The Effect of Street Design on Walkability in Historic Urban Quarters: Peace Avenue, Sukhum

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ABSTRACT

Walkability is one of the techniques to design more sustainable and livable cities. In recent decades, cities have become increasingly humane in nature, where the role of the citizens and their importance in the city has become paramount. This concept is directly related to quality improvement projects and the improvement of the urban environment, where pedestrian zones are convenient and easily accessible without interfering barriers, as well as open spaces for recreation, and well-developed cultural places, have become the main priorities in the design. The adoption of the new term "Urban Heritage" has fundamentally changed the appearance of cities, turning them into huge open-air museums. The museum conservation of the urban environment and the transformation of the urban environment into open museum galleries have become the main feature of many cities of our time. The most common positive impacts of the Pedestrianization of streetscapes in historic urban environments have many environmental, economic and social benefits. In the light of this framework, the study aims to determine the significant features affecting walkability in HUQ, in specific to the historic urban core of Sukhum city, and to what degree the Peace Avenue in Sukhum is presently walkable.

Keywords: Walkability, Pedestrinazation, Street design, Pedestrian-friendly street, Historic urban quarters

ÖZ

Yürünebilirlik, daha sürdürülebilir ve yaşanabilir kentlerin tasarlanmasında sıklıkla tercih edilen yöntemlerden bir tanesidir. Son yıllarda, kentlinin rolünün ve öneminin artması ile birlikte, daha insan odaklı yerleşim birimlerine yönelik bir artış olduğu gözlenmektedir. Yürünebilirlik kavramı, kent çevrelerinde kolay erişilebilir yaya akslarının oluşturulması; kamusal alanların ve kültürel mekanların yaratılması gibi konulara odaklanarak, kentsel çevrelerin kalitesinin yükseltilmesini hedefler. 'Kent Mirası' ifadesinin benimsenmesi ile birlikte degişen kent imgesi, bu alanların açık hava müzelerine dönüşmesini sağlamıştır. Kent çevrelerine, müze koruma anlayışı kapsamında yaklasmak tarihi merkezlerde önemli bir öğe haline gelmistir. Sokaklar gibi kamusal öneme sahip mekanların tarihi merkezlerde yayalaştırılmasının pekcok cevresel, ekonmik ve sosyo-kulturel yarari bulunmaktadir. Calisma, bu cercevede Sukhum örnegi özelinde tarihi merkezlere odaklanarak, yürünebilirligi etkileyebilecek önemli öğeleri belirlemeyi hedeflerken; Sukhum kentinde önemli ticaret akslarindan biri olan Peace caddesinin ne derecede yürünebilir oldugu sorunsalına odaklanmaktadır.

Anahtar Kelimeler: Yürünebilirlik, Yayalaştırma, Sokak tasarımı, Yaya Dostu Sokak, Tarihi Kent çevreleri,

To My Beloved Family

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INTRODUCTION

Streets, parks, and squares are the most memorable public spaces in cities, where people, primarily, congregate on foot. These places make towns and cities livable, vital and unique. Additionally, streets have a significant responsibility to be accessible to all, and to be functional, safe, and attractive places to walk. As Lynch (1960) indicates, streets are one of the most important elements by which people mentally derive an image of a city, and are the basic unit of analysis through which most people interpret a city. Streets are an important part of the public space of a city and offer "an essential counterpoint" to the private spaces of the city, providing "the channels for movement, the nodes of communication, and the common grounds for play and relaxation" (Carr et al., 1992). Public spaces are often seen as a retreat from the chaos and noise of the urban environment. On the other hand, they can also be destinations to experience urban life, rather than retreat from it. Connection with other people is an important part of public space, ranging from the passive interaction involved in people watching to more active interactions with friends and acquaintances.

However, today, the urban streets, which form an essential part of urban life are in danger because of the rapid rise in car-ownership, increase in population level, inefficient transportation system, poor quality urban design etc. The proliferation of motorization leads to an increase in traffic congestion, environmental deterioration and traffic accidents. In most of the cities there is no space specifically assigned for the

use of pedestrian paths, there is poor enforcement of traffic movement or parking laws and lack of green or attractive installations. The safety of pedestrian deteriorates as motorized transportation increases.

Pedestrianization is one of the effective alternates to mitigate the negative aspects of motorization. Pedestrianization implies the non-motorized mode of travel, which includes pedestrian movements, bicycles, and animal drawn vehicles. Non-motorized modes use available human and animal energy, which are non-polluting, safe and user friendly. In addition, pedestrianization helps to foster businesses in small scale enhancing economic growth. For instance, European cities by the late 1950s were also suffering from an increase of motorized congestion, air pollution and a decrease in the state of the urban fabric. Consequently, private vehicles were forbidden from entering to the historic core, which was characterized by narrow streets. After 1970s a movement started in Europe to separate public spaces from the cars. Thus, by the mid 1975s, many European cities banned vehicles from historic urban quarters. As a result, public areas were revitalized and cold and dormant cities become walkable and alive (Vanderschuren, 2008).

Walking is perhaps the most fundamental mode of transport for short distances. In fact, an environment that contributes walking to –work, school, and stories is considered a better place to live, furthermore, they have a higher level of social cohesion, real estate and finally, they promote healthier lifestyles (Galston, 2017). High quality and well-designed streetscape have a direct impact on the character and identity of the downtown area, and it creates a “sense of place”, creating a good appearance and

image for the community. In general well-designed streets with appropriate lighting elements, street furniture, large spaces for public events and social interaction and

appropriate parking space, invite a diversity of users and create livability in the area (Adler, 2005). Since this study focuses on historic urban quarters (HUQ), it should be mentioned that HUQ by their historic and cultural associations, provide a strong sense of place and identity to the area. HUQs are unique places not only due to the cultural heritage they possess but due to their urban pattern. Nowadays, HUQs are in danger of losing their traditional character if relevant measures are not put in place to ensure the continuity of their character (Doratli, 2000).

Based on the background information provided above, the study aims to determine what the significant features affecting walkability in HUQ are, in specific to the HUQ of Sukhum city in Abkhazia. This research involves an exploration of walkable street features and Peace Avenue and its current challenges related to walkability and how it can be improved to have a place where a diversity of pedestrian activities are welcome to occur – an environment that is accessible, safe, comfortable, and enjoyable for pedestrians. The study concentrates on the Dbar to Leselidze streets where the level of walkability within the context of physical, functional and social factors will be analyzed. The current street design of Peace Avenue presents unique challenges. The allotment of space within the public rights prioritizes car parking in the middle of two sidewalks over other uses, such as pedestrian travel. Peace Avenue also has few remaining historical streetscapes along the street edges, and much of the neighborhood's built form is dominated by surface parking lots.

1.1 Problem Statement

In recent decades, many historic centers around the world have been focusing on a diversity of issues such as rapid rising number of private cars, negligence of pedestrian-friendly routes and lack of appropriate activities, poor accessibility and, absence of functions that attract people to the place. Thus, these issues have an effect on the ability to walk in HUQ by increasing noise and decreasing safety in the environment. As a result, the HUQ is not able to fascinate and attract people and citizens leading to diminishing and private sector investment. Similar to many HUQ around the world, Peace Avenue, the traditional center of Sukhum city, has been facing the same issues, which adversely affected its walkability. Peace Avenue, which consists of numerous architectural monuments of the 19th and 20th centuries, has been suffering from crowded parking places along the street, air pollution, noise, unsafety, etc. caused by a rapid increase in private vehicles especially in the last decade. The historic urban core is increasingly becoming car-oriented and moving away from being people-friendly, leading to a confrontation between vehicles and people as well as affecting the walkability along the street. Furthermore, Peace Avenue is designed in a manner that is unfriendly towards disabled people as well as cyclists. Thus, there are certain physical, functional and social problems, which point out a lack of walkability in the selected historic urban core. Nevertheless, Peace Avenue has the potential to change into a pedestrian-friendly street. In order to have pedestrian-friendly street, a number of social and recreational functions should take place on the street, without being interrupted by cars. Thus, this research necessitates the thoughtful consideration of what is physical, functional and social attributes of the pedestrian-friendly street.

1.2 Aim of the Study and Objectives

The research aims to determine the significant features affecting walkability in HUQ, in specific to the historic urban core of Sukhum city, and to what degree the Peace Avenue in Sukhum is presently walkable. In light of this target, the study will discuss the importance of walkable street design as an essential criterion for improving the quality of social life. Secondly, the study will focus on proposing recommendations for future development and transformation of Peace Avenue, aimed at the development of a pedestrian-friendly environment in HUQ. These recommendations take into account the characteristics of the pedestrian-friendly street, may be considered in the discussions of proposals for the development of the street to improve the practice of urban street design in HUQ.

Objectives

-To define the concept and significance of pedestrianisation in HUQ in context of urban street design.

-Researching and analyzing the existing walkability features in urban street design literature aimed to develop pedestrian-friendly environment.

-To identify the existing challenges in Peace Avenue in Sukhum regarding to walkability factors and propose possible transformation features.

1.3 Methodology of the Research

This study is based on a mixed research method both qualitative and quantitative methods including related literature from primary sources like books and articles, and secondary sources such as internet sources. The main sources are: Gehl, Cities for people (2010) and Bentley, Responsive environments (1985). First, the literature review provides an understanding of pedestrian-friendly street design, why pedestrian-

friendly design is important in historic urban quarters, factors that affect walkability. Secondly, a site assessment based on observation determines to what extent Peace Avenue is currently walkable. Finally, after reviewing the data from the site assessment, questionnaires with a selected number of locals (80%) and tourists (20%) are done to understand the problems, consequently a SWOT analysis will be presented, based on the survey with locals, maps and personal observation. Finally, based on the SWOT analysis, the recommendations and possible interventions would assist the area in becoming more pedestrian-friendly.

1.4 Limitation of the Thesis

The study investigates walkability in historic urban quarters, in specific to Peace Avenue in Sukhum, and factors that affect walkability in HUQ. The study area is limited from the Dbar to Leselidze streets. The study will focus on street features of the pedestrian-friendly environment where various attributes of the walkable street will be analyzed in terms of physical, functional and social factors. However, other criteria such as economical and political reasons will not be covered in this thesis.

1.5 Structure of the Thesis

Table 1: Flow chart showing the methodology of the thesis

Introduction		
Problem Statement		
Aim and Research Objectives		
Methodology of the Research		
Limitation of the Research		
↓		
The Significance of Pedestrianization in HUQ		
Revitalization in HUQ		
Street Design in HUQ		
Understanding the factors affecting walkability		
Physical Factors	Functional Factors	Social Factors
↓		
Case Study: Peace Avenue, Sukhum		
Data Collection		
Site-Observation	Survey:Questionnaire + Focused interview	
Physical Analysis Functional Analysis	Social Analysis	
↓		
Findings and Resulting of all Attributes of Peace Avenue		
SWOT Analysis		
Conclusions and Recommendations		

Chapter 2

THEORETICAL FRAMEWORK

2.1 Understanding the Significance of Pedestrianization in HUQ

Since the thesis aims to determine the significant features affecting walkability in HUQ, this section focuses, generally in historic urban quarters (HUQ) and the importance of pedestrianization in HUQ.

Since the late 1980s, historic urban quarters (HUQ) have emerged as a focus of many conservation and regeneration efforts. HUQs, which are mainly located in the central part of cities, due to their locations and in some cases lack of historic preservation plans, these areas, are in danger and risk of obsolescence and destruction, which generally affect livability in these areas (Doratli, N. 2000). Clearly, these are important areas of cities, which have an endowed identity and character, that over the years usually lost economic viability due to diminishing variety of activities and increase of car-oriented transportation. On the other hand, sense of place in historic urban quarters is the most important quality drawing people to these areas. In this context, Lowenthal (1981), interprets the sense of place as a continuing narrative involving past, present, and future. What is important, therefore, is how they change and whether the changes develop and respect the sense-of-place or actually destroy it. Many places have, nonetheless, retained their identities through significant social, cultural and technological change and, although subject to constant change, some essence

of an urban place's identity is retained. In practice, cities such as Copenhagen and Malmo show that the revitalization in historic areas has a positive effect and impact on walkability, community and environment. It has positive effects on local citizens, which creates various functions and jobs. Focusing on the human scale in designing urban areas, Gehl (2010) discusses the main principles of livable city spaces. According to him, the human scale is the most important factor in designing cities and urban spaces. He believes that many of the pedestrianization projects in the historic city centers are only performed based on the tourism development objectives. He explains that pedestrian zones are the best spaces for communication and interaction between people, architecture, and spaces. He indicates that the best examples of human spaces can be found in areas where car traffic is limited. He believes that a pedestrian zone will give a positive impact on walkable activity in the city and provide more options for people to interact with their environment; while on the contrary, using vehicles makes them have less contact and communication with each other and their city (Gehl, 2010).

A pedestrian zone is a part of the urban space, which due to some specific reasons, is dedicated to the pedestrians where automobiles are banned to enter at all or during some hours in a day (Galston, 2017). The process of converting a street to a pedestrian zone is called pedestrianization. According to Chiquetto (1997), pedestrianization can provide better accessibility and social interaction with the urban areas for the local communities.

Based on the introduction of the significance of pedestrianization in HUQ, the following section focuses on the street design in HUQ.

2.2 Urban Revitalization in Historic Urban Quarters

Many cities have quarters that confer on them a sense of place and identity through the historic and cultural associations they provide. They are often an integral part of the city's charm and appeal and their visual and functional qualities are important elements of the city's image and identity (Bachour, 2005). The qualities of such quarters have not always been appreciated and valued. As not all such areas can become museums or museums environments, there is a need for their revitalization as functioning parts of their city. Revitalization has focused on attempts to generate sufficient economic development to provide the finance necessary to conserve, maintain and enhance the quarter. All urban areas undergo change but historic urban quarters have to cope with change in their economic fortunes while change in their physical landscapes is restricted and controlled in the interests of conservation (Bachour, 2005). Revitalization is the process through which the mismatch between the services offered by the fabric of the historic quarters and the contemporary needs can be reconciled (Tiesdell et al., 1996).

Nowadays revitalization is often defined as a comprehensive effort including restoration, reconstruction, modernization and actions aimed at the revival of a building, a district or a town devastated in different aspects, also the economic and social ones. The social aspect is among the most significant ones. In other words, there is no complete revitalization without solving social problems (Raszkowski, 2017). Revitalization activities assume taking optimal advantage of a particular territorial unit values and strengthening its local potential, including social and cultural aspects. Revitalization usually represents a long-term process, carried out by the stakeholders in a given area, including also local authorities, NGOs, entrepreneurs and performed

in cooperation with local community. Vileniske (2014), states that the term of revitalization can imply physical and social, cultural and economic dimensions. The idea of revitalization is to balance the current rapid development in urban areas through the conserving urban identity, culture and traditions. Furthermore, the revitalization program can create job opportunity to increase peoples' income, preserve natural resources, provides suitable urban amenities and facilities for the user. In need to understand the significance of revitalization in historic urban quarters and the impact it creates on walkability due to the pedestrinization opportunities it offers, a few selected examples from the European Union will be looked at follows.

2.2.1 Ghent, Belgium

The city of Ghent has a complex structure reflecting a long evolution dating back to the Middle Ages when it was the second most important city in northern Europe after Paris. The city center covers a large area with no central focus; instead it comprises many squares and narrow streets, with the River Leie running through its center. During the 1980s, the city center suffered the impacts of increasing car traffic, including congestion, air pollution and noise. Air and water pollution was degrading historic buildings and monuments in the city center. Public transport had little or no priority and conditions for cyclists and pedestrians were deteriorating. Although accident levels were not excessively high, there was a growing general perception of a lack of security. The city's streets and squares, designed over the years to accommodate car traffic, were becoming increasingly unattractive. However, in 1997 Ghent implemented the mobility plan in the city center with the aim of addressing the problems of excessive car traffic which dominated the city's streets and squares. The plan involved the closure of the city center to all through traffic, as well as a number

of traffic management strategies to provide essential access and improved public transport, cycling and walking facilities (Reclaiming city streets for people, 2013).

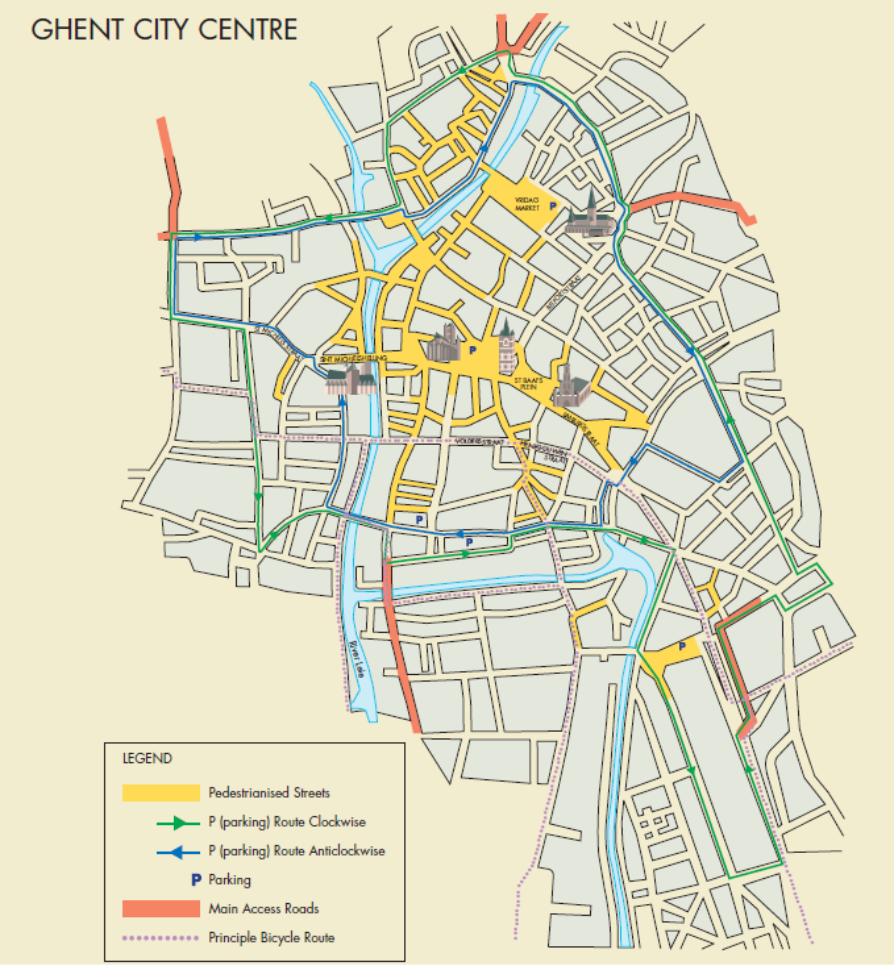

Figure 1: Map of Ghent city center (retrieved from «Reclaiming City Streets for People», 2013).

This case study has been included as an example of a city facing severe traffic problems. The plan was implemented and is generally considered a great success. Public transport use increased by 3–5 %, an increase of 3 000–5 000 riders per day, during the first two years after the implementation of the plan. Public transport services, trams and buses, have become faster and more reliable. In all 80 % of trams and trolley buses run on separate tracks in the city center, and circulation is now freed from the problems of parked cars and traffic congestion. In addition, bicycle use has

increased and initial monitoring suggests that accident levels have been reduced by about 30 %.The inner city, now free from car traffic, is a vibrant place popular with residents and visitors. Public transport services are now more reliable, patronage is increasing, and more people are cycling. A lot of events (open-air arts festival, open-air music events) are now possible in very fine surroundings. "The atmosphere for shopping is now better as well, as no cars can possibly bother shoppers."(Vansevenant, 2005).

2.2.2 Copenhagen, Denmark

Until 1962, all streets in the medieval city center were filled with cars and all the squares were used as car parks. As car traffic increased, conditions for pedestrians were rapidly deteriorating. On 17 November 1962, Copenhagen's main street, Strøget was pedestrianized. The new car free environment proved extremely popular with local residents from the first day. This marked the beginning of a gradual transformation that has continued ever since. Today Copenhagen has a vibrant city center that attracts visitors throughout the year (Reclaiming city streets for people,2013). Today the city of Copenhagen has over 96 000 m2 (of which 33 % is street and 67 % city squares) of car-free space. While pedestrian traffic levels have remained largely unchanged over past decades, activities connected with stopping and staying are almost four times greater than in 1968. During the summer months, many of the pedestrian streets are full to capacity with people enjoying the many outdoor social and cultural activities. In the winter months attractions include festivals, and outdoor ice skating. As the streets and squares in the city center have been pedestrianized and improved, the area has become more attractive yet also less accessible for the motorist. The city authority has adopted an integrated traffic management strategy for the city center: 1) limiting the number of parking spaces (charges for on-street parking are relatively high); 2)

reducing the number of lanes on several main routes into the city and using the space for bus and cycle lanes instead;3) restricting through traffic;4) while developing the suburban train, bus and bicycle networks. In the city center, 80 % of all journeys are made on foot, and 14 % by bicycle (Reclaiming city streets for people, 2013).

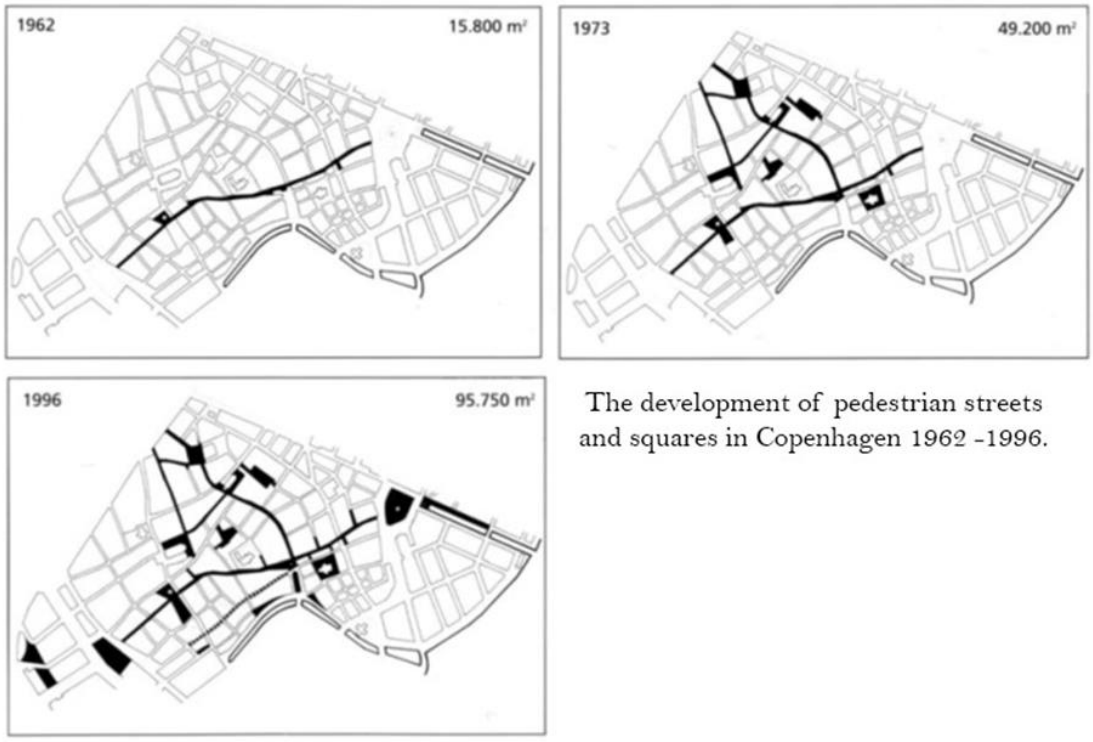

Figure 2: The development of pedestrian streets and squares in Copenhagen (retrieved from «Reclaiming city streets for people», 2013).

The examples prove that under the revitalization schemes implemented in these historically significant cities, the focus has been on creating alternative modes of transportation where walking and cycling have been promoted. However, the examples do not concentrate on street design which will be analyzed in the next sub-chapter to highlight the importance of selected criteria both in modern contemporary environments as well as historic urban quarters.

2.3 Street Design in HUQ

Safety, health, and traffic are three important variables, which have become important considerations in the street design. The aesthetic concerns including special design features landmark and marker points, fountains and trees or the uniformity has also played an important role in the design of streets (Velibeyoglu,1998). In early civilizations special architectural features upon the street scene had significant religious and aesthetic values. For example, in Vedic city plans, there was a holy bodhi tree at the intersection of two main thoroughfares. The tree was a spiritually powerful cosmic symbol (Kurokawa, 1991). In Hellenistic period there was conscious aesthetic aims rather than of compelling functional grounds in the concept of the street design. Street design and the establishment of efficient street network became the basic unit of urbanism.

In the Renaissance, due to religious and military reasons we see the importance of street networks and the full uniformity in street frontage. Baroque period, which signifies the uniformity of streets and wide straight streets again became an important goal in street design (Kostof,1987). Endless avenues and boulevards were emphasized, as they represented, the power of despotic rulers. In the design of these streets, public buildings, palaces, and churches were the focal points that terminated the vista. The industrial revolution brought new ideas to street design. Especially, in some 19th-century utopian schemes, streetless communities were proposed or replaced with covered streets. Boulevards of Haussmann also introduced the gigantic scale in the design of streets and for the first time recognized the presence of wheeled traffic. Haussmann preferred the baroque's uniform building frontages in his boulevards in terms of public order and the aesthetic beauty (Velibeyoglu, 1998).

The appearance of cars in the cities and towns has caused radical changes in street design. Early Modernist's anti-street attitude has removed life from the streets. The street design has been considered in terms of engineering standards and the comfort of automobiles by them (Kostof,1987). Grade separation has forced pedestrians to retreat from the streets. The vulnerable users of the modern streets were sacrificed to smooth, straight highways. Both, in Garden City Movement and Modern Movement, the building line was separated from the street line with set-back distances (Velibeyoglu, 1998).

However, in the last three decades this trend was slowly reversed. All over the world, there are some conscious efforts to restore life and activities on the streets. Ensuring a safe, comfortable and functional street environment for people became the major concern in the design of street. As an example, in Europe, the Dutch concept «Woonerf» of 1970's, which views the street as a social space, rather than just a channel for vehicular, mobility has proven to be successful in many European cities, by reclaiming the streets as public spaces for people's use. The projects such as D. Appleyard's Livable Street project of 1981; P. Calthorpe's pedestrian pockets; Transit-Oriented Development (TOD), and A. Duany-E. Plater-Zyberk's Traditional Neighborhood Development (TND) has brought new perspectives to street design. These projects have recognized the pedestrian priority in the design of the streets (Cervero, 1997).

2.4 Understanding the Factors Affecting Walkability

Walkability is influenced by the design of the built environment. The built environment that promotes and encourages walking- to work, school, stores, and facilities- are better places to stay and live, they have higher real estate, as well as a

healthier lifestyle and high level of social cohesion (Galston,2017). The significance of streets as public spaces can be understood by studying human behavior and necessities in street spaces, how streets can fulfill everyday needs and provide aesthetic and interactional pleasures (Mehta, 2013). This understanding of human behavior can form a basis for design interventions. Thus, this section will identify what are the specific features that attract people to walk and what are the factors forming pedestrian-friendly street.

According to Hansen (2014) walkability of the street depends on **enclosure** caused by vertical physical elements and their ability to define space. Correspondingly, Jacobs and Appleyard (1987) state that **enclosure** contributes to the livability and walkability of the street, by providing visual interest, or having an impact on sunlight, protection from the elements, or a sense of enclosure for pedestrians. On the other hand, Southworth (2005) points out that **sidewalks** play a fundamental role in the specific of the walkable street. As a channel for pedestrian movement and access, they encourage people to walk in the street. **Sidewalks** in the public spaces serve as the front steps to the city, promoting streets socially and economically. Similarly, Jane Jacobs in her book, "The death and life of great American cities", (1961) describes the significance and necessity of **sidewalks** for street security and human contact. Conversely, (Carmona,2003) indicates greenery is of the feature of the pedestrian-friendly street. As an illustration, **vegetation** provides better air quality as well as shade in the street that motivates society to walk and communicate, providing an intimate atmosphere and purifying air and oxygen to produce a pleasant environment to stay for a long time. On the contrary, Galston (2017) states that one of the most important elements of the walkable street that provides safety and security in the urban environment, particularly

in dark areas, is lighting. Additionally, **lighting** helps pedestrians to find their way in the dark time, for this reason, it is an essential attribute for the creation of a walkable environment. Another important element to make street pedestrian-friendly is **street furniture.** Schmitz et al. (2006) state that benches and tables, which are placed in open spaces have social significance. They provide conducive environments that pull people together. When urban **furniture** is selected and placed appropriately, they make public spaces pleasurable and invite people to the outdoors where they can experience a feeling of involvement, relaxation, and a welcoming atmosphere. Alfonzo (2005) defines **accessibility** as one of the factor of walkability, which has an impact and effect on location decisions for different functions, for example, recreational function, retail function etc. For this reason, **accessibility** has main role in development of the walkable street. In addition, Mehta (2014) states that streets should be "accessible and open" and provide "a sense of safety, physical and environmental comfort" (Mehta, 2014). Correspondingly, Speck (2012) in his recent book «Walkable City» and Alfonzo (2005) identify same conditions, which must be present in a street in order to be walkable. They believe that, pedestrian-friendly street must be **safe and comfortable**.

According to Mondal et al. (2016) the active participation of people in local **cultural activities** improves walkability and livability along the street, and also, it gives a sense of belonging. Contrarily, Ewing (1996) points out that the **mix of land uses** makes a pedestrian-friendly environment. In addition, C. Alexander (1977) indicates that a mix of non-residential and residential uses places trip attractions within walking distance of people's homes; people are much more likely to walk when they have some places specific and nearby to go. Equally important that mixed-use development gives an

opportunity for social interaction, feeling of safety through more eyes on the street, location and building type, urban vitality and street life, increased viability of urban facilities and support for small business. According to Lynch (1960) **legibility**- refers to the individual pedestrian being able to make sense of the urban environment and feel welcome to use it. In other words, architectural **legibility** is measured by how much the integrated elements of an environment help individuals in making a compelling mental picture, or a unique intellectual guide of the spatial qualities within a specific building, and the consequent simplicity of finding one's personal path in the surrounding environment (Lynch, 1960).

To outline, based on the literature review where different scholars define certain attributes of the walkable street, some discussions focus on the tangible features that form pedestrian-friendly streets, including enclosure, sidewalks, landscaping, lighting and street furniture. Others, however, propose intangible features such as accessibility, the mix of land uses, legibility, safety, comfort and culture activities as important attributes of the pedestrian-friendly street. Since tangible factors are considered to be related to physical conditions of the street and intangible, on the contrary relate to functional and social conditions. Thus, in this study, the attributes of the pedestrian-friendly street are divided into selected physical, functional and social factors.

Table 2: Factors affecting walkability

Physical	**Functional**	**Social**
Enclosure-contributes to the livability and walkability of the street, by providing visual interest, or having an impact on sunlight, protection from the elements, or a sense of enclosure for pedestrians (Jacobs and Appleyard, 1987)	**Accessibility-** one of the factor of walkability, which has an impact and effect on location decisions for different functions, for example, recreational function, retail function etc (Alfonzo, 2005)	**Comfort-** affected by environmental qualities or factors that might make the walk distressing (Speck, 2012)
Sidewalk design-serve as the front steps to the city, promoting streets socially and economically (Jacobs, 1961)	**Mix Land Uses-** non-residential and residential uses places trip attractions within walking distance of people's homes; people are much more likely to walk when they have some places specific and nearby to go (C. Alexander, 1977)	**Safety-** affect strolling walking (Galston, 2017)
Vegetation- provides better air quality as well as shade in the street that motivates society to walk and communicate, providing an intimate atmosphere and purifying air and oxygen to produce a pleasant environment to stay for a long time (Carmona, 2003)	**Legibility-** refers to the individual pedestrian being able to make sense of the urban environment and feel welcome to use it (Lynch, 1960).	**Culture and sense of belonging-** the active participation of people in local cultural activities improves walkability and livability along the street, and also, it gives a sense of belonging (Mondal et al., 2016)
Lighting-lighting helps pedestrians to find their way in the dark time, for this reason, it is an essential attribute for the creation of a walkable environment (Galston, 2017)		
Street Furniture- benches and tables, which are placed in open spaces have social significance. They provide conducive environments that pull people together (Schmitz et al., 2006)		

2.4.1 Physical Factors

Physical factors of pedestrian-friendly streets are considered as a set of tangible objects or arrangements that together carry out specific functions and provide services or visually identify the urban environment. Jacobs (1993) claims that the buildings, trees, walls or sometimes the combination of these; may be the defining elements of urban environment; yet, the street contains both vertical and horizontal attributes, and these parts are especially classified in physical attributes of street. Thus, this section focuses on the following physical factors, revealed while literature review, that form pedestrian-friendly streets: enclosure, sidewalks, landscaping, and lighting to be described below.

2.4.1.2 Enclosure

According to Clemente et al. (2005) enclosure visually defines the street by vertical elements such as building walls and trees. Enclosure gives a sense of an outdoor room, and an outdoor space, where the shape of the space is as strong as the shape of the buildings around it (Alexander et al., 1977). According to Gordon Cullen (1961) "Enclosure, or the outdoor room, is, perhaps, the most powerful and most obvious, of all the devices to instill a sense of position, of identity with the surroundings, it embodies the idea of the harness". Correspondingly, Allan Jacobs (1993) states that people react favorably to fixed boundaries as something safe and defined. Space is the relationship between an object (building) and the person who perceives it (Unwin, 2003). Enclosure is formed by lining the street with continuous building fronts of roughly equal height. In this manner, the physical buildings themselves become the dividers of the outside room, whilst correspondingly, the road and walkways become the floor, and if the buildings are generally of equivalent elevations and heights, then consequently, the sky extends as an undetectable roof (Galston, 2017). Building

facades should closely align and create a continuous front, accented by store entrances and windows, this creates a sense of enclosure for the pedestrians and a continuous storefront attracts and encourages people to walk. Human orientation is related to four horizontal directions: front, back, and sides. The enclosure of the two parallel walls and the long linear shape of the street control those four horizontal directions with fixed boundaries that create a room-like sense of security, focus, and direction (Jacobs, 1993; Unwin, 2003). The height of the walls is crucial to the sense of enclosure and orientation. Obtaining the right street wall height to width ratio is essential to defining the street (Hedman, 1985). The condition of enclosure generated by the height-to-width ratio is related to the physiology of the human eye. If the width of a public space is such that the cone of vision encompasses less street walls than the opening to the sky, then the degree of spatial enclosure is slight (Chapman,2008). According to Alexander et al. (1977), the total width of the street, building-to-building, should not exceed the building heights in order to maintain a comfortable feeling of enclosure. Similarly, Hedman (1984) and Ashihara (1970) state that a 1:1 height-to-width ratio gives a strong spatial definition because the street wall height limits the sky view, almost completely containing the view. Comparatively, Allan Jacobs (1993) suggests the proportion of building heights to street width at least 1:2. As a general rule, the tighter the ratio, the stronger the sense of place (Galston, 2017).

Street trees can also visually define a space with a ceiling of branches and leaves that horizontally implies a ceiling, and they can suggest the vertical enclosure of an area with their trunks. The key to influencing enclosure with trees is the close spacing of the trees along the street (Arnold, 1993). Moreover, at low suburban densities, building masses become less important in defining space, and street trees assume the dominant

role. Moreover, different kinds of vegetation on both sides of the street can humanize the height-to-width ratio. Henry Arnold (1993) states that trees define space both horizontally, by visually completing an area of open space, and vertically, by making an airy ceiling of leaves and branches. Tree lines depend on visual illusion, unlike the solid enclosure of buildings. Street space will seem enclosed only if trees are closely spaced.

a) High enclosure

b) Low enclosure

Figures 3 (a) and 4 (b) shows high and low enclosure, California (retrieved: Clemente, 2005).

a) A continuous street wall on both sides of the street gives the scene high enclosure. The buildings and street trees create a room-like effect by limiting long sight lines and views of open sky.

b) The scene has low enclosure because the arrangement of buildings does not provide a well defined street wall. The scene feels open, with the ability to see far into the distance.

2.4.1.3 Sidewalks in the Street

Walking is an active mode of transport used by everybody, every day, for multiple purposes, including commuting, and as the basic connector mode between all other modes of transport. Sidewalks play a significant role in specific of the pedestrian-

friendly street design. Furthermore, sidewalks serve as the front steps to the public spaces in the city, activating streets socially and economically. According to Boodlal (2004) sidewalks should be accessible, have an adequate width, and allow pedestrians to have a sense of safety, continuity, and convenience to the users. According to «Better Streets San Francisco»: a guide to making street improvements in SF (2010) well-designed sidewalks are a fundamental part of walkable streets. They are the building block of a great pedestrian environment and are crucial to the quality of public life and pedestrian safety. Similarly, Jacobs (1993) associates well-designed streets with sidewalks, which provide space for people to have leisurely walks. She also states that sidewalks should offer safety from vehicular traffic while at the same time invoking in people a feeling of neither being alone, nor of being crowded. Additionally, sidewalks should be designed to accommodate pedestrians of all ages and abilities. According to Boodlal (2004), the design of sidewalk environments is important to all pedestrians, but is particularly important to those with disabilities who have limited travel choices and rely most on the pedestrian environment. For instance, older adults, people with vision impairments, and children frequently rely on the sidewalk to travel independently within their community for shopping, recreation, exercise, and walking to school. Pedestrian space designed to be accessible to all sidewalk users is especially important because those with limited ability are not able to use other transportation options. Thus, the design of sidewalk environment has a vital role for every walker. Sidewalk users should not have the feeling of insecurity by traffic or by the environment.

Figure 5: Design of sidewalk that accommodate pedestrians with different abilities and ages, Toronto- street (retrieved from: Toronto complete streets guidelines,2016).

Additionally, sidewalk width has significant implications for streetscape design and the quality of the pedestrian environment. Sidewalks that are too narrow prevent a pedestrian from moving safely and comfortably. Furthermore, narrow sidewalks make it difficult to provide important additional streetscape elements and pedestrian amenities. Whereas, a wide sidewalk offers pedestrians enough space to walk at their chosen pace, stand, sit, socialize, or merely enjoy their surroundings. Wider sidewalks also offer more space for landscaping and amenities, making the streetscape more useful and attractive and also acting as a buffer between traffic and pedestrians (Better Streets San Francisco,2010). The standards of sidewalk dimensions are different for pedestrian-friendly streets, it should be considered that sidewalks be at least 12 feet (3.5 meters), which is a minimum because there are more pedestrian activity and outdoor seating demands, as well as to ensure people walk comfortably (Figure 6).

