UNIVERSITY OF BAHRAIN
COLLEGE OF ENGINEERING
DEPARTMENT OF ARCHITECTURE & INTERIOR DESIGN

# Promoting Multi Sensorial Experience to Enhance Social Interactions in the Streets of Bahrain

A thesis submitted to the Department of Architecture and Interior Design of the University of Bahrain in Partial fulfillment for the degree of Master of Architecture in Urban Design

Prepared by:
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Supervised by
**Dr. Ranjith Dayaratne**
Associate Professor of Architecture
University of Bahrain

**Kingdom of Bahrain**
**June 2022**

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# Thesis Committee Accreditation

# Abstract

The multisensorial experience of urban space is presented in this study as a theoretical paradigm within urban planning and design that connects perceptions of the urban environment with social interaction. The purpose is to examine how different senses perceive urban environments, such as Bahrain's streets, and which multi-sensory sensations enhance social interaction. The case studies conducted within this research (Manama, Muharraq, and Riffa) indicate a multi-sensory perception of streets and a vision dominance. Observations and interviews conducted in three case studies in Bahrain demonstrate that integrating multiple sensory inputs and small businesses on the ground floors produces a dynamic environment that encourages social interaction even though vision dominates perception, this study advocates for a multi-sensory approach to urban planning and design that includes smelling, touching, and hearing to create lively cities by strengthening the social function of streets by creating urban environments that encourage social interaction in the streets of Bahrain.

# Dedication

This thesis was done as part of my degree project 2022 at UOB – University of Bahrain, Bahrain, as part of the Master of Architecture in Urban Design.

I would want to thank my parents for their unwavering support throughout the years in completing my education. I am also thankful to my sisters, brothers, extended family members, and close friends for being a part of my life.

I look forward to sharing experiences in life with you and having fantastic and illuminating times ahead.

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# CHAPTER ONE
# INTRODUCTION TO THE STUDY

# CHAPTER ONE
# INTRODUCTION TO THE STUDY

## 1.1 Background

### 1.1.1 The Issue

In recent years, urban design and planning disciplines have shifted their attention to how the design of public spaces influences people's experiences and perceptions. It is well known that an individual's perception impacts how he/she relates to his/her surrounding. The notion that an urban environment directly shapes a person's views of public space is a familiar concept among both scholars and urban designers (Degen, 2012).

However, contemporary design approaches to urban spaces and cities are widely criticized for often based on 'visual' dominance (Lynch, 1960; Jacobs, 1992). Lynch (1960) argues that city designs are often seen as producing art pieces. However, he points out that cities comprise daily spaces people perceive and experience. He further states that every individual's first and most basic approach to the city is to engage with it as a person, with sensorial aesthetic experiences across space and time.

While many researchers have addressed the importance of sensory perception, the urban environment's sensory experience has recently received attention. For instance, Gehl (1987) focuses on the liveliness of cities from a user perspective on public spaces. The vibrancy, according to him, is the result of a combination of humans feeling safe in their surroundings, the behaviors adopted by them, and functions that exist on the ground floor of adjoining buildings of public spaces. He also points out that, in addition, the human-scale façades and structures and the speed through which pedestrians can move in these spaces also affect the sensory

perception of people in the experience of the vitality of spaces (Gehl, 1987, 2010; Gehl et al., 2006).

Simultaneously, Mehta (2011) points out that small business indulgences also affect the streets' vitality. In his view, small businesses can strongly impact urban design, community planning, and economic development due to their uniqueness, engagement, friendliness, and responsiveness. Small businesses influence their immediate public spaces and provide public areas with sensory stimulation, social affiliation, active and passive meetings, leisurely activities, social interactions, and relaxation. They invariably create memorable places in streets where people can interact.

According to Zardini (2006), the so-called "sensory shift" in urban-related research has resulted in a paradigmatic change in human and social sciences, expanding the study of senses in urban-related subjects. Sensory approaches to the urban environment experience, for example, can be found in urban space-related disciplines such as geography and architecture in the works of Zardini (2006), Diaconu et al. (2011) and Pallasmaa (2012). Indeed, Diaconu et al. (2011) contend that the urban environment is perceived through various senses (seeing is only visual). However, in urban design and planning studies, the vision has been and continues to be dominant, neglecting individuals' sensory well-being.

Furthermore, Degen and Rose (2012) claim that a professional sensory approach to the urban environment and its design can be utilized to connect with the image and atmosphere of a city. For example, sensory experience is now utilized in connection with marketing in which the city is marketed and designed to be unique, bright, and appealing. The experience and design of the urban environment are connected to environmental aspects such as public spaces' overall security and vitality.

For example, the rough edges have been demonstrated in the built form to promote a sense of security or unsafety (Gehl, 1987). On the other hand, the liveliness of streets is determined by activities on the ground floor, the usage, and small enterprises on the ground floor of adjoining buildings that foster social interactions among urban residents. (Mehta, 2011; Mehta & Bosson, 2018).

Visual perception and street functions have been extensively researched separately within urban planning and design. However, these disciplines still struggle to create lively, productive, and socially-interactive streets. According to Degen (2012), various aspects of senses have been researched thoroughly in other fields compared to urban design and planning, even though the design of urban environments is fundamental to sensory experience.

He further asserts that research needs to be conducted on the sensory experience of urban spaces to create knowledge and understanding of theories and practices that can help generate perceptually rich and memorable built environments (Degen, 2012).

This thesis argues that urban dwellers' perceptions, cognitions, emotions, and sensory well-being related to urban environments are under-represented in past research. Moreover, it is pointed out that it is least explored or not explored in the context of Bahrain.

## 1.2 The problem statement

Cities in the Gulf region have undergone significant transformations due to rapid urbanization and globalization over the last four decades. As a result, urban environments during olden times, designed primarily to relate to the local social structures and economies, have been changed so rapidly that they are beyond recognition. The rising oil revenues and the

Gulf States' economic transformations have led to comprehensive and distributive policies, a central and unique factor shaping the region (Salman, 2016).

In general, Bahrain and all Gulf states have been impressed by the architectural styles in Western countries. As a result, skyscrapers and sizeable western-style shopping centers have been constructed in many cities, triggered by rapid urbanization and western architecture. While they have brought economic diversification, rapid urbanization has also led to a loss of reverence for local architectural heritage and a lack of respect for communities (Hamouche, 2004; Mahgoub, 2011). It is to be noted that many traditional houses and old neighborhoods have been demolished to provide space for the new architecture to grow and enhance the images of cities and countries to be marketed to the world (Salman, 2016).

The criticism of such an approach is that introducing top-down design approaches in urban-related fields has resulted in dead and isolated spaces that largely ignore individual well-being in these spaces. Therefore, taking this as a base in this thesis, it is argued that a multi-sensorial approach to urban environment experience will lead to enhanced social interaction and liveliness in the streets of Bahrain. Therefore, this thesis examines how urban environments, such as the streets of Bahrain, are experienced via many senses and which senses promote social interaction.

The theory grounded on literature review presents perspectives within the urban design discourse and multi-sensory approaches to the interconnection between urban environments and social interaction. This thesis investigates how various senses view the urban environment like the streets and which multi-senses lead to or disqualify social experiences in an urban setting. It also examines how urban dwellers experience the atmosphere of an urban environment, with a particular emphasis on the

streets of Bahrain.

It will conduct phenomenological research on the multi-sensory experience of streets and their surroundings in terms of sociability in urban planning and design. The absence of social interaction and multisensorial research on urban streets is an issue that has not been discussed thoroughly in this field. Promoting social interaction and a multisensorial approach are required to increase liveliness in Bahrain's streets.

## 1.3 Research Questions

In this research, the following questions are posed:

1. How do urban dwellers perceive the atmosphere of an urban environment in the streets of Bahrain?
2. To what extent are the streets of Bahrain experienced as being multi-sensorial?
3. Are there other social, economic and environmental factors influencing perception and atmosphere in the urban environment?
4. How can multi-sensorial design approaches contribute to increase social interactions in the streets of Bahrain, thus creating vibrant urban spaces?

## 1.4 Aim and Objective of the Research

This research proposes theoretical ideas and practices for creating lively streets through a multi-sensory approach to promote social interaction. Its objectives are:

1. To examine how people experience and relate to the local Bahraini streets.

2. To explore how the multi-sensorial experience of the urban dwellers could contribute to an enhanced spatial experience of the streets of Bahrain.

3. To ascertain the factors contributing to the perception of the urban environment, particularly in the streets of Bahrain.

4. Finally, to determine how a multi-sensorial design approach can be employed to create vibrant and lively urban spaces that could promote social interaction in the streets of Bahrain.

## 1.5 Formulation of the Research

This research employs theoretical ideas based on human spatial experience and a phenomenological research paradigm. It is based on qualitative research and data is gathered from three case studies: Manama, Muharraq and Riffa.

The case studies were chosen based on critical commercial and social streetscapes. The three case study streets had various functions on the ground floors of the adjoining buildings, such as small, medium and multinational enterprise occupancies. In addition, they are chosen based on the degree of façades characteristics perceived actively or inactively by its users as well as a range of shop front widths. The data will be gathered for this research as follows:

1. Firstly, critical thinkers in the related field construct a solid theoretical background.

2. The data is gathered from the first-person experience, observations, on-site documentation and interviews in-place and go-along.

3. It uses random sampling for selecting interviewees (local and expatriates).

4. The population targeted ranges from age 25-65 years and is divided into two categories: participants (local, expatriates) knowing the environment

and staying there and participants (local, expatriates) who have not visited the area for a long time but have visited before.

5. It collects data through a non-linear process: going back and forth between different methods to gather rich qualitative data.

6. It involves documenting and auditing information.

7. In keeping with the principles of phenomenology, self-reflection, content analysis and triangulation analysis are used.

8. Current Covid-19 restrictions of social distancing will impose difficulties/limitations on interviews to be carried out.

9. Although observing people and photography could sometimes require the subjects' permission, there are no serious ethical issues.

## 1.6 Thesis Outline

The thesis is structured as follows:

**Chapter 1 – Introduction to the study**

This chapter offers a general view of the background to the issue and introduces the issue. It describes the main problem and what this research aims to achieve.

**Chapter 2 – Literature Review**

The second chapter introduces the work of renowned critical urban thinkers and researchers who have examined the multi-sensorial experiences of the streets.

**Chapter 3 – The Research Methodology**

This chapter introduces the research methodology adopted in this study. It introduces the phenomenological research paradigm: a qualitative approach to research, which this research has adopted. It also presents the case studies from the three central governorates of Bahrain to explore the

issue in-depth and justifies the selection.

**Chapter 4 – Findings of the Research**

In this chapter, the empirical findings are presented.

**Chapter 5 – The Data Analysis**

This chapter presents the analysis of the data, the results and the findings.

**Chapter 6 – Discussions and Conclusions**

This chapter presents the conclusions, followed by the recommendations for using key creators of atmospheres as a tool in urban planning and design practice for increased vitality of urban spaces. It also provides recommendations for further research in this field, especially considering the context of Bahrain.

# CHAPTER TWO
# LITERATURE REVIEW

# CHAPTER TWO
# LITERATURE REVIEW

## 2.1 Introduction

The following chapter examines research on the links between urban environments and social interaction from urban planning and design and multi-sensory approaches from different disciplines. This chapter investigates theoretical ideas related to how urban inhabitants perceive the atmosphere of an urban environment, with a particular emphasis on streets.

## 2.2 The history and the importance of urban streets

> *"Think of a city and what comes to mind? Its streets. If a city's streets look interesting, the city looks interesting; if they look dull, the city looks dull."*
>
> (Jacobs, 1961:29).

Cullen (1961) describes public space as a space where the buildings and landscape, to varying degrees, first open to create a space and then wrap around to 'encompass' space to keep the eye and create a special place. Since ancient times, urban spaces, streets, and markets have made a background for communities' social, cultural, and economic activities. A lively street has allowed people to cross or stroll and engage in commercial, social and leisure activities. They were places that shaped and guided movements and promoted communication and social interactions (Mehta, 2006; Miyake, 2011).

According to Whyte (2012), a street is like a living river in the city. It is the venue for gatherings—a pathway to the center and the primary place. According to Jacobs (1961 & 1993), Gehl (1987), Carr

et al. (1992) and Carmona et al. (2003), people rely on the streets for functional, social and recreational activities. They also depend on the streets for other activities like traveling, shopping, playing, meeting, interacting, and sometimes relaxing.

Jacob states,

> *"Streets and their sidewalks, the main public spaces of the city, are its most vital organs. Sidewalks, their bordering uses, and their users, are active participants in the drama of civilization..."*
>
> (Jacobs,1961:29).

In contextualizing the historical importance of the street as a public space, Mehta (2013) points out that historical cities' labyrinthine streets can still be seen to a significant degree in today's European inner cities as a substantial part of the public space. However, during the Renaissance and Baroque eras, boulevards and avenues emerged in larger cities as buildings and city spaces made their visual appearance increasingly significant. Thus, the dimensions and layout of the streets and squares were determined not only by their use but also by their legal implications also chose their size and design. Furthermore, the streets' dimensions and layout were determined not only by their services but also by their formal impacts.

Mehta (2013) points out that when the motorized traffic in cities expanded, streets and squares' layouts became increasingly geometrical. Pavements were designed to dedicate a public space to pedestrians by the seventeenth century, separating them from traffic. In addition, Mehta (2013) further affirms that boulevards replaced glass-covered arcades in the nineteenth century, which became distinct for Paris and Italy. These boulevards became venues for

gathering and bringing together people from different backgrounds and acted as stages for society to display its culture and elegance. He further claims that walking as a social activity, strolling around and street concerts became thus popular (Mehta, 2013).

However, by the late nineteenth century, increasing motor vehicles replaced the vibrant street life of the roads, thus, introducing a car-friendly and vision-dominant design of planning and urban design. This influenced how cities looked and streets functioned during the industrial era (Mehta, 2013). It was the time: the industrial era, which introduced Le Corbusier's beaming city, founded on the idea of a 'vertical garden city' (Jacobs, 1992). The city was suitable for accommodating high density and consisted of large wide open green spaces and motorways between the high-rise tower block designed to consider the existing dimensions of individual and car traffic on the urban surface that existed during that time (Howes, 2005).

Although it could zone the spaces visually, introducing this solid urban planning and design concept ignored people's daily routines. Hence, urban design and planning became more focused on simple, geometric forms with functional isolation and efficiency of the urban environment. As Howes (2005) points out, this visual zone-spacing led to sensory deprivation, which seems to curse most modern buildings due to their dullness and boredom and affected the streets and public spaces.

Gehl (1987) states that the introduction of modern urban planning principles and design theories such as functionalism, aerial photography, and large-scale social infrastructure during the twentieth

century have been central to the decline of the streets' social role: the vitality of urban and street life. He further claims that the role of the human aspects is critical for successful urban spaces. According to him, a good or bad urban environment will be judged by people who use and participate in that space. However, today, the human aspect has been under-estimated and has not been critically addressed in urban planning and design (Gehl, 2010).

Several critical thinkers such as Lynch (1960), Whyte (1980), Appelyard (1981), Jacobs (1992) and Jacobs (1993), in their various publications, research papers and books before this context of remote, functionalism and top-down perspective, in urban environments, have also demonstrated the value of the basic concepts of design and place, society and culture and urban design to increase the viability of public streets.

For instance, in response to modern developments, these critical thinkers in their nineties emphasized the importance of streets for social life and vibrant cities from urban dwellers' viewpoint while criticizing the motor vehicle dominance and top-down emphasis. Furthermore, the focus was shifted from buildings as entities, visual structuring, and zoning from an airplane perspective to places and streets and their use by urban dwellers and their significance for neighborhoods.

According to von Schönfeld & Bertilini (2017), streets were no longer seen as movement routes for individual motor traffic but as pedestrian spaces where social life occurs. It is to be noted that because of all these critical theorists, a zoomed-in, perceptional view from the viewpoint of urban dwellers and people, stressing the civic

role of streets, was applied to urban planning and design. Looking at neighborhood streets, Jacobs (1992) claims that planning should instead concentrate on sidewalks and ground-floor activities. They promote both perceived safety and social contacts and reserve for city liveliness.

In Jacob's view, vision-dominant approaches only lead to dead and dangerous towns, while planning for vibrant and safe cities must take place at the street level, considering the people who pass through them. She further criticized that what was thought to be effective planning was a series of static actions based on the geographical division of various activities in the urban environment, resulting in unsocial, dead public spaces. Her recommendation in urban design for liveliness was to concentrate on sidewalks, promoting protection and social contact. According to her findings, the types of tangible businesses built on sidewalks, such as shops, restaurants, cafés, libraries, and other public spaces, influence how people use the sidewalks in their daily lives (Jacobs, 1992).

Furthermore, using the street as the vital river of a neighborhood, the place where people could come together was emphasized. Whyte (1980) suggests that social life in public spaces contributes profoundly to individuals' quality of life and society as a whole. He further argues that physical environments can be designed to facilitate engagement and group participation based on his research into human behavior and the experience of public spaces in different urban environments.

According to Appleyard (1981), lively streets can be built by reducing automobile traffic while increasing green structures. He argues that the ecosystem of streets affects human behavior, including

street life, neighboring life, and home life. In his view, vehicular traffic limits the liveliness and accessibility of sidewalks, and people have much less freedom of movement. Therefore, Appleyard suggests that reducing traffic and increasing the green structure will enable people to live amenably in the denser urban fabric of the inner city. Furthermore, decreased traffic will also generate conditions for the re-emergence of street communities (Appleyard, 1981).

Furthermore, Jacobs (1993) shows that a city's sociability occurs on the street. He stresses studying the physical, designable, and buildable qualities of great streets to plan for good and satisfying urban areas that serve as community-building sites and attractive public spaces for all people. He further argues that planning and urban design should represent the community living in the neighborhood (Jacobs, 1993).

On the other hand, Lynch (1960) took a visual approach to streets. Based on his experience, he showed designers how to build a visual framework and branding for streets. Lynch suggests that residents of a city keep and use mental pictures derived from the visual quality of a city to direct and coordinate themselves within a city space. This consistency is determined by the legibility of the city space, provided by the image elements: paths, edges, districts, nodes, and landmarks. By presenting designers with a set of guidelines and regulations which will be involved in visual form at the urban level, he recommends that a visual strategy be used to improve the public appearance of city space (Lynch, 1960).

It is to be noted that although these approaches have subtly different emphases based on the use or vision orientation, the street

has been re-introduced as a public space in urban environments in current urban planning and design. Moreover, while critical thinkers emphasize the street view from the viewpoint of urban dwellers, the emphasis on streets remains as usage, work, and design-oriented.

The car supremacy, out-of-town growth, and leadership specialist fragmentation have stressed the commercial role of the streets while ignoring their function as social activity spaces. As a result, developers have previously overlooked the streets in providing sustainable and inclusive community forms for future commercial streets. However, they concentrated again on the streets concerning social activities (Jones et al., 2007).

Residents in many central and mixed-use neighborhoods rely on the streets for physical, social, and leisure activities. They use them to travel, shop, play, meet and interact with others, and even relax (Jacobs, 1961; Appleyard, 1981; Gehl, 1987; Carr et al., 1992; Jacobs, 1993; Lofland, 1998; Carmona et al., 2003). Furthermore, despite the changes in physical appearance, land use, business rental valuation, social importance, urban structure, internet retail, and industrial gentrification, streets have overcome various obstacles and remain a significant force for neighborhood preservation (Dawson 1988; Talen & Jeong, 2010).

According to Litvin & DiFiorio (2014), most research focuses on the 'malling' of streets, which refers to shopping malls and retail centers where a single developer can dictate all types of merchants. Litvin & Rosene (2017) say that some research focuses on tourism requirements for the design of streets rather than the needs of the residing community in leading street planning. They further claim that

recommendations for combining different local, retail and entrepreneurial stores with chain stores are presented in the literature. The researchers often suggest introducing policies around zoning and programming to build vibrant atmospheres on streets rather than deal with sensoriality.

Indeed, researchers have talked little about the multi-sensory perception of streets and their significance for social interaction. The studies usually focus on land use, vitality, pedestrian activity, and viability to draw investments rather than phenomenological approaches to the experience of streets and their environments (Ruiz-Apilanez, 2015). Furthermore, according to Hall (2015), only a limited number of ethnographic studies are undertaken on streets, emphasizing the macro-perspectives of the symbolic city.

In addition, through insights, interviews and participant evaluation, some researchers talk about street viewpoints of the collective city rather than the inner perspectives of the personal city and the practices of small-scale entrepreneurial adaptations (Hall, 2011). Daly et al. (2018) state that urban planning and design scholars suggest that people perceive and make sense of their urban environment through various senses in real life. Moreover, Zardini (2006) also shows that the body is a vital component of the human experience. Besides, in his opinion, distinctive urban areas, such as streets that are natural qualitative phenomena, can be defined by their character and atmosphere.

Peponis & Wineman (2002) also connect the built environment to organizing how behaviors and activities are inter-connected or distinguished. From a social perspective, built space can be

characterized as an area of formal co-presence, awareness, and encounter. Mehta (2011), on the other hand, states that streets, as social scapes, create a framework for social interaction. According to Damaiso (2006) and Rizzolatti & Craighero (2004), street experiences elicit various emotional states that influence cognitive processes and social behavior.

## 2.3 The impact on social interactions by the design of urban environments.

The urban environment serves as a framework and context for social interaction. According to Mehta (2009), urban environments such as neighborhood commercial streets are a behavior set comprising patterns of behavior and patterns of the physical layout of the environment. Furthermore, streets as urban environments will create contexts for any social interaction essential to personal well-being and social cohesion. Besides, streets and public spaces are also social due to their economic, cultural, and political roles.

According to Crowhurst-Lennard (1987 &1995) and Mehta (2018), several other social and necessary activities occur in a public street. These activities include reading, sharing information, initiating group dialogues, increasing social knowledge, enabling social participation, promoting ethical behavior, and fostering mutual understanding, all of which occur on the streets.

Studie salso reveal that people go shopping to meet, enjoy time with their friends, and buy products and services. People come to the streets to wander around and watch others walk around. Several sociologists and environmental psychologists have identified social interaction, sensory stimulation, and other recreational behaviors as

essential and fundamental for shopping (Tauber, 1972; Bloch, Ridgway and Sherrell, 1989).

Moreover, scholars in various fields related to urban studies also suggest streets as a social space rather than an activity channel (Jacobs, 1961; Appleyard, 1981; Gehl, 1987; Jacobs, 1993). Undeniably, streets offer short-term, low-intensity interaction and easily communicate with other people comfortably and reasonably uncompromisingly (Jacobs, 1961; Gehl, 1987). On the other hand, Jacobs (1961) argues that people grow to trust their fellow city dwellers, who may otherwise be total strangers, through repeated short-term contact in the streets.

Watching people and their actions on the streets gives children various lessons. People also get educated in new urban environments daily by meeting different people. In addition, individuals who observe separately can also learn from these urban environments. (Jacobs, 1961; Gehl, 1987; Francis, 1988; Lofland, 1998). According to Mehta (2019), in public spaces, verbal and non-verbal social interactions in urban environments include talking to someone, yelling someone's name across the street, or waving or laughing at others.

Furthermore, Mehta (2019) suggests that the streets often promote passive or fleeing sociability despite this active notion of social contact. Behaviors such as public isolation, spectating and exhibition, relaxation, and play are all forms of passive social contact. As a result of his studies on social life in cities, Mehta points out that,

> *"People sought out places to be alone in public in the presence of others even if they did not intend to directly interact or participate in any active social behaviour [...].*

*People came to read, work, eat and drink alone and only engaged in minimal and essential conversation, for example, to order food or drink or to ask for a chair."*

(Mehta, 2019:24).

Therefore, the shared interpersonal contacts between strangers and 'familiar strangers' describe passive sociability. However, he further claims that being in the company of other human beings without communicating directly with them is a human necessity in public urban spaces (Mehta, 2019). Similarly, Carmona (2019) also states that public space design influences all forms of social interactions, from large gatherings and festivals to modest low exchanges. Public areas such as the streets give their residents and communities tremendous economic, social, and environmental benefits when built right.

Benjamin (1927) states that as a dwelling place of the collective individuals, the standard of street space possesses a feeling of collective-symbolic ownership to people. At the same time, it also provides a sense of ease, protection, and 'existential insideness' as fundamental interactions (Mehta, 2013). Moreover, Peponis & Wineman (2002) state that even though streets manipulate physical resources, the social dimension embedded in design disciplines contributes to preserving behavior patterns, perceptions, and social interactions.

According to Carmona (2019), the researchers propose that the nature and physical constitution of the urban environment limit social interactions by the stimuli that exist within them. However, Hasse (2012) states that certain socio-spatial conditions are influenced and colored by ambient lighting; one can never guarantee particular social

outcomes. Moreover, it is essential to consider the social impact of physical space and the urban environment to promote desired objectives through design and multi-sensual stimulation (Carmona, 2019).

## 2.4 A need for a multi-sensory design approach in urban design

Planning and urban design as a multidisciplinary endeavor combine various aspects of the city, such as accommodation, accessibility, services, and jobs. However, Kaufman (1974, cited in Churchman 2002) states that none of these aspects of a city can be designed independently without considering the relationship with the other city elements. He further argues that, beyond the shared dependencies of different city environments, the social sphere of the urban environment is also an integrated aspect of planning.

Churchman (2002) shows that despite the emphasis on street experience and multi-sensorial approaches in urban-related fields, urban planning and design have been criticized for their inclination to think about individuals or systems and structures outside people's perceptions. Furthermore, according to Heirl (2020), some authors have attempted to re-introduce the neglected human scale and a perceptional approach to existing literature within the disciplines by focusing on individuals and their daily lives. However, the guidelines are still based on the critical thinkers' work and use their perceptional approach as an alternative to top-down approaches.

For instance, Jan Gehl follows the approach of Jane Jacobs. He focuses on public spaces from a user perspective on cities' liveliness. The liveliness, according to him, is the result of safe and exciting

public spaces. His empirical research on human behavior in public areas claims that a physical environment's vitality is a mixture of perceived safety, behaviors, and roles on the ground floors of buildings adjoining streets. Besides, the introduction of human-scale façade design and structures and the speed through which pedestrians can move in different spaces also impact the vitality of spaces (Gehl 1987, Gehl et al. 2006, Gehl, 2010).

In his view, Ground-floor facades appeal to urban users who do not dwell in the buildings. The edge elements lead to people's preferences for staying on the outskirts of a space, where their presence is much more explicit and prompts a magnificent view of the space. Gehl et al. (2006) further claim that edge elements such as a niche, a corner, a column, or something else act as the support factor that allows the human preference to stand or sit at a fixed point. According to them, providing a definition and psychological and practical physical support is another relevant behavioral factor for facade design (Gehl et al. 2006).

Gehl et al. (2006) further argue that at these edges and transition zones between buildings and city streets, a wide range of possible activities connecting the building's activities with street life emerge. The activities include entertainment, play, standing, exhibiting, commerce, banking, smoke breaks, etc. Besides, they further claim that the more distinctive the façade design is, the more activities it encourages and helps connect activities.

Gehl et al. (2006) further state that another essential condition for close encounters is visual opportunities besides the activities. It is desirable to look out of buildings and into them so that the activities

inside and outside public spaces are visually connected. They can therefore enrich and encourage each other. The combination of façade characters, details, small ground-floor structures, seating, views, and indoor and outdoor connectivities create visually exciting and pleasant places for people.

Gehl (1987) suggests three types of activities occur in public spaces. They are social activities, sometimes necessary and sometimes optional. Combining necessary and optional activities increases social contact and interaction in public areas. He further states that the more time people spend outdoors, the more often they meet and engage socially. According to Gehl's study, residents' visits to public outdoor spaces were the most critical factors in encouraging social contacts.

Gehl (2010) further claims that feeling safe makes people use public spaces. A friendly environment and functions also promote additional activities and increase the number of people and their visit duration besides providing opportunities for social interaction. While stressing the relevance of a multi-sensory design approach in urban design, it must be noted that Gehl's (1987, 2010) empiric research has led to broad design guidelines for visually attractive and pedestrian-friendly urban environments. However, the importance of multi-sensory design for socially interactive streets is still not recognized. Furthermore, as we can see, his planning theories emphasize urban environmental liveliness, so vision and function continue to dominate significantly.

Lynch (1960) has also focused on the quality of urban spaces from the point of view of visual perception. However, Zardini (2005) criticizes the theories in architecture and urban design that emphasize

the similarities and disparities in a picture-perfect view of the urban environment, thus providing a privileged position to the eye. In comparison, Gehl's suggestion on the influence of visual change in façade character on liveliness promotes vision and continues to be the dominant mode of sensory perception (Gehl, 2010).

Another alternative approach regarding the urban environmental sociability has also been introduced by Mehta (2011), who re-introduced the street's social function by suggesting small businesses be promoted for the vitality of streets. Like Jane Jacobs, Mehta finds liveliness in urban environments derived from the ground floors of buildings adjoining the streets. Instead of design and visual experience, Mehta considers small businesses at the street level. In his empirical research on social life in the streets, he found that the constitution of street environments combined with usage on the ground floors could increase social interaction.

Mehta (2019) points out that, in particular, the streets can create *"affordances for everyday social contacts that are crucial to personal well-being, social cohesion and civic action"* in addition to their economic, cultural and political functions (Mehta, 2019:2). He further claims that these streets serve the community and the neighborhood's needs regarding sociable streets. These friendly streets, according to him, are places where one could see a wide range of social, political, and economic activities.

Besides, he defines sociable streets as those where residents, tourists, staff, and people who live on the street use the streets for various purposes such as socializing, daily and unique shopping, eating, lingering, promenading, celebrating, protesting, and survival.

According to him, such streets are a desirable feature of any good mixed-use neighborhood and, therefore, any good community (Mehta, 2019).

Concerning small businesses and the vitality of the streets, Mehta (2011) further argues that streets, together with small businesses on the ground floor, create social and community values and bring life to people's lives. Small businesses, in particular, indirectly create more opportunities for interaction through social interaction with shop owners, street furniture, artifacts, and personalized storefronts, thus improving the urban environment. He further claims that a third place (café, bakeries, restaurants, etc.) is welcoming and comfortable, frequented by regulars, or is a place where old and new friends meet.

Mehta (2011) further suggests that small businesses such as coffee shops, cafes, restaurants, bars, community centers, general stores, and pubs function as third-party spaces. He stresses that these places will likely serve food and beverages. However, other possible physical characteristics distinguish third places from related enterprises or spaces.

He argues that four physical features are visible from the street that promote human use and social interaction. They additionally are likely to characterize third places rather than other places on the street. These characteristics are (a) the personalization of the business at the street front, (b) the permeability of the business to the street, (c) the provision of the business seating, and (d) the provision of the shelter of the business on the street space. Besides, he further claims that these third spaces are a place of safety apart from work or home, where people can regularly visit and communicate with friends,

neighbors, work colleagues, and even random people. Furthermore, it results in an increased social function and the vitality of the street (Mehta, 2011).

In addition, Mehta (2019) further defines streets as social scapes due to their importance for hosting and enabling social interaction. Therefore, the main or commercial street is used mainly for 'hanging out,' and passive social interaction can be called an urban environment packed with sensory stimulation. Furthermore, these features relate to small businesses, contributing to sensory stimulation and social interaction (Mehta, 2011). However, for the need for a multi-sensory design approach in urban design, Mehta emphasizes the impact of sensory stimulation of the urban environment on social interaction. He attributes it to the tenancy and the use of the main street floors.

Mehta (2011) prefers a use-and-occupation-oriented approach for community interactions and multi-sensory experience regarding street liveliness. Furthermore, von Schönfeld and Bertolini (2017) claim that the wide range of street activities, such as social roles, has been thoroughly researched in urban planning and architecture. They also deal with integrating all the elements. They argue that multiple street roles are rarely viewed simultaneously from more than one viewpoint. This approach limits an adaptive system to urban environmental experience based on various stimuli.

Schreuder et al. (2016) also argue that emotional responses to an environment are context-dependent and are not controlled solely by one sense of vision. Moreover, according to them, the connection between different presented sensory inputs will boost positive

emotional, cognitive, and behavioral responses. In their view, our environments influence how we perceive space and, as a result, how we feel and behave. The area's physical characteristics, such as illumination, sound, smell, and temperature, affect the people's perceptions of the ambient atmosphere.

Furthermore, physical features impact the users both dynamically and interactively. Moreover, they further claim that manipulating sensory aspects of an environment is gaining broad interest and social relevance from many scholars. However, it is also essential to note that the sensory effects of individual environmental characteristics and their combined effects cannot be evident (Schreuder et al., 2016). It is to be noted that the two approaches discussed very detail in this section, regarding the perception of public spaces, clearly establish an alternate method rather than a zoomed-out, top-down discourse of planning and urban design.

Even though a perceptual approach to urban environments is required in planning and urban design regarding the liveliness and sociability of public spaces, the social interaction concerning the urban environment is still studied based on its use, functions, and visual appearance. Furthermore, according to Churchman (2002), such a selective emphasis on the relationship between the urban environment and human behavior ignores consumers' behavioral and emotional dispositions and sensory well-being.

According to Carmona (2019), the architecture of the urban environment is acknowledged in community planning and design as being more or less conducive to social contact of all types. However, the discipline lacks a multi-sensory approach to urban environments

(Pallasmaa, 2005). Furthermore, Zardini (2006) shows that sounds and odors have often been considered disruptive rather than experiential. Architecture and community planning have been primarily concerned with marginalizing or removing them entirely from perceived perceptions.

According to Degen & Rose (2012), the perception of the urban environment, on the other hand, has a vibrant spectrum of sensory interaction with certain areas. They further point out that encounters with urban environments are multi-sensory, emphasizing sight, touch, sound, and scent, resulting in a distinctive atmosphere. Therefore, addressing this gap in reflecting on the atmospheric qualities of streets in a multi-sensory-perceptual approach to urban environments and social interaction will contribute to the dialogue of liveliness and sociability.

## 2.5 Introduction of atmospheric design in urban environments

According to Zardini (2005), the critical thinkers consider that a multi-sensorial design approach in urban environments is no longer driven by the language, texts, semiotics, and signs to describe the environmental quality of space. They are guided by the rediscovery of phenomenology, experience, perceptions, and the senses. He further claims that these sensorial revolutions in architecture and urbanism are the 'element of character.'

Zardini(2005) argues that critical thinkers associate the term atmospheres with a particular place that indicates place specificity. However, it does not refer to an exclusive visual condition but embraces various sensory experiences that one can have to describe

its environmental quality. He further claims that this theme of the urban environment's multi-sensorial experience was first introduced by Kevin Lynch (1960) and Norberg Schulz during the 1970s.

Norberg Schulz defined it as a total qualitative phenomenon that uses expressions like environmental character and atmosphere to describe a place. However, the terms atmosphere, ambiance, or aura are often used interchangeably to characterize a place's environmental qualities or situational character. The term atmosphere in recent years has been increasingly used to describe space's environmental attributes (Zardini, 2005). According to Churchman (2002), urban designers still aim to prepare significant environmental research that includes the perception and cognition of atmospheric characters when planning safe, lively, creative environments.

Atmospheres can be a phenomenological term in other disciplines related to space. They have been identified to closely resemble multi-sensory sensation and human connection (Gandy, 2017). In this literature review, urban atmospheres are considered a theoretical and phenomenological phenomenon that connects urban environments such as the street with social interactions based on multi-sensory experience. Furthermore, they are investigated on their tendency to increase or decrease public spaces' social activity of the streets.

## 2.6 Importance of Atmospheric design in Urban environments

According to Hasse (2012), the linkage between the urban environment and people bridges the quality of atmospheres. In his

opinion, atmospheres are both bodily feelings and synesthesias viewed sensually. They relate to things as a surrounding and have a perceptual character. Moreover, they are even sensed through physical perceptions rather than cognitive understanding. In his words, atmospheres are *"perceptible interfaces at which people experience their surroundings in emotional spatial qualities"* (Hasse 2012).

While Schmitz (2012) and Hasse (2012) define atmospheres as half-objects in an existential context, they describe the atmosphere as neither physical nor social. According to them, atmospheres are neither tangible nor localizable, nor are they subjects or objects. According to Hasse (2012), atmospheres fall into achieving their linking or connecting influence between the environment and the subject because of their situational nature. They are feelings that form and unfold depending on the situation. Furthermore, because of their distinctness, forced penetration, and physical perceptibility, atmospheres can be described as something in one's own body but not something of one's own body.

Hasse (2012) proposes atmospheres as something outside oneself that can neither be assigned entirely to a subject's side nor entirely to an object's side. He claims that while this allows earning them the title of "intermediate phenomenon," it makes it impossible to localize atmospheres spatially. He defines atmospheres as indivisible and claims that they are something present that can only be experienced in their totality.

According to Hasse (2012), it is impossible to minimize atmospheres and perceive them in parts because they become so

intrusive as a whole. Furthermore, the atmosphere changes profoundly if one component is missing because atmospheres are more than the sum of their elements; they function as a whole. He further refers to these elements that make up the structure of urban atmospheres as "atmosphere creators."

Hasse (2012) further suggests that urban designers use these atmosphere components to create a shared experience and interpret the urban environment. Furthermore, because of the atmosphere's spatial nature, in his opinion, atmospheric planning may intentionally establish common conditions that contribute to the predisposition of individual experience. Besides emphasizing this, Böhme (2006) further claims that architectural qualities are generated from the effect of each material component. Therefore, these elements' impact on developing a specific environment is described as the interaction between spatial qualities and mood.

Furthermore, Stewart (2011) claims that it would be correct to say that this means the atmosphere is object-oriented, object-dependent, or spatial but still imaginative in the atmosphere's perceiver's mood, serving as an "energy field." Consequently, it is correct to state that urban atmospheres can be defined as the relation between the multi-sensory experience of urban environments and their dispositioning character on social interaction. Thus, urban atmospheres are both a part of the environment and a person's subjective, sensory experience of its territory. Besides, they are potentially exposed to a certain degree based on their emotional predisposition. Moreover, it can be said that urban atmospheres encircle both the world and the subject, influencing them reciprocally while establishing a bond between senses and emotional disposition

(Hasse, 2012; Schmitz, 2012; and Böhme, 2006).

Besides, it can also be said that as such intermediating phenomena, atmospheres as spaces of feelings and bodily perception effectively discard individuals' feelings but are not part of them. Furthermore, the individuals and the collectives are discarded by an atmosphere's situational character between the urban environment and human behavior which is the case in urban planning and design. The following sections discuss sensory inputs as the atmosphere creators that build or limit social activity in urban environments.

## 2.7 Creators of Atmosphere

In their philosophical practice, Schmitz, Böhme, and Hasse have identified objects that create atmospheres. Atmospheres are synaesthetes, integrating several sensory stimuli simultaneously, resulting in a situational sense of their environment. According to Howes, a multi-sensory approach allows for diverse perspectives on the same environment to be captured using distinct senses(Howes, 2006).

Howes further claims that *"[W]while auditory and olfactory perception are discontinuous and fragmentary in character, tactile perception is aggregative, and visual perception is detached and summative"* (Howes, 2006:323). Furthermore, Daly et al. (2018) state that people's senses work together as a team to experience and situate themselves in their surroundings. Atmospheres are a phenomenon that can integrate and link these multisensory experiences.

As for atmosphere creators, one may identify various auditory, bodily, and social sensations. Schmitz refers to structural and artistic

aspects such as the form of a building or space, light, fabric, decor, and temperature; all create atmospheres as the spatial perception environments (Schmitz, 2012). Böhme (2006), on the other hand, identifies that rather than architectural elements such as geometry, form, proportion, dimensions, light, color, and sound that create atmospheres, symbols, signs, and materials also create atmospheres. Moreover, he further claims that these creators communicate specific sensitivities to the person and are culturally influenced.

Hasse (2012) describes building culture, smells, light and shadows, tastes, air, patterns of movement, looks and glances, clothes and human habitus, the presence of animals, and subject families as the creator's mediators of sensually experienceable atmospheres. Zardini (2006) identifies atmospheric conditions such as light and darkness, weather and climate, sound and noise, and material and smell as sensorial stimuli contributing to atmospheres in urban environments.

While one can see different atmosphere creators in the above approaches, such as movement patterns, looks and glances as bridge characteristics, light, sound, smells, and architecture can be seen as typical in all the above approaches to create atmospheres. Furthermore, aside from other creators of atmospheres, all these authors identify universal physical creators such as lightning, smell, sound, and weather/climate as essential elements in creating atmospheres. Therefore, the following segment provides further insight into these four urban-related, visual, and bodily environment creators since the primary goal of the literature review is to gain the knowledge to investigate the impact of the urban environment on social interaction.

### 2.7.1 Lighting as creators of atmosphere

Hasse (2012) states that light, as a creator of atmospheres, creates not just brightness by its 'visual intrusiveness.' However, it is also visible and emotionalizes objects and places, thus revealing a great power over the emotional experience of a space. Furthermore, according to Böhme (2006), lighting represents a fundamental atmosphere in the form of light in an area since it brings a certain feeling to its surroundings, such as evening dusk. In his view, light infuses the objects in their proximity with an 'emotive character' that captures and shapes the perceivers in a specific way based on lighting. He further claims that the color and distribution of light pervades the space, a scene, or a particular environment, making it decisive (Böhme, 2006).

In addition, Hasse (2012) claims that light can also be viewed as synesthesia, either visually by light in the space or thermally by the warmth emitted by the light's source. He further claims that light in illumination produces two realities in cities that vary from the city's environment to natural light. Furthermore, according to Zardini, the nighttime city is a more abstract place where unexpected vistas of avenues, parks, homes, or information appear while familiar ones abruptly disappear. He further states that the lighting situation, especially the difference between daytime and nighttime, produces two parallel urban realities in the same physical space of the city (Zardini, 2006).

However, Livingston (1987) states that the lack of light in the night, on the other hand, also allows for an increased multi-sensory view of the city through odors, smells, and touch, as temporary

blindness reduces vision-dominance. In his words, *"[t]he ears tune in to the particular desultoriness of the half-sleeping world; one's sense of smell is more keenly aroused in the subtle wariness stimulated by the nocturnal environment"* (Livingston, 1987). The second world of light appears due to street lighting and illuminated advertisements (Zardini, 2006).

### 2.7.2 Smell as creators of atmosphere

According to Böhme (2006), smells are an integral part of a city's environment since smells are atmospheric, unlike almost no other sensory phenomena. In his view, urban environments have olfactory-atmospheric intrusiveness due to the attachment of a place-specific odor. Furthermore, as a *"highly affective attachment to a place,"* smell has a recognition value that can be engraved into a person's memories in the form of a smell-scape (Hasse, 2012). Moreover, Zardini claims that not only every place, but every city, has its smell-scape. He further claims that these general and unique odor landscapes are invisible but present and real (Zardini, 2006).

According to Hasse (2012), smell-scapes may occur as microclimates or on a city-wide scale. Furthermore, according to Pitte (1998), smell-scapes, as an essential part of a character of a place, maybe naturally present, linked to the local flora and fauna, or artificially created, in the sense of exposing a Man's presence and activities. Moreover, Ivan Illich (1985) defines ubiquitous smell-scapes, in which the entire world has come to scent alike from oil, detergents, plumbing, and junk goods that unify into the catholic smog of our day.

However, Zardini (2006) states that smell scapes have evolved

drastically over time, with the modern city having a distinct smell scape than in medieval times, the Renaissance, or the 18th century.

According to Drobnick (2004), the description of a new city's smell-scape demonstrates the urban environment's olfactory transformation. Furthermore, Zardini (2006) states that apart from smells that exist naturally due to biological activities in cities, energy sources, aromas and herbs, plants, fruits, animals, and trash, smell-scapes are often created artificially intently in a multi-sensory economy to manipulate human behavior.

For instance, Drobnick (2004) states that KFC is just one example of the smell of food being vented into the air, primarily by advanced diffusing technology, to travel well beyond its origins. He further claims that the intentional odors follow individuals, meet them unprepared, and flare in their nostrils even when they are out of sight of the scent's sources. He further claims that circulating the streets, occupying a neighborhood, lurking along with corners in malls and other indoor marketplaces, these intentionally created odors are out on a walk, trolling for prospective buyers to be enticed.

According to Zardini (2006), smell scapes originate from artificial odors, such as those present in our shopping malls, grocery shops, and fast-food restaurants are deliberately installed to affect consumer eating behavior. Furthermore, in hotel services, Zemke and Shoemaker (2007) state that a study found that the geranium scent also enhanced social contact with strangers in a hotel lobby. Furthermore, as a sensory experience, smells and odors influence human behavior and physical well-being (Zardini, 2006).

### 2.7.3 Sound as creators of atmosphere

The recognition meaning of sounds is special. According to Friedrich (2010), Zardini (2006) and Hasse (2012), soundscapes are created by developed spaces of the city form, creating their sound resonances, through which their indicating and pointing character connect with the identification of a place. Moreover, according to Friedrich (2010), every city has its distinctive soundscape, like a landscape but consists of sound. It is through which the city can also be recognized.

For instance, Zardini (2006) claims that the multiple modes of transportation create different sound environments within each town, such as the sound of an ambulance or the closing doors of the metro are location-specific. Böhme (2006) claims that music is an expanded spatial environment, i.e., the feeling out into space created and conveyed by music. Moreover, he presents various examples of musicians recording the city's distinct sounds due to its essential ambient art.

Zardini (2006), on the other hand, describes sounds as new and old noises, depending on one's point of view that had overlapped. He further claims that some of these sounds have increasingly, or abruptly, vanished, for example, with the disappearance of factories, mills, or port facilities from specific urban centers converting to a new type of sound. Moreover, Schafer (1993) claims that the materials used to build a city contribute to the city's sound. In his view, when these materials are touched by active agents, such as people, wind, or water, these materials emit a spectrum with sounds of particular resonance.

In addition, Zardini (2006) states that we also see an increase in the number of private soundscapes produced by city dwellers. For example, the Walkman first replaced the radio in the car, and now the iPod or iPhone builds personal "bubble" environments. Furthermore, Hasse (2012) and Friedrich (2010) state that the city's unavoidable noises are shielded by using a private and self-determined auditory territory, a so-called headspace.

Friedrich (2010) further says that this personal acoustic creates a unique, self-determined sound space where the urban sound world fades out and aestheticized perceptions take their place. However, silence is impossible for all forms of sound in a contemporary city (Zardini, 2006). Besides, Thompson claims that the air belongs to the constant burr of the motor, the daily clank clank of the elevator, and the chitter of the steel drill regarding sounds of the modern city (Thompson, 2006).

In her view, the rhythmic roll of the subway over clattering ties beneath and the sound of the drone of the airplane likewise, the recurrent blasts of the internal combustion engine and the rhythmic jar of people are in constant motion. All these objects decide the speed of the auditory world we must live in. He further claims that despite urban noises, the presence of other humans does not seem to be as noisy or distracting as mechanical or traffic noise. He asserts that in 1929, the ten most scary sounds were now listed as the result of 'machine era innovations,' and only with number eleven are the loud groups due to which the sound of human action entered the score (Thompson, 2006).

Therefore, it would be right to say that even though sound is a

creator of the atmosphere, urban designers choose to work with sound in an environmentally harmful way. Moreover, to prepare for safer conditions, one should attempt to reduce the detrimental effects of noise caused by traffic.

### 2.7.4 Climate as creators of the atmosphere

Hasse (2012) states that climate and weather directly impact the atmosphere of urban spaces. In his opinion, skyscraper curves, for instance, are viewed as sharper in the bitter cold of winter than in the flickering sun of summer. Furthermore, climate and its modes of action significantly affect facades and surfaces' softness and hardness. In addition, the weather also changes their objective constitution dramatically.

Schafer (1993) states that climate provides an undivided city experience because it can be sensed, observed, and heard. In his view, an example is a guy walking in the snow, the sound of his footsteps informs you of the temperature. This is a new way of perceiving the environment, one in which the sensorium undividedly recognizes the interconnectivity of all information.

According to Erskine (1961), sensory sensations vary depending on the season. In her opinion, winter is viewed differently from summer; it's feeling, the breeze, and the perception of direct sunlight. Furthermore, regarding the multi-sensory experience in urban environments, Zardini claims that sociological and cultural variations in interpretation and adaptation of temperature, humidity, and other elemental conditions must be included in urban planning (Zardini, 2006).

## 2.8 Field of sensory perception and sensory processes

The senses are the human body's system for sensing and orienting itself inside its surroundings. Environmental stimuli activate the senses, resulting in cognitive functions. Thus, they connect the urban ecological environment and human behavior by perceiving the urban environment and being responsible for human behavior.

According to Pallasma (2012), Gibson divides experience into five sensory systems: the visual system, auditory system, taste-smell system, basic-orienting system, and haptic system, which he considers as aggressively seeking mechanisms rather than mere passive receivers. Furthermore, despite Gibson's classification, it is argued that seeing, listening, smelling, and feeling are the senses by which people experience their urban environments.

Moreover, while Gibson classifies all perception as sensory, other literature suggests a bodily experience distinct from sensory experience (Schmitz, 2012; Böhme, 2006; Hasse, 2012). Schmitz, for example, argues that one can view 'light' visually by seeing it as well as thermally as the warmth that radiates from the source of light (Hasse, 2012). In this literature review, 'feeling' is described as the bodily perception of the environment rather than sensory perception.

Since physical experience is triggered by sensory stimulation, found in the urban environment, and due to generalization, 'feeling' is classified and included in a multi-sensory experience. Furthermore, some researchers argue that not all senses are stimulated similarly due to different sensory frames (Daly et al., 2018; Gehl, 1987). Aside from a normative categorization of multi-sensory experience in various

research, one can also distinguish the urban environment's multi-sensory experience based on perceived distances.

For instance, Daly et al. (2018) argue that Gibson's five sensory systems cover diverse ranges of sensing the urban environment. In his view, the immediate environment surrounding a person's body will absorb scent and taste, supplying information on the so-called 'near-space.' At more considerable distances, visual and auditory systems can receive information from the 'far space.' The point here is that not all senses are stimulated differently or from the same distance.

Furthermore, according to Gehl, the near-space experience has been ignored in the planning and urban design for a long time because touch and scent have been considered 'lower senses' in terms of perception of the urban environment. In his view, most architects and planning theories emphasize seeing and hearing (Gehl, 2010). According to Gehl (1987), the sense of smell is limited to a range of less than one meter, whereas noise and sounds can be perceived at more considerable distances depending on the form of sound.

On the other hand, hearing and interacting can be done over seven meters, but hearing other people over 35 meters is limited. It is possible to recognize that someone is yelling but not the substance of the call. Furthermore, loud noises can be heard even up to one kilometer away. Gehl states that the sense of sight has an even broader functional area than other senses. However, there are well-defined limitations, much like other senses (Gehl, 1987).

He further suggests that an interaction between sensual impressions' strength and distance is commonly used in social interaction. According to his empirical survey conducted in Australia,

Canada, and Denmark, approximately 3.5 meters distance is used in this sense to monitor familiarity and duration in different social contexts. It also manages individual conversations' start and end. However, he further claims that social spaces are defined based on the social touch context, with familiar people or strangers. In addition, regular conversations and meaningful human interactions typically occur at a distance of one to three meters. In his view, human communication often uses an interplay between the strength and length of sensual impressions. The empirical findings from his research suggest that a certain amount of space, approximately 3.25m, is needed for conversations. Distance monitors intimacy and duration in different social contexts and the start and end of individual interactions(Gehl, 1987).

Besides, Hall (cited in Gehl 1987) distinguishes social distance based on the context of social contact, which may be with familiar people or with strangers. A talking interval of 0.45- 1.30m is assumed between people acquainted with each other, such as family members or friends. Ordinary conversations between families, colleagues, neighbors, and strangers occur at a social interval of 1.30 to 3.75 meters. In his view, a physical expression of this social distance is the sofa community of armchairs and a coffee table (Gehl, 1987).

Besides, a public distance of 3.75 to 12m distinguishes the case in more formal contexts. Gehl usually defines it as a one-way dialogue where someone wishes to know or see an incident but does not want to get involved. He further claims that based on the people participating in social interaction, one can see all three social distances in urban environments.

## 2.9 Literature Summary and gaps in the research

It is to be noted that the thoughts on the various modes of perception and the distances of perception of the urban environment and social interaction discussed in the literature have led to the recognition of gaps in knowledge. The multi-sensorial experience as a linkage between socially interactive urban environments by using elements of urban atmospheres must be investigated.

Moreover, in this literature review and further research, all sensory systems are treated as equally dominant and tailored to the urban environment by reflecting on the multi-sensory perception of listening, tasting, and feeling. The feeling is described as the bodily perception of the environment. Furthermore, derived from Daly et al.'s and Gehl's distinction between varying distances of perception between the senses, the perceptional radius of stimulus occurring in the urban environment and atmospheres' emotional space is defined as the area of sensory perception.

In addition, following Hall's differentiation of different social distances, and the areas of perception, this research will study the urban environment known as the street. The street includes the context necessary when experiencing the urban environment. For example, sensations can be encountered in perception during interactions and encounters with ground floors, for instance, businesses and public spaces such as car lanes and sidewalks. According to Mehta, the ground floors of buildings adjoining streets have various potentials for social interactions through their usages and multi-sensory stimulation. In this context, the street is the social domain of a city, the city's space to which people have clear mental, sensory, and social connections.

# CHAPTER THREE
# THE RESEARCH METHODOLOGY

# CHAPTER THREE
# THE RESEARCH METHODOLOGY

## 3.1. The Research issue and questions

As we know from the extensive literature review, the creators of atmosphere in an urban space which determine social interaction based on the human experiences of the urban environment, are seen through the sensory modalities of seeing, listening, touching and smelling. This research investigates the urban environments and social interactions based on the qualitative experience of atmospheres formed in Bahrain's urban spaces (streets). This research employs qualitative phenomenological research techniques to address the following research questions.

- How do urban dwellers perceive the atmosphere of an urban environment in Bahrain streets?
- To what extent are the streets of Bahrain seen as multi-sensorial?
- Are there other social, economic and environmental factors influencing perception and atmosphere in the urban environment?
- How can multi-sensorial design approaches contribute to increasing social interactions in Bahrain's streets, thus creating vibrant urban spaces?

It employs mixed observations and interviews on the three case studies and uses a mixed methodology to validate. All the strategies described above combine a multisensory methodological approach to exploring the linkages between urban environments and social interaction in the streets of Bahrain.

## 3.2. Qualitative Methods - Research methodology

A qualitative research methodology is used when it is necessary to deeply understand people's daily lives, their ideas, attitudes, and actions in urban environments (Mohajan, 2018). Contrary to quantitative research, qualitative research concerns non-numerical facts and their subjective interpretations, which are firmly tied to human senses and feelings. (Leung, 2015). Thus, qualitative research approach such as observations and interviews allows the researcher to document the lived experiences of people.

According to Creswell (2014), the researcher is the primary instrument for acquiring data in qualitative research, employing interviews, observation or video footage, and recovering old and new documents such as diaries, newspapers and notepads. Furthermore, Mahajan points out that several types of research on individual interactions, interpersonal contacts, and human-environment interactions employ qualitative methods. While he claims that various approaches can be applied to understand the participants' daily lives and lifeworlds to gain a more profound understanding, qualitative research findings are frequently descriptive. They depict people's repeated experiences, feelings, and ideas (Mohajan, 2018).

Furthermore, some qualitative research characteristics, such as a lack of transparency in the analytical process, the significant involvement of the researcher in the research process and the conclusions being essentially prone to the researchers' personal views and opinions. The techniques used are frequently criticized as unscientific or inadequate explanations of the methodologies used. However, this critique is usually reduced, mainly by positivist-leaning scholars. To ensure the credibility, integrity, and dependability of

findings, the positivist researchers verify the validity and applicability of mixed methods procedures in the research (Noble and Smith, 2015).

Biased opinions are reduced by using criteria such as selecting respondents, comparability, comprehensive audits, triangulation and recordkeeping to evaluate generalizability for qualitative research (Leung, 2015). This type of methodology studies a phenomenon as part of the lifeworld. As a result, the qualitative data is acquired through surveys, observations, and interviews to understand the human perception and their orientation of social interactions in the urban environment from the viewpoints of those engaged.

## 3.3. Phenomenology - Research methodology

Individual perceptions of urban environments can be investigated using a qualitative method (phenomenological method) based on their multisensorial experience of urban space and thus their inclination for social interaction in these urban spaces. Phenomenology is a theoretical concept concerned with personal human experiences. Its origins back in Edmund Husserl's studies, who was the first person to focus on the lifeworld (Denscombe, 2010). Others, including Heidegger, Merleau-Ponty, Bourdieu, and Habermas, have contributed to Husserl's growth and molding of Husserl's study since then (Aspers, 2009).

As a research paradigm, phenomenology is concerned with people's daily behavior. On the one hand, one should explain the phenomenon that becomes tangible through people's senses. It can also be related to the social constructivist theory since the interpretations of phenomena are based on the subjective experiences

of actual people (Aspers, 2009). Thus, the primary focus of phenomenology is on how individuals perceive and comprehend a phenomenon under investigation. According to Denscombe (2010), phenomenology is also an alternative to positivism. In phenomenological research, a phenomenon is studied subjectively, descriptively, and interpretatively. Contrary to concentrating on people's perceptions of phenomena objectively, analytically, accurately, and organized. It is examined through the participants' eyes and their descriptions of reality (Mohajan, 2018).

A researcher who employs this technique seeks to convey study findings uninterpreted from the first-person perspective. The goal is to describe people's experiences as though seen through personally by describing the event exactly as it is seen, without any preconceptions or any data validation (Denscombe, 2010). By doing so, this methodology also allows the researcher to avoid any reductive tendencies in the research. According to Schmicking (2010), phenomenology can be used either as a lens by which one can see the world's reality or as a method of empirical study. However, in this research, phenomenology is used to examine the world through the eyes of individuals instead of any pre-assumed assumptions, which allows the researcher to explore the urban environment's unique experiences regarding multi-sensory perception in the streets of Bahrain.

As opposed to a single unified truth being accepted worldwide, one disadvantage of this study approach is the underlying concept of numerous realities found by different people. For instance, things can be viewed in different ways by various people under other circumstances. Because of the various realities, phenomenologists

must be mindful of individuals' accounts of their experiences in an event. It is so because the realities presented might be inconsistent or even self-contradictory, thus making them look illogical from the researchers' viewpoint. However, the researcher must exclude their own opinions, assumptions, or common sense when using this methodology (Denscombe, 2010).

According to Denscombe (2010), to provide a pure description of findings rather than an interpretation of results, the researcher must be solely aware of the realities of the research. He further says that one method for obtaining clean, impartial data reports is to separate things and acquire a stranger's viewpoint, which helps the researcher see things through the eyes of the participants, that does not take things for granted or as customary and obvious. Phenomenological ideas, in his view, exist throughout Europe and North America. In Europe, for example, such research is viewed as the heart of the human experience, but in North America, academics focus on how individuals comprehend social events.

In this research, the concept of phenomenology based on the core of the human experience is used. This research approach is designed to investigate genuine, fundamental, and raw human experiences that still have not been put through the strain of analyzing and speculating (Denscombe, 2010). As a result, this study focuses on direct findings of data consciously experienced by humans through observation and description of occurrences without any preconceived notions and justifications (Spielberg, 1975 in Schmicking, 2010).

## 3.4. Case Study - Research methodology

Case studies, as a methodology, enable the examination of a case

that is spatially or factorially constrained (Flybverg, 2006; Denscombe, 2010; Mohajan, 2018). Actual events in their natural environment can be researched in detail, emphasizing their interconnections and their work mechanisms in their context. This approach differs from the bulk analysis since it is carried out on a limited scale, covering the phenomenon's concepts; thus, the emphasis of a study case is generally on the specific example, which might have implications for a broader context and other associated theories (Denscombe, 2010).

According to Denscombe (2010), a case study aims to highlight the general issue by overlooking the specific point. The method enables researchers to comprehensively investigate relationships and processes in social environments to adequately retain and adequately serve the environment's complexity. Case studies could be used either for theory construction or theory testing. In theory construction, one case is explored over a specific time. At the same time, the authenticity and scope requirements of single or competing hypotheses are evaluated during theory testing. In social research, the theory construction strategy is more widely utilized than the theory testing, which is relatively less applied (Mohajan, 2018).

Furthermore, a case study can be conducted using single-case or multiple-case studies (Yin, 2009). Data can be collected from several sources, such as observations, audio recordings, on-field reports, visual material, interviews and surveys, as well as a combination of them can also be employed in analyzing the subject overview or comparing various settings (Creswell et al., 2003; Flyvbjerg, 2006; Denscombe, 2010). Based on the logic of a critical case, Yin describes that a case study can be conducted to establish whether a set

of explanations provided would be more appropriate or whether the alternative premises of a theory are accurate (Yin, 2009).

In this approach, selecting a case is essential for the results to be credible. The intentions and grounds for selecting a case study or many case studies must be clarified beforehand. The chosen cases must be related to the real difficulties and theoretical concerns being investigated. Further, to be distinguished from other social phenomena, the item or phenomenon under investigation must have definite bounds and a start and final destination (Denscombe, 2010).

The requirement for various case analyses in this research is defined by Flybverg (2006), Denscombe (2010), and Mohajan (2018), as well as the different characteristics and key attributes recognized in theory and literature. The multisensorial experience of the urban environment and its impact on social interaction is investigated in this study through a series of case studies on Bahrain's streets. The case studies were chosen from three central governorates in Bahrain.

While the time constraints, the depth of observations, and the number of interviewees will be a constraint in a multiple case studies scenario in Bahrain. The decision to use multiple-case studies rather than a single-case study is based on the phenomenological methodology, which investigates the different individual's multi-sensorial experiences and social interactions in various streets, which will help generalize the findings in Bahrain.

The comprehensive literature review provided insights into the elements of profound researchers. For instance, Mehta and Gehl highlighted different street sociability and liveliness aspects. As a result, the following characteristics should be considered while

choosing case studies:

- The streets were chosen as critical commercial and social scape streets in a residential area.
- The case studies are based on various activities on adjoining buildings' ground floors.
- The case studies consist of different small, medium and international enterprise occupancy on the ground floors of adjoining buildings.
- The multiple case studies are chosen based on the degree of active and passive participation of the façades and a range of shop front widths.

Furthermore, while the case studies investigating are bound in the context of Bahrain, the results might be an example of more significant phenomena. They can be adapted commonalities to comparable scenarios with similar important characteristics and key attributes but in a different or similar context. For example, the similarities in a physical, historical, social, and institutional location might be used to compare (Denscombe, 2010).

The potential multiple case studies allocated in Bahrain, such as the Government Avenue, street Manama, Shaikh Hamad Avenue shopping street, Muharraq and Sheikh Ali Bin Khalifa Avenue-1 in Riffa, for performing the research are based on the following characteristics of sites:

- The factors indicated in the literature review.
- The potential sites had a long history in the street of Bahrain.
- Lastly, the researcher has lived long in Bahrain and has been familiar with these potential streets.

### 3.4.1 Government Avenue Street, Manama Bahrain

Bahrain's Government Avenue is located close to Al Manama. It is a 0.3 kilometers long street that hosts many iconic historic buildings. The landmark Bab Al Bahrain building is also located on this street. It is divided in many other ways as it runs down. Many significant banks and corporate enterprises can also be found on Government Avenue Street, outside Bab Al Bahrain. Government Avenue got its name since it used to host the Bahrain government's offices. The Gold City (not the Gold Souq) is a gold ornament shopping complex located on Government Avenue.

Government Avenue was firstly built in the 1920s before the advent of oil. However, the development of a national network linking the capital to neighboring cities and the expansion of roads in Manama's historic neighborhoods, which began as soon as the first vehicle arrived in 1914, changed the urban morphology of this street (Yasser, 2011).

This street is the best example of how the evolution of streets to automobile-oriented and vision-dominated design approaches has limited social interaction in one of the liveliest streets of Bahrain. From Fig 3.1, we can see that the length of the street is not typical until the end. It is broader in the North and reduces as it runs towards the South. Figs 3.2 and 3.3 show some of the images of the site. A detailed analysis of the potential sites will be discussed in the thesis.

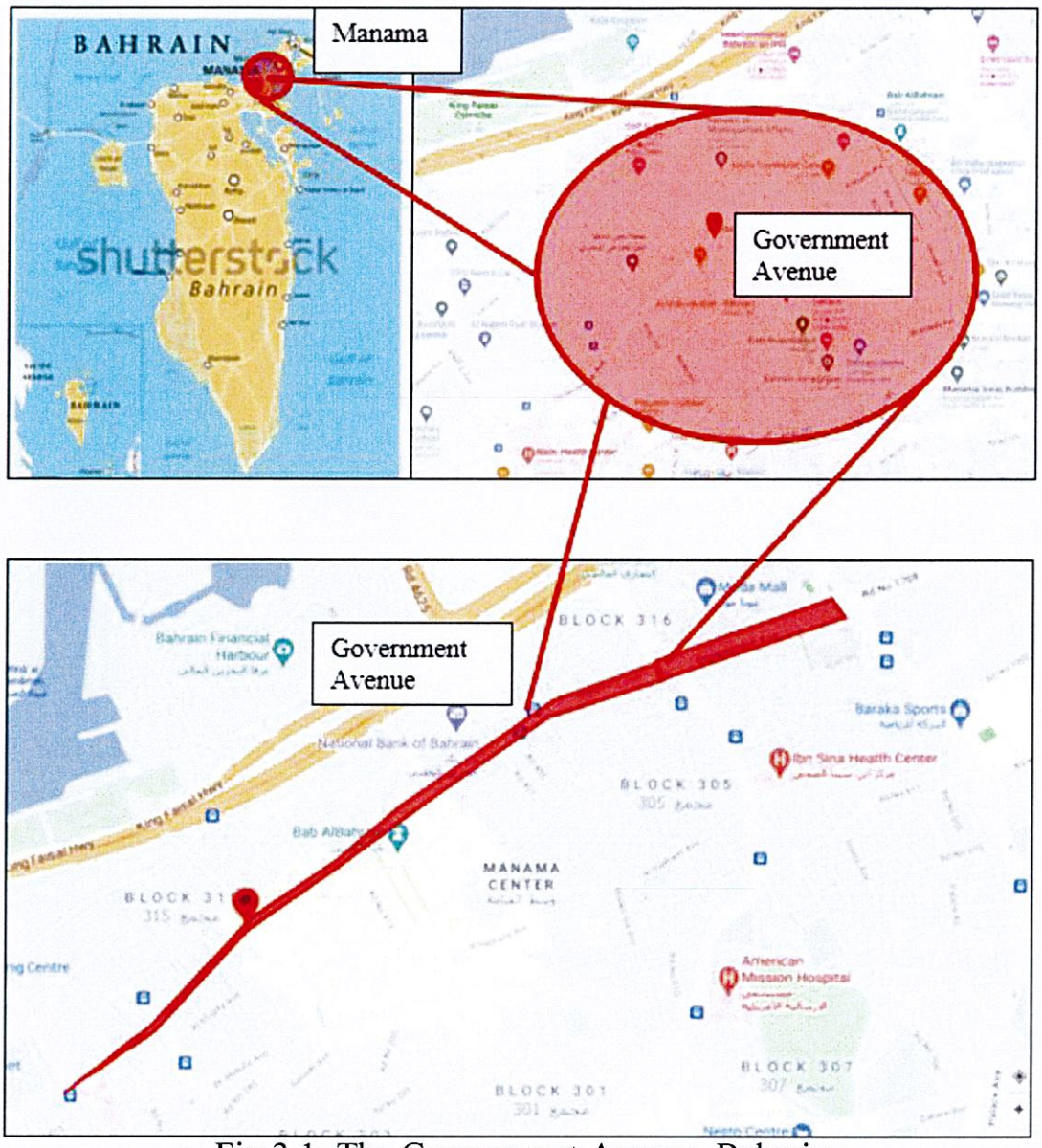



Fig 3.1: The Government Avenue, Bahrain
Source: Google map




Fig 3.2: Many different ways open up from Government street
Source: Google map



Fig 2.3: The daytime view of Government Avenue street in Manama
Source: author

### 3.4.2 Sheikh Hamad Avenue Street in Muharraq

Sheikh Hamad Avenue shopping street in Muharraq is one of the oldest streets in Bahrain. It is approximately a 0.6 km long street that opens in many different ways. The street consists of many historical buildings and shopping sprees with many local retailers occupying the ground floor. This street also joins the famous Souq Al Muhaarraq. The street has evolved from one of the pedestrian-friendly liveliest streets to an automobile-oriented street. The following Fig (3.4, 3.5 and 3.6) shows the google map location and different ways adjoined to this street and the daytime view.

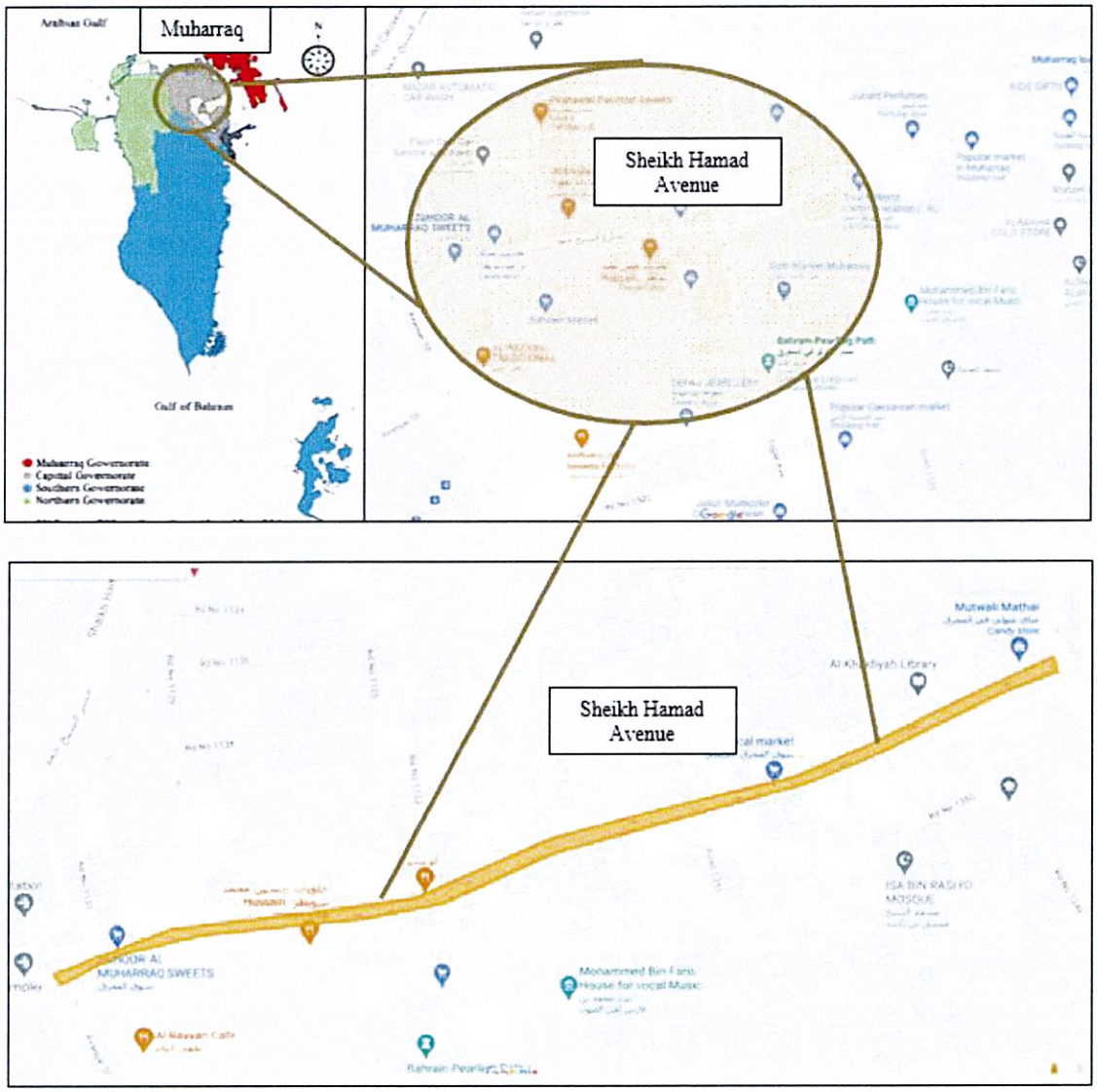



Fig 3.4: The Sheikh Hamad Avenue shopping street in Muharraq
Source: Google map




Fig 3.3: Many different ways open up from Muharraq street
Source: Google map



Fig 3.6: Day time view of Muharraq street
Source: Author

### 3.4.3 Sheikh Ali Bin Khalifa Avenue in Riffa

Sheikh Ali Bin Khalifa Avenue Street is one of the famous streets in Riffa due to its adjacency to Ar- Riffa Avenue (Souq Ar-Riffa). The street is about 0.64 km. It hosts many local retail shops, old houses, small local restaurants, and tea bars. The detailed analysis of this case study shall be discussed in the thesis. However, the potential site has also been impacted by an automobile-oriented vision-dominated top-down design approach, which disposes of social interaction. Fig (3.7, 3.8 and 3.9) show the street's Google map location and the street's daytime view.

