, uyarı levhaları vb.)	☐	☐	☐	☐	☐
Mevcut bilgilendirme ve uyarı levhaları	☐	☐	☐	☐	☐
Yaya geçitleri	☐	☐	☐	☐	☐
Trafik ışıkları/ lambaları	☐	☐	☐	☐	☐
Aydınlatma elemanları/direkleri	☐	☐	☐	☐	☐
Cadde boyunca araba park alanları	☐	☐	☐	☐	☐
Kaldırım boyunca oturma elemanları/banklar	☐	☐	☐	☐	☐
Kaldırım yanındaki açık hava yeme- içme alanları	☐	☐	☐	☐	☐
Otobüs durakları	☐	☐	☐	☐	☐
Kaldırım genişlikleri	☐	☐	☐	☐	☐
Cadde genişlikleri	☐	☐	☐	☐	☐
Bitkilendirilmiş yeşil alanlar/refüjler	☐	☐	☐	☐	☐
Büyük yol/kaldırım ağaçları	☐	☐	☐	☐	☐

HAKKINIZDAKİ BİLGİLER *

Yaşınız

Yalnızca bir şıkkı işaretleyin.

- ☐ 18'den az
- ☐ 18-25 arası
- ☐ 25-35 arası
- ☐ 35-45 arası
- ☐ 45-60 arası
- ☐ 60' ve üstü

Cinsiyetiniz *

Yalnızca bir şıkkı işaretleyin.

- ☐ Kadın
- ☐ Erkek

Medeni Durumunuz *

Yalnızca bir şıkkı işaretleyin.

- ☐ Evli
- ☐ Bekar

Eğitim Durumunuz *

Yalnızca bir şıkkı işaretleyin.

- ☐ İlköğretim
- ☐ Lise
- ☐ Üniversite
- ☐ Yüksek Lisans/Doktora

Kaç yıldır Tekirdağ'da yaşıyorsunuz? *

APPENDIX B: SURVEY QUESTIONS IN ORIGINAL LANGUAGE

1. How do you provide transportation in Tekirdağ? *

- ☐ I use public transport
- ☐ I use my own car
- ☐ I use a bike/motorcycle
- ☐ I mostly walk

2. How satisfied are you with the street designs in Tekirdağ? (Please circle the score you chose from 1 to 5 on the scale below. 1 represents the lowest score and 5 the highest score) *

1. I am not
satisfied at
all

☐

2. I am not
satisfied

☐

3. I am
undecided

☐

4. I am
satisfied

☐

5. I am very
satisfied

☐

3. How safe do you think it is to use the streets, intersections and pedestrian crossings in Tekirdağ? *

1. not safe at
all

☐

2. not safe

☐

3. I am
undecided

☐

4. safe

☐

5. quite safe

☐

4. How bike friendly and suitable for bikers do you think the streets in Tekirdag are? *

- | | | | | |
|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. not
suitable at all | 2. not
suitable | 3. I am
undecided | 4. suitable | 5. quite
suitable |
| ☐ | ☐ | ☐ | ☐ | ☐ |

5. How convenient and useful do you think the sidewalks in Tekirdag are for the use of pedestrians? *

- | | | | | |
|--------------------------------|-----------------------|-----------------------|-----------------------|------------------------|
| 1. not
convenient at
all | 2. not
convenient | 3. I am
undecided | 4. convenient | 5. quite
convenient |
| ☐ | ☐ | ☐ | ☐ | ☐ |

6. How suitable and safe do you think the sidewalks in Tekirdağ are for wheelchair/stroller use? *

- | | | | | |
|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. not
suitable at all | 2. not
suitable | 3. I am
undecided | 4. suitable | 5. quite
suitable |
| ☐ | ☐ | ☐ | ☐ | ☐ |

7. What do you think about the adequacy of the car parks/car parks in Tekirdağ? *

- | | | | | |
|------------------------|-----------------------|-----------------------|-----------------------|--------------------------------------|
| 1. quite
inadequate | 2. inadequate | 3. I am
undecided | 4. sufficient | 5. quite
sufficient
and useful |
| ☐ | ☐ | ☐ | ☐ | ☐ |

8. What kind of changes do you think should be made to make the streets and sidewalks in Tekirdağ safer and more useful? For each item listed below, mark their opinion on increasing, decreasing or maintaining the same. Please circle the appropriate number in the prepared scale system. *

	1. quite inadequate	2. should be reduced	3. enough	4. should be increased	5. should be greatly increased
drainage infrastructure (grid and manholes)	☐	☐	☐	☐	☐
reinforcement elements (garbage box, warning signs, etc.)	☐	☐	☐	☐	☐
current information and warning signs	☐	☐	☐	☐	☐
pedestrian crossings	☐	☐	☐	☐	☐
Traffic lights/lamps	☐	☐	☐	☐	☐
Lighting elements/poles	☐	☐	☐	☐	☐
Car parks along the street	☐	☐	☐	☐	☐
Seats/benches along the sidewalk	☐	☐	☐	☐	☐
Outdoor eating and drinking areas next to the pavement	☐	☐	☐	☐	☐
Bus stops	☐	☐	☐	☐	☐
Pavement widths	☐	☐	☐	☐	☐