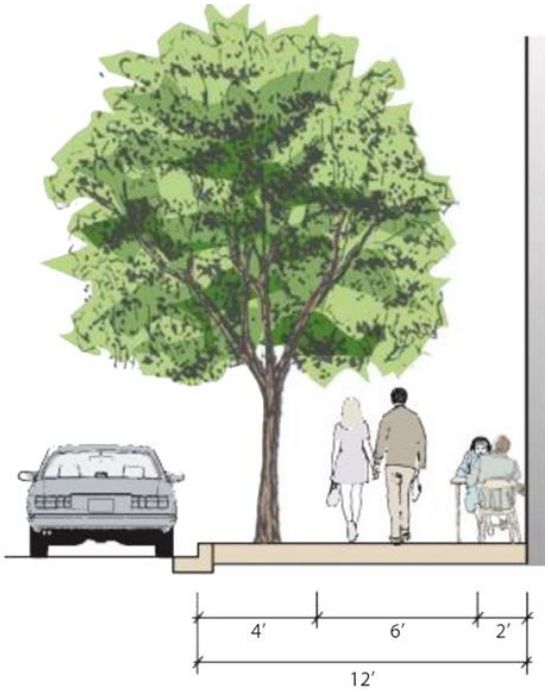

Figure 6: Better streets San Francisco: a guide to making street improvements (2010).

Besides width of sidewalks, there are several physical attributes, which can also collaborate to build more comfortable open spaces. Floor-scape in harmony with the public space is an important issue. Moreover, flooring in city spaces are divided into two major kinds; soft or hard pavement. Hard pavement is necessary in ensuring non-slip dry surfaces, which can transfer both pedestrian and vehicular loads. The change in flooring material can be used to differentiate between the space where particular traffic loads can or cannot go (Moughtin,2003).

2.4.1.4 Vegetation

Vegetation improves the livability and walkability of streets. It plays an important role in providing shade to pedestrians, cyclists, and public transport passengers. Besides, it enhances the aesthetic qualities of streets. Furthermore, effective greening with street trees reduces the street temperature, making it comfortable for people to walk, cycle, or gather for social activities, even during summer afternoons (Kost et al., 2011).This is especially important in places with a humid climate or harsh daytime sun. On a

larger scale, plants keep a city cool by reducing the urban heat island effect. Vegetation creates cooler microclimate and increases oxygen content in the atmosphere thus making the environment more comfortable. Moreover, trees also capture dust and remove glare. According to Zhang et al. (2015), greenery such as street trees, lawns, shrubs and other forms of vegetation provide shade and create enjoyable environments for walking. Thus, they help to reduce the effects of heat, which tend to accumulate in large asphalt areas. According to Kost et al. (2011), landscaping can beautify a street, providing an umbrella canopy and adding colors, fragrances, and textures. The potentially varied character of flora along a street can make it a more memorable space. Hence, a well-designed landscape promotes a sense of ownership among nearby residents or shop owners such that they contribute towards its upkeep. Carmona (2003) states that air quality is a very essential item particularly in outdoor spaces. All kind of vegetation, including trees, behave as air-filters in such areas, while rain absorbs it. Tree planting can provide shade in street to motivate society to walk and trigger group communication as well as providing an intimate atmosphere and purifying air and oxygen to produce pleasant environments to stay for a long time. According to «Better streets, better cities» a guide to street design (2010) landscaping should satisfy the following regulations:

1) appropriate distance between trees to provide continuous shade. In dry climates where trees do not grow very fast, closer spacing is necessary;

2) tree pits locations should be coordinated with the position of street lights;

3) more preferable trees with high branching structures;

4) tree pits should have dimensions of at least 1.5 m by 1.5 m to accommodate roots at full maturity.

Figure 7: Lonsdale street, Dandenong, Australia.

2.4.1.5 Lighting of the Street

Well-designed street lighting enables drivers of motor vehicle, cyclists, and pedestrians to move safely and comfortably by reducing the risk of traffic accidents and improving personal safety. However, pedestrians, cyclists and some motorized vehicles do not have lights and depend on street lighting, not only to see but also to be seen (Kost et al., 2011).

In terms of traffic safety, street lighting is especially important in potential conflict points, such as intersections, driveways, and public transport stops (Kost, 2011). According to «Better Streets San Francisco» (2010) lighting should be designed as well as for vehicular traffic on the roadways yet, also, for pedestrians on sidewalks and pedestrian paths. A well-lighted site provides clear perception for pedestrians and is essential for brightening the environment so that the needs of users can be met on the site. Galston, (2017) emphasized the importance of lighting elements by stating that they help pedestrians to find their way in the dark and are important for the creation of

social spaces. Moreover, they enable security requirements to be met while causing an interaction between the natural and built environment.

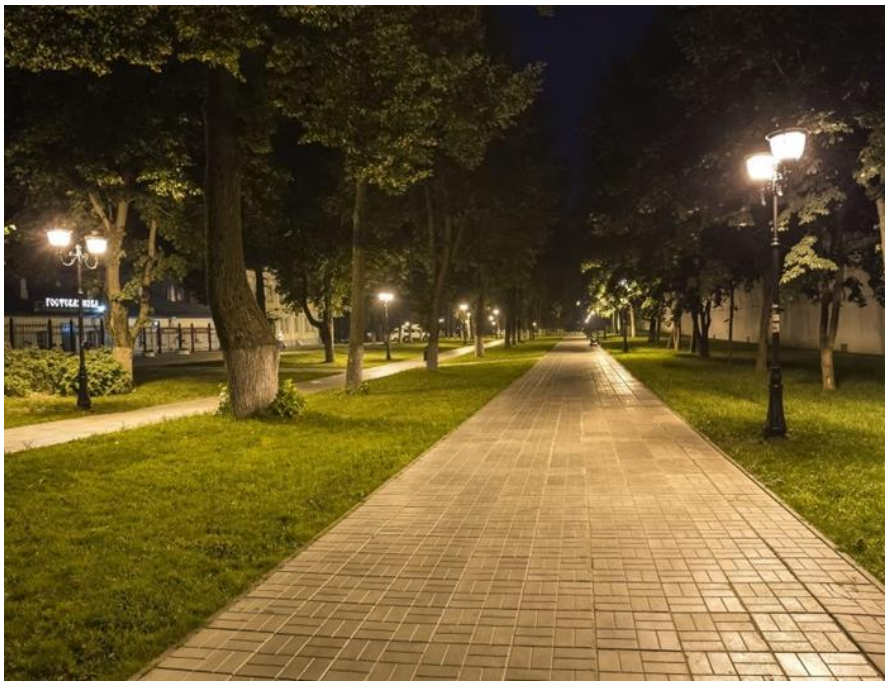

Figure 8: Kropotkinskaya street, Moscow

There is a considerable attempt to focus on parks, plazas, streets, and other public spaces more, regarding to security issues. For instance, According to Yucel (2013) an appropriate design must be related to highlighting the usability of special area in the evening or at night. Site lighting, apart from its practical functions, can be estimated in terms of the kinds of lights, their place and their vehemence, which can have a value on the method of perceiving and using the street. The site lighting can improve aesthetically the color and liveliness to environment at nighttime. The creation of the sense of security and comfort is the main priority of the street lighting especially in darkness. Lighting is extremely vital for entrances, intersections, stairs and sudden changes in grade, dead ends and remote pedestrian ways. Additionally, high criminal environments must be lit perfectly to bring up safety for citizens. In this way, citizens

will feel more secure, although lighting does not have a strong impact on the decrease of crime (Yucel,2013).

a) A single row of light posts is generally sufficient for streets up to 12 m wide.

b) On wider streets, dual lights can be mounted on a single central post.

Figure 9: These sections indicate how lights can be oriented to accommodate two types of street widths and light post locations. Streetlights typically illuminate an elliptical area. As a rule of thumb, the longitudinal dimension is equivalent to three times the pole height, and horizontal dimension is slightly longer than the pole height (retrieved from «Better streets, better cities», 2011).

According to «Better streets, better cities» a guide to street design (2011) lighting should consider the following criteria: 1) additional lighting should be provided at conflict points; 2) the placement of street lighting should be coordinated with other street elements so that trees or advertisement hoardings do not impede proper illumination; 3) the spacing between two light poles should be approximately three times the height of the fixture ; 4) poles should be no higher than 12 m. Especially in residential areas, they should be significantly lower than 12 m to reduce undesirable illumination of private properties.

2.4.1.6 Street Furniture

Street furniture provides settings where people can rest, eat, sit and interact socially with others. According to «Better Streets San Francisco» (2010), site furnishing provide important amenities for pedestrians by adding functionality and vitality to the pedestrian realm. They include benches and seating elements, bicycle racks, flower stands, kiosks, news racks, public art signs, trash receptacles ect. In fact, people with physical disabilities, elderly, and adults with small children can especially benefit from such settings. According to Schmitz et al. (2006) benches and tables, which are placed in open spaces, also, have social significance besides their functional attributes. Since street furniture provide conducive environments, which pull people together the value of it is substantial.

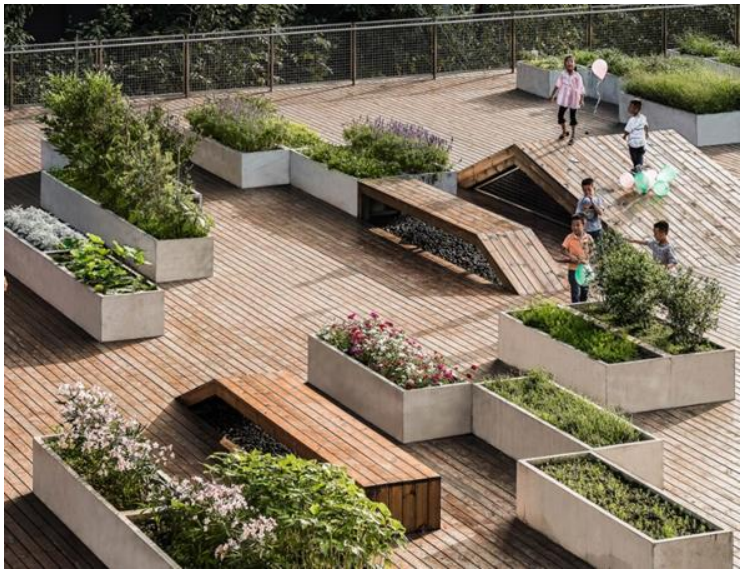

Figure 10: Royal Parade, Parkville, Melbourne, Australia (Retrieved from Pinterest).

Furthermore, suitably elected furniture can invite citizens to the outdoor environment and increase the pleasant feeling about these areas. The standards of city areas highlight the creation of sense of identity and the quality and placement of their street furniture which can be observed in different cities. For instance, London’s red

telephone booths and Paris' metro entrance are symbols of the identities of these cities. In fact, the furniture can be chosen and set up on the basis of an analysis of the site's current and desired pattern of use. Highly qualified furniture should be used where it is necessary because it is expensive. There are different strategies exist to choose or design street furniture. For instance, a similar choice brings the sense of firm tone to the streets and pedestrian ways; or in contrast, different sections of the streetscape must be built in a way to seem as art (Schmitz et al., 2006).

Figure 11: Seating elements should be integrated with other elements, such as tree guards, where possible (retrieved from: Better streets San Francisco, 2010).

Furniture and amenities should be located where they are likely to be used. Furniture is required in larger quantities in commercial hubs, market areas, crossroads, bus stops, railway stations, and public buildings. In addition, most street furniture, especially benches and tables, should be placed where it receives shade. Otherwise, it will become too hot to be used during the daytime. Furthermore, furniture should be located where it does not obstruct through movement. On streets with large numbers of

pedestrians and commercial activity, especially eateries— trash bins should be provided at regular intervals (possibly every 20 m). Whereas, on streets with lower pedestrian densities, trash bins can be provided according to adjacent land uses or street activity (Better Streets San Francisco, 2010).

2.4.2 Functional Factors

Since streets are active parts of the city and have various uses, consequently they attract different people and lead them to different destinations. According to Moughtin (2003) the street is as much a route for motor vehicles as it is a place for pedestrians. In fact, diverse activities, simultaneously, occur along the street. The functional factors of the walkable and pedestrian-friendly street are related to certain features such as a set of intangible arrangements that carry out specific functions. Accordingly, this section focuses on the following functional factors, revealed through the literature review, that form pedestrian- friendly streets: accessibility, permeability mix of land uses and legibility which will be described below.

2.4.2.1 Accessibility and Permeability

Accessibility and Permeability offer people easier and more convenient access to urban public spaces, furthermore they increase social interaction. Alfonzo (2005) states that accessibility factors may include the existence of sidewalks, paths or trails on which to walk. Although, accessibility may also involve barriers that can be actual or perceived. The barriers to walking may include physical barriers such as impenetrable land use, or natural barriers, and also psychological barrier to access, such as a wide road. Moreover, accessibility may include the number of destinations available within a reasonable walking distance as well as the integration of various land uses within a specified area. According to Jacobs (1993), the main purpose of the street is to allow one to commute from place to place, not only within the same street,

but also within the broader network of streets in the city, either on foot, bicycle, public transportation or via private motor vehicles (Jacobs,1993). In addition, accessibility is one of the most important features of a public area, it enhances coming together of people by providing conductive spaces, which are well used. Bentley, (1985) stresses the importance of accessibility as a term closely linked with permeability in that the level to which an environment allows passage is vitally important in urban settings and enhances human relationships.

Tibbalds (2001) defines permeability as the freedom one has to meander within an urban space. In order to define permeability, all the pathways should be detectable. For instance, small block size enhances ability to see and move around because people are conscious of the available routes. Consequently, the increased rate of development may minimize accessibility and movement, the Figure 12 shows two versions where permeability is less and more (Bently et al.,1985). In contrast with large blocks the small blocks gives more alternative of routes. Thus, the large-block layout offers only three alternative routes, without backtracking, between A and B. However, the option with small blocks has nine alternatives and considerably shorter length of public route. Therefore, smaller blocks, give more physical permeability, also, they increase visual permeability, improving people's awareness of the choice available. Hence, the smaller the block, the easier it is to see from one junction to the next in all directions (Bently et al. 1985). Besides, place should be connected to other areas within the urban landscape for it to thrive.

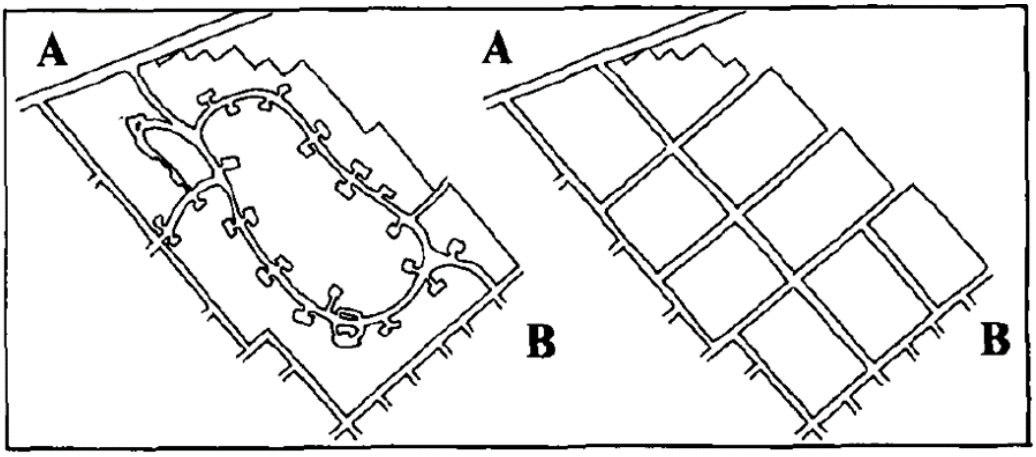

Figure 12: Less and more permeability (Bentley, 1985, p. 17)

Davies, (2005) indicates five C principles, such as: connections, convenience, conviviality, comfort and conspicuousness, that are useful when designing the pedestrian environment;

• **Connections**: providing pedestrian routes that connect places where people want to go.

• **Convenience**: ensures that routes are direct and crossings are easy to use.

• **Conviviality**: making the walking experience exciting by providing a variety of pedestrian ways and ensuring that they are attractive, well-lit and safe.

• **Comfort**: spatial dimensions of walkways and the quality of pavement.

• **Conspicuousness**: ease in finding and following a route, the surface treatment for pedestrian.

Sufficient accessibility also means that pedestrians can easily find the entrance into the street. The ease of accessibility should be available to all users, including disabled people. In this regard, Jacobs (1993) states that fundamental access for disabled people can be made by the addition of physical elements such as ramps to sidewalks where needed (Jacobs,1993). According to Carmona (2003) disabled people, pregnant

woman, elderly and small children in strollers by physical barriers may be prevented to use public places. Access for disabled people is one of the main aspects of designing pedestrian-friendly streets, hence, physical elements should be considered accordingly. They play a significant role in the creation of walkable and friendly streets, also, they enhance streets as social places, by providing accessibility and permeability for all models of transportation and all ages.

Figure 13: Curb ramp for disabled people, San Francisco.

2.4.2.2 Mix of Land Uses

Nowadays, many cities put many efforts to revitalize the downtown areas. These efforts can contribute the retailing trends, such as implementation of concepts that create main-street, retail centers, where people can walk, stroll between shops, eat and have diverse activities along the street. Various functions permits a scope of diverse land uses including private, business, and industrial to be co-situated in a coordinated manner that supports feasible yet sustainable types of transport, for example, public

transport, walking and cycling that eventually heighten neighborhood courtesy (Rodriguez, 2009). Moreover, mixed land uses can improve the economic vitality as well as security on the street by increasing the number of people on the area and in public spaces.

Figure 14: The Cotton district, showing the horizontal land mix-use (photo by: Murdock, 2013).

According to Cervero (2017) mix of uses can be achieved in any of following ways:

1) vertical mixed-use, where, typically ground floor is for the retail or offices and residential apartments are above;

2) ground-floor commercial, offers a high level of interaction with the pedestrian area, includes restaurants, cafes, and small retail;

3) horizontal mixed-use, where additional uses are built side-by-side on adjacent parcels or within the same parcel.

The Cotton District located in the historic neighborhood of Mississippi and considered a good example of a successful mixed-use. Two buildings at the corner of University Drive and Maxwell Street accommodate a diversity of uses and activities including commercial retail, apartments, and underground parking. Moreover, the historical

architecture makes a unique intersection for society. Apartments that located upper floor provide the “eyes on the street” which is necessary to create a safe environment for all users (Kumar, 2013).

2.4.2.3 Legibility

Legibility is the feature that makes an area graspable. Legibility is essential at two levels: physical structure and activity patterns. Places may be explored at either level separately. For instance, it is conceivable to build up a reasonable feeling of the physical shapes and forms of a space, aesthetically or more. Similarly, examples of many uses might be handled regardless of the absence of a solid form. Yet ideally, to comprehend a space’s capability without limit, consciousness of physical form and patterns must integrate with each other. This is particularly critical to the one, who needs to get a examine a space rapidly (Bently,1985). According to Kevin Lynch (1960) a legible environment as a place can be arranged in a coherent and recognizable pattern. The degree of legibility depends on the capacity of an area to form a mental image. Thus, Herzog and Leverich (2003) depict the legibility as the attributes of a specific space that give a certain comprehension through making intellectual maps and diagramming wayfinding. Perceiving space is a procedure of utilizing spatial information properly subsequent to getting it and analyzing it in the brain. Users observe and process space through the psycho-cognitive intellectual procedures in the human mind accordingly. These procedures are impacted by the individual characteristics defined by each unique user. Downs and Stea (1973) center around the kinds of gaining spatial information and discuss the connection between sensory gained information and the corresponding resources of information (immediate and vicarious). Sensory info gives a coordinated ecological reflection that is framed by the blended mix of visual, haptic, sound-related, olfactory, and dynamic senses. This

representation changes concrete senses to a perspective experience personal in an immediate way (Downs and Stea, 1973). In effective experience, faculties are utilized viably and exactly. Then again, in vicarious experience, senses are subjects of personal recognition and are not utilized completely and simultaneously. Vicarious sources for the most part serve visual sense, so they lead to generally visual recognition. Downs and Stea (1973) characterize vicarious information as used data; in other words, they perceive it as a sort of data that literally and metaphorically speaking, signifies "seeing the world from another person's eyes." Appleyard (1973) suggested that spatial information (immediate or circuitous) is both realistic and abstract, schematic however disconnected, and also, somehow traditional yet in some cases innovative, likewise particular, and distinctive yet pluralistic. That results from both indistinct, intricate, divided, or mistaken nature of urban areas (Appleyard, 1973) and the divided, progressive, abstract, powerful nature of the psychological procedures of the mind itself (Carlson, 1996). Kevin Lynch (1960) noticed the landmark (a unique monumental figure corresponding to the character of an urban space or city) as one of the five perceptual and visual components (landmarks, paths, districts, edges, nodes). As indicated by Lynch (1960), if any subsequent structure has a unique form, plainly appears differently in relation to its context, and has a significant location, then at that point, it very well may be viewed as a significant landmark. Steck and Mallot (2000) indentified landmarks previously mentioned to be put within two classifications: global and local. Global landmarks on one hand are those that are detectable easily over long distances. On the other hand, local landmarks are smaller in scale in relation to the global ones, and are just obvious when people approach them within a close by distance. Raubal and Winter (2002) recorded three things for the characteristic nature of these landmarks: visual remarkable quality (veneer, form, block, and color),

semantic notability (social, cultural, and historical worth), and structural eminence (location).

Figure 15: Image elements: paths, edges, districts, nodes, and landmarks (Lynch, 1960).

Spatial design influences development and distribution, yet additionally causes one to comprehend the relationship among spatial components and to reflect the mental picture perceived of this relationship. As it becomes harder to interpret the relationships and connections of spaces, diagrammatic figures of wayfinding gets more fragile. As indicated by Young (1991), the typological intersections in decision points are the most crucial and are at utmost importance. To further explain, a decision point is the place an individual needs to select a path amongst several other directions, for instance, nodes in urban space and corridor intersections in buildings are merely some of the examples. In addition, historically planned cities followed an organic pattern utilizing a deformed grid that adapts naturally by time to create what we now call as "settlements" rather than linear planned patterns (Carmona et al., 2006).

2.4.3 Social Factors

Street is a link between people's facilities and interaction. According to Jacobs(1961), street is an excellent place for social and commercial relations, place where people can gather and communicate. Nowadays, the role of the social interaction and street vary with, ethnic group, class, age structures and type of specialization of the neighborhood.

Increasing specialization and separation of community have removed many of the socially cohesive activities once found in the street. Diverse functions and activities once available on the street, yet nowadays there are fewer than before. There are countless reasons, which cause the decline of daily social life in public spaces. For instance, one of the reasons is the increasing number of private cars, increased crime and violence, impersonal supermarkets, etc. (Levitas, 1991). Thus, this section focuses on three main social factors, revealed while literature review, that can create a place that makes people feel good while walking, such as safety, comfort, and cultural activities to be described below.

2.4.3.1 Safety in the Street

The level of safety on the street depends on the existing environment, land uses, or the presence of certain groups or individuals. Bars, liquor stores, pawnshops, or other types of land uses may affect the level of safety felt by some pedestrians.

The need for safety may especially affect strolling walking, because this trip is considered to be optional (Alfonzo,2005). The number of street lights, landscaping have all been negatively related to fear of crime, hence, territorial features can decrease users fear (Perkins et al.,1992). Kuo, Bacaicoa, and Sullivan (1998) found that tree planting and vegetation affected citizen's sense of safety. However, narrow streets, existence of nonresidential property and stores on the block, adversely affect walkability and livability. Furthermore, dilapidated housing link to higher levels of delinquency (Perkins et al., 1993). Recently, Ross (2000) examined the effect of fear on the probability of walking. People who felt more afraid in their neighborhoods were significantly less likely to walk than those who felt less afraid. Hence ,the unmet need for safety may affect decisions to walk.

Figure 16: Example of safe street with street lighting, greenery and buildings around, NY.

According to Alfonzo (2005) the buildings watch out the public streets may increase the personal safety. Cities designed and considered to be used 24 hours a day, in order to avoid certain areas becoming dangerous districts. The safety measures may include: 1) providing street lighting, 2) maximizing the numbers of windows and doors to the street, 3) maximizing the linkages between new and existing developments, 4) locating important facilities such as: public transport stops in well-surveyed areas. According to "Mean Streets" (1997), protecting pedestrians and cyclists from motor traffic, is another significant issue. Therefore, there are certain actions to make street safer such as: 1) traffic calming: the installation of speed bumps, or other devices in residential neighborhoods that slow cars down 2) providing separate spaces for pedestrians, 3) designing more pedestrian friendly public spaces (Mean Streets, 1997).

2.4.3.2 Comfort in the Street

Comfort refers to a one's level of convenience, and contentment on the space. A one's satisfaction with comfort for walking may be affected by environmental qualities that either facilitate walking or remove factors that might make the walk distressing. According to Alfonzo (2005), the factors that may affect comfort levels include traffic

calming elements, the condition of the pedestrian walkway system, urban design elements intended to offer protection from unfavorable weather conditions and features that provide amenities such as street benches, drinking fountains, and other street furniture.

Figure 17: Example of comfortable public space, Hamburg, Germany.

Clark and Dornfeld (1994) found that a variety of traffic-calming strategies—including reduced street widths and speed limits, street crossings, and plantings—were associated with increased street activity, walking, and bicycling. Furthermore, in a study of the perceived environmental factors, elderly who reported that the sidewalks in their neighborhoods presented less barriers to a safe and comfortable walk were more likely to be active on the street than those who reported that the sidewalks presented more barriers (Alfonzo, 2005).

2.4.3.3 Culture and Sense of Belonging

Since culture influences how spaces are designed, it plays a vital role in architecture and urban planning. The traditional spatial objects along streets, form an integral part

of the culture and community lifestyle and has both, tangible and intangible values. These entities are the bases for cultural integration, which have been carried down through the ages and have adapted to the modern context (Mondal,2016). According to Pascual et al. (2016) culture is the fabric for the dynamic construction of individual and collective identities. The active participation of people in local cultural activities improves the walkability and livability along the street. To emphasize, diverse representations for the essence of culture on the street can be numerous activities inherited in a particular place. For example, cultural activities may include variety of entertainment such as live theater and music, movie nights, a farmers market, public art, street entertainers, shops, restaurants, and different events. Equally important, what Mumford (1961) observes, “the historic city retains, by reason of its amplitude and its long past, a larger and more various collection of cultural specimens than can be found elsewhere”. Additionally, Harvey (2001) notes that the city center is a great book of time, history and diverse identities that hold different narratives. However, today cities consist of people who do not interested in visiting any place, do not have any sense of belonging to their environment, and finally, who have defined boundaries to separate themselves from «the other» (Carrion M. and Hanley,2007). Canter (1991) states that place is understandable with the integration of perceptions, impacts and users' behavior. Besides, a sense of place creates fulfill in the environment (Relph, 1976). People like to describe themselves through a sense of belonging (Stedman, 2002). Place belonging is interpreted as a sense of belonging to the place, therefore, people like to imagine it as their own home, it has defined territory and can be understood as attaching to a particular community according to ethnicity, sex, religion, cultur, etc. (Pong et al, 2005).

Table 3: Analysis of the walkable factors, techniques and tools

	Factor of walkable street	**Techniques**	**Tools**
Physical Factors	Enclosure	Observation Site analysis	Photographs Sections
	Sidewalks design	Observation Interview	Photographs Questionnaire
	Vegetation	Observation Interview Site analysis	Photographs Questionnaire Map
	Lighting	Observation Interview	Photographs Questionnaire
	Street furniture	Observation Interview	Photographs Questionnaire
Functional Factors	Accessibility	Observation Site analysis	Photographs Maps
	Mix of land uses	Observation Site analysis Interview	Photographs Map Questionnaire
	Legibility	Observation Site analysis	Photographs Map
Social Factors	Comfort	Observation Interview	Questionnaire
	Safety	Observation Interview	Questionnaire
	Culture and sense of belonging	Observation Interview	Photographs Questionnaire

Chapter 3

CASE STUDY

3.1 The Historical Development of Sukhum City

Abkhazia is located in the west Caucasus on the coast of the Black Sea. Abkhazia is one of the most ancient ethnos of Caucasus, language, culture and traditions of which are close and related to north Caucasian people: Abaz, Adygey, Kabarda, Circassians, and Ubikh. Ruled by different conquerors, the republic of Abkhazia hosted many different cultures: the Byzantine, Greeks, Ottomans, Turks, and Russian cultures, which are reflected in her distinctive historical and cultural heritage, consequently, brought together the unique identity of her cities. The capital of Abkhazia is Sukhum, which is relatively a new city in comparison to the European cities. To clarify, starting to form in the second half of the 19th century, it becomes densely populated by the beginning of the 20th century.

The territory of Sukhum was attractive to sailors, traders and conquerors from ancient times, since it was the first city that was founded in the 6th-century BC., and was called Dioskuriades by the Ancient Greeks (Pachulia,1958). The remains of this ancient city are still preserved at the bottom of Sukhum Bay. In those days, Dioscuriada was a center of commerce. After the decline of the Dioscuriada in the 2nd-century AD., the ancient Romans founded the city of Sebastopol in its place and built a fortress. Later, Turks replaced Roman colonization, destroying the city in the middle of the 15th century, while at the beginning of the 18th century they built a fortress, and the city

began to be called Sukhum-Kale. During the 19th century, the destruction and restoration of the city continued as the city was alternately captured by either Russian or Turkish troops. Only in 1866, after the abolition of the Principality of Abkhazia (1864), Sukhum-Kale becomes Sukhum - the administrative center of the Sukhum military department of the Russian Empire, where the history of the modern city of Sukhum originates.

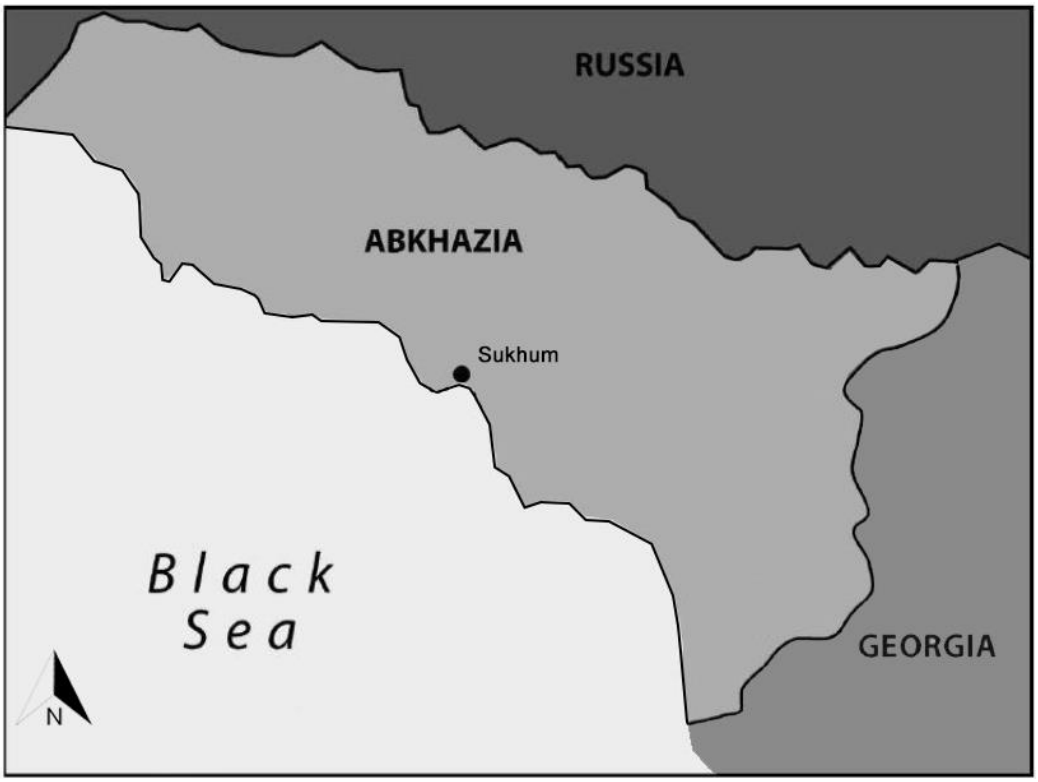

Figure 18: Location of Sukhum city in Abkhazia (Blakkisrud, 2008).

The urban plan of Sukhum city is based on a regular street system or the Hippodamian system, named after the ancient Greek architect Hippodamus of Miletus, who is credited with the invention of the city planning based on a geometrically correct street network in the 5th-century BC. (Pachulia,1958). Since ancient cities formed chaotically as the population grew and the city grew, it was impossible to plan and organize a clear system of streets and quarters in advance. As a consequence, a regular

layout was applied in Miletus, after its destruction by the Persians, and then in other later cities. As time has shown, the regular street system that replaced chaos is not always convenient in a modern city since its monotony bothers people. On the other hand, this problem rarely arises in small cities such as Sukhum, because the alternation of built-up neighborhoods with parks, squares, alleys with squares can dilute boring regularity (Agumaa,2017).

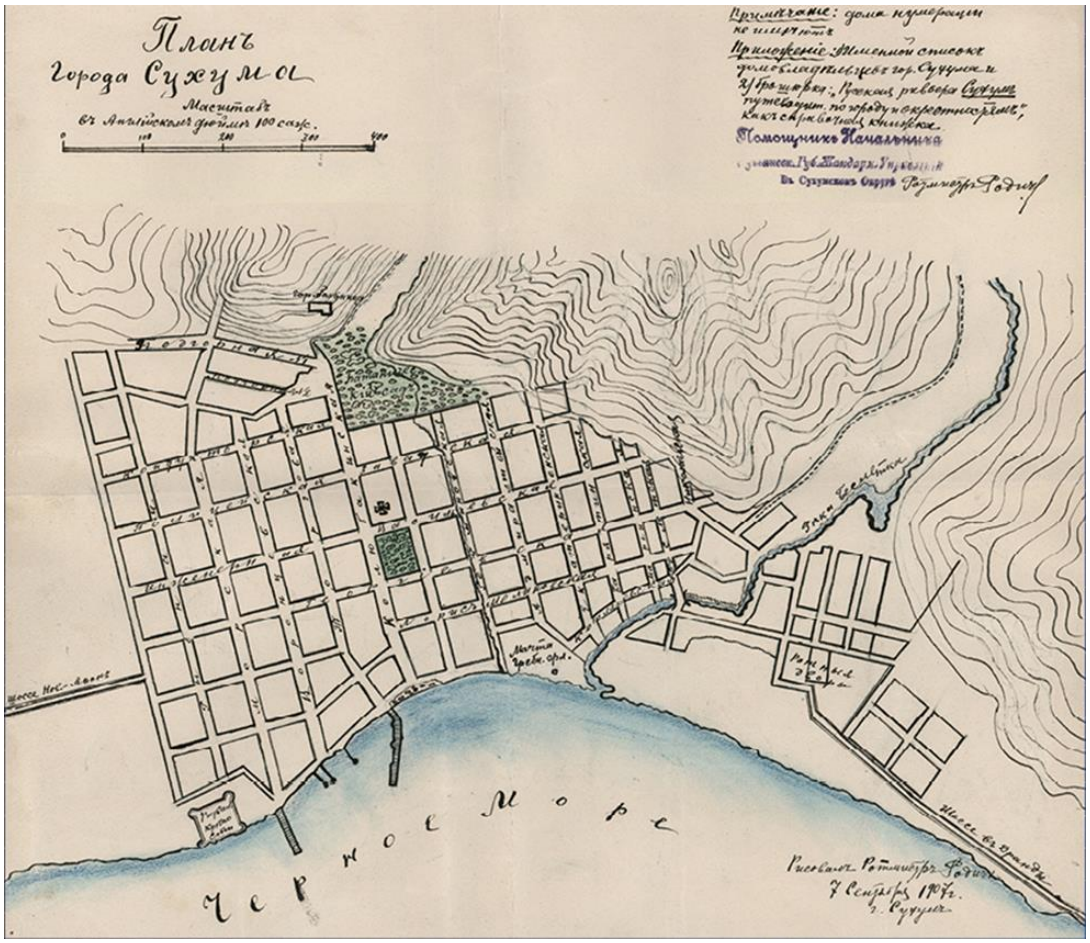

Figure 19: First map of Sukhum city, 1907 (retrieved from: Chkotua, 2008).

In Ancient Greek cities with a regular layout, much attention was paid to public spaces - squares (agoras), theaters, gymnasiums. However, in the period of active urbanization and an increase in the number of cars in cities, more attention was diluted to transport highways, while pedestrians were in the background (Rogovin et al, 1973).

Nevertheless, from the second half of the 20th century, the gradual conquest of space from transport begins in favor of the pedestrian. When Sukhum was built up, the regular layout at its core was a failure, the terrain features were not taken into account, and over time it became clear that this interferes with the growth and development of the city (Agumaa,2017).

These problems had to be solved with the involvement of large finances and advanced urban improvement technologies. Embankments were strengthened, storm sewers and small drainage systems were equipped respectively. (Agumaa,2017). Thus, the situation in the city also gradually improved due to competent development, as the Greek businessmen who inhabited the city built villas, mansions, hotels with an eye to European trends, while simultaneously, the Russian intelligentsia built up the city inviting architects from the capital. Gradually, the city had overgrown with public spaces formed by commercial areas, boulevards, embankments, squares, and parks. By the cause of high-quality architecture, the city had transformed. The main style of that period was modern, covering the whole world in a short period; it reached Sukhum (Rogovin et al, 1973). With the advent of Soviet power and the acquisition of Sukhum status as the capital of Abkhazia, a new stage in the history of the city begins. The city's budget started increasing significantly, the active reconstruction of the city (factories, factories) had begun, and railway and sea stations had been built. The northern part of the city has become industrial since there are numerous factories. In addition, at the turn of the 19th and 20th centuries, the buildings in the city mostly were built with two stories (Figures 28; 29; 30), while comparatively, in the Soviet period, the number of floors increased sharply along with the width of the main streets of the city increased. The railway cut off part of Sukhum and its outskirts from the sea.

Moreover, high-rise hotels built on the seashore deprived the low-rise buildings formed in the early 20th centuries with sea views on Hathua Mountain and Sukhumi Mountain (Figure 19).

Figure 20: High-rise buildings of the Soviet period (Retrieved from: Sputnik Abkhazia).

Nowadays, all these high-rise buildings look alien and do not fit into the historical landscape of the city, unlike in earlier days, when high-rise construction was an indicator of the development and sustainability of the city (Ribchinskiy, 2014). Stalin's Empire style proved itself to be the brightest of all Soviet architectural styles in Sukhum. To exemplify, slender columns and stucco molding lace fit perfectly into the existing building, proving that Sukhum Stalinist Empire is very restrained and elegant. On the contrary, buildings in the style of constructivism in Sukhum are only a few. During the war of 1992-1993 in Abkhazia, the architecture of the city of Sukhum was hit hard, and consequently many architectural monuments were destroyed or partially destroyed. Today, the city is being built chaotically, and the vast majority of

architecture does not reflect nor fit into the historical urban environment (Pachulia,1958).