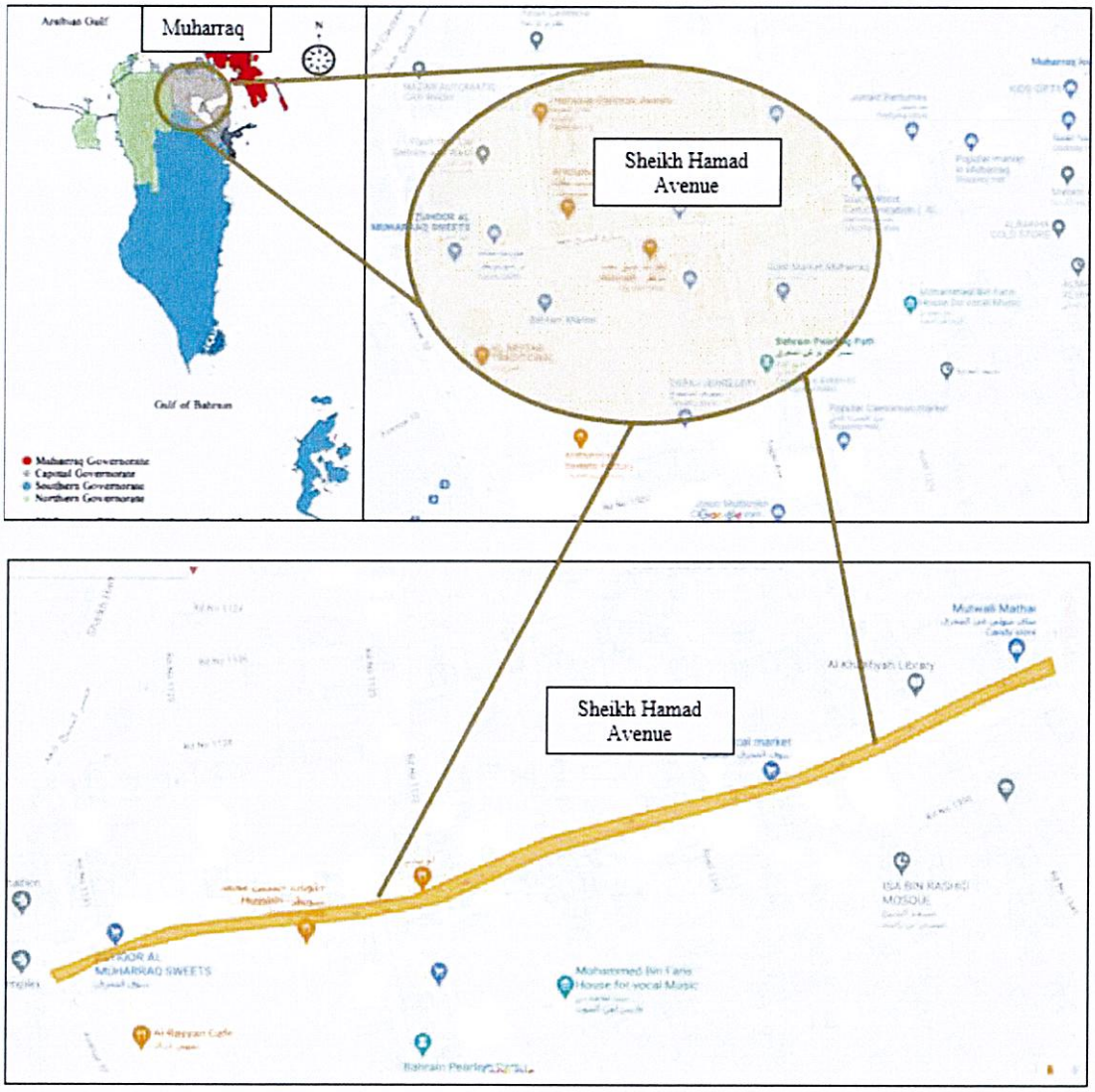



Fig3.4: Sheikh Ali Bin Khalifa Avenue in Riffa
Source: Google map




Fig 3.5: Many different ways open up from Riffa street
Source: author



Fig 3.9: The day time view of the Riffa street
Source: author

## 3.5. Research plan timeline

The following figs (3.10, 3.11 & 3.12) show the timeline with the occurrence of the five main attributes: interviews, observation, sound recordings, mapping and transcript and façade and usage occupancy during days in three empirical case studies.

### 3.5.1 Government Avenue Street, Manama Bahrain

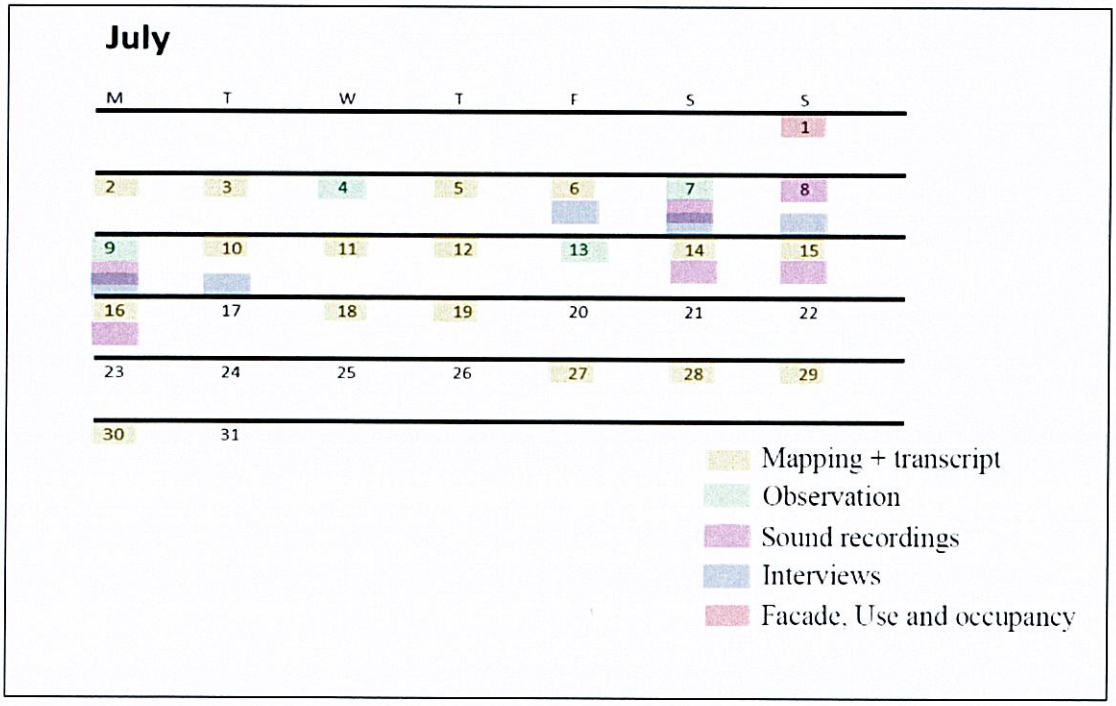



Fig 3.10: The time-line for Government Avenue, Manama
Source: author

### 3.5.2 Sheikh Hamad Avenue Street in Muharraq

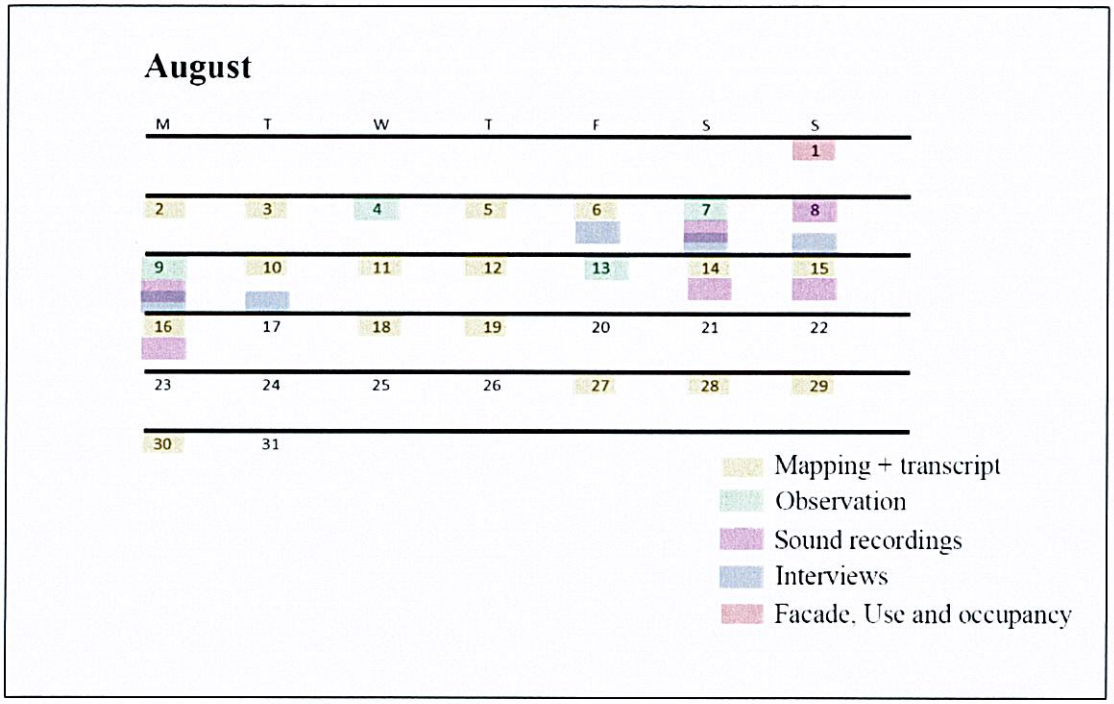



Fig 3.11: The timeline for Sheikh Hamad avenue in Muharraq
Source: author

### 3.5.3 Sheikh Ali Bin Khalifa Avenue in Riffa

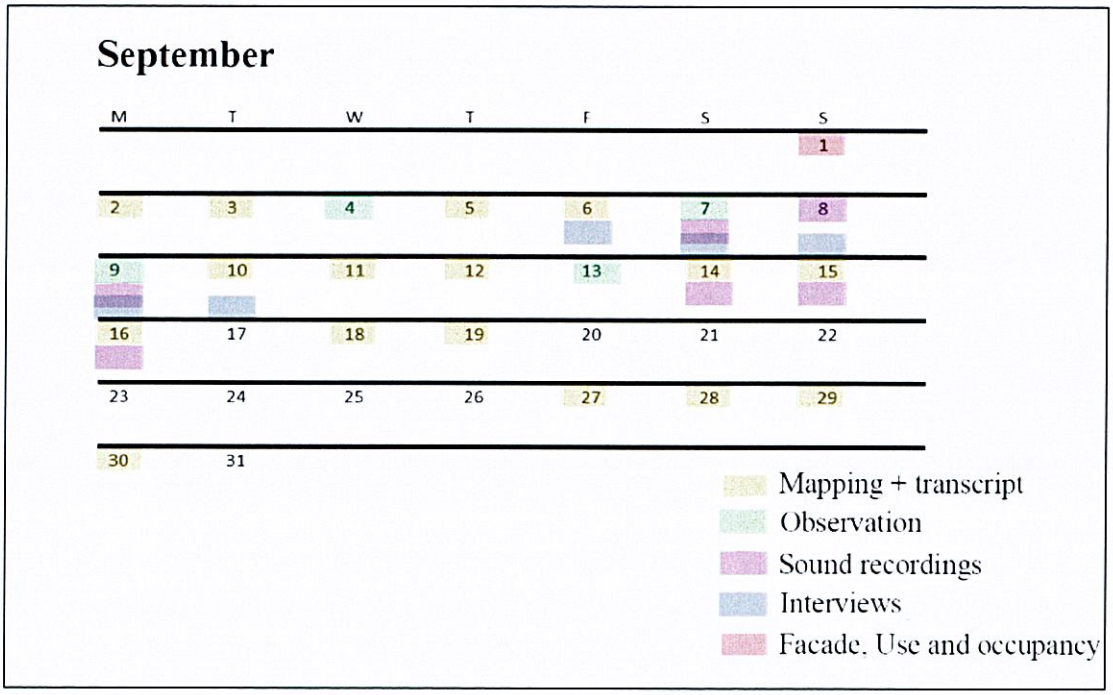



Fig 3.12: The timeline for Sheikh Ali Bin Khalifa Avenue in Riffa
Source: author

## 3.6. Detailed Research Instruments

Qualitative research instruments explore multi-sensory stimuli encountered within Bahrain's three case studies (streets). It is carried out to comprehend and explain the experience and its impact on urban environments as seen through the eyes of individuals in diverse locations of Bahrain. Observations in the case study setting aid in analyzing the urban environment regarding sensory inputs and social interactions. Interviews are conducted as a supplement to understand better the first-person multisensory experiences of the urban environment and its ambiance and the motives and reasons for social interactions in the streets of Bahrain.

According to Creswell (2014), data analysis of qualitative methods simultaneously involves other qualitative research data collection aspects. Interviews will be transcribed and evaluated as soon as they are completed to recall as much as possible while the material remains vivid in the researcher's mind. Although notes and interview transcripts will be used later in the report, real conduct can be done concurrently with data collection.

The method of gathering and interpreting data in qualitative research is when the investigator obtains data, analyzes the information, and prepares the report (Creswell, 2014). The study can comprehensively explore the multi-sensorial experience of the urban environment and its impact on social interaction through a place's atmospheric character by employing various approaches. The triangulation of the methodologies utilized improves the reliability and validity of the research design. The research instruments and validation techniques used in this research are as follows. All the complex research instruments are explained in the appendix.

**Table (3.1): Detailed Research instruments used in the research**

| Detailed Research Instruments | | |
|---|---|---|
| 1 | **Observations** | • Visual<br>• Soundscapes<br>• Tactility<br>• Olfactory<br>• Usage and Occupancy on Ground floor<br>• Fieldnotes |
| 2 | **Interviews** | • Group A participants<br>• Group B Participants |

## 3.7. Empirical Triangulation methodology to increase Reliability and Validity

Triangulation is a method where many approaches are combined to examine the study issue from several perspectives, improving subjective study results and increasing the validity of the results. Triangulation aims to compare data collected through multiple methods and validate the inherent hazards in the same approach (Flick, 2007).

Triangulation can be used on sources of data, methods, and approaches. The premise for triangulation, according to Atkinson and Hammersley, is determined by the extent to which these methods involve distinct sorts of validity threats (Hammersley and Atkinson, 1983 in Flick, 2007).

In this thesis, three methods are combined within a research methodology and a subjective research approach to increase the truthfulness of the findings of investigating the urban environment experience and the acquirement of social interactions through creators of atmospheres in urban spaces such as the streets of Bahrain. These approaches complement one another by providing data from a

generally applicable case study, and combining them decreases overall validity risks associated with any of these methods.

As a result, the multidimensional experience of the urban environment in terms of impact on social interaction is being examined in three different case studies of Bahrain. This enables the study to be utilized in a comparable environment with the same elements and limits. In the three case study scenarios, findings provide interpretative data on what activities occur when, where, and how often.

Structured observation regimens enhance this technique's validity on social interaction activities, occupancies on ground floors of adjoining buildings, and façade characteristics. Collaborative, open-ended conversations in the three-case studies give personal information on people's experiences of the urban environment in the case research context. They also help to understand the causes and process of social interactions in the study context.

## 3.8. Potential Restrictions

The phenomena investigated are the source of this study's limitations. The theoretical framework of any research derives broad constraints by previously defining research topics and confining the research environment. In this thesis, a focus on urban design and urban environments such as the streets, multisensory experience, and impact on social interactions narrows the studies to a limited scope within the urban design while also opening up to corresponding fields of study and constraints about the research occurrences.

A subjective research design studies individual and group behavior influenced by the urban environment. As a result, the

limitations of this thesis include those arising from the study technique and methodologies, such as the investigator's involvement and preconceptions. As a result, the limits of the conclusions derived from the procedures utilized primarily involve concerns of impartiality, the researcher's influencing role, and potential preconceptions.

For example, because it focuses on procedures and events rather than quantifiable conclusions, the research technique utilized in this thesis generates relatively soft data. As a result, some researchers see qualitative data as unreliable. In addition, since one of the methodologies utilized is a case study, potential restrictions stem from identifying precise limits for the case setting. As a result, findings may be difficult to generalize (Denscombe, 2010).

Regardless of the limits of the case studies technique, this type of passive information and the emphasis on process and implementation instead of outcomes is of interest when researching a multisensorial experience of the urban environments in Bahrain. When selecting a research setting, a case studies method allows for examining crucial qualities and distinguishing elements based on literature and contemporary paradigms. For example, Gehl and Mehta's research, which ended with the influence of façade design and the functions and occupancies of ground floors of adjoining buildings, might be applied to selecting three research studies based on such important characteristics.

The drawbacks of the observational approach include its concentration on behavior rather than intents or views and its interpretative outcomes. Given that the findings reflect the author's encounters with the subject under investigation, the findings have a personal prejudice imposed by the investigator. As a result,

perceptions are limited in their impartiality and ability to generalize their results. On the other hand, using systemic observational plans allows for immediate data collection as it is witnessed, without respect for the researcher's ideas, perceptions, or opinions.

Because they are methodical and strict, observational plans make findings more genuine. They also remove the researcher's and her presence in the field's prejudices. Furthermore, because vast amounts of data can be obtained quickly, observations are an effective method. The strategy benefits from providing already available post-data for additional analysis by sticking to the structure and framework of observation. Observations' findings have excellent dependability due to a systematic approach that enables correction from other investigators, resulting in similar data (Denscombe, 2010).

Therefore, inter-researcher validity can be proven provided the researcher adheres to particular structural guidelines. In addition, observations can be supplemented by interviews to compensate for the researcher's one-sided viewpoint on the investigated phenomenon. Regardless of the advantage of receiving first-hand, qualitative information, interviewing data may be limited and impacted by the investigator. The researcher distorts the data by altering the 'natural' environment since she is continually present in the natural context (Denscombe, 2010).

When collecting the behavior and perceptions of participants in these go-along, the researcher's role is active and engaging. Both are significant assets, and researchers must be both contemplative and skilled. Furthermore, although the in-person study, this mixed technique of interview and observation has limitations due to the researcher's presence, which disturbs the emerging of everyday

occurrences as they affect social contexts. Furthermore, go-along can never be a 'natural' social interaction with the researcher since she constantly affects the respondents' experiences even when the researcher is not there(Kusenbach, 2011).

Other thesis restrictions may be the researcher's predetermined judgments or conclusions, influencing the data collection outcome. Because the study is conducted in the environment and hence is bounded by context, the investigator must be aware of the research environment. Furthermore, the researcher must be aware that she is a determining factor in the experiences and perceptions of the respondents' environment and, therefore, a participant in the research procedure (Mohajan, 2018).

Nonetheless, due to presuppositions, the investigator may only hear what she needs to listen (Denscombe, 2010). Furthermore, the information obtained through these methods could be difficult to understand or disrupt and modify reactions due to the researcher's simple presence, resulting in limits in the results (Creswell, 2014).

Data access might be problematic when employing descriptive study and technique, raising moral difficulties and confidentiality concerns for those engaged. Despite the limits imposed by each methodology, such as authenticity and generality, a mix of these techniques can decrease and mitigate some of them. A 3-dimensional perspective of the methods and outcomes helps lessen the 'validity risks' inherent in all approaches (Flick, 2007).

The limitations of boundaries creation in case studies approaches, for example, can be reduced by employing a features review of the literature. The researcher's subjective

perspective can be decreased by adopting observation schedules to increase inter-researcher validity.

Furthermore, theory limits the study. Lighting (darkness/sunset) has been postulated as a separate mood shaper in the perceptual experiences of urban centers (Böhme, Zardini, Hasse), although the selected case settings are just explored during the daytime, not at night. The findings are limited to the daytime experience of the urban environments and their impact on social interactions in the streets of Bahrain.

## 3.9.Ethical Concerns

Since this thesis aims to examine social interaction as the experience of urban environments influences it through phenomenological research, ethical considerations concerning the investigator's role and the interviewing respondents must be addressed. Respondents were interviewed on the three streets in a research context and were enrolled using social media platforms and close communication. The respondents gave roughly 10-20 minutes on average, but they also entrusted the researcher with their personal views, thoughts, and beliefs about the study streets and their presence inside.

Most interviewees shared incredibly intimate, even childhood, memories of the street with the researcher. All contributions are kept anonymous to protect the integrity of their identity and unique ideas. Participants' names are anonymized, and they are issued a word for the sort of place connection (A for association with the site, B for no relationship with the site) and the numbers to differentiate across respondents' responses (A1-A9, B1-B6). On the other hand, using

their genuine names would contribute nothing to the research findings.

Because of the time constraints for conducting interviews and the enrollment process, the investigator was obliged to deal with interviewing settings in which respondents either were strange urban dwellers, acquaintances, or friends of the family. Each of these two interviewee partnerships has unique moral considerations. When interviewees were friends or friends, the researcher used the approach of carefully pondering probable preconceptions and attempting to see the subject through unusual eyes.

When respondents voiced fears, discontent, and condemnation about the appearance of the street, its development and planning, and urban regeneration, the investigator maintained a caring attitude and invited ear or these emotions while remaining detached and returning the attention to the interview issues. When respondents proposed street adjustments, the investigator tried to embrace and accept them while also pointing out the limitations of this research, such as the inability to change the urban environment of the streets.

In terms of observations, the study adheres to the research principles of objectivity and self-reflection (Creswell, 2014). The researcher uses an intersubjective viewpoint to account for any personal opinions and observes the studied phenomenon using qualitative data and observation schedules.

# CHAPTER FOUR
# FINDINGS OF THE RESEARCH

# CHAPTER FOUR
# FINDINGS OF RESEARCH

## 4.1 Introduction

Based on the conceptual ideas outlined in the theoretical chapter, an empirical investigation was carried out in three commercial streets of Bahrain. The aim was to investigate how various people perceive urban environments and to ascertain which surroundings facilitate social interaction.

The research findings are based primarily on different sensory systems, such as visual, auditory, olfactory, and haptic systems contributing to the multi-sensorial perceptions of urban surroundings that promote social interaction. At the same time, the ground-floor usage and occupancy of the adjoining buildings were observed to concretize the findings, that contribute to the social scape.

## 4.2 Observations

The findings from the observations identify different sensory stimuli (visual, auditory, olfactory, and haptic systems) and components that help in generating social interactions (occupancy and functions on the ground floors, as well as the façade characteristics on the ground floors) within the three streets (Manama, Muharraq and Riffa) in Bahrain. At the same time, interviews supplement these findings. The findings and personal evaluations of the respondents on the environments of the three streets, reveal social interactions in response to various stimuli, façade characteristics and the usage occupancy in the ground floors of adjoining buildings. The details of findings in each street are discussed below.

**Table 4.1**: Detailed observations of multi-sensory stimuli and other sociability factors in all three(Manama, Muharraq and Riffa) Street.

| **Manama, Muharraq and Riffa Street** | | |
|---|---|---|
| **Multi-sensory perceptions** | | |
| **1** | **Visual** | Characteristics of facades of the ground floors of the adjoining buildings. |
| | | Presence of Vehicles. |
| | | Characteristics of pavements. |
| | Effects of visual stimuli on social interactions | |
| **2** | **Soundscapes** | Sound recordings at spots 1, 2, 3 & 4 during the weekdays. |
| | | Sound recordings at spots 1, 2, 3 & 4 during the weekends. |
| | Effects of sound stimuli on social interactions | |
| **3** | **Tactility** | Weather condition and shaded areas. |
| | | Material texture. |
| | Effects of tactility on social interactions | |
| **4** | **Olfactory** | smell |
| | Effects of olfactory stimuli on social interactions | |
| Other sociability Factor | | |
| **5** | **Mehta's sociability factor** | Usages of the ground floors of the adjoining buildings. |
| | | Occupancy of the ground floors of the adjoining buildings. |
| | Effect of Mehta's sociability factor on social interactions | |
| **6** | **Social interaction** | Social interactions during the week. |
| | | Social interactions during the weekends. |
| **7** | **Fieldnotes** | In-the-field recording of information by means of writing and sketching. |
| **The lively atmosphere of Manama, Muharraq and Riffa Street** | | |

## 4.3 Government Avenue Street Manama Observation

Government Avenue is located close to Al Manama. This street section is 0.3 kilometers long and hosts many iconic historic buildings. Many significant banks and corporate enterprises can also be found on Government Avenue, outside Bab Al Bahrain.

Government Avenue got its name due to hosting the Bahrain government's offices in the past. The Gold City (not the Gold Souq) is a gold ornament shopping complex located on Government Avenue.

This street section is chosen since retail, service, office, residential and public buildings are sources of social interactions, as shown in Fig. 4.1. The street is divided into two parts (parts 1 and 2), while each plot on the streets is mentioned as sections for detailed observations, as shown in Fig. 4.2.

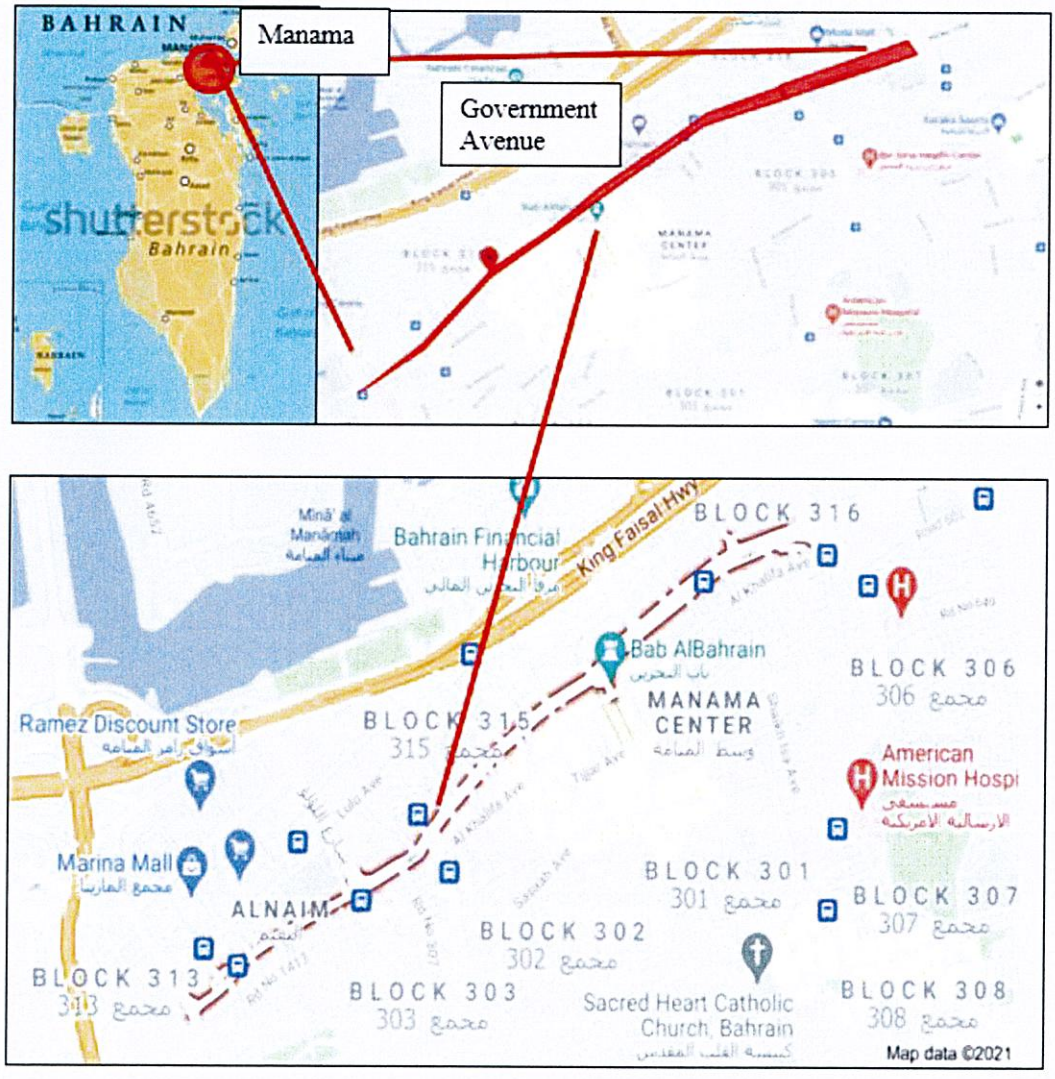



Fig 4.1: Many different ways open up from Manama Street
Source: Google map



Fig. 4.2: Part 1 and Part 2 sections of the Manama Street
Source: Author

### 4.3.1 Visual

#### 4.3.1.1 The Characteristics of facades of the ground floors adjoining buildings

According to Gehl's classification, the façade characteristics of the ground floors of the buildings that adjoin Government Avenue in Manama that impact the liveliness of streets can be classified into five categories: active, friendly, mixed, boring, and inactive. The designs and the appearances of façades enhance visual stimuli and the overall atmospheric character of Manama Street.

Manama street is divided into two parts. Part 1, Fig. 4.3, shows the detailed observations of the street from sections S01 – S04 and sections S10 - S15. In part 1 of the street, two friendly facades have been observed adjacent to sections S10 and S13. At the same time, eight mixed facades are highlighted in pink, as shown in sections S02, S10, S13 & S14, with fewer blinds and variations in functions. Many active facades with small units and characters shown in dark blue are observed in sections S03, S11, S12 & S15. On the other hand, sections S01, S02 & S14 have three inactive facades. Few boring facades are observed in this street, with few variations and fewer details. Thus, active facades predominate in this part of the street.

In part 2 of this street, Fig. 4.4, the detailed analysis from sections S06 – S09 and sections S14 - S20 are discussed. More inactive facades with no visible variations in functions and more passive units highlighted in dull green are observed in this part of the street. However, in this part of the street, four dull facades with fewer details are highlighted in dark yellow, as shown in sections S07, S16 & S17.

Two mixed façades are highlighted in pink, shown in sections

S06 and S08, with subtle and fewer details on the façades. In contrast, this street has one active façade with good details and materials. At the same time, no friendly facades are observed in this part of the street.

Thus, inactive facades predominate on this street. The variety of façades along the street indicates a difference in visual perception and ambiance. In general, the design of inclusive, mixed-use, and dynamic façades results in a pleasant, aesthetically pleasing environment on the street. However, the atmosphere is less appealing when the facades are passive and boring. There is also a transit zone when the visual atmosphere changes. Fig. 4.5 shows characteristics of facades of the ground floors of adjoining buildings on Government Avenue in Manama

**Table 4.2: Summary of characteristics of facades of the ground floors of adjoining buildings on Government Avenue in Manama**
**Source: Author**

| **Visual Characteristics of facades of the ground floors of adjoining buildings.** | | | | |
|---|---|---|---|---|
| Part 1 of the street | | | | |
| Friendly | Mixed | Active | Inactive | Boring |
| Two | Eight | Many | Three | Few |
| Part 2 of the street | | | | |
| Friendly | Mixture | Active | Inactive | Boring |
| Nil | Two | One | Many | Four |

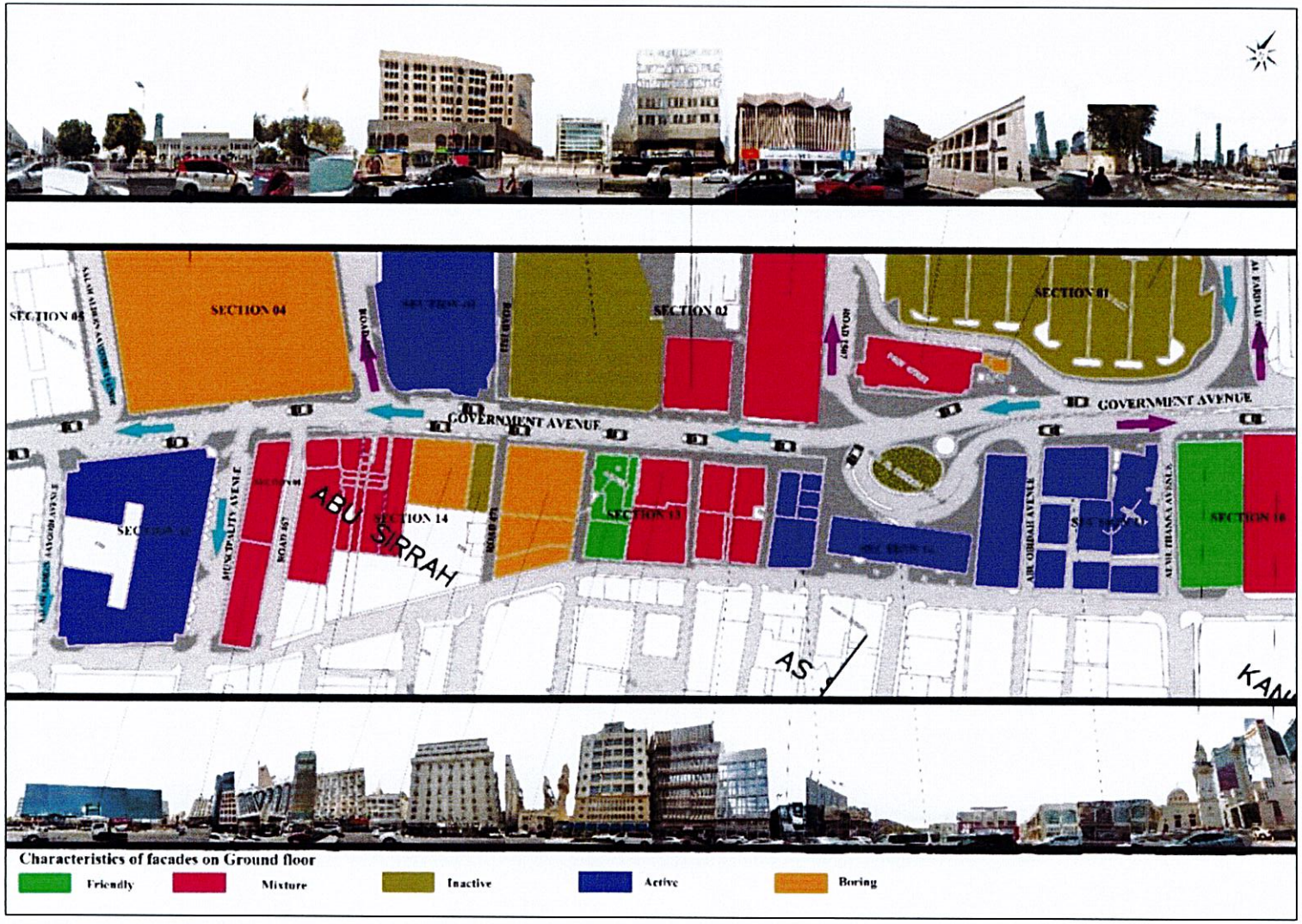



**Fig. 4.3**: Characteristics of facades of ground floors of adjoining buildings – The Government Avenue part-1, Manama
Source: author

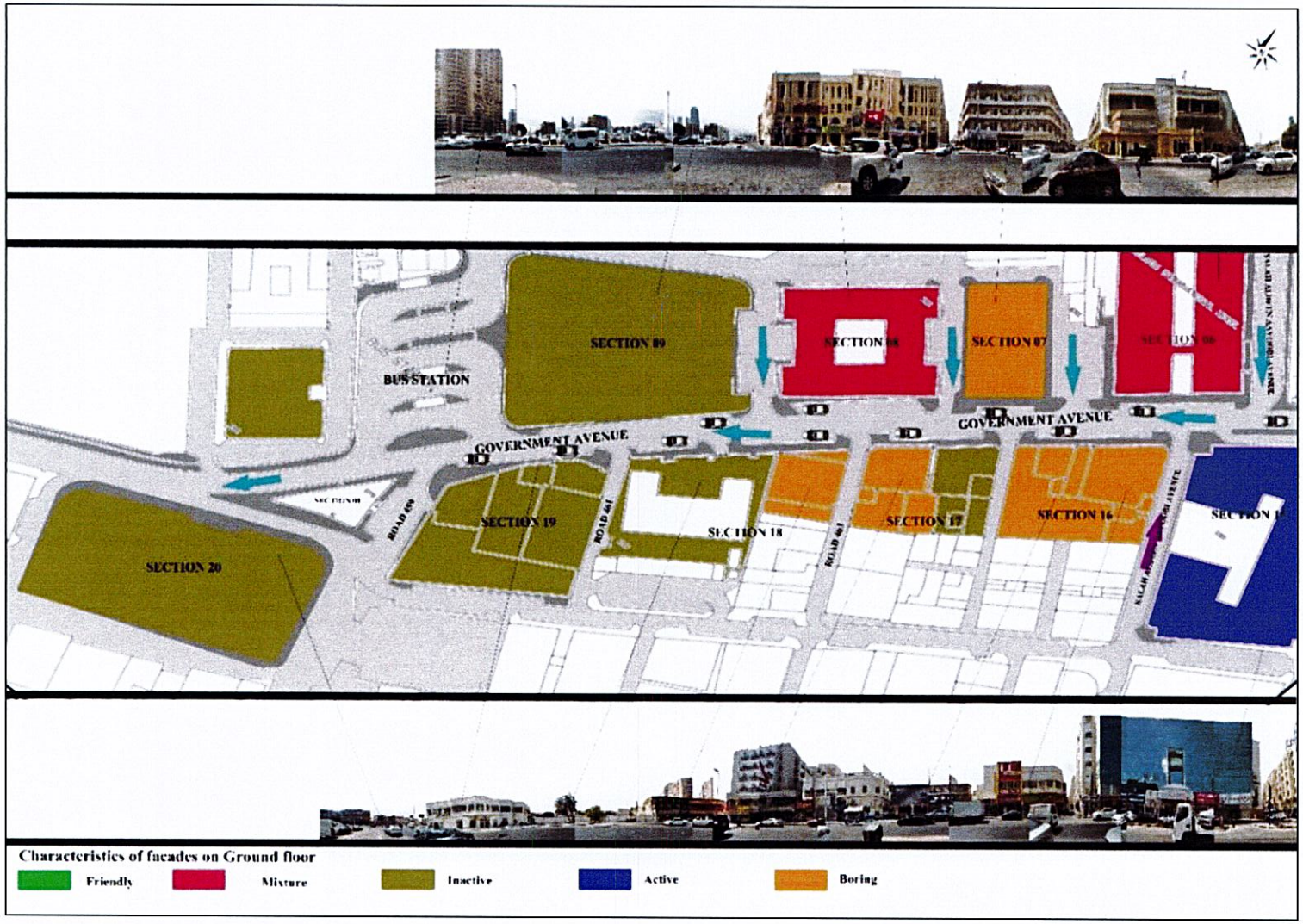



**Fig. 4.4**: Characteristics of facades of ground floors adjoining buildings - The Government Avenue, part-2, Manama.
Source: author

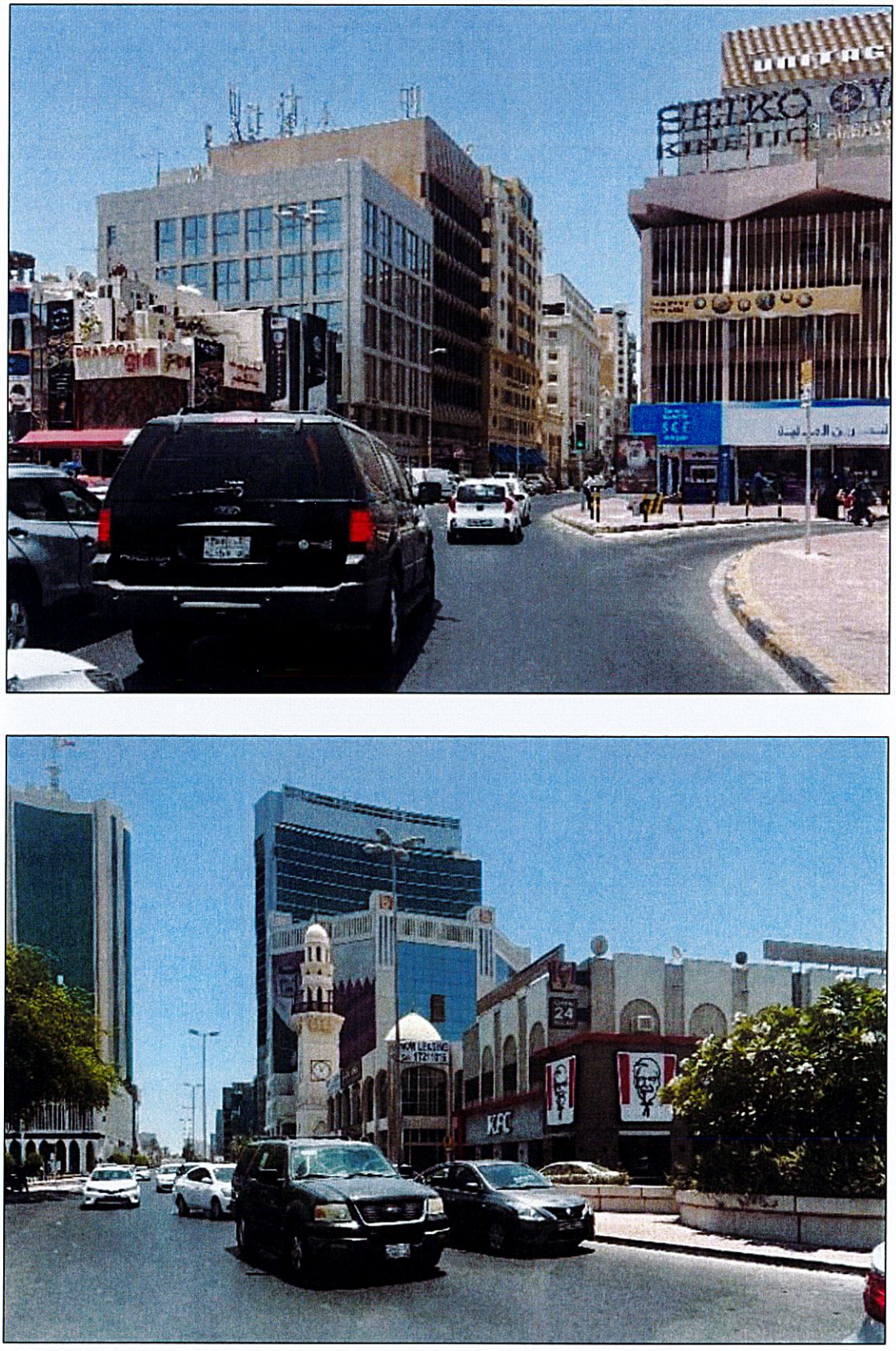



**Fig. 4.5**: Variant façade charaterisitics of Government Avenue in Manama
Source: author

### 4.3.1.2 Presence of Vehicles

The parked automobiles on the Government Avenue of Manama are a severe visual barrier. Here, pedestrian movement was hindered due to the chaotic parking of automobiles. The illegally parked cars reduced the width of the streets, causing the movement of vehicles and people crossing to be messy, resulting in congestion. There were fewer authorized crossings for pedestrians on this route. However, no heavy vehicle schedules were in place.

Part 1 of this street, Fig. 4.6, illustrates parked cars impeding the view, restricting the width of the road, prohibiting pedestrian mobility, and reducing the street's liveliness. However, a separate paid parking zone in this street area is still accessible in sections S01 & S04, which frees the movement compared to other streets. Government Avenue is also highly monitored by police patrol to avoid informal parking.

Part 2 of this street, Fig. 4.7, depicts automobiles parked in front of businesses, obscuring the view. There were automobiles parked on the pavement or arbitrarily on the road, obstructing the view and other movements of cars, producing traffic congestion during peak hours of the day and reducing the liveliness of this area. The absence of automobiles during the non-peak hours changes the street character so that it is more open and vibrant, as shown in Fig. 4.8. However, as compared to other avenues, this street has been provided with opportunities to reduce the impact of visual dominance.

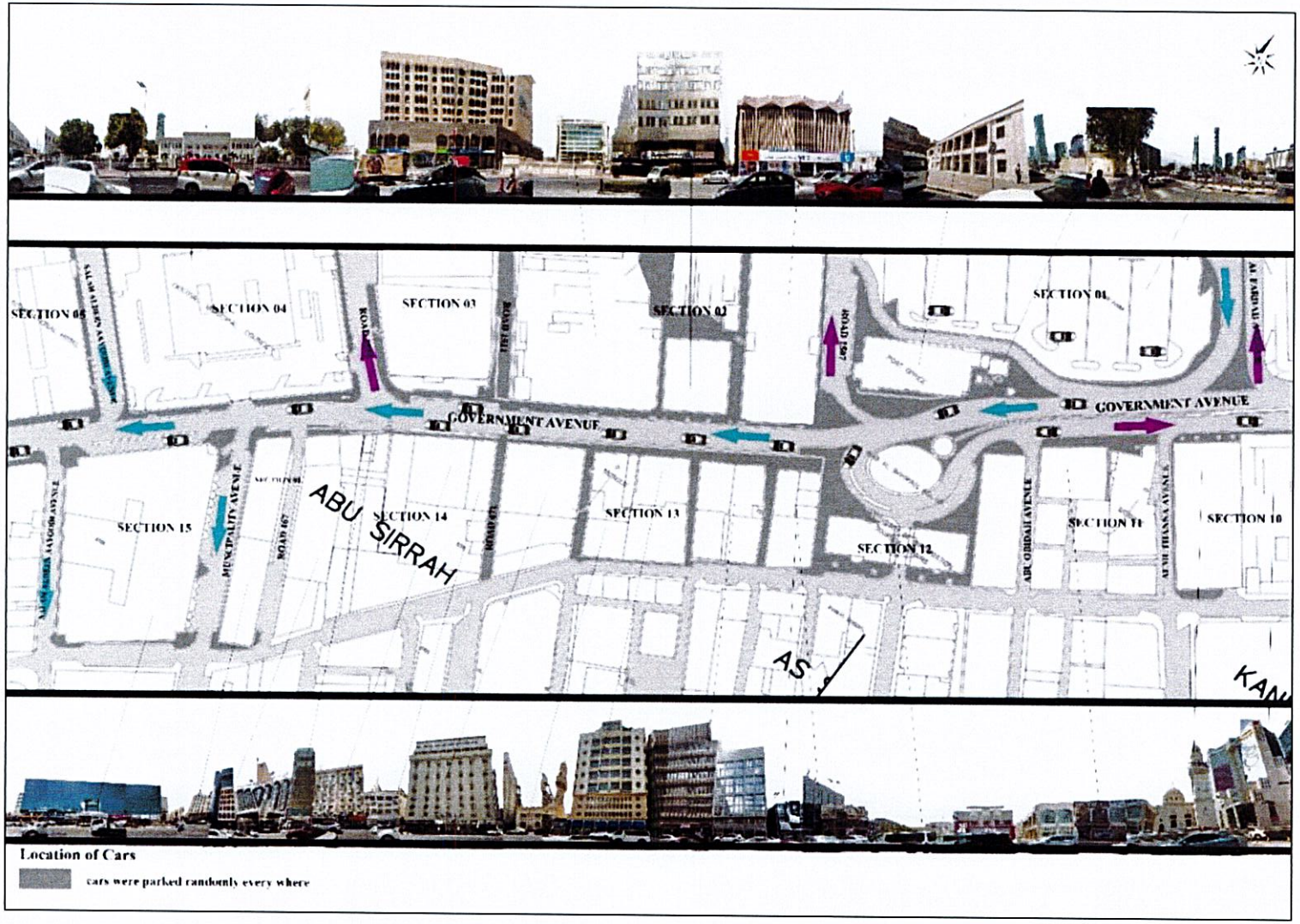



Fig. 4.6: Presence of cars in the Government Avenue part-1 in Manama
Source: author

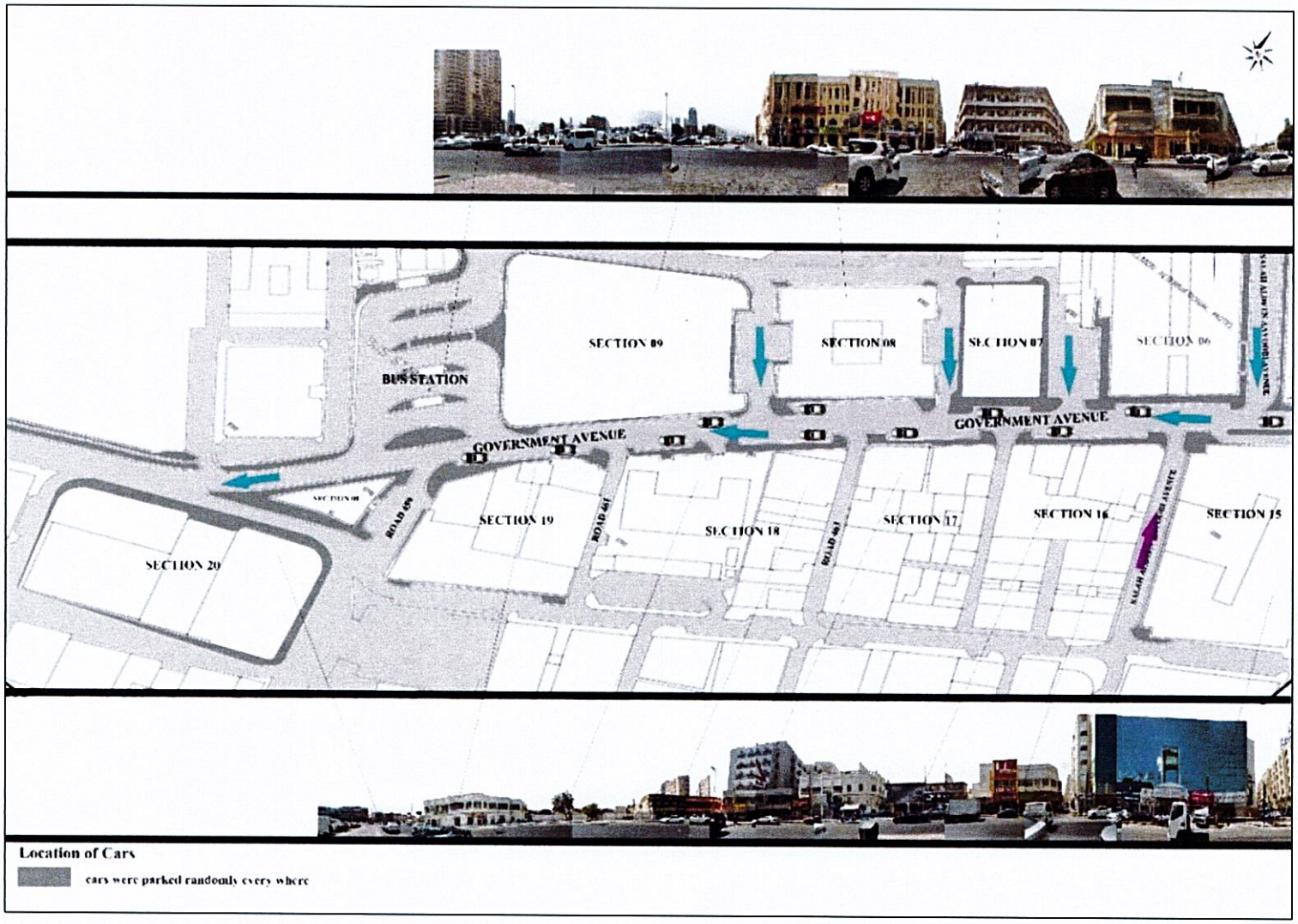



Fig. 4.7: Presence of cars in the Government Avenue part-2 in Manama
Source: author







Fig. 4.8: Cars obstructing the view in the Government Avenue in Manama
Source: author

### 4.3.1.3 Characteristics of the pavement

Overall, the pavements of the Government Avenue in Manama are repetitive and unpleasant, with little or no vegetation. Changing the asphalt finish of the road to the pavement, on the other hand, incites the visitors' visual stimuli. Most of the pavements in this street are herringbone, with a few exceptions. In front of the Manama post office, Bab Al Bahrain employed a circular, half arc, and box pavement style. Besides preventing vehicles from crossing immediately, most pavement widths are expanded by a minimum of three meters in width. Moreover, some of the streets are blocked by bollards. Pedestrians increasingly use the pavements along these routes for safe movement.

Part 1 of this street, Fig. 4.9, depicts the variable width of pavements accompanied by urban furniture in the pavement's center when the width is high and at the pavement's border in sections S01, S02, S11, S12, S13 & S14. Most sections of this street have blockades from side streets with bollards and herringbone pattern pavements. The street barricades block the direct entries of cars. However, some sections had cracked and pressed pavements because of informal vehicular parking on the pavement, creating a visible barrier. Overall, planned initiatives were to identify parking zones to make it a pedestrian-friendly street.

Part 2 of this street, Fig. 4.10, like Part 1, shows the variability in pavement width with vehicles parked in front of businesses. The pavements are dull, visually unappealing, and devoid of plants. However, urban furniture was available in front of sections S16, S19 & the Bus Station). The overall width of the pavement is more significant in this street. The transition from the road to pavement

incites visual stimuli. There are no illuminations or signs to help people to find their way. This street section has a mixture of old and new pavement types. However, overall, a herringbone pattern is applied in this street section.

The parking allocation and sidewalks in all the street parts have been indicated by changes in the materials from asphalt to herringbone pattern concrete. The increased width of the pavement on the edges of the street provides a friendly atmosphere to the visitor, thus increasing social interaction. Fig. 4.11 shows the changing characteristics of the pavement.

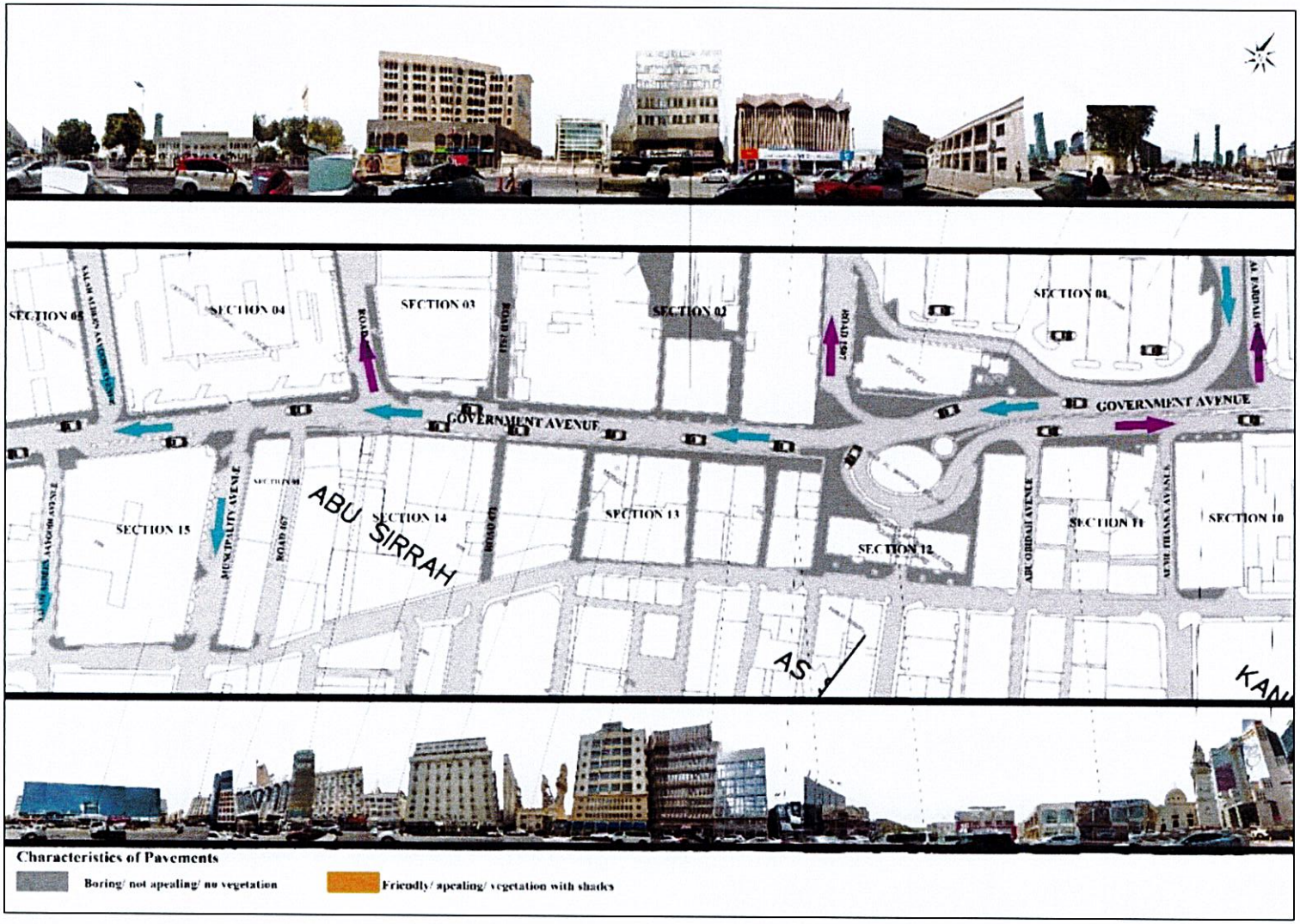



Fig. 4.9: Characteristics of the pavement in the Government Avenue part-1 in Manama
Source: Author

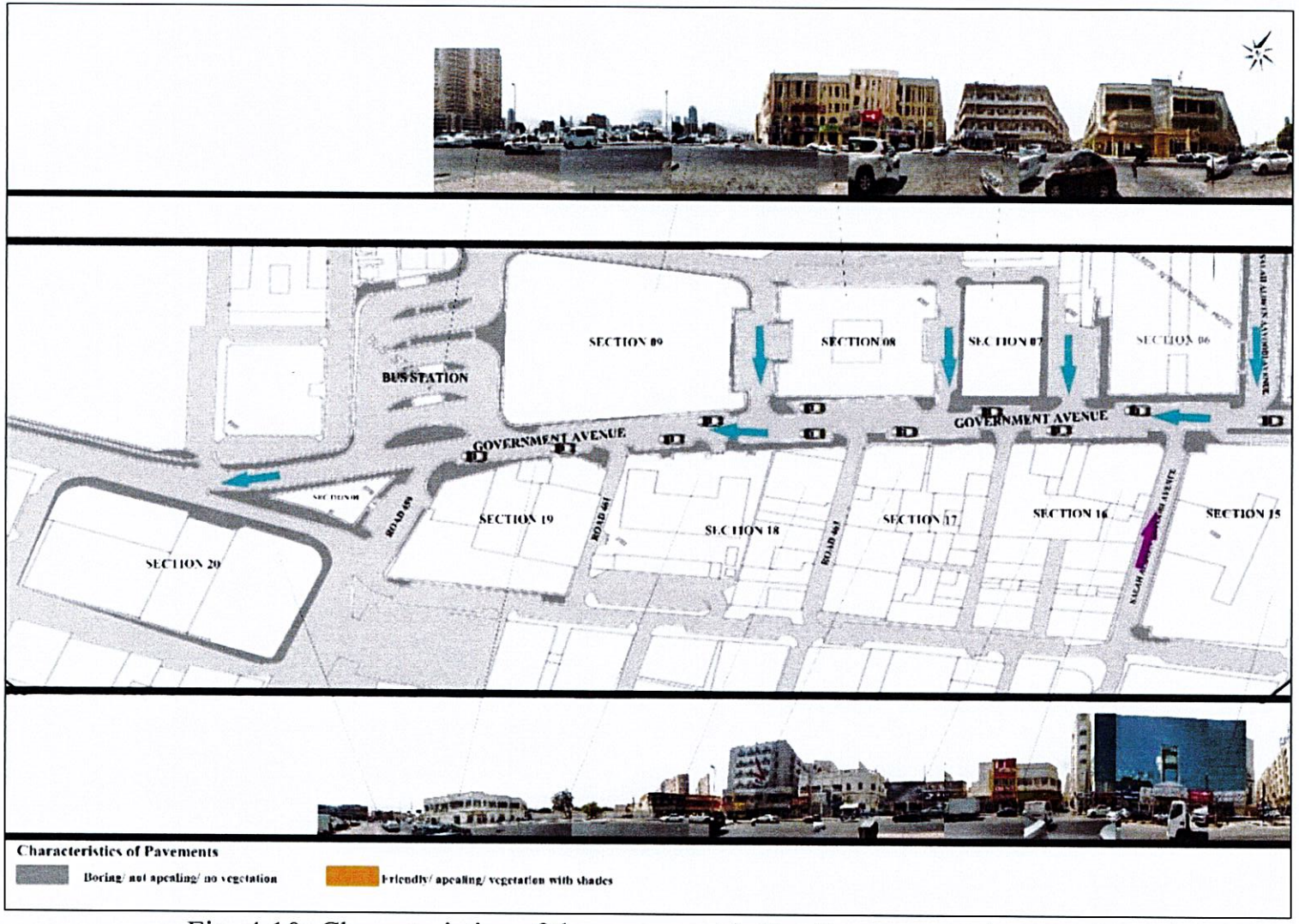



Fig. 4.10: Characteristics of the pavement in the Government Avenue part-2 in Manama
Source: Author






Fig. 4.11: Characteristics of the pavement in the Government Avenue in Manama
Source: Author

### 4.3.1.4 The effect of visual stimuli on social interaction

The effect of visual stimuli on social interaction on government avenues in Bahrain, it was found that there was a link between social engagement and façades that were cheerful, active, or a combination of the two individuals would like to spend more time in front characteristics of facades that are vibrant, attractive and pleasant developing social connections. Other sites had less social contact since their façades were generally dreary and lifeless, with a few scattered mixed façades. Conversations were observed while moving (walking or riding bicycles) but not lingering in front of these facades.

Part 1 of this street, as seen in Figs 4.12 and 4.13, is predominantly made up of people gathering while standing and conversing, resting and conversing, and working and conversing in front of dynamic and mixed façades or where the pavement width is higher. An example is between pavements and on the edge of streets in front of Bab Al Bahrain and the Manama Post Office. Walking and speaking were commonly carried out in front of drab facades with shorter walkways and more vehicular traffic.

Other than the façades, the functions can also increase social interactions. Even though people were standing, informally sitting, and chatting, the façades of the Café, bakery, Arabic coffee shops, and retail establishments, for example, are regarded as unattractive. Passers-by would stop and stand to talk with diners seated on the benches outdoors. The social contact in this situation is influenced by the use and social purpose of this third area (café, bakery and restaurants) and retail establishments on the ground floors of adjoining buildings rather than variant active or inactive façade characteristics of the ground floor of the buildings.

Part 2 of the street Fig. 4.14 and 4.15, like Part 1, was occupied mainly by people standing and discussing, sitting, and chatting in front of a lively and mixed façade. Customers and business owners conversed while working and talking, standing and discussing in front of shopfront doors, and sitting and chatting while standing on informal stairs outside shop fronts and buildings. Even though the façade elements were repetitive, this interaction can primarily be attributed to the retail spaces.

In addition, people-to-people contacts occurred in front of passive facades where furniture was available. The phrase "attractive ground floors" refers to regions where social interactions develop due to shop spaces, cafes, restaurants, or the presence of urban furnishings at the ground level. It should be noted that the amount of participation fluctuated from weekday to weekend, with weekend interactions being higher than the weekday interactions.

The cars were visually blocking the views in all parts of the street. The visual impression was negatively dominated by the parked vehicles. In other words, Parking automobiles, particularly delivery vehicles, formed a visual barrier by obstructing views of the opposite side of the street and the façades, ground floors, and pavements.

Most of the buildings, such as Bab al Bahrain, the Manama post office, various hotels, banks and office buildings, act as prominent visual landmarks in different street parts. The visible landmarks attract visitors towards them to create affiliations to the space, thus making this street one of the most prestigious streets in Bahrain.