Street widths	☐	☐	☐	☐	☐
Vegetated green spaces/refuges	☐	☐	☐	☐	☐
Large road/pavement trees	☐	☐	☐	☐	☐

INFORMATION ABOUT YOU *

Age

- ☐ under 18 years old
- ☐ between 18-25
- ☐ between 25-35
- ☐ between 35-45
- ☐ between 45-60
- ☐ over 60 years

Gender *

- ☐ Female
- ☐ Male

Marial Status *

- ☐ Married
- ☐ Single

Education Status *

- ☐ primary education
- ☐ high school
- ☐ university
- ☐ Master / Phd

How many years have you been living in Tekirdag? *



APPENDIX C: ETHICS COMMITTEE REPORT



T.C.
YEDİTEPE ÜNİVERSİTESİ REKTÖRLÜĞÜ

13.01.2023

Sayı : E.50532705-302.14.01-1446
Konu : Cemre Arun Kurul Onayı

İLGİLİ MAKAMA

Üniversitemiz Fen Bilimleri Enstitüsü Kentsel Tasarım ve Peyzaj Mimarlığı Yüksek Lisans Öğrencisi Cemre Arun'un "The Implementation of Street design strategies: the case of Tekirdağ" başlıklı araştırmasının Beşeri Bilimler etik standartlarına uygunluğuna ilişkin Yeditepe Üniversitesi Beşeri ve Sosyal Araştırmalar Etik Kurulu Onayı ekte sunulmuştur.

Gerekli iznin verilmesi hususunu bilgilerinize arz ve rica ederim.

İmza
Prof. Dr. Fatma Yeşim EKİNCİ
Rektör a.
Rektör Yardımcısı

Ek: Etik Kurul Onayı.pdf

Bu belge, güvenli elektronik imza ile imzalanmıştır.

Belge Doğrulama Adresi : <http://belgedogrulama.yeditepe.edu.tr/bg.aspx?id=FAFF59F8-1257-49F0-AC5C-761A132A42C7>
Yeditepe Üniversitesi 26 Ağustos Yerleşimi, İnönü Mahallesi Kayışdağı
Caddesi 34755
Ataşehir / İSTANBUL
Telefon No: (0216) 578 00 00 Faks No : (0216) 578 02 99
İnternet Adresi www.yeditepe.edu.tr
Kep Adresi : yeditepeuniversitesi@hs03.kep.tr

Bilgi İçin: Suat ANAR
Unvan: Öğretim Üyesi
Telefon No: (0216) 578 00 00



**YEDİTEPE ÜNİVERSİTESİ BEŞERİ VE SOSYAL BİLİMLER ETİK
KURULU KOMİSYONU**

**02.12.2022 TARİHLİ
34/2022 No'lu TOPLANTI KARARLARI**

- 5) Yeditepe Üniversitesi Fen Bilimleri Enstitüsü Kentsel Tasarım ve Peyzaj Mimarlığı Yüksek Lisans Öğrencilerinden Cemre Arun'un "The Implementation of Street design strategies: the case of Tekirdağ" başlıklı araştırmasının Beşeri Bilimler etik standartlarına uygunluğu Yeditepe Üniversitesi Beşeri ve Sosyal Araştırmalar Etik Kurulu tarafından değerlendirilmiş ve onaylanmıştır.



**YEDİTEPE ÜNİVERSİTESİ BEŞERİ VE SOSYAL BİLİMLER ETİK
KURULU KOMİSYONU**

02.12.2022 TARİHLİ

34/2022 No'lu TOPLANTI KARARLARI

Prof. Dr. Suat ANAR
Etik Kurul Komisyon Başkanı
İletişim Fakültesi, Gazetecilik Bölümü

Prof. Dr. Sultan ÜZELTÜRK
Hukuk Fakültesi, Hukuk Bölümü

Prof. Dr. Cengiz ERİŞEN
İktisadi ve İdari Bilimler Fakültesi, Siyaset Bilimi ve Uluslararası İlişkiler Bölümü

Prof. Dr. Demet LÜKÜSLÜ
Fen-Edebiyat Fakültesi, Sosyoloji Bölümü

Prof. Dr. Saffet BABÜR
Fen-Edebiyat Fakültesi, Felsefe Bölümü

Prof. Dr. Rıfat KAMAŞAK
İktisadi ve İdari Bilimler Fakültesi, İşletme Bölümü

Prof. Dr. Ayşe Münire Erden
Eğitim Fakültesi, Rehberlik ve Psikolojik Danışmanlık Bölümü