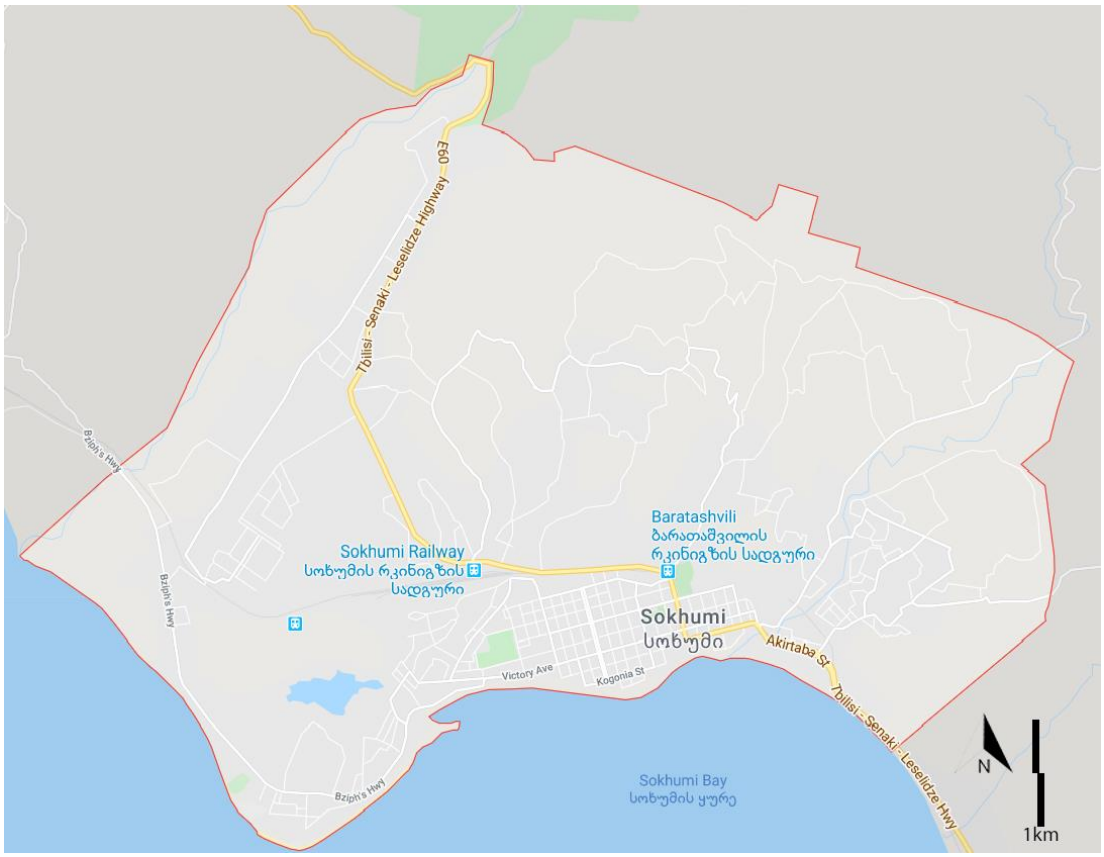

Figure 21: Map of Sukhum district (retrieved from Google map).

3.2 The cultural heritage of Peace Avenue

The selected area for the study in Sukhum city is the Peace Avenue. The Avenue is located in the city center and it is one of the oldest streets of Sukhum (Figure 20). This is the former territory of the first city bazaar, later - Stalin Park and nowadays a commercial center of Sukhum. Peace Avenue consist of numerous historical buildings and architectural heritage. Similarly, there are also three parks on Peace Avenue: Voronov Park, Aiaaira Park, and Pushkin Park.

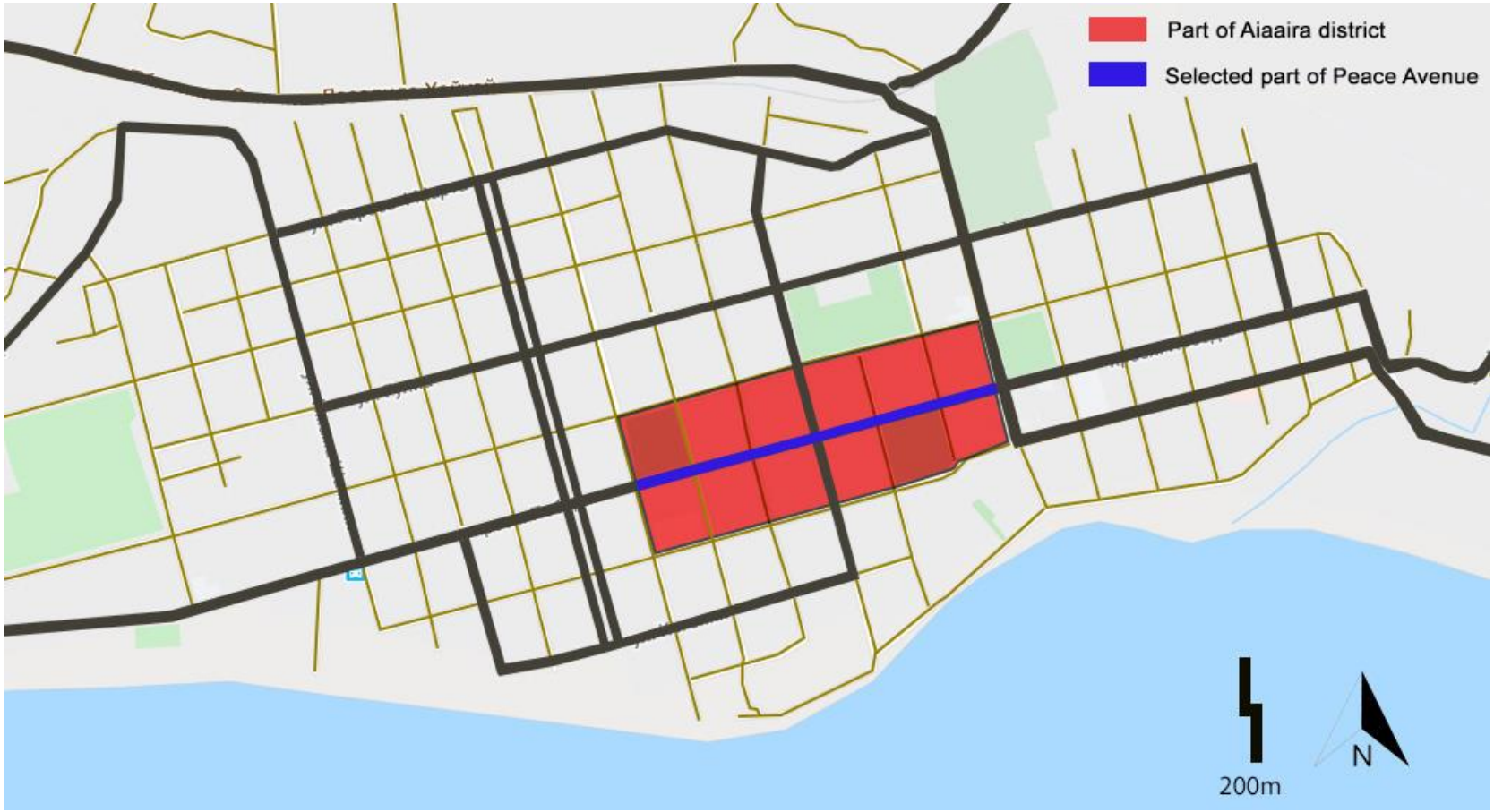

Figure 22: Map of Sukhum city and location of Peace Avenue

Many shops, hotels, and interesting architectural objects were built there, among which one can distinguish: 1) The cinema "Sukhum"; 2) New building of Sukhum postal and telegraph office in 1915 (Figure 23) ; 3) The house of Stefanidi of 1912 ; 4) Building of the cafe-restaurant "Pallas" 1914 (Figure 24) ; 5) The house of Metaksa of 1912; 6) House of the trading company Bogdanov, 1904; 7) Building of furnished rooms "Europe" of 1913; 8) Administration building.

These buildings are on the list of the historical heritage of Sukhum as monuments of urban planning and architecture (Figure 23).

Figure 23: Postal and telegraph office.

Figure 24: Café-restaurant «Pallas»

Figure 25: The historical heritage along Peace Avenue

3.2.1 The House of Stefanidi

Figure 26: The house of Stefanidi (retrieved from: Sputnik Abkhazia).

The house of the industrialist Stefan Stefanidi was built in 1912 according to the project of architect A.V. Modrakh. The apartment building with a height of 19m is located at the intersection of Peace Avenue and Abazinskaya Street. On the ground floor of the house, there were shops and a private pharmacy, and above were the apartments that Stefanidi rented out. The building is made in the architectural style of eclecticism, in which the facades are richly decorated with various stucco molding of different styles. The angular location of the building determined its configuration, as the corner of the building is the center of the composition. Floor-mounted semicircular

balconies form the corner of the building, and its octagonal bay window with a spire completes the architectural character of the building. Not to mention, the fifth floor of the building is the attic with small windows overlooking both the main facades of the building. The ratio of the height and width of the building, as well as the composition of the facades, emphasized by vertical decorative elements in the form of regularly repeating paired pilasters, and attics, gives the building harmony and grandeur. Again, horizontally, the building is divided into wide floor cornices. It is impossible not to pay attention to the house of Stefanidi, being at the intersection of these streets. The ground floor of the building is less decorated, and the main element of the decor is rustication. Despite the mixing of decorative elements of various styles, the building does not look elaborate and tasteless. Decorative elements skillfully fit into the overall composition of the facade, which creates a harmonious and complete image.

3.2.2 Building of Furnished Rooms "Europe"

The building of the furnished rooms "Europe" was built on the corner of Aidgilara and Peace Avenue in 1913. The architect of the project is Alfred Bamme, who practiced architecture in Sukhum since 1908, mainly in the modern style. The hotel building is two-three-stories; with the rooms located on the 2nd floor, while the 1st floor was occupied by various shops. To continue, the architecture of the building combines modern elements with architectural techniques reminiscent of a Swiss chalet.

Figure 27: The Europe complex (retrieved from: Sputnik Abkhazia).

A characteristic difference of architectural objects of this style is a sloping roof, and the edges of which protrude beyond the main walls and form a visor. This again refers to the motives of the chalet architecture, where a complex roof is an indispensable element of the building. Moreover, in Soviet times, the Sukhum military executive committee was located on the 2nd floor, then a spa clinic, and the first floor was used as a shopping center as before. The most popular store of the shopping center was "Detsky Mir", which is why the building is still called "Detsky Mir" among residents of the city.

3.2.3 Administration Building (Clocks)

The history of Administration building in Sukhum began in 1914 when the tobacco magnate decided to build a mansion. The building was erected in the modern style by the architect Veniamin Ostrovidov. When the house was built, Stefanidi sold it to the owner of the "Mir tobacco" factory, and the office of the enterprise was located in the building for a while.

Figure 28: Administration building (retrieved from: Sputnik Abkhazia)

After the establishment of Soviet union in Abkhazia, the building was nationalized and was called the "Palace of Labor". Furthermore, in 1950, Sukhum was recognized as the cleanest city of the Soviet Union, and on this occasion, the Moscow City Council presented the city the clock-chime. Currently, the building is the administration of the city of Sukhum.

3.3 Methodology of the Analysis of Case Study

As obtained from the literature review in Chapter two, the features that affect walkability on the street, will be analyzed in this chapter. Thus, based on observation and interviews, the thorough analyses provided in Table 4 need to be considered in order to be able to achieve a walkable and livable street. A SWOT analysis will also be utilizes to support the methodology which will be based on the survey with locals, maps and personal observation.

Table 2: Methodology of the case study analyses

Criteria		Why is it important for walkability?	Needed Analysis
Physical Functions	**Enclosure**	-It refers to the degree to which the building walls, trees, and other vertical elements visually define the streets (Ewing)	-Observation -Section analysis
	Sidewalks	-It serves as the front steps to the public spaces in the city, activating streets socially and economically -The design of sidewalk environments is important to all pedestrians, but is particularly important to those with disabilities who have limited travel choices (Boodlal)	- Observation - Interview
	Vegetation	-It plays a functional role in providing shade to pedestrians. -It enhances the aesthetic qualities of streets.	-Observation -Landscaping Map - Interview
	Lighting	- Street lighting enables motor vehicle drivers, cyclists, and pedestrians to move safely and comfortably by reducing the risk of traffic accidents and improving personal safety (Patel, 2011).	-Observation - Interview
	Street furniture	-It provide settings where people can rest, eat, sit and interact socially with others. -It provide important amenities for pedestrians by adding functionality and vitality to the pedestrian realm (Better Streets SF).	-Observation - Interview
	Accessibility/ Permeability	- offer people easier and more convenient access to urban public spaces and they increase social interaction (Bentley) -It is important to easy to get to and move around (Carmona)	-Traffic and transportation analysis - Maps

			-Observation
	Mix of land uses	-It enhances the economic vitality and perceived security of an area by increasing the number of people on the street and in public spaces (Kumar,2013).	-Land use analysis - Observation - Interview
	Legibility	-It is one of the factor to achieve people friendly street (Tibbalds) It is the quality which help people read their surroundings (Bentley)	- Lynch Analysis - Observation
Social Factors	**Comfort**	-comfort for walking may be affected by environmental qualities that either facilitate walking or remove factors that might make the walk distressing (2005)	-Observation - Interview
	Safety	-The need for safety may particularly affect strolling walking (Alfonzo,2005).	-Observation - Interview
	Culture and sense of belonging	The active participation of people in local cultural activities improves the walkability and livability along the street.	-Observation - Interview

3.4 Analysis of the Physical Factors of Peace Avenue

Peace Avenue has been analyzed in terms of enclosure, sidewalks conditions, landscaping, lighting conditions and street furniture.

3.4.1 Enclosure in Peace Avenue

According to personal observation of enclosure, one place on the corner of Peace Avenue and Abazinskaya street was selected, where the highest building on Peace Avenue is located, with 5 floors and 19 m of height; while simultaneously and on the opposite side, the lowest building with 5m of height lies (Figures 31 and 32). Furthermore, the second place on the corner of Peace Avenue and Aidgilara street was selected to show the average height of buildings along the historical quarter, where the

building height from one side is 11m; whilst on the opposite side, the building height is 9m (Figures 31 and 33). Personal observation revealed that the average height of building along Peace Avenue varies from 9m to 14 m. Since the width of Peace Avenue is 20 m and the highest point is 19m along the street; which means that almost 1:1 height-to-width ratio. However, considering the average height of buildings along the street that range from 9m to 14m the height-to-width ratio is approximately 1: 0.7

Thus, the existing height-to-width gives a strong spatial definition because the street wall height limits the sky view, almost completely containing the view. A continuous street wall on both sides of the street gives this scene of high enclosure.

Figure 29: The average height of buildings along Peace Avenue.

According to Arnold, (1993) street trees can also visually define a space with a ceiling of branches and leaves that horizontally implies a ceiling; also, they can suggest the vertical enclosure of an area with their trunks. The key to influencing enclosure with

trees is the close spacing of the trees along the street. Thus, the existing rows of trees on both sides of Peace Avenue humanizes the height-to-width ratio (Figure 30). Horizontally they do so by visually enclosing or completing an area of open space. Vertically they define space by creating an airy ceiling of branches and leaves. Accordingly, the buildings and uniform street trees, landscaping along a sidewalks along Peace Avenue create a room-like effect by limiting long sight lines and views of open sky.

Figure 30: The existing rows of trees along Peace Avenue.

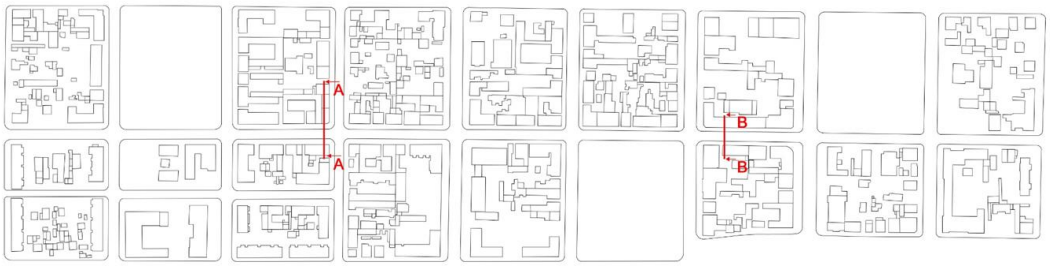

Figure 31: Highlighted selected sections on the plan.

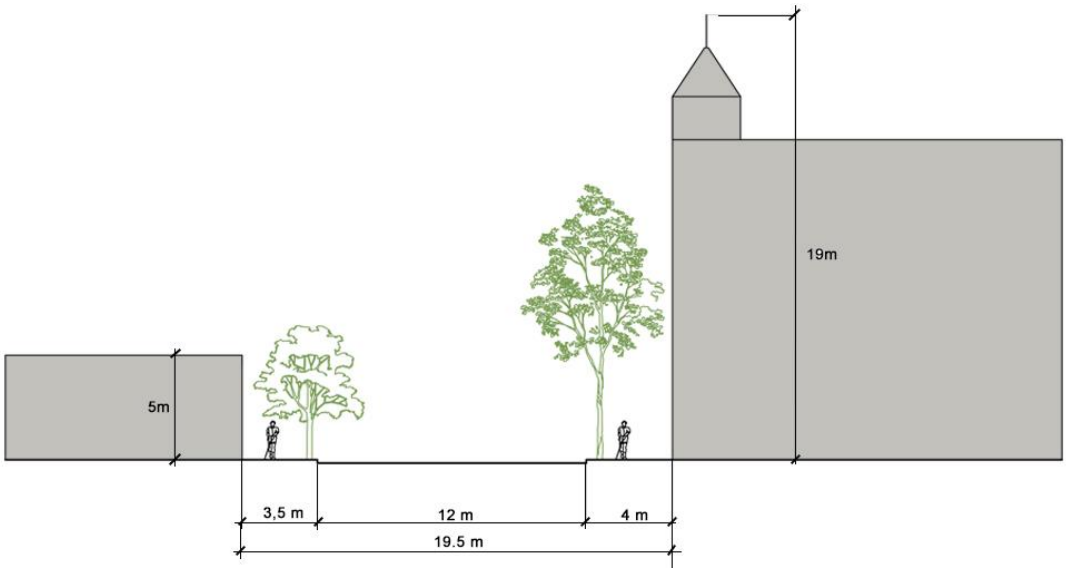

Figure 32: Section A-A of Peace Avenue with the highest and lowest building on the street (Map not to scale)

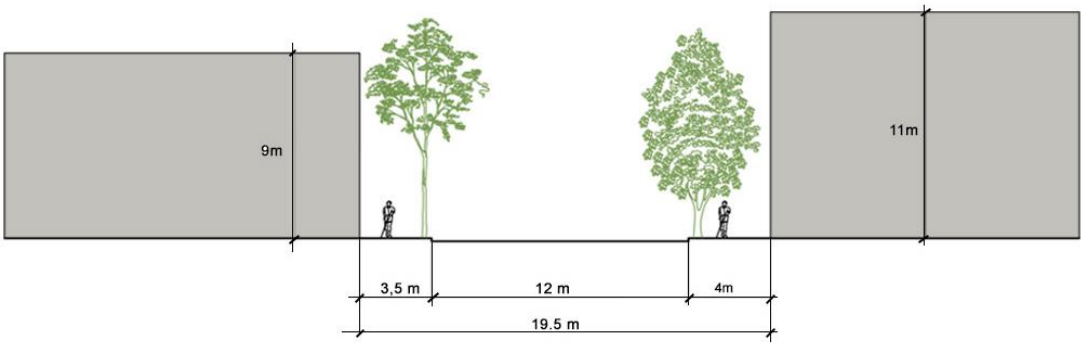

Figure 33: Section B-B

3.4.2 Sidewalks of Peace Avenue

Well-designed sidewalks are a fundamental part of walkable streets. Sidewalks are one of the most important parts of the street for pedestrians, especially in historic urban quarters and city centers, where many tourists and locals walk for different purposes. The sidewalks in historic core of Sukhum have some issues. According to observation, in Peace Avenue there are sidewalks that are in poor conditions and one of its major problem is inappropriate and old surfaces. This makes it difficult to walk conveniently in many parts along the street. In addition, there is no continuity in the pattern of the

street; instead, there are lots of height variations, which make walking very difficult, not only for disabled pedestrians but for everybody as shown in Figure 34 and 35.

Figure 34: Poor sidewalk condition in Voronov park, Peace Avenue, Sukhum.

Furthermore, the sidewalks on the street have inconvenient and undefined places with insufficient ramps or any special materials for physically and visually disabled people to pass the street and sidewalks easily and safely. On the other hand, the width of the sidewalks in Peace Avenue varies from 3.5 to 4 meters; which is an appropriate width for all pedestrians. Moreover, around Aiaaira Park in Peace Avenue, there are well-designed sidewalks and ramps, yet there are no special materials for physically and visually disabled people.

Figure 35: Pictures show the absence of ramp and special materials for disabled people.

According to the research survey questionnaires, out of 100 respondents, 27.3% believe that the condition of the sidewalks in Peace Avenue is poor, while the other 56.8% state that conditions are fair; so, as a result, only 15.9% of users evaluated condition of sidewalks in a positive way as shown in Figure 36.

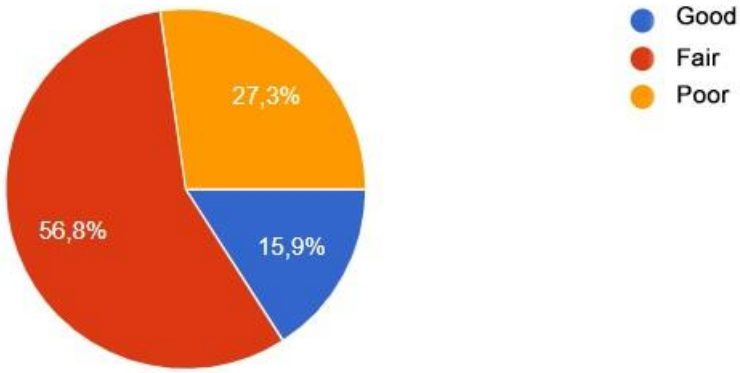

Figure 36: Rating of sidewalks condition.

3.4.3 Vegetation along Peace Avenue

Vegetation plays a vital role in street design by providing shade to pedestrians, creating more enjoyable environment for walking and beautifying the street. According to personal observation of Peace Avenue, there are some places, where the landscape design is poor; for example: the absence of tree pits as shown in Figure 37.

Figure 37: Absence of tree pits.

However, there are trees with high branching structures along Peace Avenue, that create shade and convenience. Moreover, rows of trees along Peace Avenue serve as a border between people on the sidewalks and traffic by creating a safer place for users (Figure 38)

Figure 38: Trees with high branching structures along Peace Avenue.

Primarily, there are three kinds of trees along Peace Avenue including tilia, eucalyptus and palms (Figure 39). Peace Avenue is mostly green even in winter season. On the other hand, there is a lack of shrubs, bushes and other forms of vegetation as shown Figure 40. According to the survey out of 100% interviewed, 29.5% respondents evaluated landscaping in a positive way; while 45.5% are neutral ; not to mention the 25% dissatisfied with the landscape design along Peace Avenue as shown in Figure 41.

Figure 39: Existing trees along the street.

Figure 40: Lack of shrubs and bushes.

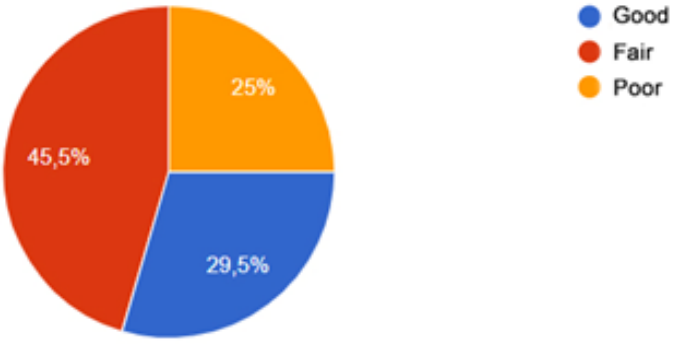

Figure 41: Rating the level of the vegetation.

Figure 42: green areas along Peace Avenue

3.4.4 Lighting in Peace Avenue

A well-lighted site provides clear perception for pedestrians and is necessary for brightening the environment to make the street safer for people at night time. According to personal observation, there are some issues related to lighting conditions along Peace Avenue. For example, the placement of street lighting close to other street elements like trees or advertisement hoardings impede proper illumination. Moreover, many lightings along the street do not work as shown Figure 43.

Figure 43: some lightings do not work and lighting close to the tree impedes proper illumination.

However, the "Clocks" close to Pushkin Park and Aiaaira Park are well lit as shown in Figure 45 and 46. In addition, according to survey out of 100 interviewed, 45.5% answered that lighting conditions along Peace Avenue are good; while 40.9% respondents evaluated satisfactorily; and only 13.6% noted a low level of lighting

conditions. Thus, according to survey Peace Avenue is conveniently lit, however according to personal observation males gather in parks or open areas at night time more often, while women are respectively rarely appear to be invited at Peace Avenue. For this reason Peace Avenue found rather empty most of the time, hence it needs to be under maintenance constantly for it to avoid being vulnerable to unhabitability.

Figure 44: Lighting conditions on the sidewalks close to Aiaaira Park.

Figure 45: Clocks building.

Figure 46: Aiaaira Park.

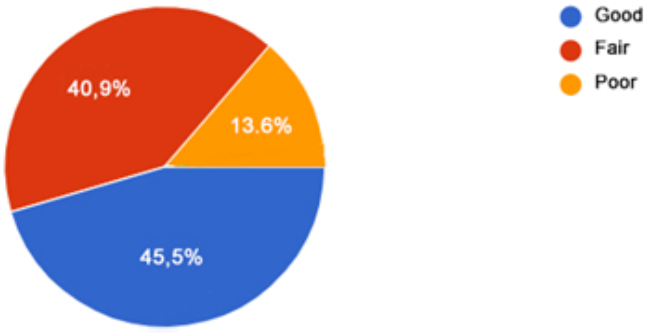

Figure 47: Rating of the lighting conditions along PA.

3.4.5 Street Furniture in Peace Avenue

Street furniture is one of the great significances in ensuring the comfort of people in all public spaces. According to personal observation, Peace Avenue lacks bicycle racks, flower stands, kiosks, public arts, and trash receptacles. Peace Avenue has two kinds of bins: stable and movable; the existing movable bins are in poor conditions which give the street a bad image accordingly (Figure 48). In addition, inconvenient instant road bumps not only disturb the general environment of the street yet also, intrudes with the amenity and the service of its function. Moreover, the existing light poles around the surrounding pedestrians are old and rustic, reflecting the street as outdated and primitive (Figure 49).

There is a small number of benches and seating elements along the street; they are only found in Aiaaira Park and Pushkin Park (Figure 50). According to survey out of 100% respondents, 18.2% are satisfied with the street furniture along Peace Avenue, while 34.1% users evaluated it as satisfactorily, and other 47.7% noted inappropriate conditions of street furniture along the street.

Figure 48: Bins in poor conditions.

Figure 49: Bumps and light poles in poor conditions.

Figure 50: Benches on Aiaaira park.

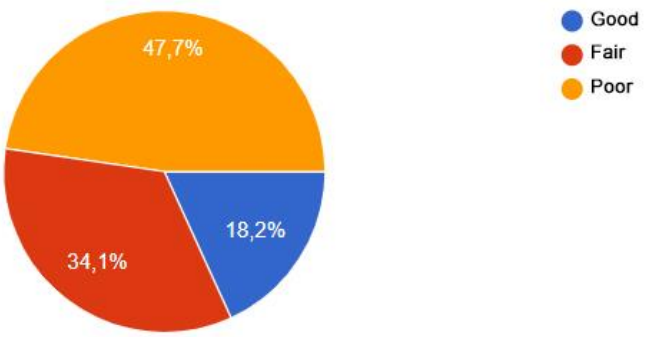

Figure 51: Rating the street furniture conditions.

3.5 Analysis of the Functional Factors of Peace Avenue

Peace Avenue has been analyzed in terms of accessibility and permeability, mix land uses and legibility.

3.5.1 Accessibility and Permeability of Peace Avenue

Accessibility to the Sukhum city is organized mainly by the highway (E-60) which is a highway of national importance. It passes through the city transport network and Peace Avenue as Lesilidze Street. The secondary road also passes through Peace Avenue but through Sakharova Street and Peace Avenue Street; where partly access is limited from Dbar streets to Leselidze street. While, the tertiary road is used inter-quarterly as shows Figure 52. According to the analysis and scrutinizing of the assigned map, Sukhum city has a small block size and therefore there are high accessibility and permeability. Since the urban structure of Sukhum consists of small blocks that enhances the ability to see and move around, people have more alternatives with a slightly shorter length of the public route. Small blocks also increase visual permeability, improving people's awareness of the choice available: the smaller the block, the easier it is to see from one junction to the next in all directions. In addition, there is public transport accessibility to Peace Avenue as shown in Figure 53.

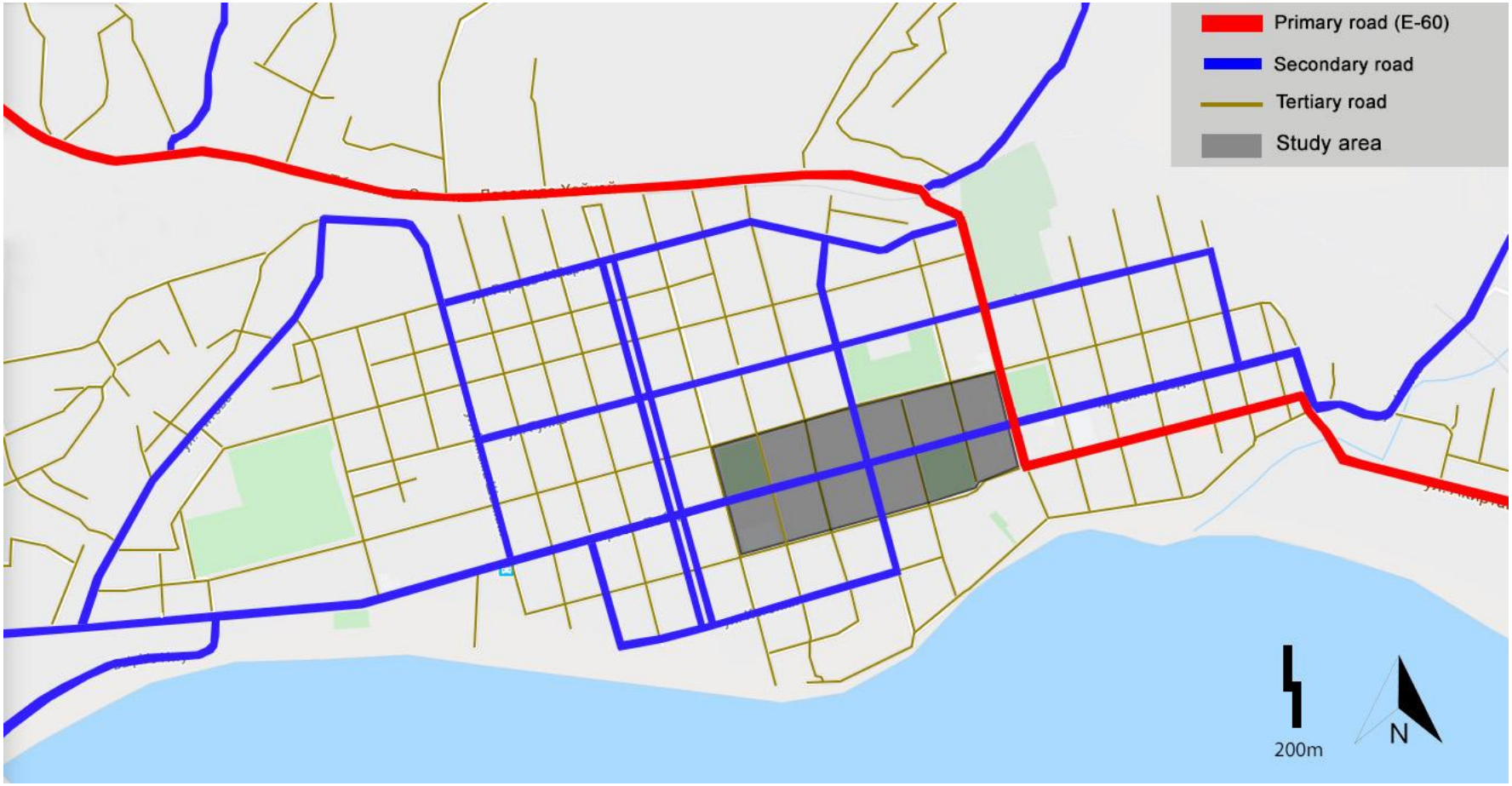

Figure 52: The existing road structure of Sukhum city

Figure 53: Accessibility in Peace Avenue

Above all, access for disabled people elderly, small children in strollers, pregnant women are also another necessary aspect of accessibility in the street. These play an important role to create more lively streets and they improve them as social spaces in urban areas; which accordingly should provide accessibility and permeability for all kinds of models of transportation for all ages. Nevertheless, according to personal observation, Peace Avenue has some issues within this regard. Existing poor conditions of sidewalks along Peace Avenue, no special technical equipment for blind people, no pedestrian crossings on some roads, and no traffic lights restrict the freedom of smooth movement for pedestrians. The street is not equipped with ramps; and even in Aiaaira Park, where they insufficiently exist, cars standing on the street close the access to the ramps as shown in Figures 54 and 55.

Figure 54: Poor condition of sidewalk.

Figure 55: Closed access to the ramp.

3.5.2 Mix Land Uses in Peace Avenue

The presence of historical buildings should fill Peace Avenue with a culturally enlightening function. However, the main functions and concentration of buildings

forming the appearance of the environment are commercial. The saturation of this space is a business and a commercial enterprise on the first floors whilst residential apartments on the second and third. Different types of residences host many people including locals who have been living for decades and mainly elderly people. Peace Avenue has recreational areas, which are Voronov Park, Aiaaira Park, and Pushkin Park. Although the main function of the street is providing transit through the historical center, it lost its function in 1866 and has been used as parking spaces instead.

Figure 56: Small flea markets on the street.

Nowadays, buildings on the street are filled with functions as: retail, community centers, institutional, housing, and offices. For example, clothing stores, small flea markets on the street, postal office, bank, mobile offices, cassette store, drapery store etc. However, despite the wide range of variable building functions, according to the

survey, an insufficient number of functions were identified following the modern needs of people. These critical missing functions include culture and entertainment, places of public catering, and social hubs which will aid in reflecting the social diversity of the space.

Figure 57: Violence of the appearance of the historic street.

Moreover, according to the conducted survey, Peace Avenue consists of functions that have lost relevance over time. Based on research, more dominant commercial functions and lack of culturally entertaining functions is noted. To clarify, Peace Avenue is used as a pedestrian transit but not as a place of gathering and entertainment. Also, the parking function on the street limits and negatively affects the comfort and safety of people. Another issue is that existing owners of commercial enterprises do not monitor the image of the historical environment and rather violate the appearance of the historic city center; because they make window replacements, put air conditioners, banners, materials, and painting of buildings that do not fit to the heritage of the environment (Figures 57, 58)

Figure 58: Violence of the appearance of the historic street.

Thus, according to the survey, only 2.3% of respondents evaluated the variety of functions along Peace Avenue positively, while other 22.7% took a neutral point of view, and 75% of users were dissatisfied with the variety of functions in the street.

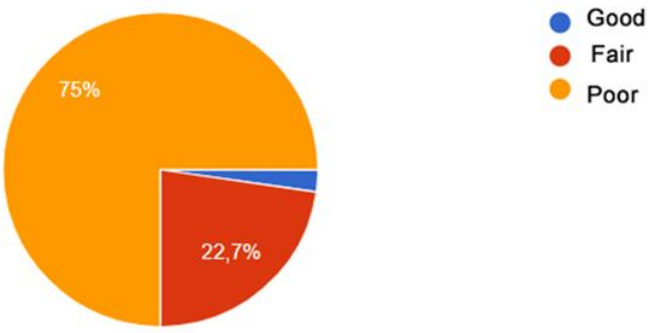

Figure 59: Rating of the level of functions on the street

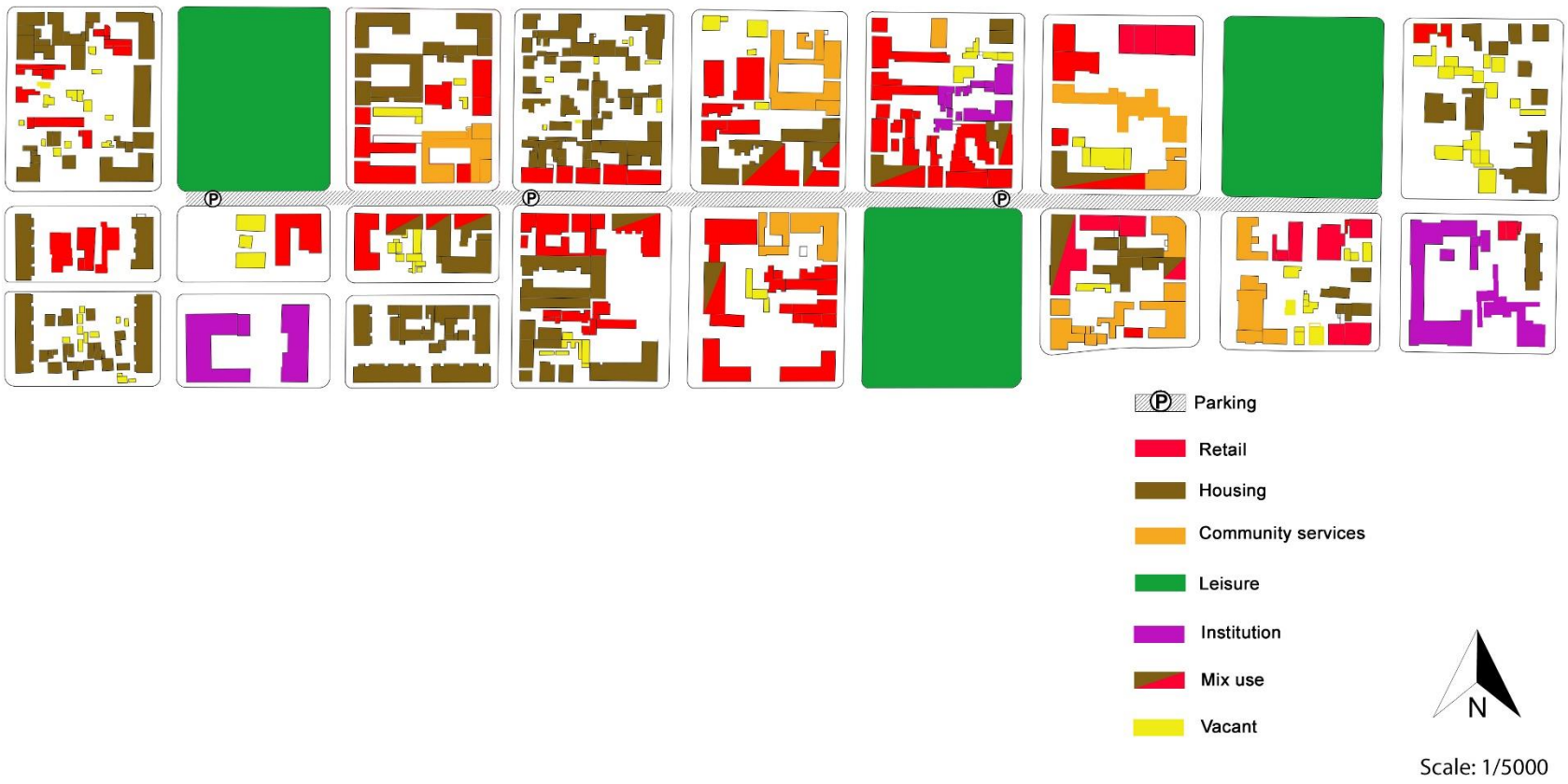

Figure 60: Land use map in Peace Avenue

3.5.3 Legibility of Peace Avenue

Peace Avenue was analyzed according to Lynch by the availability of edges, nodes, paths, landmarks and districts. According to Lynch (1960), if any landmark has a clear form that clearly contrasts with its background, and has a crucial location: then it can be considered important. Thus, in Peace Avenue's 5 landmarks, 3 out 5 are parks. While the other 2 are classified as the highest and most recognizable buildings in the street: «Clockes» and house of Stefanidi (Figures 61, 62). Furthermore, the main edges of the street are formed by the red building lines and the parks created along the Peace Avenue to identify its borders clearly.