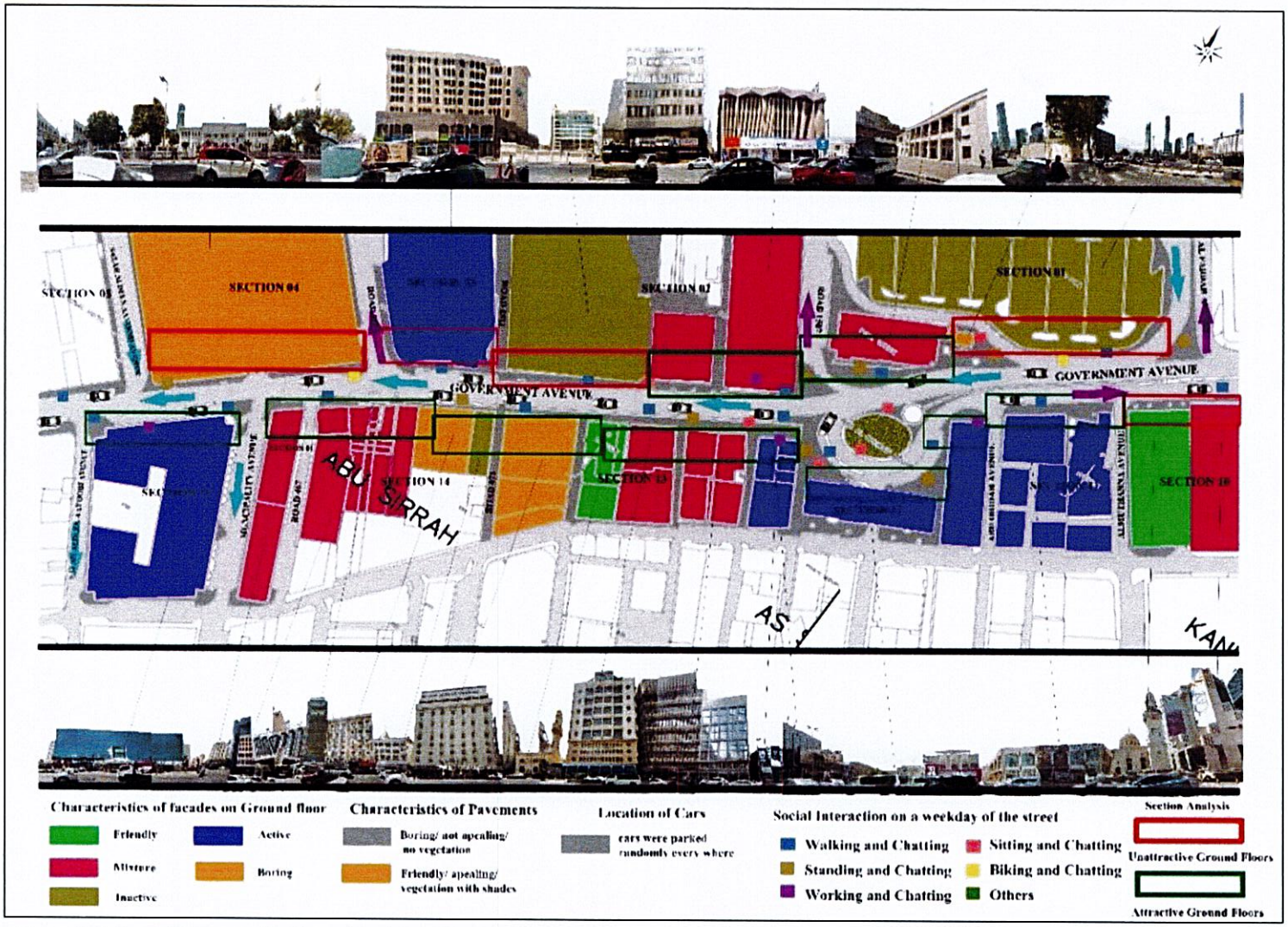



Fig. 4.12: Effects of visual stimuli on social interaction in part-1 of the Manama Street - Weekday
Source: Author

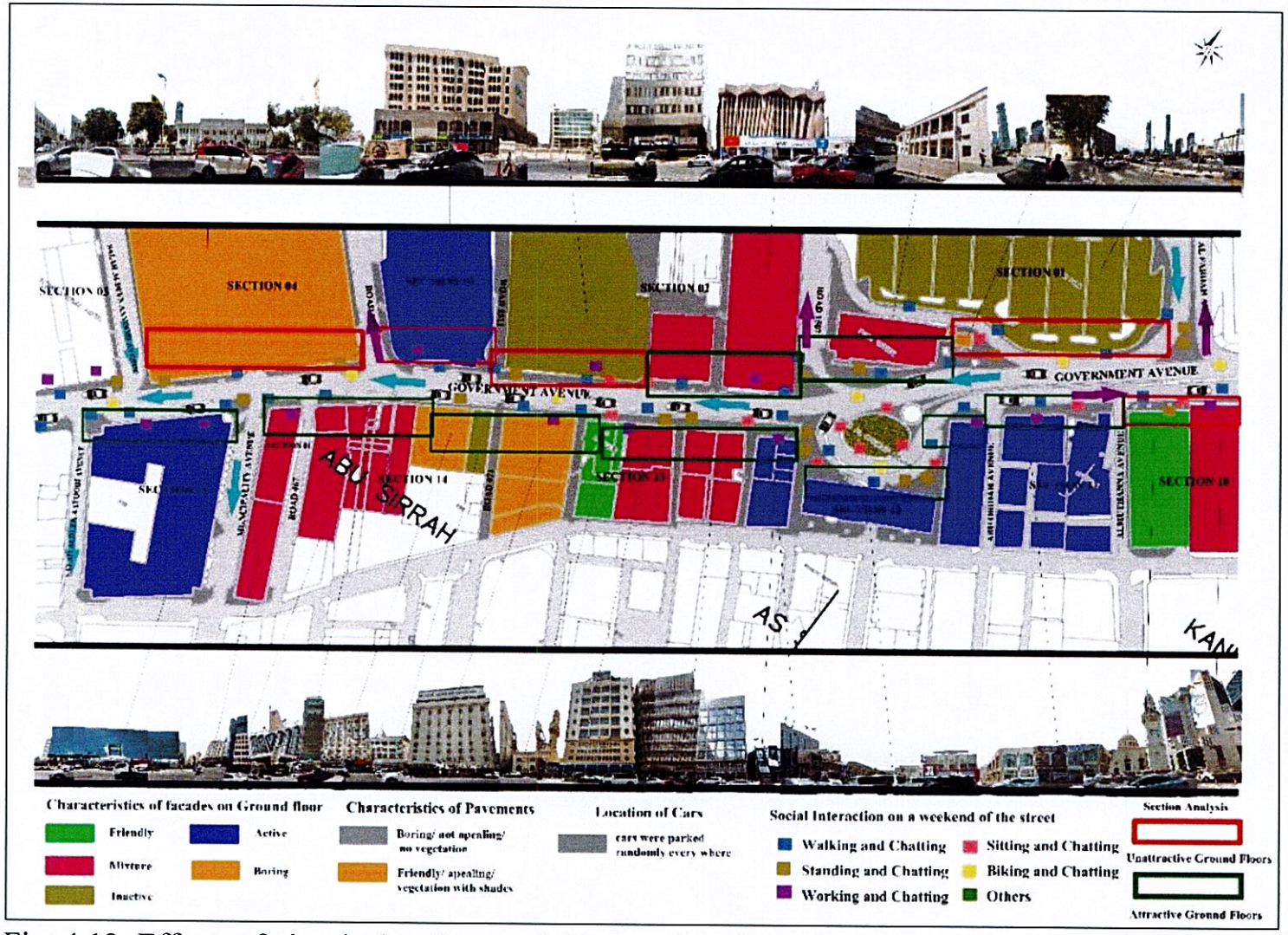



Fig. 4.13: Effects of visual stimuli on social interactions in part-1 of the Manama Street- Weekend
Source: Author

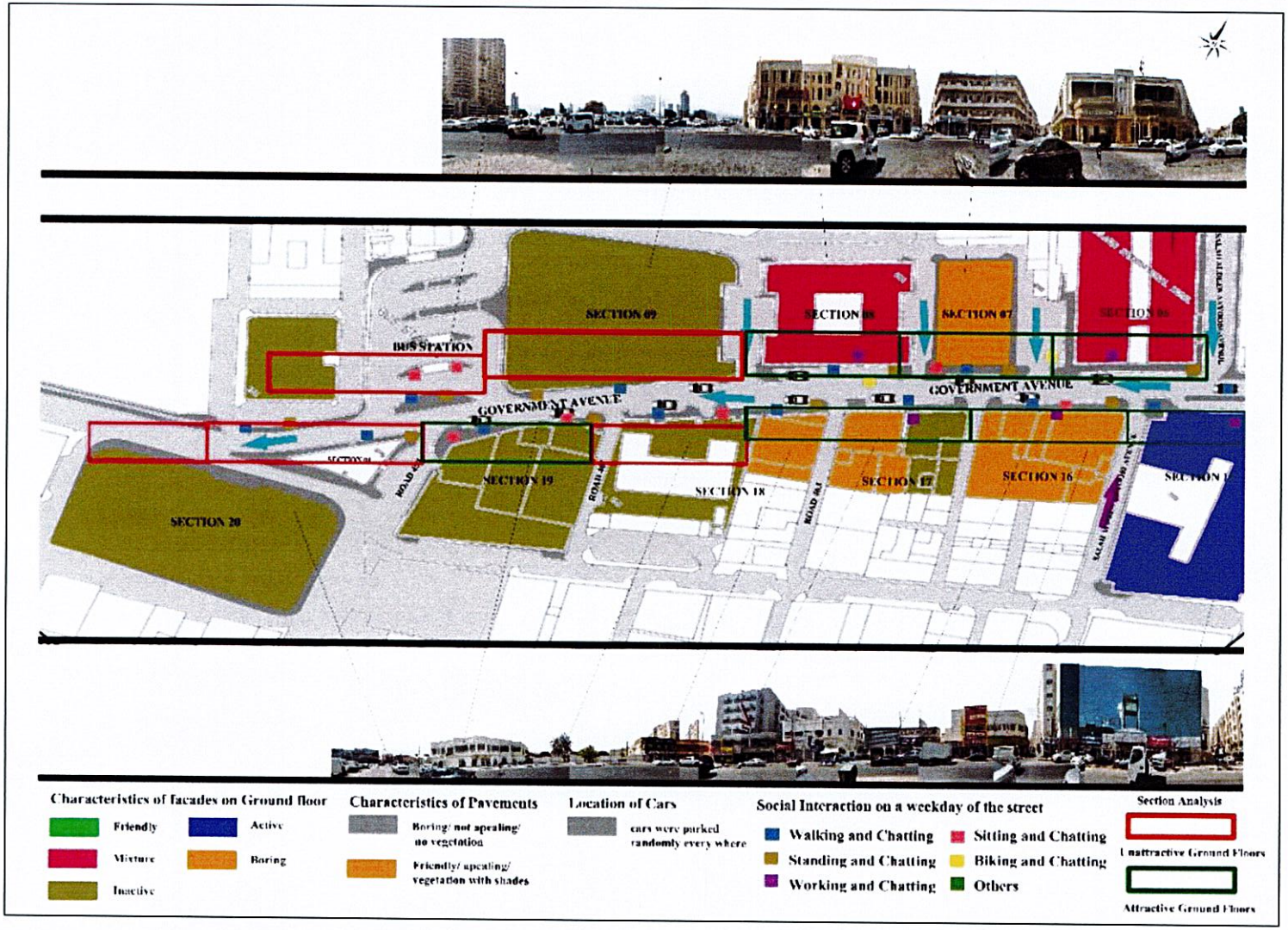



Fig. 4.14: Effects of visual stimuli on social interactions in part-2 of the Manama Street- Weekday
Source: Author

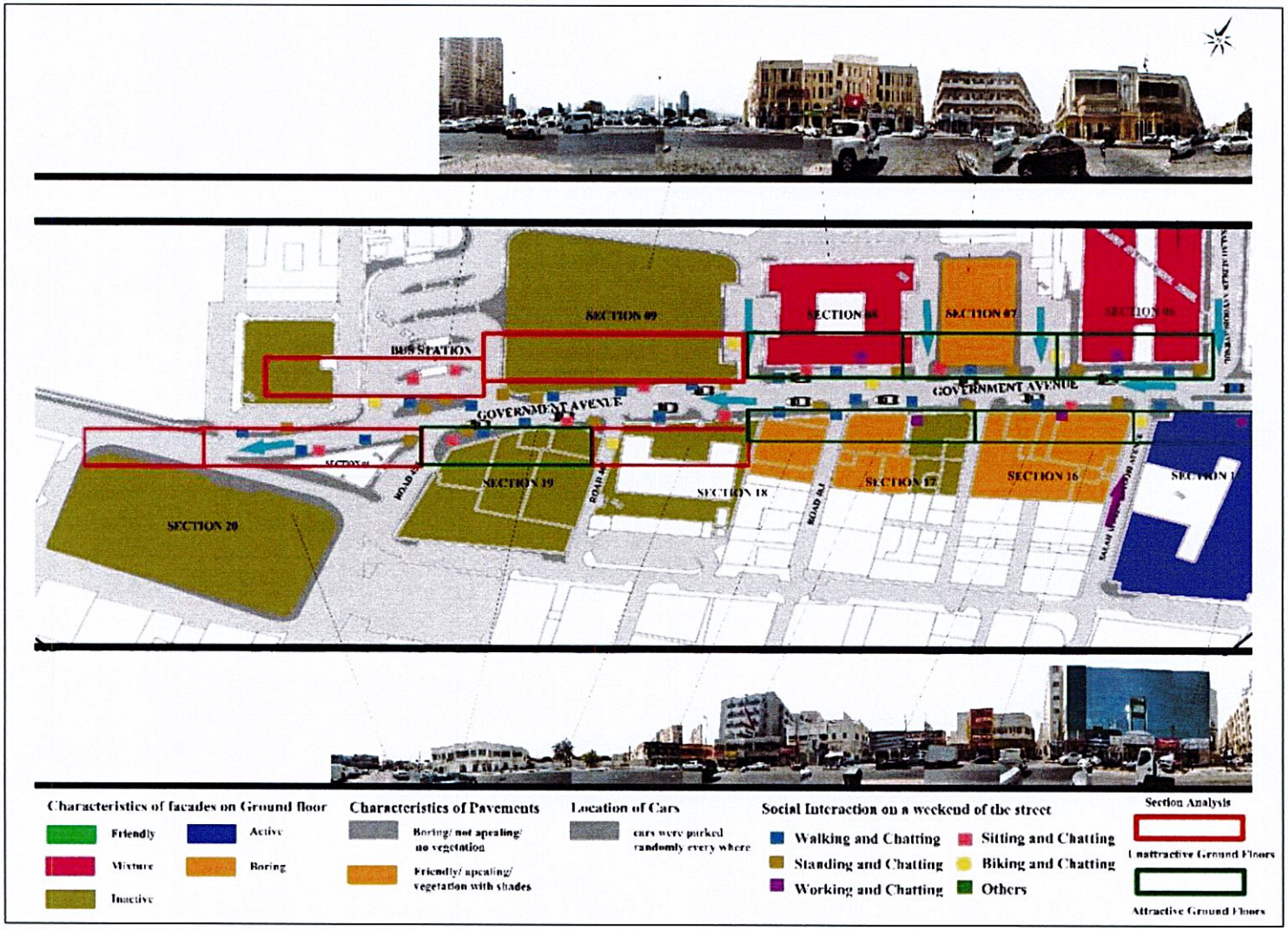



Fig. 4.15: Effects of visual stimuli on social interactions in part-2 of the Manama Street - Weekend
Source: Author

### 4.3.2 Soundscapes

The street soundscape was seen to change throughout the day as an auditory ambient stimulus, with sound peaks in early mornings, late afternoons and evenings: the typical rush hours. The soundscapes vary more quickly during the day than over a week.

Fig. 4.16 shows the general sounds in Manama street. The sounds such as a steady buzzing and sweeping background sounds, passing automobiles, people conversing, the regular and periodic sounds of electric machinery and prayers from the Mosque are repeated throughout the week and on weekends. However, some variations, such as specific sounds banging from goods deliveries, are less prevalent on the weekends.

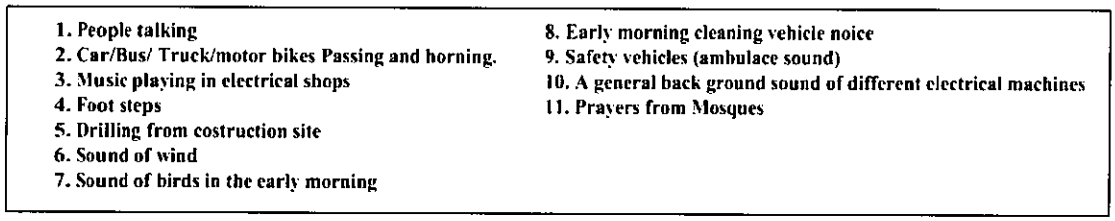



Fig. 4.16: General Sounds in the Manama Street
Source: Author

In Manama, the soundscapes cumming from different items changed across the four locations on the Street. In spots 1 and 2, there were much more traffic sounds in a larger quantity. Spots three and four have lower levels of traffic sound pollution. Conversations may be held without raising one's voice, depending on traffic movement like persons had to do at spots 1 and 2.

The soundscape of this street fluctuates in general, with louder sounds of vehicles towards the Southwest and lower noises in the Northwest. There are loud sounds of cleaning and sweeping machine heard in specific locations early in the morning. At the same time, the

sounds of cleaning vehicles may be heard during the early hours of the week. The soundscapes also fluctuate during weekdays and weekends and different day hours.

#### 4.3.2.1 Weekday soundscapes of Manama Street at spots 1 and 2

On a weekday morning (about 7 a.m.), the soundscape of Manama street's spot 1 appears to be substantially quieter and calmer, with breezes, birds, and footstep noises. Spot 1 seems to be significantly noisier during the lunch hour (from 9.00 a.m. to 1.00 p.m.), with more vehicles passing, music playing from electronic stores, prayers from mosques and people speaking. Spot 1 settles down in the afternoon (about 1.00 p.m. to 3.00 p.m.), with fewer people talking, fewer autos, and partially closed businesses.

Because of its proximity to Manama's major highway, the soundscapes closer to the beginning of Manama Street may have more significant traffic and sound from passing cars. Bumping sounds from vehicles may be heard more frequently at location 1 than at the other locations and more frequently during the week than on weekends. At various times of the day, people converse at cafes, restaurants, and exchange shops, traditional shops in Bab Al Bahrain keep the street crowded.

Similarly, at spot 2 on a weekday morning (about 7 a.m.), the soundscape is calmer and quieter, with birds, winds, basic footfall passing, and the occasional sound of cleaning trucks. However, during the midday hour (from 9.00 a.m. to 1.00 p.m.), it becomes louder, with sounds emanating from passing vehicles, people speaking and drilling from the construction sites. The pitch of the voice of individuals speaking is higher in place 2 than in spot 1.

The spot gets calmer again around midday (about 1.00 p.m. to 3.00 p.m.) due to fewer people moving and less vehicle noise. At spot 2, sounds of many people conserving can be heard compared to spot 1 and spot 3 since it consists of some urban furniture. The variation in sound levels implies that activity levels increase during the day. Fig. 4.17 shows the soundscapes of a weekday at spots 1 and 2.

#### 4.3.2.2 Weekend soundscapes of Manama Street at spots 1 and 2

On weekends, spot 1 is significantly louder, with vehicles creating most of the sound. On the other hand, much talking is going on while people perform their jobs. Furthermore, prayers were audible from the mosque during the recording and window shoppers buzzed around the street (during noon). The sound on the spot 1 is louder and more spread on weekends, with a scattered peak from sounds of vehicles, social scapes, and ground floor activity. On weekends, spot 1 is significantly louder, with vehicles creating most of the sound.

Similarly, at spot 2, due to the closeness of mosques and Friday prayer being held at the time of recording, spot 2 is substantially noisier. However, due to multiple retail stores and people conversing, spot 2 is more piercing in distributed noises. In contrast, compared to spot 1, the background noise of vehicles is reduced at spot 2.

In addition, due to the high volume of activity in both places, the typical background hum of electrical machinery is frequently unnoticed throughout the lunch hour, while sound cumming from electric machinery is very noticeable during the day's early hours. The sound's strength might be attributed to the dense structure of the building and the diffraction sound on the building facades in the center of the street section. The sound strength is low on crossings or at both

ends of the streets, where the sound could disappear. Fig. 4.18 shows the weekend soundscapes at spots 1 and 2.

#### 4.3.2.3 Weekday soundscapes of Manama Street at spots 3 & 4

Similar to spots 1 and 2 the soundscape is calmer and quieter on a weekday morning (about 7 a.m.), with birds, breezes, basic footfall passing, and the odd sound of cleaning vehicles. Spots 3 and 4 get louder during the midday hour (from 9.00 a.m. to 1.00 p.m.), with sounds rising from passing cars, people speaking, and noon prayer. The pitch of the voices released by noon prayer and people speaking is higher in position 3 than in position 4. A drilling sound may be heard from far away from spot 2.

The area becomes more peaceful about midday (from 1.00 p.m. to 3.00 p.m.) due to fewer people moving and less vehicle noise. Spots 3 and 4 are more tranquil than Spot 1 and spot 2 due to their availability of more open inactive spaces. Many people conversing sound can be heard due to the availability of urban furniture. The fluctuation in sound levels suggests that the activity levels rise during the day. Fig. 4.19 shows the weekday soundscapes at spots 3 and 4.

#### 4.3.2.4 Weekend soundscapes of Manama street at spots 3 & 4

Spot 3 is significantly louder than spot four during the weekend's midday hour due to the proximity of mosques and the availability of retail stores. However, spot 3 is more piercing during lunch due to several shop outlets and people speaking. Spots 1, 3 and 4 have less background noise from vehicles and dispersed sound.

The sound in spots 3 and 4 is more evenly distributed and has

more extraordinary peaks than the sound at spot 1. Similar to spots 1 and 2, due to the significant number of activities at spot 3, the regular background hum of electrical gear often goes unnoticed during the lunch hour; however very noticeable during the early hours of the day. Based on traffic intensity, discussions might be had without increasing one's tone, as people were doing at spot 1. The soundscape varies as you go down the same street, with stronger, harsher sounds from vehicles throughout the south and quieter sounds in the north. Fig. 4.20 shows the weekend soundscapes of spots 3 and 4.

The following Fig. (4.17- 4.20) show the week and weekend soundscapes and the general intensity of their pitch at different spots. It is to be noted that sounds from vehicles, people conversing, sounds from various shops, and prayers from mosques were higher during the weekend than on weekdays.

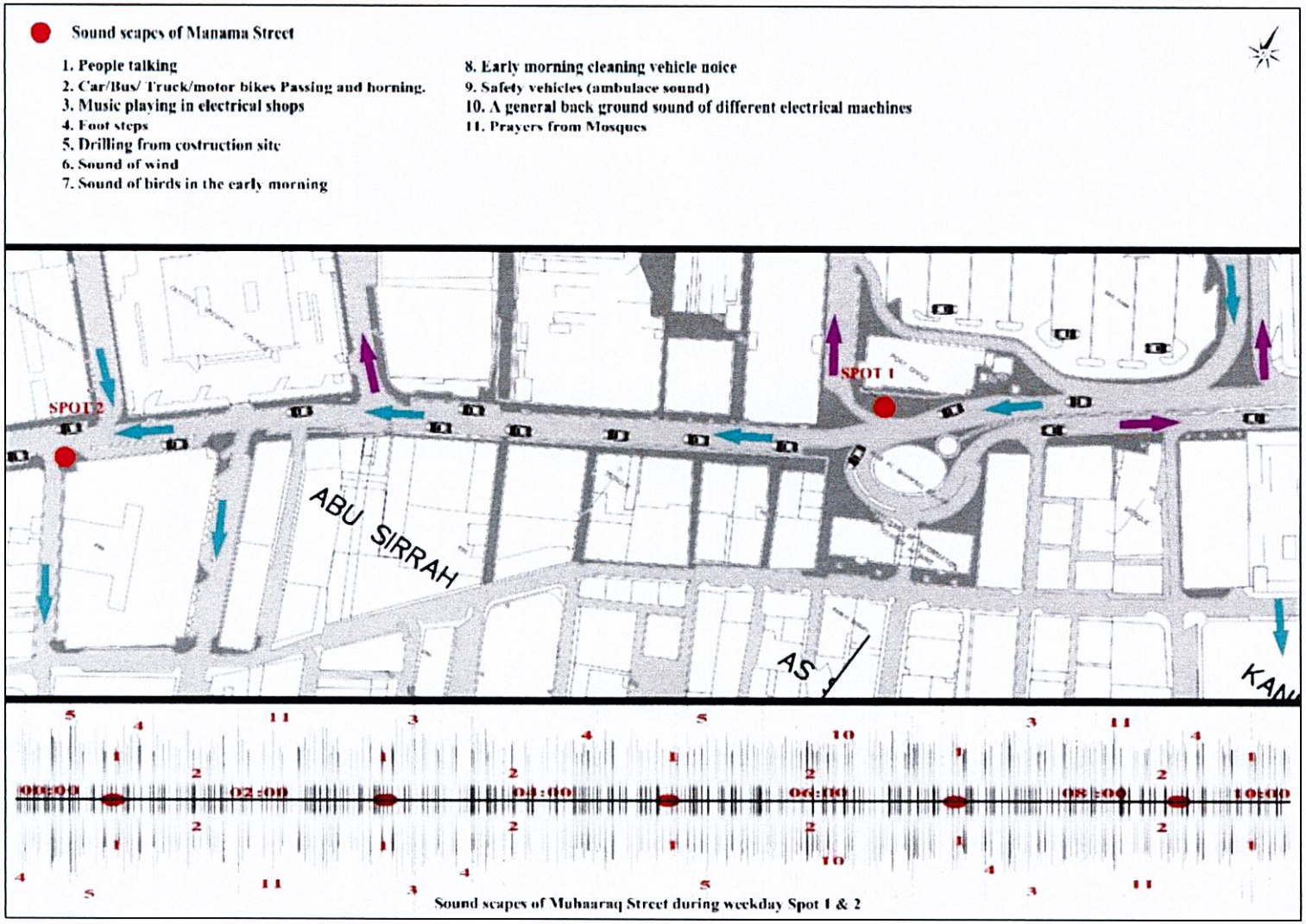



Fig. 4.17: Weekday sound scapes on Government Avenue spot 1 and 2 in Manama
Source: Author

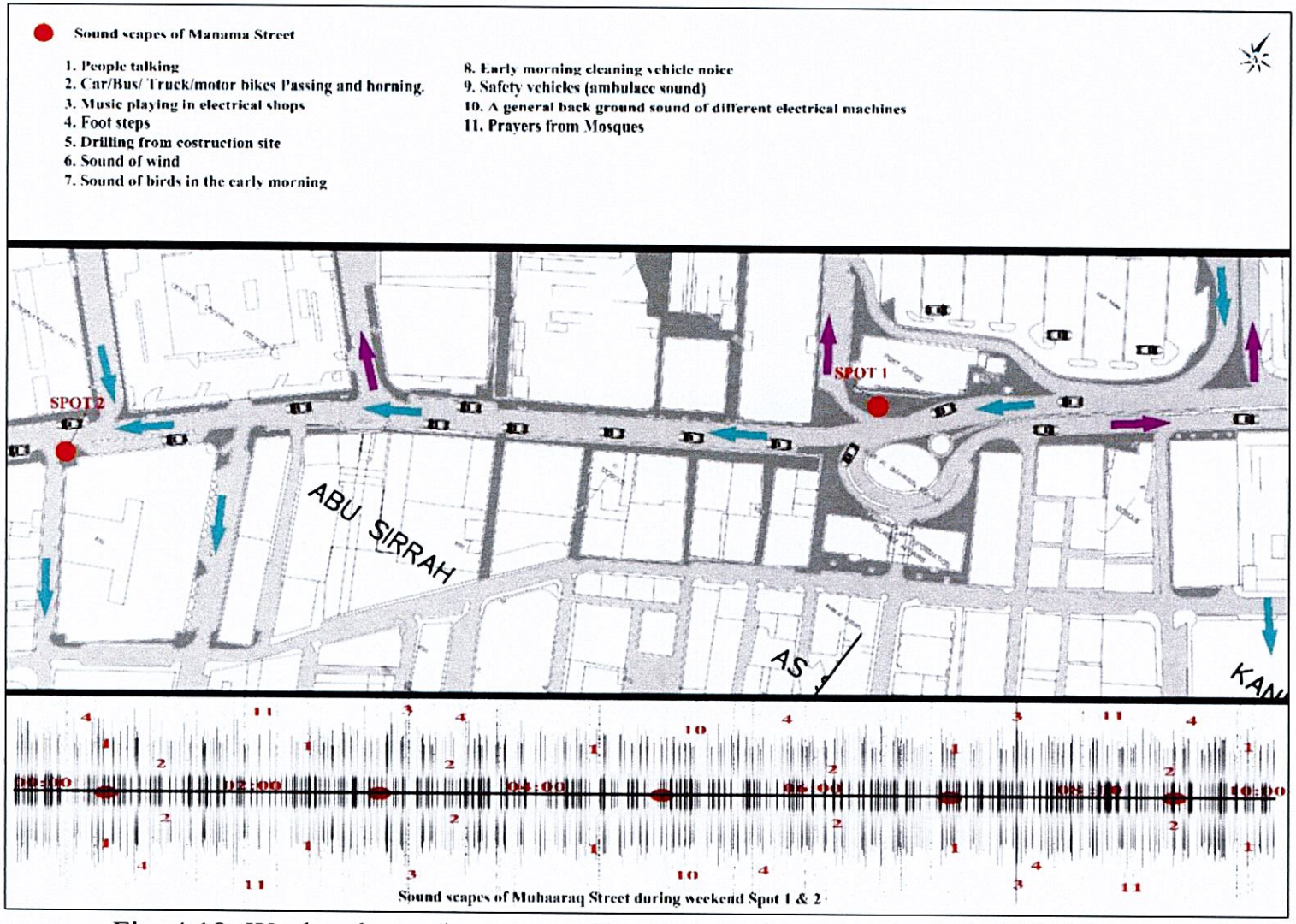



Fig. 4.18: Weekend sound scapes on Government Avenue spot 1 and 2 in Manama
Source: Author

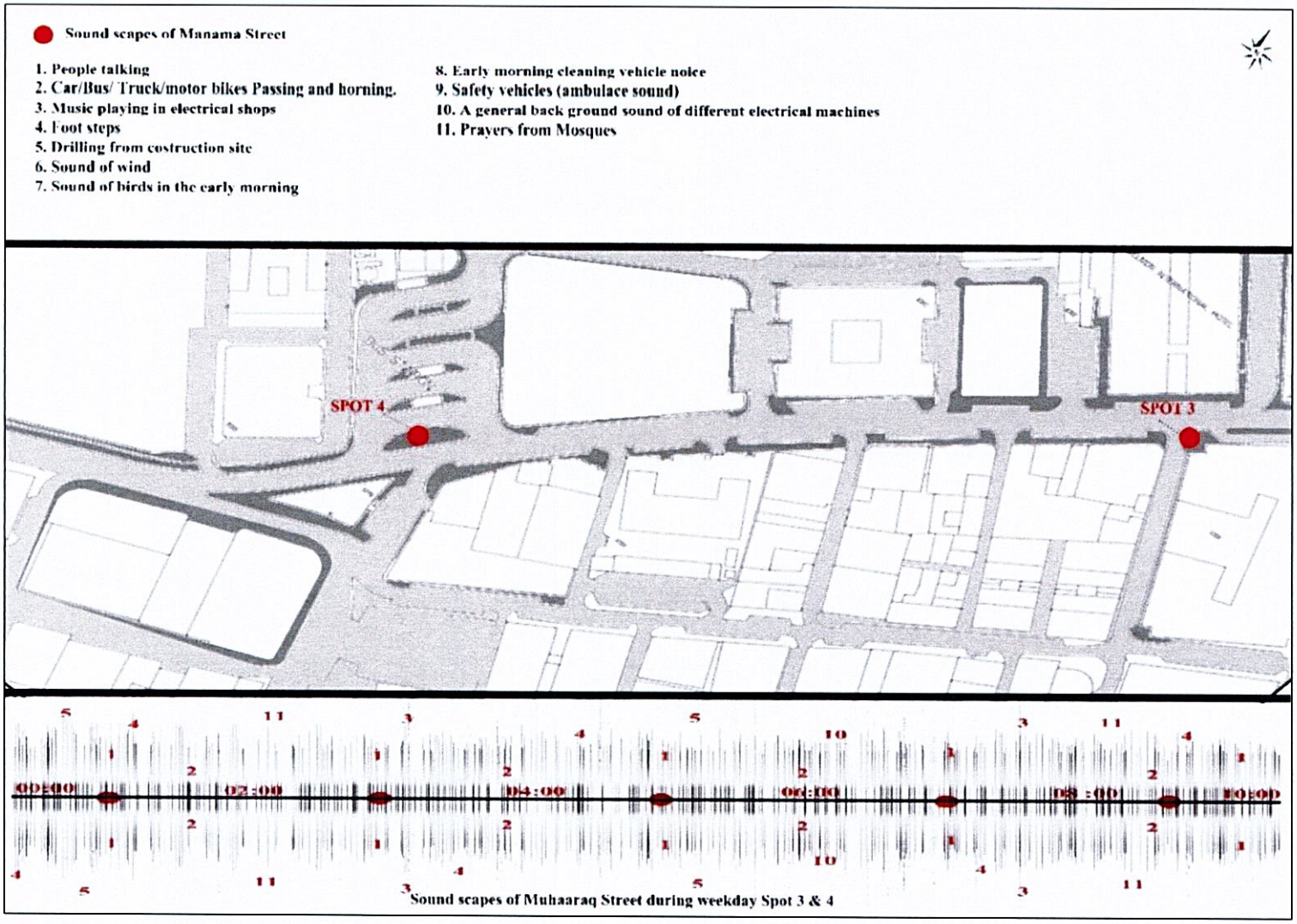



Fig. 4.19: Weekday sound scapes of the Government Avenue spot 3 and 4 in Manama
Source: Author

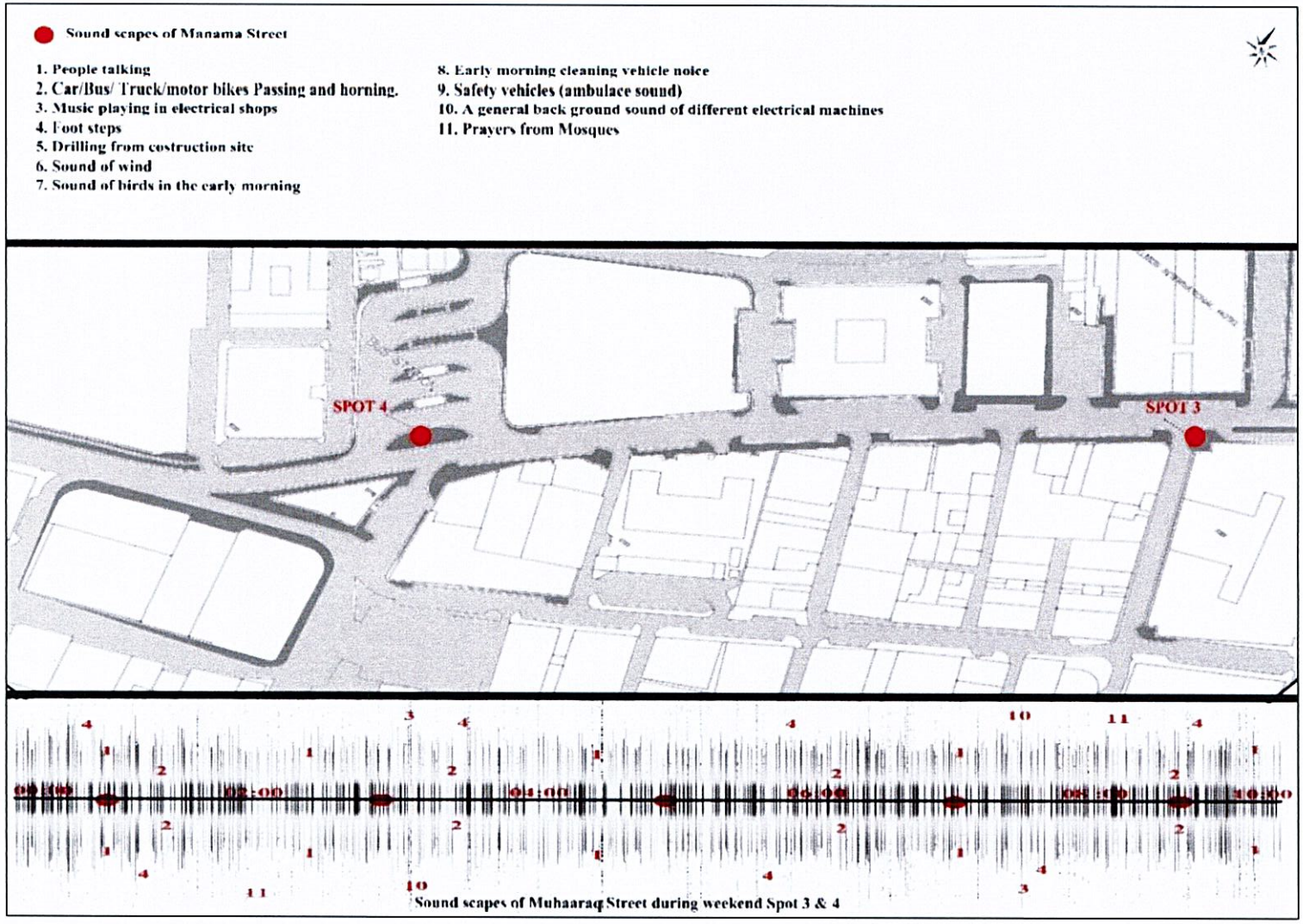



Fig. 4.20: Weekend sound scapes of the Government Avenue spot 3 and 4 in Manama
Source: Author

### 4.3.2.5 Effects on social interaction through sound stimuli

In terms of the sensory environment of the street, auditory inputs were assessed to be second in dominance after visual inputs in this street as well. At the exact moment, various people perceive sounds from different items differently. The soundscape of Manama street shifts throughout the day, with sound peaks in the morning, late morning, and late afternoon and during traffic hours.

Because individual noises during the day and on weekends are generally equivalent, there are more auditory variations during the day than during the week. On weekdays, though, a bumping sound associated with goods delivery can also be heard in this street. The sounds on Government Avenue were substantially more robust in the top upper half of the street (spots 1 and 2) than in the top lower half of the street (spots 3 and 4). Meanwhile, the sound is significantly more distributed in locations 2 and 3. The soundscape is dispersed more on weekends than during the week.

This is true for most of the locations, except spot 1 and spot 3, which may be attributed to a more significant number of people and vehicles on weekends than during the week and the existence of restaurants. Bab Al Bahrain Retail stores, and the Gold City center, are the sound sources. Manama Street's acoustic environment fluctuates throughout the day and week. While traffic noise provides an urban or unpleasant environment, other people's voices on the street generate a dynamic ambiance.

### 4.3.3 Tactility(Bodily perception)

#### 4.3.3.1 Weather conditions and the shaded areas

The sensory impressions created by the climatic conditions were recorded in the field notes. When the climate altered between weekend and weekday investigations, the solar height remained consistent and was differentiated between three distinct parts: 7:00 a.m. to 12:00 p.m. solar altitude, noon solar altitude, and 1:00 p.m. to 3:00 p.m. solar altitude. These are shown in Fig. 4.21-4.26. The sun changed from the West to the East just before dusk, illuminating the street from the North to the South. During the day, the solar altitude shows the illumination conditions in Part 1 of Manama Street. Furthermore, it reflects the thermal essence of the warmth of sunlight, which is sensed through bodily experience.

The lack of shaded seating spots to protect against hot weather conditions reduces the vibrancy of the street. Furthermore, depending on the solar altitude, the movement behavior of people in reaction to changing circumstances is also recognized. Social interaction happens opposite to sunshine length on an informal shaded area beneath the retail stores. The following Figs show the solar altitude and shading conditions on part and part 2 this street from (7.00a.m to 3.00p.m).

## a) Weather condition and shaded area at part 1 of the street

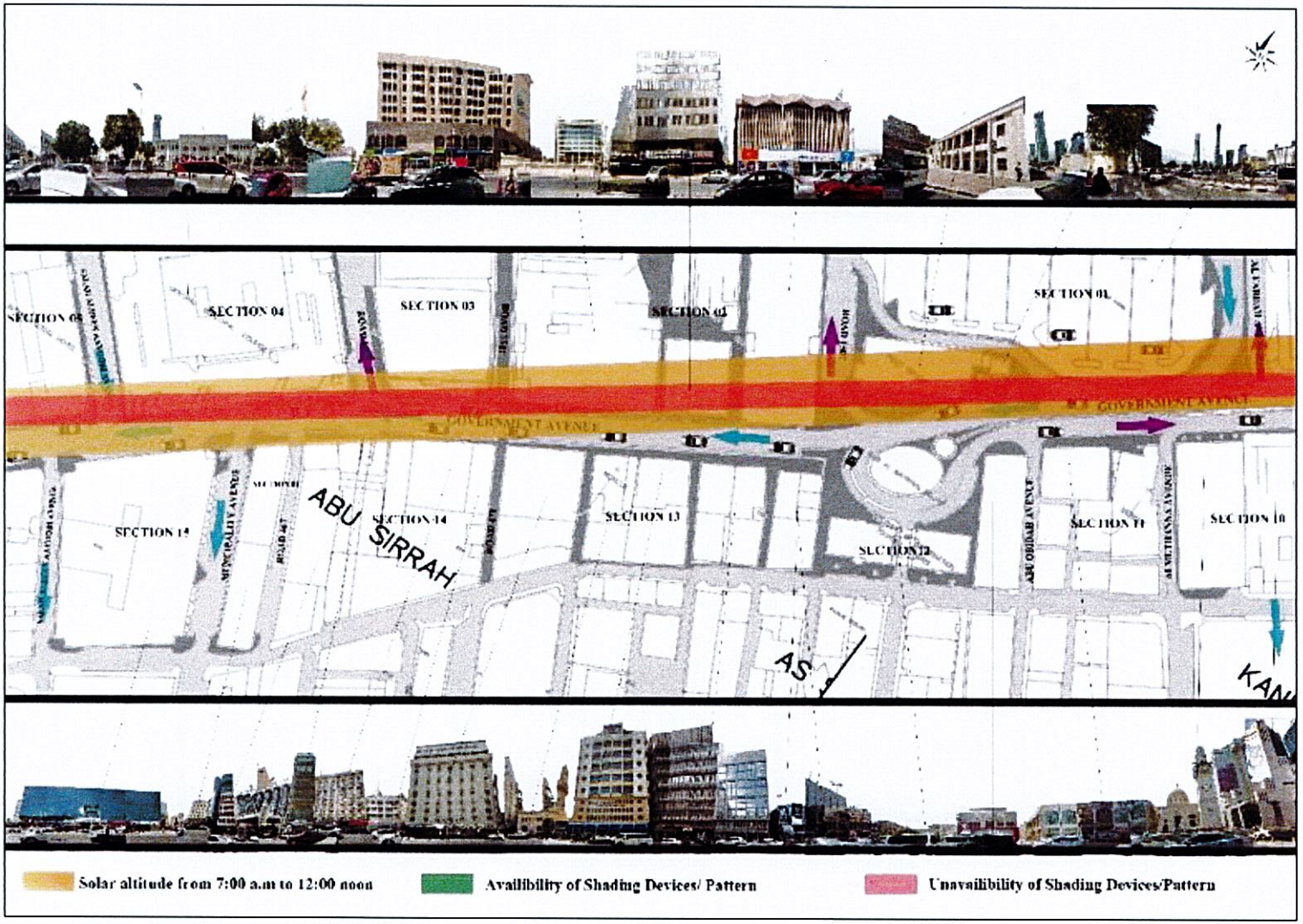



Fig. 4.21: Solar altitude from 7:00am to 12:00 p.m. in the Government Avenue part 1 in Manama
Source: author




Fig. 4.22: Solar altitude at 12:00p.m. in the Government Avenue part 1 in Manama
Source: author

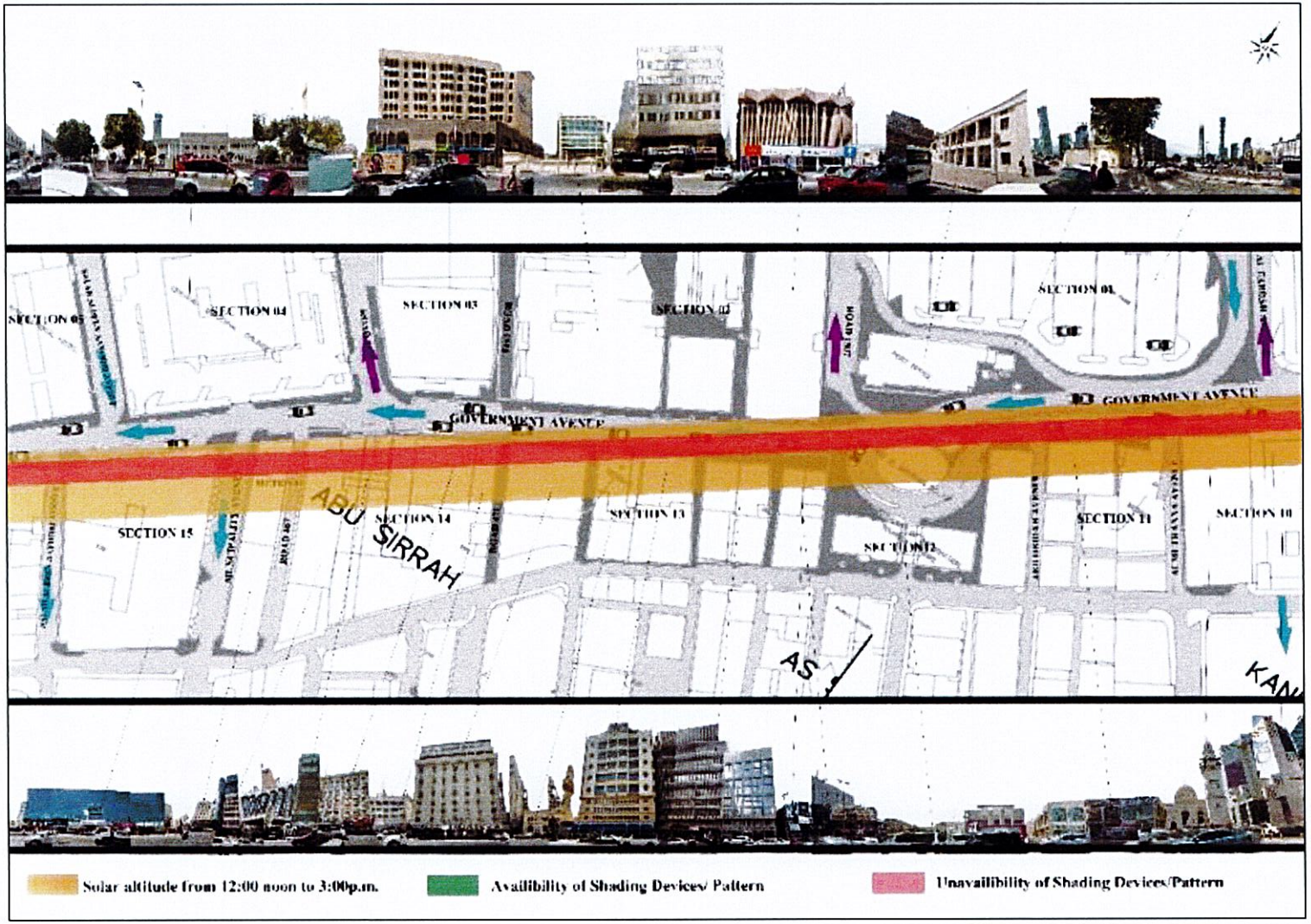



Fig. 4.23: Solar altitude at 12:00 p.m. to 3.00 p.m. in the Government Avenue part 1 in Manama
Source: author

**b) Weather condition and shaded area at part 2 of the street**

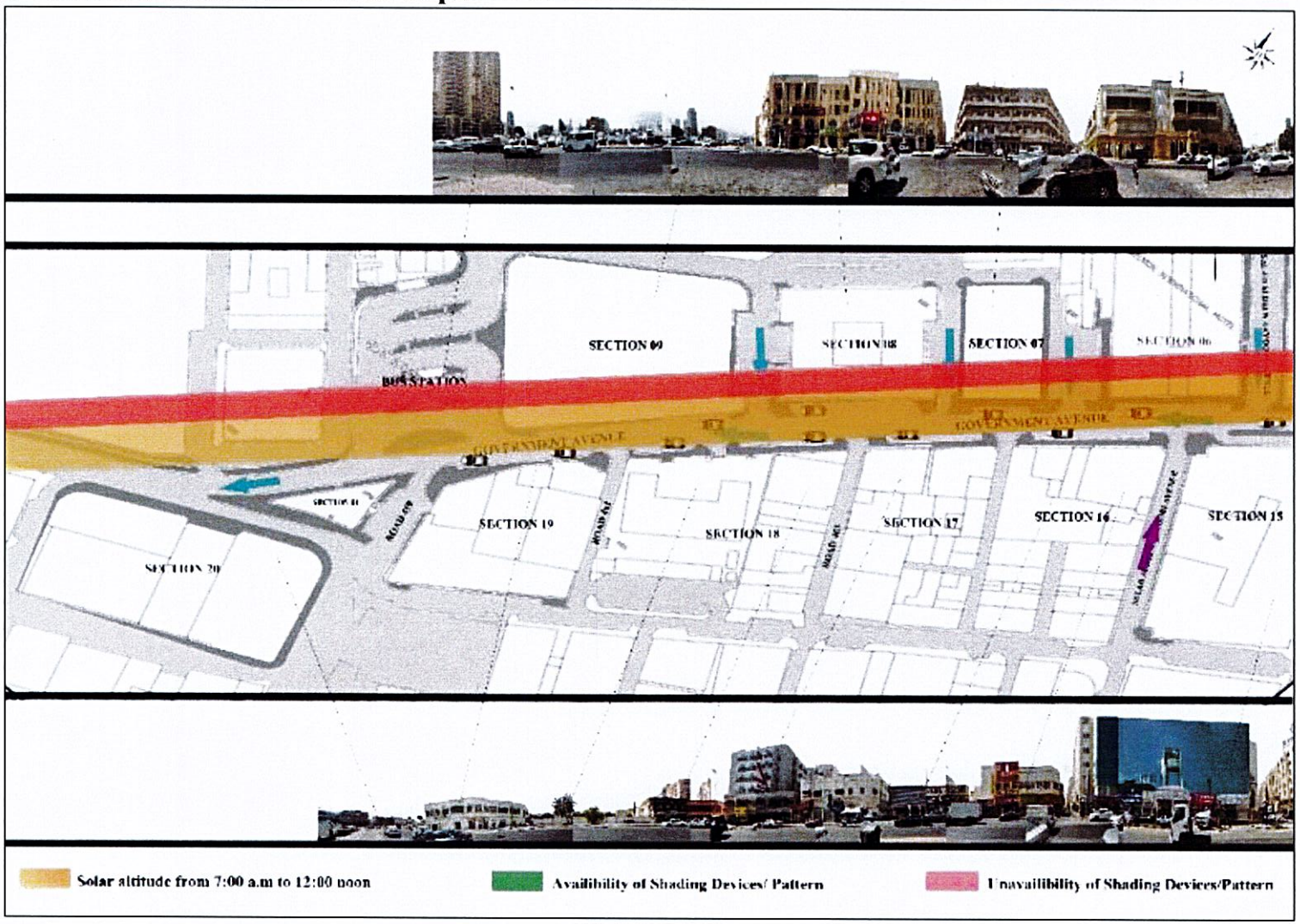



Fig. 4.24: Solar altitude from 7:00am to 12:00 p.m. in the Government Avenue part 2 in Manama
Source: Author




Fig. 4.25: Solar altitude at 12:00 p.m. in the Government Avenue part 2 in Manama
Source: Author

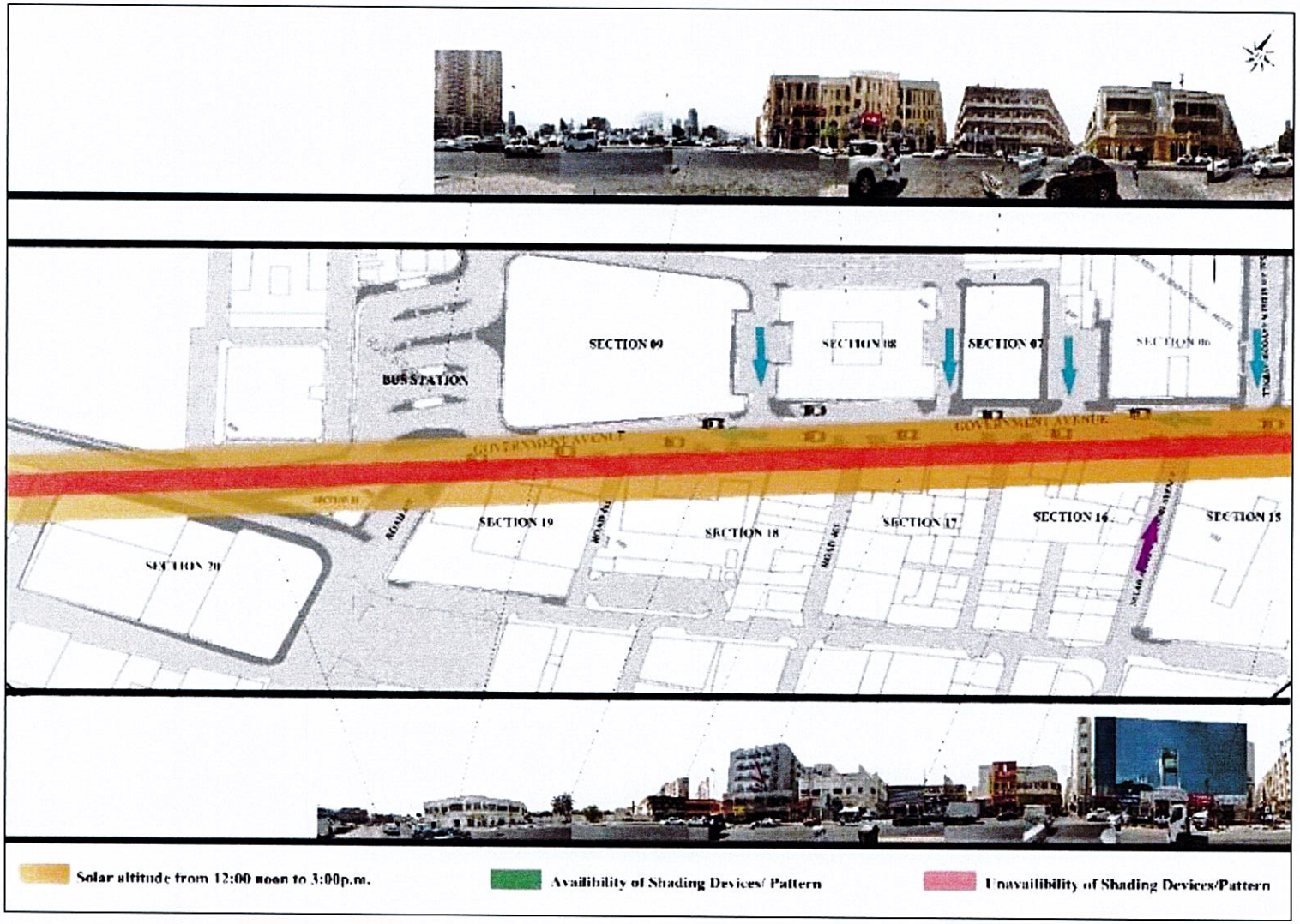



Fig. 4.26: Solar altitude at 12: 00 p.m to 3.00 p.m. in the Government Avenue part 2 in Manama
Source: Author

### 4.3.3.2 Material texture

Part 1 of the street, as shown in Fig. 4.27, consists of older historic buildings between ten and fifteen years of age. The old structures have been remodeled with smooth concrete finishes. Stainless steel has been utilized in various applications, including light poles, signs and garbage bins. The prestigious historic buildings such as the Bab Al Bahrain, the Manama post office, and the Manama Municipality represent Bahrain's strong places of identity.

Simultaneously, concrete bollards have been utilized to prevent vehicles from entering directly. This street section has cement finish urban sitting furniture and fixed planters. The material transition from asphalt to grey herringbone directs the users to park, while the color transition from grey to red and yellow herringbone directs the pedestrian flow.

Part 2 of this street, as shown in Fig. 4.28, consists of fewer recently erected concrete structures. Stainless steel lighting poles and the dustbins are evenly distributed. There is an absence of urban seating furniture and signage in this part of the street. Refurbished hotels and the Gold City are visual landmarks in this part of the street.

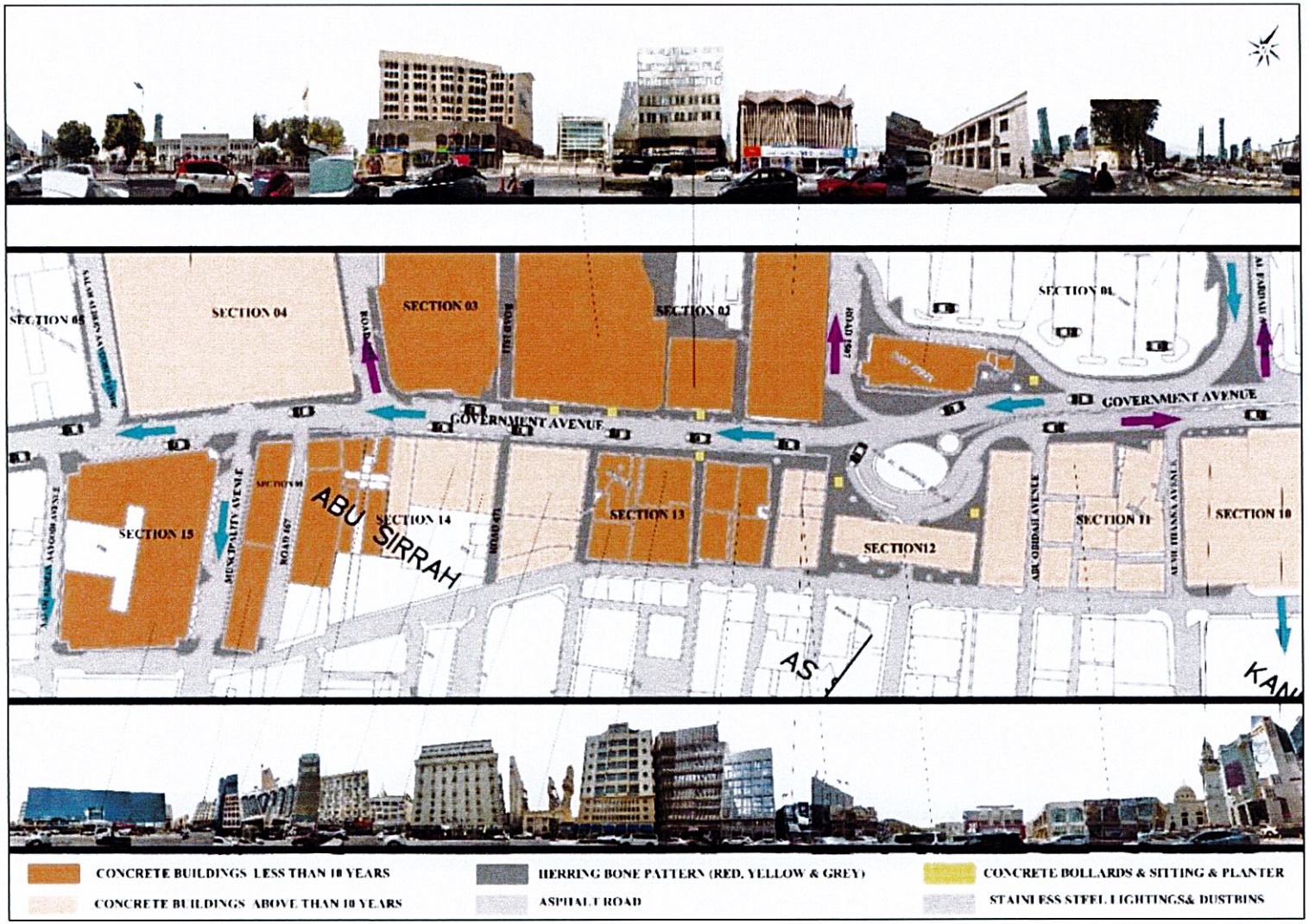



Fig. 4.27: Different material texture in the Government Avenue part1 in Manama
Source: Author

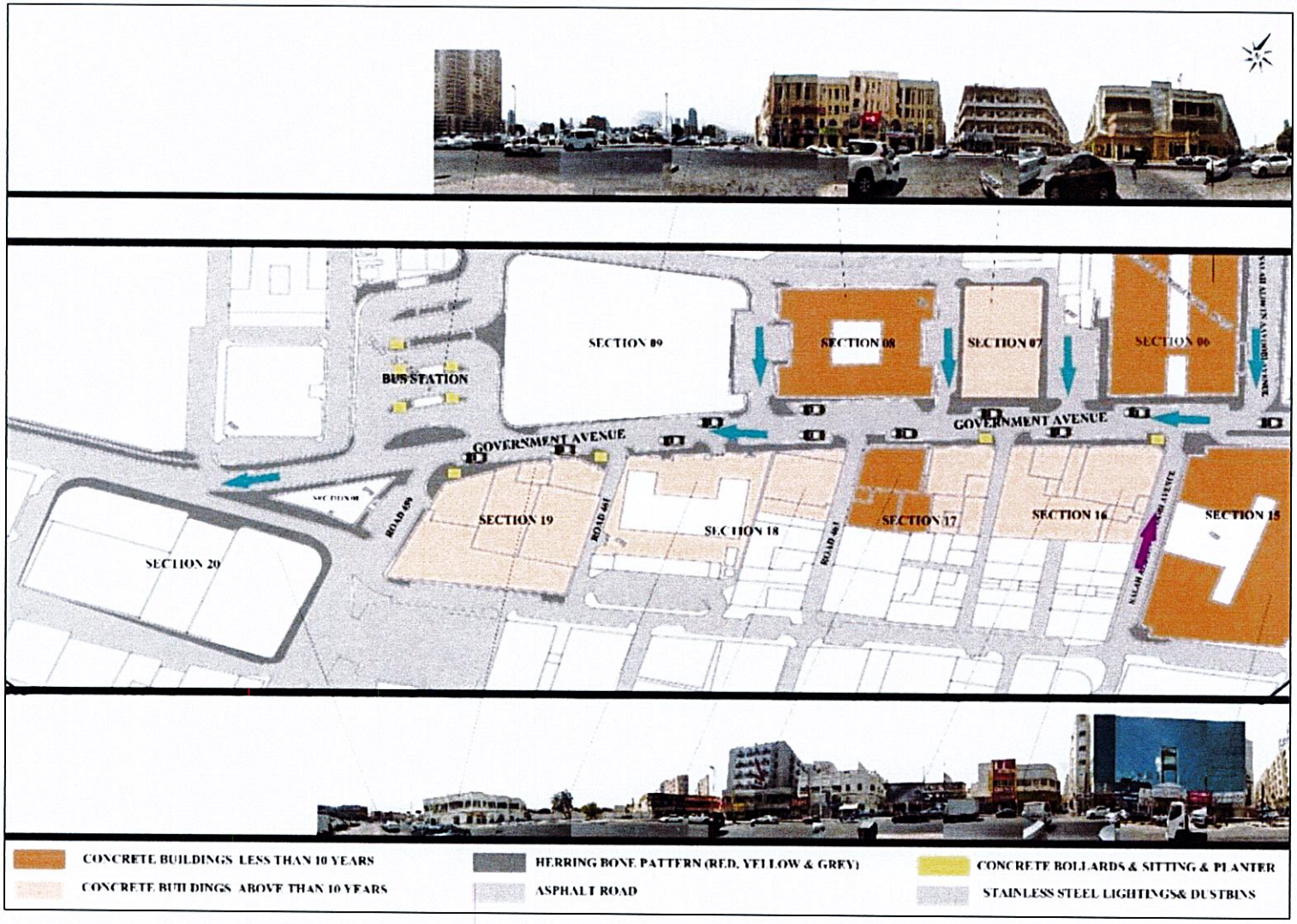



Fig. 4.28: Different material texture in the Government Avenue part 2 in Manama
Source: Author




Fig. 4.29: Different material texture used in the Government Avenue in Manama
Source: Author

### 4.3.4 Bodily perception stimuli and their Effects on Social interaction

The environment on Manama Street gets brighter as the sun becomes less warm, both during the day and the year, based on the various sensorial stimulation created by the solar height. As the number of daylight hours and the temperature of the surroundings increases in the spring and summer, fewer people flock to the sidewalks and outdoor seating spaces on Manama Street. Since more people participate in social interactions while standing or lingering on the shady sides of the walkways, the location of social integrations on Manama Street can be related to the sun's position.

### 4.3.5 Olfactory experience and its effect on social interactions

Even though no specific smell scape or olfactory environment could be established along the observed stretch of the Government Avenue in Manama, it was revealed that the street had more olfactory variations than visual variations. Apart from a scent-neutral environment, the characteristics of the smell on the street was highly impacted by the usages and occupancies on the ground floors of adjoining buildings, such as coffee shops, restaurants, and cafés. These, as sources of fragrance, create pleasant smells. On the other side, vehicle emissions, the decaying stink from the garbage bins, and precipitations of hot weather were sources of unpleasant odors.

The steady, gentle breeze, on the other hand, quickly blew away the majority of the odors. Neither pleasant nor disagreeable odors last long or were easily identified along the way. The scent was the most missing sensation on the street, making it hard to establish how much of the street experience and social interaction is affected by this one

sense.

### 4.3.6 Mehta's sociability factor

#### 4.3.6.1 Usages on the ground floor

The usage and occupancy of the ground floors of the Government Avenue in Manama fostered sociability and liveliness as observed in this street. The ground floor is classified into six sections: retail, services, dwellings, third spaces, gastronomy areas, and vacant areas.

The major part of the ground floors of Manama Street's part 1, as shown in Fig. 4.30, are occupied by retail (blue) and service-related enterprises (purple). The third-largest group is third spaces (green), such as cafeterias and bakeries. There are fewer empty slots in this section (beige). While residences (brown) and gastronomy (pink), including showaiter stores and traditional Arabic businesses, also have the lowest occupancy rates. Some public buildings in this part of the street include the Bab Al Bahrain, the Manama post office, the Manama Municipality, etc.

Part 2 of the street, as shown in Fig. 4.31and 4.32, is occupied by retail (blue), services (purple), and third spaces. There are more vacant spaces in this part of the street. Gastronomy and housing areas were least available in this part of the street. In general, retail and services predominate in each part.

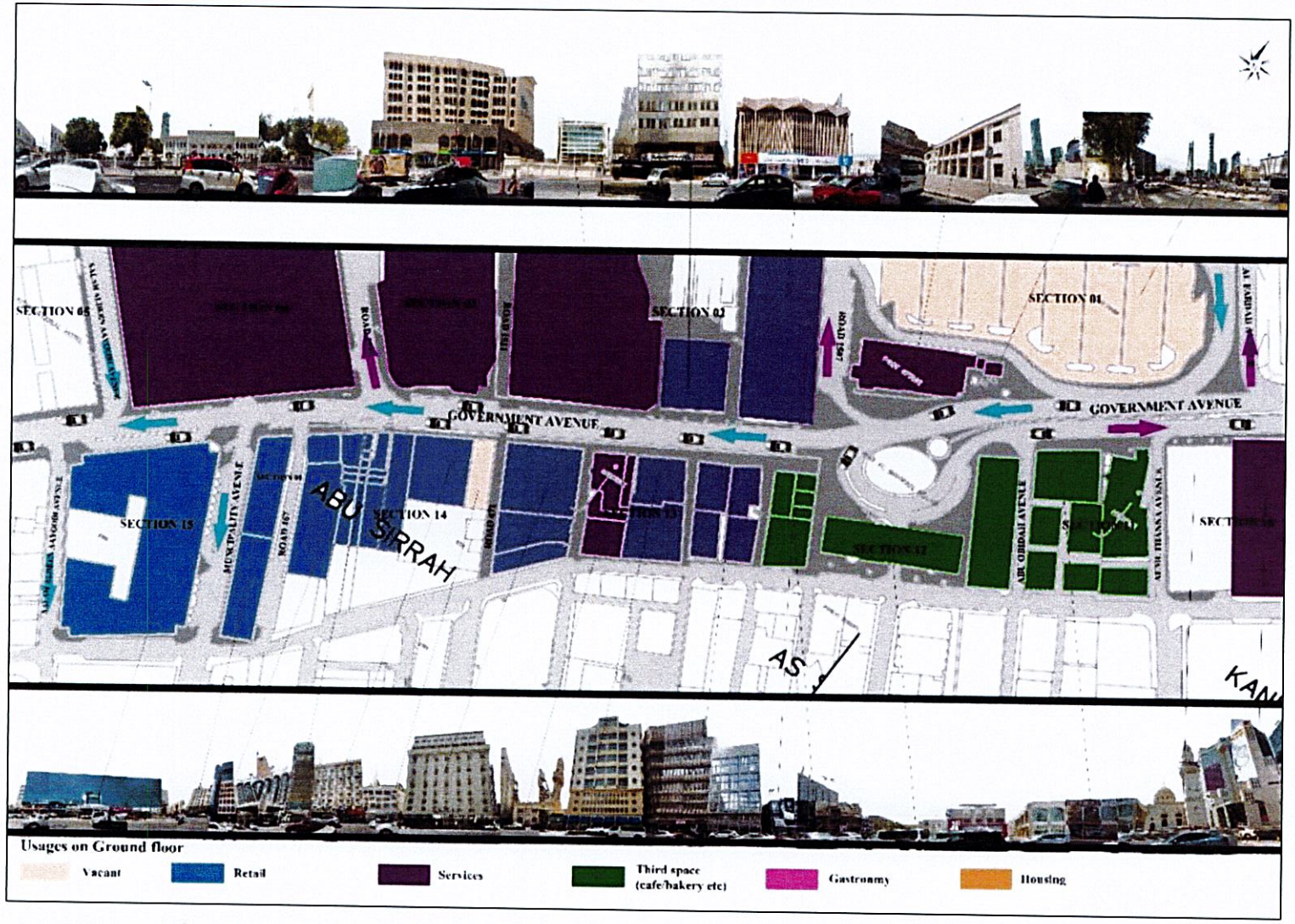



Fig. 4.30: Usage on ground floor on Government Avenue part 1 in Manama
Source: Author

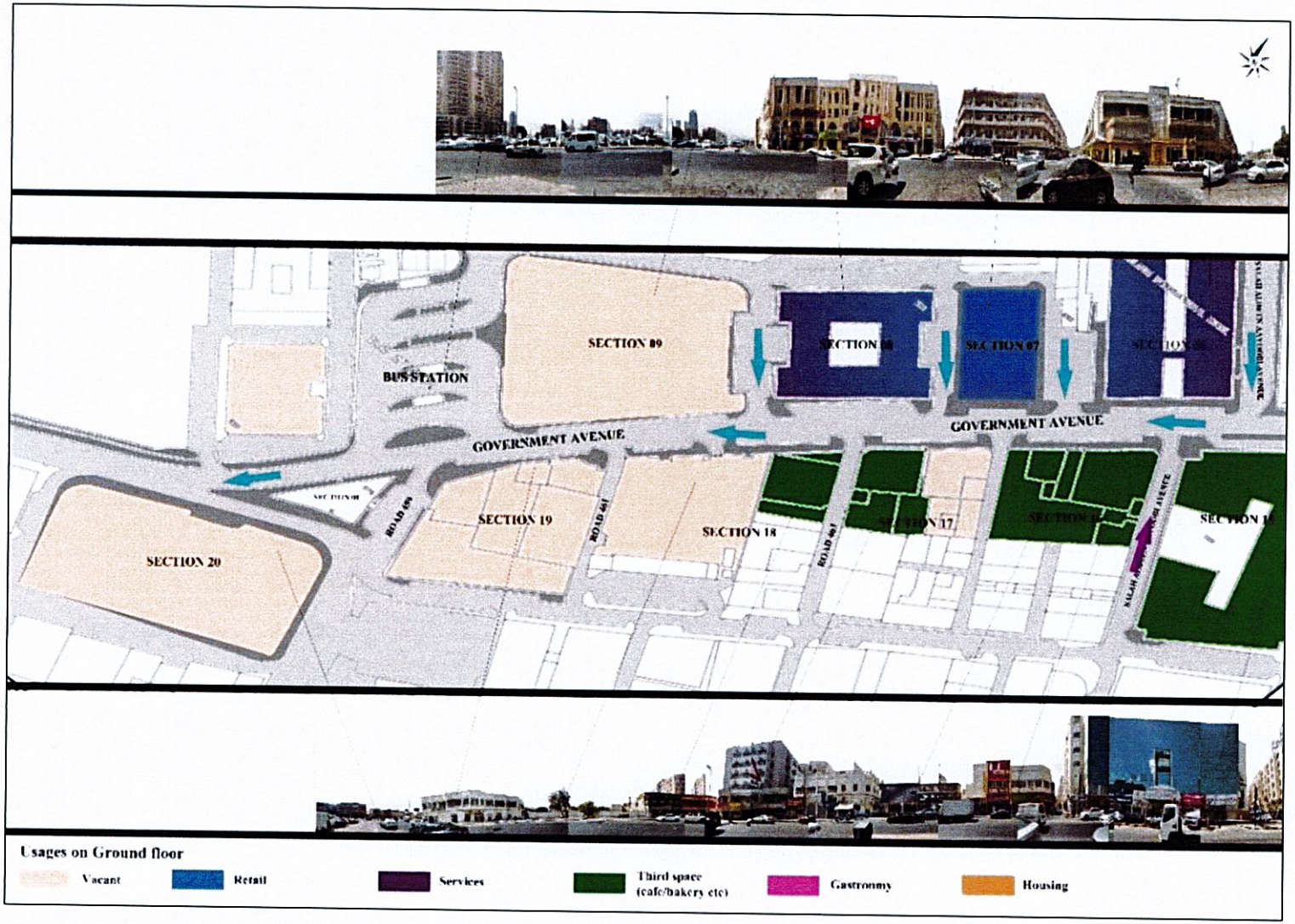



Fig. 4.31: Usage on ground floor on Government Avenue part 2 in Manama
Source: Author

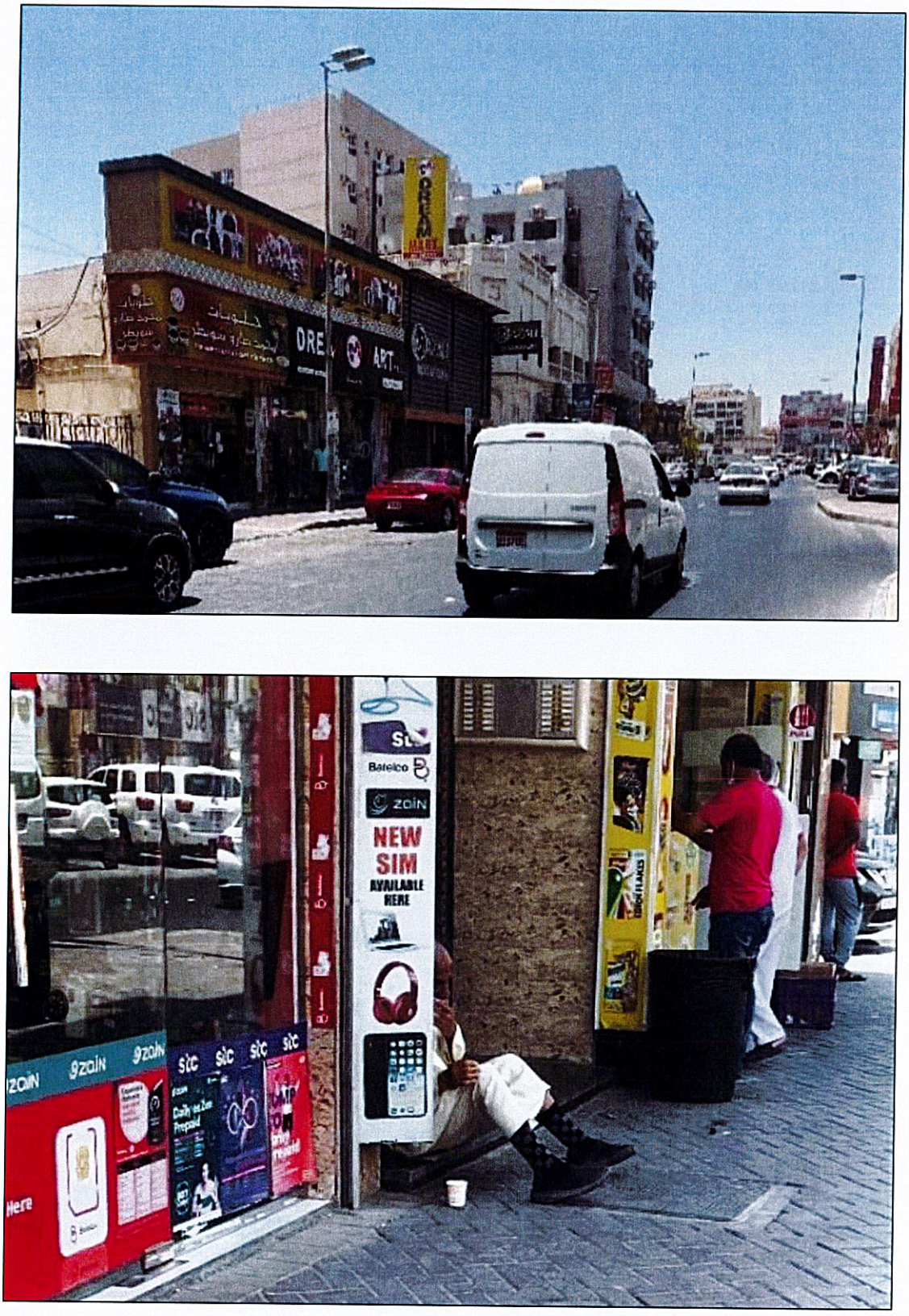



Fig. 4.32: Usage of the ground floor spaces in the Government Avenue in Manama
Source: Author

### 4.3.6.2 Occupancy in the ground floor areas

Ground floor occupancy on the Government Avenue in Manama may be separated into four categories as an influencing factor on sociability: small chains, small businesses, public buildings, and vacant areas. In part 1 of the street, as shown in Figs 4.33 and 4.34, most of the ground floor areas are occupied by Big enterprises and multinational banks with more than five branches in other streets in Bahrain, which are indicated in light green.

The second-most occupied space on the ground floor is small, independent enterprises marked in dark green: small, primarily local firms with fewer than five branch outlets in Bahrain. This street does not have many unoccupied spaces indicated in beige. At the same time, some buildings have a door that leads to higher-level residential areas and high-rise offices.