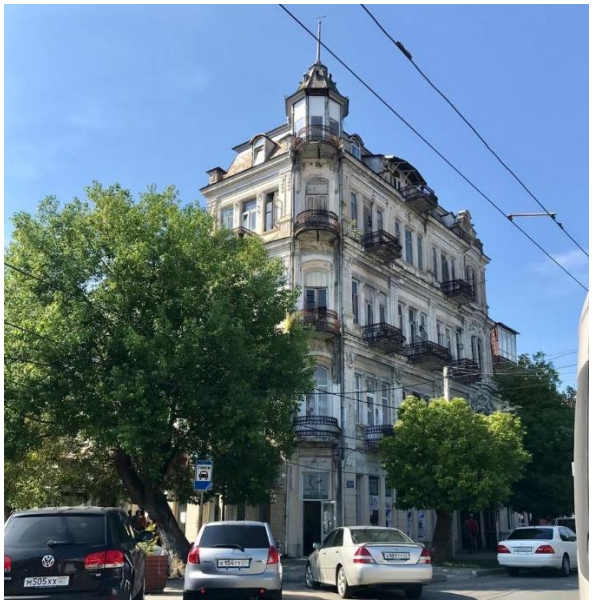

Figure 61: House of Stefanidi.

Figure 62: Clocks building.

Another point to mention will be categorizing the sea close by as a natural edge. Similarly, paths are all roads including a main highway, secondary and tertiary roads, as previously discussed. The intersection of streets forms the main transport nodes. To explain, there are two main nodes that cross Peace Avenue on Leselidze street, the main highway (E-60), and the secondary road on Sakharova street.

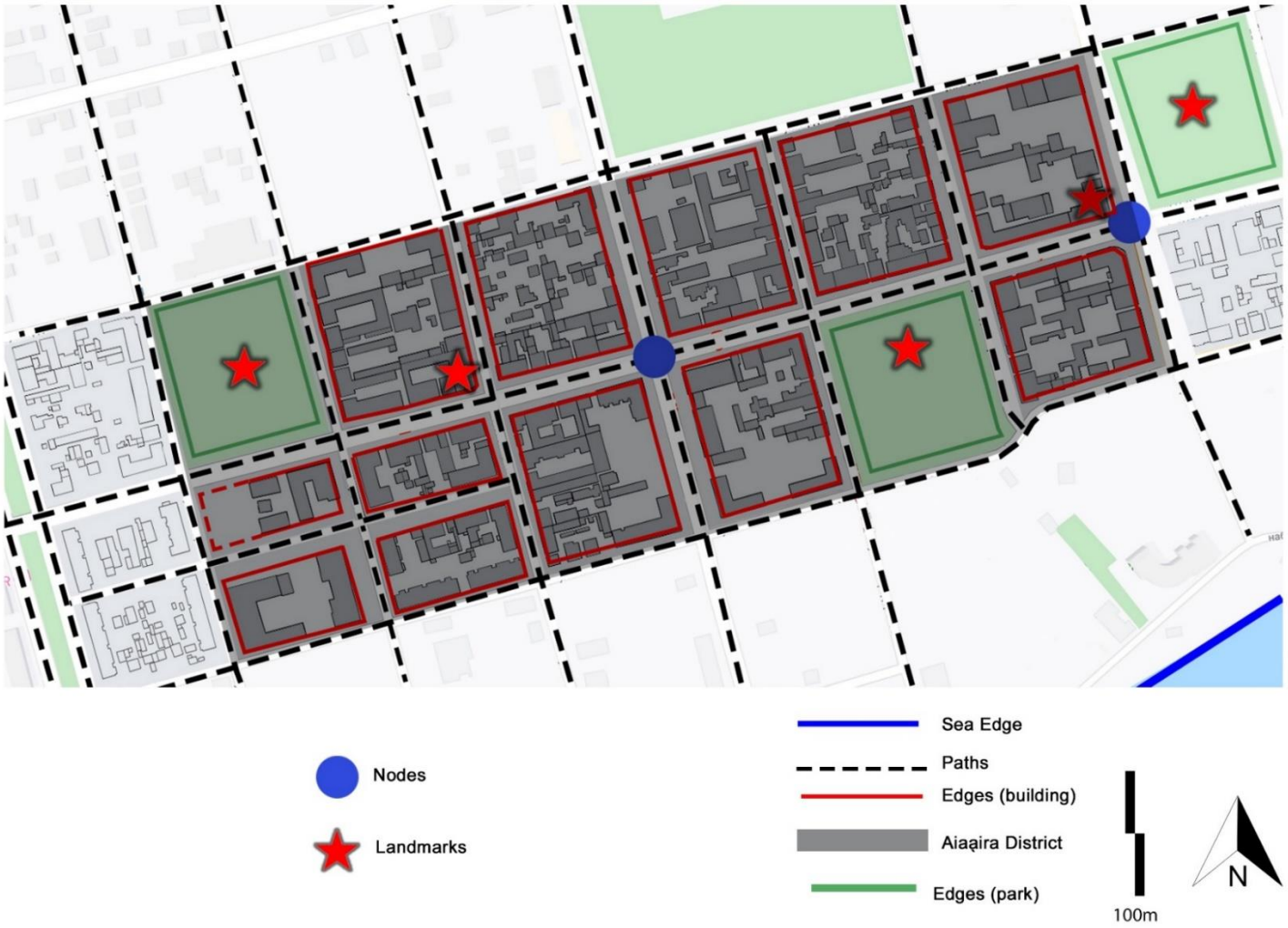

Figure 63: Legibility of Peace Avenue

3.6 Analysis of the Social Factors of Peace Avenue

Peace Avenue has been analyzed in terms of safety, comfort, culture and sense of belonging.

3.6.1 Comfort and Safety along Peace Avenue

Being comfortable, feeling safe and at ease are the qualities of a livable space that will attract people using the street and make them stay. The experiences of the street users can be used to evaluate the level of comfort in the street and indicate the degree of social interaction within. As a result, the scrutiny of the comfort of the public users can be studied through a well-balanced analysis of both the physical and the social attributes contributing to the experiences and the perceptions respectively. With this in mind, the physical factors in coordination with elements such as greenery, shading spaces, street furniture, lighting elements, and universal equipment assure the establishment of a well-defined and simultaneously comfortable environment to be around.

At the same time, the safety of the street users becomes crucial when discussing the comfort that comes along. To further explain, the social threatening aspects like lack of security, minimal police inspections, and the deficiency of public safety highlight the significance of their existence. To elaborate, several reasons for feeling unsafe on Peace Avenue can be noted through a lack of 24 hours activities and functions on the street since the commercial sectors close by 7pm and the poor street lighting conditions at night in some areas, limits the density of people and families. Therefore, which at night time, the street becomes a gathering spot for different gangster groups, and certain crowds of dangerous individuals triggering a threatening ambiance across the avenue. Not to mention, this hazard and intimidation provokes the parks to be

uninhabitable by people and various users at night. Moreover, nowadays the level of crime on Peace Avenue is high. Besides, according to the survey conducted of 100 respondents, 20.5% of the respondents evaluated the comfort of Peace Avenue to be good, while the other 40.9% responded as neutral, and the rest of the 38.6% evaluated it as uncomfortable.

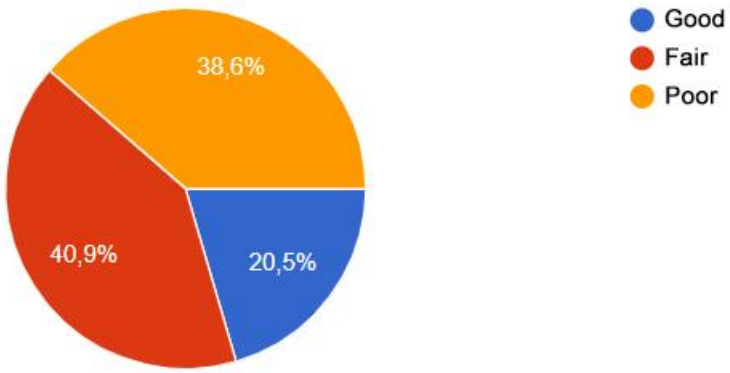

Figure 64: Rating of the level of comfort and safety along the street.

In short, the physical and social attributes go hand in hand rather than individually to enrich the comprehensive comfort experience and guarantee the ease and satisfaction of one's safety perspective.

3.6.2 Culture and sense of belonging on Peace Avenue

Peace Avenue has deep historical roots, starting the history as a bazaar and transforming during the time, to become the main commercial street in Sukhum city in the Soviet time. Though, during the time, most of the functions of that period have lost their relevance, yet the historical environment and existing architecture heritage give a strong identity and sense of belonging to people. The buildings such as: Administration building, prior Café «Palas» and current «Burger King», the house of Stefanidi, prior Building of furnished rooms «Europe» and current «Detski Mir» bring

the cultural identity to the street and thus the sense of belonging particularly to the citizens. However, concerning the socio- cultural activities on the street, there are only few events such as National Victory Day and National Flag Day when locals wear traditional outfits and walk along the Avenue (Figure 65).

Figure 65: Celebration of the National Flag Day.

Another concern involves the daily lack of cultural activities since there is only one routine found, where locals can sit in parks and watch people passing by. The activities like live theater and music, movie nights, a farmers market, public art, restaurants do not exist on Peace Avenue. In addition, according to the survey, 20.5% of the respondents evaluated the cultural activities to be good, while the other 27.3% responded as neutral, and the rest of the 52.3% evaluated variety of cultural activities along the street as poor.

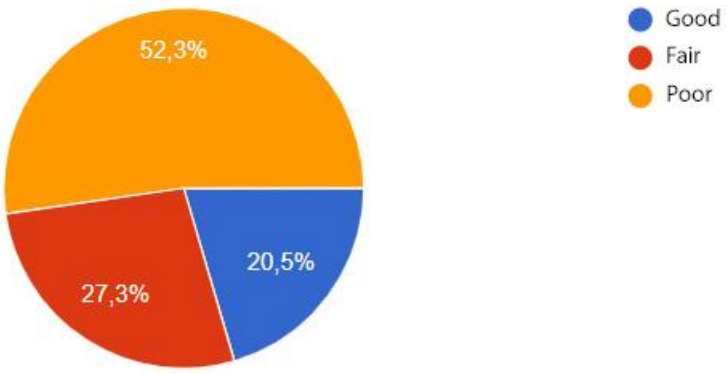

Figure 66: Rating of the level of cultural activities.

SWOT

Chapter 4

CONCLUSIONS AND RECOMMENDATIONS

Literature survey on the walkability concept revealed that streets have a significant responsibility to be accessible to all, to be functional, safe, and to act as attractive places to walk. Historic Urban Quarters (HUQ) by their historical and cultural association provide a strong sense of place and identity to the area. However, in recent decades, many historic centers around the world have been focusing on a diversity of issues such as rapid rising number of private cars, negligence of pedestrian-friendly routes, lack of appropriate activities, poor accessibility, and an absence of functions that attract people to the place.

In the first chapter the problem statement, aim of the research, methodology and limitations are pointed out. The aim of the research focused on determining the significant features affecting walkability in HUQ, in specific to the historic urban core of Sukhum city, and to what degree the Peace Avenue in Sukhum is presently walkable. The study was based on a mixed research method both qualitative and quantitative including related literature from primary sources like books and articles, and secondary sources such as internet sources. The study area was limited from Dbar to Leselidze streets, Sukhum, Abkhazia.

In chapter two of this study, the main concept and general definition of pedestrian-friendly streets and HUQ are explored, where the relationship between walkability and

street design, street design in HUQ, and the components of walkable street are described in detail. Tangible and intangible features of walkable street are analyzed according to physical, functional and social factors that form pedestrian-friendly streets.

In chapter three, Peace Avenue in Sukhum city is taken as the case study, and the walkability was measured by focusing on physical, functional and social factors. In addition, the questionnaire survey was conducted with 100 people some of whom lived in Sukhum and some tourists. By recording the result of each indicator by the criteria of measurement, it is revealed that the walkability factor cannot be classified entirely as pedestrian-friendly due to problems associated with sidewalks, comfort, safety, street furniture, variety of uses and lighting conditions. Hence, in line with the street problems underlined, some recommendations are proposed to increase the walkability on Peace Avenue.

Recommendations:

The obtained data has clarified that some improvements and changes are needed to implement a pedestrian-friendly environment along the street. Thus, to increase the walkability level in Peace Avenue, the following recommendations and suggestions should be taken into consideration; which can be grouped under 3 main factors: physical, functional and social.

Physical Factors:

• Redesign pavements and ramps and propose special materials for physically and visually disabled people

• Provide proper tree pits

• Increase the variety of vegetation along the street including shrubs, bushes and other forms of vegetation to create safer pathways for pedestrians.

• Enhance the existing lighting conditions by providing well-lit streets so that streets can function 7/24.

• Provide benches and seating elements as well as bicycle racks, flower stands, kiosks, public art, trash receptacles, road bumps and improve the conditions of light poles.

Functional Factors:

• Prohibit car parking along Peace Avenue

• Pedestrianize the existing parking area along Peace Avenue from Dbar to Leselidze streets to make it more convenient, safe and walkable

• Offer alternative car park areas in close proximity

• Provide alternative housing opportunities for a variety of users

• Maintain the unique building facades by keeping them user friendly and harmonize shop and street signs

• In introduce sidewalk cafes to help encourage pedestrian exploration

• Orient buildings to street and remove parking in front of them

• Organize uses to support public activity

• Increase the variety of functions in the whole area to invite diversity of users to come to place and keep it walkable and active.

• Improve and propose cultural activities and entertainment, places of public catering, social hubs, and proposing some places for social interaction that will aid in reflecting the social diversity of the space.

• Offer alternative modes of transportation facilities such as cycling ways in the area to attract variety of people to come

• Encourage and promote municipality to use the proper materials for the buildings to reach the proper textures in area and emphasize harmony in historical facades.

• Propose semi-open spaces for social communion and interaction

• Preserving the historic buildings in the area to keep the characteristics and identity unique.

• Revitalizing the area by giving new functions

• Keep the image of the historical environment and appearance of the historic city center in appropriate conditions

Social Factors:

• Increase the safety of pedestrian paths to increase the walkability and livability level in the area 7/24.

• Increase 24 hours activities and functions

• Promote security, police inspections, and special security equipment

• Propose cultural activities such as open theater, movie nights, a farmers market, public art, street entertainers, shops, and restaurants along the street.

All these suggestions and recommendations may contribute to walkability in the area and make Peace Avenue more pedestrian-friendly. Based on the evaluation of walkability functions, it is revealed that, for measuring the walkability in the area, all features and indicators (physical, functional and social) have to be taken into consideration and evaluated repeatedly, in order to reach the walkability in the area.

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APPENDIX

Questionnaire

In following, there is the three pages of questionnaire that was conducted with 100 persons. The answers of the questions are used within the chapter three.

Survey on walkability factors on Peace Avenue

Dear Respondent

As part of the Urban Design Master's Program of Eastern Mediterranean University, I am conducting a research survey for exploring the users' evaluation of walkability factors, which positively improve the livability and sustainability in Sukhum city. Your kind participation is highly appreciated. This survey is anonymous; the data obtained will be presented as general conclusions. If you have any query, please contact me.

Thank you in advance for your time and support.

PART A:

1. Gender?

☐ Male ☐ Female

2. What is age group?

☐ 18 to 27 ☐ 28 to 37 ☐ 38 to 47 ☐ 48 to 57 ☐ 58 to 67

3. Educational Level?

☐ Primary school ☐ Middle School ☐ High School

☐ Junior technical college ☐ University

4. Marital Status?

☐ Single ☐ Married ☐ Divorced ☐ Widowed

5. Are you

☐ Local ☐ Tourist

6. Are you dominantly a

☐ Driver ☐ Pedestrian ☐ Public transfer user

7. How often do you walk on Peace Avenue?

a) Every day

b) Once in a week

c) Twice in a week

d) Once in a month

8. What time of the day do you prefer to walk on Peace Avenue?

a) Morning time

b) Noon time

c) Evening time

d) Night time

9. What time of the year do you mostly prefer to walk on Peace Avenue?

a) Winter time

b) Spring time

c) Summer time

d) Autumn time

10. Which of the criteria below expresses your walking purpose along Peace Avenue?

a) Leisure

b) Sport purposes

c) Shopping purposes

d) Sightseeing

11. How often do you do sport activities on Peace Avenue?

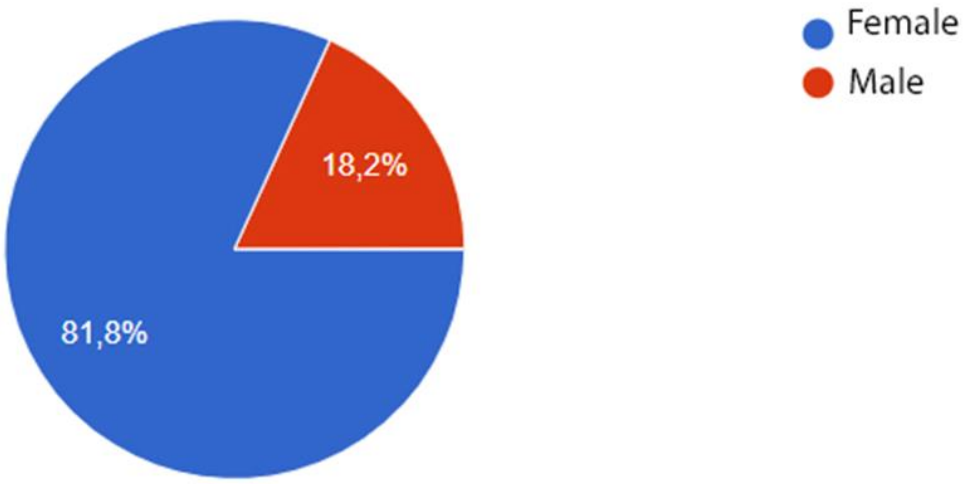
a) Every day

b) Once in a week

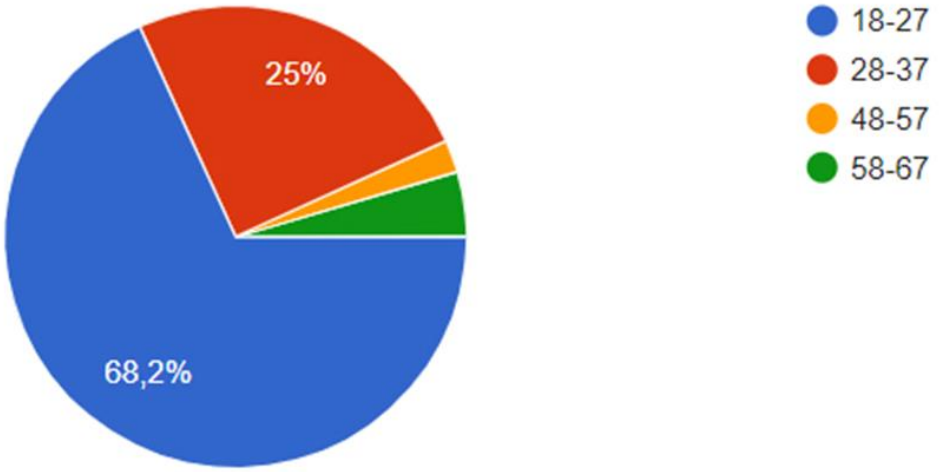
c) Once in a month

d) Never

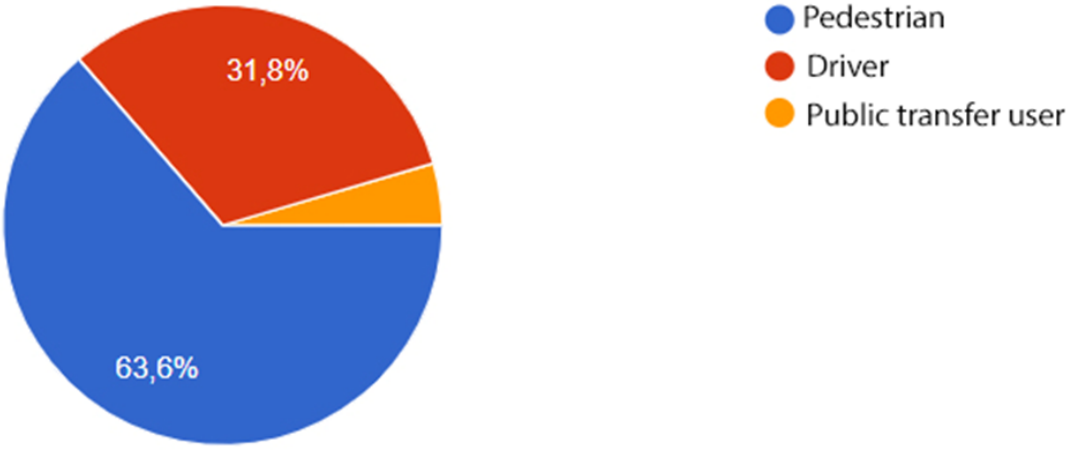
What gender are you?



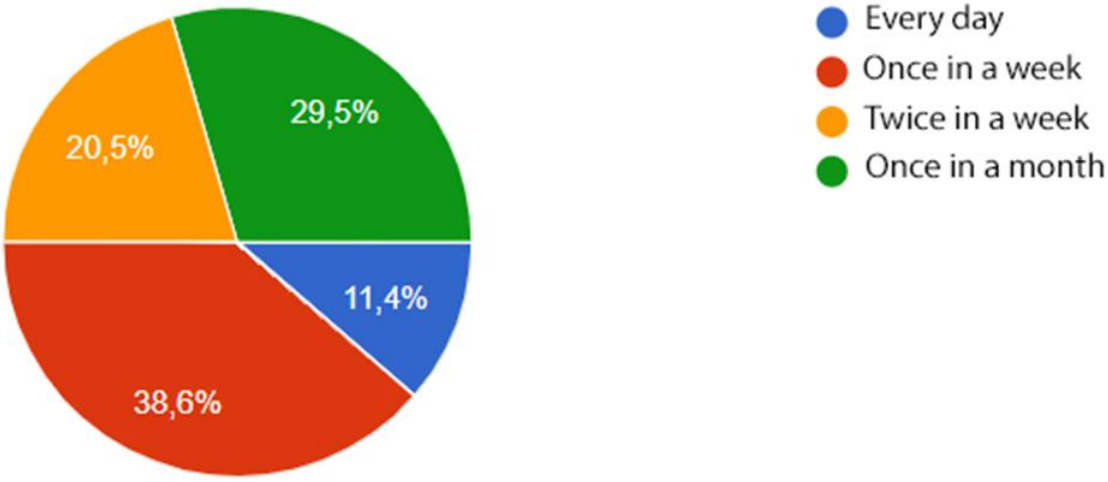
What is your age group?



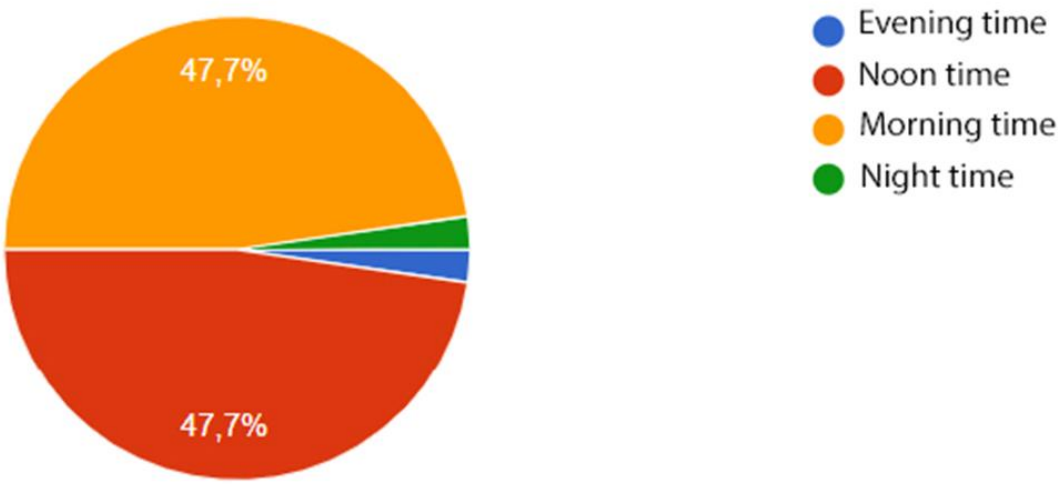
Who are you dominantly



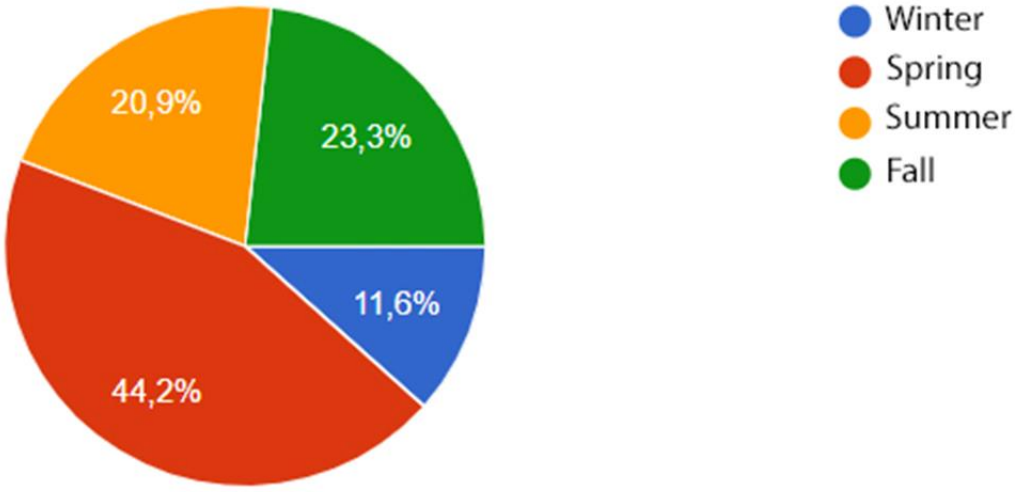
How often do you walk on Peace Avenue?



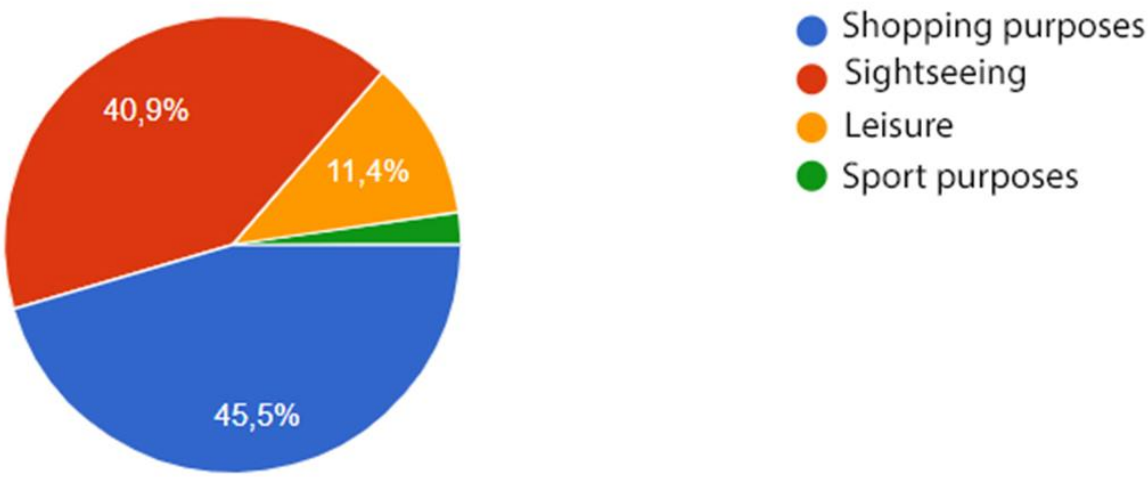
What time of the day do you prefer to walk on Peace Avenue?



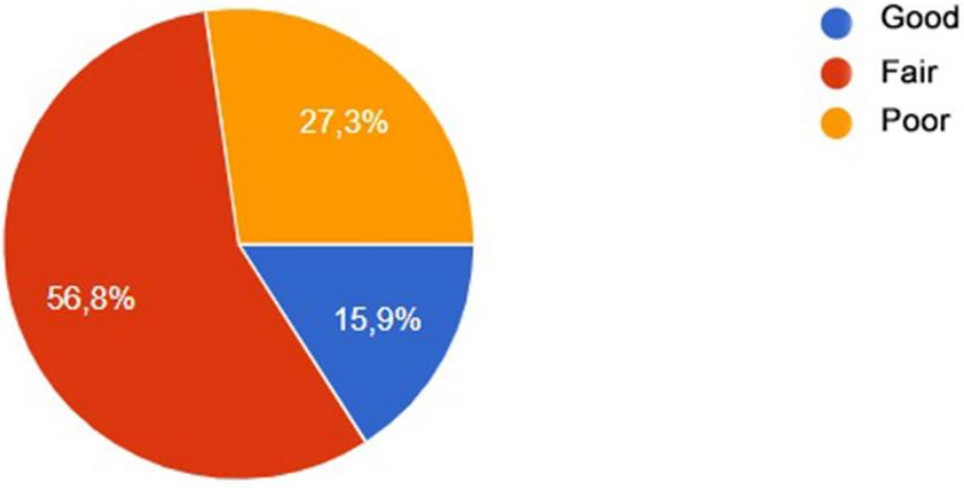
What time of the year do you mostly prefer to walk on Peace Avenue?



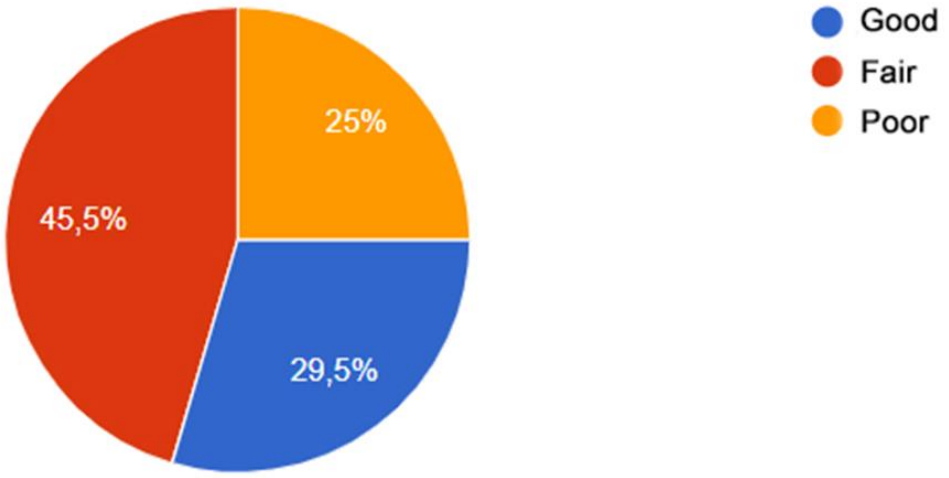
Which of the criteria below expresses your walking purpose along Peace Avenue?



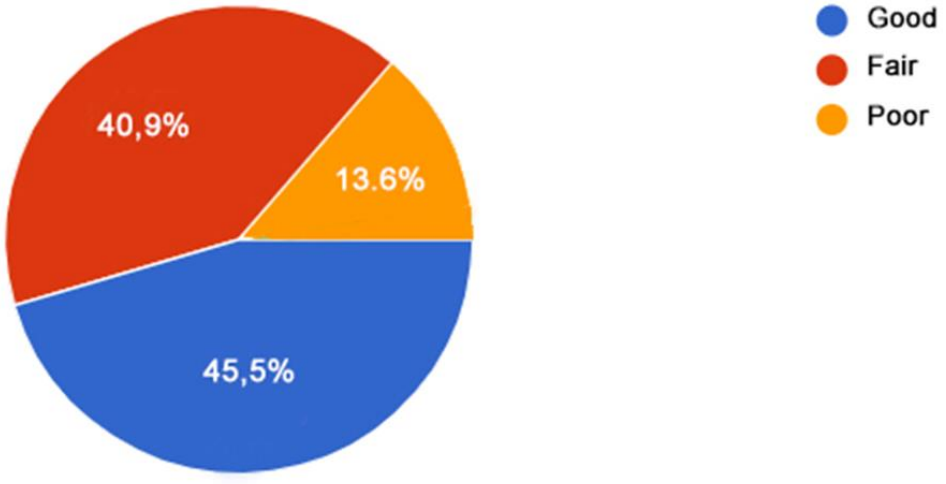
How can you assess the quality of sidewalks along Peace Avenue?



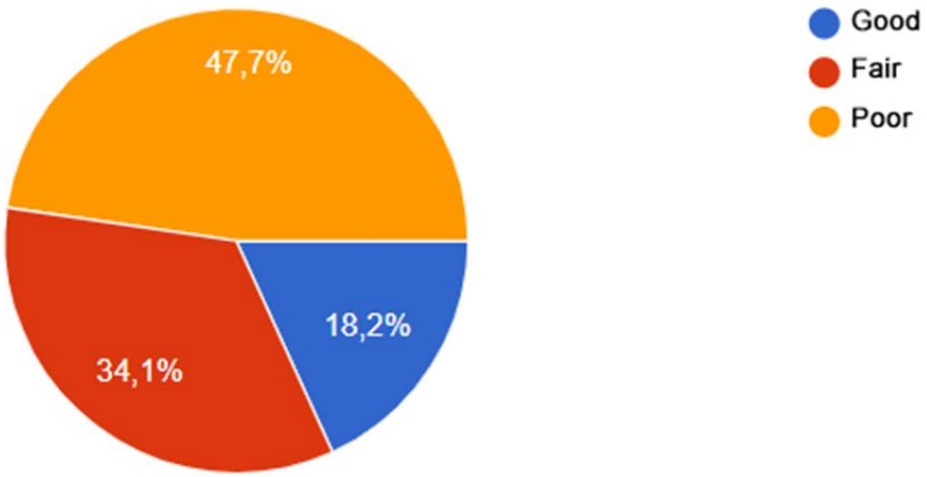
How do you assess the amount of green area and landscaping along the street?



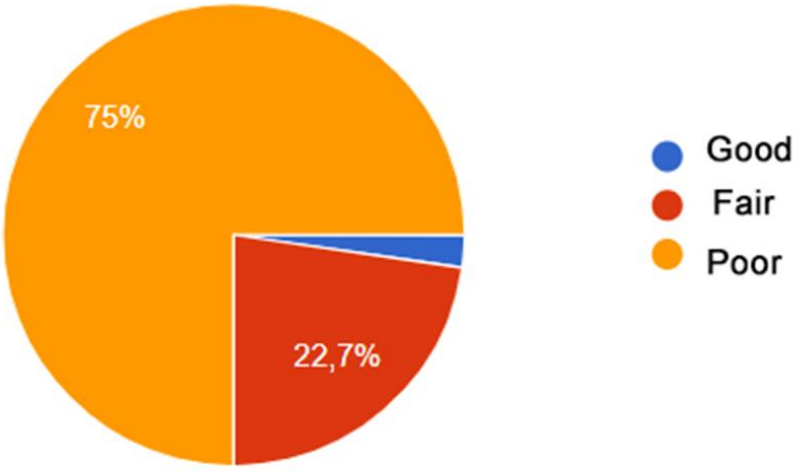
How do you assess lighting conditions on Peace Avenue?

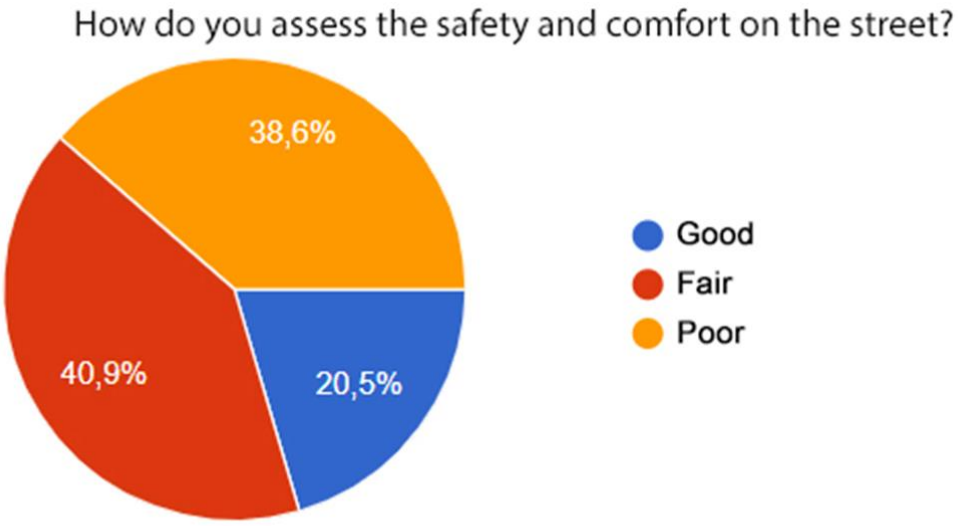


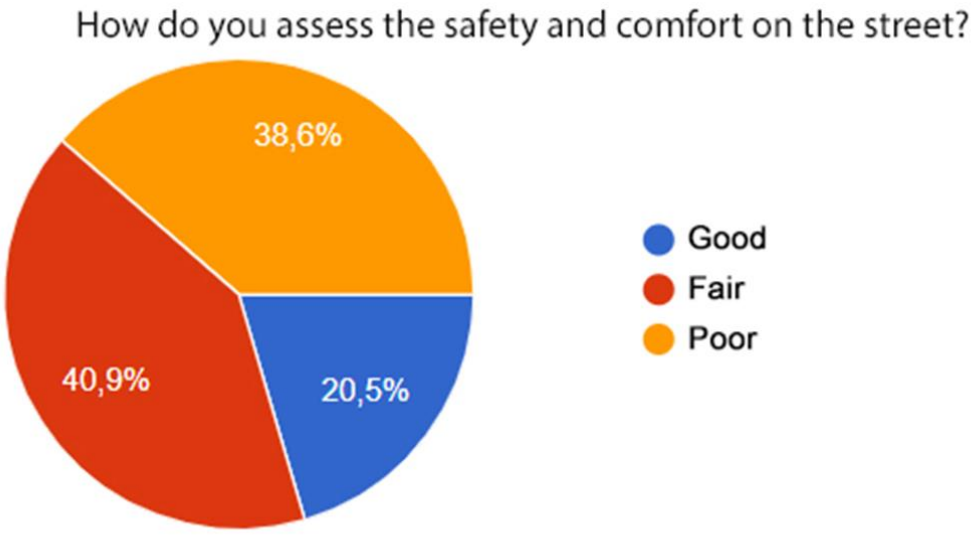
How do you assess the street furniture along the street?