In parts 2 of the street, as shown in Figs 4.35 and 4.36, the ground level is inhabited by several small local shops. Part 2 of the street has more vacant spaces shown in beige than part 1. There are fewer public buildings allocated in part 2 of the street. While in comparison, part 2 of the street has fewer Big enterprise businesses with more than five branches in various streets around Bahrain. There are entrances for residential areas and offices on the ground level of both the street segments.

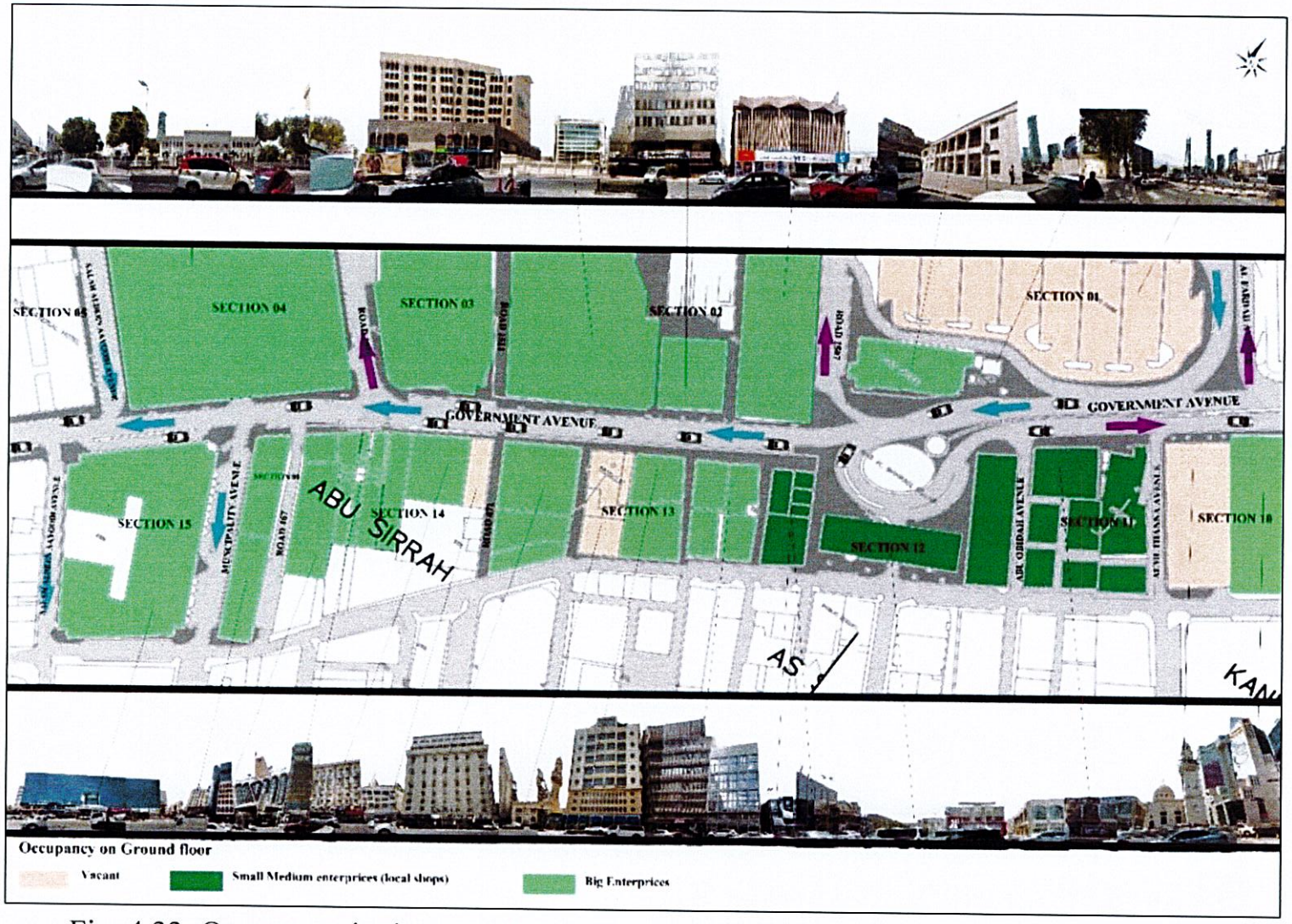



Fig. 4.33: Occupancy in the ground floor of the Government Avenue- Part 1 in Manama
Source: Author




Fig. 4.34: Occupancy of ground floor areas in the Government Avenue-Part 1 in Manama
Source: Author

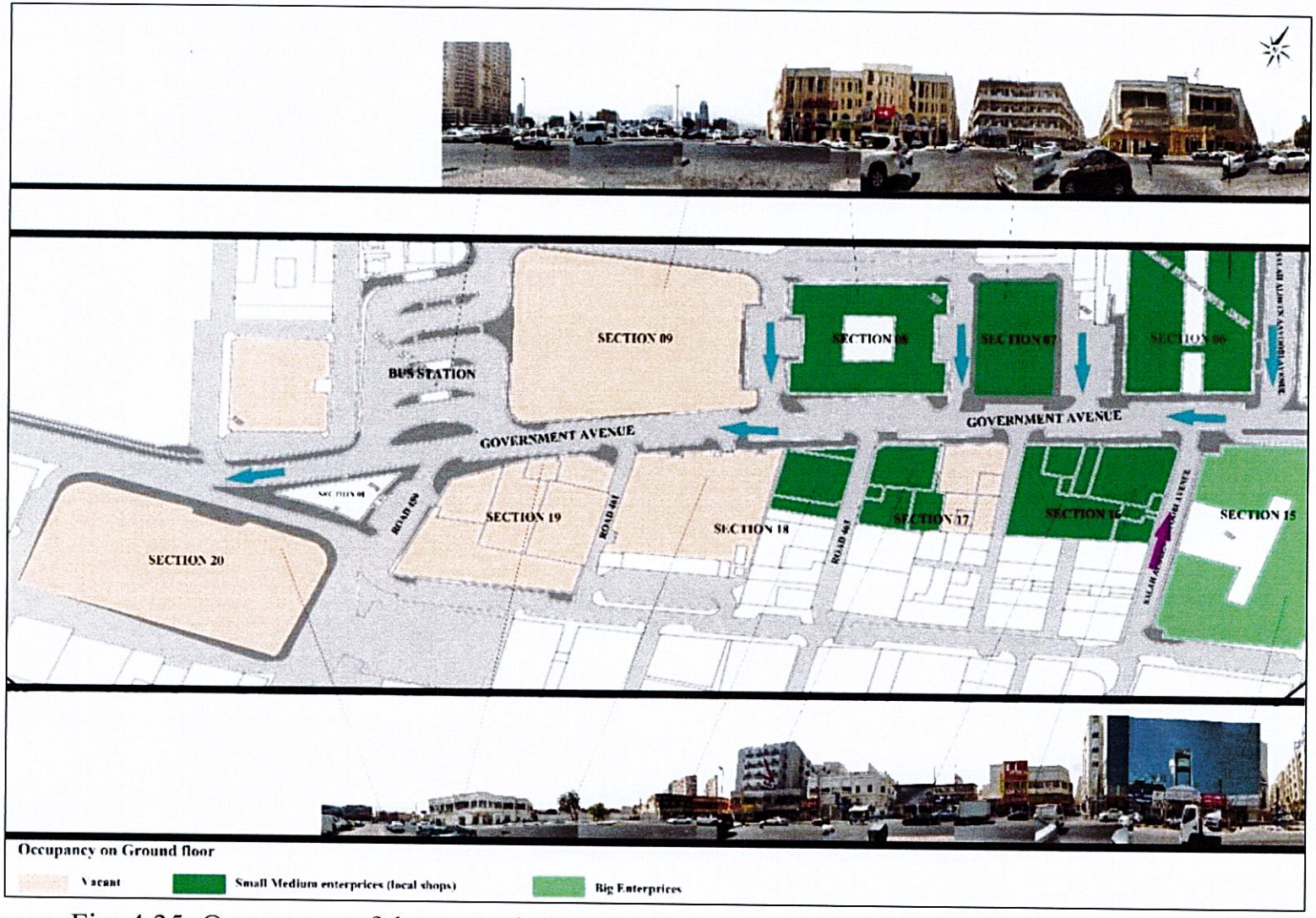



Fig. 4.35: Occupancy of the ground floor areas in the Government Avenue-Part 2 in Manama
Source: Author



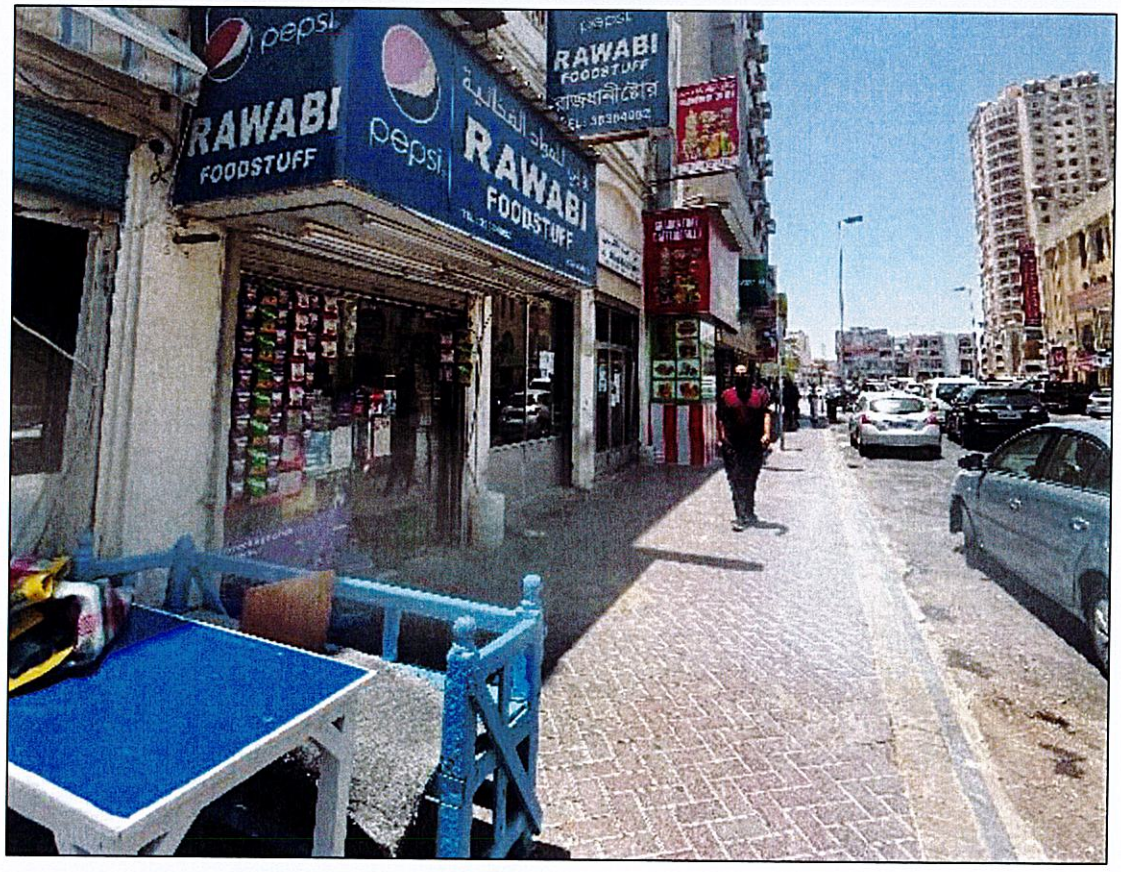




Fig. 4.36: Occupancy of the ground floor areas in the Government Avenue- Part 2 in Manama
Source: Author

### 4.3.6.3 Effects on social interaction through the presence of usage and occupancy on the ground floor

As shown in Figs 4.37- 4.44, ground floor usage and occupancy observation demonstrate that street liveliness is impacted by multisensory stimulation, ground floor utilization, and local businesses. People slowed down and even halted their journeys to engage in social interactions, particularly in front of third places such as cafés, restaurants, shopping areas, and businesses on Manama Street.

The most prevalent forms of social interactions in Manama street were speaking while standing or sitting, especially in front of Caféterias, bakeries, and local shops. People were just passing through in front of ground floors of adjoining buildings with smaller footpaths or no pavements in front of businesses, socializing and conversing. The usage and occupancy of the ground floor demonstrate that the environment in or near local businesses that encourage social contacts, whether through purchase or social contribution, promotes increased social engagement.

The following Figs show the number of interactions increased due to occupancy and usage on ground floors during weekends and weekdays even though facades were dull.

a. Effect of usage on the ground floor on Social interaction during weekdays.
b. Effect of usage on the ground floor on social interaction during the weekend.
c. Effect of occupancy on social interaction during the week
d. Effect of occupancy on social interaction during the weekend.

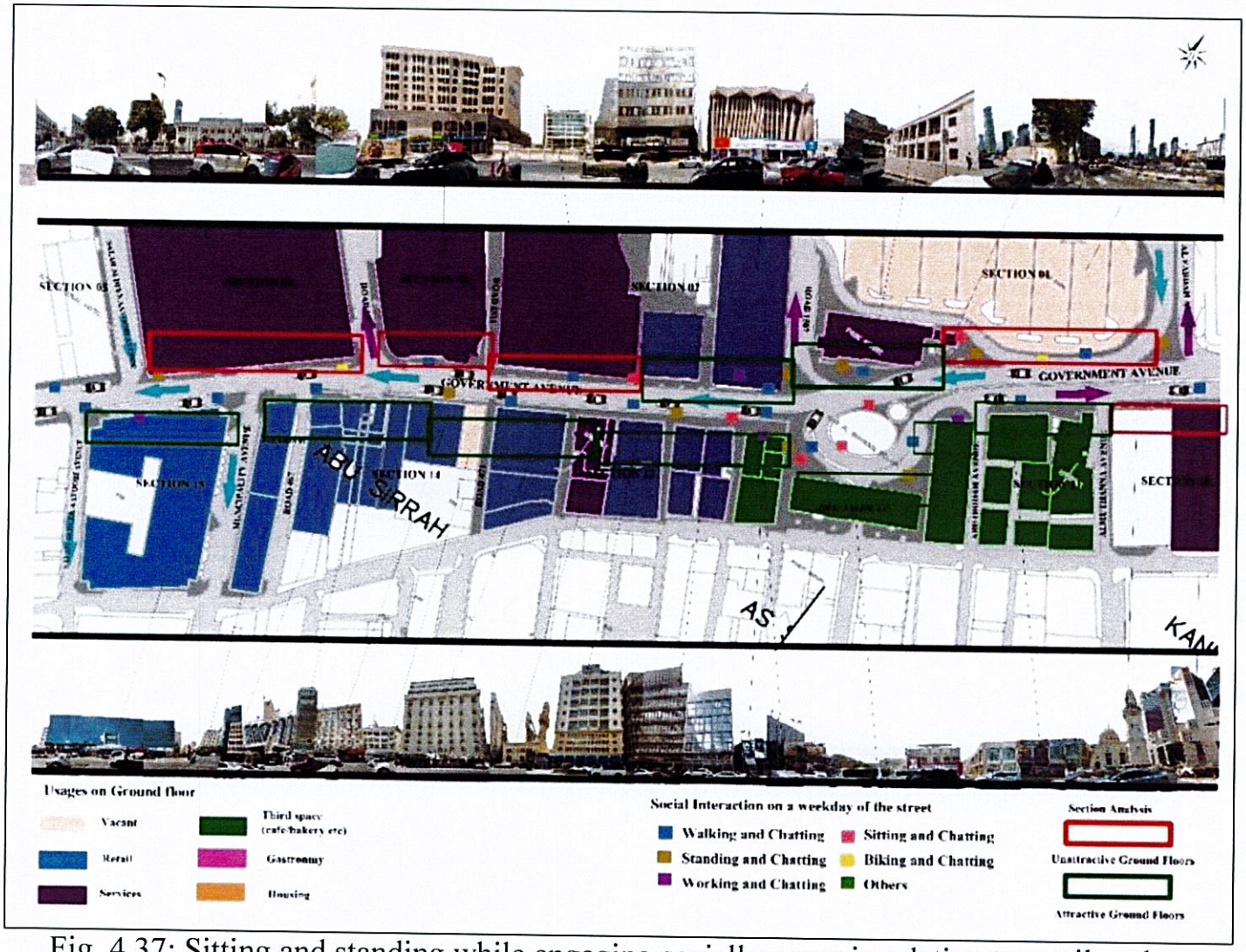



Fig. 4.37: Sitting and standing while engaging socially occur in relation to retail outlets and third places; during the week, in the Government Avenue part 1 in Manama
Source: Author

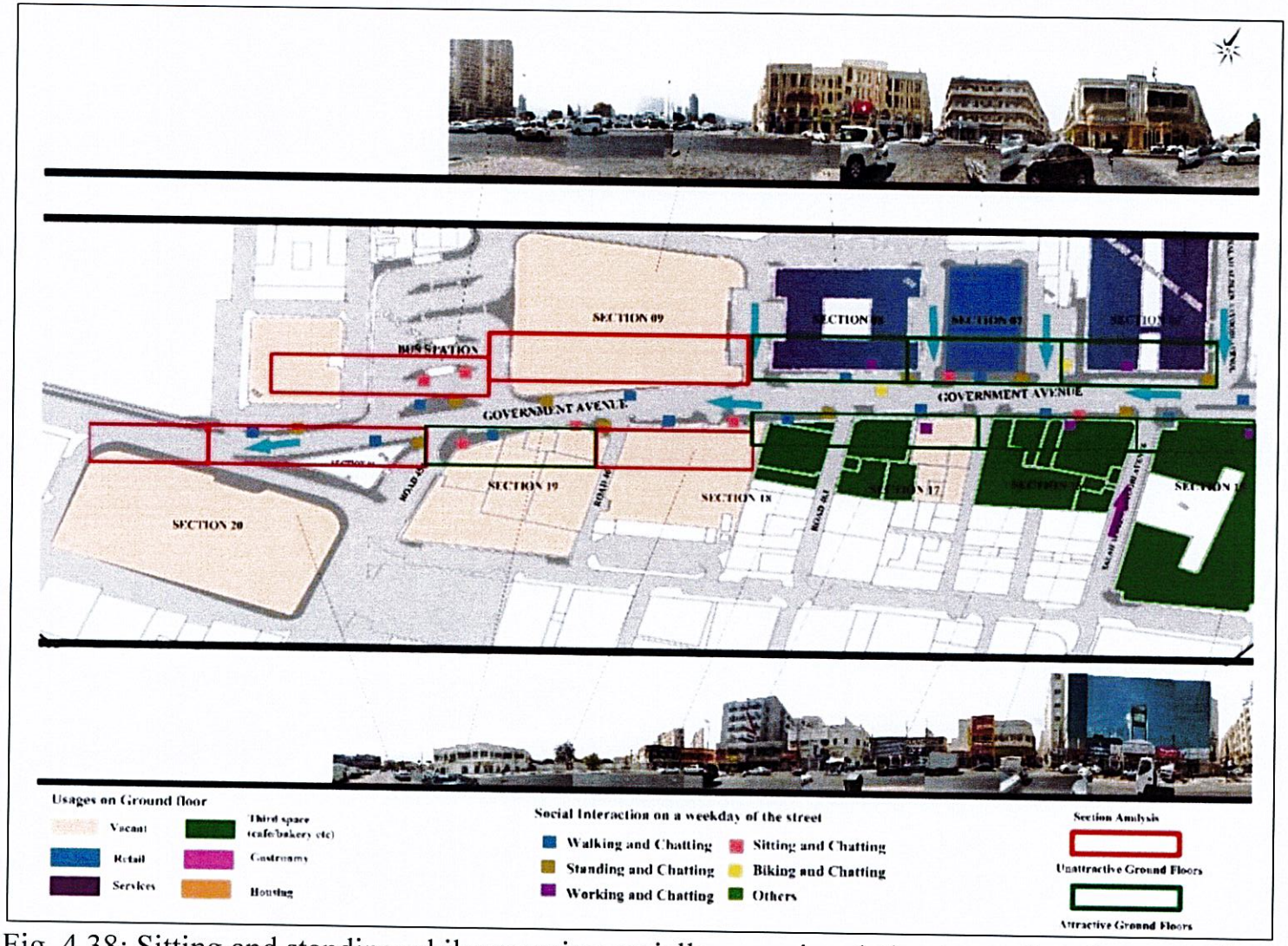



Fig. 4.38: Sitting and standing while engaging socially occur in relation to retail outlets and third places; during the week, in the Government Avenue part 2 in Manama
Source: Author

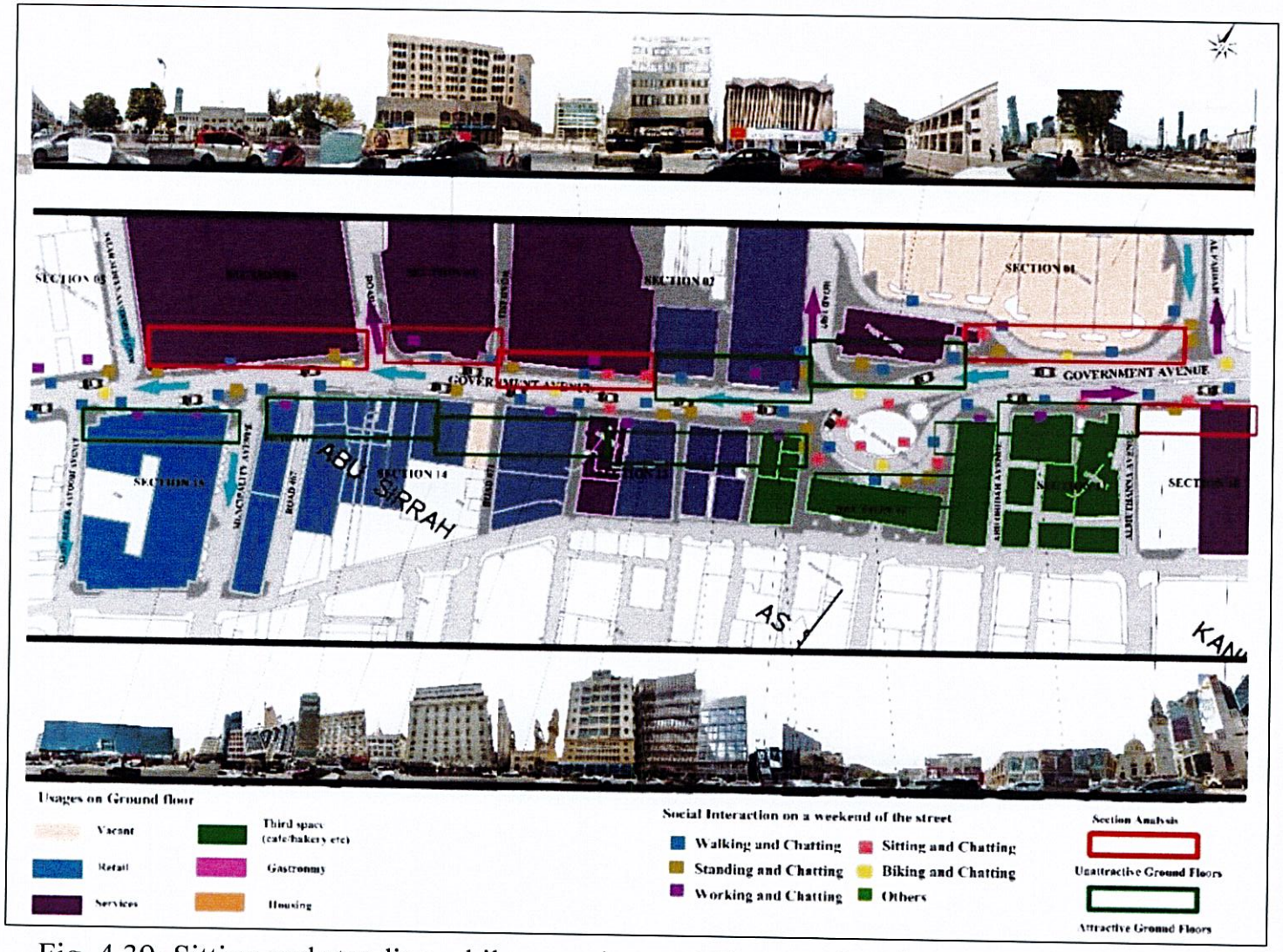



Fig. 4.39: Sitting and standing while engaging socially occur in relation to retail outlets and third places; during the weekend, in the Government Avenue part 1 in Manama
Source: Author

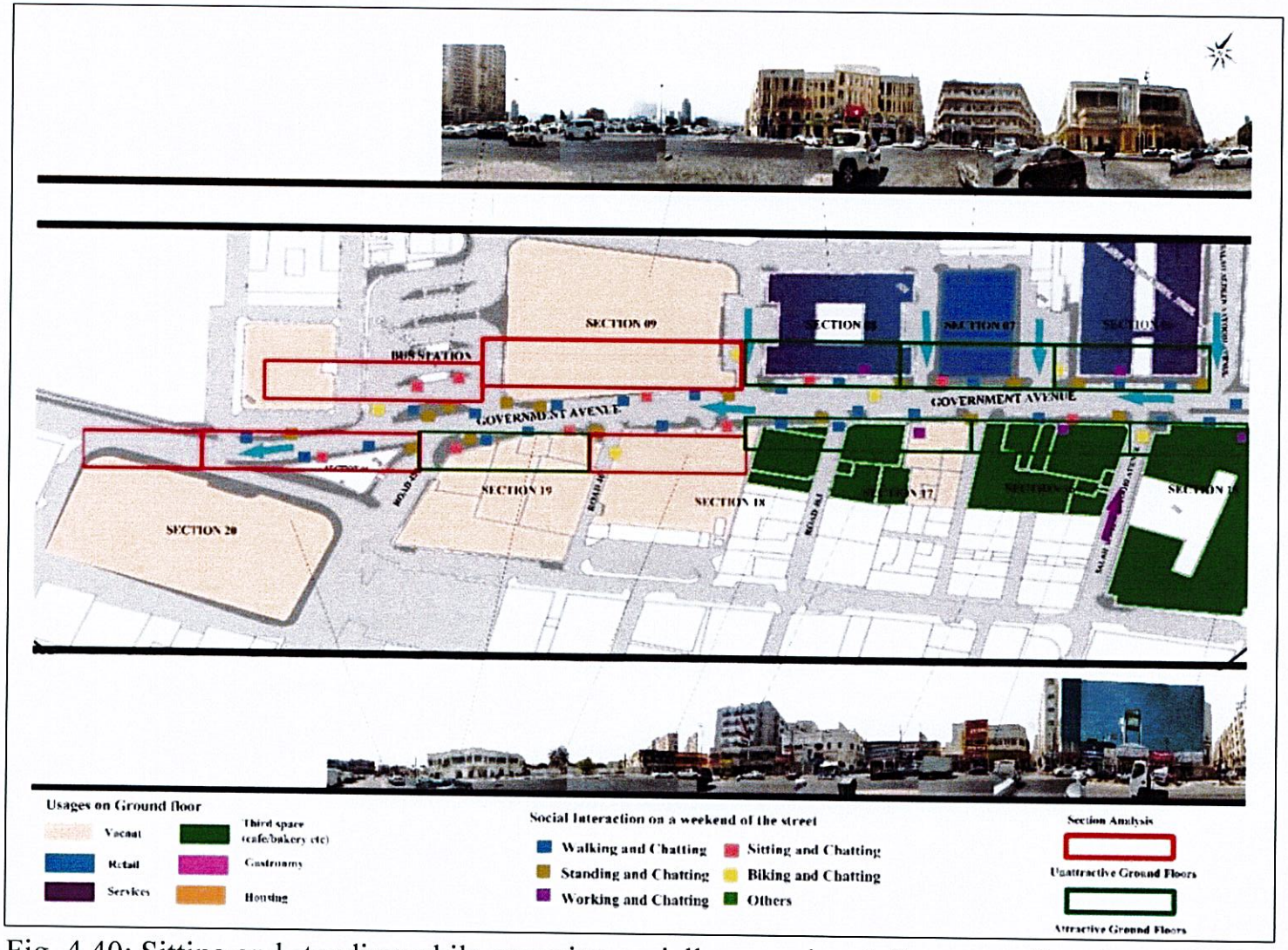



Fig. 4.40: Sitting and standing while engaging socially occur in relation to retail outlets and third places; during the weekend, in the Government Avenue part 2 in Manama
Source: Author

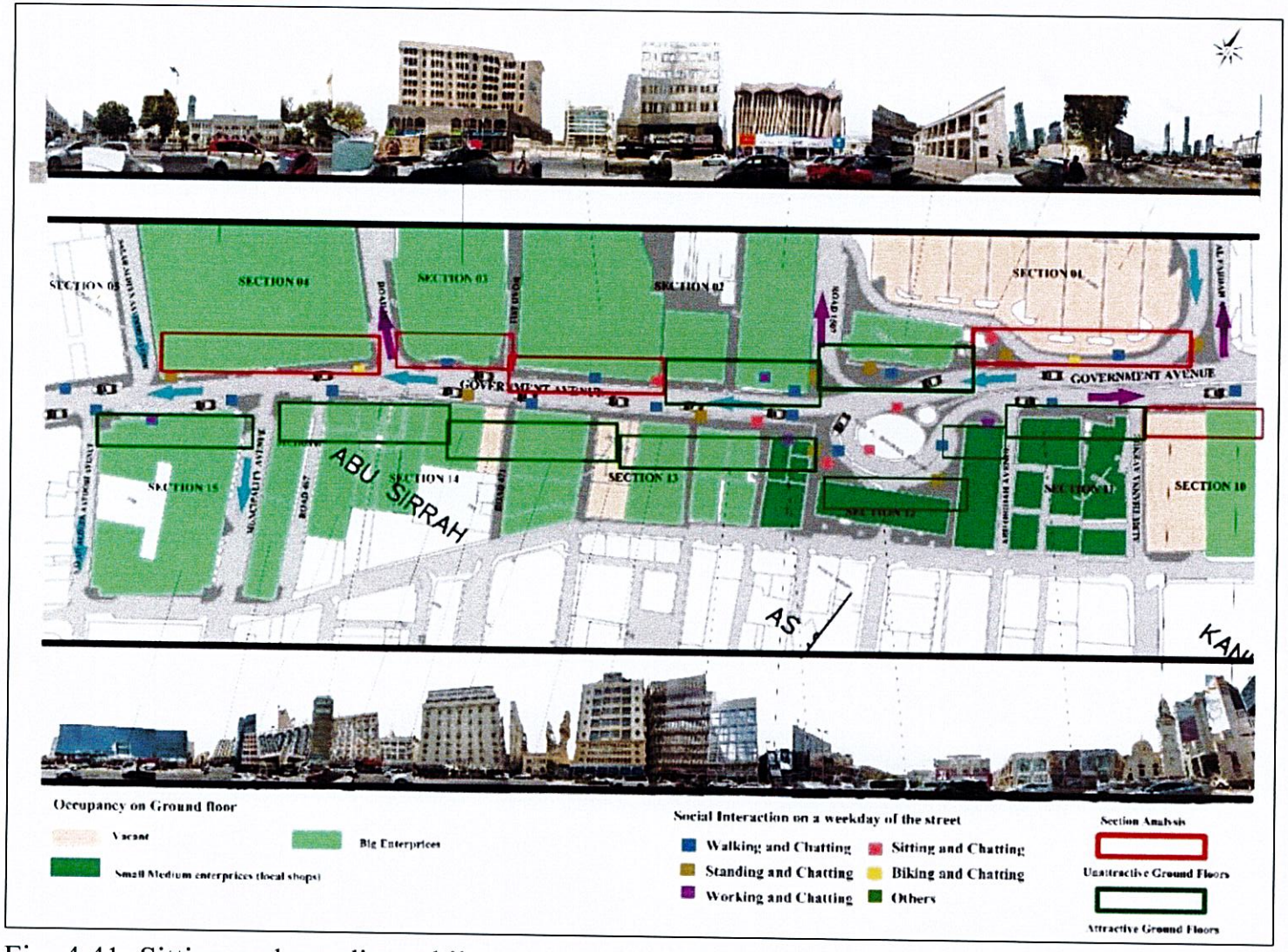



Fig. 4.41: Sitting and standing while engaging socially occur in relation to retail outlets and third places; during the weekday, in the Government Avenue part 1 in Manama
Source: Author

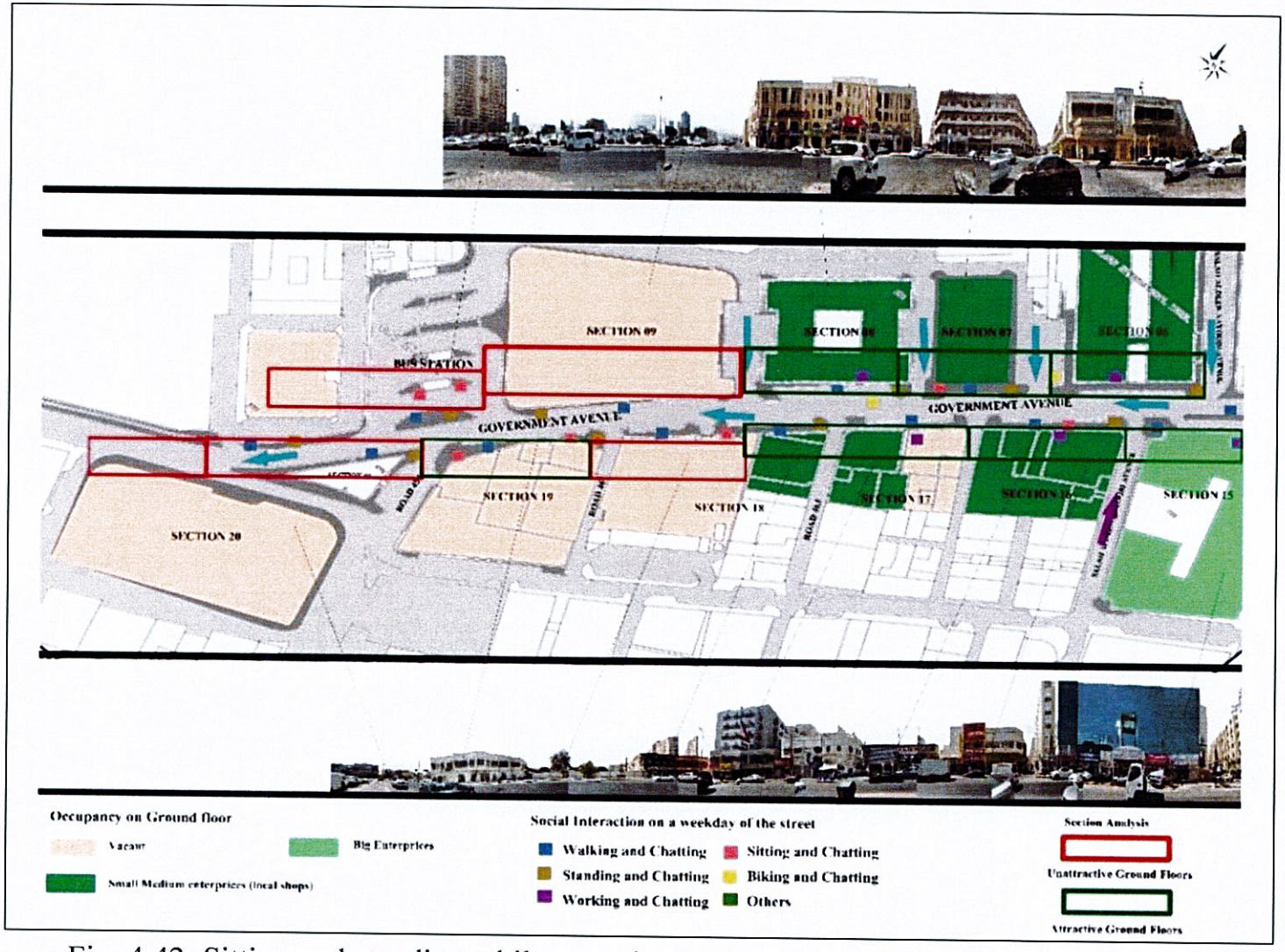



Fig. 4.42: Sitting and standing while engaging socially occur in relation to retail outlets and third places; during the weekday, in the Government Avenue part 2 in Manama
Source: Author

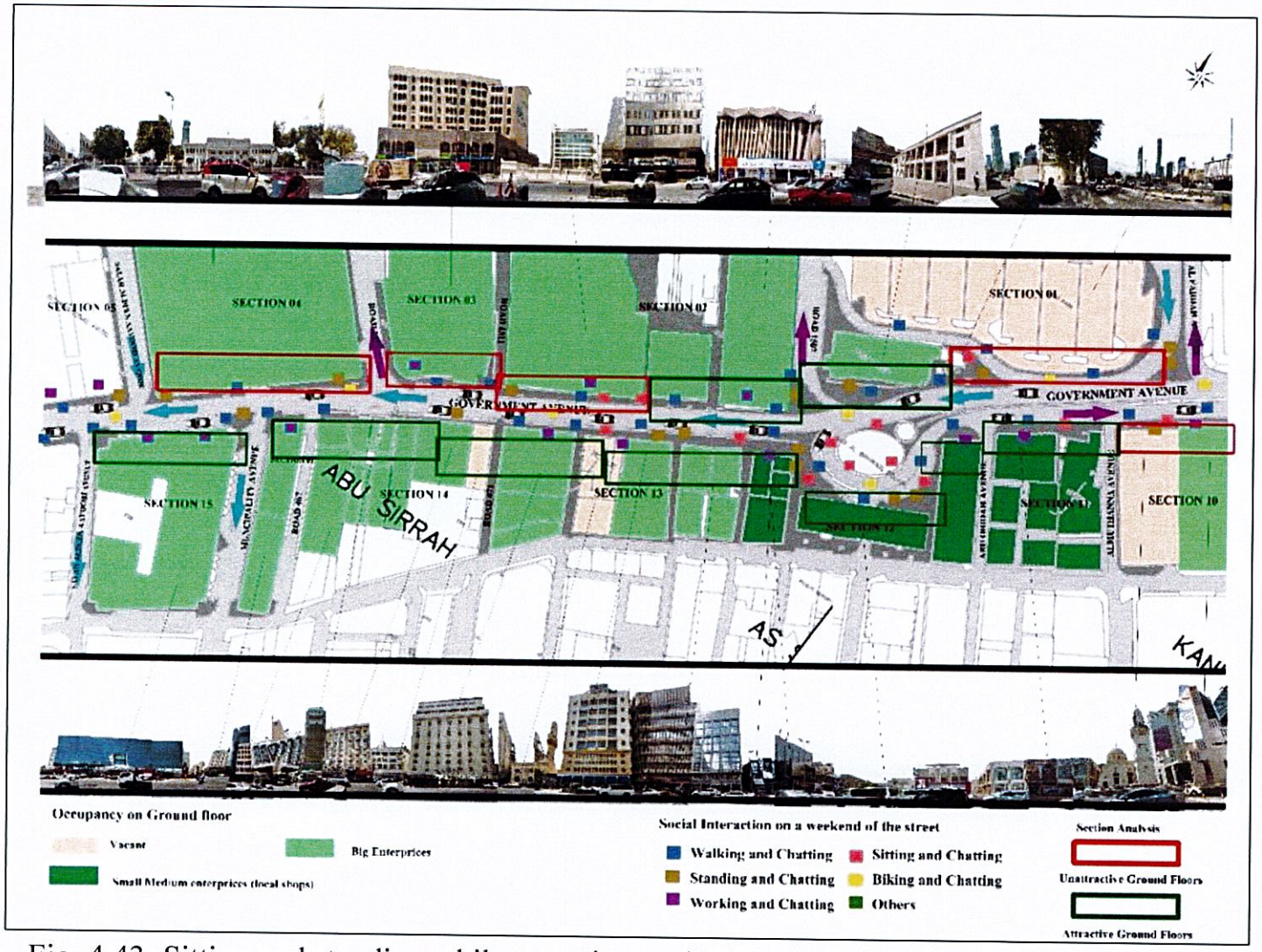



Fig. 4.43: Sitting and standing while engaging socially occur in relation to retail outlets and third places; during the weekday, in the Government Avenue part 1 in Manama
Source: Author

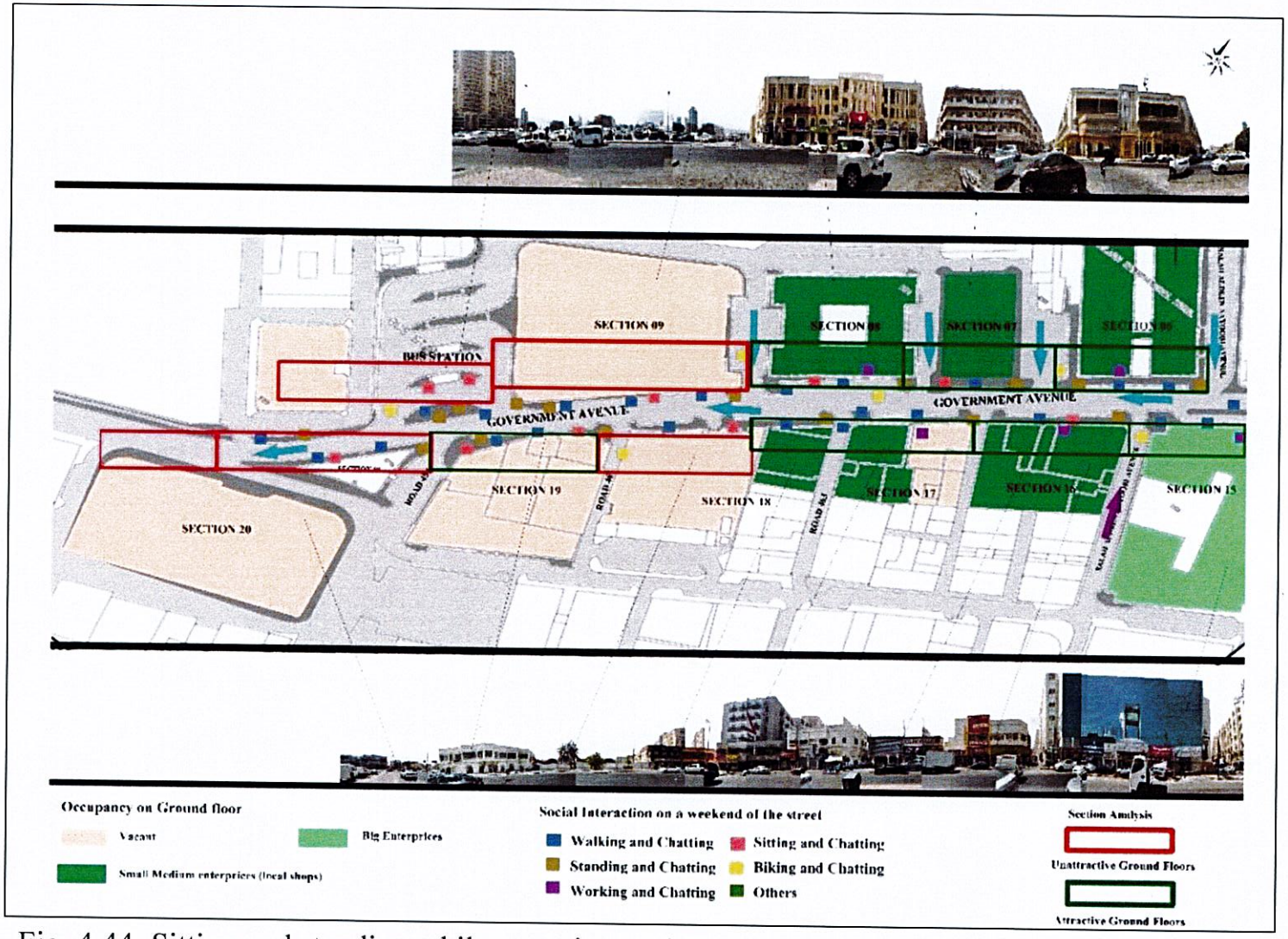



Fig. 4.44: Sitting and standing while engaging socially occur in relation to retail outlets and third places during the weekday in the Government Avenue part 2 in Manama
Source: Author

### 4.3.7 Social Interactions

Government Avenue's most standard social contacts include speaking while strolling, sitting while talking (particularly on a spring day), and standing while discussing. Most social meetings occurred in groups of two who appeared to know each other. Encounters between strangers were uncommon; when they did occur, they appeared to be between a customer and a shopkeeper/worker.

Individuals strolling down the street conversing with one another provide a sense of security due to their presence, whereas standing and sitting create a busy street. People feel more comfortable to stay more than if they were just going down the street. Social contacts on Government Avenue in Manama vary on weekends and weekdays at different times and in other parts of the street. The weekend and weekday variations show that the environment is also changing.

#### 4.3.7.1 Social interactions during the week

As shown in Fig. 4.45, a constant pattern emerges in part one of this street throughout the week. The most significant concentrations of persons engaged in conversations were seen in front of the establishments in sections S02, S11, S12, S13, S14 & S15, near the bakery, café, restaurants, coffee shops, the bank and exchanges, retail stores, and everyday services and where there was the availability of urban seating and kiosks.

Most social interactions occurred either side of the street, at regular retail and service establishments. Surprisingly, little engagement occurred in sections S01, SO3, S04, S05 & S10. This might be due to the small pavement, less enticing businesses, and absence of urban furniture. Walking and chatting are common social

contact in this part of the street. Surprisingly, social interactions fluctuated more in these sections: S01, S03, S04, S05 & S10 than in others. This might be attributed to more public amenities such as the post office, mosque, and municipality offices, etc.

Part 2 of this street, as shown in Fig. 4.46, is primarily made up of local retail establishments with more unoccupied spaces. This section of the street saw the least amount of social contact since it was occupied primarily by the store shoppers, who were most active in the evenings or on weekends. Walking and speaking were the most prevalent social engagement in this street section, followed by walking and chatting. There are fewer standing, sitting, and conversing forms of social engagement in unoccupied spaces where urban furniture is available.

Social contact on both sides of the street happened randomly, with vehicles waiting outside on the street sometimes parked randomly. A unique interaction occurred while waiting at a bus station, as shown in Fig. 4.46. This part was calmer than another part of the street regarding social interaction.

Social interactions increased throughout the day in all two parts of Government Avenue street until lunchtime, after which they declined. Most social contacts occurred between 7 a.m and 10 a.m. when bakeries, cafeterias, and municipality offices and post offices opened. These interactions included standing and speaking (15 interactions) at the bakery and cafeteria shop, strolling and conversing (15), and working and conversing (15 interactions). Five vehicles abruptly parked and people conversing were also observed on this street.

More and more encounters were seen throughout the mornings, with a peak at about 12.30 a.m., involving 30 exchanges of people in the Government Avenue Street Part 1 and 30 interactions in Part 2. Most social contacts took place on the street's eastern side until early afternoon when they faded. However, the most popular type of social engagement was walking while speaking, which can be observed all over the street, especially near traffic crossings.

Chatting while sitting was observed where there was the availability of urban seating or casual outdoor seating at the stairs of the stores. On both sides of Government Avenue Street, people are standing and conversing at various street locations where the width of the pavement is large or at the edge of streets combing other streets. In addition, outside of businesses, banks, and money exchanges. In contrast, people would halt in front of bakeries and cafeterias to speak with people they knew outside the restaurants and bakeries.

Surprisingly, cafeterias, bakeries, marts, banks, and junctions where other streets intersected with Government Avenue were bustling with activities. This might be because people take their time orienting themselves, selecting which way to take after exiting the street, or because locals know one another by sight and engage in informal, impromptu discussions as they pass cafés and ordinary shops. The following Figs generally show different types of interaction occurring during weekdays at varying hours and at different locations in the two parts of the street.

- **Social interaction during the week**

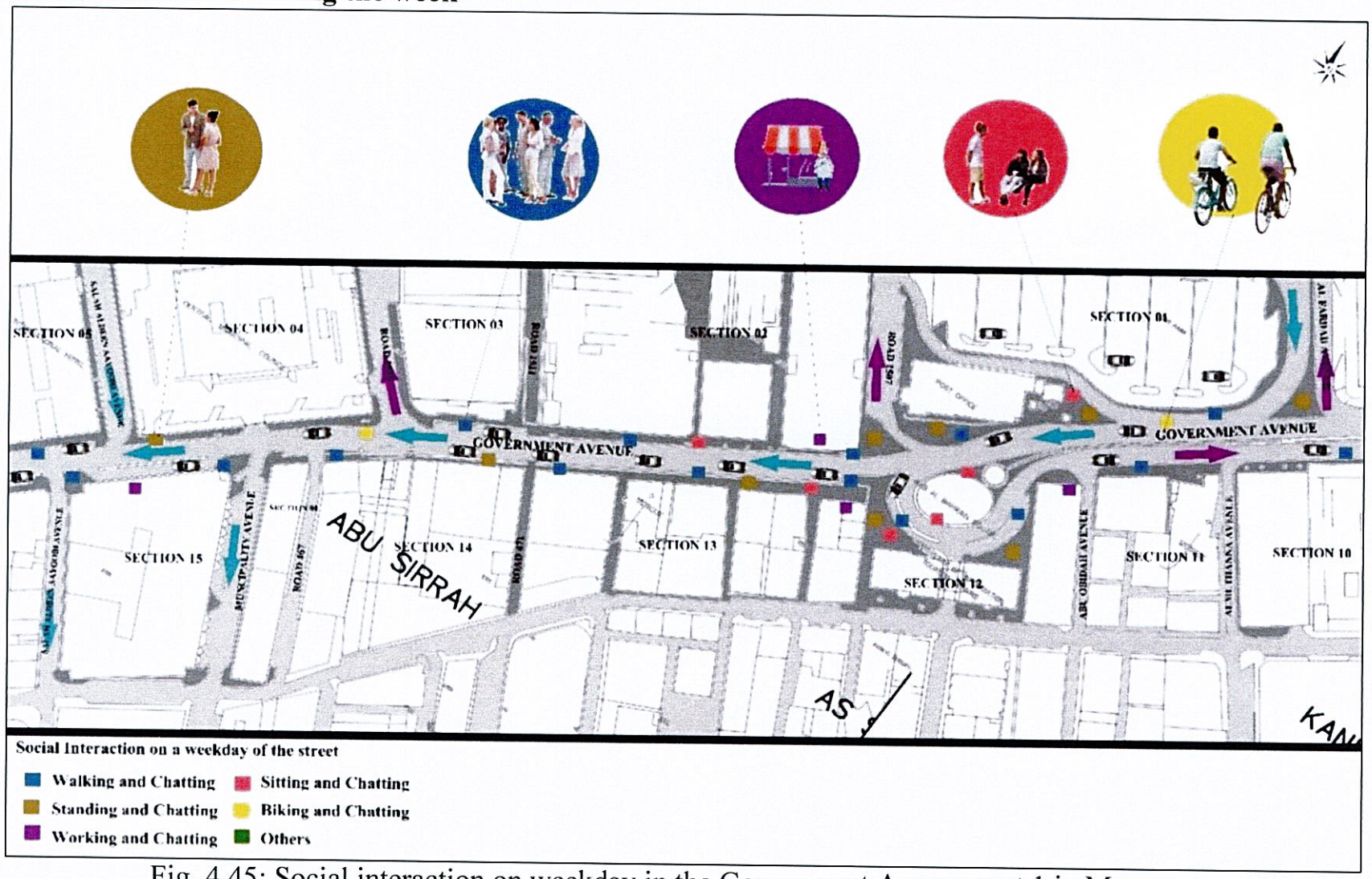



Fig. 4.45: Social interaction on weekday in the Government Avenue part 1 in Manama
Source: author

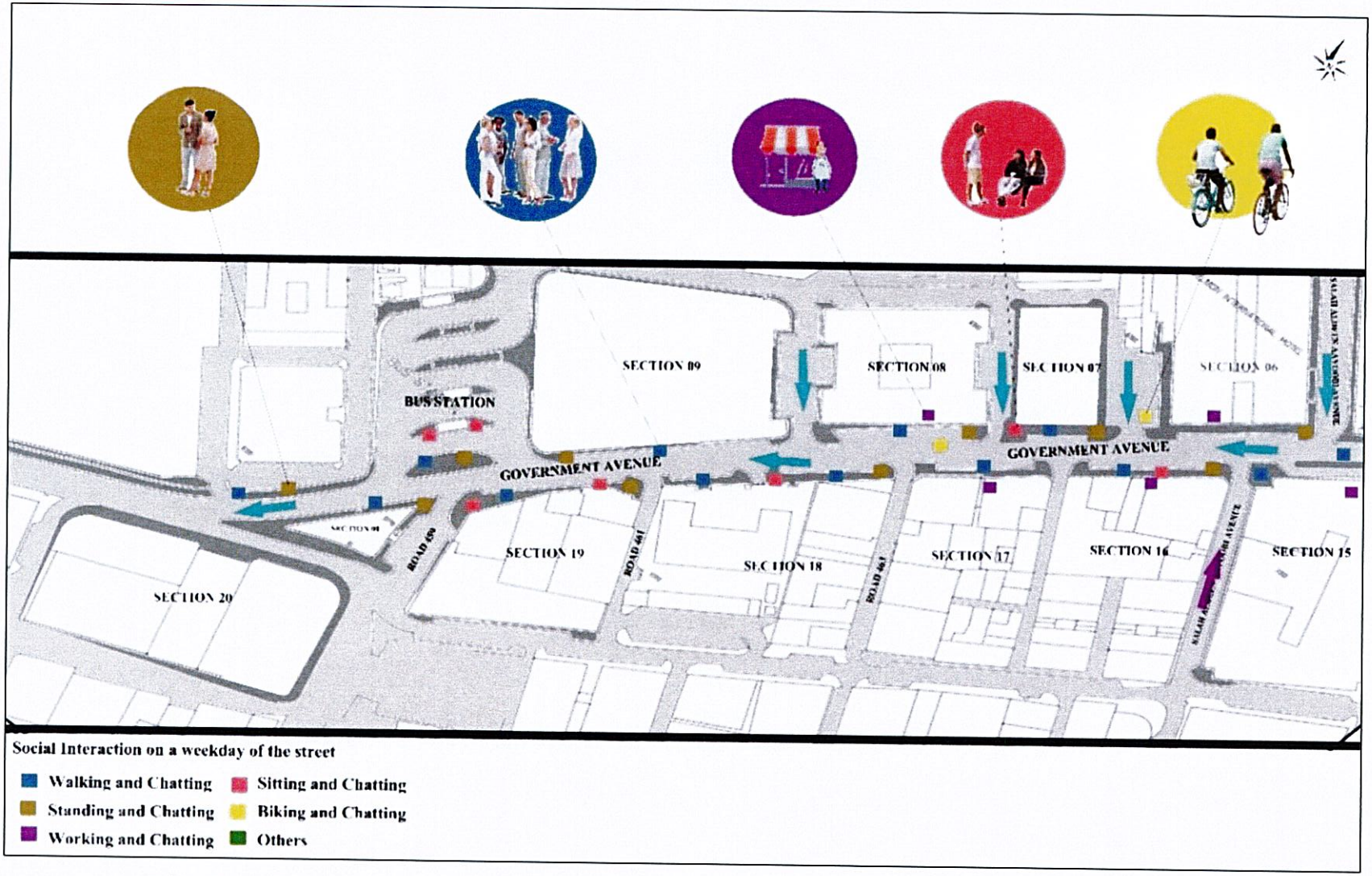



Fig. 4.46: Social interactions on weekdays in the Government Avenue part 2 in Manama
Source: Author

### 4.3.7.2 Social interactions during the weekend

Most people were seen socializing in front of Government Avenue's retail establishments and mosques during the weekend. Many social encounters occurred at street crossings' entrances, corners, and barriers. Contact was also on the opposite side of the street and next to the basic amenities shop.

However, by the late afternoon (about 1.00 p.m.), social interaction had changed from the street section's entrances (North) to the street section's exit (part 2) of the street and the area surrounding the crossing at the Government Avenue part 2. Regarding the social scape, the peak of social contact occurred in part one on Friday from 1.30 p.m. to 5.30 p.m., with Fifty different types of interactions per hour. Furthermore, the timing of the peaks and movement in the social scape in the afternoon occurred where the Mosque and stores are located, implying a relationship between window shoppers and prayers, which are popular social activities, particularly on weekends.

At 9.00 a.m., the most prevalent interaction on part one of this street, as shown in Fig. 4.47, was walking while talking, followed by standing while speaking, which grew from 11:00 a.m. At least ten interactions in which people sat in front of stores or at urban seating designated at various locations along this stretch of the street to talk, as shown in Sections S02, S11, S12, S13, S14 & S15. At 2 a.m., there were only ten interactions, three standing while chatting at sections S01, S02, S12 and S13, one at section 10, one at section 11 and one in between sections 3 and 4 (both times at the junction). In sections S04, S05, S14 and S15, three walking and chatting interactions were observed simultaneously.

Part 2 of the street, as shown in Fig. 4.48, was quiet around 9.00 a.m., with the most common interaction being walking while talking. However, the most common interaction at noon was standing, sitting, and talking. Individuals sat and stood in front of the establishments or sat at available urban seats to talk. There were only five interactions around 2 a.m., including four individuals walking and talking at the junction of sections S05, S06, S14, and S15 of the street. One meeting of individuals conversing while sitting in front of section 16.

It's also worth noting that fifteen larger groups of four or more people wandered along the street, talking. This variant in interactions says that sidewalk congestion affects standing when interacting. Fewer people stopped and waited for interactions as more people walked along the street while talking with a companion.

The pedestrian activity creates a collective flow at the weekend social scape peaks (12.00 p.m and 4.00 p.m), making it inconvenient to halt and linger on the pavements. Instead, one would be dragged along with them. Resting and conversing occurred in locations where outdoor seating (public or private )was provided and on the stairs in front of enterprises and mosques in various street parts.

Surprisingly, many people did not stop and stand in Part 2 of the street. People usually went past the buildings after the intersection while talking to their companion (s). The lack of engagement might be ascribed to ground-floor uses and the lack of small businesses.

Inaddition, the areas with the most significant difference in social contact between weekends and weekdays between part 1 sections S02, S11, S12, S13, S14 & S15, part 2 sections S06, S07, S15, S16 and S17. These areas appear extremely busy during the weekend, both by

individuals walking and those remaining to socialize due to retail stores and mosques. During the week, however, there is virtually little social interaction.

The fewer social interactions might be related to the façade character, mixed and uninteresting in these specific parts and their purposes, including service and retail. In particular, the interactions occur during the day, primarily due to small businesses in these sections that do not provide everyday necessities.

- **Social interactions during the weekend**

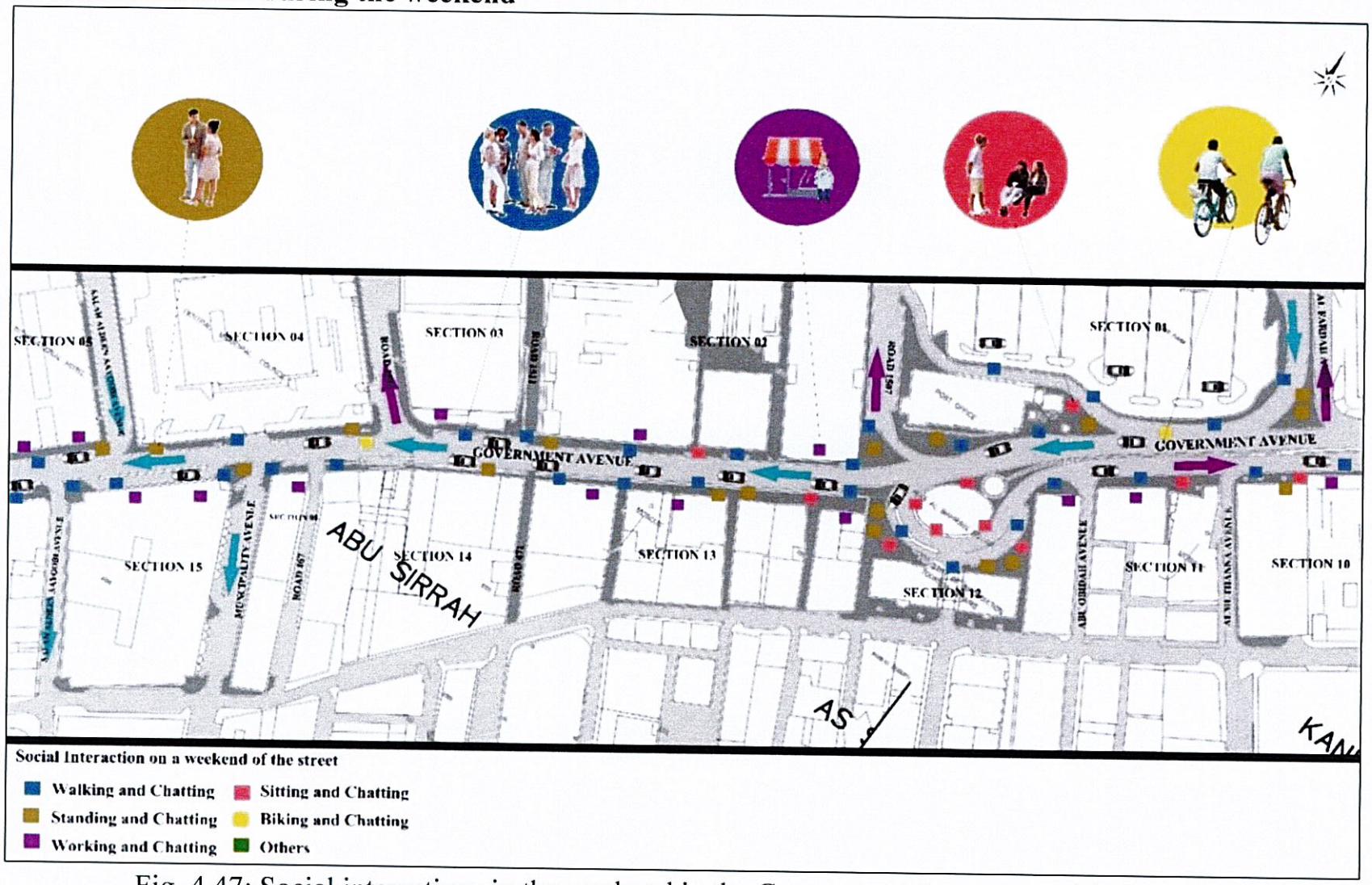



Fig. 4.47: Social interactions in the weekend in the Government Avenue part 1 in Manama
Source: Author

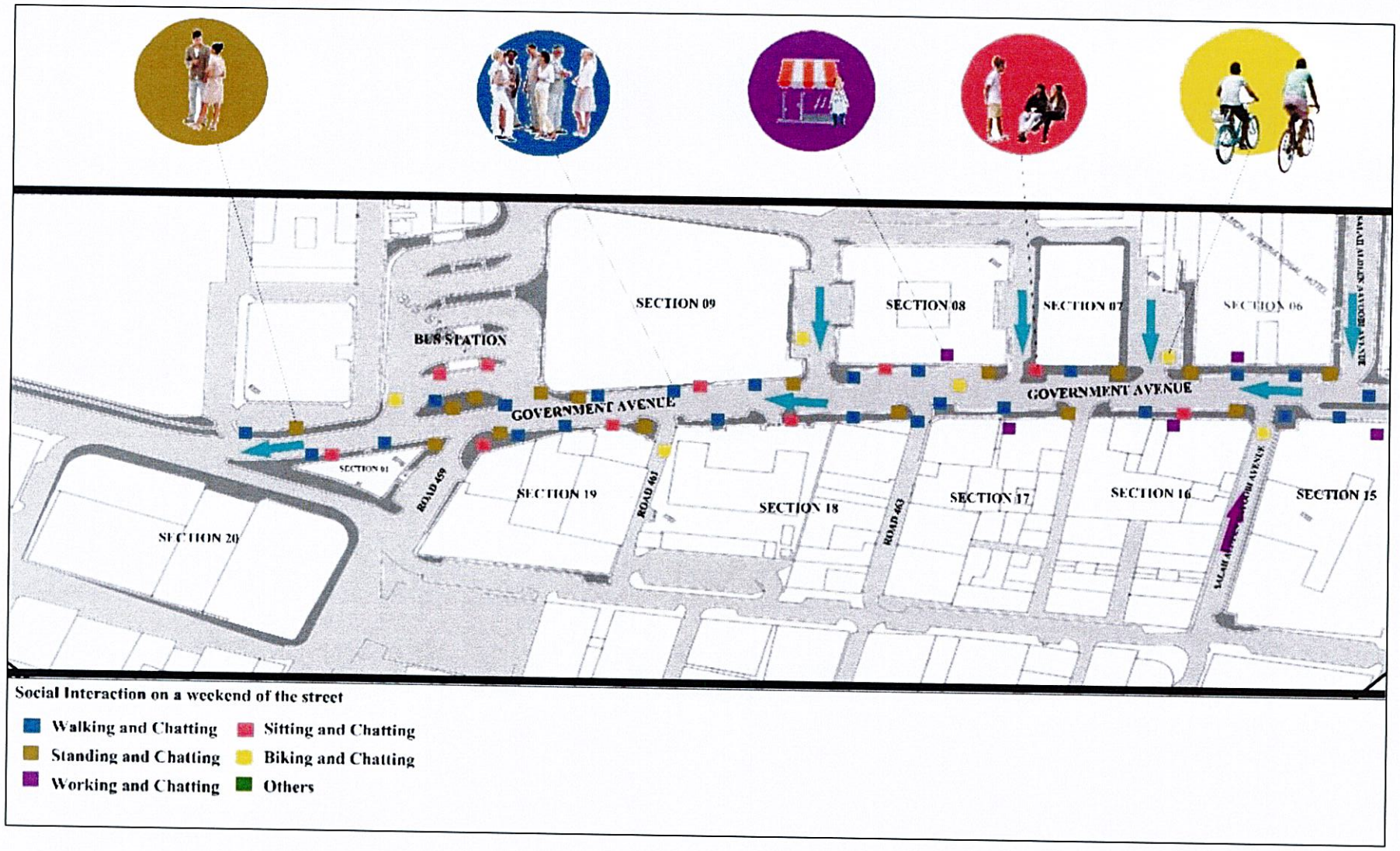



Fig. 4.48: Social interactions in th eweekend in the Government Avenue part 2 in Manama
Source: Author

## 4.3.8 Notes from the field

The field notes related to the Government Avenue in Figs 4.49 and 4.50 show the meteorological and sun conditions and the researcher's moods, ideas, and pre-conceptions. Taking into consideration the researcher's circumstances while still in the environment, the researcher recognized preconceptions and worked towards them by becoming conscious of how these personal biases may impact the results.

**FIELDNOTES :1**

- Observation notes
- Date: 08/07/2021
- Day: Thursday
- Time : 11:00 a.m. – 1:30 p.m.
- Warm weather
- Bright sun shining temperature felt 50 degrees centigrade

It seemed to be on the verge of burning. I'm tired and fatigued. and I'm filthy. I can feel the warmth and heat on my face when the sun shines. I'm thinking about how much I miss the springtime when the weather is nice enough to go for a stroll.

I'm feeling uneasy. like if everyone is wondering what I'm up to. I'm uncomfortable viewing them since I'm receiving suspicious chilly looks most of the time. I have the impression that I am a stranger who has intruded on their privacy.

there were concrete seats sitting on the sidewalk at the beginning of the street. Most of the people I saw were seated on stairs or theses urban benches outside their businesses. People were gathered in front of restaurants. cafe. coffee shops. Sitting and conversation were uncommon on this particular day due to schoring heat.

Walking and speaking in the street appears to be the most popular type of social interaction. Pedestrians appear to detect persons who walk towards them in order to pass them. They do not. however. interact with one another. The only interaction is between persons who walk together or are smokers. car washers. cyclists. rent-a-car drivers. and business owners and frequent customers who have known each other for a long time.

The sun is at its strongest around midday. and one can feel the warmth on one's body and face. A prayer may be heard coming from the mosque. While people frequent the street for services. retail activity on the street is gradually decreasing. Informally. fewer people are standing and sitting outside the cafeteria and cold stores. I'm also becoming hungry and bored. I'm going to propose 3-4 observation sessions for a future visit. Despite my presence. the street consisted of fewer people mostly expatriates wandering arround.

Fig. 4.49: Field note: 1 in the Government Avenue in Manama
Source: Author

**FIELD NOTES:2**

- Observation notes
- Date: 09/07/2021
- Day: Friday
- Time : 11:00 a.m. – 2:00 p.m.
- Warm weather
- Bright sun shining temperature felt 50 degrees centigrade

I arrived on the street about 11:00 a.m., which seemed unusually early. I'm drowsy, fatigued, and a little dizzy. The sun is shining brightly, making it difficult to collect data under these intense weather circumstances. As soon as I got to the street, I began documenting my variables of observation, including social interaction. As the day progressed, more individuals were seen on the street, most of whom were heading to the mosque for Friday prayers. People arrive early for their location in the mosque since it is covid -19 days and people entering to the mosques are limited.

Most retail establishments, money exchange shops, bakeries, and cafeterias were open early in the morning, which astonished me. I intended to go to the Gold souq once I finished my observation to get view some of the prestigious jewelleries. The occassion of Eid is heading up nd there are promotion offer banners struck on the lighting poll of the street. Surprisingly, people began to recognize me after my first visit. Interestingly, additional police patrol cars were observed patrolling the area to prevent any disasters over the weekend.

I'm sitting outside on a public concrete seatiing working on my job application and waiting for the street to come to life. More and more people are flocking to the street to pray on Fridays. During this period, people were standing, sitting, and conversing. I started walking towards the middle of the street at 12:30 to persuade people to give me an interview. Around 12:45, I met a few others who were interested in joining. I'm finished, and I'm in the middle of third conversations. I need to arrange and transcribe them for better comprehension.

I intended to wait until 3:00 p.m. for the next observation, but dizziness is worsening owing to the hot temperature. I'm having a headache and have purposefully kept the car running so that the car's air conditioning keeps my body temperature stable. After snapping some shots and sitting in the sun, I decided to call it a day around 2:00 p.m. I expected the temperature to be above 50 degrees Celsius at this time.

Fig. 4.50: Field note: 2 in the Government Avenue in Manama
Source: Author

## 4.4 Sheikh Hamad Avenue Muharraq Observation

Sheikh Hamad Avenue in Muharraq is one of the oldest streets in Bahrain. It is approximately 0.6 km long that opens up in many different ways. The street is bordered by many historical buildings and shopping areas, with many local retailers occupying the ground floors of these buildings. This street also joins the well-known Souq Al Muharraq. The street has evolved from one of the pedestrian-friendly liveliest streets to an automobile-oriented street. Fig. 4.51 shows the location of the street. While Figs 4.52, 4.53 and 4.54 show the division of the street into parts for detailed observations, each plot in the street is mentioned as sections.

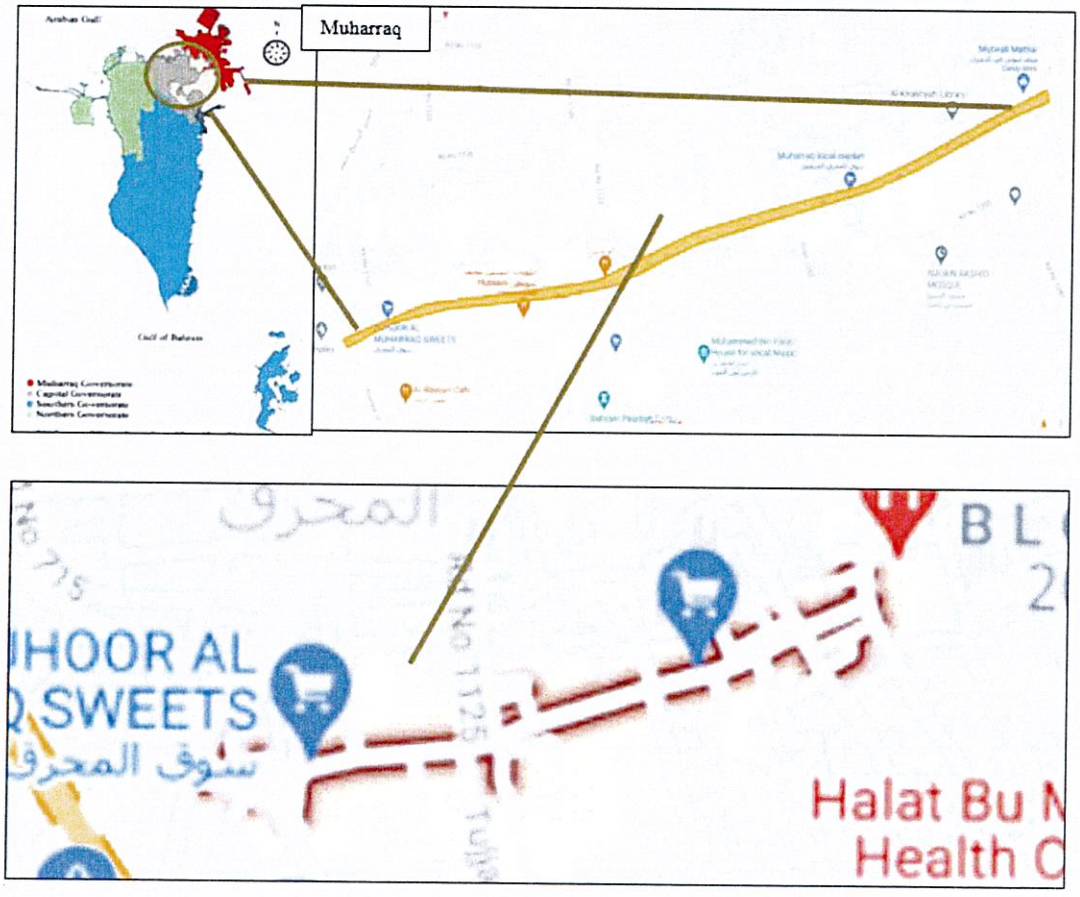



Fig. 4.51: The Sheikh Hamad Avenue in Muharraq
Source: Google map

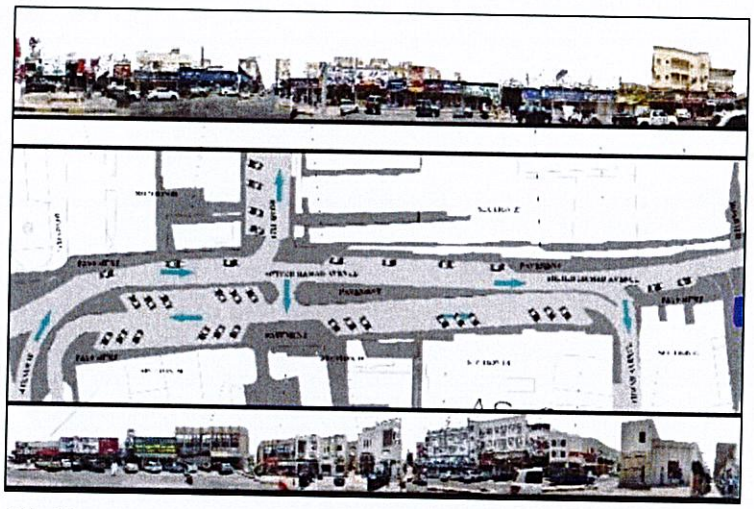


Fig. 4.52: Part1 section of Sheikh Hamad Avenue in Muharraq
Source: Author

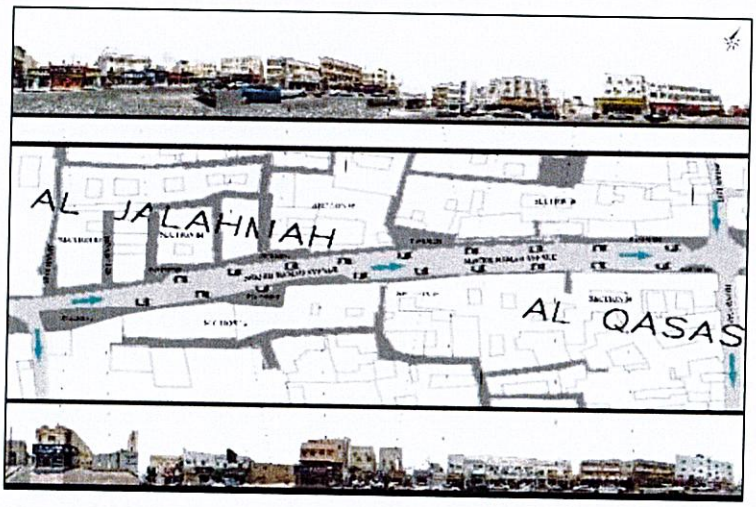



Fig. 4.53: Part 2 section of Sheikh Hamad Avenue in Muharraq
Source: Author

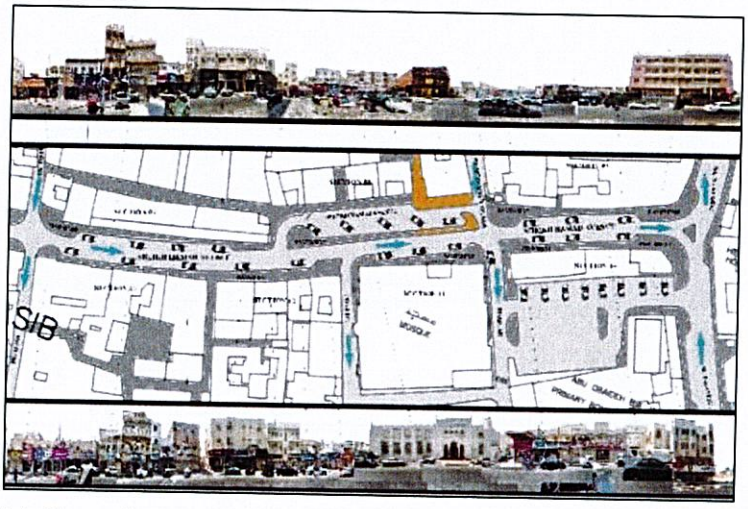



Fig. 4.54: Part 3 section of Sheikh Hamad Avenue in Muharraq
Source: Author

### 4.4.1 Visual

#### 4.4.1.1 Characteristics of the facades of the ground floors of the adjoining buildings

Similar to Government Avenue, the Sheikh Hamad Avenue façade characteristics of the ground floors that impact the street's liveliness were also observed according to Gehl's classification, as mentioned earlier. These designs and the appearance of façades enhance the aesthetic appearance as well as the overall environmental characteristics of Muharraq Street.

This street is divided into three parts. Part 1, as depicted in Fig. 4.55, shows the detailed analysis of Muharraq Street from sections S01 – S02 and sections S17 - S20. In part 1 of the street, there are no inactive facades. One facade in section S17, shown in dark blue, was active with small units and designs on the facade. There are three mixed facades highlighted in pink shown in sections S18, S19, and S20 with fewer blinds and variations in functions. Mainly dull, boring facades are observed in this part of the street, with few variations and fewer details.

In part 2 of this street, as shown in Fig. 4.56, the detailed analysis from sections S03-S06 and S14-S16 is discussed. There are more boring facades observed in this street part. However, four inactive facades are highlighted in dull green shown in sections S06, S15 & S16 with no visible variations in functions and more passive units. There is one mixture façade highlighted in pink shown in section 6 with subtle and fewer details on the façade. In contrast, there is no active façade with good details and materials in this part of the street.

In part 3 of this street, as shown in Fig. 4.57, the detailed analysis

from sections S07-S09 and section S10-S13 is discussed. The facades in this part of the street are primarily dull and monotonous, as highlighted in dark yellow with fewer details. There are fewer or no variations on the facades of buildings and uninteresting units with fewer doors.

However, two inactive facades in this part of the street section are highlighted in dull green sections S10 and S13. One friendly facade is highlighted in green shown in section 8 with few blinds, passive units, and many details. There is one mixture façade highlighted in pink shown in section 11 with subtle and fewer façade details, some blinds and passive units.

It is worth noting that dull facades predominate in this street, with fewer and more vibrant ground floor facades. The variation in the types of façades along the street suggests a shift in visual perception and atmosphere. Generally, friendly, mixed-use, and dynamic façades design creates a pleasant, aesthetically appealing ambiance. Where the facades are passive and dull, the atmosphere is aesthetically less inviting. Furthermore, there is a transit zone when the visual atmosphere changes, as shown in Fig. 4.58.

**Table (4.3): Summary of the characteristics of facades on the ground floor of Sheikh Hamad avenue in Muharraq**

| Visual characteristics of facades on the ground floor | | | | |
|---|---|---|---|---|
| Part 1 of the street | | | | |
| **Friendly** | **Mixture** | **Active** | **Inactive** | **Boring** |
| nil | three | one | Nil | many |
| Part 2 of the street | | | | |
| **Friendly** | **Mixture** | **Active** | **Inactive** | **Boring** |
| Nil | one | nil | four | many |
| Part 3 of the street | | | | |
| **Friendly** | **Mixture** | **Active** | **Inactive** | **Boring** |
| one | one | One | nil | many |

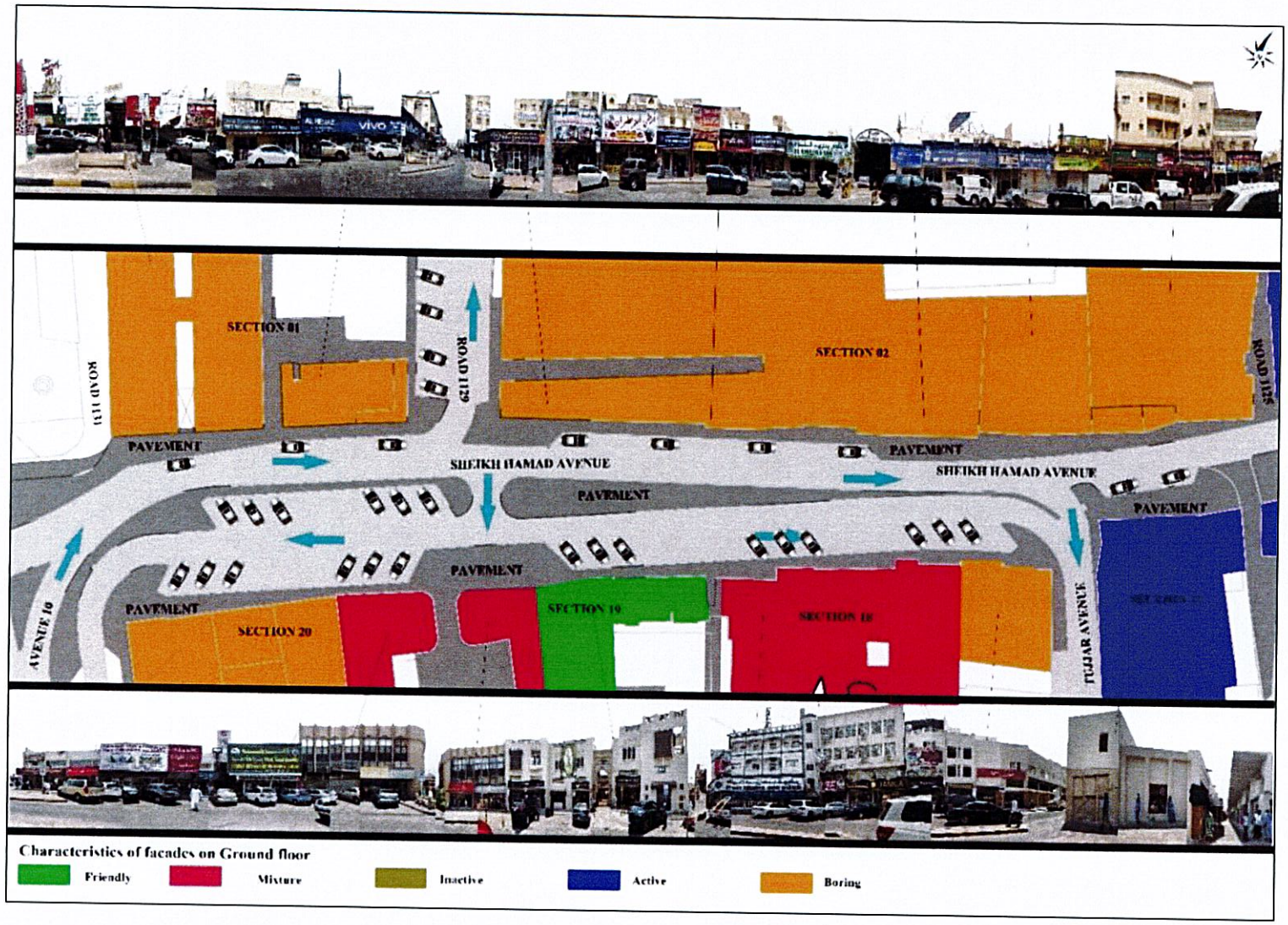



Fig. 4.55: Characteristics of the facades in the ground floor of Sheikh Hamad Avenue part-1 in Muharraq
Source: Author

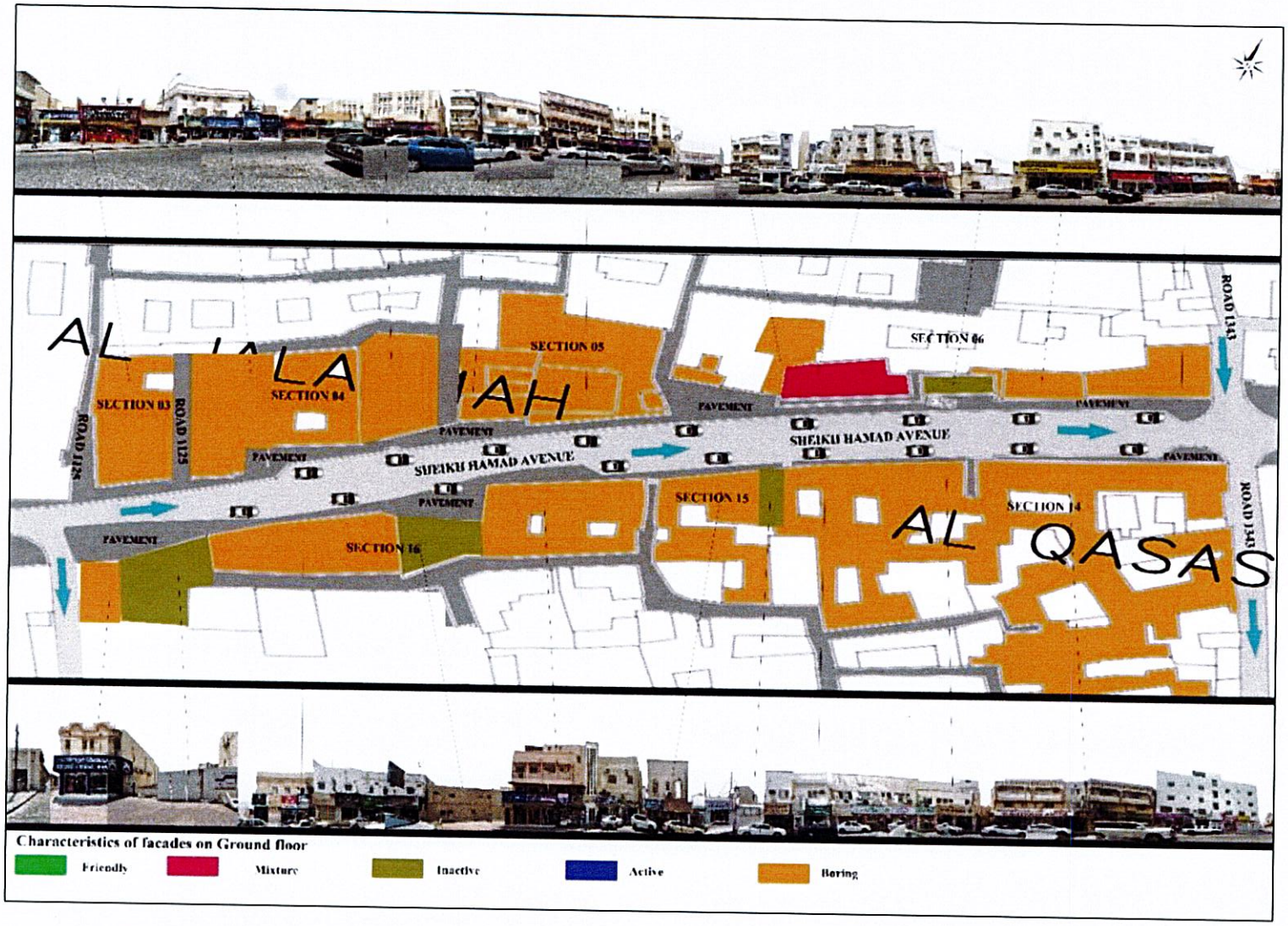



Fig. 4.56: Characteristics of the facades in the ground floor of Sheikh Hamad Avenue part-2 in Muharraq
Source: Author

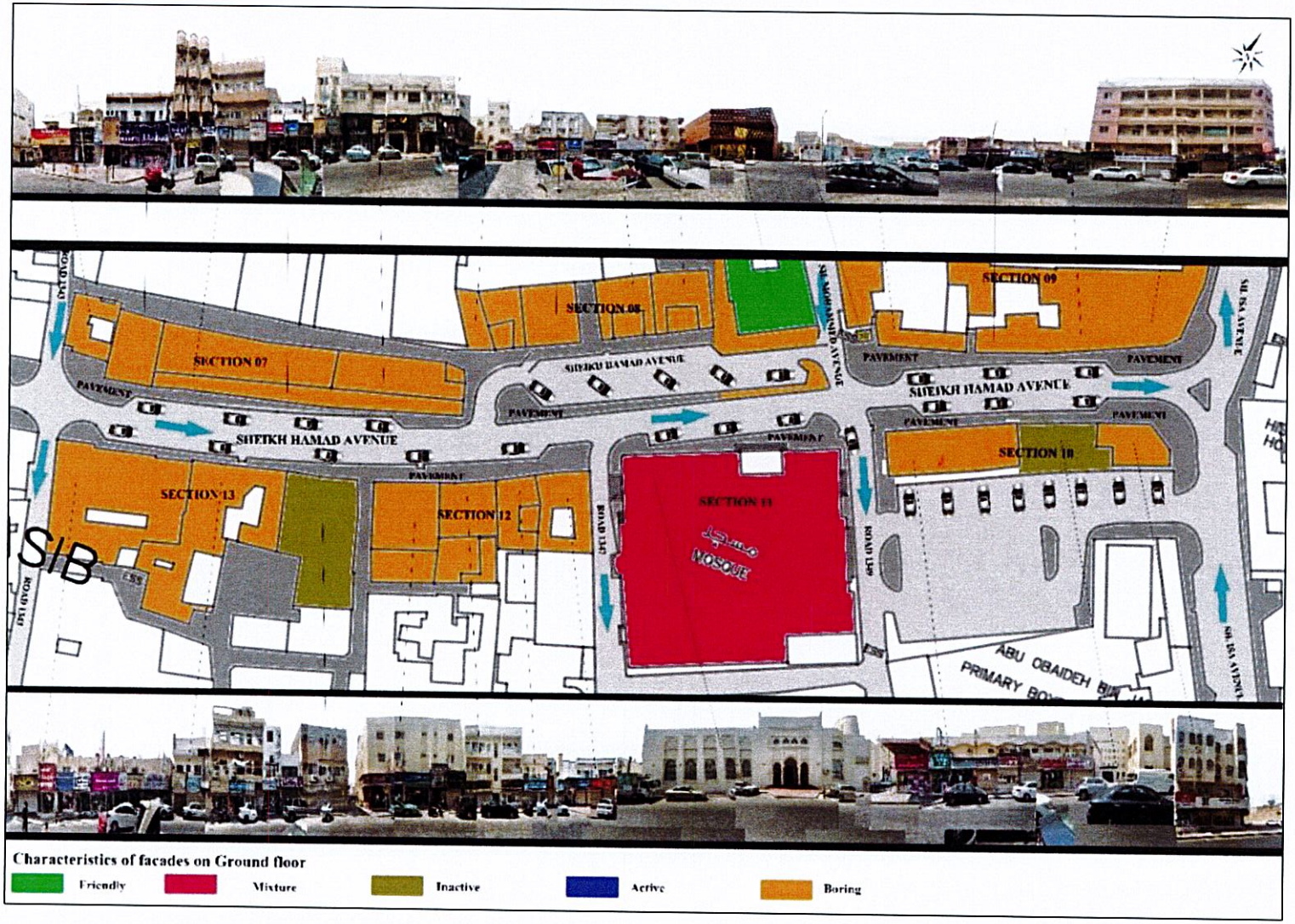



Fig. 4.57:Characteristics of the facades in the ground floor of Sheikh Hamad Avenue part-3 in Muharraq
Source: Author




Fig. 4.58: Characteristics of the facades in the ground floor of Sheikh Hamad Avenue in Muharraq
Source: Author

### 4.4.1.2 Presence of vehicles

Overall, the parked vehicles in Muharraq's Sheikh Hamad Avenue appeared to be a significant visual obstacle. The haphazard parking of vehicles discouraged pedestrian traffic. In addition, the illegally parked automobiles limited the width of the roadways, causing future movement of vehicles and people crossing to be chaotic, causing traffic congestion. There were no legal markers for pedestrian crossings or prescribed schedules for heavy vehicles on this roadway.

Part 1 of this street, as shown in Fig. 4.59, depicts parked automobiles visibly obstructing the view, limiting the width of the road, preventing pedestrian movement, and diminishing the street's vibrancy.

Part 2 of this street, as shown in Fig. 4.60, shows the cars parked in front of shops obstructing the view. There were cars parked on the pavement or parked randomly on the road that blocked the view and further movement of cars, causing traffic congestion during the peak hours of the day and affecting the vibrancy of this street.

Part 3 of this street, as shown in Fig. 4.61, depicts the automobiles parked haphazardly on a one-way road, diminishing the road's width and hindering mobility. There is no designated pedestrian crossing in this area of the roadway. During peak hours, traffic congestion obstructs pedestrian mobility, turning the street into a vehicular-dominated area, thus reducing the street's vitality. The absence of automobiles during the non-peak hours changes the street's character, making it more open and vibrant.

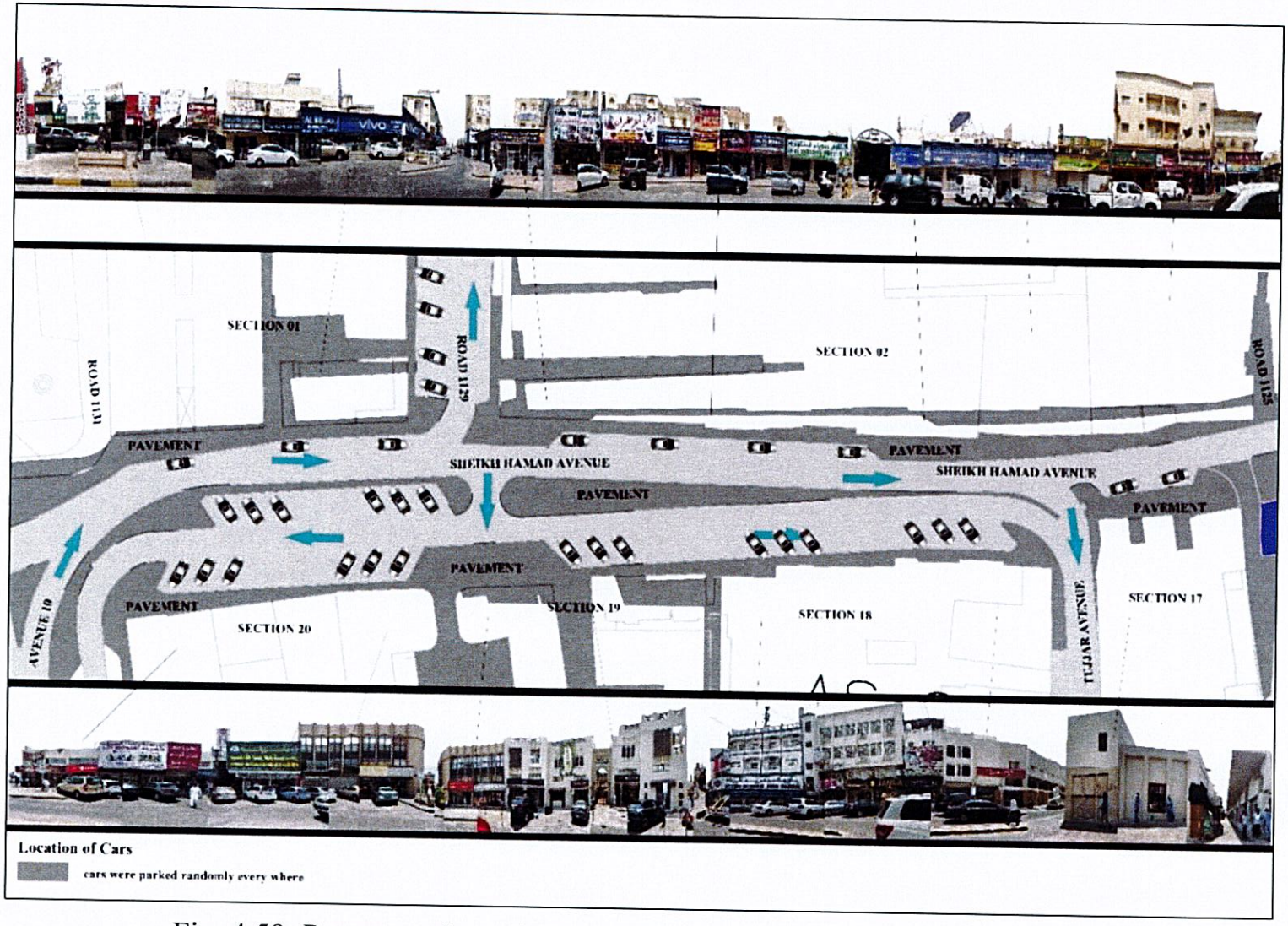



Fig. 4.59: Presence of cars in Sheikh Hamad Avenue part-1 in Muharraq
Source: Author

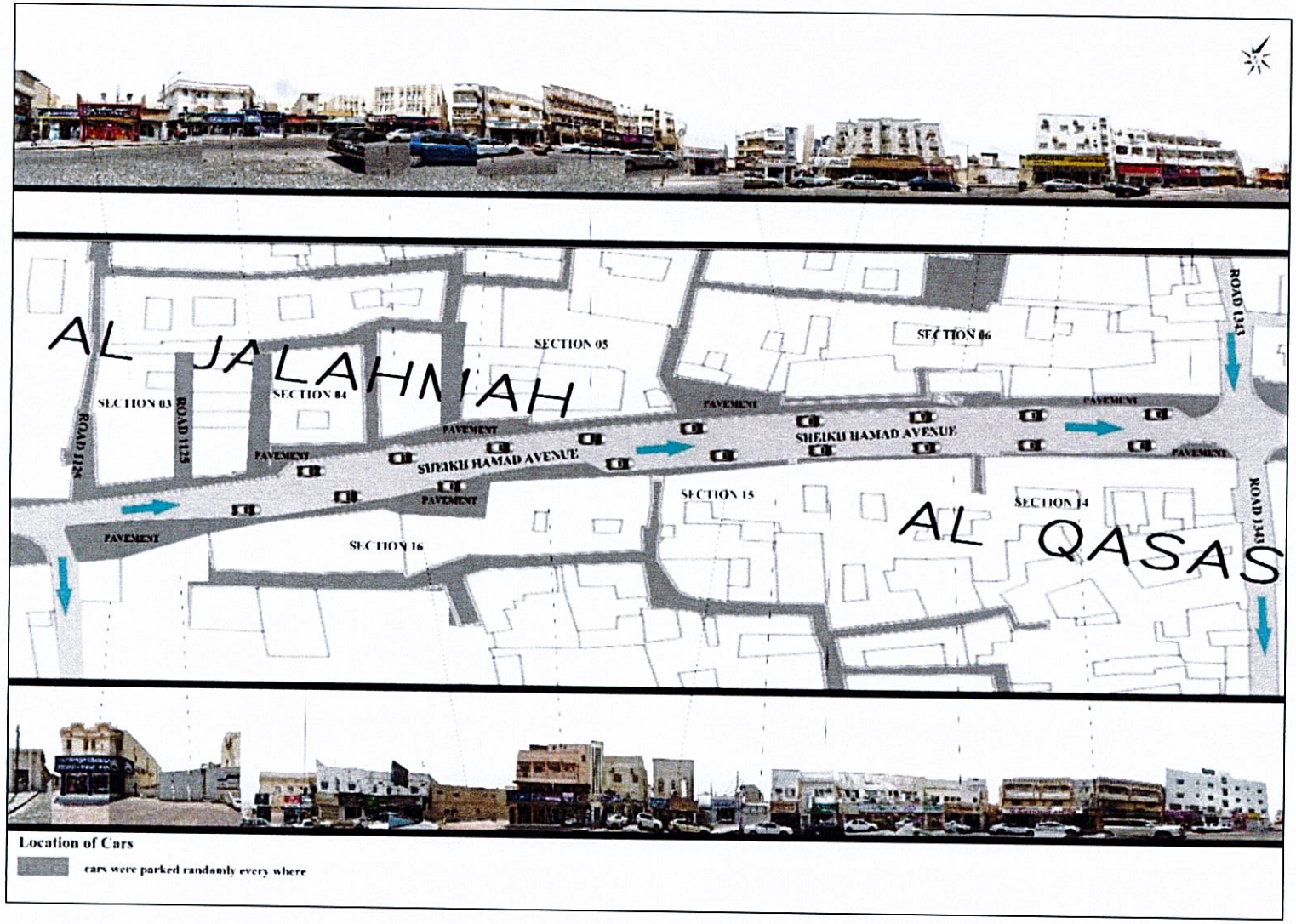



Fig. 4.60: Presence of cars in the Sheikh Hamad Avenue part-2 in Muharraq
Source: Author

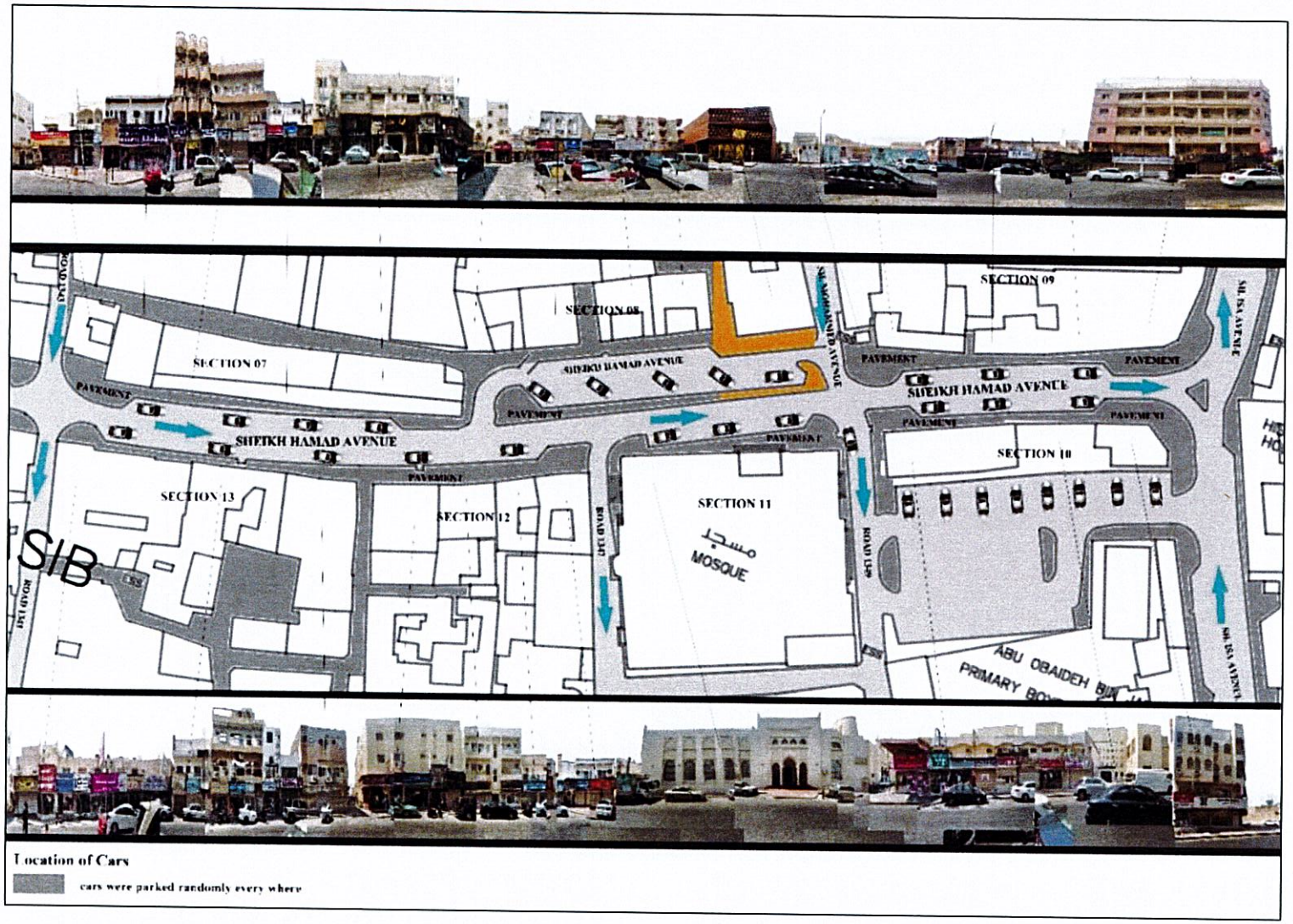



Fig. 4.61: Presence of cars in the Sheikh Hamad Avenue part-3 in Muharraq
Source: Author

### 4.4.1.3 Characteristics of the pavement

Overall, the Sheikh Hamad Avenue pavements in Muharraq are monotonous and unappealing, with little or no greenery. Changing the road's asphalt material to the pavement, on the other hand, incites the visitors' visual stimuli. Most pavements feature herringbone patterns, with minor exceptions in front of the Muharraq library, where the circular pavement design has been used. Some of the pavement widths are increased and are obstructed by bollards to prevent vehicles from crossing directly. Pedestrians are increasingly using these pavement routes for safe travel.

Part 1 of this street, as shown in Fig. 4.62, shows the irregular width of the pavements accompanied by urban furniture in the middle pavement. It is where the width is ample and at the edge of pavement in sections S01, S19 & S20. There are blockade streets with bollards and herringbone pattern pavements in all sections of this street. The blockade of the street restricts the informal parking of the vehicles. There are broken pavements in sections S01 & S02 as informal vehicles were parked on the pavement creating a visual barrier.

Part 2 of this street as shown in Fig. 4.63, like Part 1, illustrates the inconsistent width of pavements with automobiles parked on them. The pavements are dull, aesthetically less attractive, and absent of plants. However, urban furniture is available in front of sections 16 and 6. The transition from the road to the pavement, on the other hand, attracts visual stimuli. There is no lighting or signage to guide the pedestrians. This part of the street includes old and new pavement types. However, an overall herringbone pattern is used in this part of the street.

Part 3 of this street, as shown in Figs 4.64 and 4.65, indicates pavements designed in front of the Muharraq library. However, there is no urban furniture and shades for visitors' social interactions in this part of the street. People sit in front of the informal steps of mosques and enterprises. In addition, there is a variety of widths on the pavements of this street. The parking allocation and sidewalks in all the parts of this street have been indicated by changes in the material from asphalt to herringbone pattern concrete. The increased width of the pavement on the street edges provides a friendly atmosphere to the visitors, thus increasing social interactions.

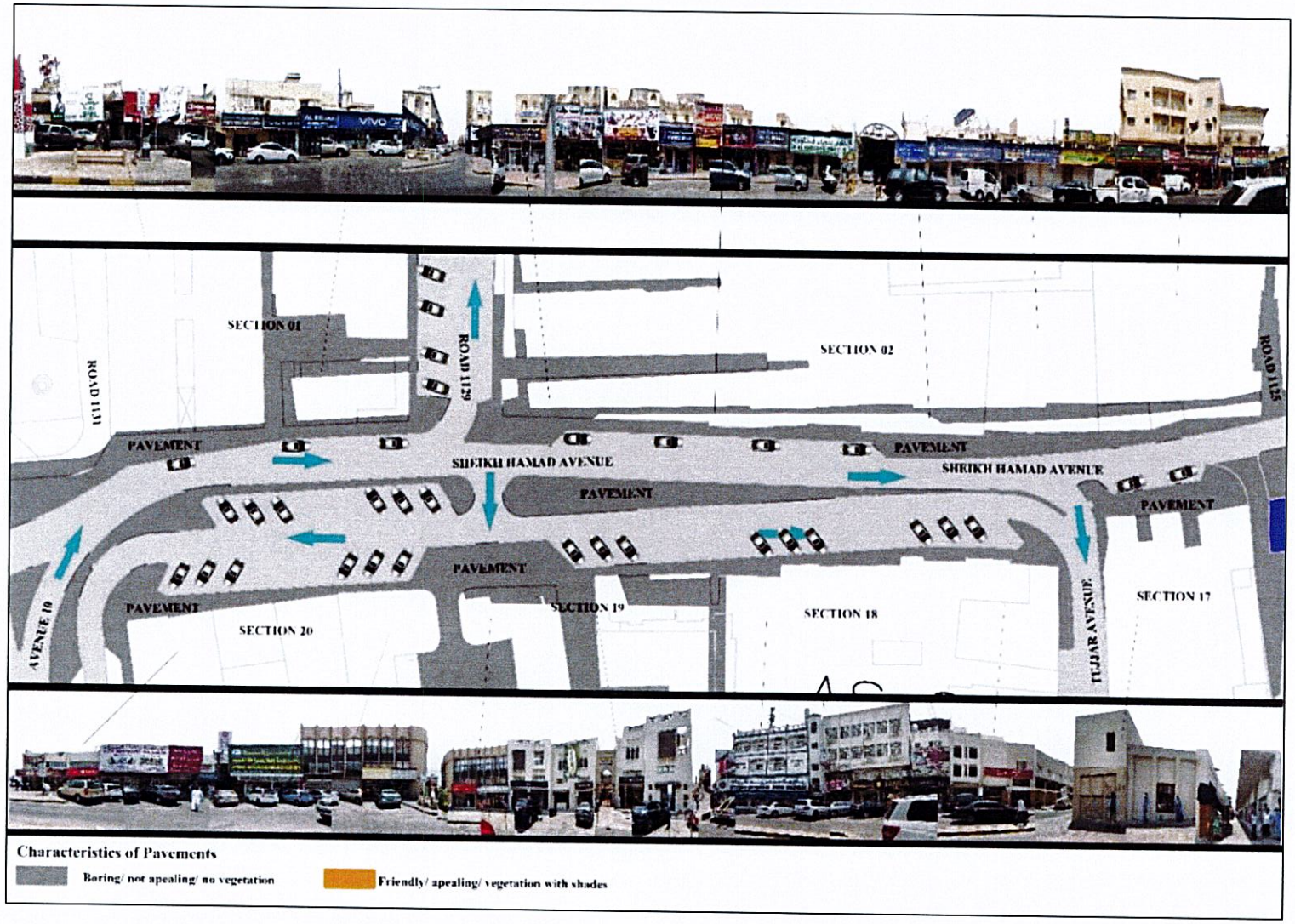



Fig. 4.62: Characteristics of the pavement on Sheikh Hamad Avenue part-1 in Muharraq
Source: Author

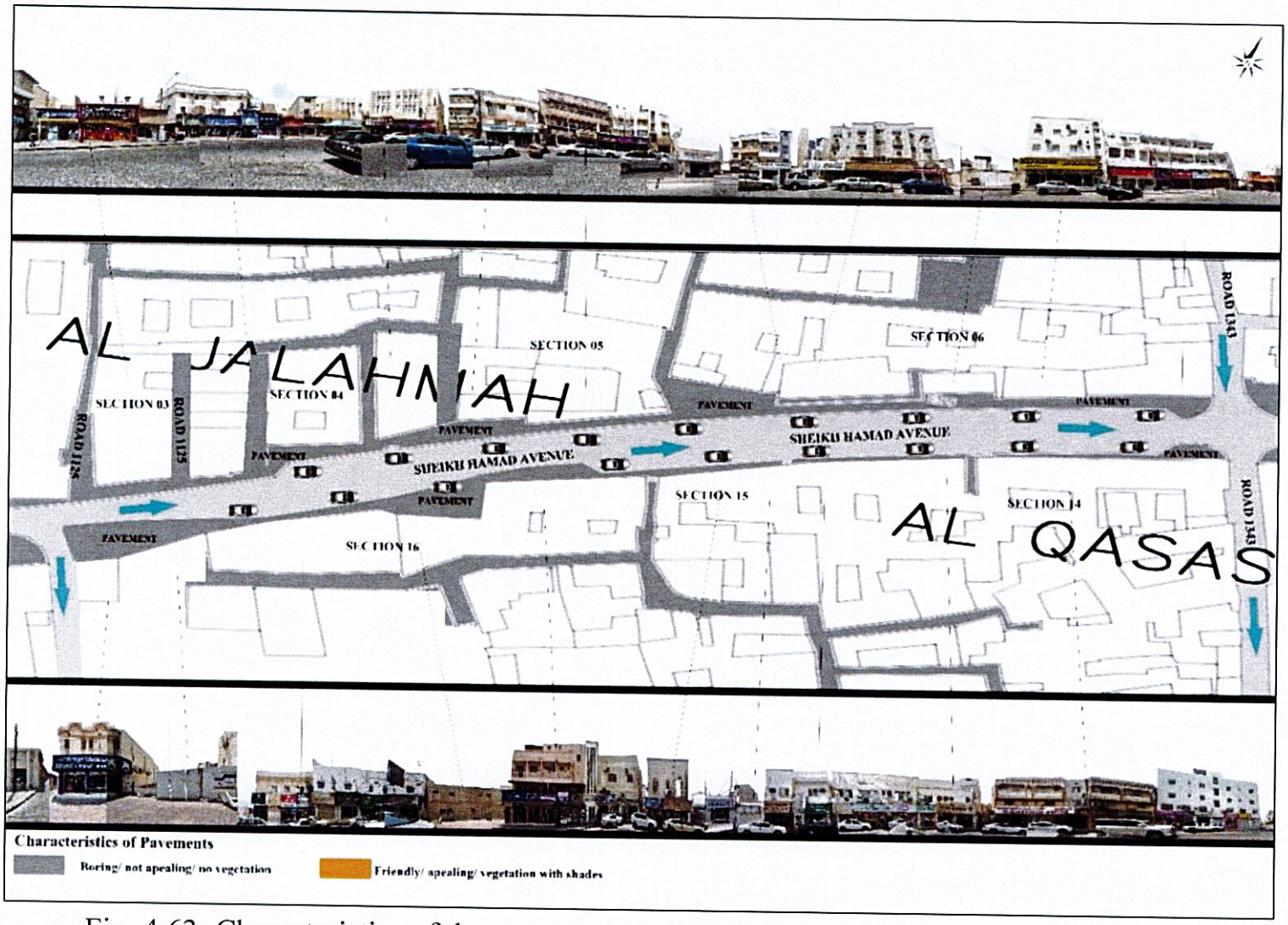



Fig. 4.63: Characteristics of the pavement on Sheikh Hamad Avenue part-2 in Muharraq
Source: Author

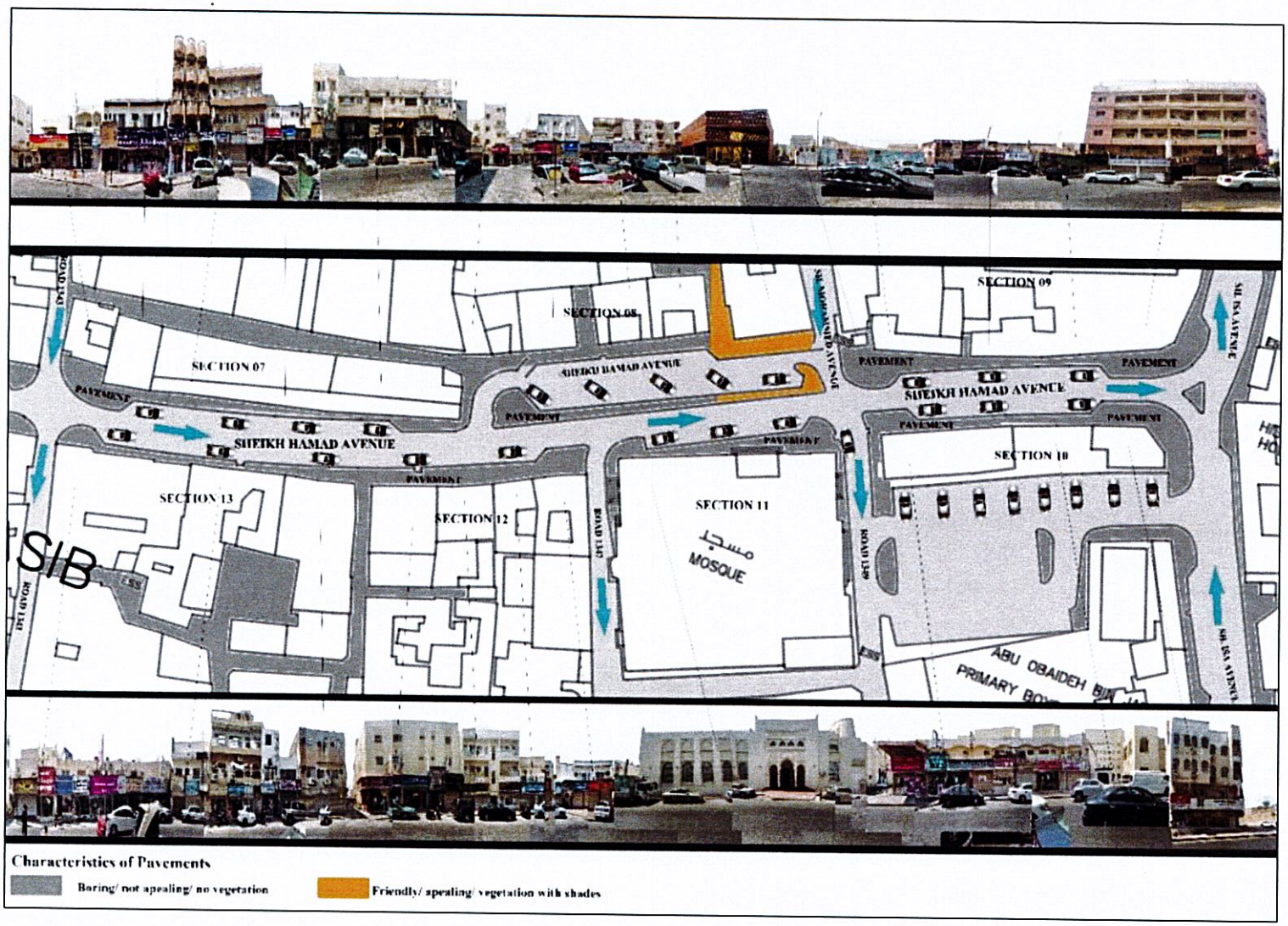



Fig. 4.64: Characteristics of the pavement in Sheikh Hamad Avenue part-3 in Muharraq
Source: Author



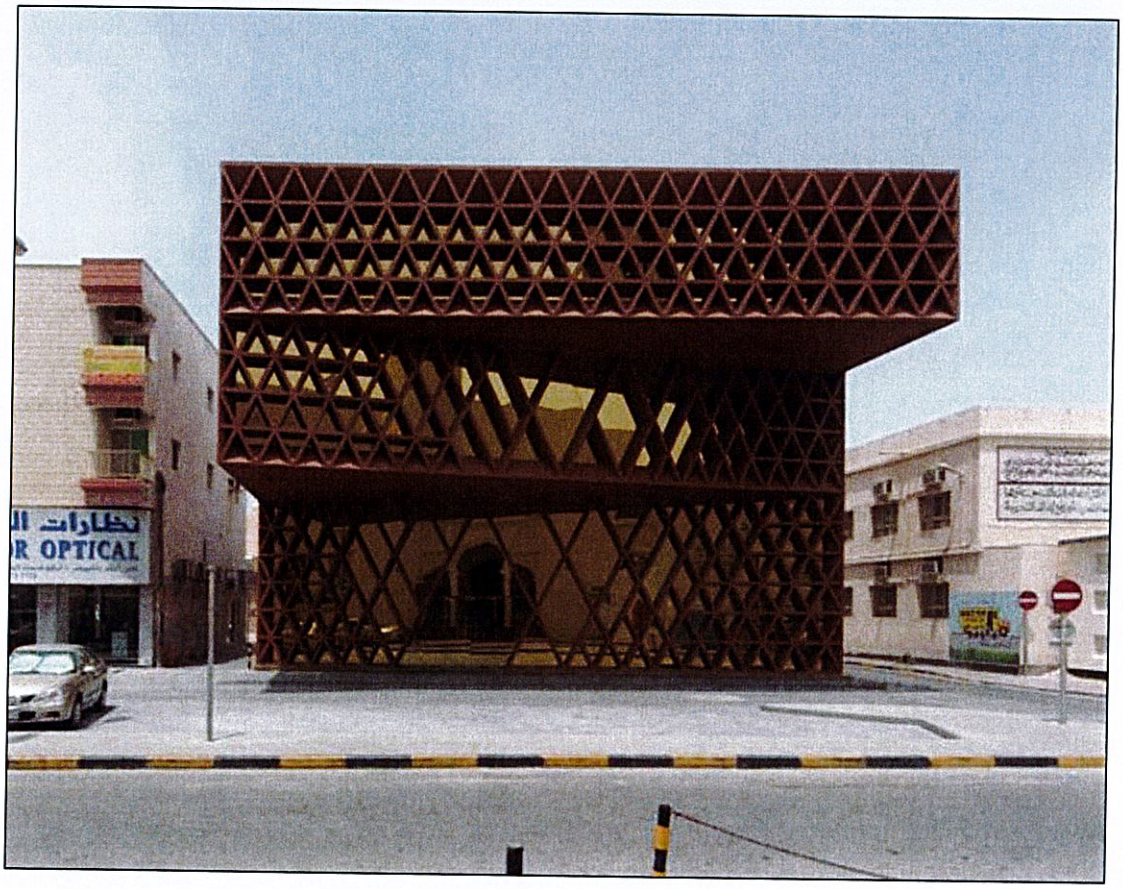



Fig. 4.65: Characteristics of the pavement in the Sheikh Hamad Avenue in Muharraq
Source: Author

#### 4.4.1.4 Effect of visual stimuli on social interaction

Similar to Manama street, there was a correlation between social interaction and façades characterized as friendly, active, or mixed, as individuals felt more comfortable spending time in front of facades with characteristics than just strolling by them. Other locations with mostly dull and inactive façades and a few dispersed mixed façades had less social contact. Conversations in front of these facades could be described as moving (walking or biking) but not lingering.

Part 1 of the street, as shown in Fig. 4.66 ad 4.67, consists primarily of people sitting, standing, and working while speaking in front of dynamic and mixed façades or where the pavement width is larger such as in the middle partition or at the edge of streets. Walking and conversing were frequently done in front of dull facades with narrower sidewalks and increased motor traffic.

On the other hand, the functions on the ground floor of adjoining buildings may improve social interaction other than the façade. The façade of the Café, bakery, traditional Arabic sweets, and retail stores are observed as uninteresting, despite people standing, informally sitting, and mingling here. In front of these facades, passers-by would stop and stand to converse with customers seated on the steps outside. In these situations, this third space and retail stores influence social interactions rather than the variantfaçade characteristics on the ground floors of adjoining buildings.

Part 2, similar to part 1 of the street, as shown in Fig. 4.68 and 4.69 was occupied primarily by people standing and conversing, sitting and chatting in front of the dynamic and mixed façades. Customers and store owners also interacted while working and

talking, standing and speaking at the doors of shop fronts, and sitting and chatting on informal steps.

This contact is primarily due to shops, even though the façade elements were monotonous. In addition, interaction took place in front of inactive facades where furniture was available. The term "attractive ground floors" refers to areas where social contact occurs due to the retail spaces or the presence of urban furniture on the ground level. It should be highlighted that the level of engagement varied from weekday to weekend, with weekend interactions rising more than a weekday.

The cars were blocking the street's view in terms of vehicular presence. In other words, the visual impression was negatively dominated by parked vehicles. Parking cars, particularly delivery vehicles, obstructed views of the other side of a street, their façades on the ground floors of adjoining buildings and pavements.

As shown in Fig. 4.70 and 4.71, the character of the façades changed in Part 3 of the street, from dull and inactive to lively, intriguing, and pleasant, and then again to dull. This resulted in visually pleasing or soft environments that could be related to vibrancy depending on the location of social interaction, which changed proportionally. People were sitting, standing, and engaging in this part of the street. There was a higher sidewalk width and unique pavement characteristics in front of the Muharraq library. However, there was no urban furniture in this part of the street. The Muharraq library, the Qasariyra souq, the Muharraq souq, and the Muharraq mosque act as outstanding visual landmarks in this street, attracting visitors to create space affiliation.

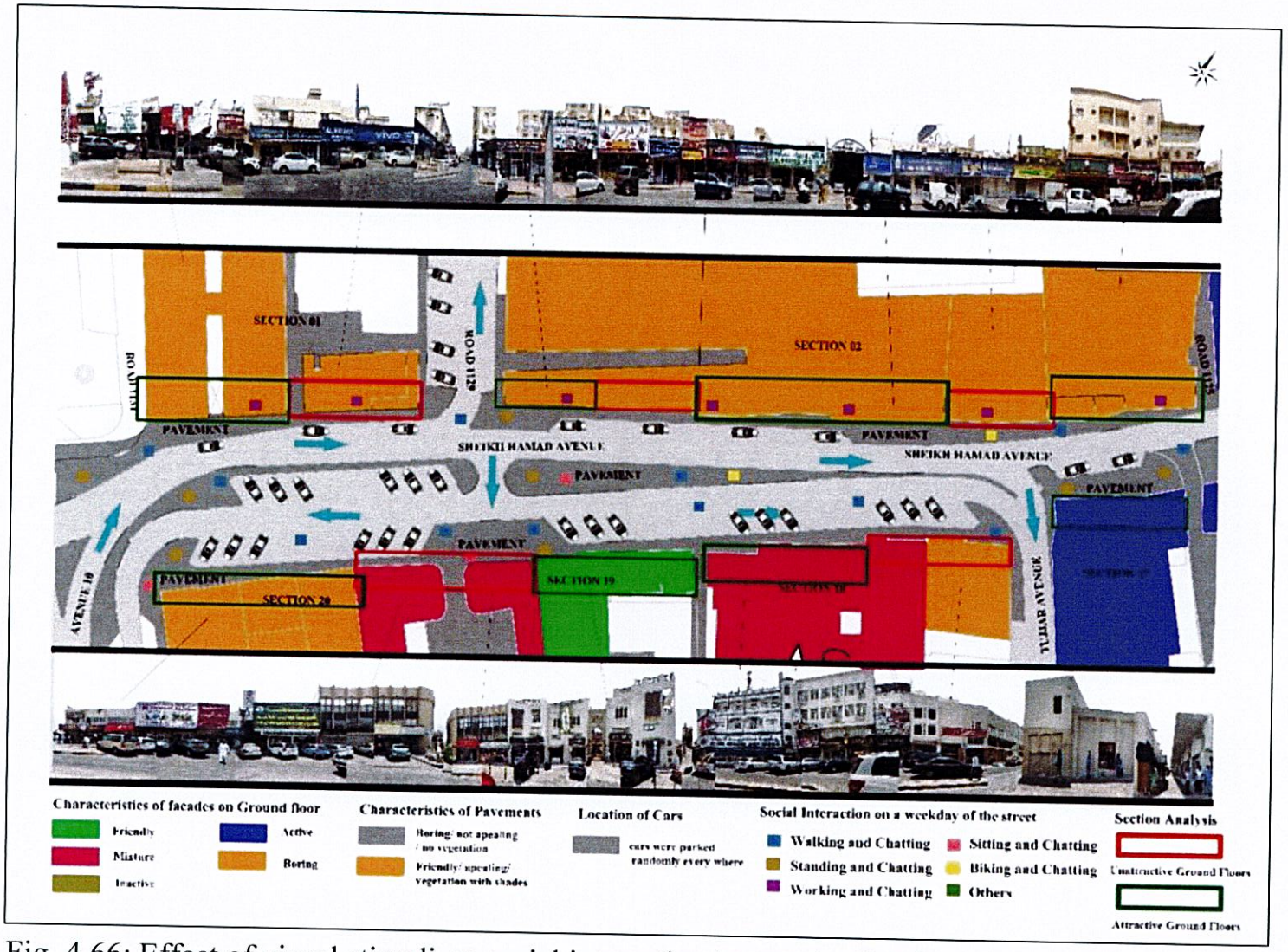



Fig. 4.66: Effect of visual stimuli on social interaction in part-1 of Muharraq street- Weekday
Source: Author

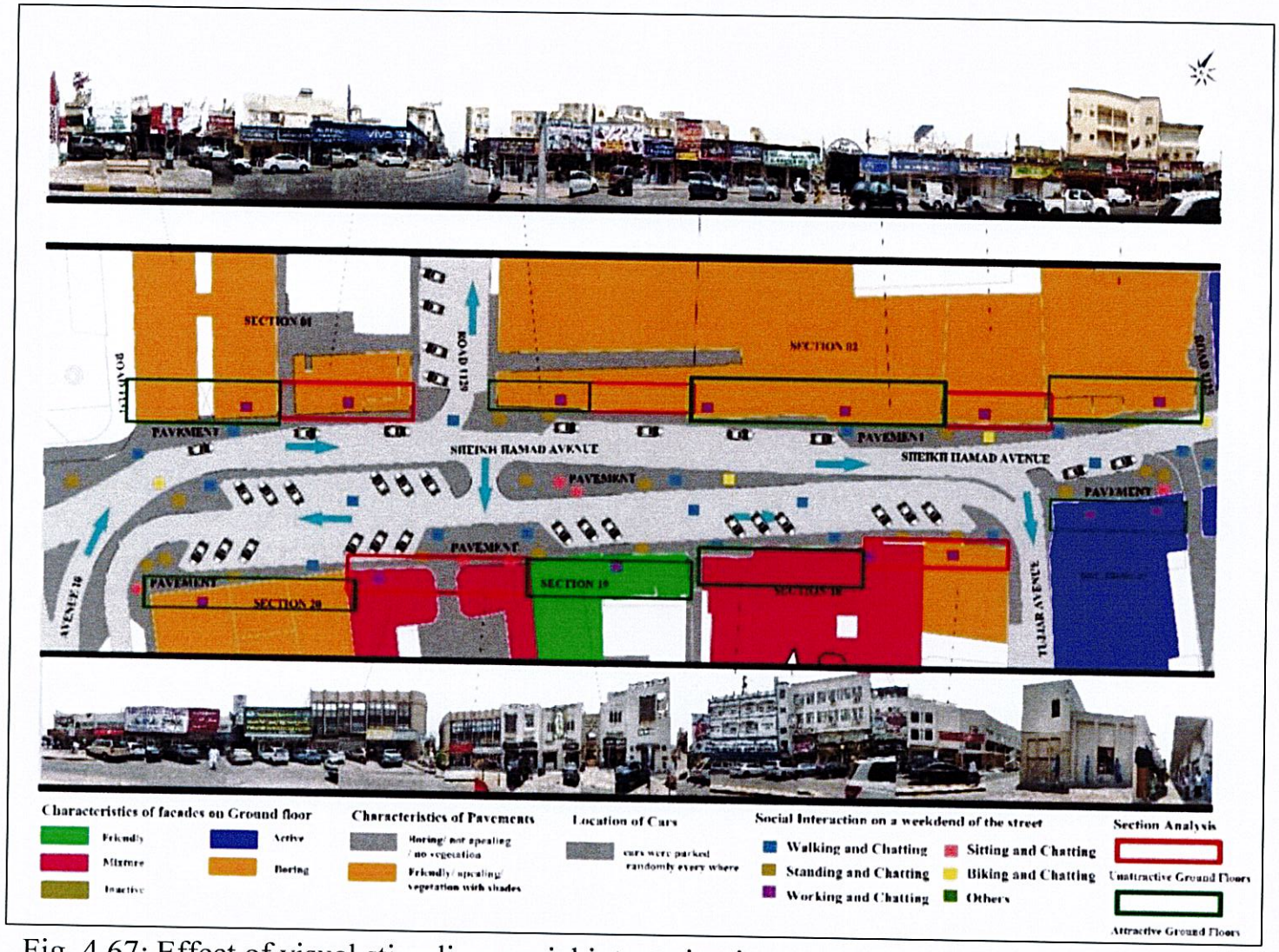



Fig. 4.67: Effect of visual stimuli on social interaction in part-1 of Muharraq Street- Weekend
Source: Author

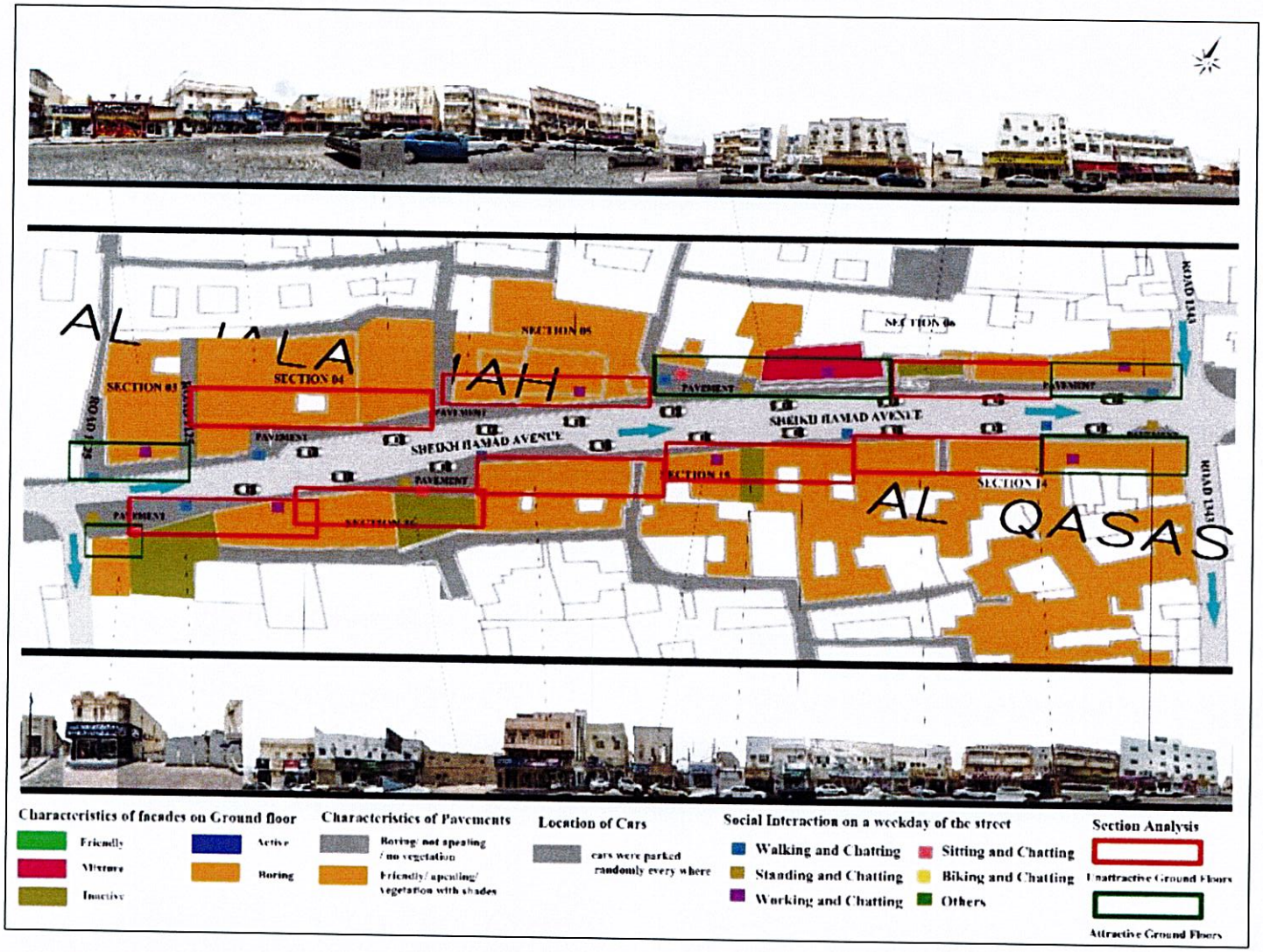



Fig. 4.68: Effect of visual stimuli on social interaction in part- 2 of the Muharraq Street- Weekday
Source: Author

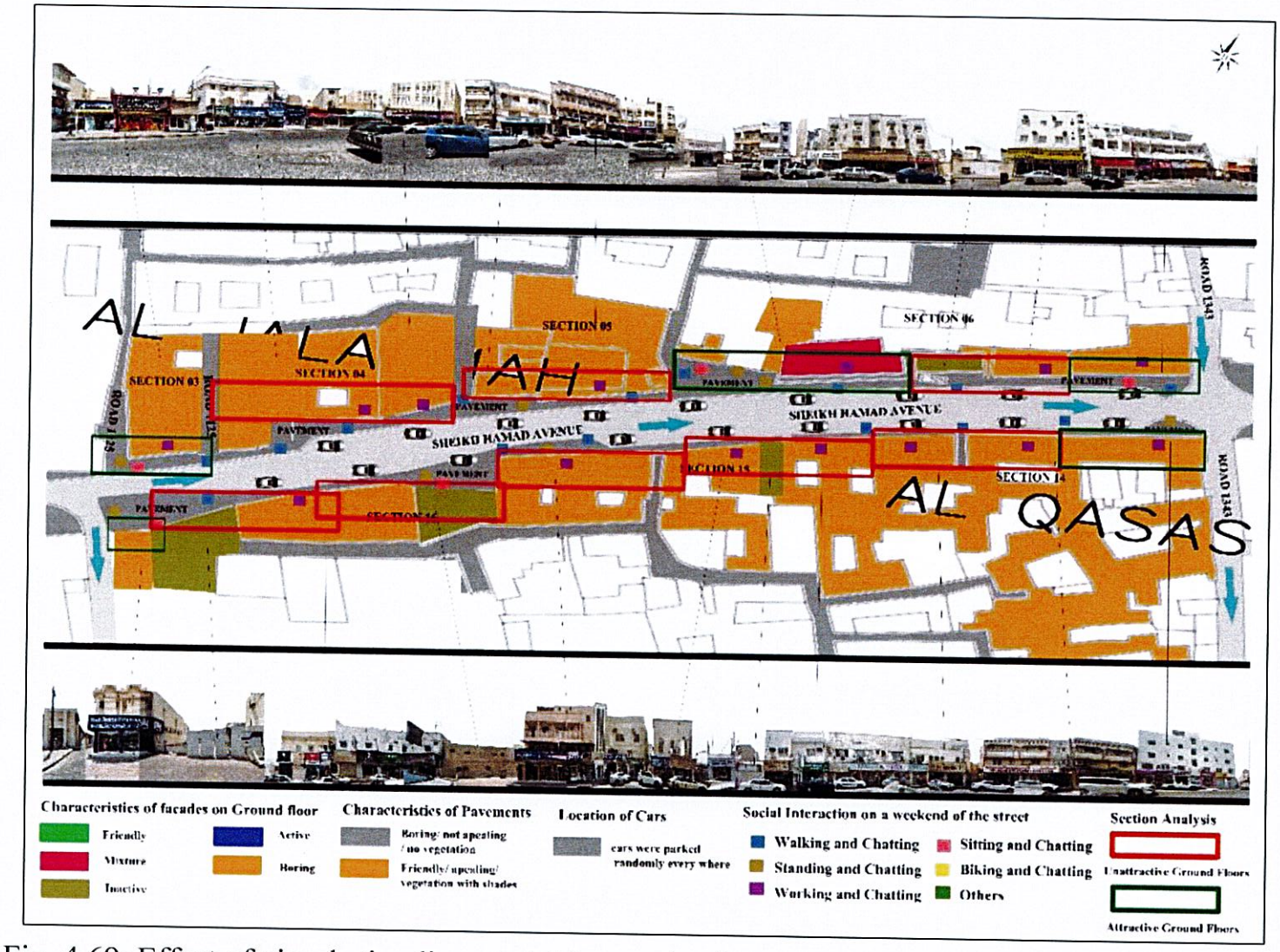



Fig. 4.69: Effect of visual stimuli on social interaction in part- 2 of the Muharraq Street- Weekend
Source: Author

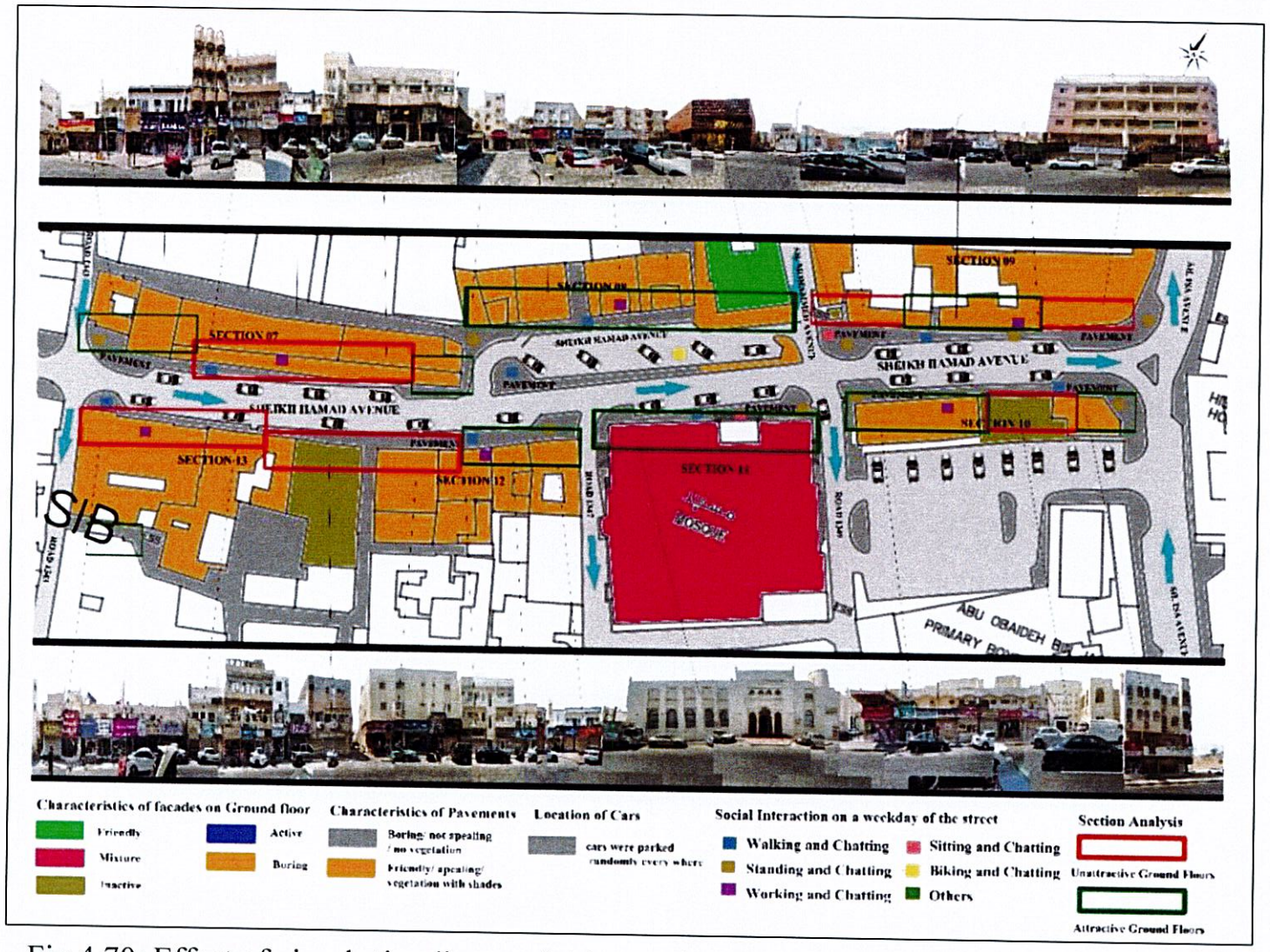



Fig 4.70: Effect of visual stimuli on social interaction part- 3 of Muharraq Street- Weekday
Source: Author

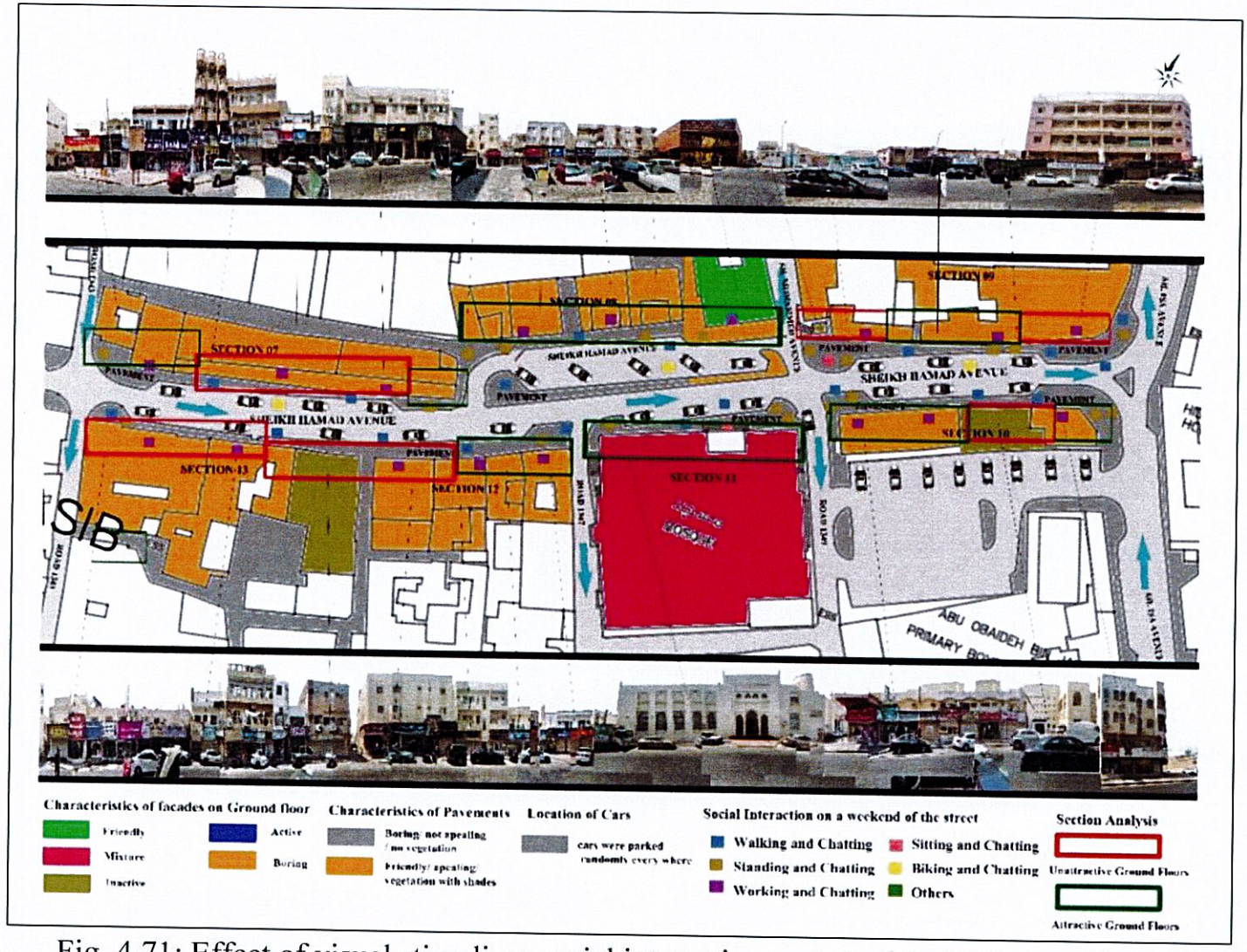



Fig. 4.71: Effect of visual stimuli on social interaction part- 3 of the Muharraq Street- Weekend

Source: Author

### 4.4.2 Soundscapes

Fig. 4.72 shows the general sound distribution of Muharrq Street. On weekends, however, some differences in sounds could be observed similar to other streets that are less typical during weekdays.