How do you assess the existing functions along the street?




How do you assess the safety and comfort on the street?
38,6%
40,9%
20,5%
Good
Fair
Poor


How do you assess the safety and comfort on the street?
38,6%
40,9%
20,5%
Good
Fair
Poor

Chapter 1

INTRODUCTION

Streets, parks, and squares are the most memorable public spaces in cities, where people, primarily, congregate on foot. These places make towns and cities livable, vital and unique. Additionally, streets have a significant responsibility to be accessible to all, and to be functional, safe, and attractive places to walk. As Lynch (1960) indicates, streets are one of the most important elements by which people mentally derive an image of a city, and are the basic unit of analysis through which most people interpret a city. Streets are an important part of the public space of a city and offer "an essential counterpoint" to the private spaces of the city, providing "the channels for movement, the nodes of communication, and the common grounds for play and relaxation" (Carr et al., 1992). Public spaces are often seen as a retreat from the chaos and noise of the urban environment. On the other hand, they can also be destinations to experience urban life, rather than retreat from it. Connection with other people is an important part of public space, ranging from the passive interaction involved in people watching to more active interactions with friends and acquaintances.

However, today, the urban streets, which form an essential part of urban life are in danger because of the rapid rise in car-ownership, increase in population level, inefficient transportation system, poor quality urban design etc. The proliferation of motorization leads to an increase in traffic congestion, environmental deterioration and traffic accidents. In most of the cities there is no space specifically assigned for the

use of pedestrian paths, there is poor enforcement of traffic movement or parking laws and lack of green or attractive installations. The safety of pedestrian deteriorates as motorized transportation increases.

Pedestrianization is one of the effective alternates to mitigate the negative aspects of motorization. Pedestrianization implies the non-motorized mode of travel, which includes pedestrian movements, bicycles, and animal drawn vehicles. Non-motorized modes use available human and animal energy, which are non-polluting, safe and user friendly. In addition, pedestrianization helps to foster businesses in small scale enhancing economic growth. For instance, European cities by the late 1950s were also suffering from an increase of motorized congestion, air pollution and a decrease in the state of the urban fabric. Consequently, private vehicles were forbidden from entering to the historic core, which was characterized by narrow streets. After 1970s a movement started in Europe to separate public spaces from the cars. Thus, by the mid 1975s, many European cities banned vehicles from historic urban quarters. As a result, public areas were revitalized and cold and dormant cities become walkable and alive (Vanderschuren, 2008).

Walking is perhaps the most fundamental mode of transport for short distances. In fact, an environment that contributes walking to –work, school, and stories is considered a better place to live, furthermore, they have a higher level of social cohesion, real estate and finally, they promote healthier lifestyles (Galston, 2017). High quality and well-designed streetscape have a direct impact on the character and identity of the downtown area, and it creates a “sense of place”, creating a good appearance and

image for the community. In general well-designed streets with appropriate lighting elements, street furniture, large spaces for public events and social interaction and

appropriate parking space, invite a diversity of users and create livability in the area (Adler, 2005). Since this study focuses on historic urban quarters (HUQ), it should be mentioned that HUQ by their historic and cultural associations, provide a strong sense of place and identity to the area. HUQs are unique places not only due to the cultural heritage they possess but due to their urban pattern. Nowadays, HUQs are in danger of losing their traditional character if relevant measures are not put in place to ensure the continuity of their character (Doratli, 2000).

Based on the background information provided above, the study aims to determine what the significant features affecting walkability in HUQ are, in specific to the HUQ of Sukhum city in Abkhazia. This research involves an exploration of walkable street features and Peace Avenue and its current challenges related to walkability and how it can be improved to have a place where a diversity of pedestrian activities are welcome to occur – an environment that is accessible, safe, comfortable, and enjoyable for pedestrians. The study concentrates on the Dbar to Leselidze streets where the level of walkability within the context of physical, functional and social factors will be analyzed. The current street design of Peace Avenue presents unique challenges. The allotment of space within the public rights prioritizes car parking in the middle of two sidewalks over other uses, such as pedestrian travel. Peace Avenue also has few remaining historical streetscapes along the street edges, and much of the neighborhood's built form is dominated by surface parking lots.

1.1 Problem Statement

In recent decades, many historic centers around the world have been focusing on a diversity of issues such as rapid rising number of private cars, negligence of pedestrian-friendly routes and lack of appropriate activities, poor accessibility and, absence of functions that attract people to the place. Thus, these issues have an effect on the ability to walk in HUQ by increasing noise and decreasing safety in the environment. As a result, the HUQ is not able to fascinate and attract people and citizens leading to diminishing and private sector investment. Similar to many HUQ around the world, Peace Avenue, the traditional center of Sukhum city, has been facing the same issues, which adversely affected its walkability. Peace Avenue, which consists of numerous architectural monuments of the 19th and 20th centuries, has been suffering from crowded parking places along the street, air pollution, noise, unsafety, etc. caused by a rapid increase in private vehicles especially in the last decade. The historic urban core is increasingly becoming car-oriented and moving away from being people-friendly, leading to a confrontation between vehicles and people as well as affecting the walkability along the street. Furthermore, Peace Avenue is designed in a manner that is unfriendly towards disabled people as well as cyclists. Thus, there are certain physical, functional and social problems, which point out a lack of walkability in the selected historic urban core. Nevertheless, Peace Avenue has the potential to change into a pedestrian-friendly street. In order to have pedestrian-friendly street, a number of social and recreational functions should take place on the street, without being interrupted by cars. Thus, this research necessitates the thoughtful consideration of what is physical, functional and social attributes of the pedestrian-friendly street.

1.2 Aim of the Study and Objectives

The research aims to determine the significant features affecting walkability in HUQ, in specific to the historic urban core of Sukhum city, and to what degree the Peace Avenue in Sukhum is presently walkable. In light of this target, the study will discuss the importance of walkable street design as an essential criterion for improving the quality of social life. Secondly, the study will focus on proposing recommendations for future development and transformation of Peace Avenue, aimed at the development of a pedestrian-friendly environment in HUQ. These recommendations take into account the characteristics of the pedestrian-friendly street, may be considered in the discussions of proposals for the development of the street to improve the practice of urban street design in HUQ.

Objectives

-To define the concept and significance of pedestrianisation in HUQ in context of urban street design.

-Researching and analyzing the existing walkability features in urban street design literature aimed to develop pedestrian-friendly environment.

-To identify the existing challenges in Peace Avenue in Sukhum regarding to walkability factors and propose possible transformation features.

1.3 Methodology of the Research

This study is based on a mixed research method both qualitative and quantitative methods including related literature from primary sources like books and articles, and secondary sources such as internet sources. The main sources are: Gehl, Cities for people (2010) and Bentley, Responsive environments (1985). First, the literature review provides an understanding of pedestrian-friendly street design, why pedestrian-

friendly design is important in historic urban quarters, factors that affect walkability. Secondly, a site assessment based on observation determines to what extent Peace Avenue is currently walkable. Finally, after reviewing the data from the site assessment, questionnaires with a selected number of locals (80%) and tourists (20%) are done to understand the problems, consequently a SWOT analysis will be presented, based on the survey with locals, maps and personal observation. Finally, based on the SWOT analysis, the recommendations and possible interventions would assist the area in becoming more pedestrian-friendly.

1.4 Limitation of the Thesis

The study investigates walkability in historic urban quarters, in specific to Peace Avenue in Sukhum, and factors that affect walkability in HUQ. The study area is limited from the Dbar to Leselidze streets. The study will focus on street features of the pedestrian-friendly environment where various attributes of the walkable street will be analyzed in terms of physical, functional and social factors. However, other criteria such as economical and political reasons will not be covered in this thesis.

1.5 Structure of the Thesis

Table 1: Flow chart showing the methodology of the thesis

Introduction		
Problem Statement		
Aim and Research Objectives		
Methodology of the Research		
Limitation of the Research		
↓		
The Significance of Pedestrianization in HUQ		
Revitalization in HUQ		
Street Design in HUQ		
Understanding the factors affecting walkability		
Physical Factors	Functional Factors	Social Factors
↓		
Case Study: Peace Avenue, Sukhum		
Data Collection		
Site-Observation	Survey:Questionnaire + Focused interview	
Physical Analysis Functional Analysis	Social Analysis	
↓		
Findings and Resulting of all Attributes of Peace Avenue		
SWOT Analysis		
Conclusions and Recommendations		

Chapter 2

THEORETICAL FRAMEWORK

2.1 Understanding the Significance of Pedestrianization in HUQ

Since the thesis aims to determine the significant features affecting walkability in HUQ, this section focuses, generally in historic urban quarters (HUQ) and the importance of pedestrianization in HUQ.

Since the late 1980s, historic urban quarters (HUQ) have emerged as a focus of many conservation and regeneration efforts. HUQs, which are mainly located in the central part of cities, due to their locations and in some cases lack of historic preservation plans, these areas, are in danger and risk of obsolescence and destruction, which generally affect livability in these areas (Doratli, N. 2000). Clearly, these are important areas of cities, which have an endowed identity and character, that over the years usually lost economic viability due to diminishing variety of activities and increase of car-oriented transportation. On the other hand, sense of place in historic urban quarters is the most important quality drawing people to these areas. In this context, Lowenthal (1981), interprets the sense of place as a continuing narrative involving past, present, and future. What is important, therefore, is how they change and whether the changes develop and respect the sense-of-place or actually destroy it. Many places have, nonetheless, retained their identities through significant social, cultural and technological change and, although subject to constant change, some essence

of an urban place's identity is retained. In practice, cities such as Copenhagen and Malmo show that the revitalization in historic areas has a positive effect and impact on walkability, community and environment. It has positive effects on local citizens, which creates various functions and jobs. Focusing on the human scale in designing urban areas, Gehl (2010) discusses the main principles of livable city spaces. According to him, the human scale is the most important factor in designing cities and urban spaces. He believes that many of the pedestrianization projects in the historic city centers are only performed based on the tourism development objectives. He explains that pedestrian zones are the best spaces for communication and interaction between people, architecture, and spaces. He indicates that the best examples of human spaces can be found in areas where car traffic is limited. He believes that a pedestrian zone will give a positive impact on walkable activity in the city and provide more options for people to interact with their environment; while on the contrary, using vehicles makes them have less contact and communication with each other and their city (Gehl, 2010).

A pedestrian zone is a part of the urban space, which due to some specific reasons, is dedicated to the pedestrians where automobiles are banned to enter at all or during some hours in a day (Galston, 2017). The process of converting a street to a pedestrian zone is called pedestrianization. According to Chiquetto (1997), pedestrianization can provide better accessibility and social interaction with the urban areas for the local communities.

Based on the introduction of the significance of pedestrianization in HUQ, the following section focuses on the street design in HUQ.

2.2 Urban Revitalization in Historic Urban Quarters

Many cities have quarters that confer on them a sense of place and identity through the historic and cultural associations they provide. They are often an integral part of the city's charm and appeal and their visual and functional qualities are important elements of the city's image and identity (Bachour, 2005). The qualities of such quarters have not always been appreciated and valued. As not all such areas can become museums or museums environments, there is a need for their revitalization as functioning parts of their city. Revitalization has focused on attempts to generate sufficient economic development to provide the finance necessary to conserve, maintain and enhance the quarter. All urban areas undergo change but historic urban quarters have to cope with change in their economic fortunes while change in their physical landscapes is restricted and controlled in the interests of conservation (Bachour, 2005). Revitalization is the process through which the mismatch between the services offered by the fabric of the historic quarters and the contemporary needs can be reconciled (Tiesdell et al., 1996).

Nowadays revitalization is often defined as a comprehensive effort including restoration, reconstruction, modernization and actions aimed at the revival of a building, a district or a town devastated in different aspects, also the economic and social ones. The social aspect is among the most significant ones. In other words, there is no complete revitalization without solving social problems (Raszkowski, 2017). Revitalization activities assume taking optimal advantage of a particular territorial unit values and strengthening its local potential, including social and cultural aspects. Revitalization usually represents a long-term process, carried out by the stakeholders in a given area, including also local authorities, NGOs, entrepreneurs and performed

in cooperation with local community. Vileniske (2014), states that the term of revitalization can imply physical and social, cultural and economic dimensions. The idea of revitalization is to balance the current rapid development in urban areas through the conserving urban identity, culture and traditions. Furthermore, the revitalization program can create job opportunity to increase peoples' income, preserve natural resources, provides suitable urban amenities and facilities for the user. In need to understand the significance of revitalization in historic urban quarters and the impact it creates on walkability due to the pedestrinization opportunities it offers, a few selected examples from the European Union will be looked at follows.

2.2.1 Ghent, Belgium

The city of Ghent has a complex structure reflecting a long evolution dating back to the Middle Ages when it was the second most important city in northern Europe after Paris. The city center covers a large area with no central focus; instead it comprises many squares and narrow streets, with the River Leie running through its center. During the 1980s, the city center suffered the impacts of increasing car traffic, including congestion, air pollution and noise. Air and water pollution was degrading historic buildings and monuments in the city center. Public transport had little or no priority and conditions for cyclists and pedestrians were deteriorating. Although accident levels were not excessively high, there was a growing general perception of a lack of security. The city's streets and squares, designed over the years to accommodate car traffic, were becoming increasingly unattractive. However, in 1997 Ghent implemented the mobility plan in the city center with the aim of addressing the problems of excessive car traffic which dominated the city's streets and squares. The plan involved the closure of the city center to all through traffic, as well as a number

of traffic management strategies to provide essential access and improved public transport, cycling and walking facilities (Reclaiming city streets for people, 2013).

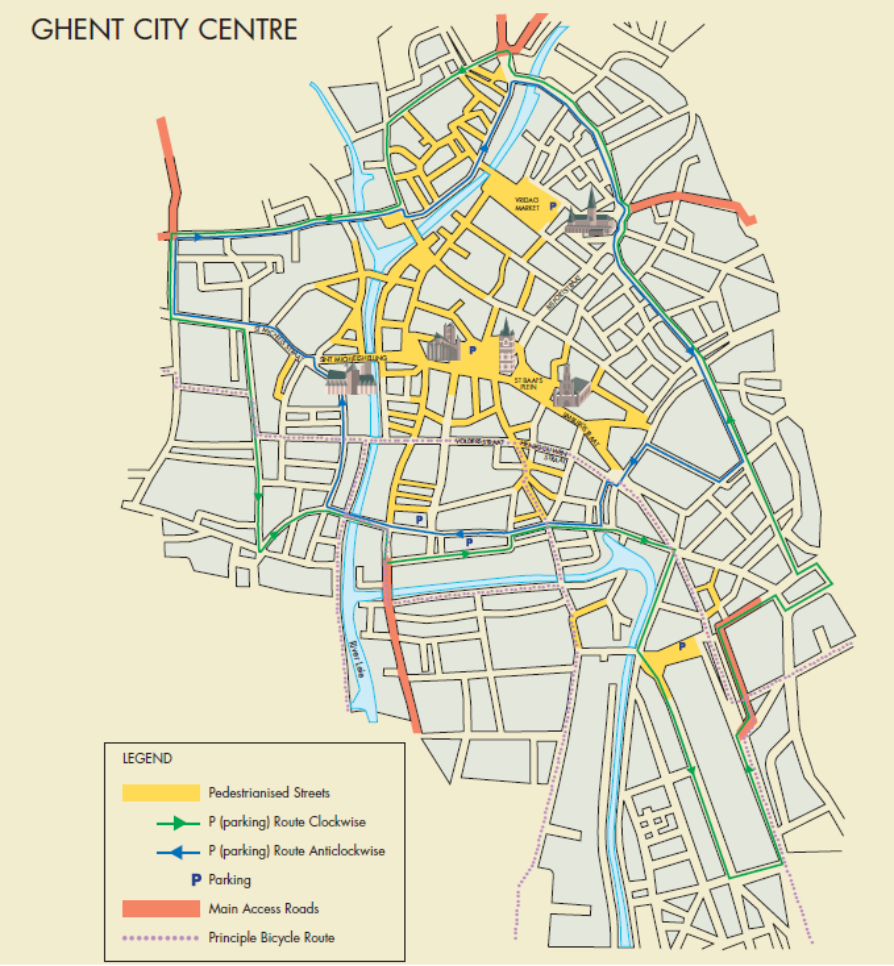


Figure 1: Map of Ghent city center (retrieved from «Reclaiming City Streets for People», 2013).

This case study has been included as an example of a city facing severe traffic problems. The plan was implemented and is generally considered a great success. Public transport use increased by 3–5 %, an increase of 3 000–5 000 riders per day, during the first two years after the implementation of the plan. Public transport services, trams and buses, have become faster and more reliable. In all 80 % of trams and trolley buses run on separate tracks in the city center, and circulation is now freed from the problems of parked cars and traffic congestion. In addition, bicycle use has

increased and initial monitoring suggests that accident levels have been reduced by about 30 %.The inner city, now free from car traffic, is a vibrant place popular with residents and visitors. Public transport services are now more reliable, patronage is increasing, and more people are cycling. A lot of events (open-air arts festival, open-air music events) are now possible in very fine surroundings. "The atmosphere for shopping is now better as well, as no cars can possibly bother shoppers."(Vansevenant, 2005).

2.2.2 Copenhagen, Denmark

Until 1962, all streets in the medieval city center were filled with cars and all the squares were used as car parks. As car traffic increased, conditions for pedestrians were rapidly deteriorating. On 17 November 1962, Copenhagen's main street, Strøget was pedestrianized. The new car free environment proved extremely popular with local residents from the first day. This marked the beginning of a gradual transformation that has continued ever since. Today Copenhagen has a vibrant city center that attracts visitors throughout the year (Reclaiming city streets for people,2013). Today the city of Copenhagen has over 96 000 m2 (of which 33 % is street and 67 % city squares) of car-free space. While pedestrian traffic levels have remained largely unchanged over past decades, activities connected with stopping and staying are almost four times greater than in 1968. During the summer months, many of the pedestrian streets are full to capacity with people enjoying the many outdoor social and cultural activities. In the winter months attractions include festivals, and outdoor ice skating. As the streets and squares in the city center have been pedestrianized and improved, the area has become more attractive yet also less accessible for the motorist. The city authority has adopted an integrated traffic management strategy for the city center: 1) limiting the number of parking spaces (charges for on-street parking are relatively high); 2)

reducing the number of lanes on several main routes into the city and using the space for bus and cycle lanes instead;3) restricting through traffic;4) while developing the suburban train, bus and bicycle networks. In the city center, 80 % of all journeys are made on foot, and 14 % by bicycle (Reclaiming city streets for people, 2013).

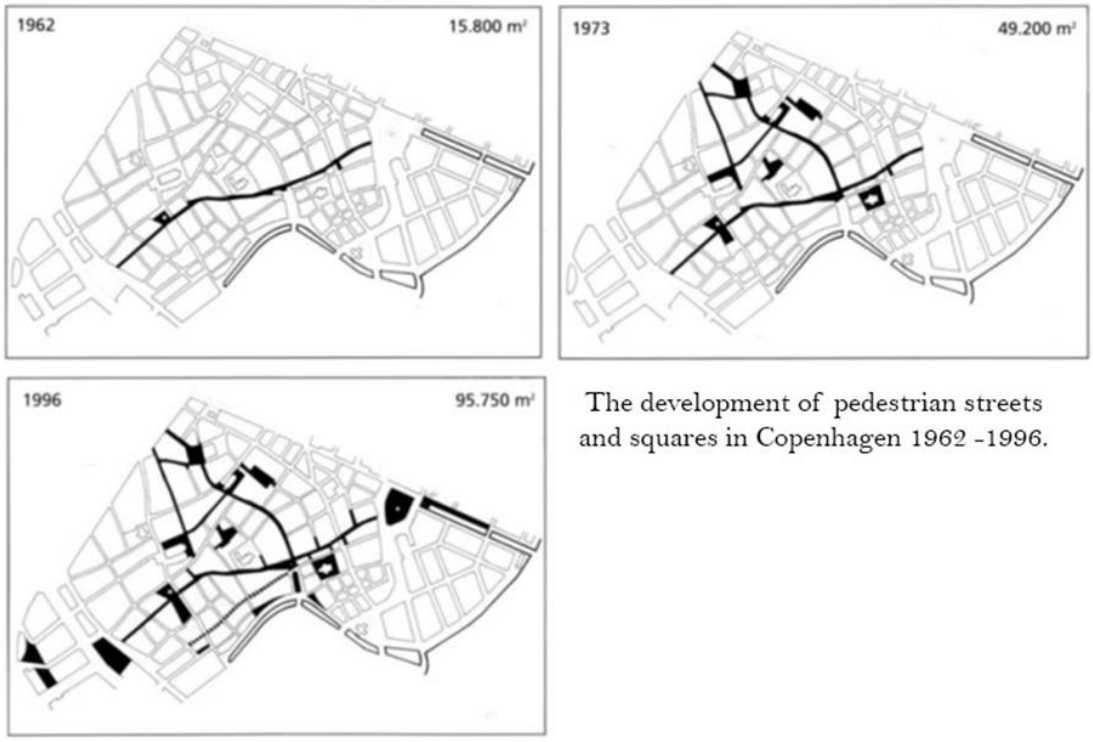


Figure 2: The development of pedestrian streets and squares in Copenhagen (retrieved from «Reclaiming city streets for people», 2013).

The examples prove that under the revitalization schemes implemented in these historically significant cities, the focus has been on creating alternative modes of transportation where walking and cycling have been promoted. However, the examples do not concentrate on street design which will be analyzed in the next sub-chapter to highlight the importance of selected criteria both in modern contemporary environments as well as historic urban quarters.

2.3 Street Design in HUQ

Safety, health, and traffic are three important variables, which have become important considerations in the street design. The aesthetic concerns including special design features landmark and marker points, fountains and trees or the uniformity has also played an important role in the design of streets (Velibeyoglu,1998). In early civilizations special architectural features upon the street scene had significant religious and aesthetic values. For example, in Vedic city plans, there was a holy bodhi tree at the intersection of two main thoroughfares. The tree was a spiritually powerful cosmic symbol (Kurokawa, 1991). In Hellenistic period there was conscious aesthetic aims rather than of compelling functional grounds in the concept of the street design. Street design and the establishment of efficient street network became the basic unit of urbanism.

In the Renaissance, due to religious and military reasons we see the importance of street networks and the full uniformity in street frontage. Baroque period, which signifies the uniformity of streets and wide straight streets again became an important goal in street design (Kostof,1987). Endless avenues and boulevards were emphasized, as they represented, the power of despotic rulers. In the design of these streets, public buildings, palaces, and churches were the focal points that terminated the vista. The industrial revolution brought new ideas to street design. Especially, in some 19th-century utopian schemes, streetless communities were proposed or replaced with covered streets. Boulevards of Haussmann also introduced the gigantic scale in the design of streets and for the first time recognized the presence of wheeled traffic. Haussmann preferred the baroque's uniform building frontages in his boulevards in terms of public order and the aesthetic beauty (Velibeyoglu, 1998).

The appearance of cars in the cities and towns has caused radical changes in street design. Early Modernist's anti-street attitude has removed life from the streets. The street design has been considered in terms of engineering standards and the comfort of automobiles by them (Kostof,1987). Grade separation has forced pedestrians to retreat from the streets. The vulnerable users of the modern streets were sacrificed to smooth, straight highways. Both, in Garden City Movement and Modern Movement, the building line was separated from the street line with set-back distances (Velibeyoglu, 1998).

However, in the last three decades this trend was slowly reversed. All over the world, there are some conscious efforts to restore life and activities on the streets. Ensuring a safe, comfortable and functional street environment for people became the major concern in the design of street. As an example, in Europe, the Dutch concept «Woonerf» of 1970's, which views the street as a social space, rather than just a channel for vehicular, mobility has proven to be successful in many European cities, by reclaiming the streets as public spaces for people's use. The projects such as D. Appleyard's Livable Street project of 1981; P. Calthorpe's pedestrian pockets; Transit-Oriented Development (TOD), and A. Duany-E. Plater-Zyberk's Traditional Neighborhood Development (TND) has brought new perspectives to street design. These projects have recognized the pedestrian priority in the design of the streets (Cervero, 1997).

2.4 Understanding the Factors Affecting Walkability

Walkability is influenced by the design of the built environment. The built environment that promotes and encourages walking- to work, school, stores, and facilities- are better places to stay and live, they have higher real estate, as well as a

healthier lifestyle and high level of social cohesion (Galston,2017). The significance of streets as public spaces can be understood by studying human behavior and necessities in street spaces, how streets can fulfill everyday needs and provide aesthetic and interactional pleasures (Mehta, 2013). This understanding of human behavior can form a basis for design interventions. Thus, this section will identify what are the specific features that attract people to walk and what are the factors forming pedestrian-friendly street.

According to Hansen (2014) walkability of the street depends on **enclosure** caused by vertical physical elements and their ability to define space. Correspondingly, Jacobs and Appleyard (1987) state that **enclosure** contributes to the livability and walkability of the street, by providing visual interest, or having an impact on sunlight, protection from the elements, or a sense of enclosure for pedestrians. On the other hand, Southworth (2005) points out that **sidewalks** play a fundamental role in the specific of the walkable street. As a channel for pedestrian movement and access, they encourage people to walk in the street. **Sidewalks** in the public spaces serve as the front steps to the city, promoting streets socially and economically. Similarly, Jane Jacobs in her book, "The death and life of great American cities", (1961) describes the significance and necessity of **sidewalks** for street security and human contact. Conversely, (Carmona,2003) indicates greenery is of the feature of the pedestrian-friendly street. As an illustration, **vegetation** provides better air quality as well as shade in the street that motivates society to walk and communicate, providing an intimate atmosphere and purifying air and oxygen to produce a pleasant environment to stay for a long time. On the contrary, Galston (2017) states that one of the most important elements of the walkable street that provides safety and security in the urban environment, particularly

in dark areas, is lighting. Additionally, **lighting** helps pedestrians to find their way in the dark time, for this reason, it is an essential attribute for the creation of a walkable environment. Another important element to make street pedestrian-friendly is **street furniture.** Schmitz et al. (2006) state that benches and tables, which are placed in open spaces have social significance. They provide conducive environments that pull people together. When urban **furniture** is selected and placed appropriately, they make public spaces pleasurable and invite people to the outdoors where they can experience a feeling of involvement, relaxation, and a welcoming atmosphere. Alfonzo (2005) defines **accessibility** as one of the factor of walkability, which has an impact and effect on location decisions for different functions, for example, recreational function, retail function etc. For this reason, **accessibility** has main role in development of the walkable street. In addition, Mehta (2014) states that streets should be "accessible and open" and provide "a sense of safety, physical and environmental comfort" (Mehta, 2014). Correspondingly, Speck (2012) in his recent book «Walkable City» and Alfonzo (2005) identify same conditions, which must be present in a street in order to be walkable. They believe that, pedestrian-friendly street must be **safe and comfortable**.

According to Mondal et al. (2016) the active participation of people in local **cultural activities** improves walkability and livability along the street, and also, it gives a sense of belonging. Contrarily, Ewing (1996) points out that the **mix of land uses** makes a pedestrian-friendly environment. In addition, C. Alexander (1977) indicates that a mix of non-residential and residential uses places trip attractions within walking distance of people's homes; people are much more likely to walk when they have some places specific and nearby to go. Equally important that mixed-use development gives an

opportunity for social interaction, feeling of safety through more eyes on the street, location and building type, urban vitality and street life, increased viability of urban facilities and support for small business. According to Lynch (1960) **legibility**- refers to the individual pedestrian being able to make sense of the urban environment and feel welcome to use it. In other words, architectural **legibility** is measured by how much the integrated elements of an environment help individuals in making a compelling mental picture, or a unique intellectual guide of the spatial qualities within a specific building, and the consequent simplicity of finding one's personal path in the surrounding environment (Lynch, 1960).

To outline, based on the literature review where different scholars define certain attributes of the walkable street, some discussions focus on the tangible features that form pedestrian-friendly streets, including enclosure, sidewalks, landscaping, lighting and street furniture. Others, however, propose intangible features such as accessibility, the mix of land uses, legibility, safety, comfort and culture activities as important attributes of the pedestrian-friendly street. Since tangible factors are considered to be related to physical conditions of the street and intangible, on the contrary relate to functional and social conditions. Thus, in this study, the attributes of the pedestrian-friendly street are divided into selected physical, functional and social factors.

Table 2: Factors affecting walkability

Physical	**Functional**	**Social**
Enclosure-contributes to the livability and walkability of the street, by providing visual interest, or having an impact on sunlight, protection from the elements, or a sense of enclosure for pedestrians (Jacobs and Appleyard, 1987)	**Accessibility-** one of the factor of walkability, which has an impact and effect on location decisions for different functions, for example, recreational function, retail function etc (Alfonzo, 2005)	**Comfort-** affected by environmental qualities or factors that might make the walk distressing (Speck, 2012)
Sidewalk design-serve as the front steps to the city, promoting streets socially and economically (Jacobs, 1961)	**Mix Land Uses-** non-residential and residential uses places trip attractions within walking distance of people's homes; people are much more likely to walk when they have some places specific and nearby to go (C. Alexander, 1977)	**Safety-** affect strolling walking (Galston, 2017)
Vegetation- provides better air quality as well as shade in the street that motivates society to walk and communicate, providing an intimate atmosphere and purifying air and oxygen to produce a pleasant environment to stay for a long time (Carmona, 2003)	**Legibility-** refers to the individual pedestrian being able to make sense of the urban environment and feel welcome to use it (Lynch, 1960).	**Culture and sense of belonging-** the active participation of people in local cultural activities improves walkability and livability along the street, and also, it gives a sense of belonging (Mondal et al., 2016)
Lighting-lighting helps pedestrians to find their way in the dark time, for this reason, it is an essential attribute for the creation of a walkable environment (Galston, 2017)		
Street Furniture- benches and tables, which are placed in open spaces have social significance. They provide conducive environments that pull people together (Schmitz et al., 2006)		

2.4.1 Physical Factors

Physical factors of pedestrian-friendly streets are considered as a set of tangible objects or arrangements that together carry out specific functions and provide services or visually identify the urban environment. Jacobs (1993) claims that the buildings, trees, walls or sometimes the combination of these; may be the defining elements of urban environment; yet, the street contains both vertical and horizontal attributes, and these parts are especially classified in physical attributes of street. Thus, this section focuses on the following physical factors, revealed while literature review, that form pedestrian-friendly streets: enclosure, sidewalks, landscaping, and lighting to be described below.

2.4.1.2 Enclosure

According to Clemente et al. (2005) enclosure visually defines the street by vertical elements such as building walls and trees. Enclosure gives a sense of an outdoor room, and an outdoor space, where the shape of the space is as strong as the shape of the buildings around it (Alexander et al., 1977). According to Gordon Cullen (1961) "Enclosure, or the outdoor room, is, perhaps, the most powerful and most obvious, of all the devices to instill a sense of position, of identity with the surroundings, it embodies the idea of the harness". Correspondingly, Allan Jacobs (1993) states that people react favorably to fixed boundaries as something safe and defined. Space is the relationship between an object (building) and the person who perceives it (Unwin, 2003). Enclosure is formed by lining the street with continuous building fronts of roughly equal height. In this manner, the physical buildings themselves become the dividers of the outside room, whilst correspondingly, the road and walkways become the floor, and if the buildings are generally of equivalent elevations and heights, then consequently, the sky extends as an undetectable roof (Galston, 2017). Building

facades should closely align and create a continuous front, accented by store entrances and windows, this creates a sense of enclosure for the pedestrians and a continuous storefront attracts and encourages people to walk. Human orientation is related to four horizontal directions: front, back, and sides. The enclosure of the two parallel walls and the long linear shape of the street control those four horizontal directions with fixed boundaries that create a room-like sense of security, focus, and direction (Jacobs, 1993; Unwin, 2003). The height of the walls is crucial to the sense of enclosure and orientation. Obtaining the right street wall height to width ratio is essential to defining the street (Hedman, 1985). The condition of enclosure generated by the height-to-width ratio is related to the physiology of the human eye. If the width of a public space is such that the cone of vision encompasses less street walls than the opening to the sky, then the degree of spatial enclosure is slight (Chapman,2008). According to Alexander et al. (1977), the total width of the street, building-to-building, should not exceed the building heights in order to maintain a comfortable feeling of enclosure. Similarly, Hedman (1984) and Ashihara (1970) state that a 1:1 height-to-width ratio gives a strong spatial definition because the street wall height limits the sky view, almost completely containing the view. Comparatively, Allan Jacobs (1993) suggests the proportion of building heights to street width at least 1:2. As a general rule, the tighter the ratio, the stronger the sense of place (Galston, 2017).

Street trees can also visually define a space with a ceiling of branches and leaves that horizontally implies a ceiling, and they can suggest the vertical enclosure of an area with their trunks. The key to influencing enclosure with trees is the close spacing of the trees along the street (Arnold, 1993). Moreover, at low suburban densities, building masses become less important in defining space, and street trees assume the dominant

role. Moreover, different kinds of vegetation on both sides of the street can humanize the height-to-width ratio. Henry Arnold (1993) states that trees define space both horizontally, by visually completing an area of open space, and vertically, by making an airy ceiling of leaves and branches. Tree lines depend on visual illusion, unlike the solid enclosure of buildings. Street space will seem enclosed only if trees are closely spaced.

a) High enclosure

b) Low enclosure

Figures 3 (a) and 4 (b) shows high and low enclosure, California (retrieved: Clemente, 2005).

a) A continuous street wall on both sides of the street gives the scene high enclosure. The buildings and street trees create a room-like effect by limiting long sight lines and views of open sky.

b) The scene has low enclosure because the arrangement of buildings does not provide a well defined street wall. The scene feels open, with the ability to see far into the distance.

2.4.1.3 Sidewalks in the Street

Walking is an active mode of transport used by everybody, every day, for multiple purposes, including commuting, and as the basic connector mode between all other modes of transport. Sidewalks play a significant role in specific of the pedestrian-

friendly street design. Furthermore, sidewalks serve as the front steps to the public spaces in the city, activating streets socially and economically. According to Boodlal (2004) sidewalks should be accessible, have an adequate width, and allow pedestrians to have a sense of safety, continuity, and convenience to the users. According to «Better Streets San Francisco»: a guide to making street improvements in SF (2010) well-designed sidewalks are a fundamental part of walkable streets. They are the building block of a great pedestrian environment and are crucial to the quality of public life and pedestrian safety. Similarly, Jacobs (1993) associates well-designed streets with sidewalks, which provide space for people to have leisurely walks. She also states that sidewalks should offer safety from vehicular traffic while at the same time invoking in people a feeling of neither being alone, nor of being crowded. Additionally, sidewalks should be designed to accommodate pedestrians of all ages and abilities. According to Boodlal (2004), the design of sidewalk environments is important to all pedestrians, but is particularly important to those with disabilities who have limited travel choices and rely most on the pedestrian environment. For instance, older adults, people with vision impairments, and children frequently rely on the sidewalk to travel independently within their community for shopping, recreation, exercise, and walking to school. Pedestrian space designed to be accessible to all sidewalk users is especially important because those with limited ability are not able to use other transportation options. Thus, the design of sidewalk environment has a vital role for every walker. Sidewalk users should not have the feeling of insecurity by traffic or by the environment.

Figure 5: Design of sidewalk that accommodate pedestrians with different abilities and ages, Toronto- street (retrieved from: Toronto complete streets guidelines,2016).

Additionally, sidewalk width has significant implications for streetscape design and the quality of the pedestrian environment. Sidewalks that are too narrow prevent a pedestrian from moving safely and comfortably. Furthermore, narrow sidewalks make it difficult to provide important additional streetscape elements and pedestrian amenities. Whereas, a wide sidewalk offers pedestrians enough space to walk at their chosen pace, stand, sit, socialize, or merely enjoy their surroundings. Wider sidewalks also offer more space for landscaping and amenities, making the streetscape more useful and attractive and also acting as a buffer between traffic and pedestrians (Better Streets San Francisco,2010). The standards of sidewalk dimensions are different for pedestrian-friendly streets, it should be considered that sidewalks be at least 12 feet (3.5 meters), which is a minimum because there are more pedestrian activity and outdoor seating demands, as well as to ensure people walk comfortably (Figure 6).

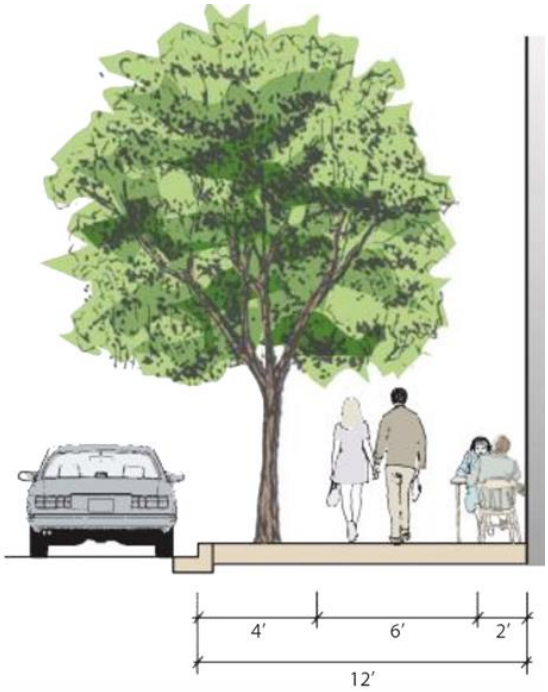


Figure 6: Better streets San Francisco: a guide to making street improvements (2010).

Besides width of sidewalks, there are several physical attributes, which can also collaborate to build more comfortable open spaces. Floor-scape in harmony with the public space is an important issue. Moreover, flooring in city spaces are divided into two major kinds; soft or hard pavement. Hard pavement is necessary in ensuring non-slip dry surfaces, which can transfer both pedestrian and vehicular loads. The change in flooring material can be used to differentiate between the space where particular traffic loads can or cannot go (Moughtin,2003).