The soundscapes differed among the four spots chosen on Muharraq Street. There was more traffic sound in spots 1 and 2 at a higher volume. The intensity of these vehicle sounds was lower in spots three and four.

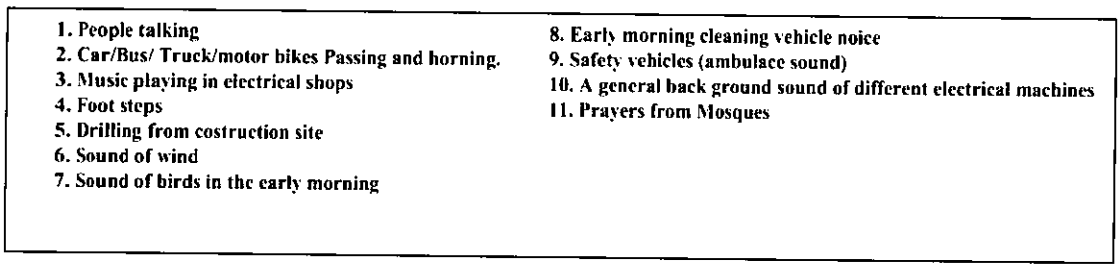



Fig. 4.72: General Sounds in the Muharraq Street
Source: Author

#### 4.4.2.1 Weekday soundscapes of the Muharraq Street at spot 1

On a weekday morning (about 7 a.m.), the soundscape at spot one at Muharraq Street, as depicted in Fig. 4.73, is significantly quieter and calmer, with the sounds of breezes, birds, and footsteps. However, during the noon hour (from 9.00 a.m. to 1.00 p.m.), spot 1 has substantially higher sound levels, with more vehicles passing, music playing from electronic stores, drilling from the construction sites, and people talking. Spot 1 calms down again in the afternoon (about 1.00 p.m. to 3.00 p.m.), with fewer people talking, fewer automobiles, and partially shuttered storefronts.

Due to its proximity to the Muharraq's main highway, one may hear more traffic and sound from passing vehicles in the soundscapes

closer to the initial portion of Muharraq Street. Vehicle bumping sounds could be heard more often at the entrance during the week. People speaking at the bakery, the Muharraq traditional shops and the café make the street busy at certain times.

#### 4.4.2.2 Weekend soundscapes of Muharraq Street at spot 1

During the weekend, spot 1, as depicted in Fig. 4.74, has substantially more sound, with vehicles producing most of the sound. Conversely, much conversation occurs while people are doing their things. In addition, at the time of the recording, some prayers were heard from the mosque and window shoppers buzzing around the street (during noon). On weekends, the sounds at the spot are louder and more distributed, with a scattered peak from vehicular sounds, social interactions between people and ground floor activities.

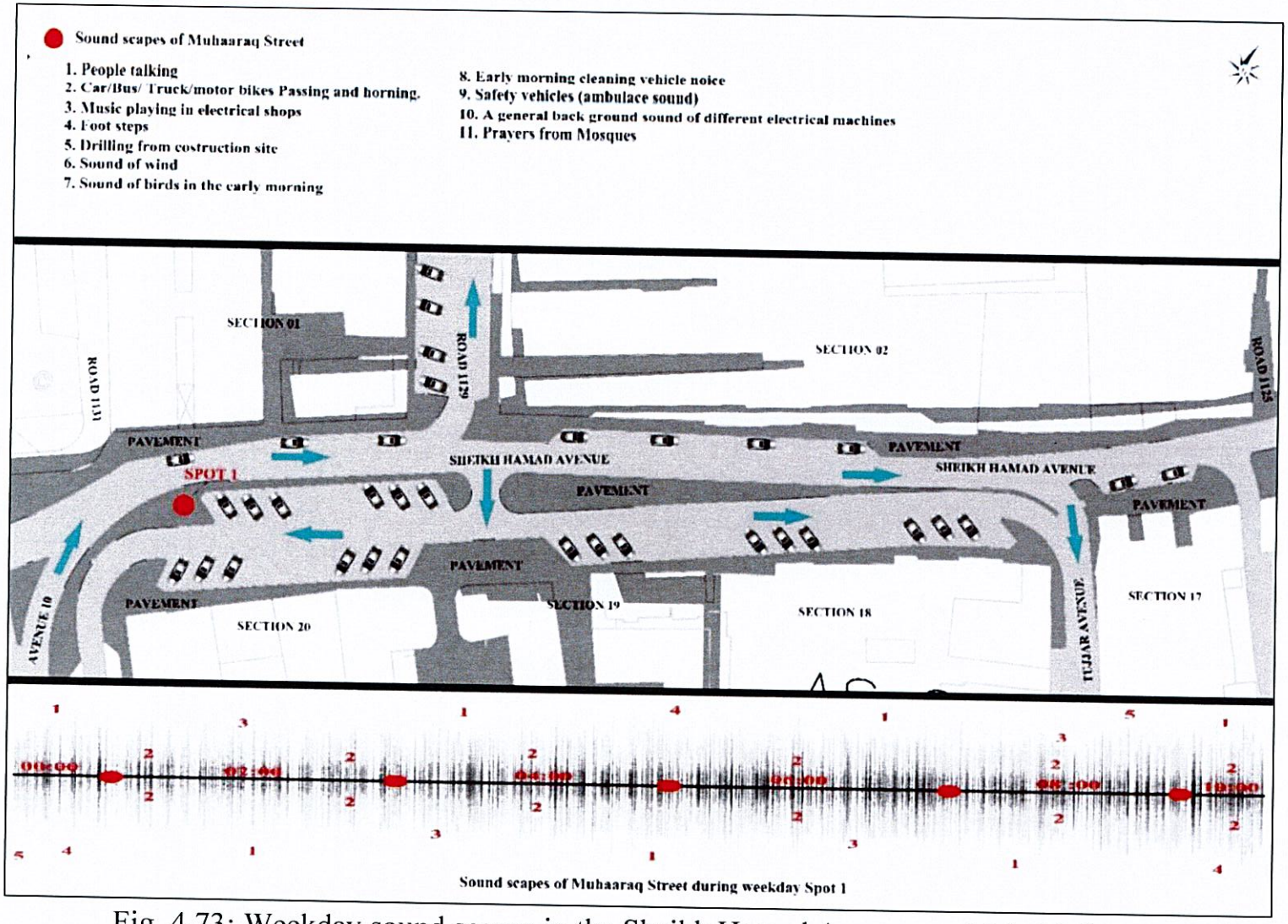



Fig. 4.73: Weekday sound scapes in the Sheikh Hamad Avenue spot 1 in Muharraq
Source: Author

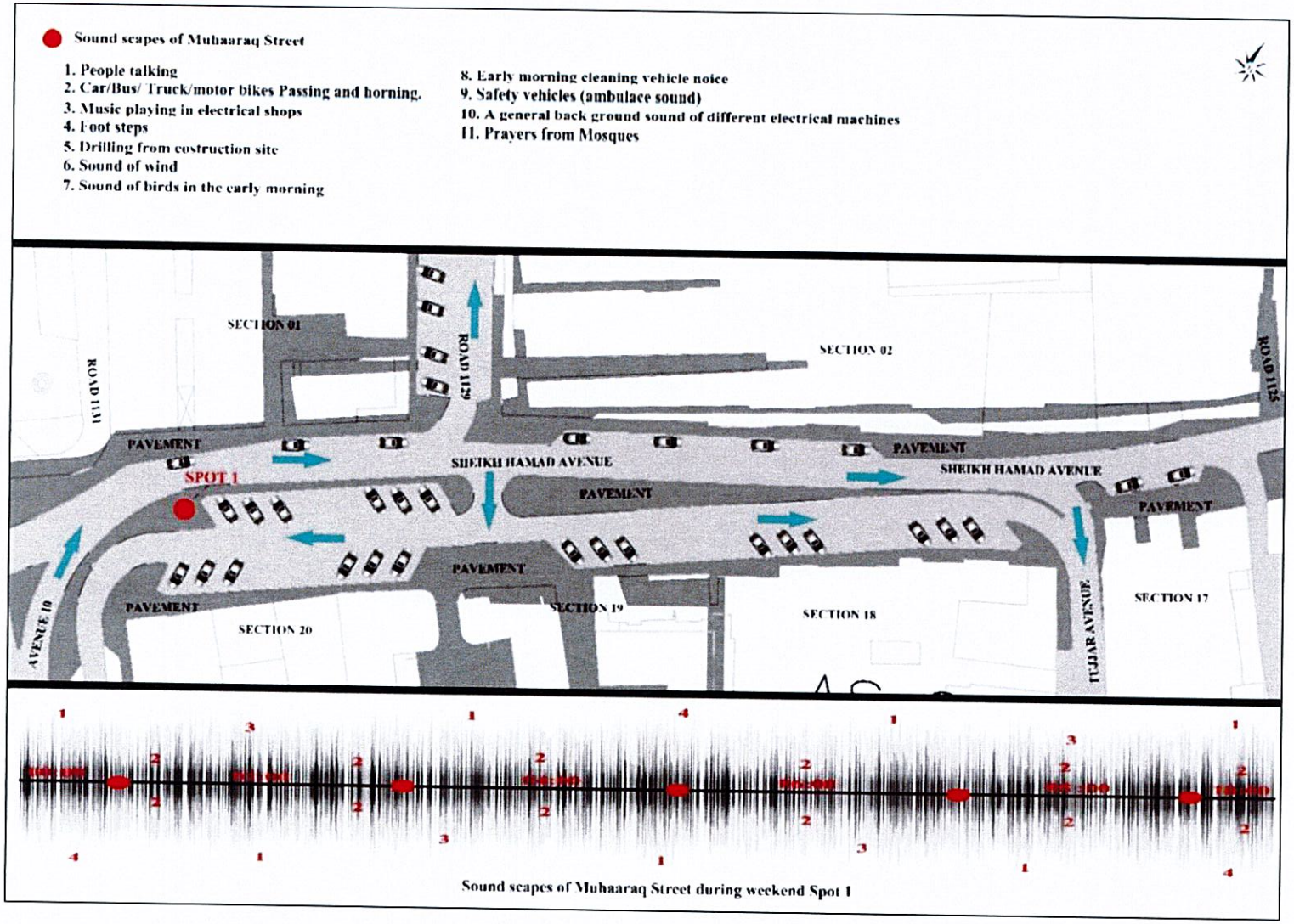



Fig. 4.74: Weekend sound scapes in Sheikh Hamad Avenue spot 1 in Muharraq
Source: Author

### 4.4.2.3 Weekday soundscapes of Muharraq street at spots 2 & 3

As shown in Fig. 4.75, the soundscape is calmer and quieter on a weekday morning (about 7 a.m.), with birds, winds, the basic sound of people's footsteps, and the occasional sounds of cleaning trucks. However, during the midday hour (from 9.00 a.m. to 1.00 p.m.), spots 2 and 3 become louder, with sounds emanating from passing vehicles, people speaking, and noon prayer. The pitch of the voice emitted by midday prayer and people speaking is higher in spot 3 than in spot 2. A drilling sound was heard considerably away from spot 1 and spot 4.

Spots 2 and 3 get calmer again around midday (about 1.00 p.m. to 3.00 p.m.) due to fewer people moving and less vehicle sound. Because of their closeness to Muharraq Avenue, Spots 2 and 3 are calmer than Spot 1. In Spot 2, the sounds of many people conversing can be heard compared to spot 3 since it consists of some open spaces with the availability of urban furniture. The variation in sound levels implies that activity levels increase during the day.

### 4.4.2.4 Weekend soundscapes of the Muharraq Street at spots 2 & 3

Due to the closeness of mosques and Friday prayer being held at the time of recording, spot 3 has substantially more sound than spot 2 during the midday hour of the weekend. However, spot 2 is more piercing during lunch due to multiple retail stores and people talking. In terms of distributed sounds, Spots 2 and 3 sound louder than those in Spot 1. However, compared to spot 1, the background sounds of vehicles are reduced at these locations, as shown in Fig. 4.76.

In addition, as seen in Fig. 4.76, spots 2 and 3 have more

uniformly dispersed sound and higher amplitude than spot 1. Furthermore, due to the high volume of activities at both places, the typical background hum of electrical machinery is usually unnoticed throughout lunch, which can be heard during early mornings. The strength of the sound might be ascribed to a dense building structure as it does not easily escape. The sound reflects on the exterior façades of buildings allocated at the central part of the street section, compared to fewer crossings or at both ends of streets. The sound quickly disappears at the end of the street section(exits).

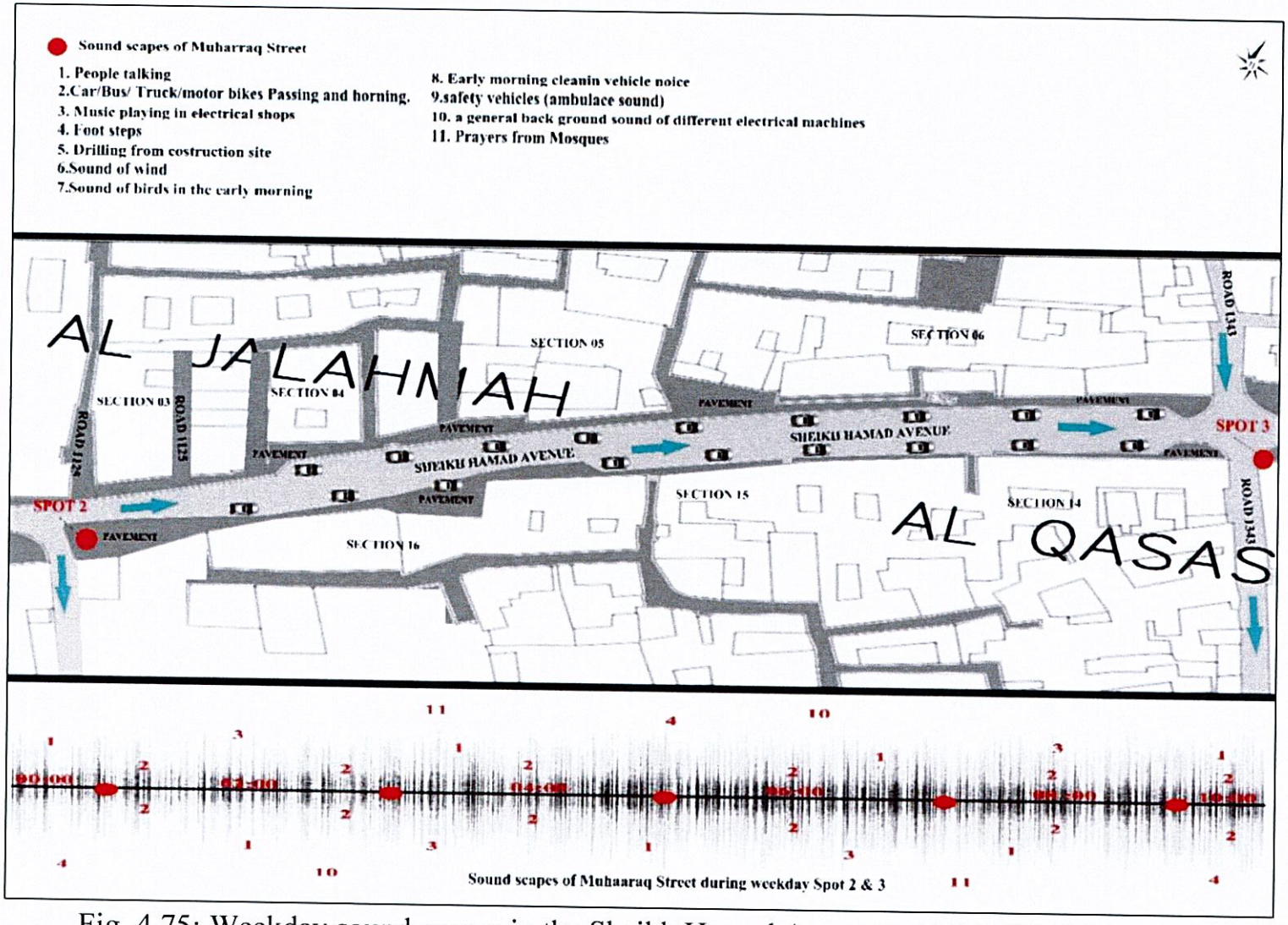



Fig. 4.75: Weekday sound scapes in the Sheikh Hamad Avenue spot 2 & 3 in Muharraq
Source: Author

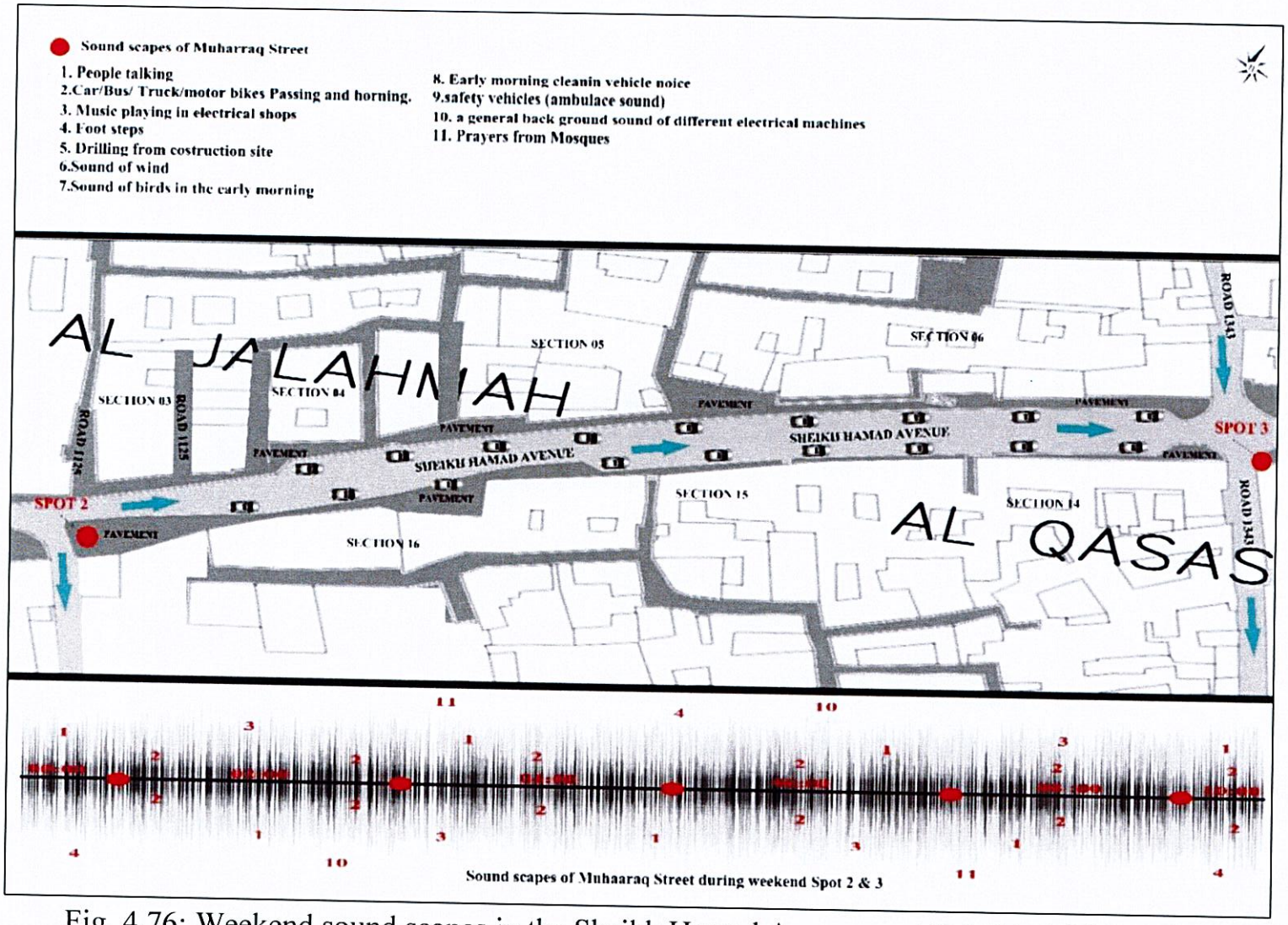



Fig. 4.76: Weekend sound scapes in the Sheikh Hamad Avenue spot 2 & 3 in Muharraq
Source: Author

#### 4.4.2.5 Weekday soundscapes of Muharraq Street at spot 4

During the day on a weekday, the soundscapes at spot 4 is significantly quieter and calmer than those at spots 1, 2, and 3, as shown in Fig. 4.77. The wider roadway, more public buildings, and lesser retail shops minimize traffic sound compared to other sites. On a typical weekday morning (about 7 a.m.), there is a heightened sound of birds, children passing by, the sound coming from a school and people conversing in front of the library. The wind may be heard since there is a larger open space in this part of the street, as shown in Fig. 4.77. Due to the absence of a covered sitting area, fewer sounds of people speaking are heard around noon (from 9.00 a.m. to 1.00 p.m.). With scattered sounds, the steady background sounds of vehicles are heard. N random sounds are observed in this spot. However, the street has more sounds from noon (about 1.00 p.m. to 3.00 p.m.) from vehicles waiting to collect students from the school and students talking. Stores are closed during noon hours.

#### 4.4.2.6 Weekend soundscapes of Muharraq street at spot 4

As shown in Fig. 4.78, spot 4 is usually louder during noon due to the availability of a shaded sitting area. The sound of birds and winds is frequently more heard in this spot. In addition, traffic sounds were lower in this spot compared to spot 3. Conversations are held without raising one's voice in this spot. The street's soundscape is changing across this street, with higher sound peaks from the vehicles in the South and lower sound peaks in the North.

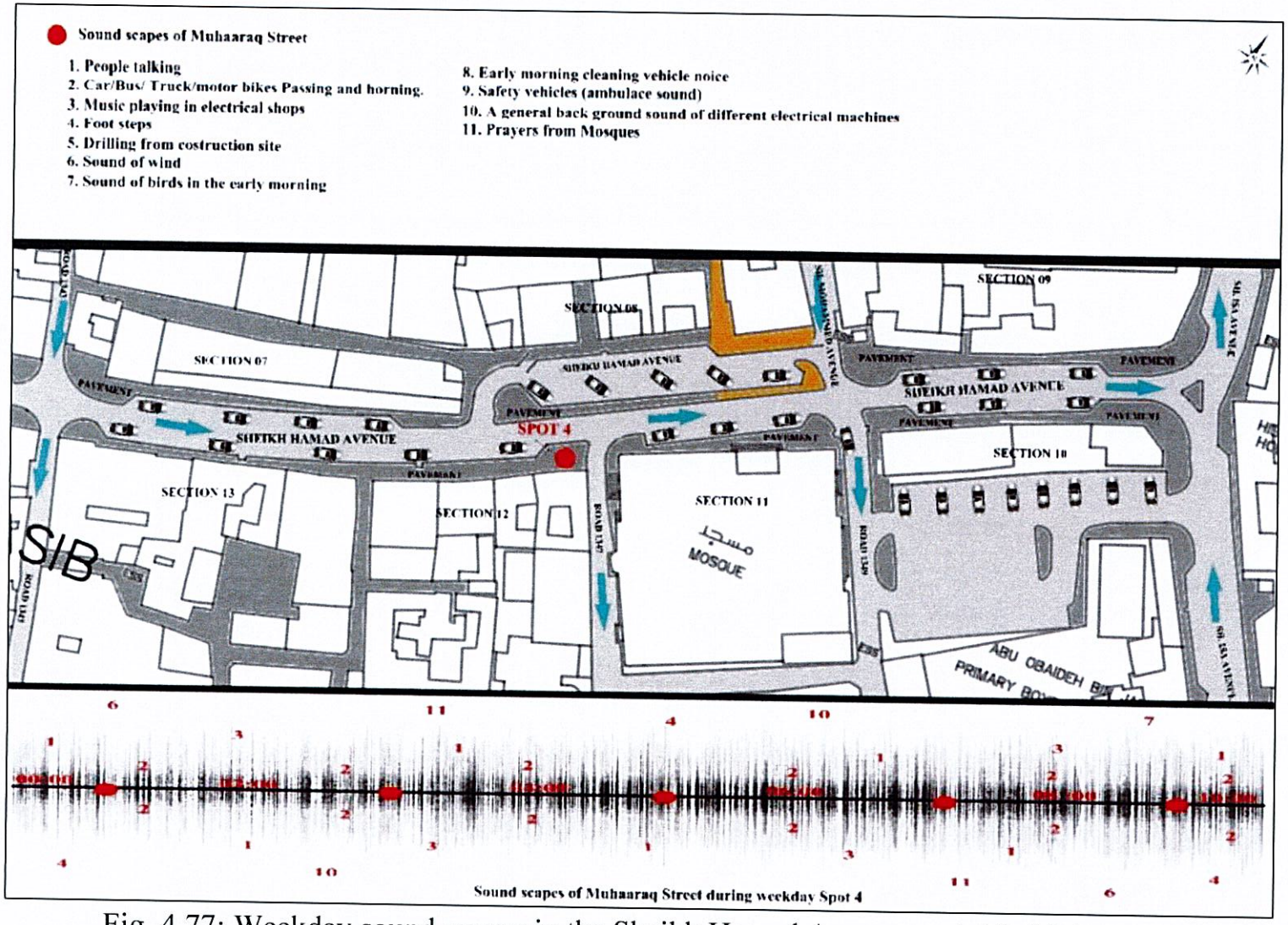



Fig. 4.77: Weekday sound scapes in the Sheikh Hamad Avenue spot 4 in Muharraq
Source: Author

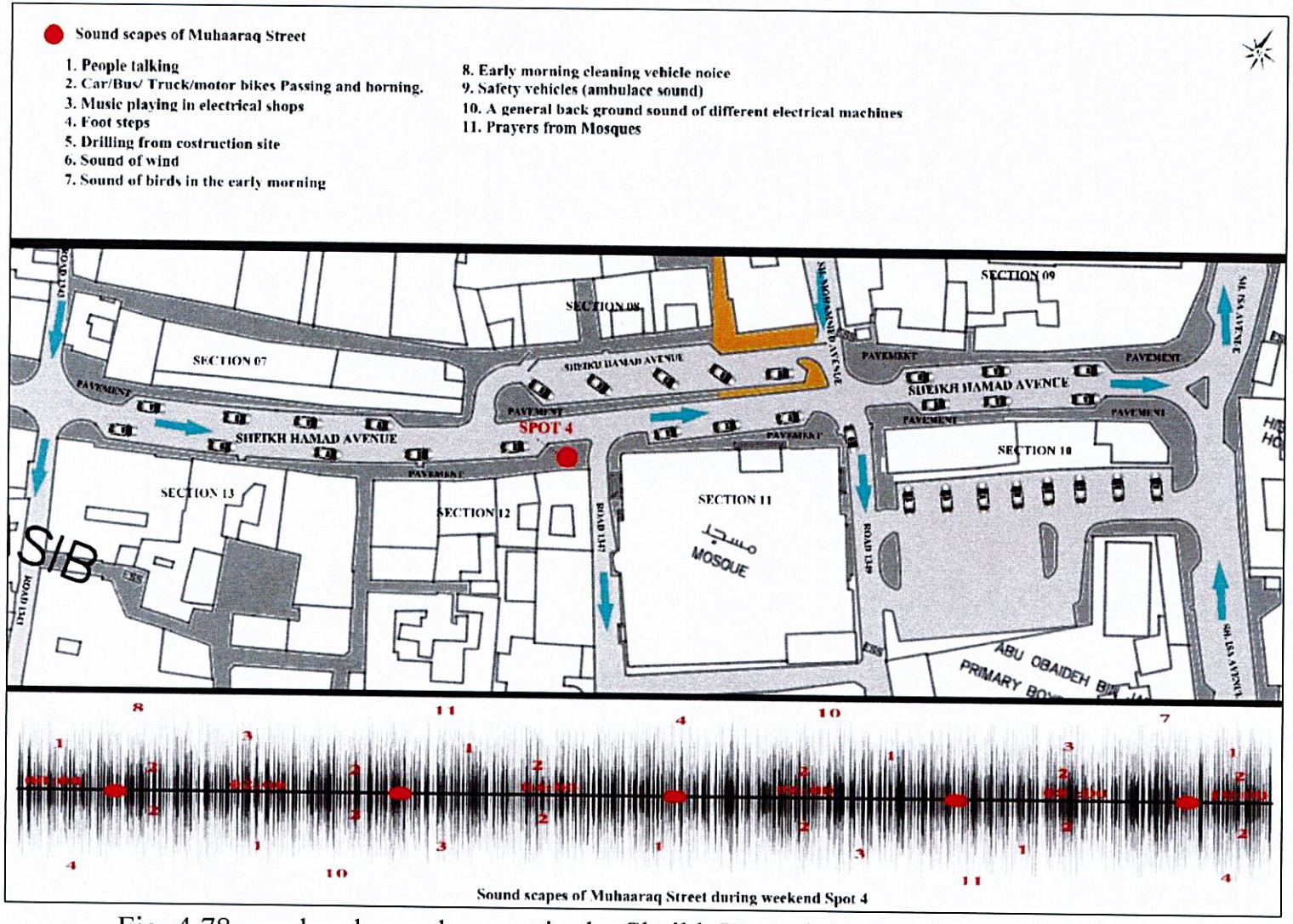



Fig. 4.78: weekend sound scapes in the Sheikh Hamad Avenue spot 4 in Muharraq
Source: Author

#### 4.4.2.7 Effect of sound stimuli on social interactions

The sound on Sheikh Hamad Avenue was higher in the top lower half of the street (spots 1 and 2) than in the top half (spots 3 and 4). The sound is significantly more dispersed in spots 2 and 3 than in spots 1 and 4. At the same time, the sound is diffused more on weekends than throughout the week.

This is true for most locations, except for spot 2, which may be attributed to a more considerable number of people on weekends than during the week owing to the sound source. Due to the presence of the Al Qasariya Souq. The acoustic environment of Muharraq Street changes throughout the day and week. While traffic noise creates an urban or unpleasant environment, other people's voices provide a lively ambiance on the street.

### 4.4.3 Tactility

#### 4.4.3.1 Weather condition and shaded area

The solar altitude depicts the lighting conditions in Parts 1, 2, and 3 of Muharraq Street during the day, as shown in Figs 4.79 - 4.87. Furthermore, it conveys the thermal nature of light, and its warmth, which is perceived through bodily perception. The lack of shaded seating areas to shield against hot weather decreases the street's vitality. Furthermore, the movement pattern of individuals in response to changing circumstances is detected depending on the solar altitude. Social interaction occurs in the opposite direction of sunlight length on an informal shading area under the enterprises. The following Figs show weather conditions and shaded areas in parts 1,2 and 3 of the street.

## a) Weather condition and shaded area at part 1 of the street

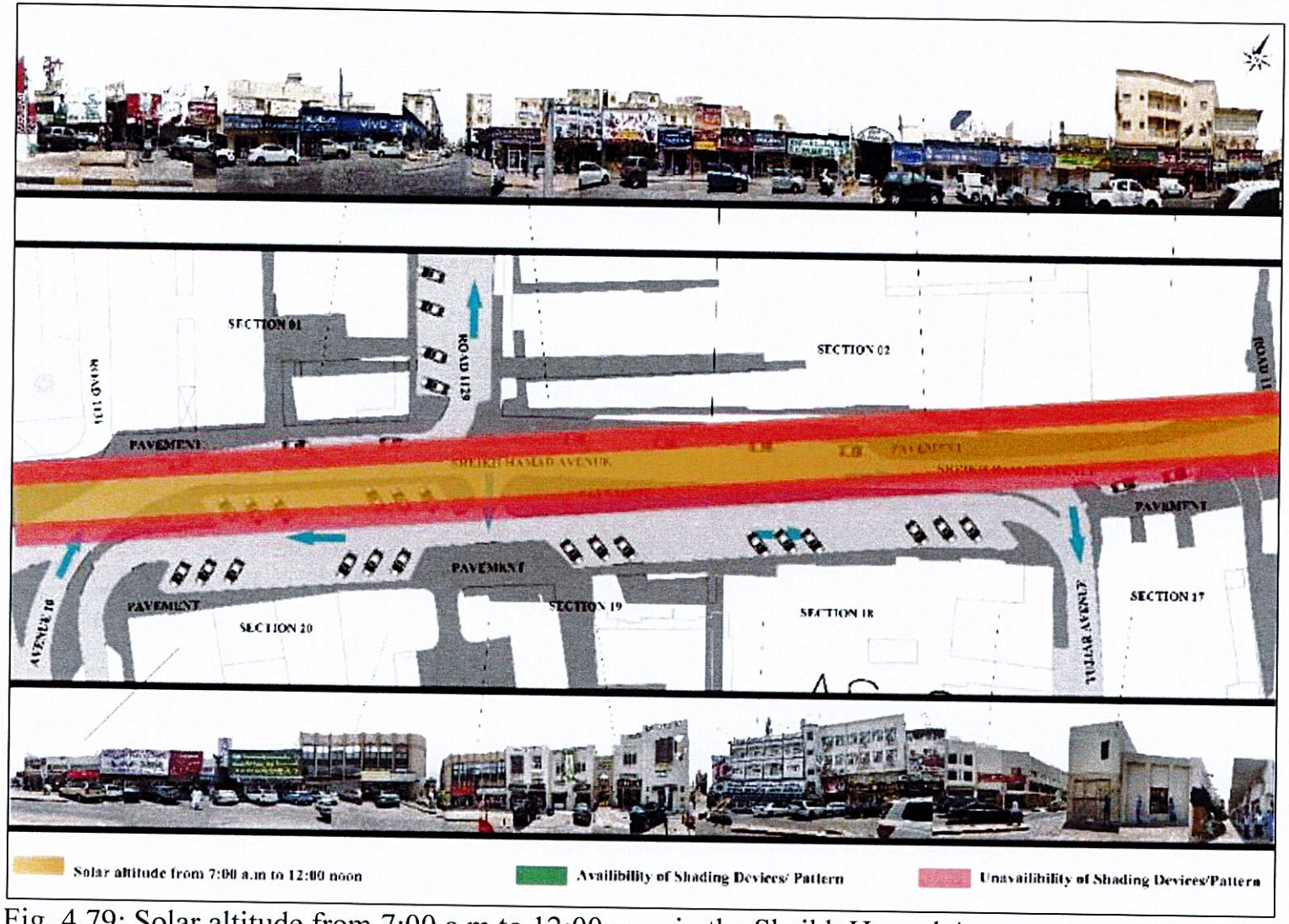



Fig. 4.79: Solar altitude from 7:00 a.m to 12:00 p.m. in the Sheikh Hamad Avenue part 1 in Muharraq
Source: Author

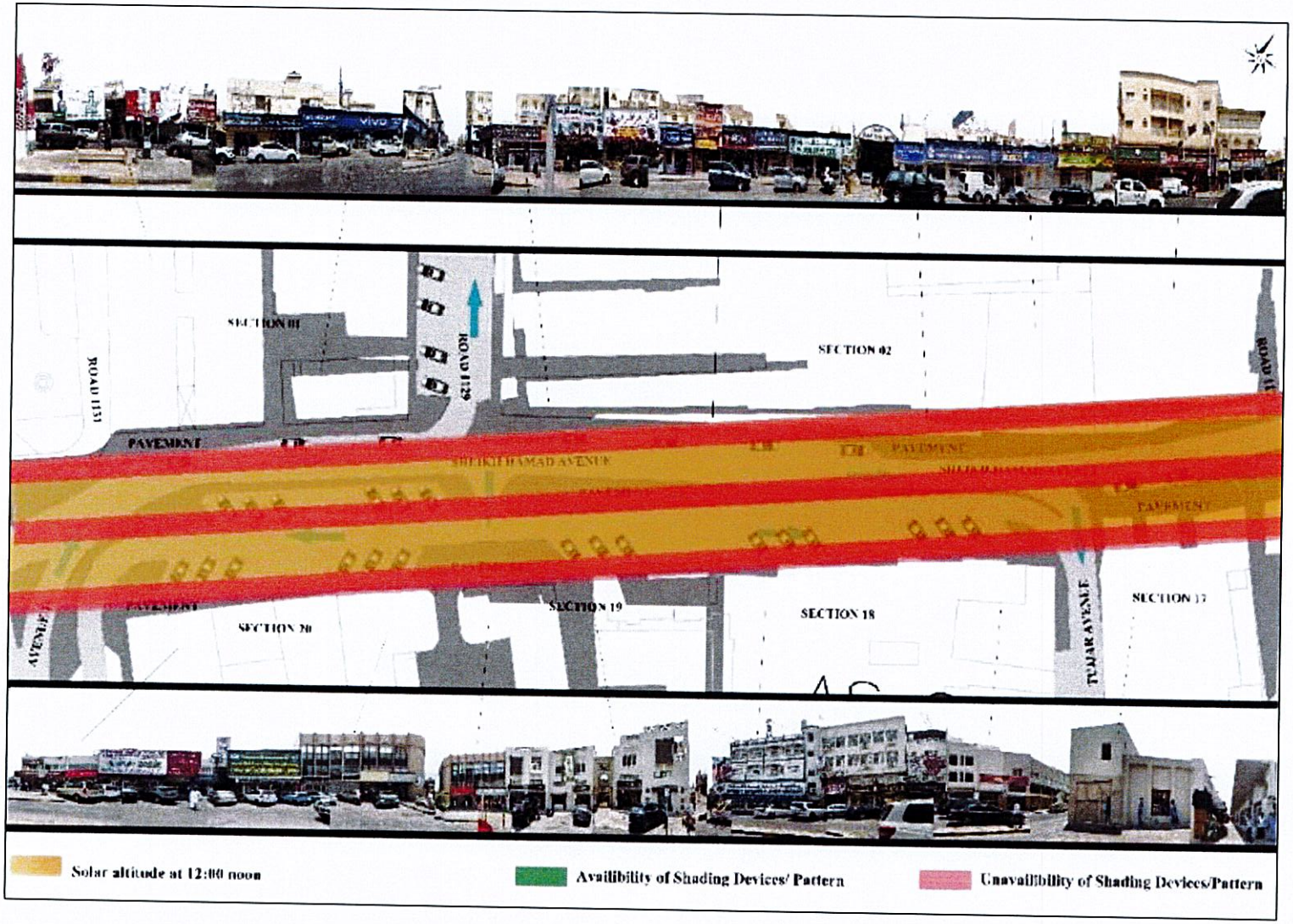



Fig. 4.80: Solar altitude at 12:00 p.m. in the Sheikh Hamad Avenue part 1 in Muharraq
Source: Author

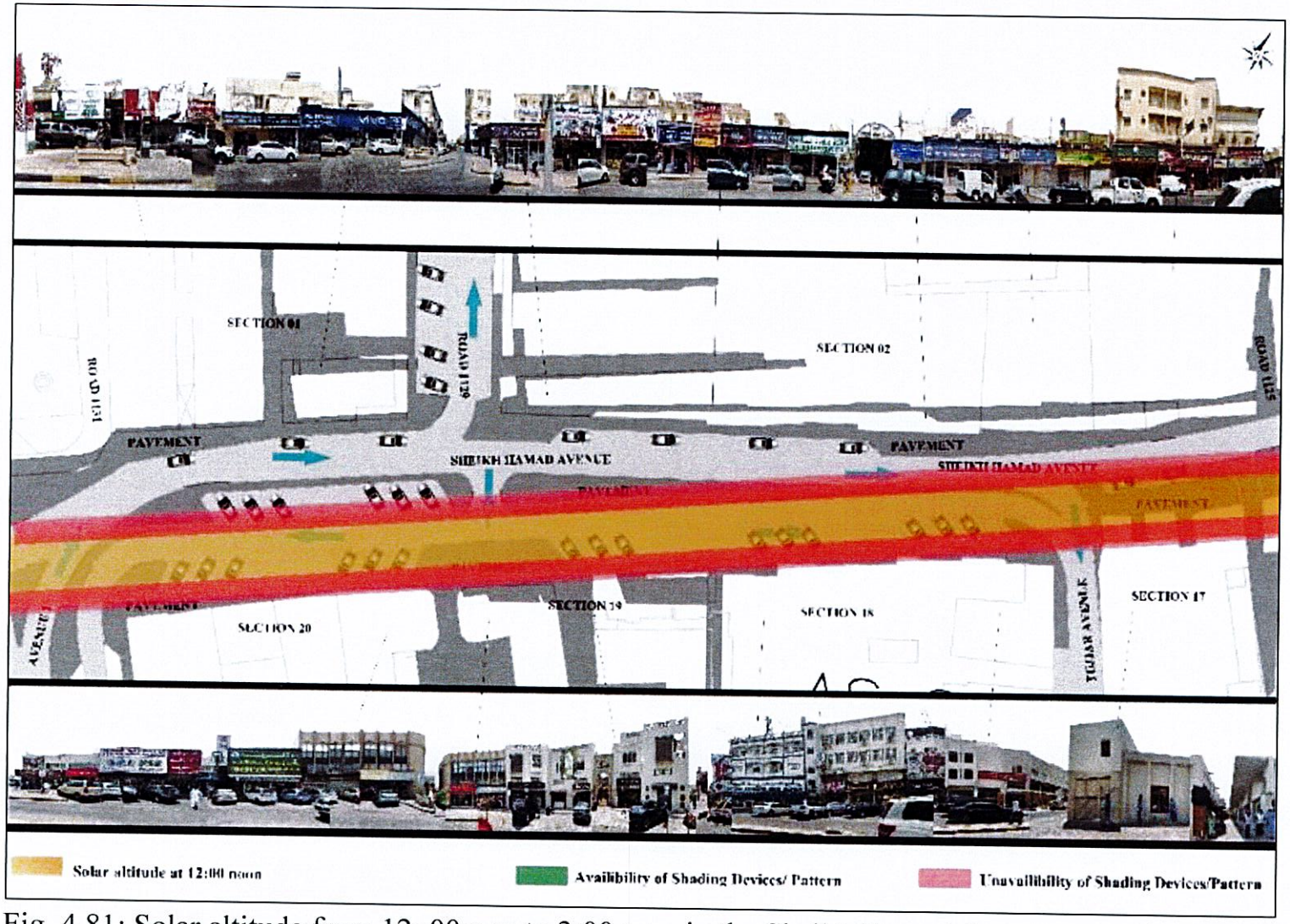



Fig. 4.81: Solar altitude from 12: 00 p.m to 3:00 p.m. in the Sheikh Hamad Avenue part 1 in Muharraq
Source: Author

## b) Weather condition and shaded areas at part 2 of the street

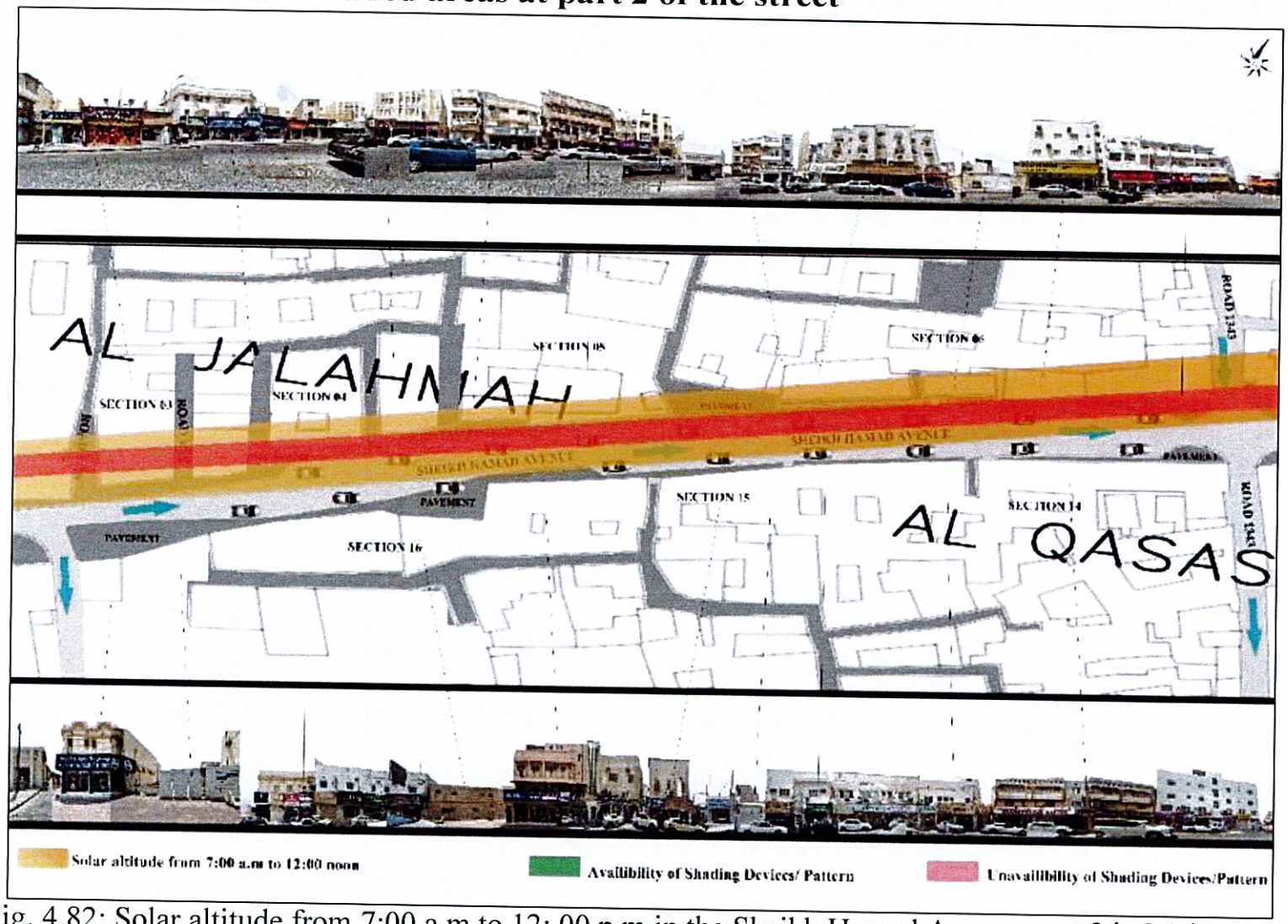



Fig. 4.82: Solar altitude from 7:00 a.m to 12: 00 p.m in the Sheikh Hamad Avenue part 2 in Muharraq
Source: Author

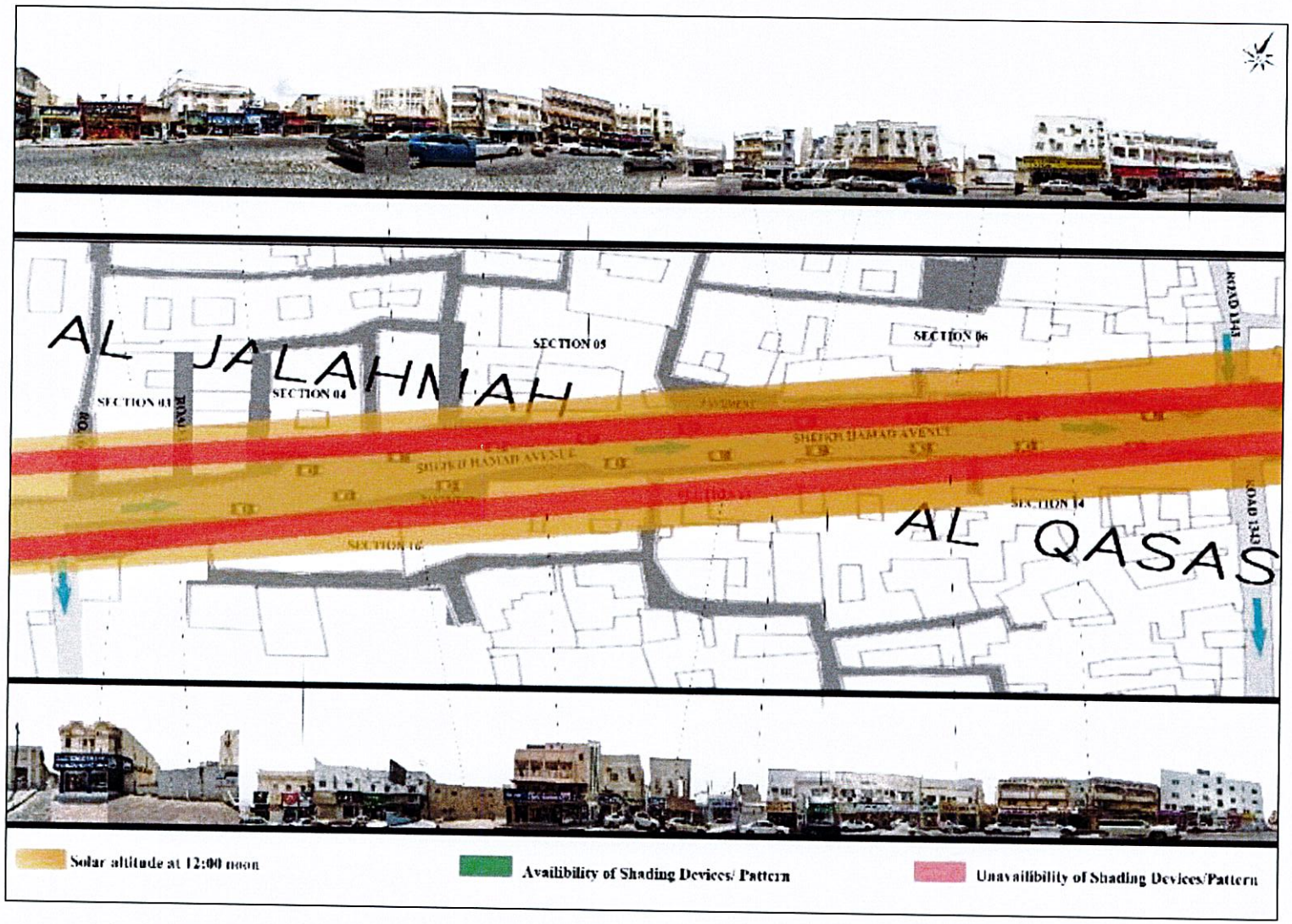



Fig. 4.83: Solar altitude at 12:00 p.m. in the Sheikh Hamad Avenue part 2 in Muharraq
Source: Author

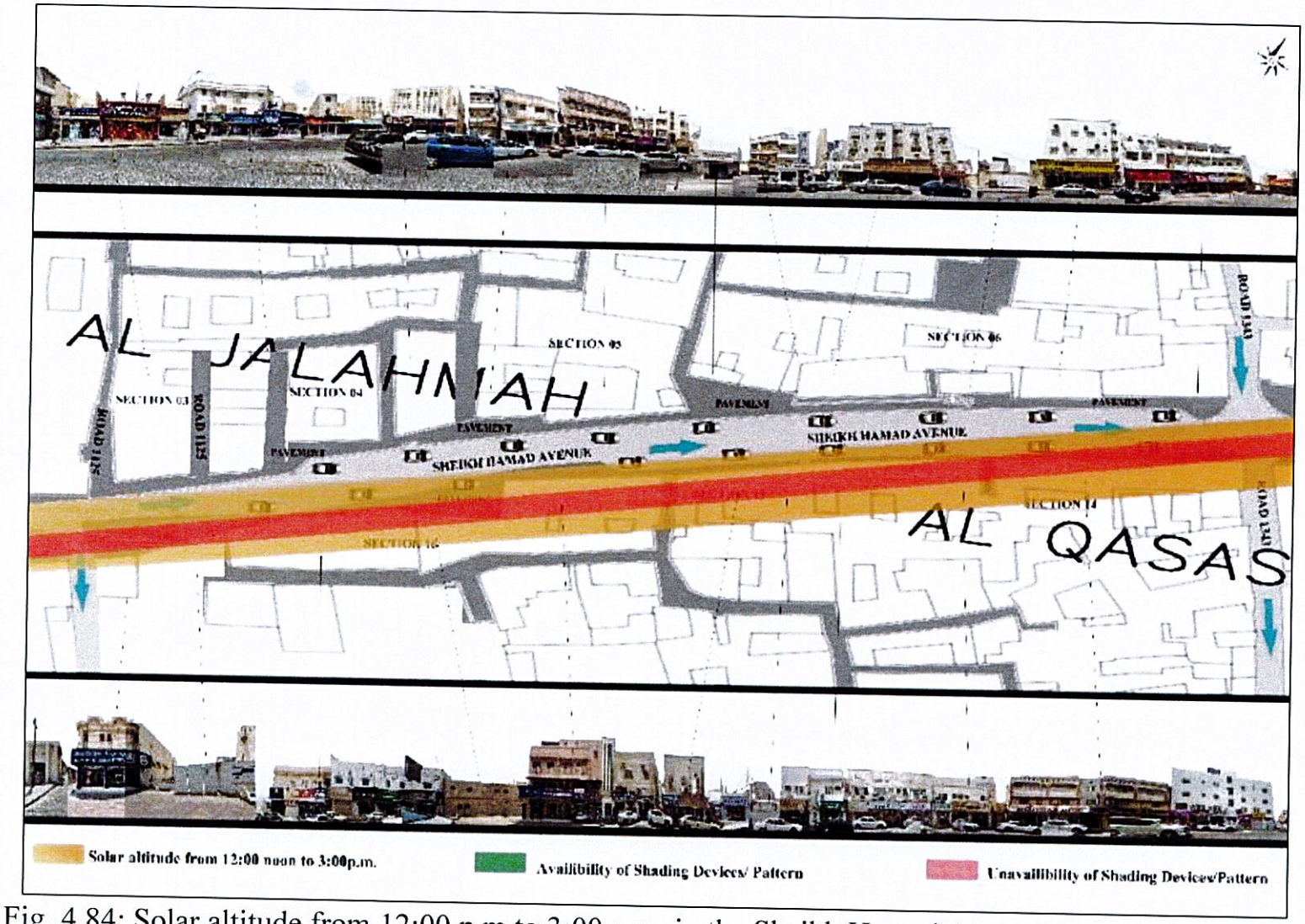



Fig. 4.84: Solar altitude from 12:00 p.m to 3:00 p.m. in the Sheikh Hamad Avenue part 2 in Muharraq
Source: Author

## c) Weather condition and shaded areas at part 3 of the street

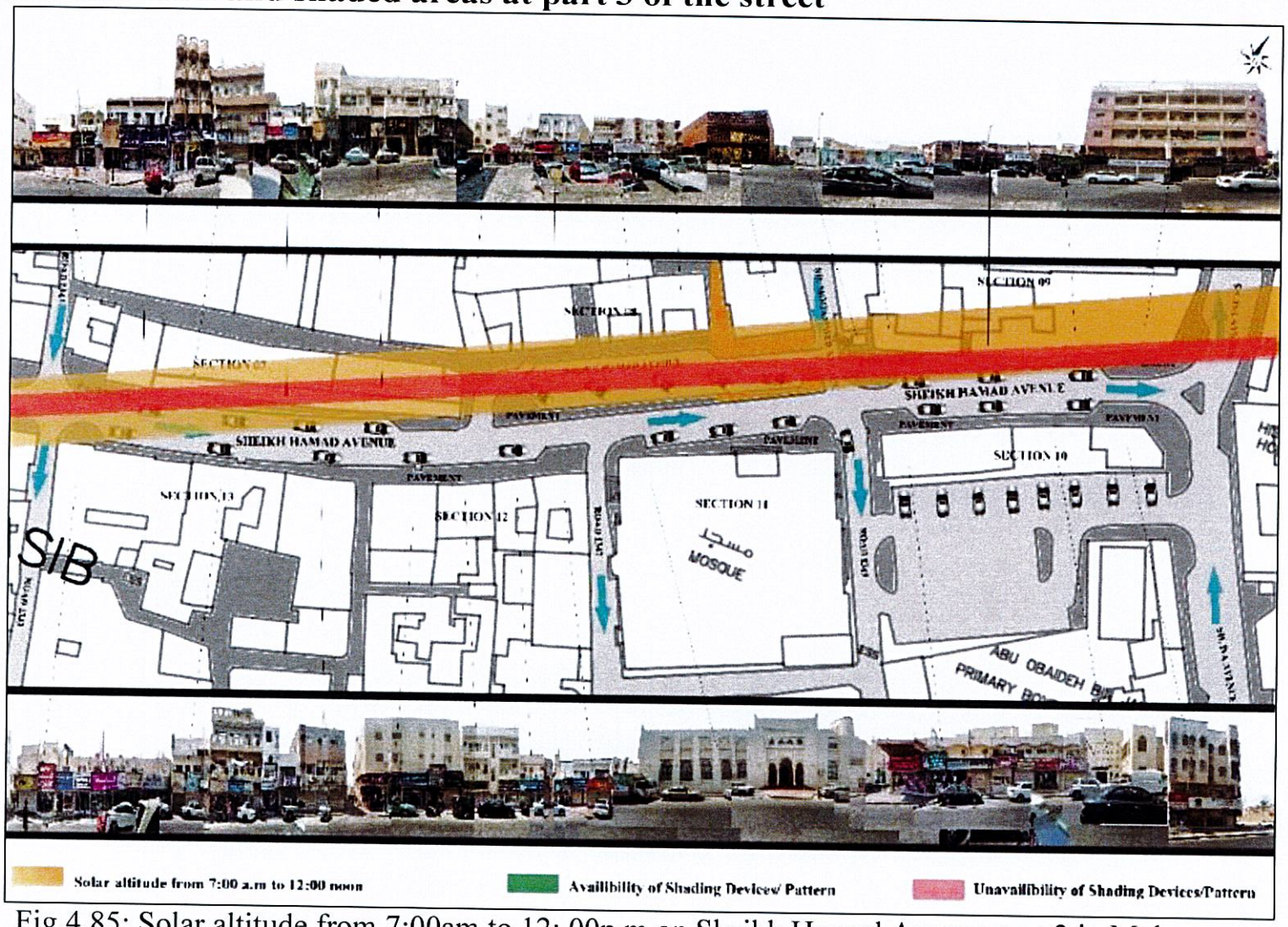



Fig 4.85: Solar altitude from 7:00am to 12: 00p.m on Sheikh Hamad Avenue part 3 in Muharraq
Source: author

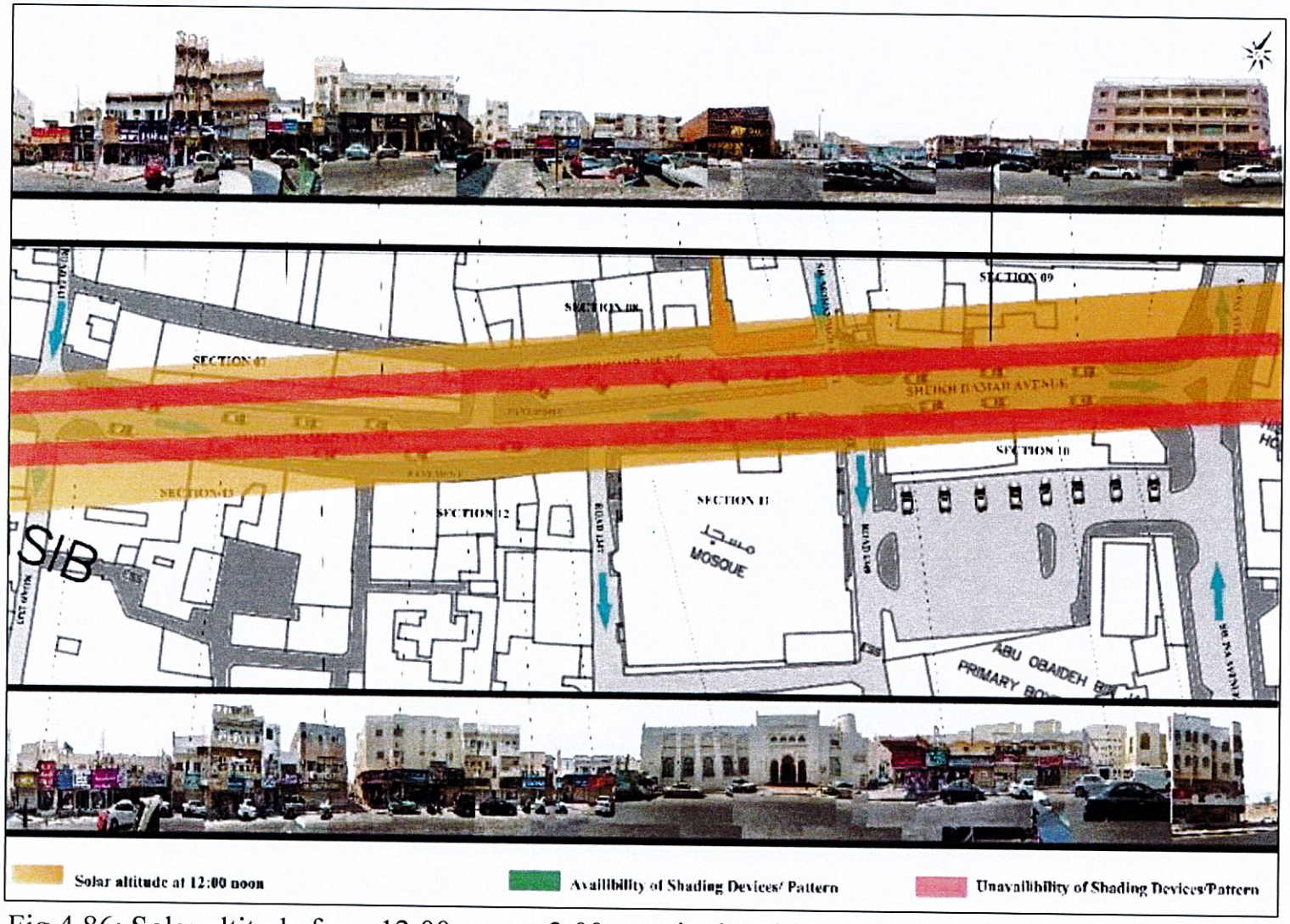



Fig 4.86: Solar altitude from 12:00 p.m to 3:00 p.m. in the Sheikh Hamad Avenue part 3 in Muharraq
Source: Author

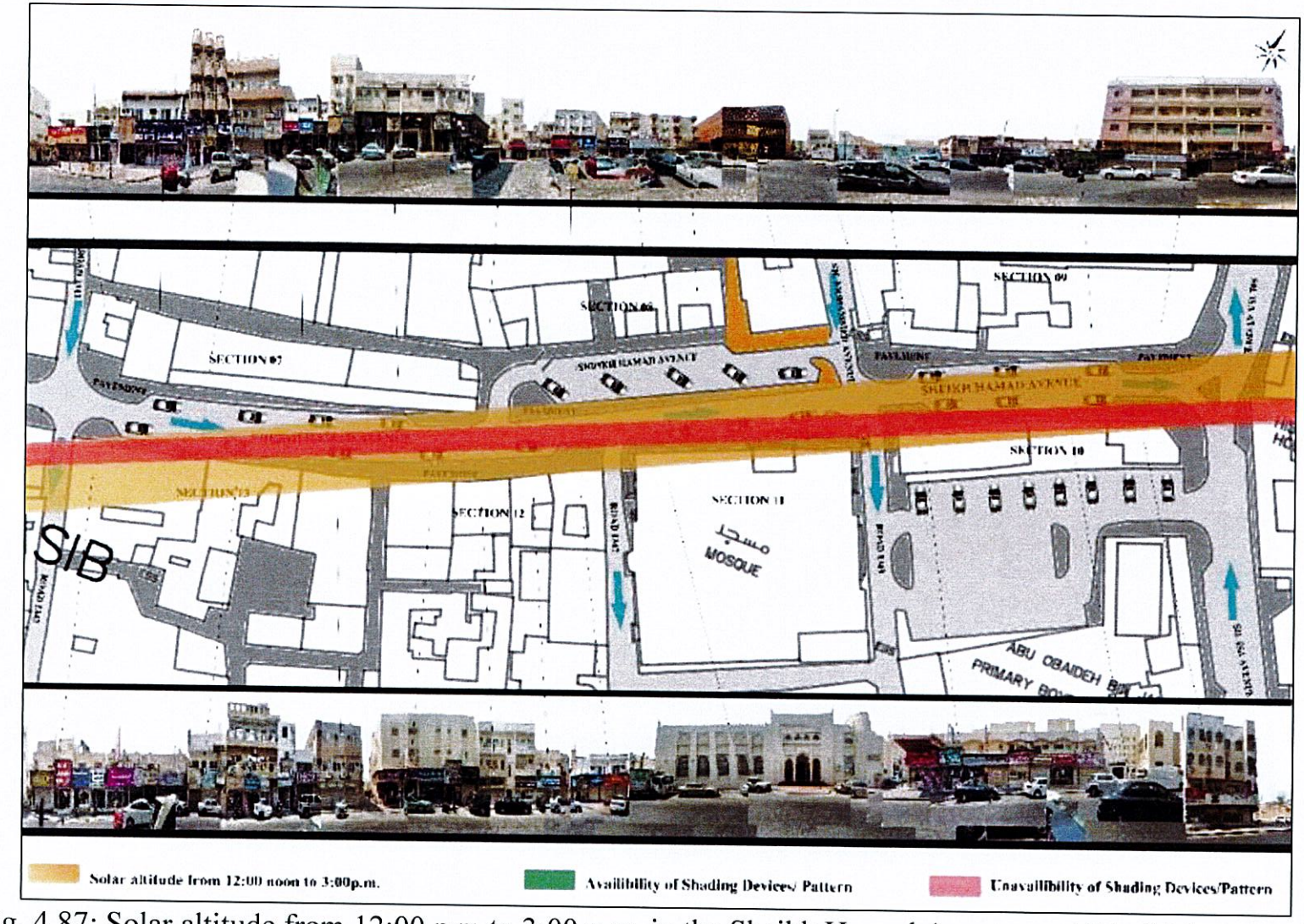



Fig. 4.87: Solar altitude from 12:00 p.m to 3:00 p.m. in the Sheikh Hamad Avenue part 3 in Muharraq
Source: Author

### 4.4.3.2 Material texture

Part 1 of the street, as shown in Figs 4.88 and 4.89, is made up of older buildings above ten and fifteen years old. The ancient, transitioned buildings appear rougher than the modern aged buildings with smooth concrete finishes. Stainless steel is used for lighting polls, signs, and trash bins, among other things. While to connect with old Muhaaraq streets and place identity, this street partly consists of terrazzo finish urban furniture and timber-designed shades on facades near the Al Qasariya Souq.

Simultaneously, concrete bollards are utilized to prevent vehicles from entering directly. This street section has concrete finish urban sitting furniture and fixed planters. The material transition from asphalt to grey herringbone directs the user to park, while the color transition from grey to red and yellow herringbone directs the pedestrian flow.

Part 2 of this street, as shown in Fig. 4.90, comprises concrete buildings between 10 and 15 years old. The facades are more corroded in this street section, with pavements broken. The stainless-steel lighting polls are placed evenly in this part of the street. However, it does not consist of much public seating.

Part 3 of this street, as shown in Fig. 4.91, consists of fewer recently erected concrete structures. Stainless steel lighting polls and dustbins are evenly distributed. There is an absence of urban seating furniture and signage in this part of the street. The Muharraq library and newly constructed Mosque act as visual landmarks in this part of the street.

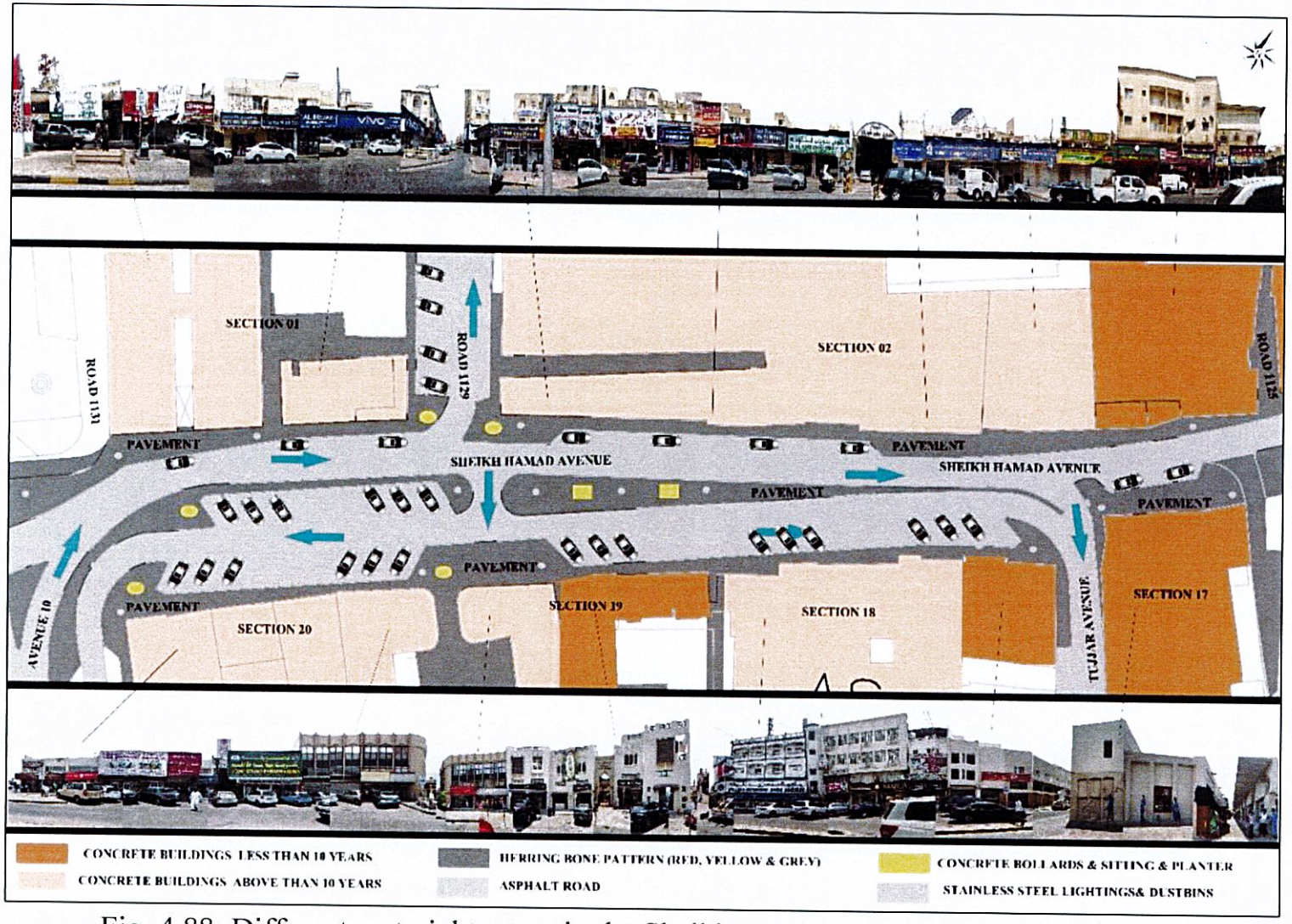



Fig. 4.88: Different material texture in the Sheikh Hamad Avenue part 1 in Muharraq
Source: Author







Fig. 4.89: Different material texture in the Sheikh Hamad Avenue part 1 in Muharraq
Source: Author

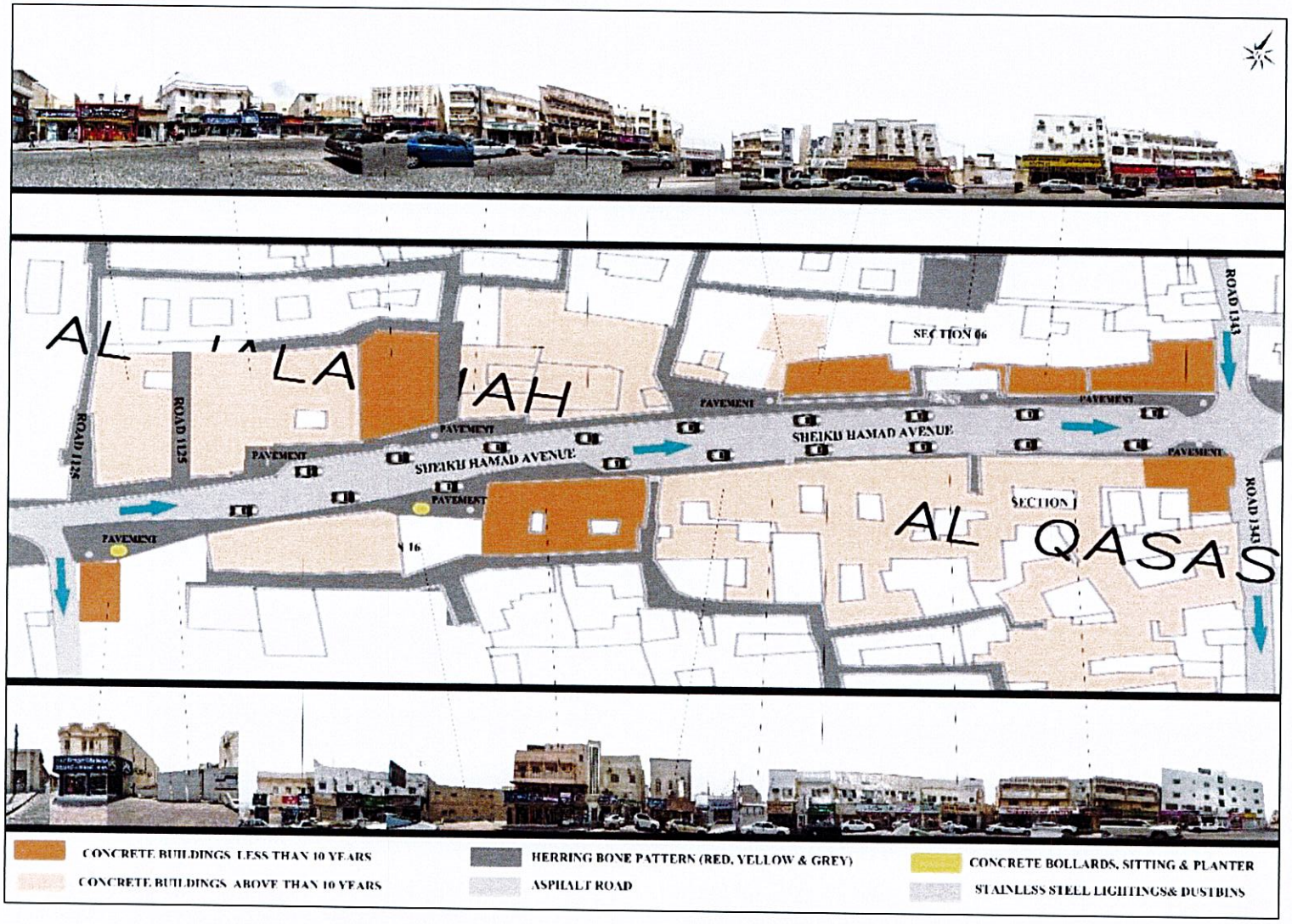



Fig. 4.90: Different material texture in the Sheikh Hamad Avenue part 2 in Muharraq
Source: Author

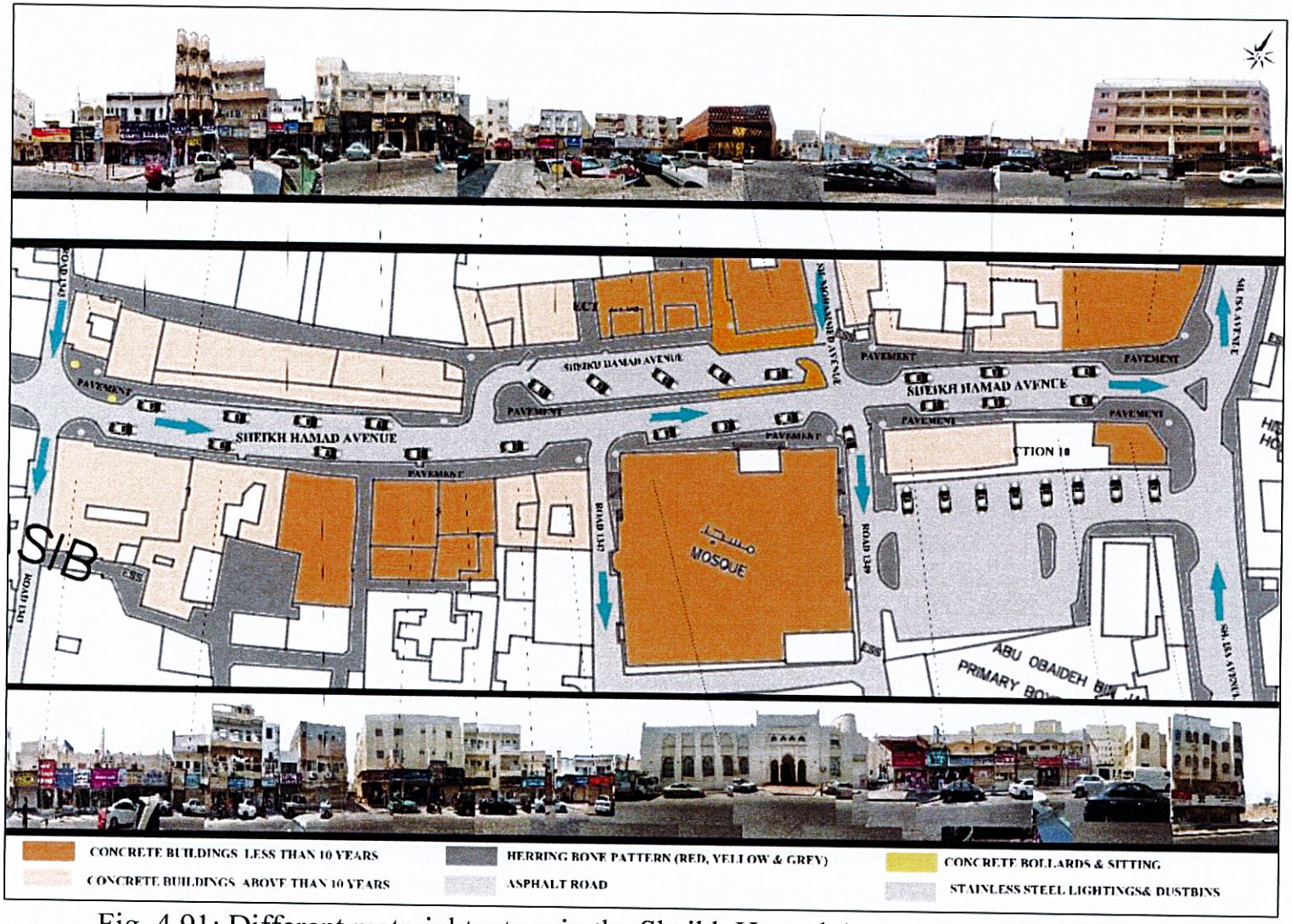



Fig. 4.91: Different material texture in the Sheikh Hamad Avenue part 3 in Muharraq
Source: Author

#### 4.4.3.3 Bodily experience stimuli and their effect on social interactions

Muharraq Street's atmosphere, like that of Manama Street, grows livelier as the sun becomes less warm, both during the day and year-round, depending on the physical sensations generated by the solar intensity.

In the spring and early summer, as both the number of daylight hours and the sunrise temperature, very few people come out onto the pavements and sit in the public seating areas of Muharraq Street. Because more individuals participate in social connections by resting or moving on the shady side of the walkways, the location of social contact on Muharraq Street can be connected to the sun's position.

### 4.4.4 Olfactory experience and its effect on social interactions

Although no specific smell environment could be established along the tested stretch of Sheik Hamad Avenue in Muharraq, it was determined that the roadway had higher olfactory variability than visual variation. Apart from a scent-neutral environment, the odor of the street was significantly impacted by ground floor usages, such as the Showaiters shop, the restaurants, the cafés, and sources of fragrance smell that create pleasant odor. Vehicle emissions, the rotting stench from trash bins, and precipitation in hot weather, on the other hand, were sources of unpleasant odor.

However, the constant, mild breeze immediately blew away most of the odors. Neither pleasant nor repulsive scents persisted for long or were easily detected along the road. The smell was the most absent stimulus on this street, making it impossible to determine how much

this single sense is otherwise discarding the experience on this street.

### 4.4.5 Mehtas sociability factor

#### 4.4.5.1 Usages on the ground floor

Observations revealed that the usage and occupancy on the Sheik Hamad Avenue ground floors in Muharraq stimulated sociability and liveliness. Most of the ground floors in Muharraq Street's part 1, as shown in Figs 4.92 and 4.93, are occupied by retailing (blue) and services (purple). Gastronomy (pink) is the third-largest group, including showaiter and traditional Arabic stores. This section has fewer vacant spaces (beige). In contrast, housing (brown) and third spaces (green), such as cafeterias and bakeries, have the lowest occupancy rates.

Parts 2 of the street ground floor, Figs 4.94 and 4.95, are retail (blue) and services (purple). There are fewer vacant spaces in part 2 of this street with third spaces. At the same time, gastronomy and housing were least available in this part of the street.

Similarly, in part 3 of the street, as depicted in Figs 4.96 and 4.97, most retail (blue) and services (purple) occupy the ground floor with fewer thirds spaces such as cafeterias and bakeries. It also consists of vacant spaces. Public buildings are also allocated in this part of the street, such as the Muharraq library, Mosque, and the government school. The functions are very mixed in the various parts of the street. Retail and services predominate in each part of the street.




Fig. 4.92: Usage of the ground floor of the Sheikh Hamad Avenue part 1 in Muharraq
Source: Author




Fig. 4.93: Usage of the ground floor of the Sheikh Hamad Avenue part 1 in Muharraq
Source: Author

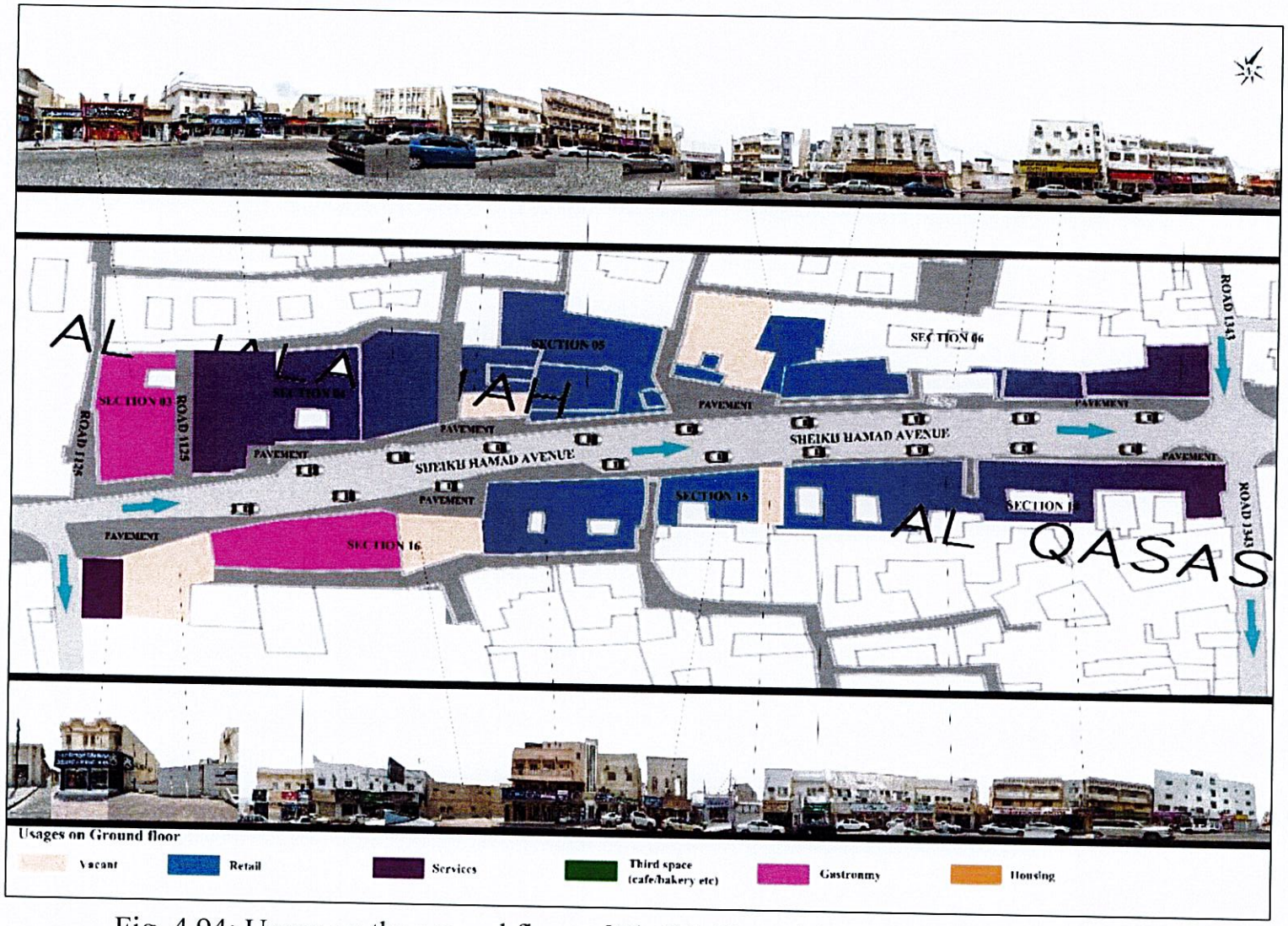



Fig. 4.94: Usage on the ground floor of Sheikh Hamad Avenue part 2 in Muharraq
Source: Author

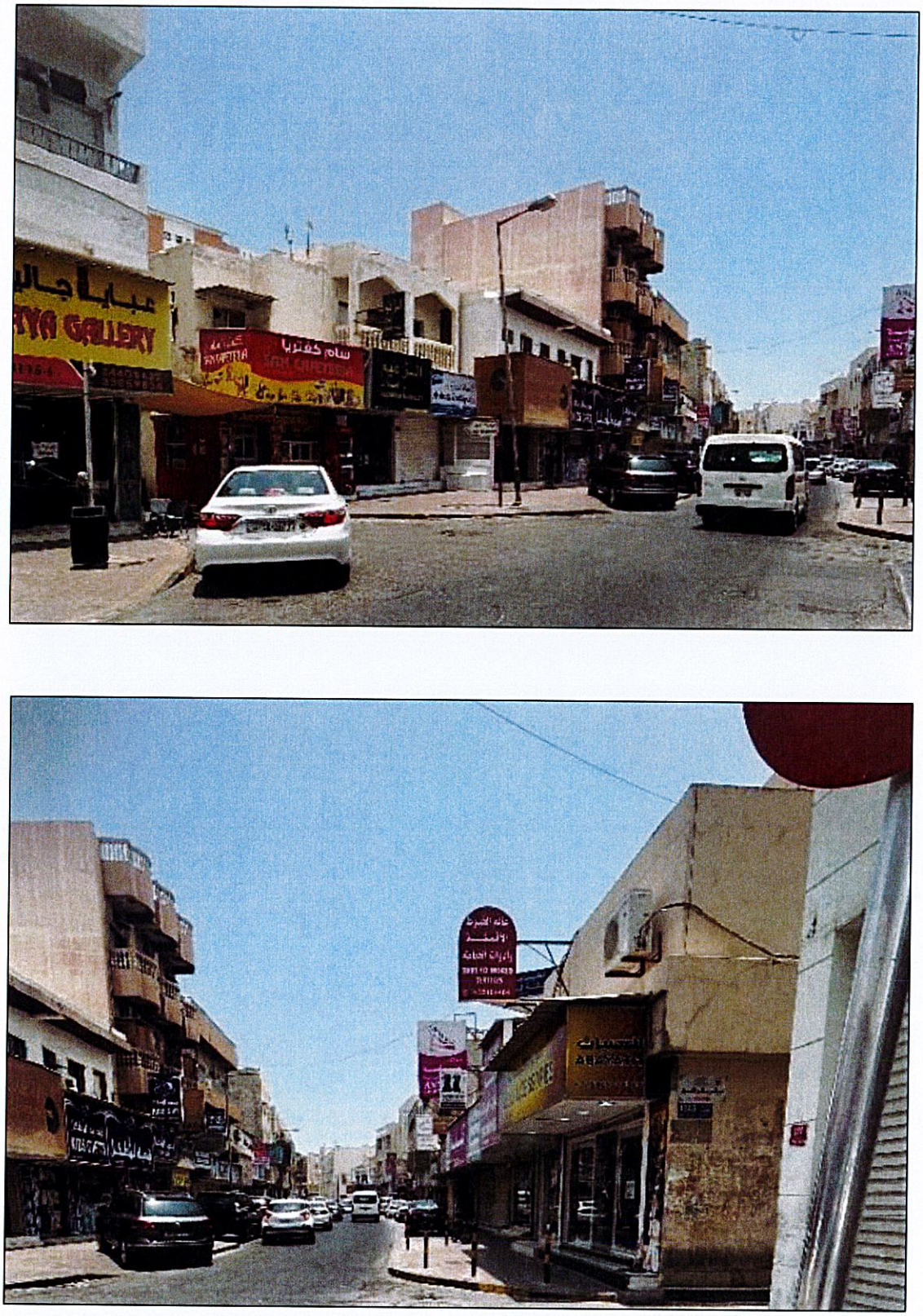


Fig. 4.95: Usage of the ground floor of the Sheikh Hamad Avenue part 2 in Muharraq
Source: Author

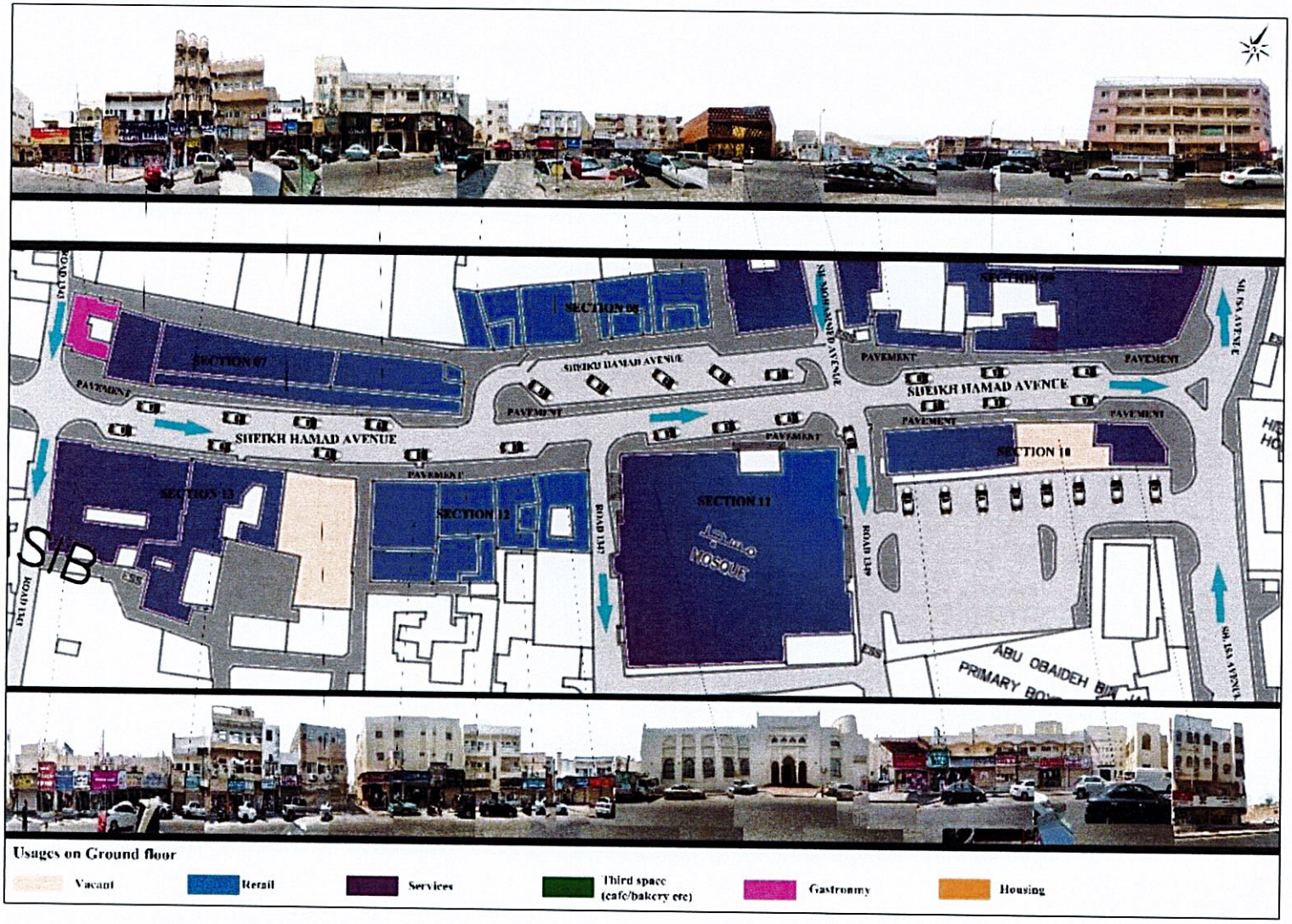



Fig. 4.96: Usage of the ground floor of the Sheikh Hamad Avenue part 3 in Muharraq
Source: Author







Fig. 4.97: Usage of the ground floor of the Sheikh Hamad Avenue part 3 in Muharraq
Source: Author

### 4.4.5.2 Occupancy of the ground floors of the adjoining buildings

As separated in Government Avenue, Manama Bahrain, the Ground floor occupancy of the Sheikh Hamad Avenue in Muharraq can also be divided into four categories as influencing factors on sociability: small chains, small businesses, public buildings, and vacant. In part 1 of the street, Fig. 4.98 ad 4.99, majorities of the ground floors are occupied by small, independent enterprises indicated in dark green: small, largely local firms with fewer than five branch outlets in Bahrain.

The second most occupied space on the ground floor is small chains and multinational banks with more than five branches in other streets in Bahrain, which is light green. This street does not have many unoccupied spaces marked in beige. At the same time, some buildings have doors that lead to higher-level residential and office flats.

Similarly, in Parts 2 and 3, as depicted in Fig. 4.100 -4.102, the ground level of this street is inhabited by several small local shops. In comparison, part 2 of the street has more vacant spaces shown in beige than in part 3. Moreover, more public buildings such as libraries, mosques, and schools are located in part 3 of the street than in part 2. At the same time, in comparison, part 2 of the street has fewer small chain businesses (international chains) with more than five branches in various streets around Bahrain. There are entrances for residential flats and offices on the ground level of both street segments.




Fig. 4.98: Occupancy of the ground floor of the Sheikh Hamad Avenue part 1 in Muharraq
Source: Author




Fig. 4.99: Occupancy of the ground floor of the Sheikh Hamad Avenue part 1 in Muharraq
Source: Author




Fig. 4.100: Occupancy of the ground floor of the Sheikh Hamad Avenue part 2 in Muharraq
Source: Author

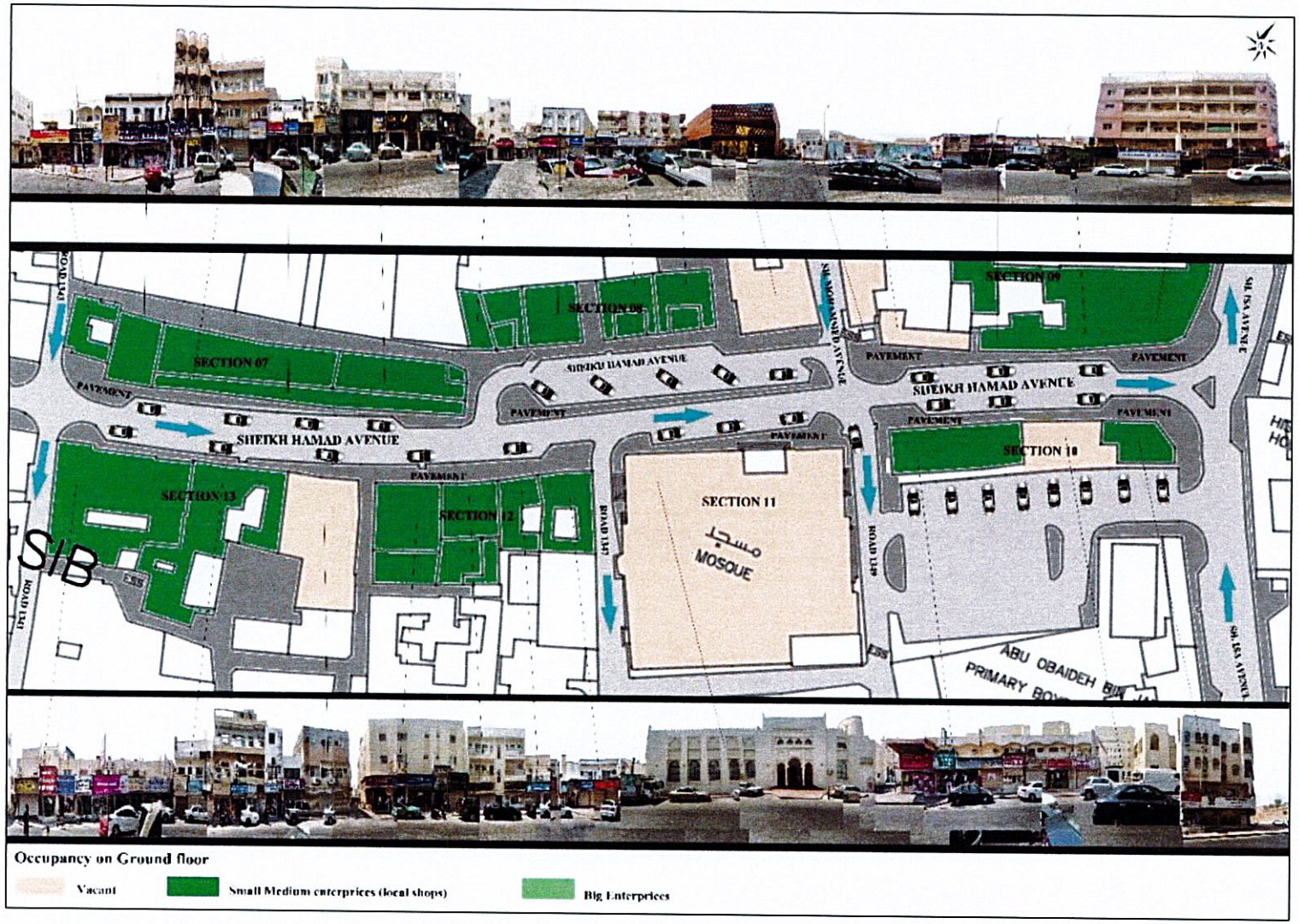



Fig. 4.101: Occupancy of the ground floor of the Sheikh Hamad Avenue part 3 in Muharraq
Source: Author




Fig. 4.102: Occupancy of the ground floor of the Sheikh Hamad Avenue part 2 and 3 in Muharraq
Source: Author

### 4.4.5.3 Usages on Ground Floor and its effect on social interaction

The observations of the usage and occupancy of the ground floors show that street liveliness is influenced by multisensory stimulation and utilization of the ground floors and the local enterprises. In Muharraq Street, local stores foster friendliness and a sense of "small neighborhood." People slowed to a rest when they were engaged in social interactions, especially in front of cafés, restaurants, and retail outlets. Standing, sitting, and speaking were frequent, especially in front of Caféterias, bakeries, and local businesses.

People were walking past in front of the ground levels with more small pavements or no pavements in front of the stores, socially engaging and speaking as they did so. The usage and occupancy of the ground floors show that the atmosphere in or near local businesses that facilitates social interactions, whether through purchase or social contributions, promotes greater social engagement. Fig. 4.103 – 4.114 shows the usage and occupancy of the ground floor spaces and their effect on social interaction during weekdays and weekends.

a) Effect of usage on social interactions during weekday.

b) Effect of usage on social interactions during a weekend.

c) Effect of occupancy on social interactions during the week.

d) Effect of occupancy on social interactions during the weekend.

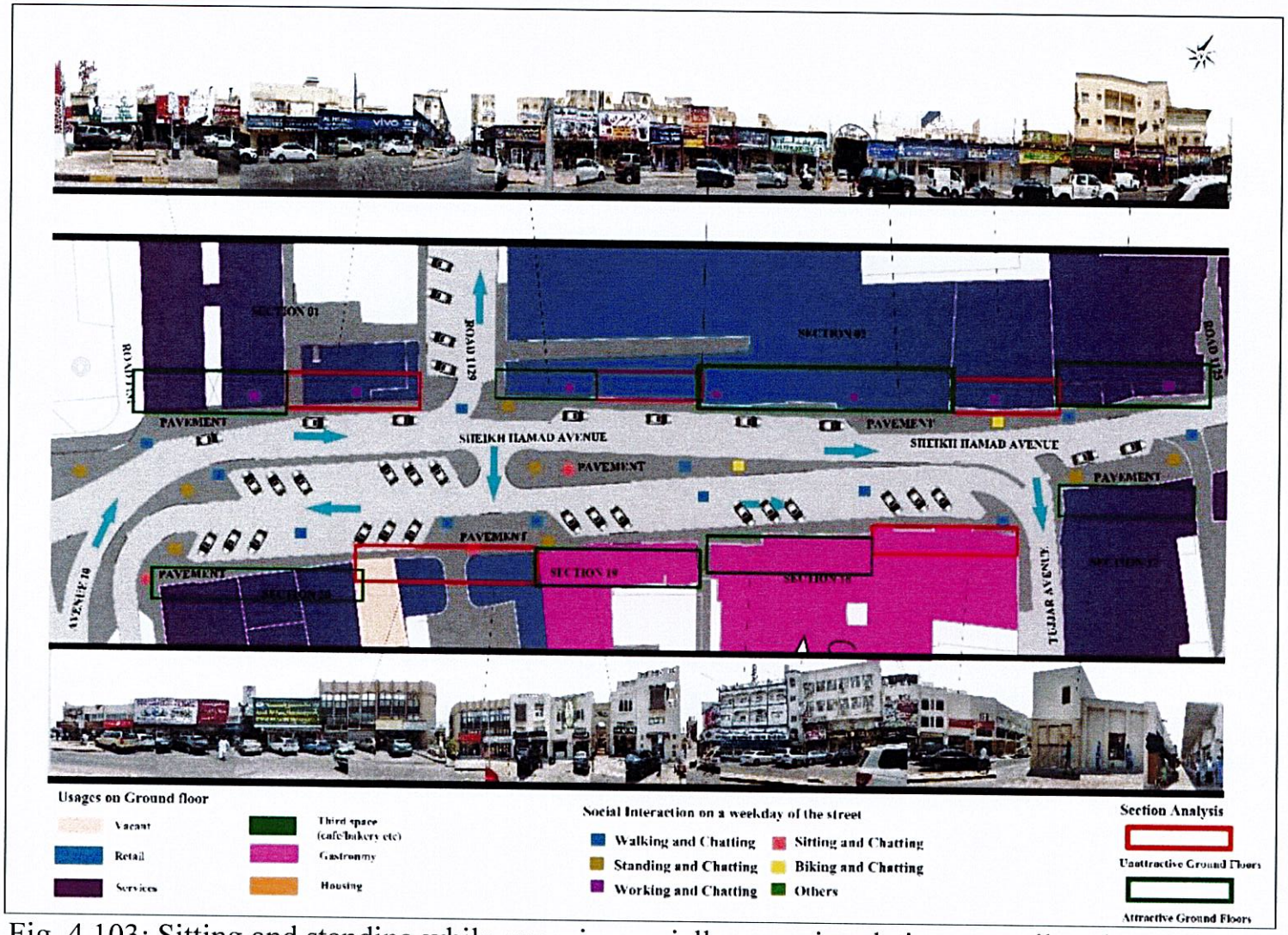



Fig. 4.103: Sitting and standing while engaging socially occur in relation to retail outlets and third places during the week in the Sheikh Hamad Avenue part 1 in Muharraq
Source: Author

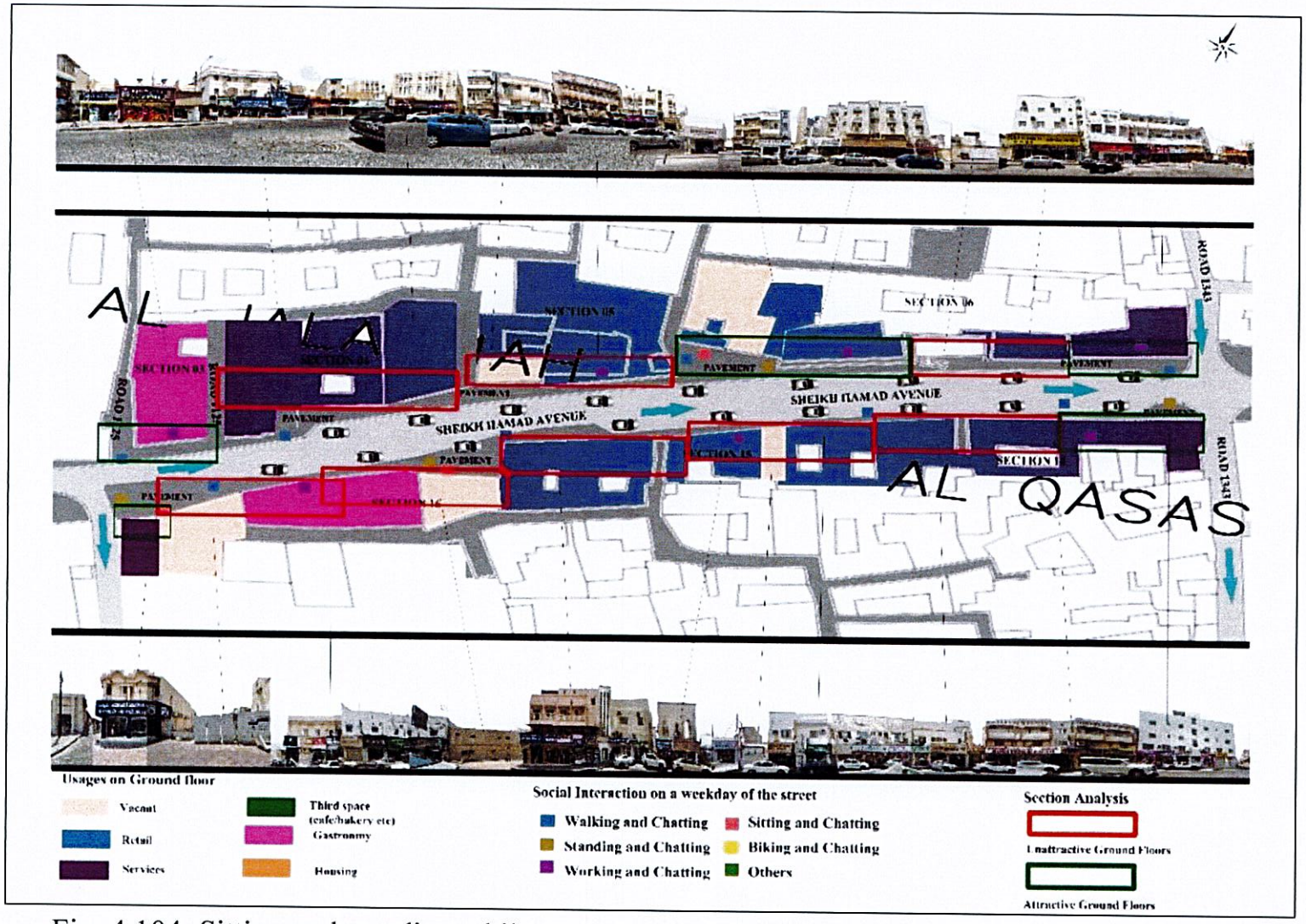



Fig. 4.104: Sitting and standing while engaging socially occur in relation to retail outlets and third places during the week in the Sheikh Hamad Avenue part 2 in Muharraq
Source: Author

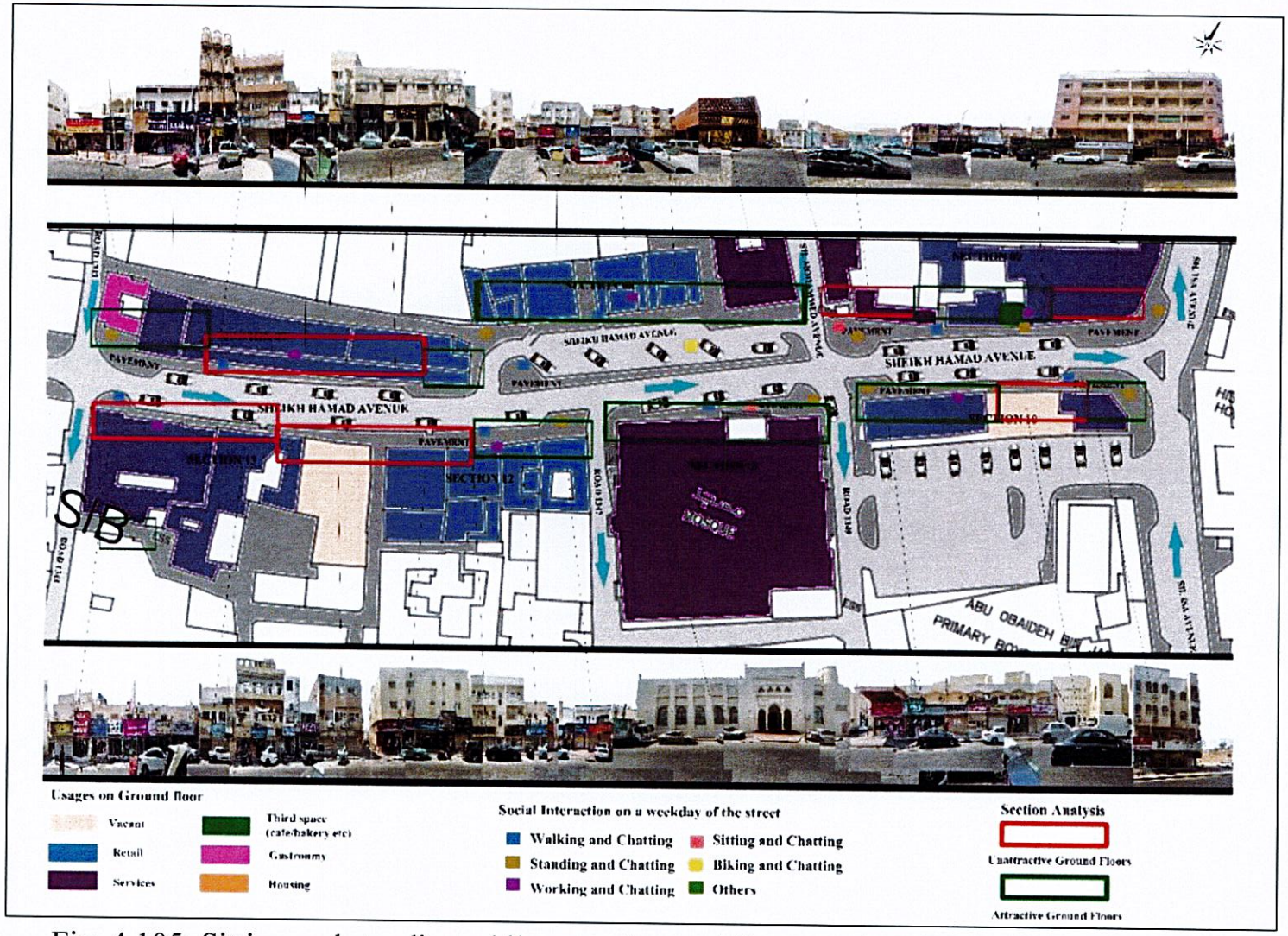



Fig. 4.105: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the week in the Sheikh Hamad Avenue part 3 in Muharraq
Source: Author

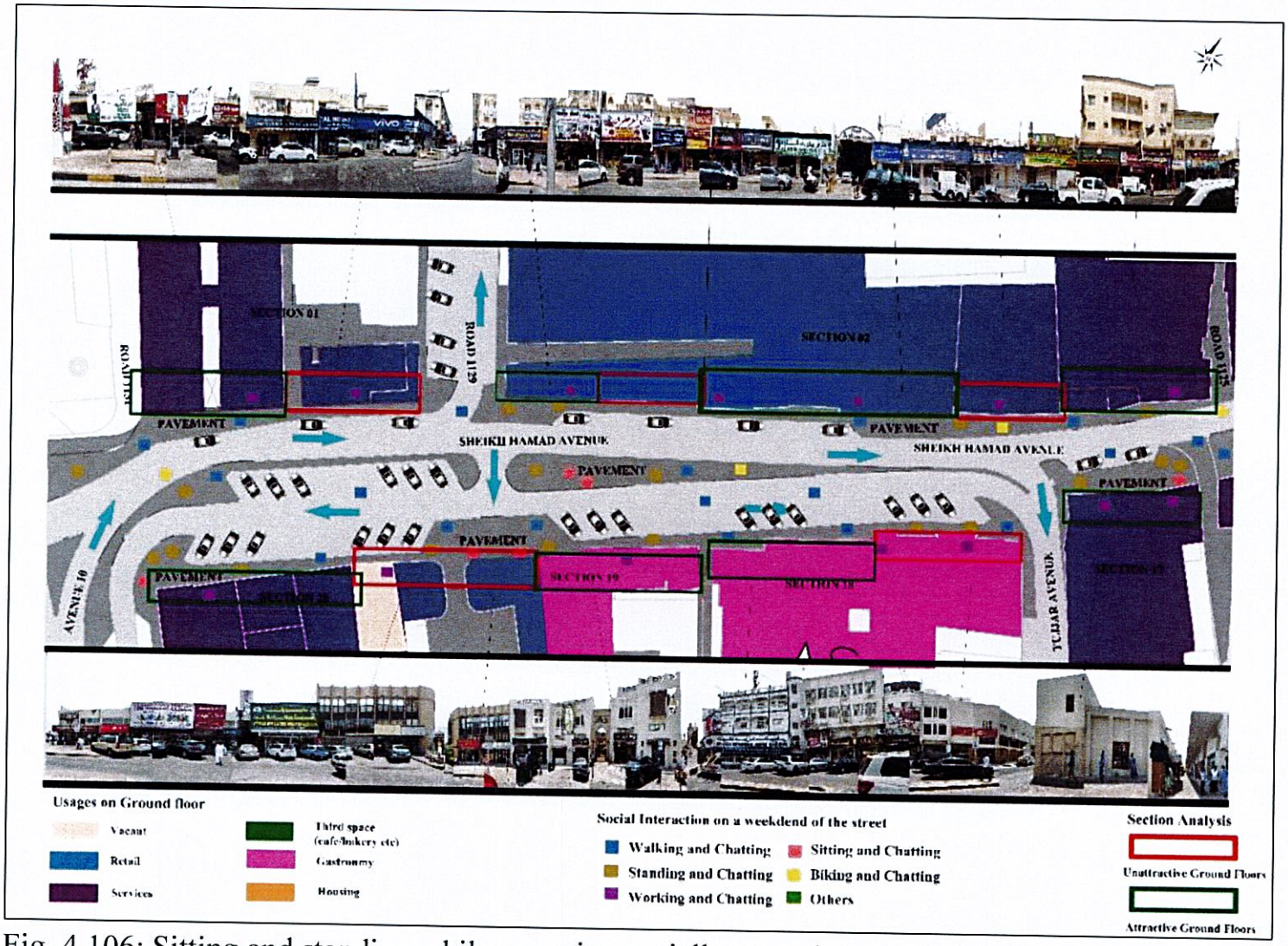



Fig. 4.106: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the weekend, in Sheikh Hamad Avenue part 1 in Muharraq
Source: Author

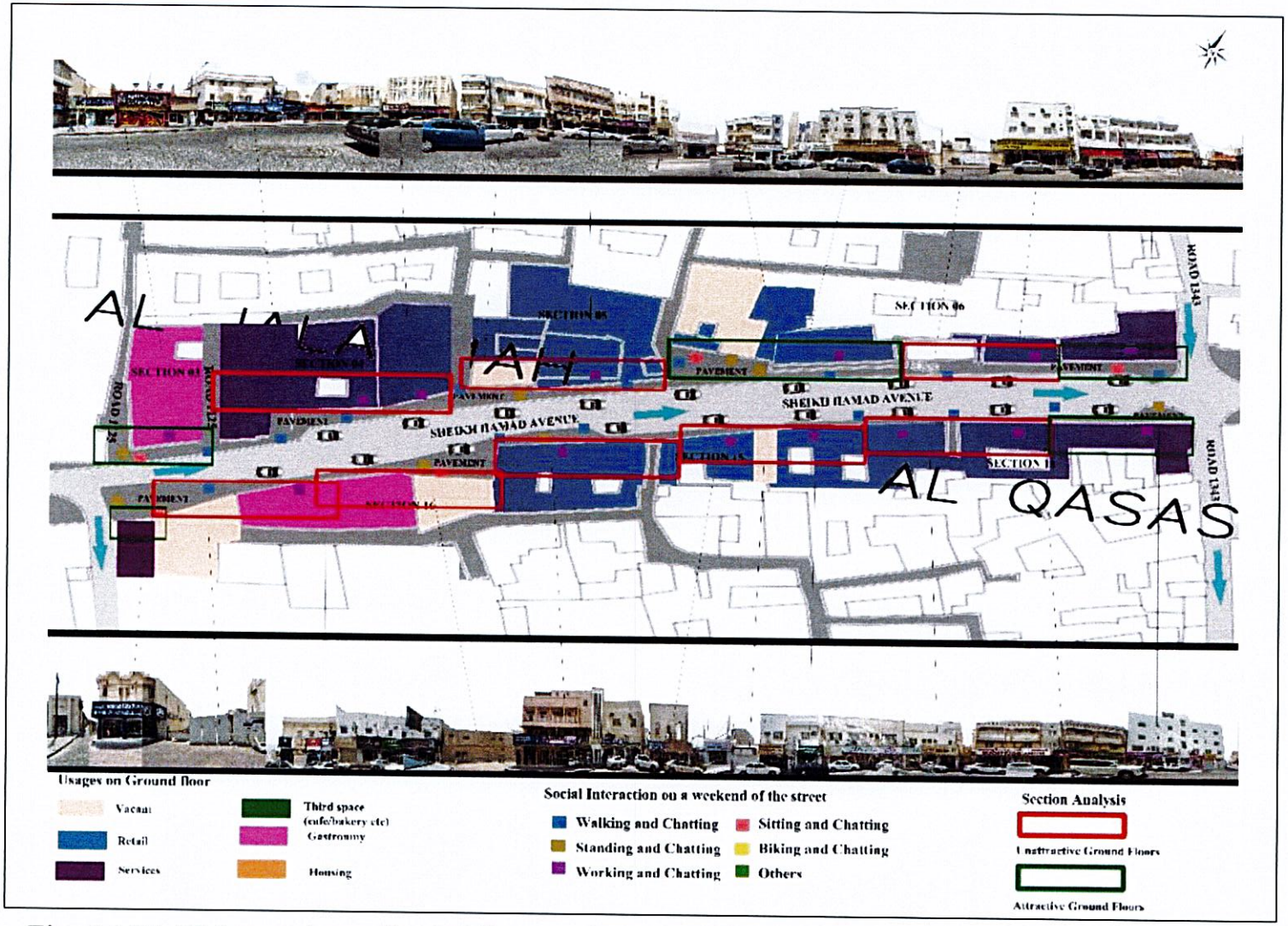



Fig. 4.107: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the weekend, in the Sheikh Hamad Avenue part 2 in Muharraq
Source: Author

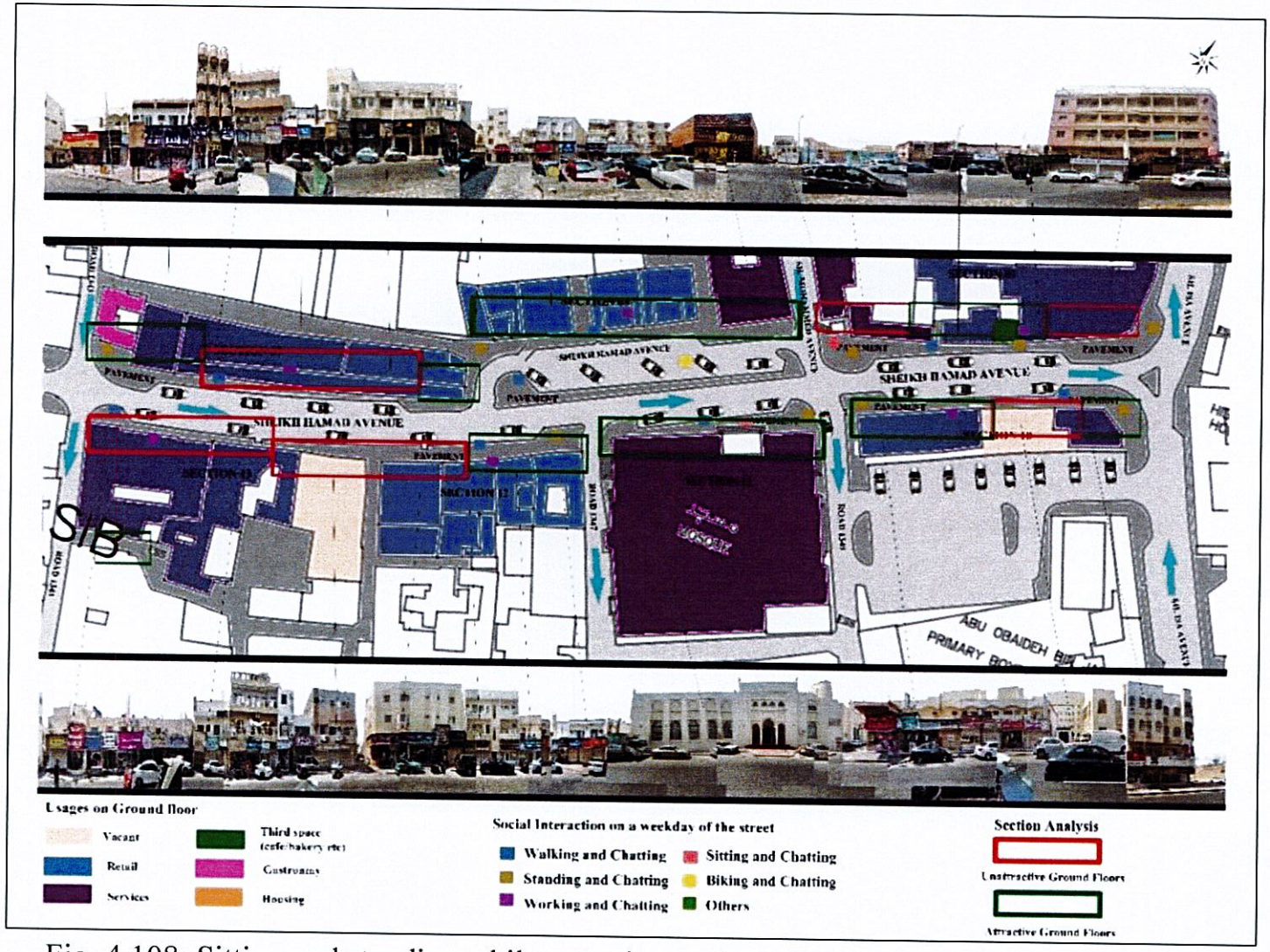



Fig. 4.108: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the weekend, in the Sheikh Hamad Avenue part 3 in Muharraq
Source: Author

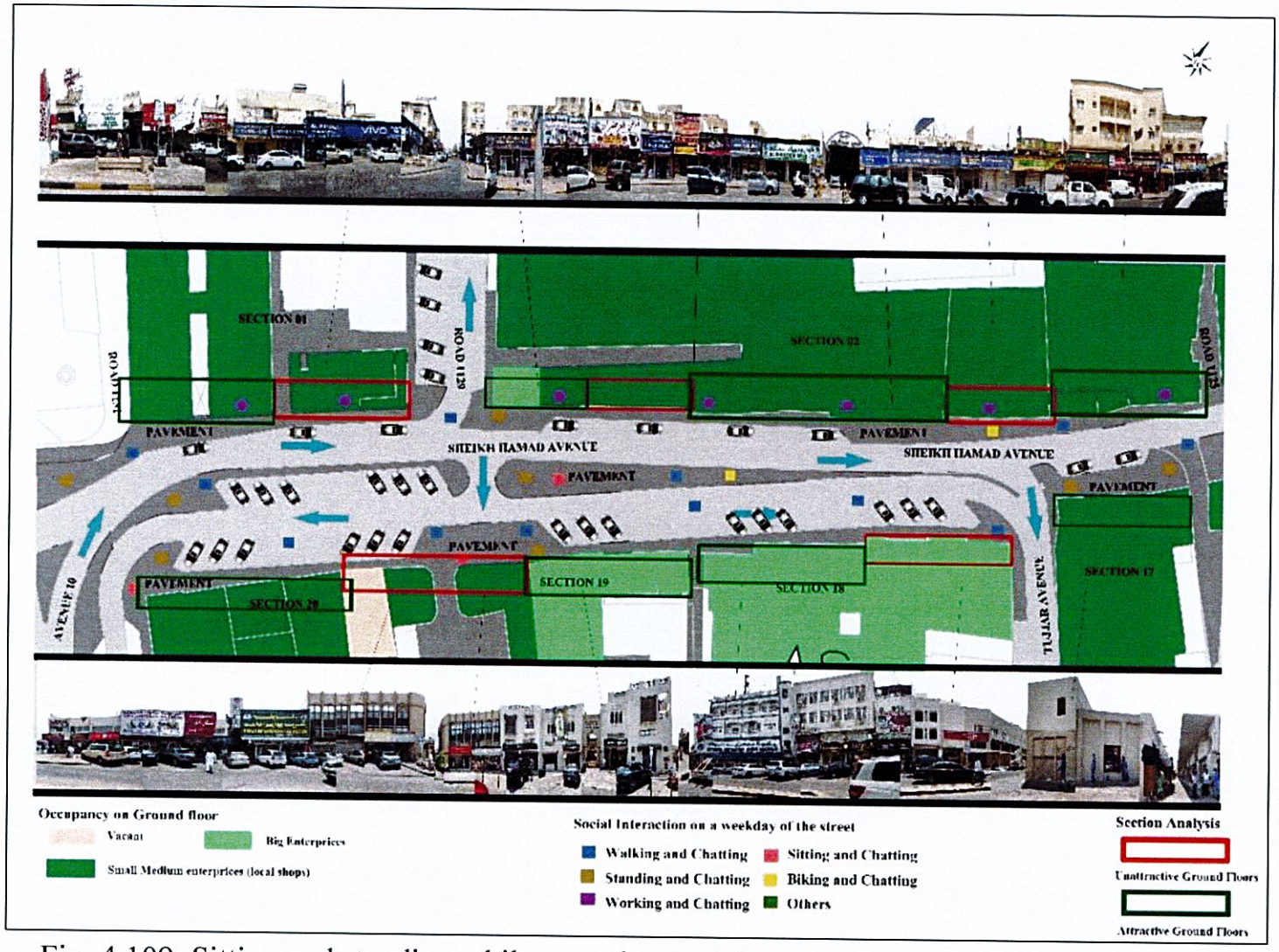



Fig. 4.109: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the week, in the Sheikh Hamad Avenue part 1 in Muharraq
Source: Author

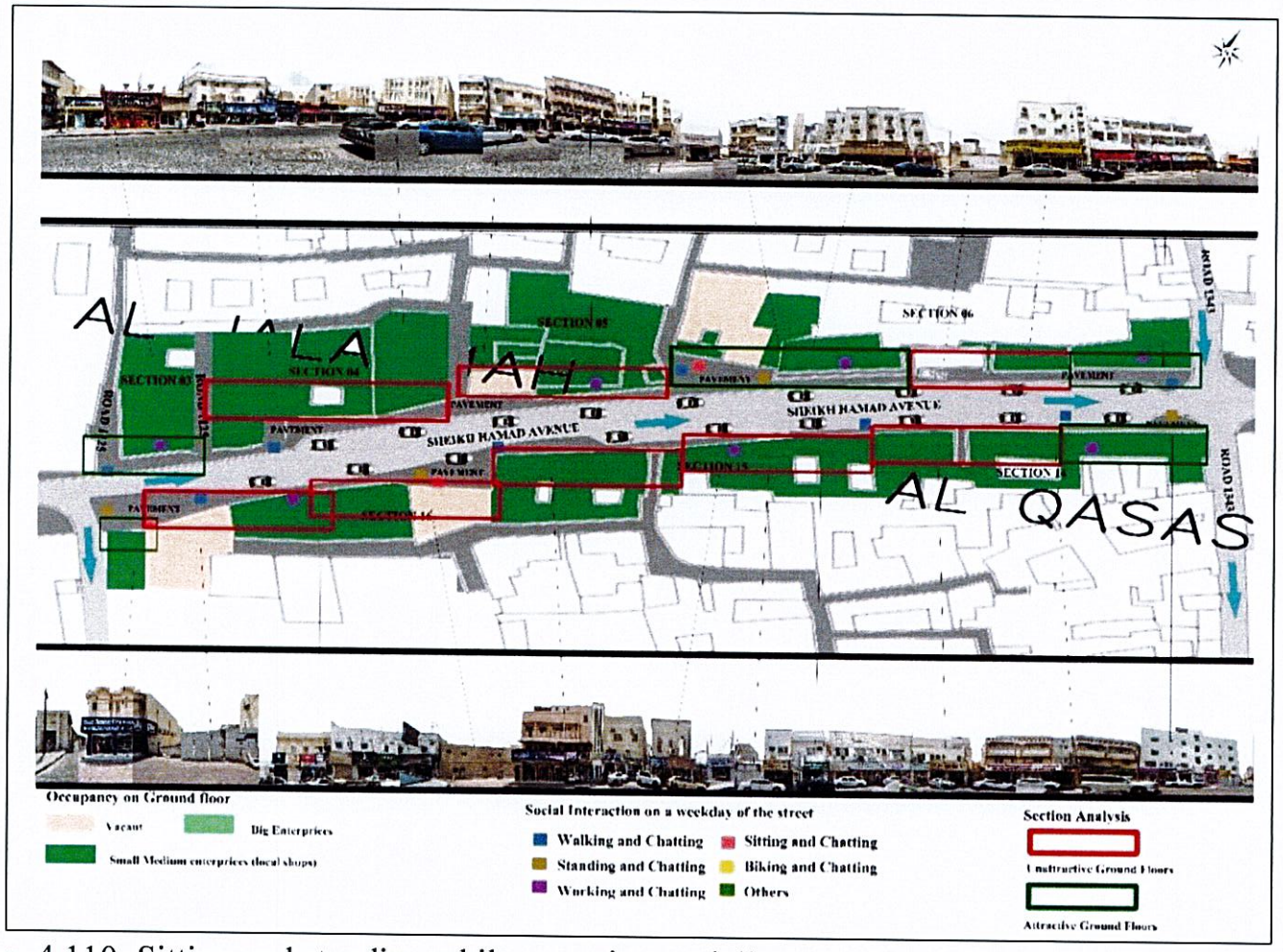



Fig. 4.110: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the week, in the Sheikh Hamad Avenue part 2 in Muharraq
Source: Author

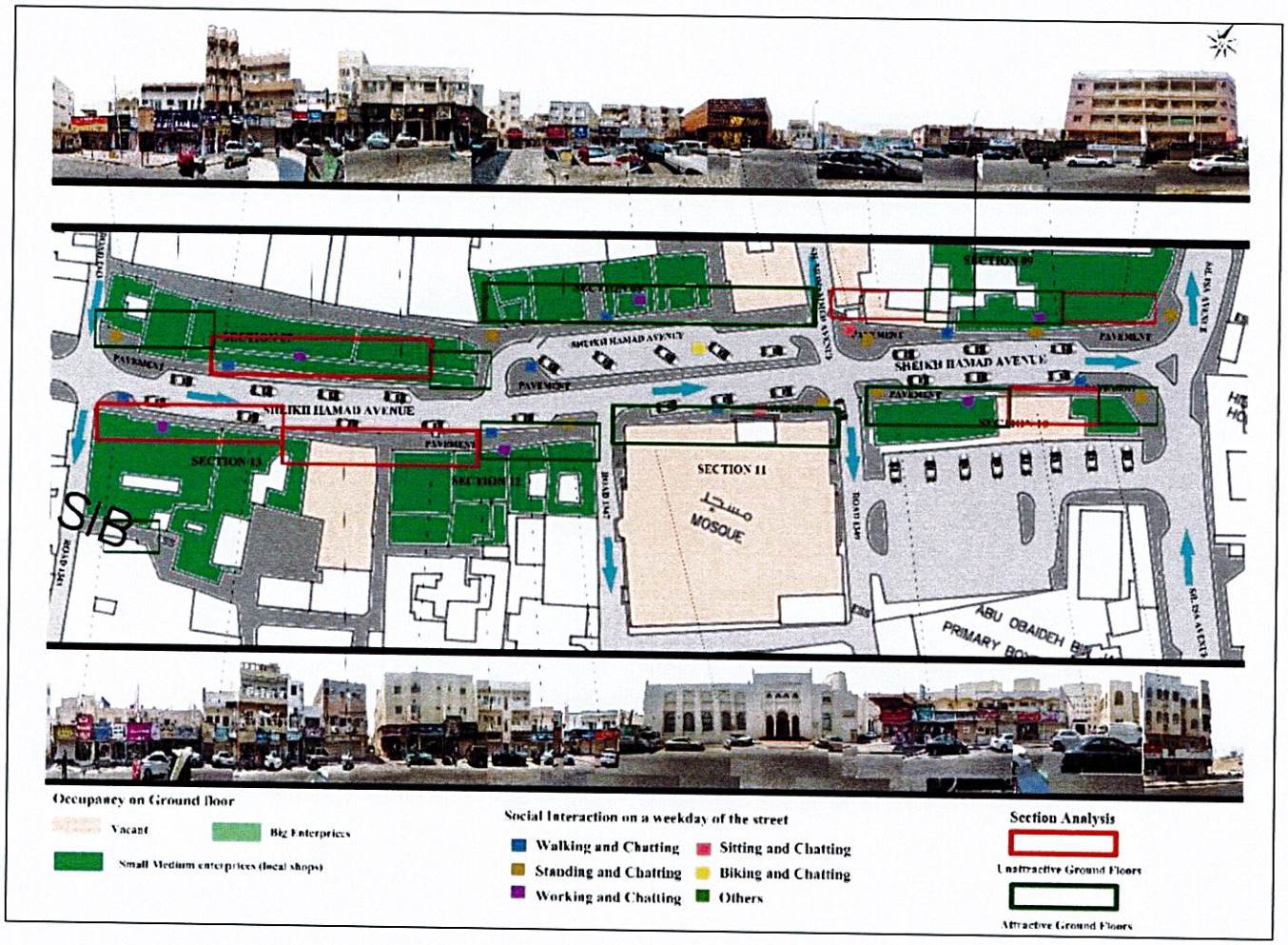



Fig. 4.111: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the week, in the Sheikh Hamad Avenue part 3 in Muharraq
Source: Author

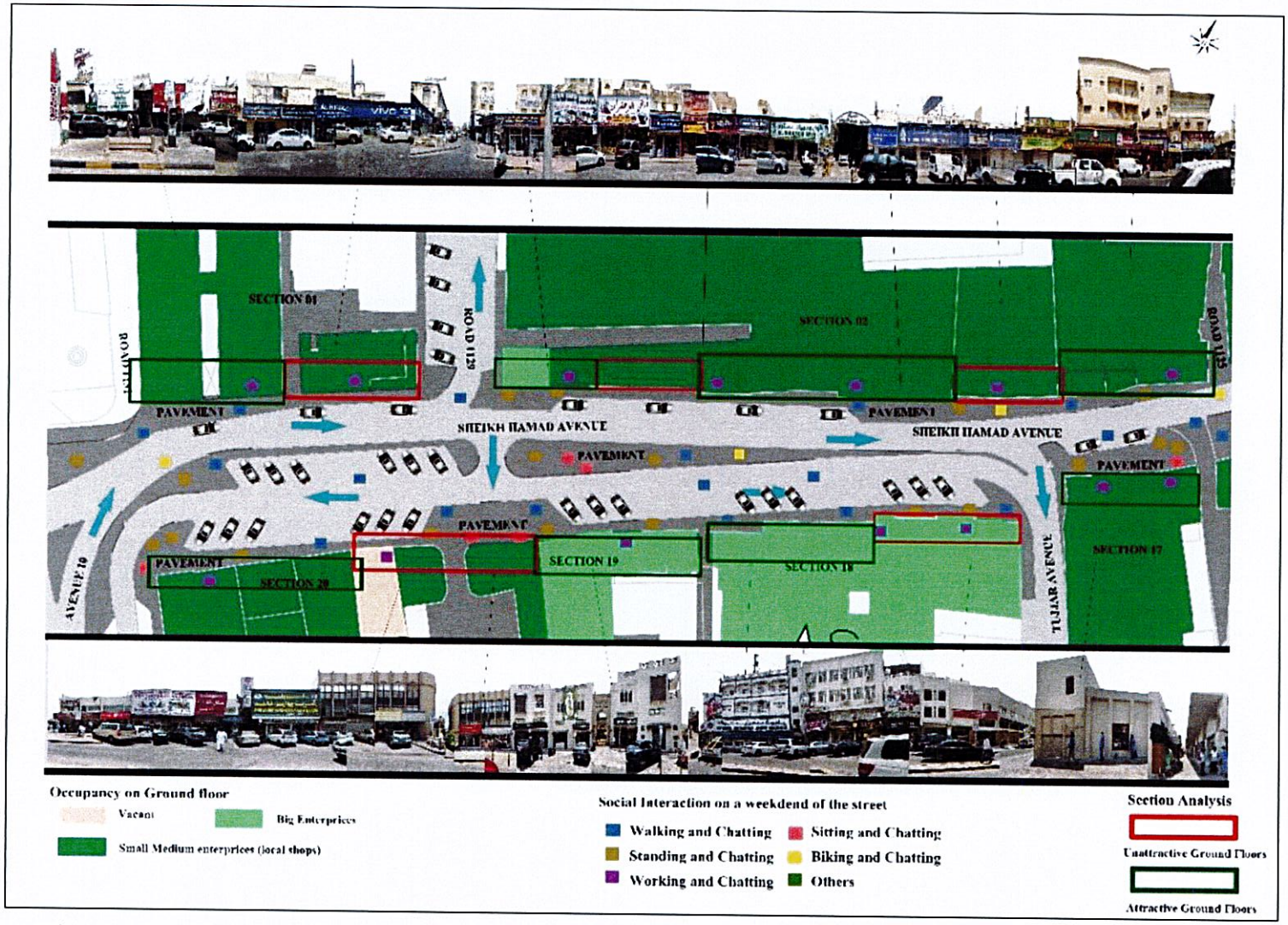



Fig. 4.112: Sitting and standing while engaging socially occur in relation to retail outlets and third places; during the weekend, in the Sheikh Hamad Avenue part 1 in Muharraq
Source: Author

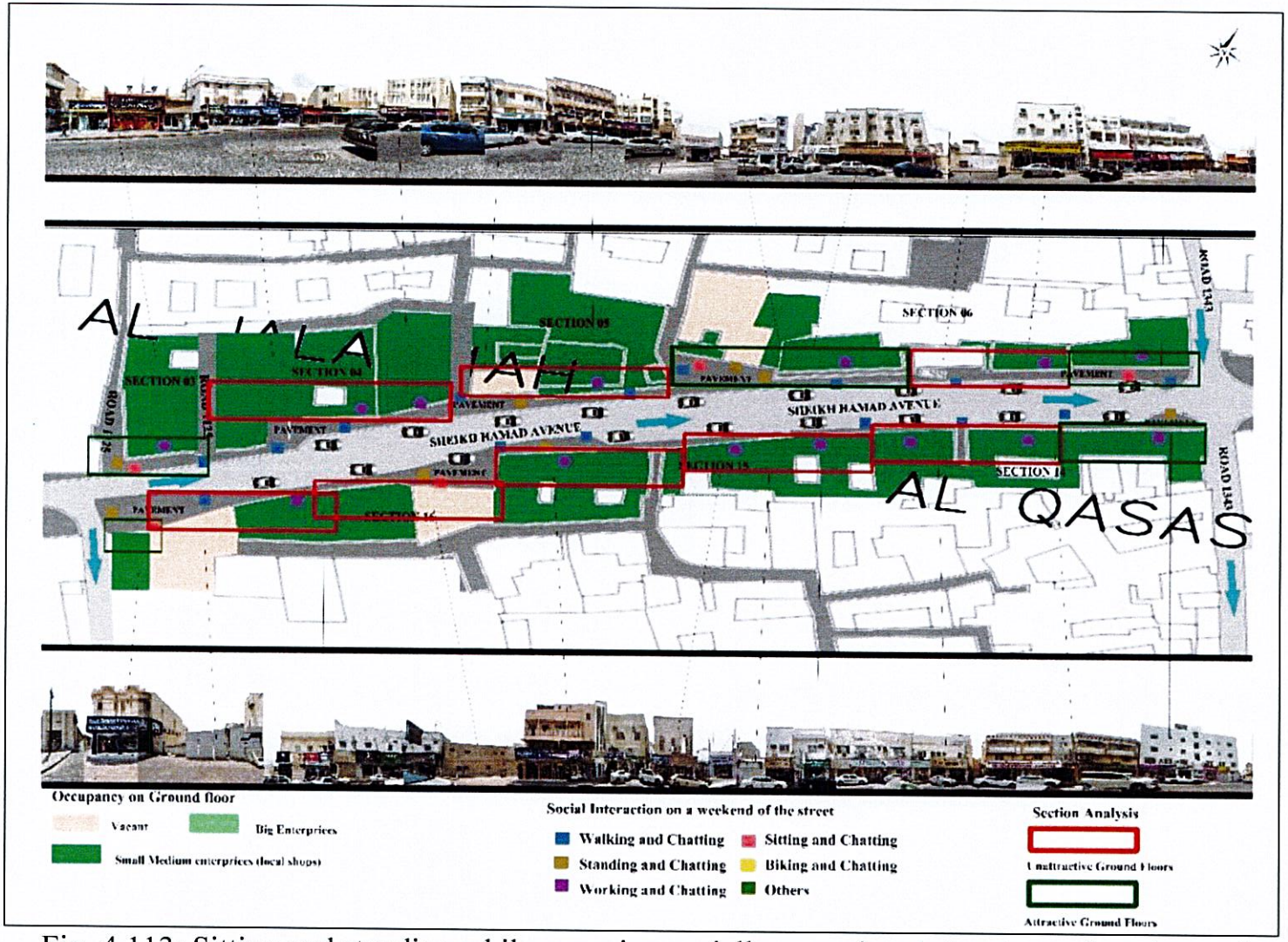



Fig. 4.113: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the weekend, in the Sheikh Hamad Avenue part 2 in Muharraq
Source: Author

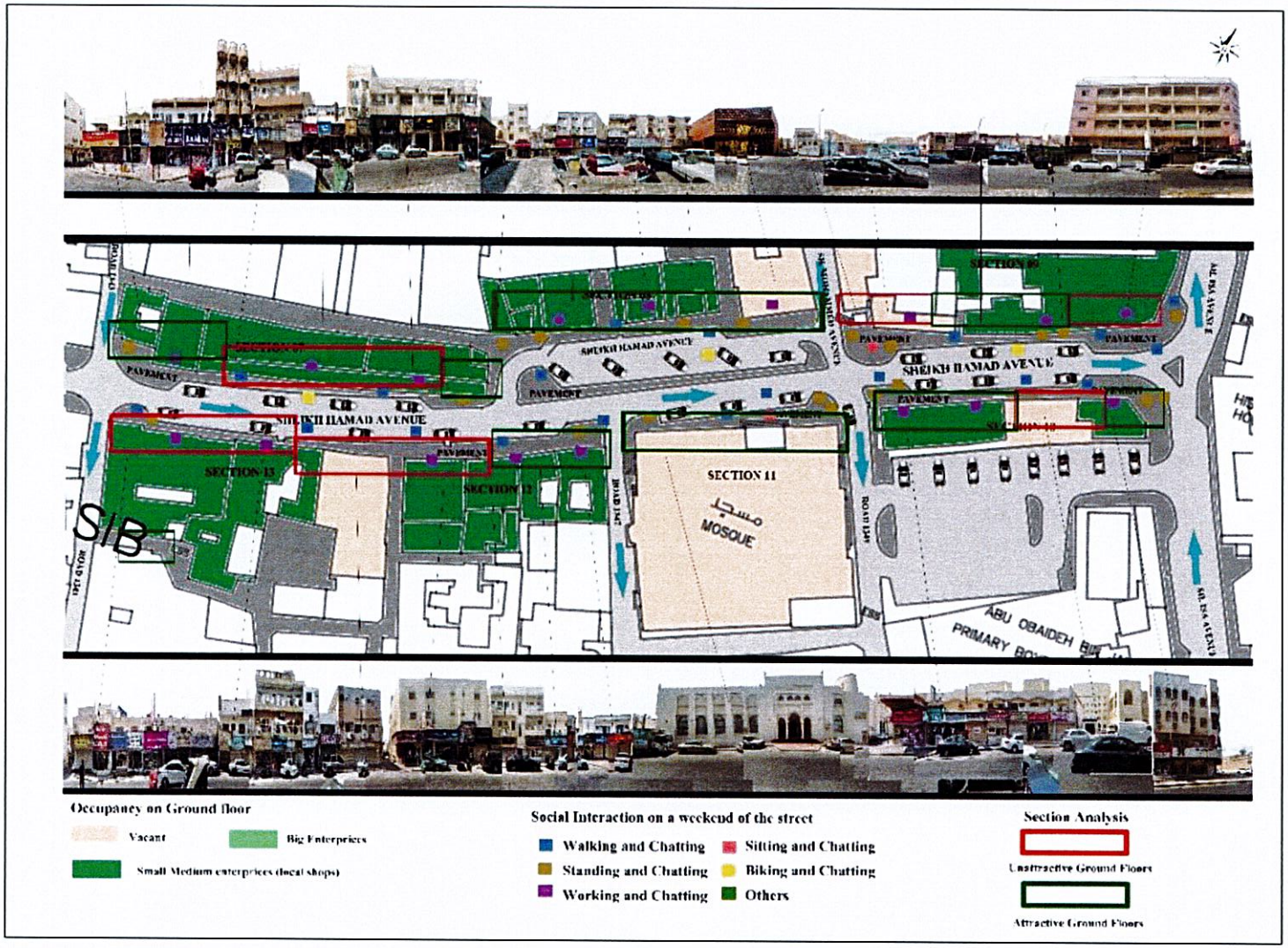



Fig. 4.114: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the weekend, in the Sheikh Hamad Avenue part 3 in Muharraq
Source: Author

### 4.4.6 Social Interactions

Similar to Government Avenue street in Manama, the most typical social interactions in Sheikh Hamad Avenue in Muharraq are people walking while talking, sitting while talking (especially on a spring day), and standing while discussing.