2.4.1.4 Vegetation

Vegetation improves the livability and walkability of streets. It plays an important role in providing shade to pedestrians, cyclists, and public transport passengers. Besides, it enhances the aesthetic qualities of streets. Furthermore, effective greening with street trees reduces the street temperature, making it comfortable for people to walk, cycle, or gather for social activities, even during summer afternoons (Kost et al., 2011).This is especially important in places with a humid climate or harsh daytime sun. On a

larger scale, plants keep a city cool by reducing the urban heat island effect. Vegetation creates cooler microclimate and increases oxygen content in the atmosphere thus making the environment more comfortable. Moreover, trees also capture dust and remove glare. According to Zhang et al. (2015), greenery such as street trees, lawns, shrubs and other forms of vegetation provide shade and create enjoyable environments for walking. Thus, they help to reduce the effects of heat, which tend to accumulate in large asphalt areas. According to Kost et al. (2011), landscaping can beautify a street, providing an umbrella canopy and adding colors, fragrances, and textures. The potentially varied character of flora along a street can make it a more memorable space. Hence, a well-designed landscape promotes a sense of ownership among nearby residents or shop owners such that they contribute towards its upkeep. Carmona (2003) states that air quality is a very essential item particularly in outdoor spaces. All kind of vegetation, including trees, behave as air-filters in such areas, while rain absorbs it. Tree planting can provide shade in street to motivate society to walk and trigger group communication as well as providing an intimate atmosphere and purifying air and oxygen to produce pleasant environments to stay for a long time. According to «Better streets, better cities» a guide to street design (2010) landscaping should satisfy the following regulations:

1) appropriate distance between trees to provide continuous shade. In dry climates where trees do not grow very fast, closer spacing is necessary;

2) tree pits locations should be coordinated with the position of street lights;

3) more preferable trees with high branching structures;

4) tree pits should have dimensions of at least 1.5 m by 1.5 m to accommodate roots at full maturity.

Figure 7: Lonsdale street, Dandenong, Australia.

2.4.1.5 Lighting of the Street

Well-designed street lighting enables drivers of motor vehicle, cyclists, and pedestrians to move safely and comfortably by reducing the risk of traffic accidents and improving personal safety. However, pedestrians, cyclists and some motorized vehicles do not have lights and depend on street lighting, not only to see but also to be seen (Kost et al., 2011).

In terms of traffic safety, street lighting is especially important in potential conflict points, such as intersections, driveways, and public transport stops (Kost, 2011). According to «Better Streets San Francisco» (2010) lighting should be designed as well as for vehicular traffic on the roadways yet, also, for pedestrians on sidewalks and pedestrian paths. A well-lighted site provides clear perception for pedestrians and is essential for brightening the environment so that the needs of users can be met on the site. Galston, (2017) emphasized the importance of lighting elements by stating that they help pedestrians to find their way in the dark and are important for the creation of

social spaces. Moreover, they enable security requirements to be met while causing an interaction between the natural and built environment.

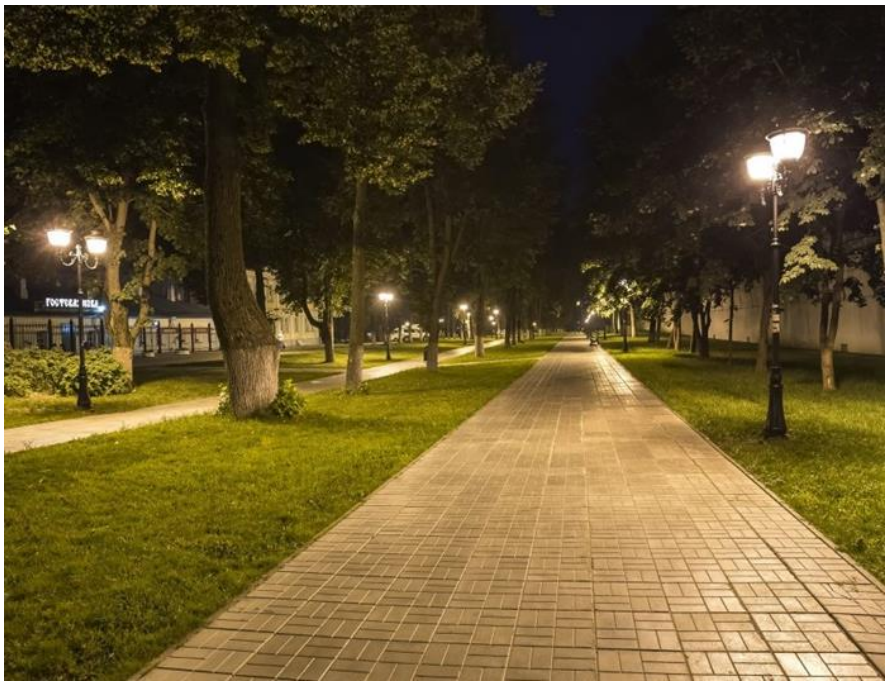


Figure 8: Kropotkinskaya street, Moscow

There is a considerable attempt to focus on parks, plazas, streets, and other public spaces more, regarding to security issues. For instance, According to Yucel (2013) an appropriate design must be related to highlighting the usability of special area in the evening or at night. Site lighting, apart from its practical functions, can be estimated in terms of the kinds of lights, their place and their vehemence, which can have a value on the method of perceiving and using the street. The site lighting can improve aesthetically the color and liveliness to environment at nighttime. The creation of the sense of security and comfort is the main priority of the street lighting especially in darkness. Lighting is extremely vital for entrances, intersections, stairs and sudden changes in grade, dead ends and remote pedestrian ways. Additionally, high criminal environments must be lit perfectly to bring up safety for citizens. In this way, citizens

will feel more secure, although lighting does not have a strong impact on the decrease of crime (Yucel,2013).

a) A single row of light posts is generally sufficient for streets up to 12 m wide.

b) On wider streets, dual lights can be mounted on a single central post.

Figure 9: These sections indicate how lights can be oriented to accommodate two types of street widths and light post locations. Streetlights typically illuminate an elliptical area. As a rule of thumb, the longitudinal dimension is equivalent to three times the pole height, and horizontal dimension is slightly longer than the pole height (retrieved from «Better streets, better cities», 2011).

According to «Better streets, better cities» a guide to street design (2011) lighting should consider the following criteria: 1) additional lighting should be provided at conflict points; 2) the placement of street lighting should be coordinated with other street elements so that trees or advertisement hoardings do not impede proper illumination; 3) the spacing between two light poles should be approximately three times the height of the fixture ; 4) poles should be no higher than 12 m. Especially in residential areas, they should be significantly lower than 12 m to reduce undesirable illumination of private properties.

2.4.1.6 Street Furniture

Street furniture provides settings where people can rest, eat, sit and interact socially with others. According to «Better Streets San Francisco» (2010), site furnishing provide important amenities for pedestrians by adding functionality and vitality to the pedestrian realm. They include benches and seating elements, bicycle racks, flower stands, kiosks, news racks, public art signs, trash receptacles ect. In fact, people with physical disabilities, elderly, and adults with small children can especially benefit from such settings. According to Schmitz et al. (2006) benches and tables, which are placed in open spaces, also, have social significance besides their functional attributes. Since street furniture provide conducive environments, which pull people together the value of it is substantial.

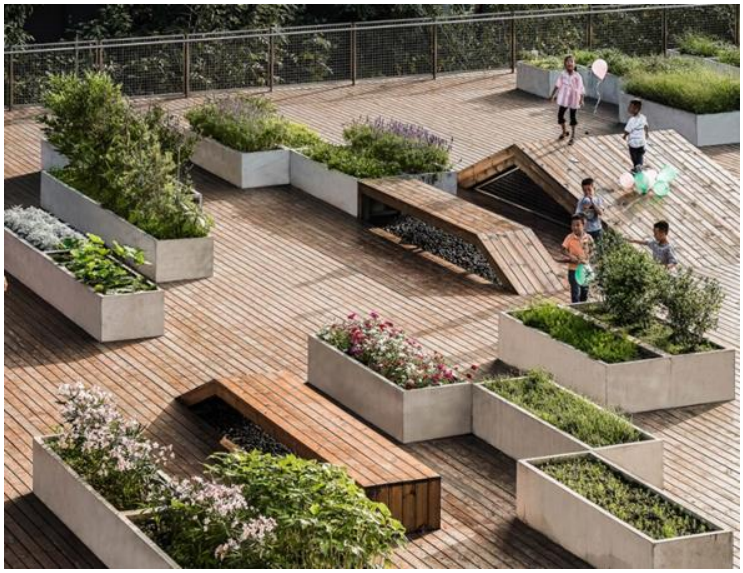


Figure 10: Royal Parade, Parkville, Melbourne, Australia (Retrieved from Pinterest).

Furthermore, suitably elected furniture can invite citizens to the outdoor environment and increase the pleasant feeling about these areas. The standards of city areas highlight the creation of sense of identity and the quality and placement of their street furniture which can be observed in different cities. For instance, London’s red

telephone booths and Paris' metro entrance are symbols of the identities of these cities. In fact, the furniture can be chosen and set up on the basis of an analysis of the site's current and desired pattern of use. Highly qualified furniture should be used where it is necessary because it is expensive. There are different strategies exist to choose or design street furniture. For instance, a similar choice brings the sense of firm tone to the streets and pedestrian ways; or in contrast, different sections of the streetscape must be built in a way to seem as art (Schmitz et al., 2006).

Figure 11: Seating elements should be integrated with other elements, such as tree guards, where possible (retrieved from: Better streets San Francisco, 2010).

Furniture and amenities should be located where they are likely to be used. Furniture is required in larger quantities in commercial hubs, market areas, crossroads, bus stops, railway stations, and public buildings. In addition, most street furniture, especially benches and tables, should be placed where it receives shade. Otherwise, it will become too hot to be used during the daytime. Furthermore, furniture should be located where it does not obstruct through movement. On streets with large numbers of

pedestrians and commercial activity, especially eateries— trash bins should be provided at regular intervals (possibly every 20 m). Whereas, on streets with lower pedestrian densities, trash bins can be provided according to adjacent land uses or street activity (Better Streets San Francisco, 2010).

2.4.2 Functional Factors

Since streets are active parts of the city and have various uses, consequently they attract different people and lead them to different destinations. According to Moughtin (2003) the street is as much a route for motor vehicles as it is a place for pedestrians. In fact, diverse activities, simultaneously, occur along the street. The functional factors of the walkable and pedestrian-friendly street are related to certain features such as a set of intangible arrangements that carry out specific functions. Accordingly, this section focuses on the following functional factors, revealed through the literature review, that form pedestrian- friendly streets: accessibility, permeability mix of land uses and legibility which will be described below.

2.4.2.1 Accessibility and Permeability

Accessibility and Permeability offer people easier and more convenient access to urban public spaces, furthermore they increase social interaction. Alfonzo (2005) states that accessibility factors may include the existence of sidewalks, paths or trails on which to walk. Although, accessibility may also involve barriers that can be actual or perceived. The barriers to walking may include physical barriers such as impenetrable land use, or natural barriers, and also psychological barrier to access, such as a wide road. Moreover, accessibility may include the number of destinations available within a reasonable walking distance as well as the integration of various land uses within a specified area. According to Jacobs (1993), the main purpose of the street is to allow one to commute from place to place, not only within the same street,

but also within the broader network of streets in the city, either on foot, bicycle, public transportation or via private motor vehicles (Jacobs,1993). In addition, accessibility is one of the most important features of a public area, it enhances coming together of people by providing conductive spaces, which are well used. Bentley, (1985) stresses the importance of accessibility as a term closely linked with permeability in that the level to which an environment allows passage is vitally important in urban settings and enhances human relationships.

Tibbalds (2001) defines permeability as the freedom one has to meander within an urban space. In order to define permeability, all the pathways should be detectable. For instance, small block size enhances ability to see and move around because people are conscious of the available routes. Consequently, the increased rate of development may minimize accessibility and movement, the Figure 12 shows two versions where permeability is less and more (Bently et al.,1985). In contrast with large blocks the small blocks gives more alternative of routes. Thus, the large-block layout offers only three alternative routes, without backtracking, between A and B. However, the option with small blocks has nine alternatives and considerably shorter length of public route. Therefore, smaller blocks, give more physical permeability, also, they increase visual permeability, improving people's awareness of the choice available. Hence, the smaller the block, the easier it is to see from one junction to the next in all directions (Bently et al. 1985). Besides, place should be connected to other areas within the urban landscape for it to thrive.

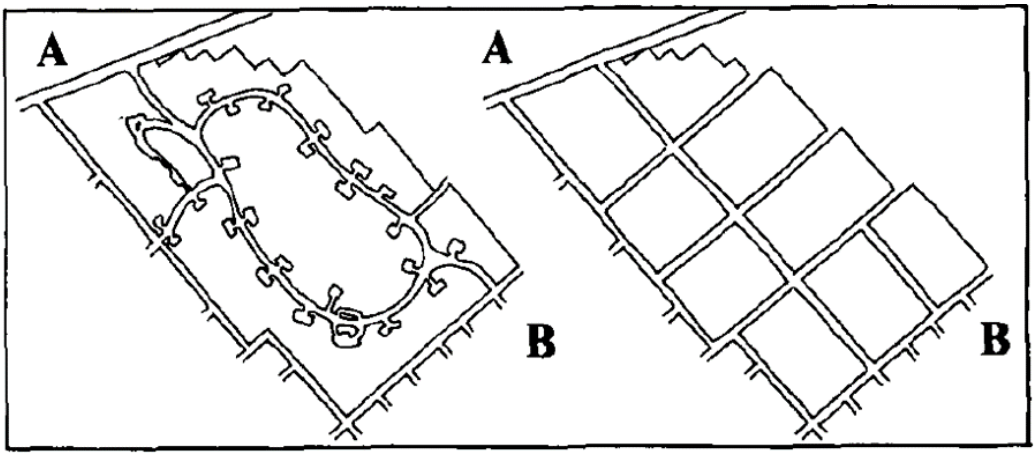


Figure 12: Less and more permeability (Bentley, 1985, p. 17)

Davies, (2005) indicates five C principles, such as: connections, convenience, conviviality, comfort and conspicuousness, that are useful when designing the pedestrian environment;

• **Connections**: providing pedestrian routes that connect places where people want to go.

• **Convenience**: ensures that routes are direct and crossings are easy to use.

• **Conviviality**: making the walking experience exciting by providing a variety of pedestrian ways and ensuring that they are attractive, well-lit and safe.

• **Comfort**: spatial dimensions of walkways and the quality of pavement.

• **Conspicuousness**: ease in finding and following a route, the surface treatment for pedestrian.

Sufficient accessibility also means that pedestrians can easily find the entrance into the street. The ease of accessibility should be available to all users, including disabled people. In this regard, Jacobs (1993) states that fundamental access for disabled people can be made by the addition of physical elements such as ramps to sidewalks where needed (Jacobs,1993). According to Carmona (2003) disabled people, pregnant

woman, elderly and small children in strollers by physical barriers may be prevented to use public places. Access for disabled people is one of the main aspects of designing pedestrian-friendly streets, hence, physical elements should be considered accordingly. They play a significant role in the creation of walkable and friendly streets, also, they enhance streets as social places, by providing accessibility and permeability for all models of transportation and all ages.

Figure 13: Curb ramp for disabled people, San Francisco.

2.4.2.2 Mix of Land Uses

Nowadays, many cities put many efforts to revitalize the downtown areas. These efforts can contribute the retailing trends, such as implementation of concepts that create main-street, retail centers, where people can walk, stroll between shops, eat and have diverse activities along the street. Various functions permits a scope of diverse land uses including private, business, and industrial to be co-situated in a coordinated manner that supports feasible yet sustainable types of transport, for example, public

transport, walking and cycling that eventually heighten neighborhood courtesy (Rodriguez, 2009). Moreover, mixed land uses can improve the economic vitality as well as security on the street by increasing the number of people on the area and in public spaces.

Figure 14: The Cotton district, showing the horizontal land mix-use (photo by: Murdock, 2013).

According to Cervero (2017) mix of uses can be achieved in any of following ways:

1) vertical mixed-use, where, typically ground floor is for the retail or offices and residential apartments are above;

2) ground-floor commercial, offers a high level of interaction with the pedestrian area, includes restaurants, cafes, and small retail;

3) horizontal mixed-use, where additional uses are built side-by-side on adjacent parcels or within the same parcel.

The Cotton District located in the historic neighborhood of Mississippi and considered a good example of a successful mixed-use. Two buildings at the corner of University Drive and Maxwell Street accommodate a diversity of uses and activities including commercial retail, apartments, and underground parking. Moreover, the historical

architecture makes a unique intersection for society. Apartments that located upper floor provide the “eyes on the street” which is necessary to create a safe environment for all users (Kumar, 2013).

2.4.2.3 Legibility

Legibility is the feature that makes an area graspable. Legibility is essential at two levels: physical structure and activity patterns. Places may be explored at either level separately. For instance, it is conceivable to build up a reasonable feeling of the physical shapes and forms of a space, aesthetically or more. Similarly, examples of many uses might be handled regardless of the absence of a solid form. Yet ideally, to comprehend a space’s capability without limit, consciousness of physical form and patterns must integrate with each other. This is particularly critical to the one, who needs to get a examine a space rapidly (Bently,1985). According to Kevin Lynch (1960) a legible environment as a place can be arranged in a coherent and recognizable pattern. The degree of legibility depends on the capacity of an area to form a mental image. Thus, Herzog and Leverich (2003) depict the legibility as the attributes of a specific space that give a certain comprehension through making intellectual maps and diagramming wayfinding. Perceiving space is a procedure of utilizing spatial information properly subsequent to getting it and analyzing it in the brain. Users observe and process space through the psycho-cognitive intellectual procedures in the human mind accordingly. These procedures are impacted by the individual characteristics defined by each unique user. Downs and Stea (1973) center around the kinds of gaining spatial information and discuss the connection between sensory gained information and the corresponding resources of information (immediate and vicarious). Sensory info gives a coordinated ecological reflection that is framed by the blended mix of visual, haptic, sound-related, olfactory, and dynamic senses. This

representation changes concrete senses to a perspective experience personal in an immediate way (Downs and Stea, 1973). In effective experience, faculties are utilized viably and exactly. Then again, in vicarious experience, senses are subjects of personal recognition and are not utilized completely and simultaneously. Vicarious sources for the most part serve visual sense, so they lead to generally visual recognition. Downs and Stea (1973) characterize vicarious information as used data; in other words, they perceive it as a sort of data that literally and metaphorically speaking, signifies "seeing the world from another person's eyes." Appleyard (1973) suggested that spatial information (immediate or circuitous) is both realistic and abstract, schematic however disconnected, and also, somehow traditional yet in some cases innovative, likewise particular, and distinctive yet pluralistic. That results from both indistinct, intricate, divided, or mistaken nature of urban areas (Appleyard, 1973) and the divided, progressive, abstract, powerful nature of the psychological procedures of the mind itself (Carlson, 1996). Kevin Lynch (1960) noticed the landmark (a unique monumental figure corresponding to the character of an urban space or city) as one of the five perceptual and visual components (landmarks, paths, districts, edges, nodes). As indicated by Lynch (1960), if any subsequent structure has a unique form, plainly appears differently in relation to its context, and has a significant location, then at that point, it very well may be viewed as a significant landmark. Steck and Mallot (2000) indentified landmarks previously mentioned to be put within two classifications: global and local. Global landmarks on one hand are those that are detectable easily over long distances. On the other hand, local landmarks are smaller in scale in relation to the global ones, and are just obvious when people approach them within a close by distance. Raubal and Winter (2002) recorded three things for the characteristic nature of these landmarks: visual remarkable quality (veneer, form, block, and color),

semantic notability (social, cultural, and historical worth), and structural eminence (location).

Figure 15: Image elements: paths, edges, districts, nodes, and landmarks (Lynch, 1960).

Spatial design influences development and distribution, yet additionally causes one to comprehend the relationship among spatial components and to reflect the mental picture perceived of this relationship. As it becomes harder to interpret the relationships and connections of spaces, diagrammatic figures of wayfinding gets more fragile. As indicated by Young (1991), the typological intersections in decision points are the most crucial and are at utmost importance. To further explain, a decision point is the place an individual needs to select a path amongst several other directions, for instance, nodes in urban space and corridor intersections in buildings are merely some of the examples. In addition, historically planned cities followed an organic pattern utilizing a deformed grid that adapts naturally by time to create what we now call as "settlements" rather than linear planned patterns (Carmona et al., 2006).

2.4.3 Social Factors

Street is a link between people's facilities and interaction. According to Jacobs(1961), street is an excellent place for social and commercial relations, place where people can gather and communicate. Nowadays, the role of the social interaction and street vary with, ethnic group, class, age structures and type of specialization of the neighborhood.

Increasing specialization and separation of community have removed many of the socially cohesive activities once found in the street. Diverse functions and activities once available on the street, yet nowadays there are fewer than before. There are countless reasons, which cause the decline of daily social life in public spaces. For instance, one of the reasons is the increasing number of private cars, increased crime and violence, impersonal supermarkets, etc. (Levitas, 1991). Thus, this section focuses on three main social factors, revealed while literature review, that can create a place that makes people feel good while walking, such as safety, comfort, and cultural activities to be described below.

2.4.3.1 Safety in the Street

The level of safety on the street depends on the existing environment, land uses, or the presence of certain groups or individuals. Bars, liquor stores, pawnshops, or other types of land uses may affect the level of safety felt by some pedestrians.

The need for safety may especially affect strolling walking, because this trip is considered to be optional (Alfonzo,2005). The number of street lights, landscaping have all been negatively related to fear of crime, hence, territorial features can decrease users fear (Perkins et al.,1992). Kuo, Bacaicoa, and Sullivan (1998) found that tree planting and vegetation affected citizen's sense of safety. However, narrow streets, existence of nonresidential property and stores on the block, adversely affect walkability and livability. Furthermore, dilapidated housing link to higher levels of delinquency (Perkins et al., 1993). Recently, Ross (2000) examined the effect of fear on the probability of walking. People who felt more afraid in their neighborhoods were significantly less likely to walk than those who felt less afraid. Hence ,the unmet need for safety may affect decisions to walk.

Figure 16: Example of safe street with street lighting, greenery and buildings around, NY.

According to Alfonzo (2005) the buildings watch out the public streets may increase the personal safety. Cities designed and considered to be used 24 hours a day, in order to avoid certain areas becoming dangerous districts. The safety measures may include: 1) providing street lighting, 2) maximizing the numbers of windows and doors to the street, 3) maximizing the linkages between new and existing developments, 4) locating important facilities such as: public transport stops in well-surveyed areas. According to "Mean Streets" (1997), protecting pedestrians and cyclists from motor traffic, is another significant issue. Therefore, there are certain actions to make street safer such as: 1) traffic calming: the installation of speed bumps, or other devices in residential neighborhoods that slow cars down 2) providing separate spaces for pedestrians, 3) designing more pedestrian friendly public spaces (Mean Streets, 1997).

2.4.3.2 Comfort in the Street

Comfort refers to a one's level of convenience, and contentment on the space. A one's satisfaction with comfort for walking may be affected by environmental qualities that either facilitate walking or remove factors that might make the walk distressing. According to Alfonzo (2005), the factors that may affect comfort levels include traffic

calming elements, the condition of the pedestrian walkway system, urban design elements intended to offer protection from unfavorable weather conditions and features that provide amenities such as street benches, drinking fountains, and other street furniture.

Figure 17: Example of comfortable public space, Hamburg, Germany.

Clark and Dornfeld (1994) found that a variety of traffic-calming strategies—including reduced street widths and speed limits, street crossings, and plantings—were associated with increased street activity, walking, and bicycling. Furthermore, in a study of the perceived environmental factors, elderly who reported that the sidewalks in their neighborhoods presented less barriers to a safe and comfortable walk were more likely to be active on the street than those who reported that the sidewalks presented more barriers (Alfonzo, 2005).

2.4.3.3 Culture and Sense of Belonging

Since culture influences how spaces are designed, it plays a vital role in architecture and urban planning. The traditional spatial objects along streets, form an integral part

of the culture and community lifestyle and has both, tangible and intangible values. These entities are the bases for cultural integration, which have been carried down through the ages and have adapted to the modern context (Mondal,2016). According to Pascual et al. (2016) culture is the fabric for the dynamic construction of individual and collective identities. The active participation of people in local cultural activities improves the walkability and livability along the street. To emphasize, diverse representations for the essence of culture on the street can be numerous activities inherited in a particular place. For example, cultural activities may include variety of entertainment such as live theater and music, movie nights, a farmers market, public art, street entertainers, shops, restaurants, and different events. Equally important, what Mumford (1961) observes, “the historic city retains, by reason of its amplitude and its long past, a larger and more various collection of cultural specimens than can be found elsewhere”. Additionally, Harvey (2001) notes that the city center is a great book of time, history and diverse identities that hold different narratives. However, today cities consist of people who do not interested in visiting any place, do not have any sense of belonging to their environment, and finally, who have defined boundaries to separate themselves from «the other» (Carrion M. and Hanley,2007). Canter (1991) states that place is understandable with the integration of perceptions, impacts and users' behavior. Besides, a sense of place creates fulfill in the environment (Relph, 1976). People like to describe themselves through a sense of belonging (Stedman, 2002). Place belonging is interpreted as a sense of belonging to the place, therefore, people like to imagine it as their own home, it has defined territory and can be understood as attaching to a particular community according to ethnicity, sex, religion, cultur, etc. (Pong et al, 2005).

Table 3: Analysis of the walkable factors, techniques and tools

	Factor of walkable street	**Techniques**	**Tools**
Physical Factors	Enclosure	Observation Site analysis	Photographs Sections
	Sidewalks design	Observation Interview	Photographs Questionnaire
	Vegetation	Observation Interview Site analysis	Photographs Questionnaire Map
	Lighting	Observation Interview	Photographs Questionnaire
	Street furniture	Observation Interview	Photographs Questionnaire
Functional Factors	Accessibility	Observation Site analysis	Photographs Maps
	Mix of land uses	Observation Site analysis Interview	Photographs Map Questionnaire
	Legibility	Observation Site analysis	Photographs Map
Social Factors	Comfort	Observation Interview	Questionnaire
	Safety	Observation Interview	Questionnaire
	Culture and sense of belonging	Observation Interview	Photographs Questionnaire

Chapter 3

CASE STUDY

3.1 The Historical Development of Sukhum City

Abkhazia is located in the west Caucasus on the coast of the Black Sea. Abkhazia is one of the most ancient ethnos of Caucasus, language, culture and traditions of which are close and related to north Caucasian people: Abaz, Adygey, Kabarda, Circassians, and Ubikh. Ruled by different conquerors, the republic of Abkhazia hosted many different cultures: the Byzantine, Greeks, Ottomans, Turks, and Russian cultures, which are reflected in her distinctive historical and cultural heritage, consequently, brought together the unique identity of her cities. The capital of Abkhazia is Sukhum, which is relatively a new city in comparison to the European cities. To clarify, starting to form in the second half of the 19th century, it becomes densely populated by the beginning of the 20th century.

The territory of Sukhum was attractive to sailors, traders and conquerors from ancient times, since it was the first city that was founded in the 6th-century BC., and was called Dioskuriades by the Ancient Greeks (Pachulia,1958). The remains of this ancient city are still preserved at the bottom of Sukhum Bay. In those days, Dioscuriada was a center of commerce. After the decline of the Dioscuriada in the 2nd-century AD., the ancient Romans founded the city of Sebastopol in its place and built a fortress. Later, Turks replaced Roman colonization, destroying the city in the middle of the 15th century, while at the beginning of the 18th century they built a fortress, and the city

began to be called Sukhum-Kale. During the 19th century, the destruction and restoration of the city continued as the city was alternately captured by either Russian or Turkish troops. Only in 1866, after the abolition of the Principality of Abkhazia (1864), Sukhum-Kale becomes Sukhum - the administrative center of the Sukhum military department of the Russian Empire, where the history of the modern city of Sukhum originates.

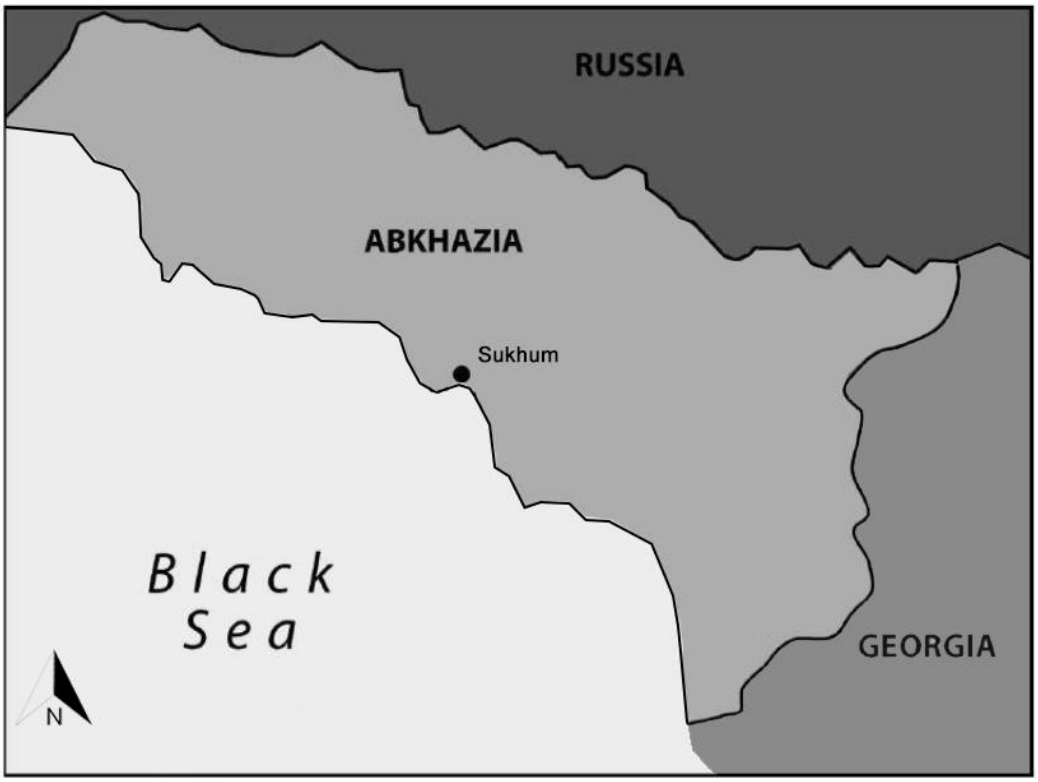


Figure 18: Location of Sukhum city in Abkhazia (Blakkisrud, 2008).

The urban plan of Sukhum city is based on a regular street system or the Hippodamian system, named after the ancient Greek architect Hippodamus of Miletus, who is credited with the invention of the city planning based on a geometrically correct street network in the 5th-century BC. (Pachulia,1958). Since ancient cities formed chaotically as the population grew and the city grew, it was impossible to plan and organize a clear system of streets and quarters in advance. As a consequence, a regular

layout was applied in Miletus, after its destruction by the Persians, and then in other later cities. As time has shown, the regular street system that replaced chaos is not always convenient in a modern city since its monotony bothers people. On the other hand, this problem rarely arises in small cities such as Sukhum, because the alternation of built-up neighborhoods with parks, squares, alleys with squares can dilute boring regularity (Agumaa,2017).

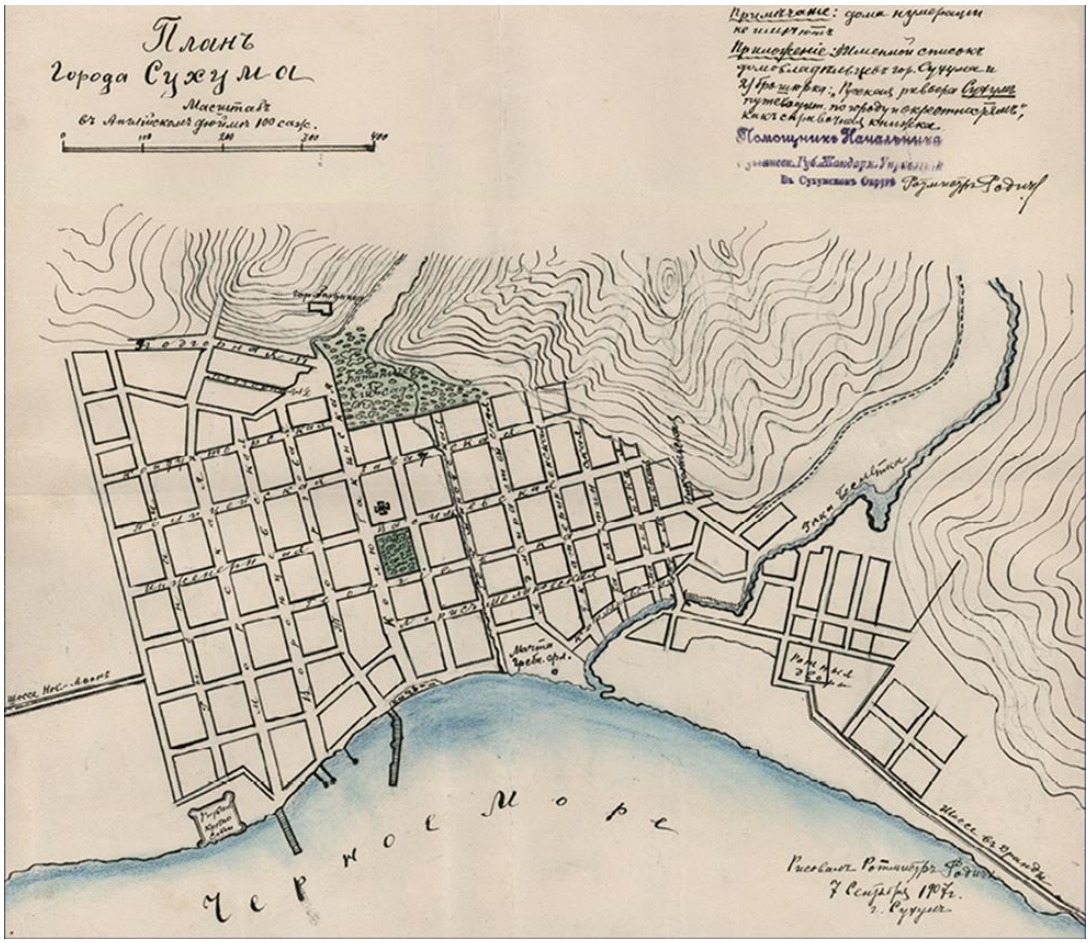


Figure 19: First map of Sukhum city, 1907 (retrieved from: Chkotua, 2008).

In Ancient Greek cities with a regular layout, much attention was paid to public spaces - squares (agoras), theaters, gymnasiums. However, in the period of active urbanization and an increase in the number of cars in cities, more attention was diluted to transport highways, while pedestrians were in the background (Rogovin et al, 1973).

Nevertheless, from the second half of the 20th century, the gradual conquest of space from transport begins in favor of the pedestrian. When Sukhum was built up, the regular layout at its core was a failure, the terrain features were not taken into account, and over time it became clear that this interferes with the growth and development of the city (Agumaa,2017).

These problems had to be solved with the involvement of large finances and advanced urban improvement technologies. Embankments were strengthened, storm sewers and small drainage systems were equipped respectively. (Agumaa,2017). Thus, the situation in the city also gradually improved due to competent development, as the Greek businessmen who inhabited the city built villas, mansions, hotels with an eye to European trends, while simultaneously, the Russian intelligentsia built up the city inviting architects from the capital. Gradually, the city had overgrown with public spaces formed by commercial areas, boulevards, embankments, squares, and parks. By the cause of high-quality architecture, the city had transformed. The main style of that period was modern, covering the whole world in a short period; it reached Sukhum (Rogovin et al, 1973). With the advent of Soviet power and the acquisition of Sukhum status as the capital of Abkhazia, a new stage in the history of the city begins. The city's budget started increasing significantly, the active reconstruction of the city (factories, factories) had begun, and railway and sea stations had been built. The northern part of the city has become industrial since there are numerous factories. In addition, at the turn of the 19th and 20th centuries, the buildings in the city mostly were built with two stories (Figures 28; 29; 30), while comparatively, in the Soviet period, the number of floors increased sharply along with the width of the main streets of the city increased. The railway cut off part of Sukhum and its outskirts from the sea.

Moreover, high-rise hotels built on the seashore deprived the low-rise buildings formed in the early 20th centuries with sea views on Hathua Mountain and Sukhumi Mountain (Figure 19).

Figure 20: High-rise buildings of the Soviet period (Retrieved from: Sputnik Abkhazia).

Nowadays, all these high-rise buildings look alien and do not fit into the historical landscape of the city, unlike in earlier days, when high-rise construction was an indicator of the development and sustainability of the city (Ribchinskiy, 2014). Stalin's Empire style proved itself to be the brightest of all Soviet architectural styles in Sukhum. To exemplify, slender columns and stucco molding lace fit perfectly into the existing building, proving that Sukhum Stalinist Empire is very restrained and elegant. On the contrary, buildings in the style of constructivism in Sukhum are only a few. During the war of 1992-1993 in Abkhazia, the architecture of the city of Sukhum was hit hard, and consequently many architectural monuments were destroyed or partially destroyed. Today, the city is being built chaotically, and the vast majority of

architecture does not reflect nor fit into the historical urban environment (Pachulia,1958).

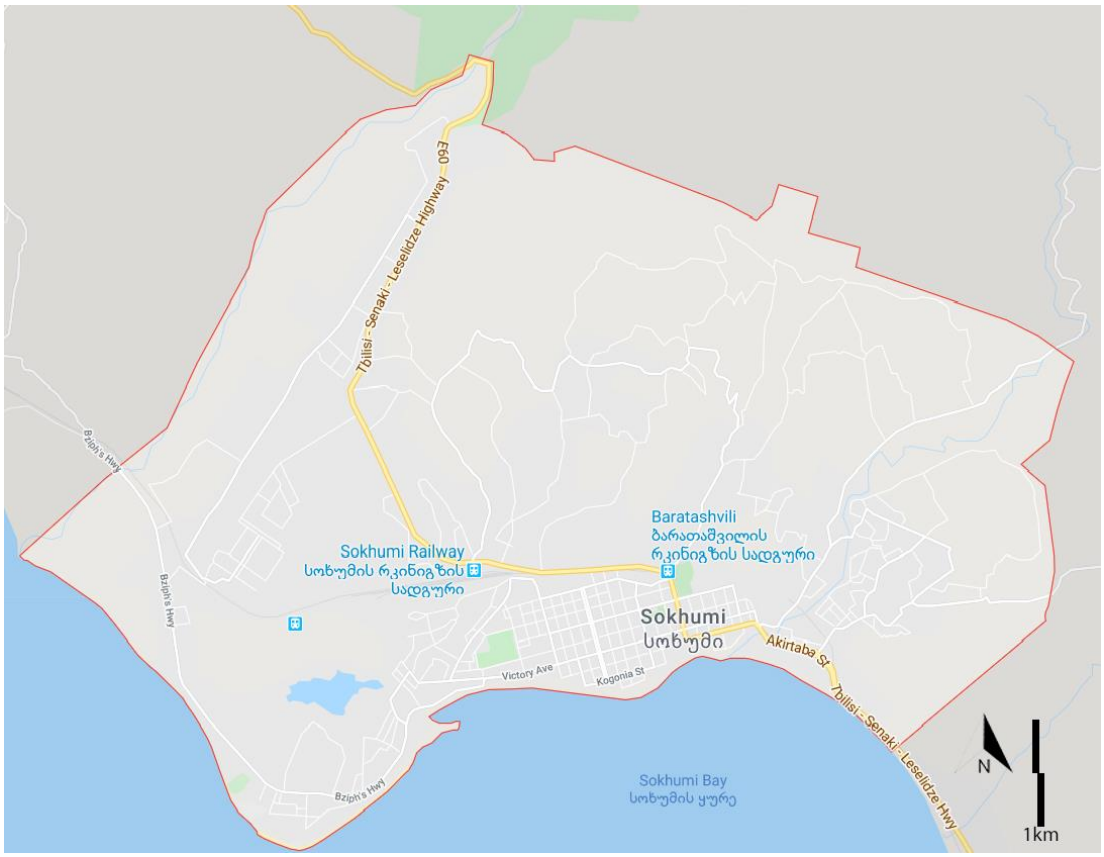


Figure 21: Map of Sukhum district (retrieved from Google map).

3.2 The cultural heritage of Peace Avenue

The selected area for the study in Sukhum city is the Peace Avenue. The Avenue is located in the city center and it is one of the oldest streets of Sukhum (Figure 20). This is the former territory of the first city bazaar, later - Stalin Park and nowadays a commercial center of Sukhum. Peace Avenue consist of numerous historical buildings and architectural heritage. Similarly, there are also three parks on Peace Avenue: Voronov Park, Aiaaira Park, and Pushkin Park.

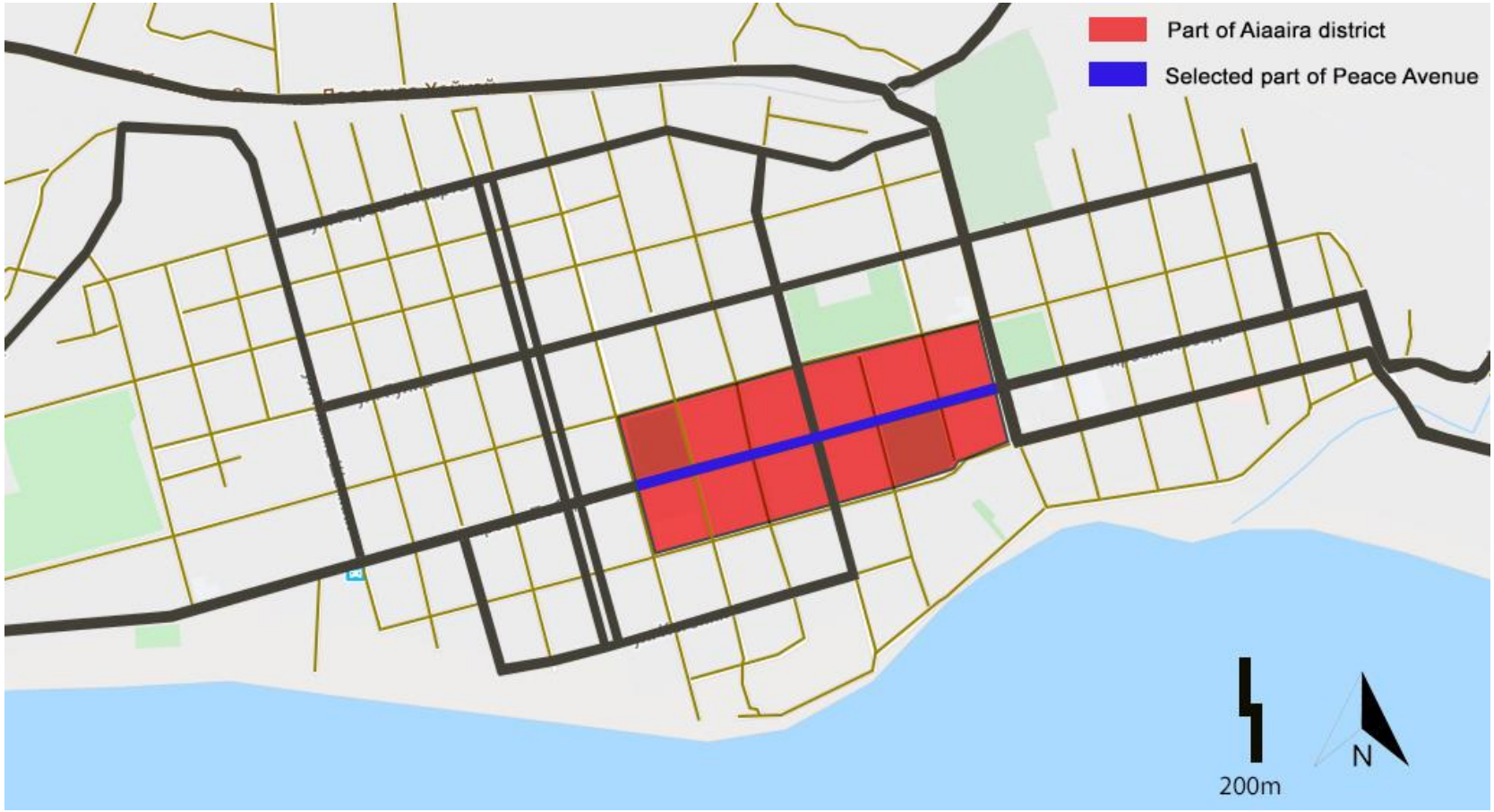


Figure 22: Map of Sukhum city and location of Peace Avenue

Many shops, hotels, and interesting architectural objects were built there, among which one can distinguish: 1) The cinema "Sukhum"; 2) New building of Sukhum postal and telegraph office in 1915 (Figure 23) ; 3) The house of Stefanidi of 1912 ; 4) Building of the cafe-restaurant "Pallas" 1914 (Figure 24) ; 5) The house of Metaksa of 1912; 6) House of the trading company Bogdanov, 1904; 7) Building of furnished rooms "Europe" of 1913; 8) Administration building.

These buildings are on the list of the historical heritage of Sukhum as monuments of urban planning and architecture (Figure 23).

Figure 23: Postal and telegraph office.

Figure 24: Café-restaurant «Pallas»

Figure 25: The historical heritage along Peace Avenue

3.2.1 The House of Stefanidi

Figure 26: The house of Stefanidi (retrieved from: Sputnik Abkhazia).

The house of the industrialist Stefan Stefanidi was built in 1912 according to the project of architect A.V. Modrakh. The apartment building with a height of 19m is located at the intersection of Peace Avenue and Abazinskaya Street. On the ground floor of the house, there were shops and a private pharmacy, and above were the apartments that Stefanidi rented out. The building is made in the architectural style of eclecticism, in which the facades are richly decorated with various stucco molding of different styles. The angular location of the building determined its configuration, as the corner of the building is the center of the composition. Floor-mounted semicircular

balconies form the corner of the building, and its octagonal bay window with a spire completes the architectural character of the building. Not to mention, the fifth floor of the building is the attic with small windows overlooking both the main facades of the building. The ratio of the height and width of the building, as well as the composition of the facades, emphasized by vertical decorative elements in the form of regularly repeating paired pilasters, and attics, gives the building harmony and grandeur. Again, horizontally, the building is divided into wide floor cornices. It is impossible not to pay attention to the house of Stefanidi, being at the intersection of these streets. The ground floor of the building is less decorated, and the main element of the decor is rustication. Despite the mixing of decorative elements of various styles, the building does not look elaborate and tasteless. Decorative elements skillfully fit into the overall composition of the facade, which creates a harmonious and complete image.

3.2.2 Building of Furnished Rooms "Europe"

The building of the furnished rooms "Europe" was built on the corner of Aidgilara and Peace Avenue in 1913. The architect of the project is Alfred Bamme, who practiced architecture in Sukhum since 1908, mainly in the modern style. The hotel building is two-three-stories; with the rooms located on the 2nd floor, while the 1st floor was occupied by various shops. To continue, the architecture of the building combines modern elements with architectural techniques reminiscent of a Swiss chalet.

Figure 27: The Europe complex (retrieved from: Sputnik Abkhazia).

A characteristic difference of architectural objects of this style is a sloping roof, and the edges of which protrude beyond the main walls and form a visor. This again refers to the motives of the chalet architecture, where a complex roof is an indispensable element of the building. Moreover, in Soviet times, the Sukhum military executive committee was located on the 2nd floor, then a spa clinic, and the first floor was used as a shopping center as before. The most popular store of the shopping center was "Detsky Mir", which is why the building is still called "Detsky Mir" among residents of the city.

3.2.3 Administration Building (Clocks)

The history of Administration building in Sukhum began in 1914 when the tobacco magnate decided to build a mansion. The building was erected in the modern style by the architect Veniamin Ostrovidov. When the house was built, Stefanidi sold it to the owner of the "Mir tobacco" factory, and the office of the enterprise was located in the building for a while.

Figure 28: Administration building (retrieved from: Sputnik Abkhazia)

After the establishment of Soviet union in Abkhazia, the building was nationalized and was called the "Palace of Labor". Furthermore, in 1950, Sukhum was recognized as the cleanest city of the Soviet Union, and on this occasion, the Moscow City Council presented the city the clock-chime. Currently, the building is the administration of the city of Sukhum.

3.3 Methodology of the Analysis of Case Study

As obtained from the literature review in Chapter two, the features that affect walkability on the street, will be analyzed in this chapter. Thus, based on observation and interviews, the thorough analyses provided in Table 4 need to be considered in order to be able to achieve a walkable and livable street. A SWOT analysis will also be utilizes to support the methodology which will be based on the survey with locals, maps and personal observation.

Table 2: Methodology of the case study analyses

Criteria		Why is it important for walkability?	Needed Analysis
Physical Functions	**Enclosure**	-It refers to the degree to which the building walls, trees, and other vertical elements visually define the streets (Ewing)	-Observation -Section analysis
	Sidewalks	-It serves as the front steps to the public spaces in the city, activating streets socially and economically -The design of sidewalk environments is important to all pedestrians, but is particularly important to those with disabilities who have limited travel choices (Boodlal)	- Observation - Interview
	Vegetation	-It plays a functional role in providing shade to pedestrians. -It enhances the aesthetic qualities of streets.	-Observation -Landscaping Map - Interview
	Lighting	- Street lighting enables motor vehicle drivers, cyclists, and pedestrians to move safely and comfortably by reducing the risk of traffic accidents and improving personal safety (Patel, 2011).	-Observation - Interview
	Street furniture	-It provide settings where people can rest, eat, sit and interact socially with others. -It provide important amenities for pedestrians by adding functionality and vitality to the pedestrian realm (Better Streets SF).	-Observation - Interview
	Accessibility/ Permeability	- offer people easier and more convenient access to urban public spaces and they increase social interaction (Bentley) -It is important to easy to get to and move around (Carmona)	-Traffic and transportation analysis - Maps

			-Observation
	Mix of land uses	-It enhances the economic vitality and perceived security of an area by increasing the number of people on the street and in public spaces (Kumar,2013).	-Land use analysis - Observation - Interview
	Legibility	-It is one of the factor to achieve people friendly street (Tibbalds) It is the quality which help people read their surroundings (Bentley)	- Lynch Analysis - Observation
Social Factors	**Comfort**	-comfort for walking may be affected by environmental qualities that either facilitate walking or remove factors that might make the walk distressing (2005)	-Observation - Interview
	Safety	-The need for safety may particularly affect strolling walking (Alfonzo,2005).	-Observation - Interview
	Culture and sense of belonging	The active participation of people in local cultural activities improves the walkability and livability along the street.	-Observation - Interview

3.4 Analysis of the Physical Factors of Peace Avenue

Peace Avenue has been analyzed in terms of enclosure, sidewalks conditions, landscaping, lighting conditions and street furniture.

3.4.1 Enclosure in Peace Avenue

According to personal observation of enclosure, one place on the corner of Peace Avenue and Abazinskaya street was selected, where the highest building on Peace Avenue is located, with 5 floors and 19 m of height; while simultaneously and on the opposite side, the lowest building with 5m of height lies (Figures 31 and 32). Furthermore, the second place on the corner of Peace Avenue and Aidgilara street was selected to show the average height of buildings along the historical quarter, where the

building height from one side is 11m; whilst on the opposite side, the building height is 9m (Figures 31 and 33). Personal observation revealed that the average height of building along Peace Avenue varies from 9m to 14 m. Since the width of Peace Avenue is 20 m and the highest point is 19m along the street; which means that almost 1:1 height-to-width ratio. However, considering the average height of buildings along the street that range from 9m to 14m the height-to-width ratio is approximately 1: 0.7

Thus, the existing height-to-width gives a strong spatial definition because the street wall height limits the sky view, almost completely containing the view. A continuous street wall on both sides of the street gives this scene of high enclosure.

Figure 29: The average height of buildings along Peace Avenue.

According to Arnold, (1993) street trees can also visually define a space with a ceiling of branches and leaves that horizontally implies a ceiling; also, they can suggest the vertical enclosure of an area with their trunks. The key to influencing enclosure with

trees is the close spacing of the trees along the street. Thus, the existing rows of trees on both sides of Peace Avenue humanizes the height-to-width ratio (Figure 30). Horizontally they do so by visually enclosing or completing an area of open space. Vertically they define space by creating an airy ceiling of branches and leaves. Accordingly, the buildings and uniform street trees, landscaping along a sidewalks along Peace Avenue create a room-like effect by limiting long sight lines and views of open sky.

Figure 30: The existing rows of trees along Peace Avenue.

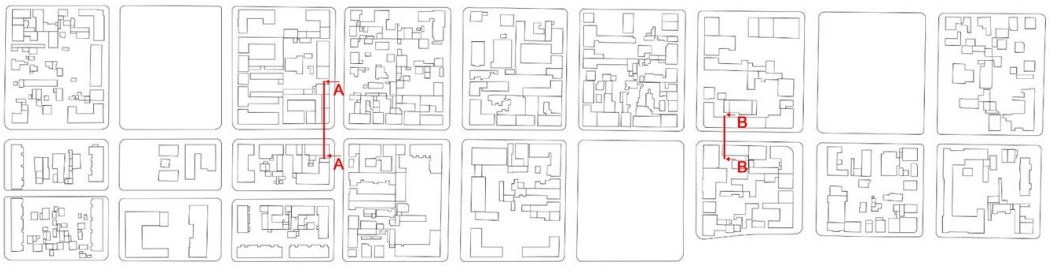


Figure 31: Highlighted selected sections on the plan.

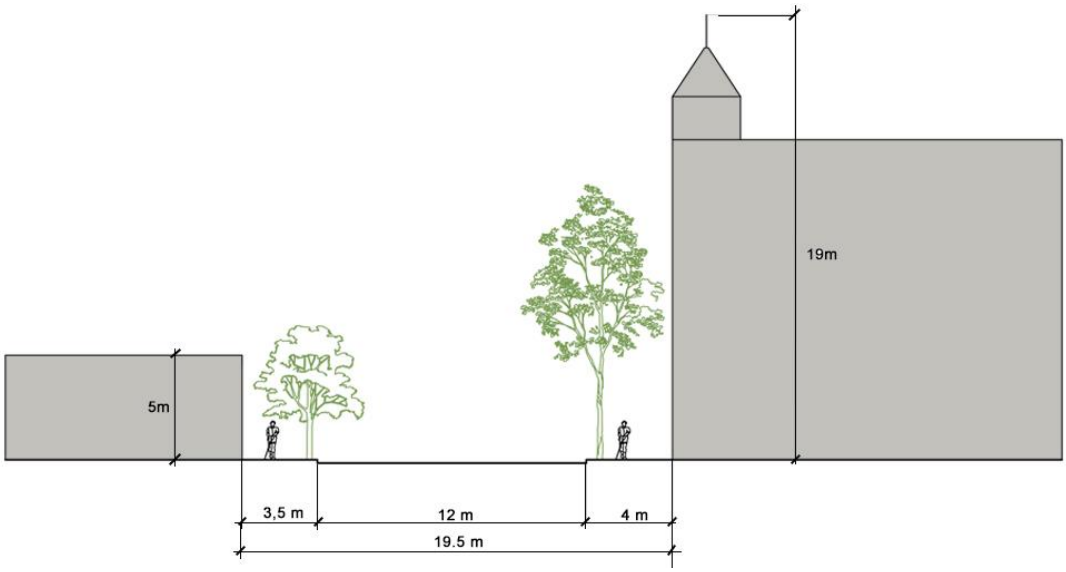


Figure 32: Section A-A of Peace Avenue with the highest and lowest building on the street (Map not to scale)

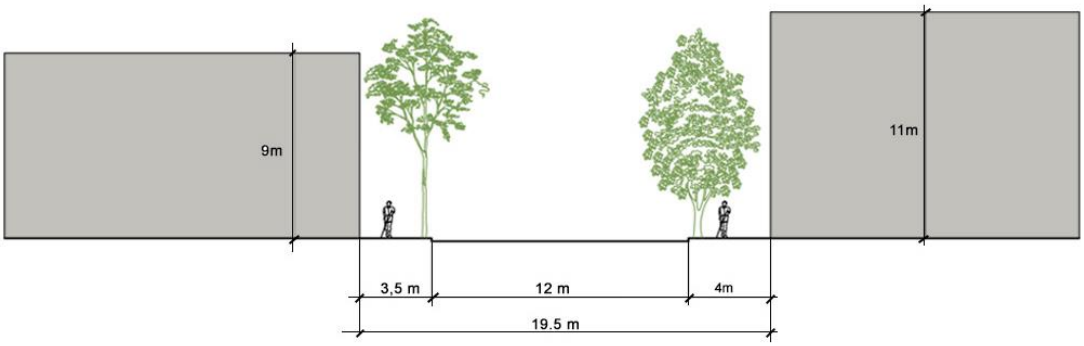


Figure 33: Section B-B

3.4.2 Sidewalks of Peace Avenue

Well-designed sidewalks are a fundamental part of walkable streets. Sidewalks are one of the most important parts of the street for pedestrians, especially in historic urban quarters and city centers, where many tourists and locals walk for different purposes. The sidewalks in historic core of Sukhum have some issues. According to observation, in Peace Avenue there are sidewalks that are in poor conditions and one of its major problem is inappropriate and old surfaces. This makes it difficult to walk conveniently in many parts along the street. In addition, there is no continuity in the pattern of the

street; instead, there are lots of height variations, which make walking very difficult, not only for disabled pedestrians but for everybody as shown in Figure 34 and 35.

Figure 34: Poor sidewalk condition in Voronov park, Peace Avenue, Sukhum.

Furthermore, the sidewalks on the street have inconvenient and undefined places with insufficient ramps or any special materials for physically and visually disabled people to pass the street and sidewalks easily and safely. On the other hand, the width of the sidewalks in Peace Avenue varies from 3.5 to 4 meters; which is an appropriate width for all pedestrians. Moreover, around Aiaaira Park in Peace Avenue, there are well-designed sidewalks and ramps, yet there are no special materials for physically and visually disabled people.

Figure 35: Pictures show the absence of ramp and special materials for disabled people.

According to the research survey questionnaires, out of 100 respondents, 27.3% believe that the condition of the sidewalks in Peace Avenue is poor, while the other 56.8% state that conditions are fair; so, as a result, only 15.9% of users evaluated condition of sidewalks in a positive way as shown in Figure 36.

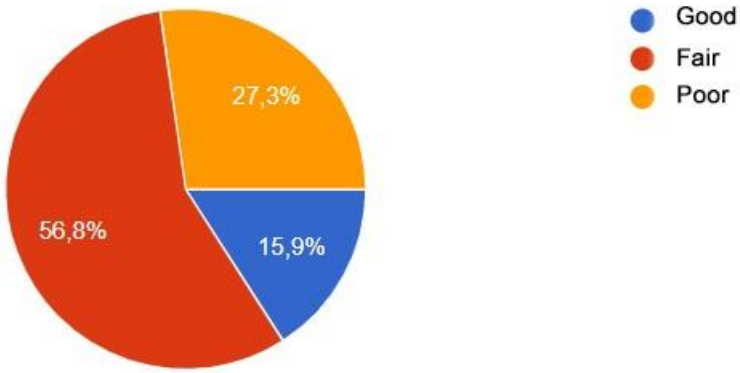


Figure 36: Rating of sidewalks condition.

3.4.3 Vegetation along Peace Avenue

Vegetation plays a vital role in street design by providing shade to pedestrians, creating more enjoyable environment for walking and beautifying the street. According to personal observation of Peace Avenue, there are some places, where the landscape design is poor; for example: the absence of tree pits as shown in Figure 37.

Figure 37: Absence of tree pits.

However, there are trees with high branching structures along Peace Avenue, that create shade and convenience. Moreover, rows of trees along Peace Avenue serve as a border between people on the sidewalks and traffic by creating a safer place for users (Figure 38)

Figure 38: Trees with high branching structures along Peace Avenue.

Primarily, there are three kinds of trees along Peace Avenue including tilia, eucalyptus and palms (Figure 39). Peace Avenue is mostly green even in winter season. On the other hand, there is a lack of shrubs, bushes and other forms of vegetation as shown Figure 40. According to the survey out of 100% interviewed, 29.5% respondents evaluated landscaping in a positive way; while 45.5% are neutral ; not to mention the 25% dissatisfied with the landscape design along Peace Avenue as shown in Figure 41.

Figure 39: Existing trees along the street.

Figure 40: Lack of shrubs and bushes.

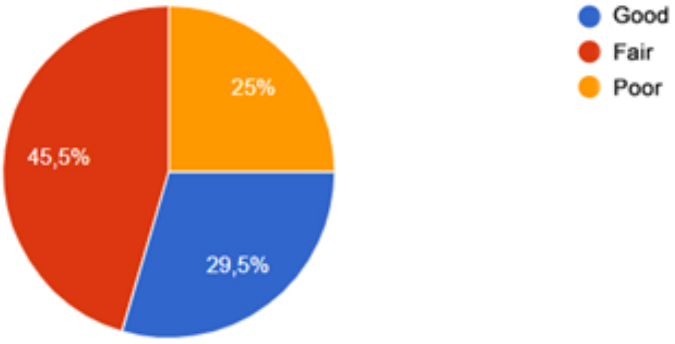


Figure 41: Rating the level of the vegetation.

Figure 42: green areas along Peace Avenue

3.4.4 Lighting in Peace Avenue

A well-lighted site provides clear perception for pedestrians and is necessary for brightening the environment to make the street safer for people at night time. According to personal observation, there are some issues related to lighting conditions along Peace Avenue. For example, the placement of street lighting close to other street elements like trees or advertisement hoardings impede proper illumination. Moreover, many lightings along the street do not work as shown Figure 43.

Figure 43: some lightings do not work and lighting close to the tree impedes proper illumination.

However, the "Clocks" close to Pushkin Park and Aiaaira Park are well lit as shown in Figure 45 and 46. In addition, according to survey out of 100 interviewed, 45.5% answered that lighting conditions along Peace Avenue are good; while 40.9% respondents evaluated satisfactorily; and only 13.6% noted a low level of lighting

conditions. Thus, according to survey Peace Avenue is conveniently lit, however according to personal observation males gather in parks or open areas at night time more often, while women are respectively rarely appear to be invited at Peace Avenue. For this reason Peace Avenue found rather empty most of the time, hence it needs to be under maintenance constantly for it to avoid being vulnerable to unhabitability.

Figure 44: Lighting conditions on the sidewalks close to Aiaaira Park.

Figure 45: Clocks building.

Figure 46: Aiaaira Park.

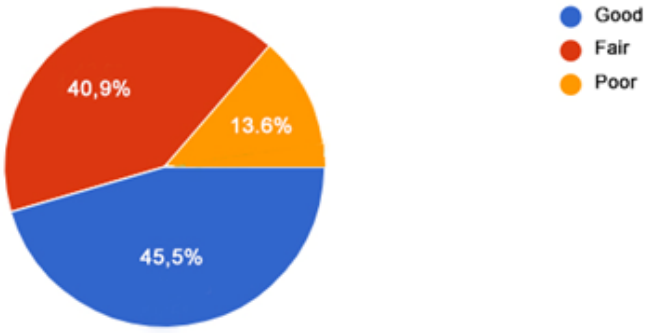


Figure 47: Rating of the lighting conditions along PA.

3.4.5 Street Furniture in Peace Avenue

Street furniture is one of the great significances in ensuring the comfort of people in all public spaces. According to personal observation, Peace Avenue lacks bicycle racks, flower stands, kiosks, public arts, and trash receptacles. Peace Avenue has two kinds of bins: stable and movable; the existing movable bins are in poor conditions which give the street a bad image accordingly (Figure 48). In addition, inconvenient instant road bumps not only disturb the general environment of the street yet also, intrudes with the amenity and the service of its function. Moreover, the existing light poles around the surrounding pedestrians are old and rustic, reflecting the street as outdated and primitive (Figure 49).

There is a small number of benches and seating elements along the street; they are only found in Aiaaira Park and Pushkin Park (Figure 50). According to survey out of 100% respondents, 18.2% are satisfied with the street furniture along Peace Avenue, while 34.1% users evaluated it as satisfactorily, and other 47.7% noted inappropriate conditions of street furniture along the street.

Figure 48: Bins in poor conditions.

Figure 49: Bumps and light poles in poor conditions.

Figure 50: Benches on Aiaaira park.

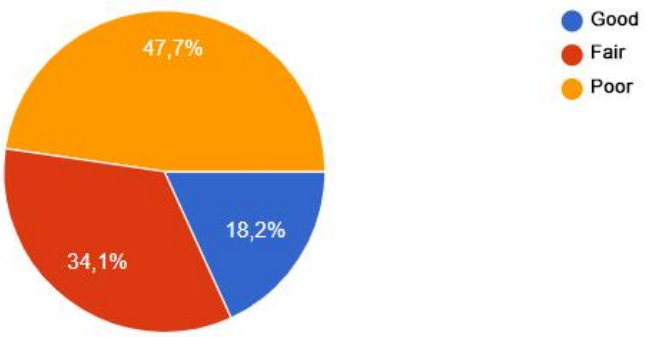


Figure 51: Rating the street furniture conditions.

3.5 Analysis of the Functional Factors of Peace Avenue

Peace Avenue has been analyzed in terms of accessibility and permeability, mix land uses and legibility.

3.5.1 Accessibility and Permeability of Peace Avenue

Accessibility to the Sukhum city is organized mainly by the highway (E-60) which is a highway of national importance. It passes through the city transport network and Peace Avenue as Lesilidze Street. The secondary road also passes through Peace Avenue but through Sakharova Street and Peace Avenue Street; where partly access is limited from Dbar streets to Leselidze street. While, the tertiary road is used inter-quarterly as shows Figure 52. According to the analysis and scrutinizing of the assigned map, Sukhum city has a small block size and therefore there are high accessibility and permeability. Since the urban structure of Sukhum consists of small blocks that enhances the ability to see and move around, people have more alternatives with a slightly shorter length of the public route. Small blocks also increase visual permeability, improving people's awareness of the choice available: the smaller the block, the easier it is to see from one junction to the next in all directions. In addition, there is public transport accessibility to Peace Avenue as shown in Figure 53.

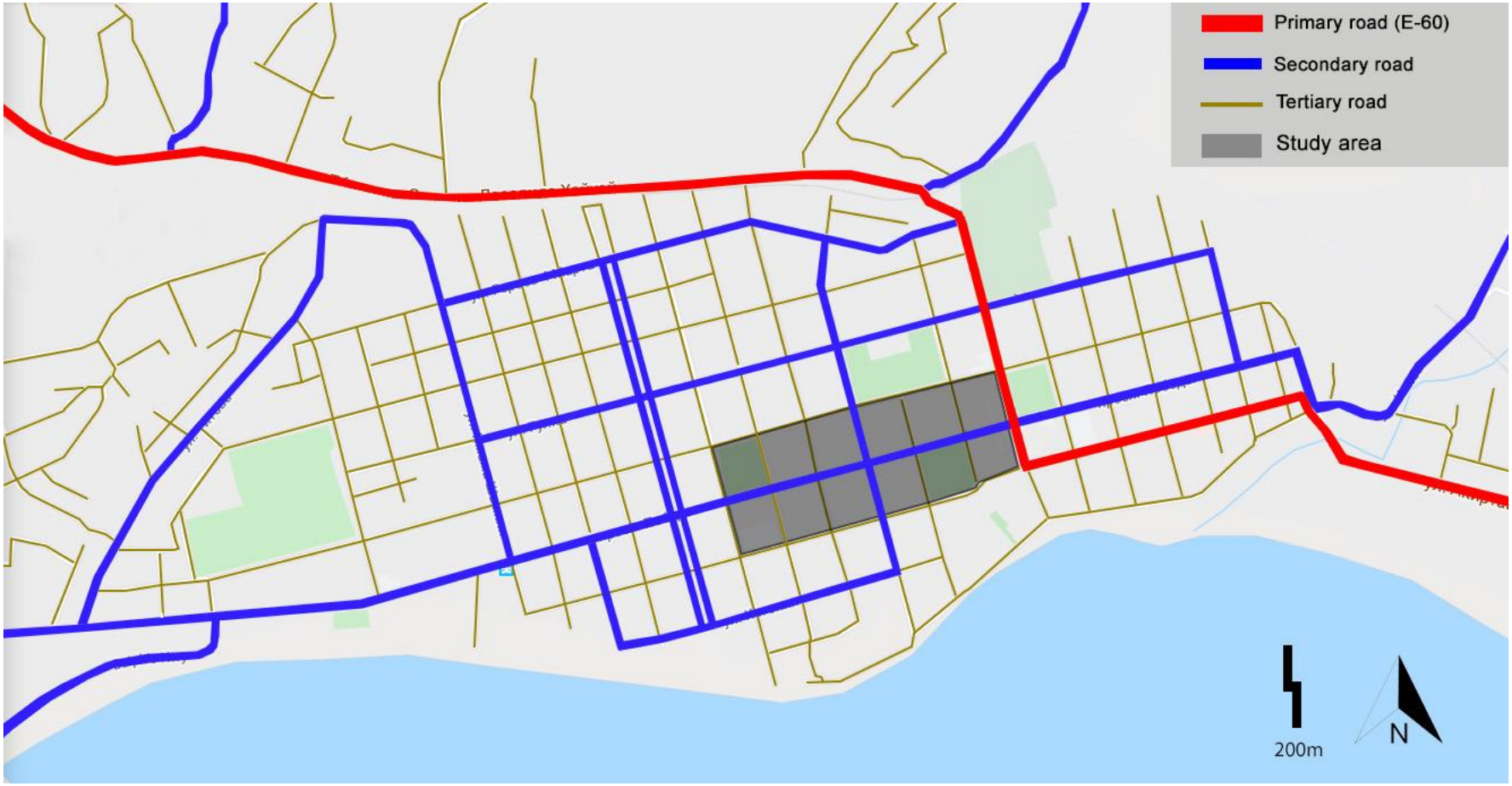


Figure 52: The existing road structure of Sukhum city

Figure 53: Accessibility in Peace Avenue

Above all, access for disabled people elderly, small children in strollers, pregnant women are also another necessary aspect of accessibility in the street. These play an important role to create more lively streets and they improve them as social spaces in urban areas; which accordingly should provide accessibility and permeability for all kinds of models of transportation for all ages. Nevertheless, according to personal observation, Peace Avenue has some issues within this regard. Existing poor conditions of sidewalks along Peace Avenue, no special technical equipment for blind people, no pedestrian crossings on some roads, and no traffic lights restrict the freedom of smooth movement for pedestrians. The street is not equipped with ramps; and even in Aiaaira Park, where they insufficiently exist, cars standing on the street close the access to the ramps as shown in Figures 54 and 55.

Figure 54: Poor condition of sidewalk.

Figure 55: Closed access to the ramp.

3.5.2 Mix Land Uses in Peace Avenue

The presence of historical buildings should fill Peace Avenue with a culturally enlightening function. However, the main functions and concentration of buildings

forming the appearance of the environment are commercial. The saturation of this space is a business and a commercial enterprise on the first floors whilst residential apartments on the second and third. Different types of residences host many people including locals who have been living for decades and mainly elderly people. Peace Avenue has recreational areas, which are Voronov Park, Aiaaira Park, and Pushkin Park. Although the main function of the street is providing transit through the historical center, it lost its function in 1866 and has been used as parking spaces instead.

Figure 56: Small flea markets on the street.

Nowadays, buildings on the street are filled with functions as: retail, community centers, institutional, housing, and offices. For example, clothing stores, small flea markets on the street, postal office, bank, mobile offices, cassette store, drapery store etc. However, despite the wide range of variable building functions, according to the

survey, an insufficient number of functions were identified following the modern needs of people. These critical missing functions include culture and entertainment, places of public catering, and social hubs which will aid in reflecting the social diversity of the space.

Figure 57: Violence of the appearance of the historic street.

Moreover, according to the conducted survey, Peace Avenue consists of functions that have lost relevance over time. Based on research, more dominant commercial functions and lack of culturally entertaining functions is noted. To clarify, Peace Avenue is used as a pedestrian transit but not as a place of gathering and entertainment. Also, the parking function on the street limits and negatively affects the comfort and safety of people. Another issue is that existing owners of commercial enterprises do not monitor the image of the historical environment and rather violate the appearance of the historic city center; because they make window replacements, put air conditioners, banners, materials, and painting of buildings that do not fit to the heritage of the environment (Figures 57, 58)

Figure 58: Violence of the appearance of the historic street.

Thus, according to the survey, only 2.3% of respondents evaluated the variety of functions along Peace Avenue positively, while other 22.7% took a neutral point of view, and 75% of users were dissatisfied with the variety of functions in the street.

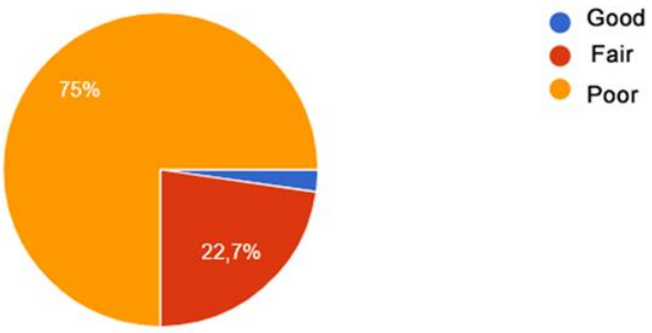


Figure 59: Rating of the level of functions on the street

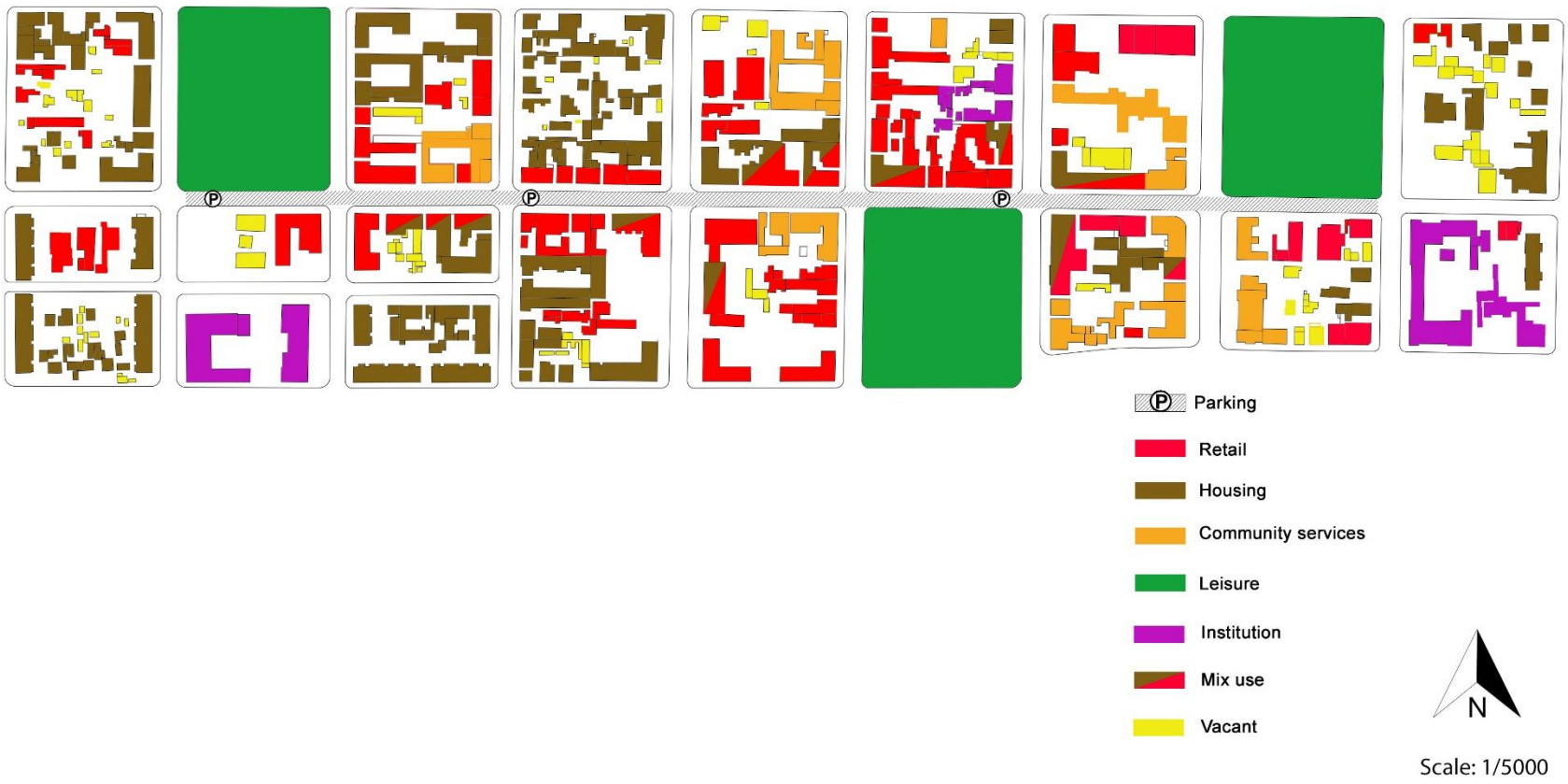


Figure 60: Land use map in Peace Avenue

3.5.3 Legibility of Peace Avenue

Peace Avenue was analyzed according to Lynch by the availability of edges, nodes, paths, landmarks and districts. According to Lynch (1960), if any landmark has a clear form that clearly contrasts with its background, and has a crucial location: then it can be considered important. Thus, in Peace Avenue's 5 landmarks, 3 out 5 are parks. While the other 2 are classified as the highest and most recognizable buildings in the street: «Clockes» and house of Stefanidi (Figures 61, 62). Furthermore, the main edges of the street are formed by the red building lines and the parks created along the Peace Avenue to identify its borders clearly.

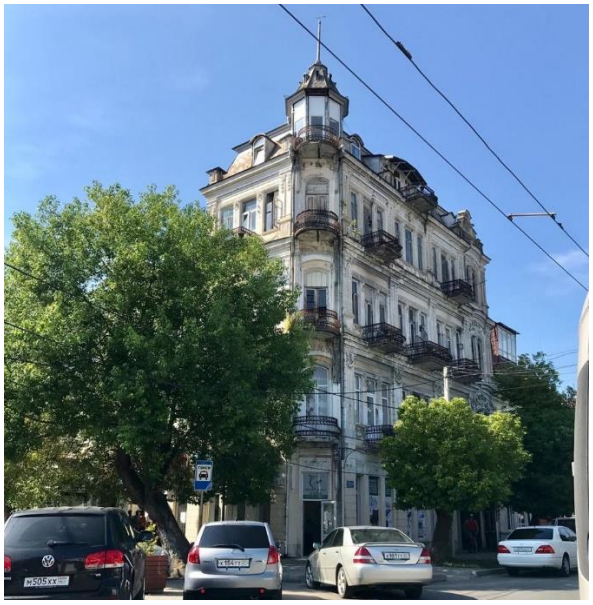


Figure 61: House of Stefanidi.

Figure 62: Clocks building.

Another point to mention will be categorizing the sea close by as a natural edge. Similarly, paths are all roads including a main highway, secondary and tertiary roads, as previously discussed. The intersection of streets forms the main transport nodes. To explain, there are two main nodes that cross Peace Avenue on Leselidze street, the main highway (E-60), and the secondary road on Sakharova street.

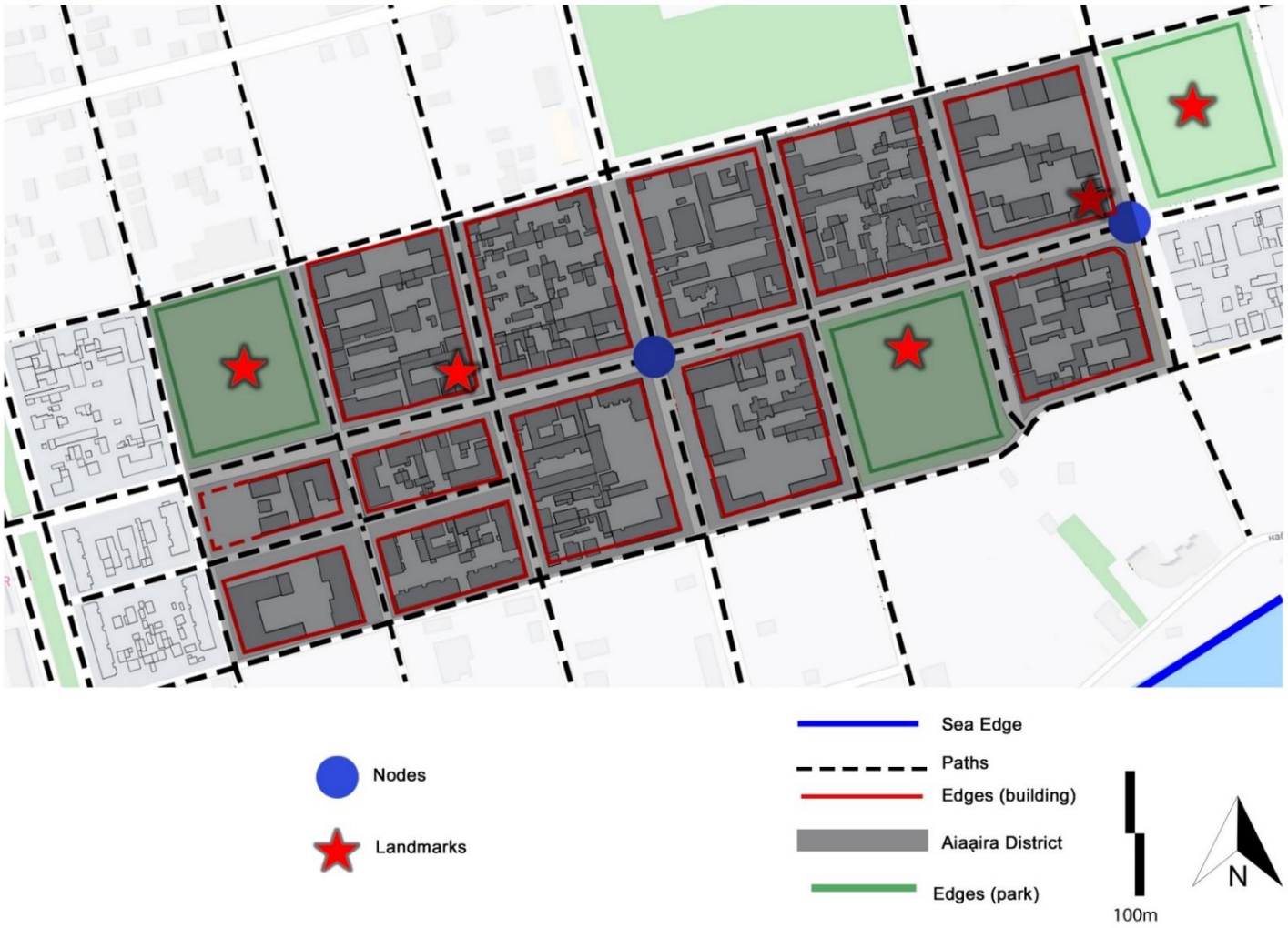


Figure 63: Legibility of Peace Avenue

3.6 Analysis of the Social Factors of Peace Avenue

Peace Avenue has been analyzed in terms of safety, comfort, culture and sense of belonging.

3.6.1 Comfort and Safety along Peace Avenue

Being comfortable, feeling safe and at ease are the qualities of a livable space that will attract people using the street and make them stay. The experiences of the street users can be used to evaluate the level of comfort in the street and indicate the degree of social interaction within. As a result, the scrutiny of the comfort of the public users can be studied through a well-balanced analysis of both the physical and the social attributes contributing to the experiences and the perceptions respectively. With this in mind, the physical factors in coordination with elements such as greenery, shading spaces, street furniture, lighting elements, and universal equipment assure the establishment of a well-defined and simultaneously comfortable environment to be around.

At the same time, the safety of the street users becomes crucial when discussing the comfort that comes along. To further explain, the social threatening aspects like lack of security, minimal police inspections, and the deficiency of public safety highlight the significance of their existence. To elaborate, several reasons for feeling unsafe on Peace Avenue can be noted through a lack of 24 hours activities and functions on the street since the commercial sectors close by 7pm and the poor street lighting conditions at night in some areas, limits the density of people and families. Therefore, which at night time, the street becomes a gathering spot for different gangster groups, and certain crowds of dangerous individuals triggering a threatening ambiance across the avenue. Not to mention, this hazard and intimidation provokes the parks to be

uninhabitable by people and various users at night. Moreover, nowadays the level of crime on Peace Avenue is high. Besides, according to the survey conducted of 100 respondents, 20.5% of the respondents evaluated the comfort of Peace Avenue to be good, while the other 40.9% responded as neutral, and the rest of the 38.6% evaluated it as uncomfortable.

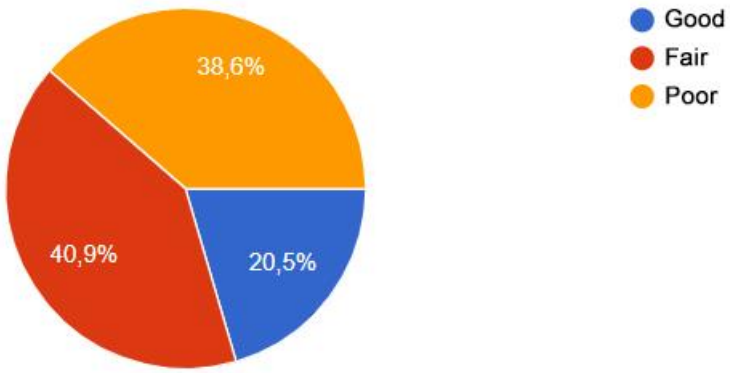


Figure 64: Rating of the level of comfort and safety along the street.

In short, the physical and social attributes go hand in hand rather than individually to enrich the comprehensive comfort experience and guarantee the ease and satisfaction of one's safety perspective.

3.6.2 Culture and sense of belonging on Peace Avenue

Peace Avenue has deep historical roots, starting the history as a bazaar and transforming during the time, to become the main commercial street in Sukhum city in the Soviet time. Though, during the time, most of the functions of that period have lost their relevance, yet the historical environment and existing architecture heritage give a strong identity and sense of belonging to people. The buildings such as: Administration building, prior Café «Palas» and current «Burger King», the house of Stefanidi, prior Building of furnished rooms «Europe» and current «Detski Mir» bring

the cultural identity to the street and thus the sense of belonging particularly to the citizens. However, concerning the socio- cultural activities on the street, there are only few events such as National Victory Day and National Flag Day when locals wear traditional outfits and walk along the Avenue (Figure 65).

Figure 65: Celebration of the National Flag Day.

Another concern involves the daily lack of cultural activities since there is only one routine found, where locals can sit in parks and watch people passing by. The activities like live theater and music, movie nights, a farmers market, public art, restaurants do not exist on Peace Avenue. In addition, according to the survey, 20.5% of the respondents evaluated the cultural activities to be good, while the other 27.3% responded as neutral, and the rest of the 52.3% evaluated variety of cultural activities along the street as poor.

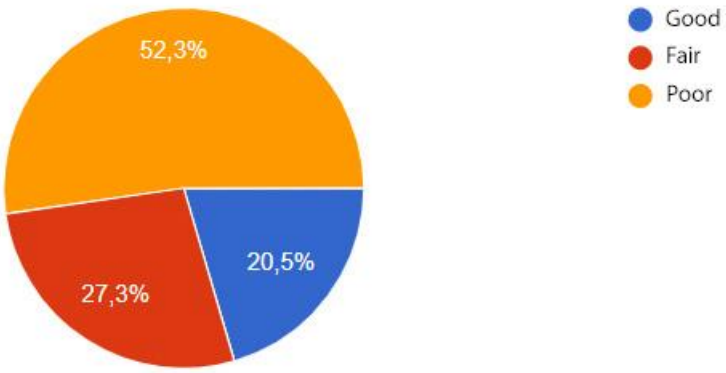


Figure 66: Rating of the level of cultural activities.

SWOT

Chapter 4

CONCLUSIONS AND RECOMMENDATIONS

Literature survey on the walkability concept revealed that streets have a significant responsibility to be accessible to all, to be functional, safe, and to act as attractive places to walk. Historic Urban Quarters (HUQ) by their historical and cultural association provide a strong sense of place and identity to the area. However, in recent decades, many historic centers around the world have been focusing on a diversity of issues such as rapid rising number of private cars, negligence of pedestrian-friendly routes, lack of appropriate activities, poor accessibility, and an absence of functions that attract people to the place.

In the first chapter the problem statement, aim of the research, methodology and limitations are pointed out. The aim of the research focused on determining the significant features affecting walkability in HUQ, in specific to the historic urban core of Sukhum city, and to what degree the Peace Avenue in Sukhum is presently walkable. The study was based on a mixed research method both qualitative and quantitative including related literature from primary sources like books and articles, and secondary sources such as internet sources. The study area was limited from Dbar to Leselidze streets, Sukhum, Abkhazia.

In chapter two of this study, the main concept and general definition of pedestrian-friendly streets and HUQ are explored, where the relationship between walkability and

street design, street design in HUQ, and the components of walkable street are described in detail. Tangible and intangible features of walkable street are analyzed according to physical, functional and social factors that form pedestrian-friendly streets.

In chapter three, Peace Avenue in Sukhum city is taken as the case study, and the walkability was measured by focusing on physical, functional and social factors. In addition, the questionnaire survey was conducted with 100 people some of whom lived in Sukhum and some tourists. By recording the result of each indicator by the criteria of measurement, it is revealed that the walkability factor cannot be classified entirely as pedestrian-friendly due to problems associated with sidewalks, comfort, safety, street furniture, variety of uses and lighting conditions. Hence, in line with the street problems underlined, some recommendations are proposed to increase the walkability on Peace Avenue.

Recommendations:

The obtained data has clarified that some improvements and changes are needed to implement a pedestrian-friendly environment along the street. Thus, to increase the walkability level in Peace Avenue, the following recommendations and suggestions should be taken into consideration; which can be grouped under 3 main factors: physical, functional and social.

Physical Factors:

• Redesign pavements and ramps and propose special materials for physically and visually disabled people

• Provide proper tree pits

• Increase the variety of vegetation along the street including shrubs, bushes and other forms of vegetation to create safer pathways for pedestrians.

• Enhance the existing lighting conditions by providing well-lit streets so that streets can function 7/24.

• Provide benches and seating elements as well as bicycle racks, flower stands, kiosks, public art, trash receptacles, road bumps and improve the conditions of light poles.

Functional Factors:

• Prohibit car parking along Peace Avenue

• Pedestrianize the existing parking area along Peace Avenue from Dbar to Leselidze streets to make it more convenient, safe and walkable

• Offer alternative car park areas in close proximity

• Provide alternative housing opportunities for a variety of users

• Maintain the unique building facades by keeping them user friendly and harmonize shop and street signs

• In introduce sidewalk cafes to help encourage pedestrian exploration

• Orient buildings to street and remove parking in front of them

• Organize uses to support public activity

• Increase the variety of functions in the whole area to invite diversity of users to come to place and keep it walkable and active.

• Improve and propose cultural activities and entertainment, places of public catering, social hubs, and proposing some places for social interaction that will aid in reflecting the social diversity of the space.

• Offer alternative modes of transportation facilities such as cycling ways in the area to attract variety of people to come

• Encourage and promote municipality to use the proper materials for the buildings to reach the proper textures in area and emphasize harmony in historical facades.

• Propose semi-open spaces for social communion and interaction

• Preserving the historic buildings in the area to keep the characteristics and identity unique.

• Revitalizing the area by giving new functions

• Keep the image of the historical environment and appearance of the historic city center in appropriate conditions

Social Factors:

• Increase the safety of pedestrian paths to increase the walkability and livability level in the area 7/24.

• Increase 24 hours activities and functions

• Promote security, police inspections, and special security equipment

• Propose cultural activities such as open theater, movie nights, a farmers market, public art, street entertainers, shops, and restaurants along the street.

All these suggestions and recommendations may contribute to walkability in the area and make Peace Avenue more pedestrian-friendly. Based on the evaluation of walkability functions, it is revealed that, for measuring the walkability in the area, all features and indicators (physical, functional and social) have to be taken into consideration and evaluated repeatedly, in order to reach the walkability in the area.

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APPENDIX

Questionnaire

In following, there is the three pages of questionnaire that was conducted with 100 persons. The answers of the questions are used within the chapter three.

Survey on walkability factors on Peace Avenue

Dear Respondent

As part of the Urban Design Master's Program of Eastern Mediterranean University, I am conducting a research survey for exploring the users' evaluation of walkability factors, which positively improve the livability and sustainability in Sukhum city. Your kind participation is highly appreciated. This survey is anonymous; the data obtained will be presented as general conclusions. If you have any query, please contact me.

Thank you in advance for your time and support.

PART A:

1. Gender?

☐ Male ☐ Female

2. What is age group?

☐ 18 to 27 ☐ 28 to 37 ☐ 38 to 47 ☐ 48 to 57 ☐ 58 to 67

3. Educational Level?

☐ Primary school ☐ Middle School ☐ High School

☐ Junior technical college ☐ University

4. Marital Status?

☐ Single ☐ Married ☐ Divorced ☐ Widowed

5. Are you

☐ Local ☐ Tourist

6. Are you dominantly a

☐ Driver ☐ Pedestrian ☐ Public transfer user

7. How often do you walk on Peace Avenue?

a) Every day

b) Once in a week

c) Twice in a week

d) Once in a month

8. What time of the day do you prefer to walk on Peace Avenue?

a) Morning time

b) Noon time

c) Evening time

d) Night time

9. What time of the year do you mostly prefer to walk on Peace Avenue?

a) Winter time

b) Spring time

c) Summer time

d) Autumn time

10. Which of the criteria below expresses your walking purpose along Peace Avenue?

a) Leisure

b) Sport purposes

c) Shopping purposes

d) Sightseeing

11. How often do you do sport activities on Peace Avenue?

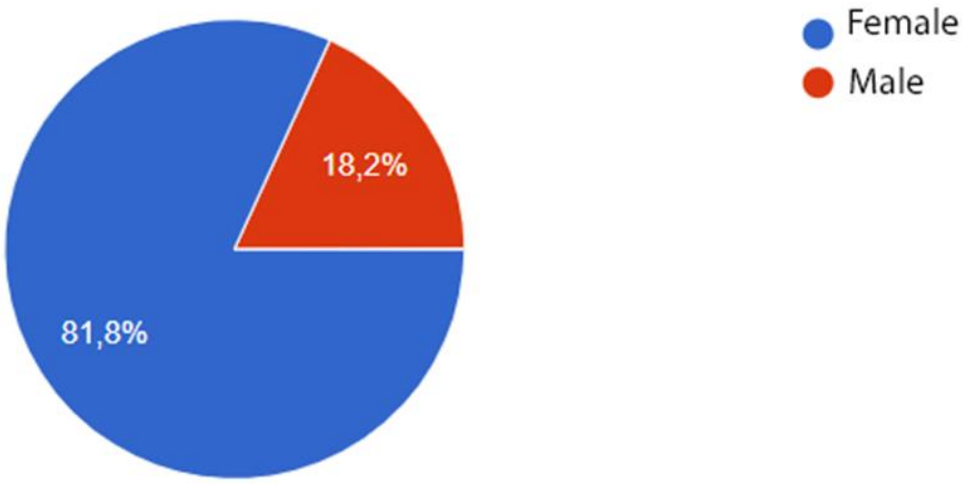
a) Every day

b) Once in a week

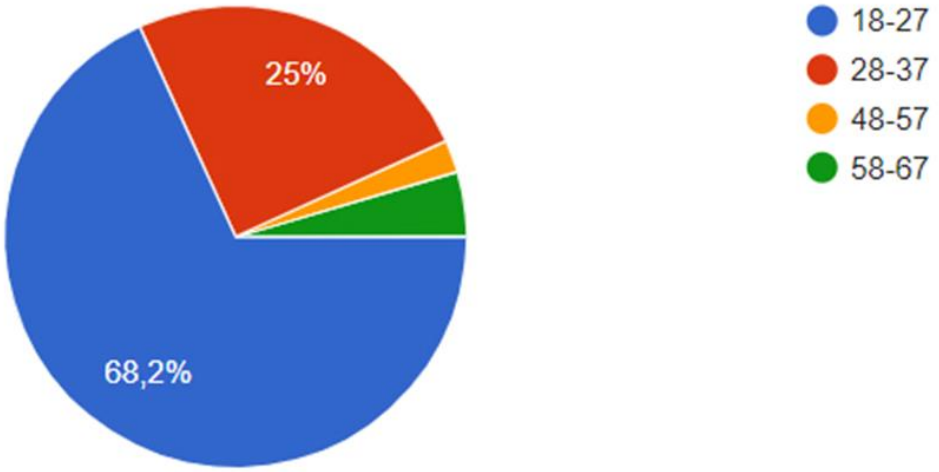
c) Once in a month

d) Never

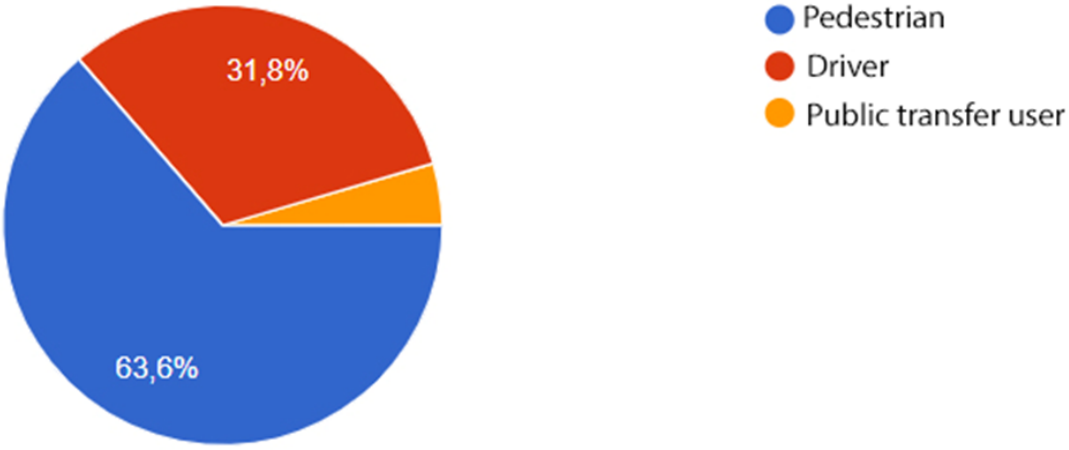
What gender are you?



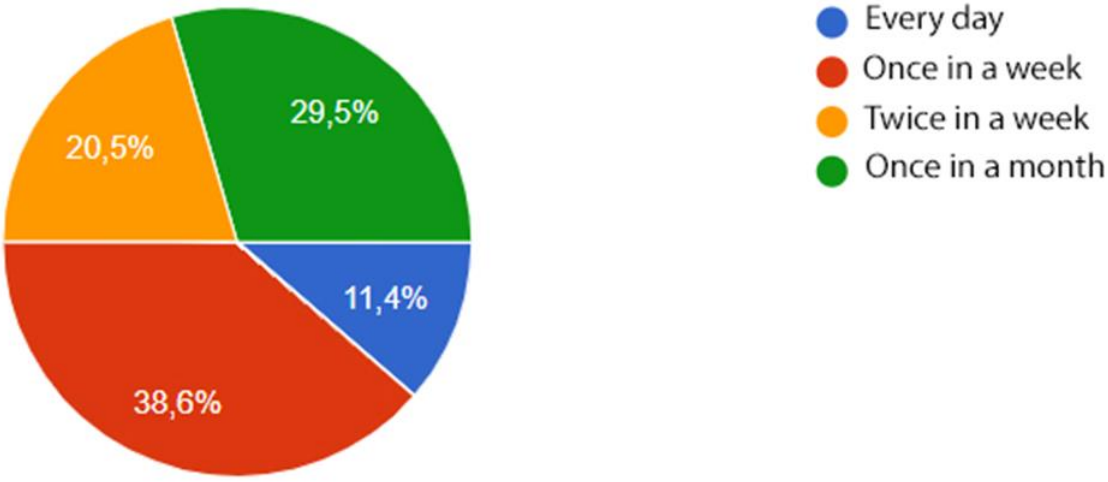
What is your age group?



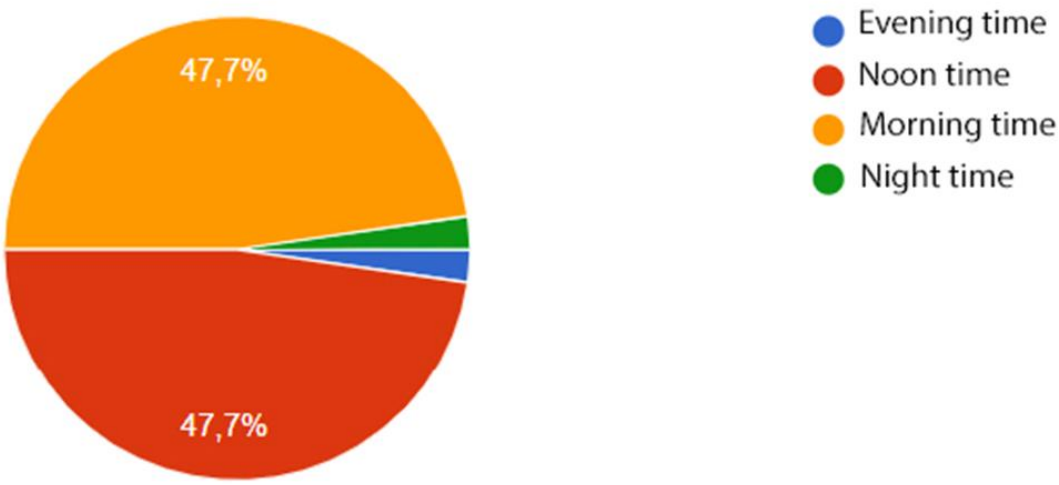
Who are you dominantly



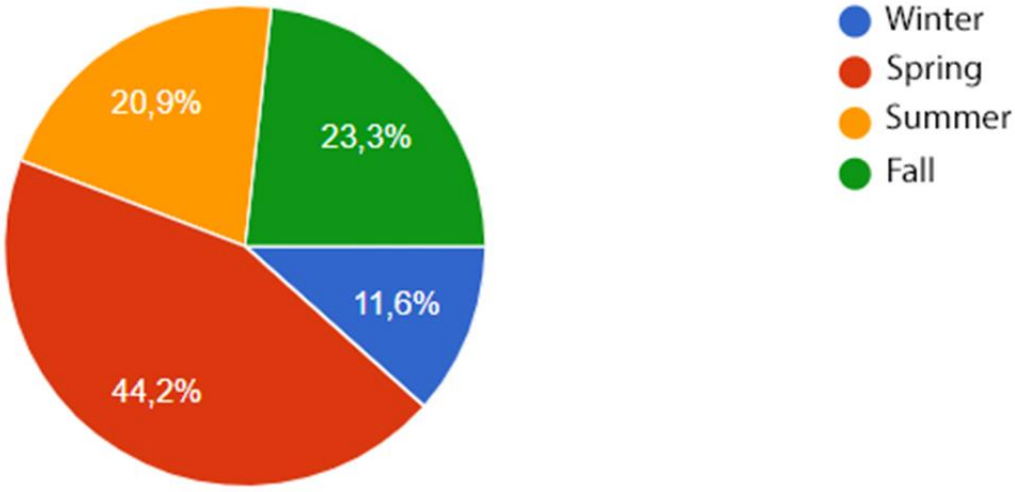
How often do you walk on Peace Avenue?



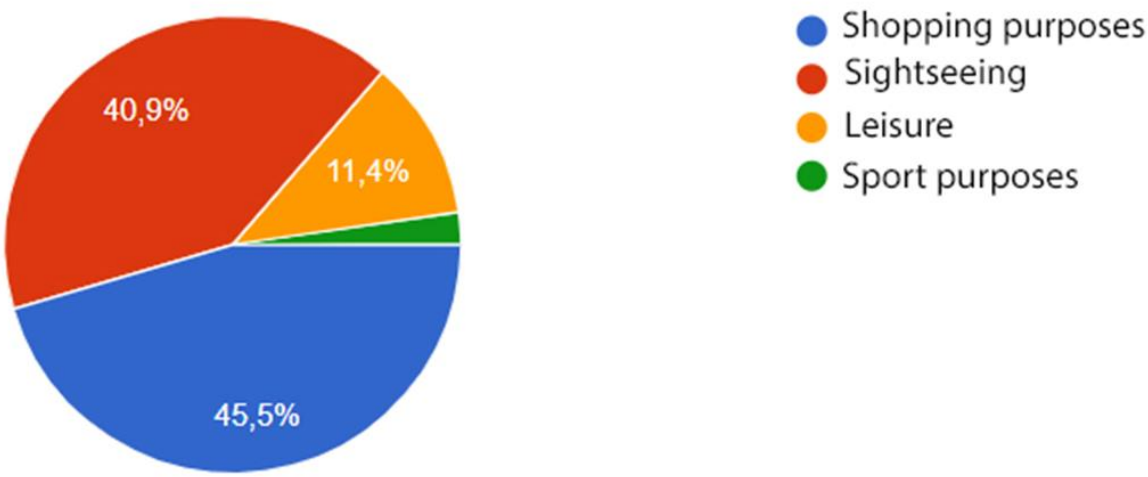
What time of the day do you prefer to walk on Peace Avenue?



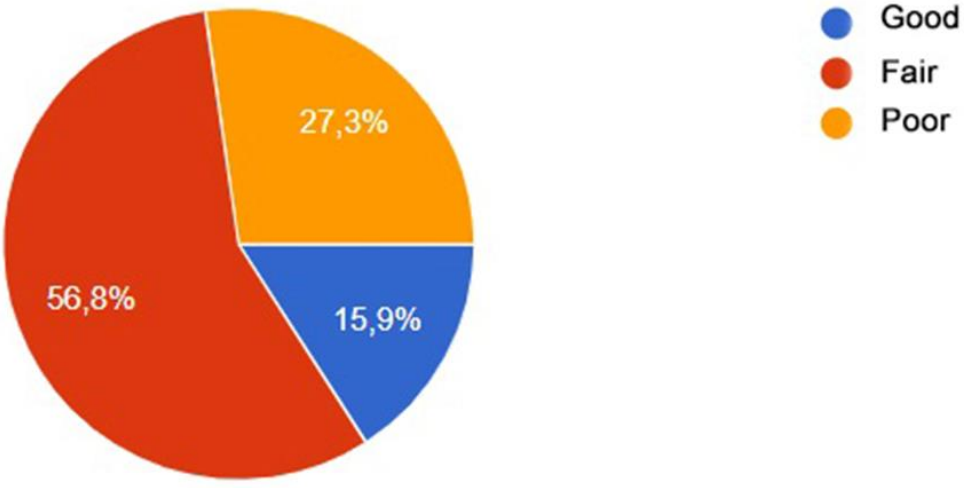
What time of the year do you mostly prefer to walk on Peace Avenue?



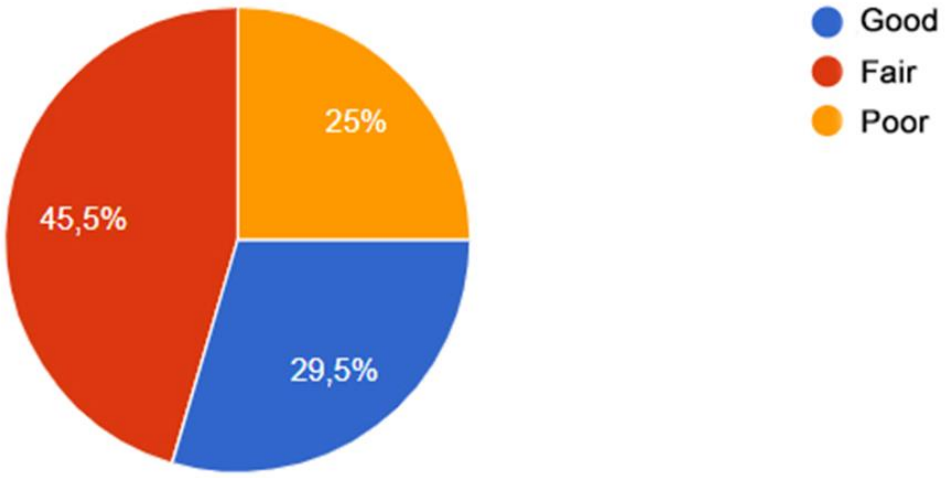
Which of the criteria below expresses your walking purpose along Peace Avenue?



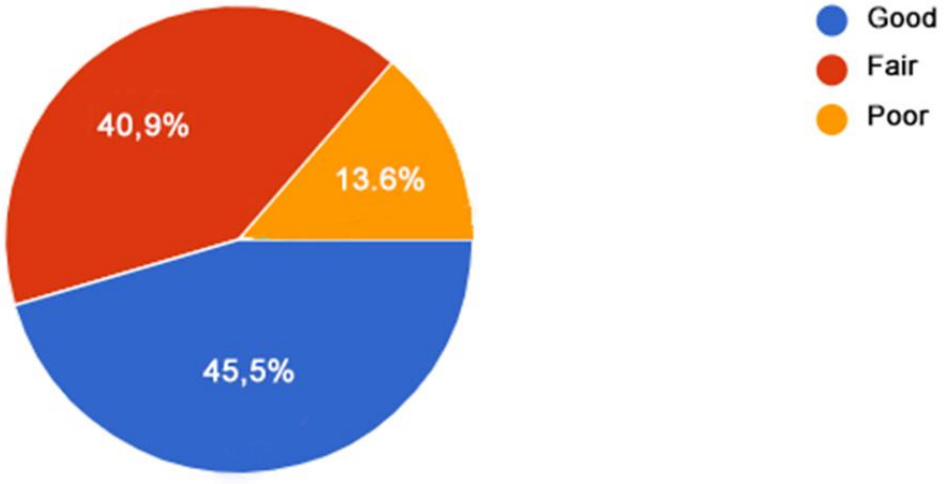
How can you assess the quality of sidewalks along Peace Avenue?



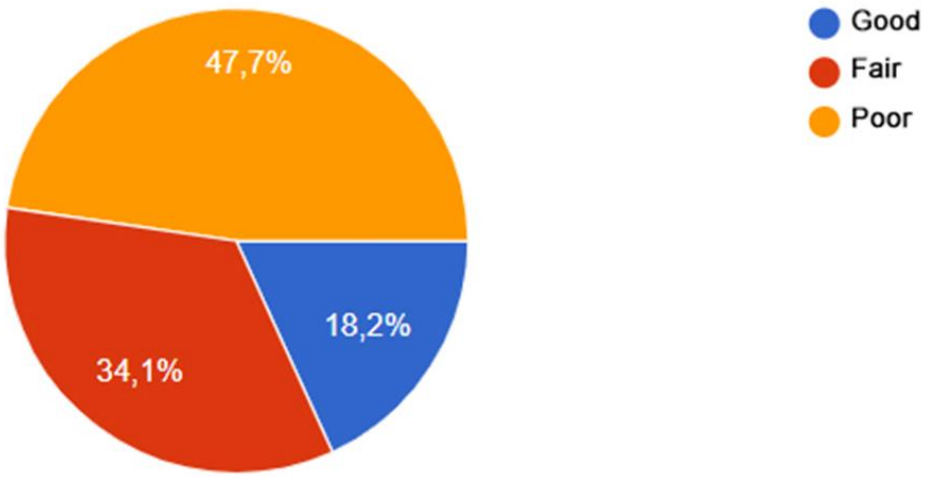
How do you assess the amount of green area and landscaping along the street?



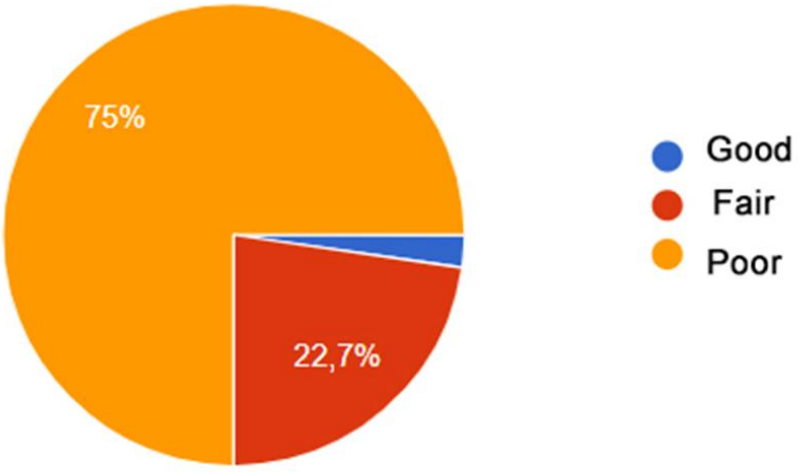
How do you assess lighting conditions on Peace Avenue?

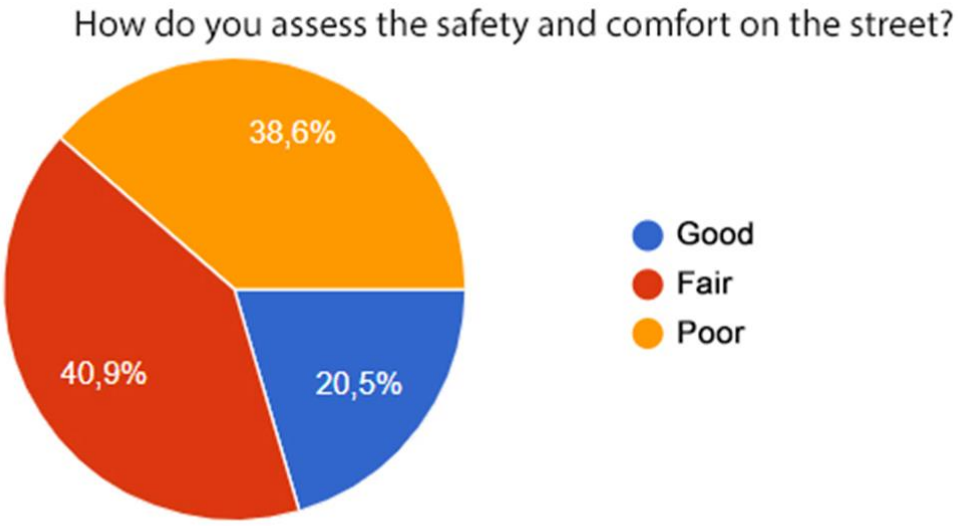


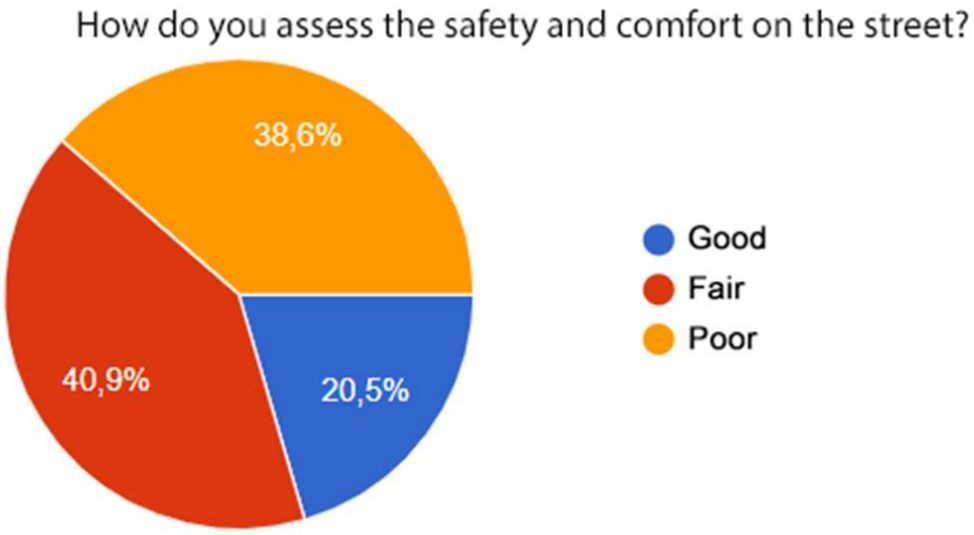
How do you assess the street furniture along the street?



How do you assess the existing functions along the street?




How do you assess the safety and comfort on the street?
38,6%
40,9%
20,5%
Good
Fair
Poor


How do you assess the safety and comfort on the street?
38,6%
40,9%
20,5%
Good
Fair
Poor