The social interaction on Sheikh Hamad Avenue differs on weekends, weekdays, at various times, and in different parts of the street. The weekend and weekday course variances indicate that the environment is also shifting.

#### 4.4.6.1 Social interaction during the week

A consistent pattern is formed throughout the week in part one of the streets. The highest concentrations of people engaging with one another were noticed in the stores on Section S01, S19, S20 part 1 of the street shown in Fig 4.115 near the bakery, café, in front of Gastronomy(Showaiter shops), near the bank, retail stores and everyday stores services.

In comparison, most social interactions occurred on either side of the street, at traditional retail and service establishments. Surprisingly, there was little interaction in sections S02, S17 &S18, part 1 of the street, as shown in Fig 4.115.This might be because the pavement is narrower or the businesses are less appealing. Walking and speaking are common forms of social engagement in some street regions.

Part 2 of this street, as shown in Fig 4.116, consists of primarily local retail stores with fewer vacant spaces. In general, this part of the street witnessed a minor level of social contact since it mainly

comprised store shoppers, who are frequently active in the evenings or on weekends. Walking and chatting was the most common form of social interaction in this part of the street. There are fewer standing, sitting, and talking forms of social interaction in vacant spaces where urban furniture is available.

In part 3 of this street, as shown in Fig 4.117, a generous amount of social interaction occurred in sections S08, S09, S10 &S11 due to increased pavement width. The social interaction occurred by standing and chatting or sitting and chatting on and informal steps of enterprises or mosques. Social interaction occurred randomly with drivers waiting outside of section eight. Surprisingly, there was more fluctuation in social interaction in this part of the street compared to other avenues. This might be due to more public buildings such as libraries, schools, and mosques.

Social contacts grew throughout the day in all three parts of Muharraq's Sheikh Hamad Avenue until midday, then reduced. Most social connections occur in the morning, between 7 and 10 a.m., when bakeries, cafeterias and public schools are located. In terms of modes of mobility, these encounters comprised standing and conversing (10 interactions of people) at the bakery and cafeteria store, strolling and conversing (10 interactions of people), and working and conversing (7 interactions of people). There were also three ridings in this section, and speaking movement was also observed.

More contacts were seen during the mornings, peaking around 12.30 p.m., involving 30 exchanges of people on part 1 of Muharraq street and ten interactions on part 2 and twenty interactions of people in part three. Until the early afternoon, most social interactions took place on the street's eastern side while they began to wane again in the

afternoon. However, the most common social interaction was walking while conversing, which may be seen all along the street, particularly around traffic crossings.

Chatting while sitting was noticed where there was the availability of urban seating or casual outdoor seating at the stairs of the stores. While on both sides of Muharraq street, people are standing and conversing at different street locations where the width is large or at the edge of streets. In addition, outside of businesses, banks, and money exchanges. Furthermore, city dwellers would pause in front of bakeries and cafeterias to converse with individuals they knew standing outside the eateries and bakeries.

Surprisingly, there was a lot of activity at cafeterias, bakeries, marts, banks, and intersections where other streets met Sheikh Hamad Avenue. This might be due to people taking their time orienting themselves, deciding which path to take after exiting the street, or to residents knowing one another and engaging in casual chats as they pass the third spaces and everyday businesses.

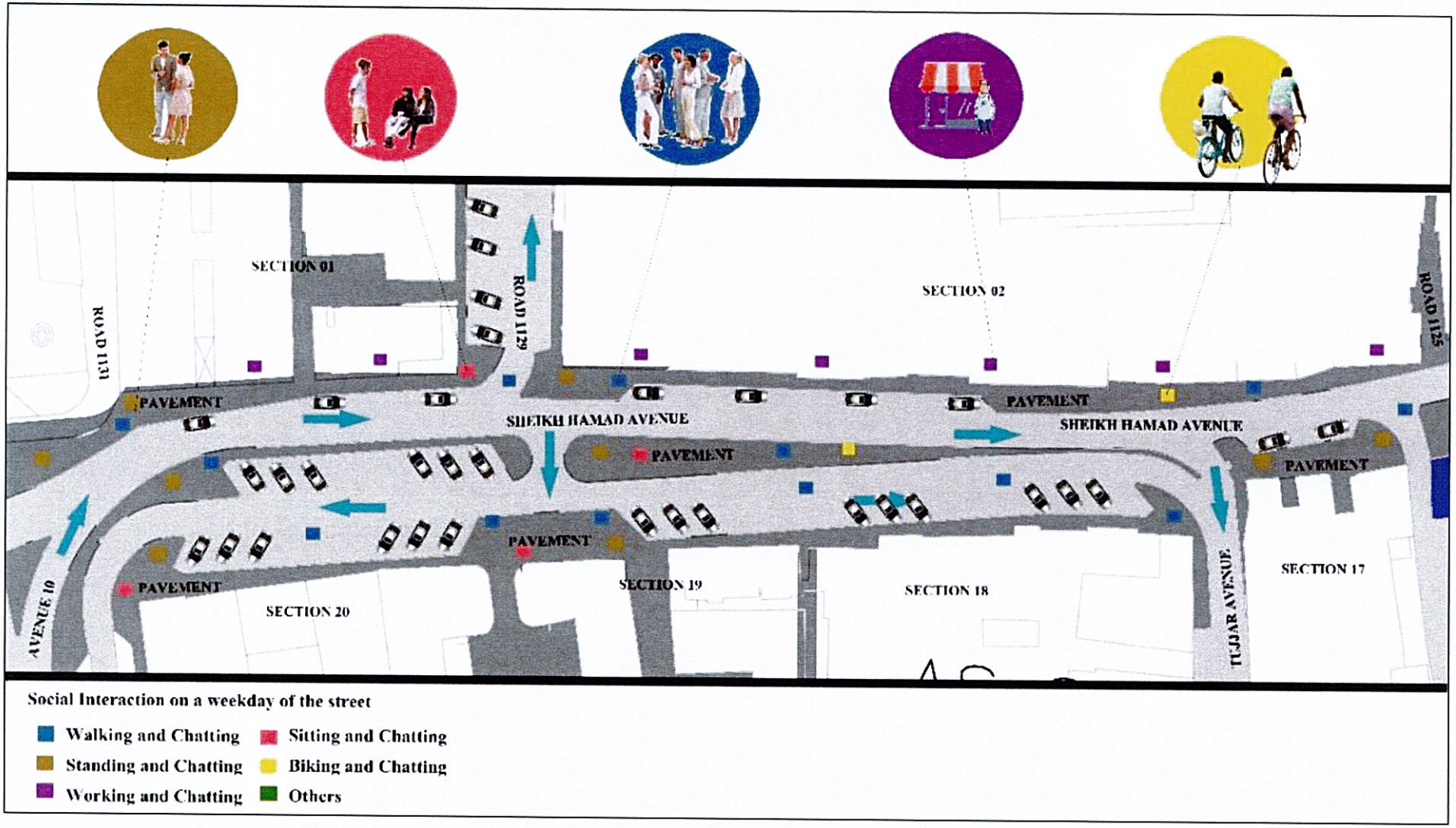



Fig 4.115: Social interaction on weekday Sheikh Hamad Avenue part 1 in Muharraq
Source: author

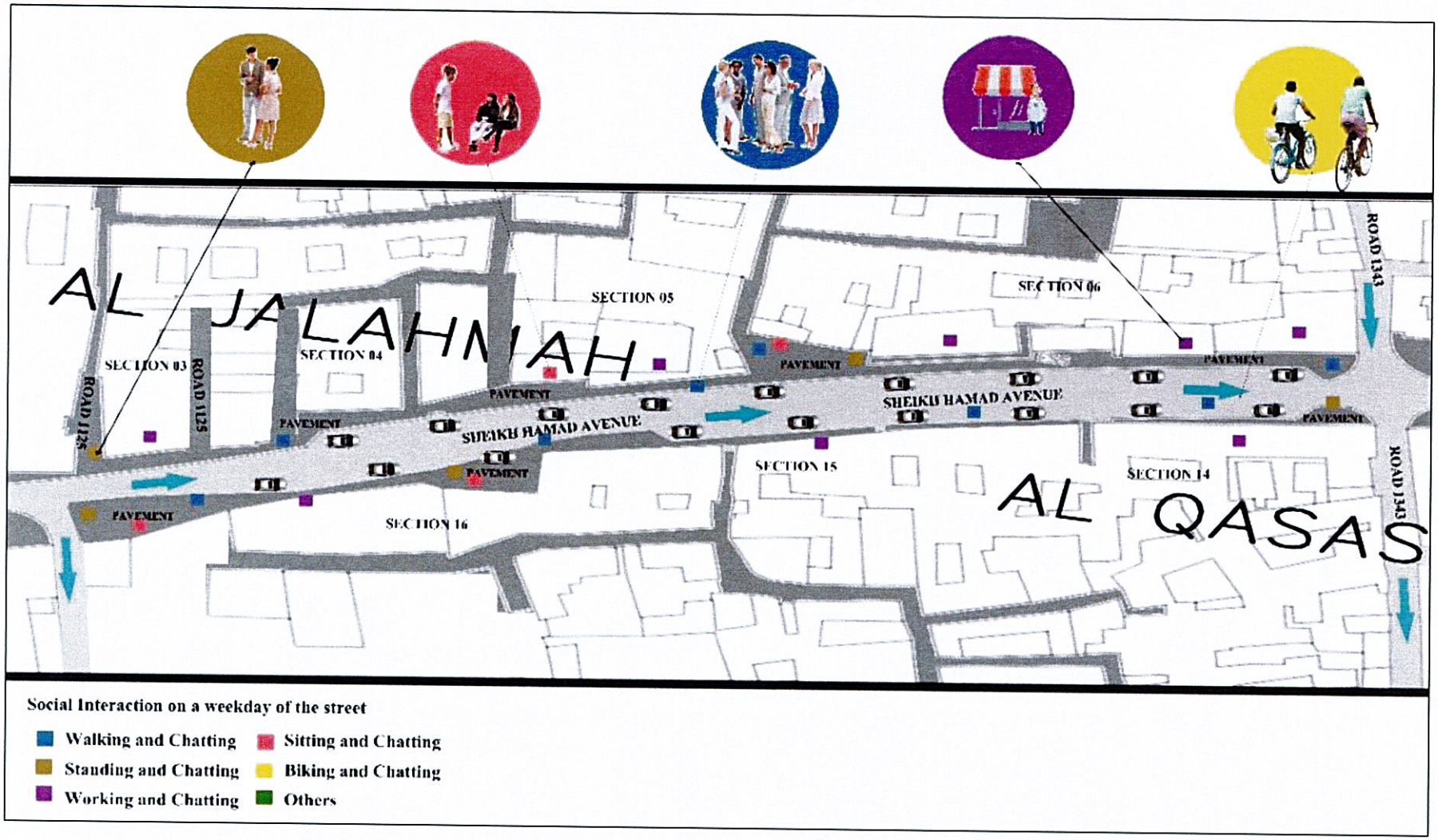



Fig4.116: Social interaction on weekday Sheikh Hamad Avenue part 2 in Muharraq
Source: author

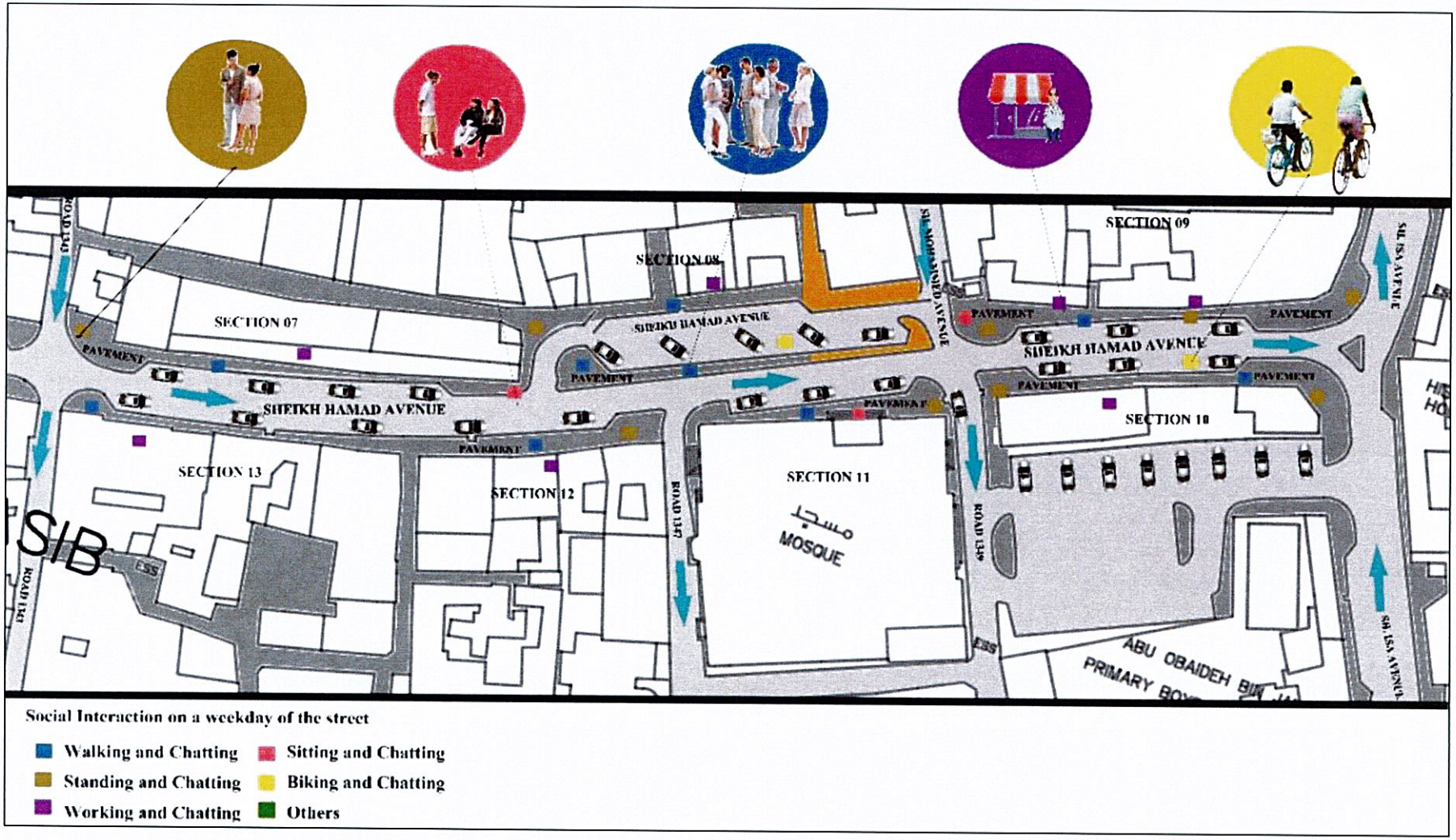



Fig 4.117: Social interaction on weekday Sheikh Hamad Avenue part 3 in Muharraq
Source: author

### 4.4.6.2 Social interactions during the weekend

During the weekend, most people were spotted socializing in front of the retail businesses and mosques on Sheikh Hamad Avenue. Many social interactions occurred in the middle, entry, and corners of street crossings and along with the partition. There were also interactions on the opposite side of the street, on a government-provided sitting area and alongside the bakery and primary store and in front of a school where a sitting area is provided.

However, in the late afternoon (around 1.00 p.m.), the social interactions have shifted from the street section's entrances (south) to the street section's center (part 2) of the street and the area surrounding the crossing at part 2 Muharraq street. Regarding the social scape, the maximum of social contact occurred in this part on Friday from 1.00 p.m. till 5.00 p.m., with thirty interactions each.In addition, the timing of the peaks and a movement in the social scape in the afternoon occurred where the Mosque and shops are located, implying a connection to window shoppers and prayers. There are popular social activities, especially on weekends.

In part 1 of this street, as shown in Fig. 4.118 at 9.00 a.m., the most common interaction was strolling while chatting, followed by standing while talking, which increased from 11:00 a.m. There was a minimum of ten contacts in which individuals sat in front of shops or at urban seating allocated at different places in this part of the street to talk. At 2.00 a.m., there were just seven encounters that included three standing while speaking at sections S19 & S20, one at section 1 and one between sections 1 and 2; both at the junction. At the same time, three-time encounters of walking and chatting in sections 2 and

18.

At 9.00 a.m., part 2 of the street, as shown in Fig 4.119, was calm, with the most typical interaction being walking while talking. However, beginning at noon, the most prevalent interaction was standing, sitting, and talking. People sat and stood in front of stores or sat at available urban seating to chat with each other. At 2 a.m., there were only five interactions, including four meetings of individuals walking and discussing at the intersection of sections S05, S06, S14 & S15 of the street and one interaction of persons talking while sitting in front of section 16.

In part 3 of the street, as shown in Fig. 4.120, at around 11.00 a.m., the most common social interaction was walking-talking people towards the Mosque on the street. There was a minimum of four interactions of people standing and chatting in sections S08, S09 & S11. However, this part of the street is usually quieter after the prayers.

It's also worth noticing that seven groups with two, three, four or more people were strolling alongside the street, talking. This variation implies that sidewalk congestion impacts standing when interacting. Fewer people stopped and lingered for interaction as more walked on the sidewalk while speaking with their friends. During the weekend, social scape peaks (12.00 and 4.00 o'clock), and pedestrian activity forms a collective flow, making it difficult to stay on the sidewalk. Instead, one is pushed along. Sitting and speaking occurred in areas where outdoor seating was provided or on the stairs in front of stores and mosques on different street parts.

Surprisingly, many people did not stop and stand in Part 3 of the

street. People usually went past the buildings after the intersection while talking to their companion (s). The lack of engagement might be ascribed to ground-floor uses and a lack of small businesses. The areas with the most significant difference in social contact between weekends and weekdays between part 1 sections S02 & S20, part 2 sections S04, S05, S14, S15 and part 3 sections S08, S09, S10 & S11. These areas appear extremely busy during the weekend, both by individuals strolling and by those remaining to socialize due to retail stores and mosques.

During the week, however, there is virtually little social interaction. The fewer social interactions might be related to the façade character, which is mixed and uninteresting in these specific parts and their purposes, including service and retail. However, the interactions occur at particular hours of the day due to the presence of the school and the library. They are primarily small businesses in these sections that do not provide everyday necessities.

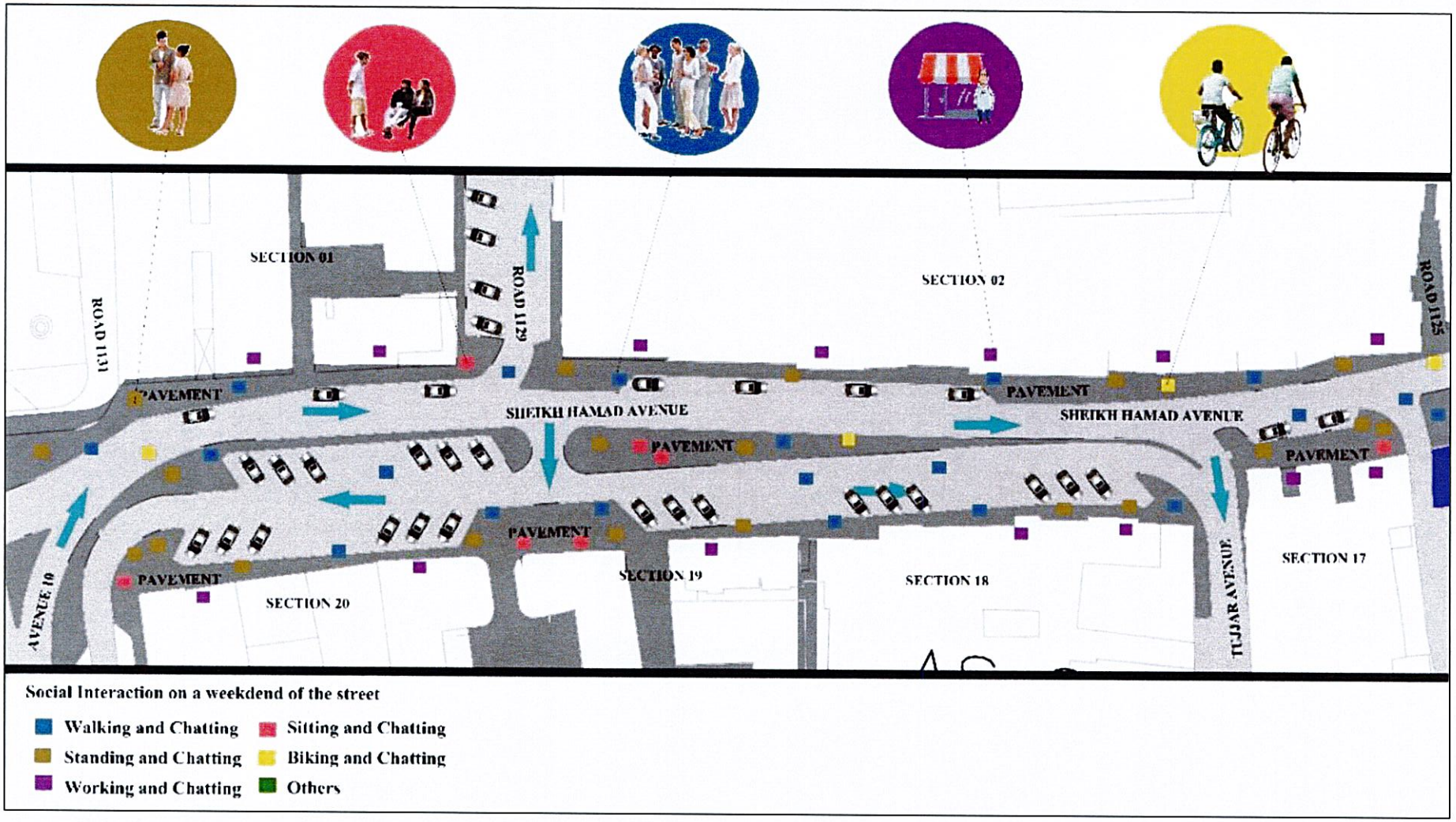



Fig. 4.118: Social interaction in the weekend in the Sheikh Hamad Avenue part 1 in Muharraq
Source: Author

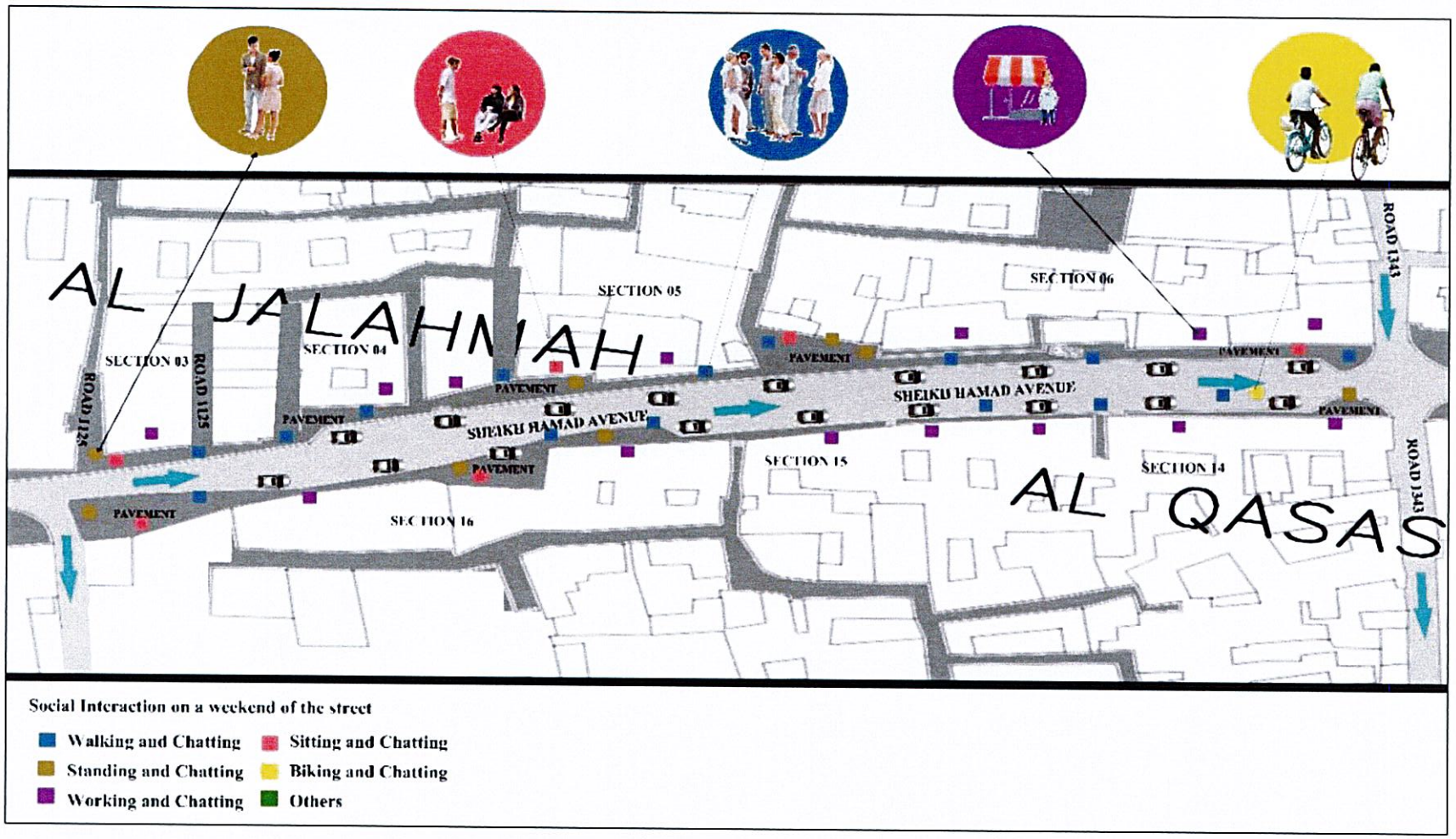



Fig. 4.119: Social interactions in the weekend in the Sheikh Hamad Avenue part 2 in Muharraq
Source: Author

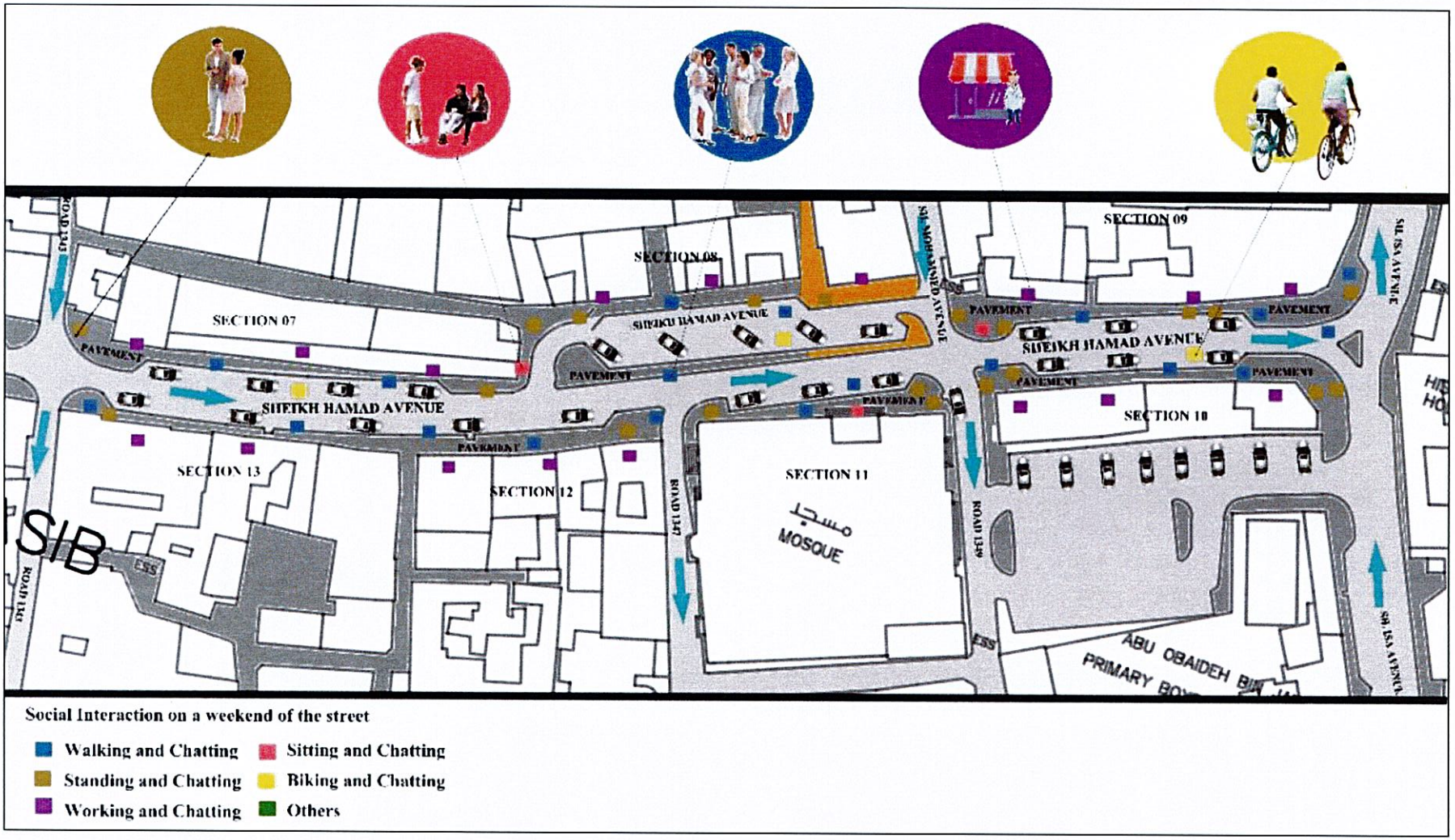
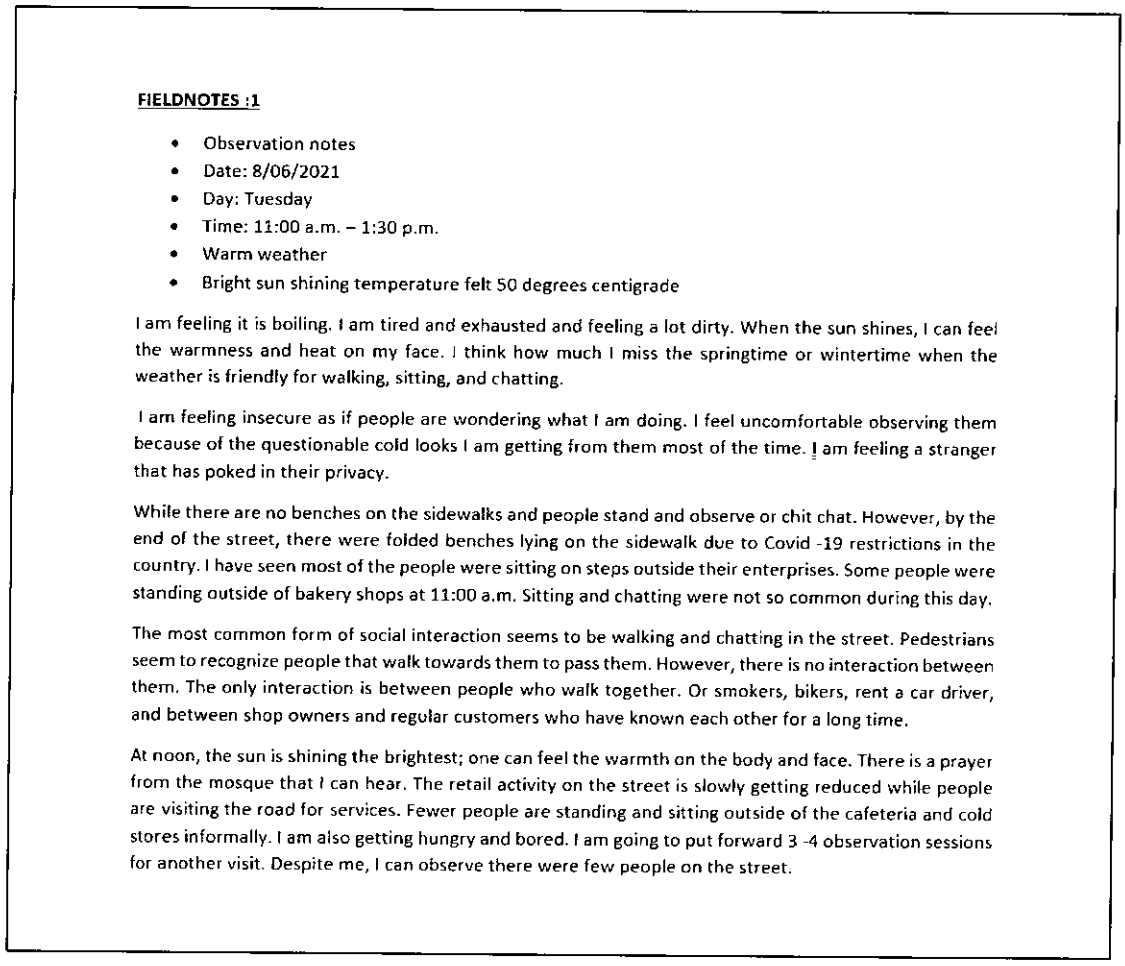



Fig. 4.120: Social interactions in the weekend in the Sheikh Hamad Avenue part 3 in Muharraq
Source: Author

## 4.4.7 Notes from the field

The field notes related to Sheikh Ali Bin Khalifa Avenue, as shown in Figs 4.121 and 4.122, showed meteorological and sun conditions and the researcher's moods, ideas, and preconceptions. Considering the personal circumstances while in the field allowed the researcher to detect biases and work against them by being aware of how these personal biases may impact the results.



**FIELDNOTES :1**

- Observation notes
- Date: 8/06/2021
- Day: Tuesday
- Time: 11:00 a.m. – 1:30 p.m.
- Warm weather
- Bright sun shining temperature felt 50 degrees centigrade

I am feeling it is boiling. I am tired and exhausted and feeling a lot dirty. When the sun shines, I can feel the warmness and heat on my face. I think how much I miss the springtime or wintertime when the weather is friendly for walking, sitting, and chatting.

I am feeling insecure as if people are wondering what I am doing. I feel uncomfortable observing them because of the questionable cold looks I am getting from them most of the time. I am feeling a stranger that has poked in their privacy.

While there are no benches on the sidewalks and people stand and observe or chit chat. However, by the end of the street, there were folded benches lying on the sidewalk due to Covid -19 restrictions in the country. I have seen most of the people were sitting on steps outside their enterprises. Some people were standing outside of bakery shops at 11:00 a.m. Sitting and chatting were not so common during this day.

The most common form of social interaction seems to be walking and chatting in the street. Pedestrians seem to recognize people that walk towards them to pass them. However, there is no interaction between them. The only interaction is between people who walk together. Or smokers, bikers, rent a car driver, and between shop owners and regular customers who have known each other for a long time.

At noon, the sun is shining the brightest; one can feel the warmth on the body and face. There is a prayer from the mosque that I can hear. The retail activity on the street is slowly getting reduced while people are visiting the road for services. Fewer people are standing and sitting outside of the cafeteria and cold stores informally. I am also getting hungry and bored. I am going to put forward 3 -4 observation sessions for another visit. Despite me, I can observe there were few people on the street.

Fig. 4.121: Field note : 1 on weekend Sheikh Hamad Avenue in Muharraq
Source: Author

**FIELD NOTES: 2**

- Observation notes
- Date: 2/07/2021
- Day: Friday
- Time: 11:00 a.m. – 2:00 p.m.
- Warm weather
- Bright sun shining temperature felt 50 degrees centigrade

I reached the street at 11:00 a.m. and it seemed it was very early. I am feeling sleepy, tired and a bit dizzy. The sun is shining very bright, and it is hard to collect data in extreme weather conditions. Reaching the street, I had immediately started documenting my variables of observation, including social interaction. As the day passed, more people were on the street, mostly going towards the mosque for Friday prayers. It's a covid -19 days people come early for their placement in the mosque.

I was surprised that most retail shops, money exchange shops, bakeries and cafeterias were open. I planned that after completing my observation to visit the mobile shop to repair my phone. Interestingly, people had started recognizing me after my first visit. Surprisingly, more police patrols cars could be seen monitoring the street to avoid any mishaps during the weekend.

Sitting on an informal Step of an enterprise, I am working on my job application as well while also waiting for the street to come to life. More and more people are visiting the street to attend the Friday prayer or taking necessities. People were standing, walking, sitting, and chatting during this time. At around 12:30, I started to walk towards the middle of the street to convince people for an interview. I found a few people interested in participating at around 12:45. I am done and have seven discussions now. I need to reorganize them and transcribe them for better understanding.

I wanted to wait till 3:00 p.m. for the last observation, but dizziness due to hot weather is increasing. I am getting a headache and have consciously kept the car start so that the car's air condition keeps my body temperature regular. I decided to call it a day by 2:00 p.m. after taking some photos and waiting some time in the sun. I fell the temperature at this time to be above 50 degrees centigrade.

Fig. 4.122: Field note: 2 in the weekend in the Sheikh Hamad Avenue in Muharraq
Source: Author

## 4.5 Riffa Street Observation (Sheikh Ali Avenue)

Sheikh Ali Bin Khalifa Avenue Street is one of the well-known streets in Riffa due to its adjacency to Ar- Riffa Avenue (Souq Ar-Riffa). The street is about 0.64 km long. Fig. 4.123 shows many different ways linked to this street. The street is divided into three parts (1, 2 & 3) as shown in Figs 4.124 and 4.126 to understand the observations better. The street is orientated towards the North.

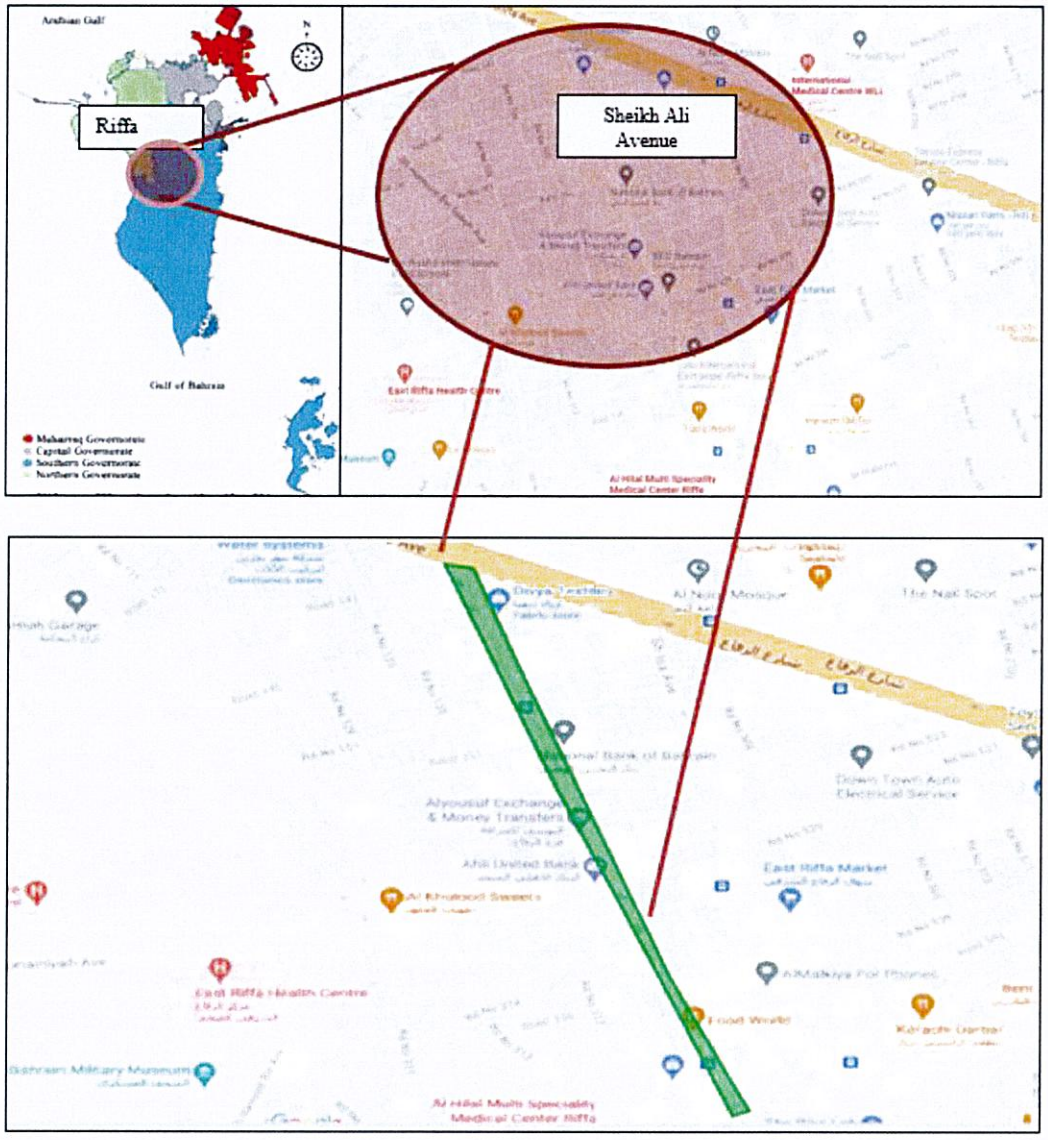



Fig. 4.123: Many different ways from The Sheikh Ali Bin Khalifa Avenue in Riffa
Source: Google map

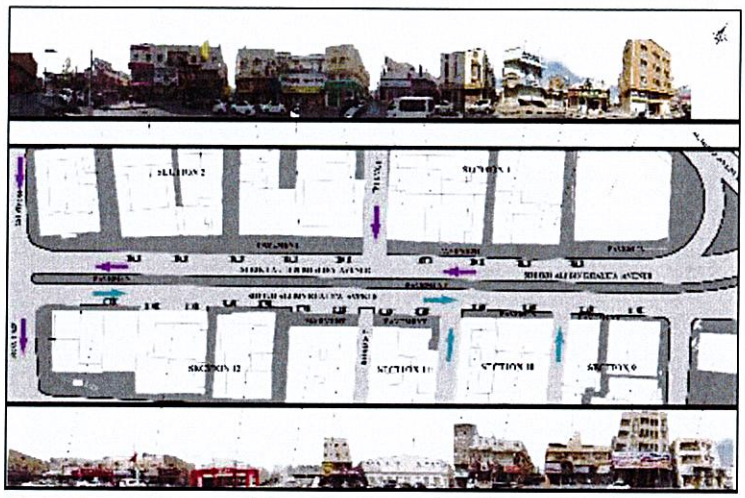


Fig. 4.124: Part 1 section of the Sheikh Ali Bin Khalifa Avenue in Riffa
Source: Author

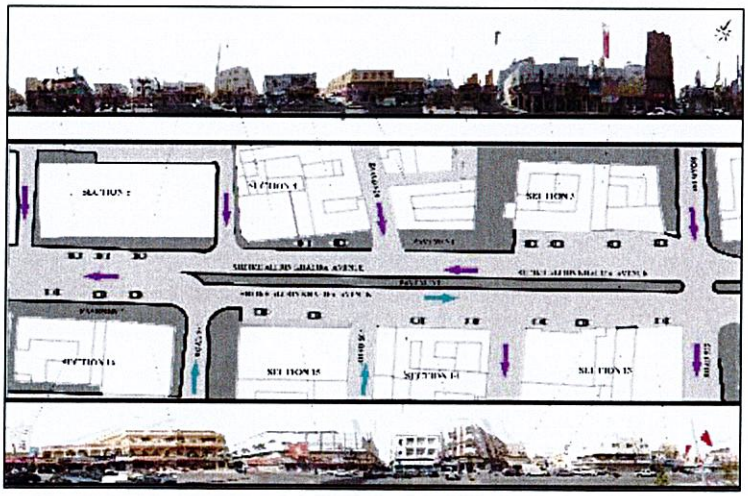


Fig. 4.125: Part 2 section of the Sheikh Ali Bin Khalifa Avenue in Riffa
Source: Author

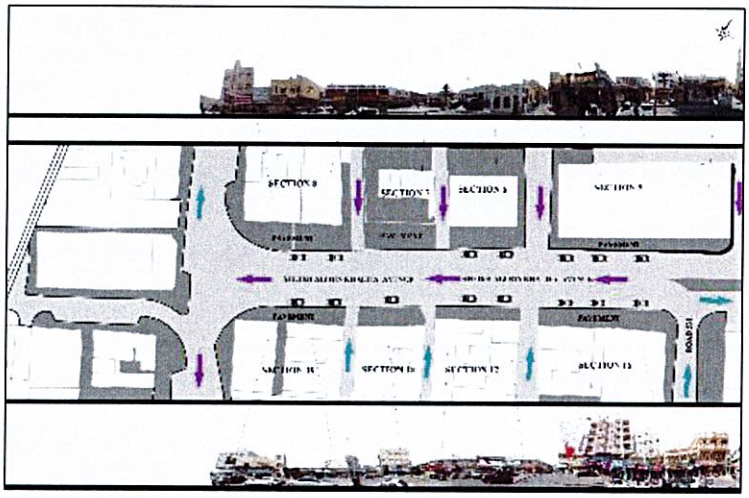


Fig. 4.126: Part 3 section of the Sheikh Ali Bin Khalifa Avenue in Riffa
Source: Author

### 4.5.1 Visual

#### 4.5.1.1 Characteristics of facades on the ground floor

According to Gehl's classification, the façade characteristics of the Sheikh Ali Bin Khalifa Avenue ground floors in Riffa that impact the street's liveliness can be classified. These variant façade designs and their appearances enhance visual stimuli and the overall atmosphere of Riffa Street.

This street is divided into three parts where part 1, as shown in Fig. 4.127, shows the detailed analysis of Riffa Street from sections S01 & S02 and sections S9 & S12. In part 1 of the street, adjacent to the Al Riffa Avenue, three inactive facades have been observed in sections S01 & S11, highlighted in dull green. Three facades in sections S01, S02 & S12, shown in dark blue, were active with small units and characters. There are three mixture facades highlighted in pink shown in sections S09, S10 & S11, with fewer blinds and variations in functions. Mainly dull facades are observed in this part of the street, with few variations and fewer details.

In part 2 of this street, as shown in Fig 4.128, the detailed analysis from sections S03-S05 and S13-S16 is discussed. There are more boring facades being observed in this street part. However, two inactive facades are highlighted in dull green shown in blocks S04 & S13 with no visible variations in function and more passive units. In contrast, there is one active façade in section 4 with good details and materials. One mixture façade highlighted in pink is shown in section 16 with subtle and fewer details on the façade.In part 3, as shown in Figs 4.129 and 4.130, the detailed analysis of Riffa Street from sections S05-S08 and section S16- S19 is discussed. The facades in this part of the street are primarily boring, highlighted in dark yellow

with fewer details, less or no variation on facades of buildings and uninteresting units with fewer doors.

However, there are no active and inactive facades in this street section. One friendly facade highlighted in green is shown in section 7 with few blinds, passive units, and many details. There are three mixture façades highlighted in pink shown in sections S06, S08 & S17 with subtle and fewer façade details, some blinds and passive units. It is to be noted that dull facades dominate the street with a fewer mixture and active ground floor facades. The differences in the characteristics of façades on the ground floor of adjoining street buildings indicate visual perception change and its atmosphere. Generally, a visually attractive atmosphere is created by designing the façades that are friendly, mixed and active. The atmosphere is visually less appealing and the facades are inactive and dull.

**Table 4.4: Summary of characteristics of facades of the ground floor of Sheikh Ali Bin Khalifa Avenue in Riffa**

| **Visual characteristics of the facades** | | | | |
|---|---|---|---|---|
| Part 1 of the street | | | | |
| **Friendly** | **Mixture** | **Active** | **Inactive** | **Boring** |
| nil | three | three | three | many |
| Part 2 of the street | | | | |
| **Friendly** | **Mixture** | **Active** | **Inactive** | **Boring** |
| Nil | one | one | two | many |
| Part 3 street | | | | |
| **Friendly** | **Mixture** | **Active** | **Inactive** | **Boring** |
| one | three | nil | nil | many |




Fig. 4.127: Characteristics of facades of ground floors of the Sheikh Ali Bin Khalifa Avenue part-1 in Riffa
Source: Author

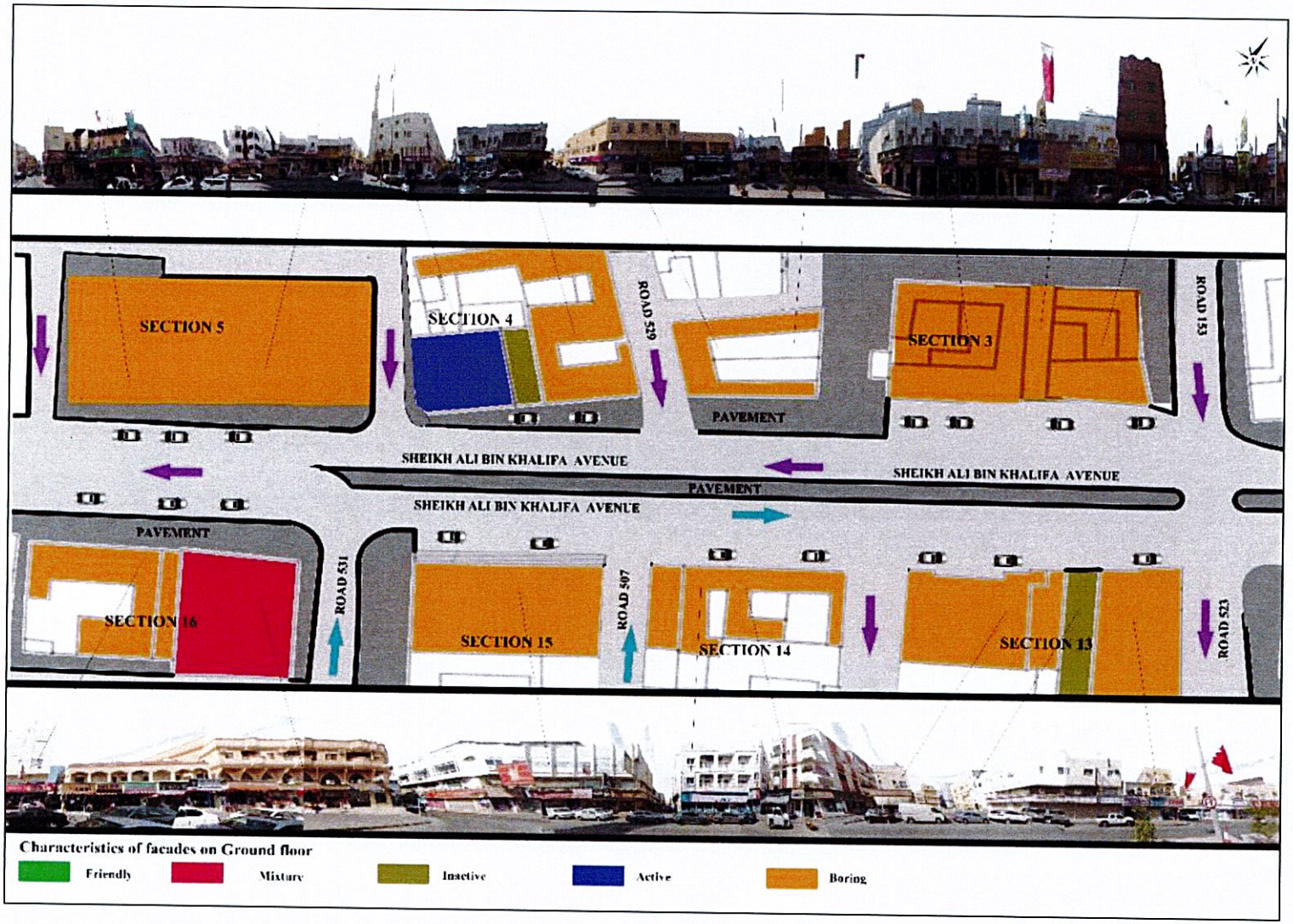



Fig. 4.128: characteristics of the facades of the ground floors of the Sheikh Ali Bin Khalifa Avenue part-2 in Riffa
Source: Author

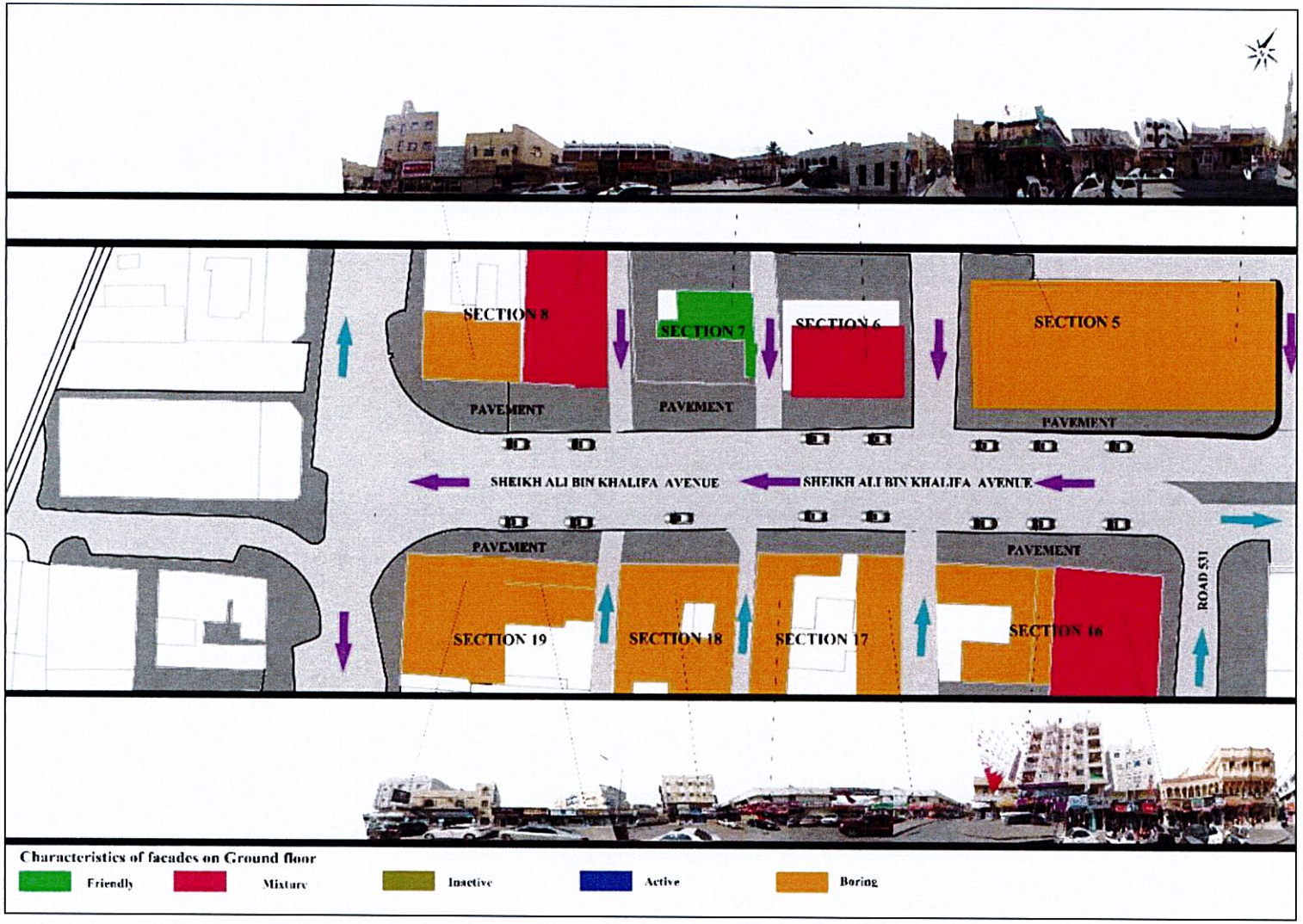



Fig. 4.129: Characteristics of the facades of the ground floors of the Sheikh Ali Bin Khalifa Avenue part-3 in Riffa
Source: author




Fig. 4.130: Characteristics of the facades of the ground floors of the Sheikh Ali Bin Khalifa Avenue in Riffa
Source: Author

### 4.5.1.2 Presence of Vehicles

Overall, the parking vehicles are a visual obstacle on the Sheikh Ali Bin Khalifa Avenue in Riffa. The randomly parked cars discouraged pedestrian circulation. The informally parked cars reduced the width of the roads, which created further haphazard movements of vehicles and pedestrians crossing, creating traffic congestion. There were no formal markings for pedestrian crossings on this street and there are no specific timings for heavy vehicles.

Part 1 of this street, as shown in Fig 4.131, illustrates randomly parked cars visually obstructing the view, reducing the width of the road, and discouraging pedestrian movement, thus reducing liveliness.

Part 2 of this street, as shown in Fig 4.132, shows the cars parked on the pavement in front of shops obstructing the view. Some building fronts don't have pavements for informal parking. At the same time, the middle partition between the two-way road has been removed to increase the width of the road for parked and moving cars.

Part 3 of this street, as shown in Fig 4.133, shows the removal of the partition between the two-way road to make it a one-way road to increase the road width for informal car parking and movements. There is no pedestrian crossing marked in this part of the street. Traffic congestion during peak hours obstructs pedestrian movement, thus making the street a vehicular-dominated area, affecting the liveliness of the street. The reduction of the vehicles during the non-peak hours alters the nature of the street more favorably, making it more open and livelier.

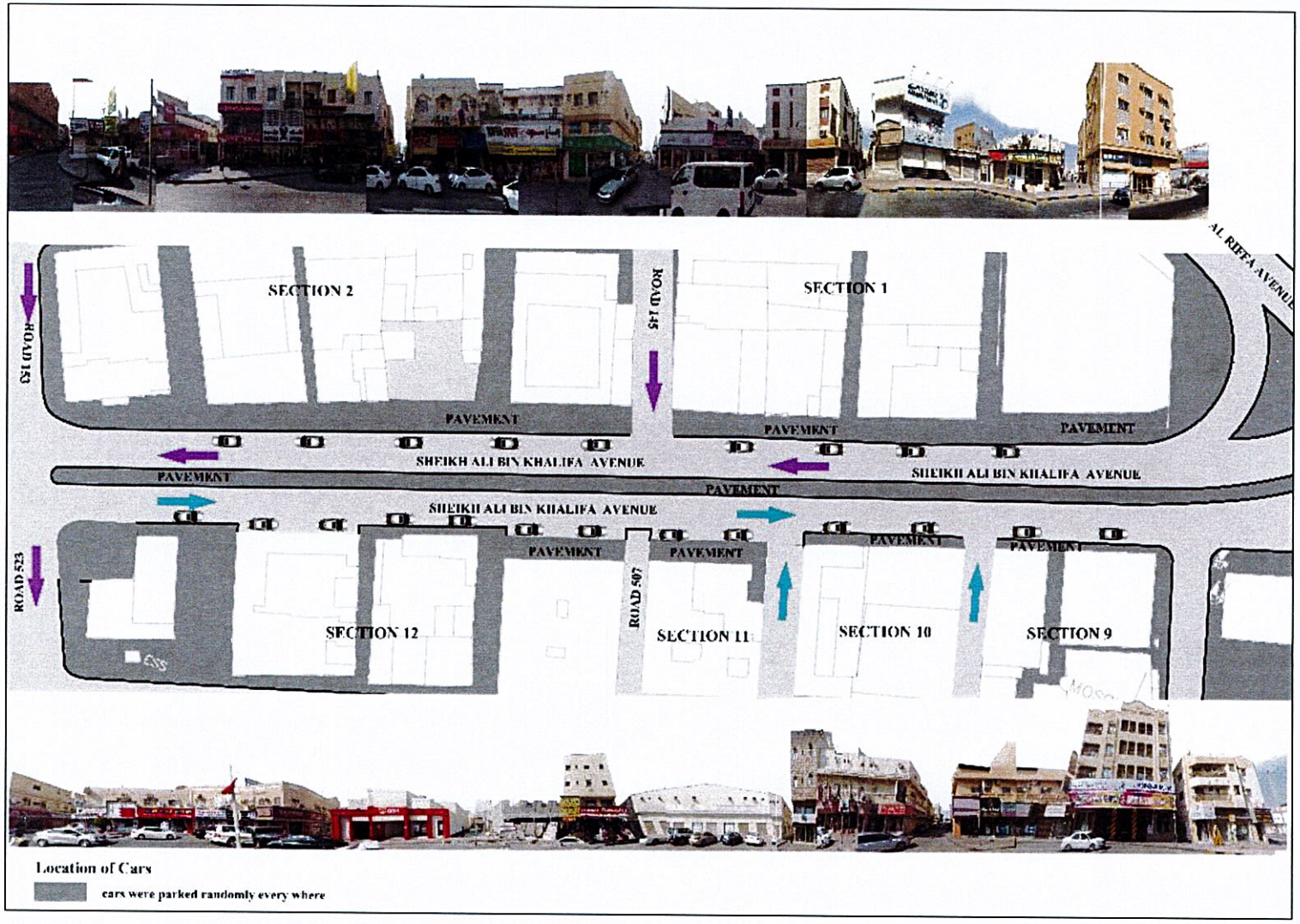



Fig. 4.131: Presence of cars in the Sheikh Ali Bin Khalifa Avenue part-1 in Riffa
Source: Author

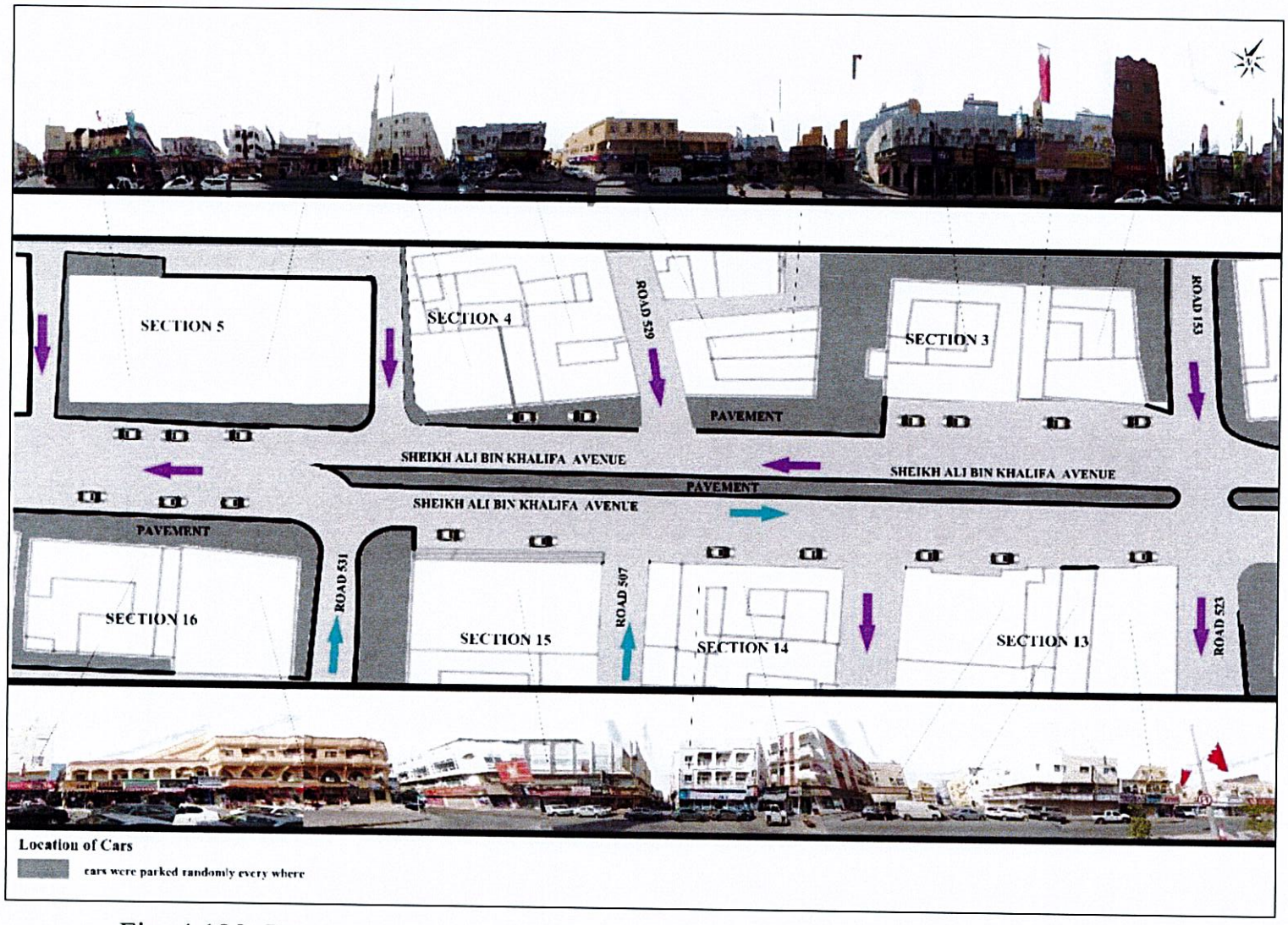



Fig. 4.132: Presence of cars in the Sheikh Ali Bin Khalifa Avenue part-2 in Riffa
Source: Author

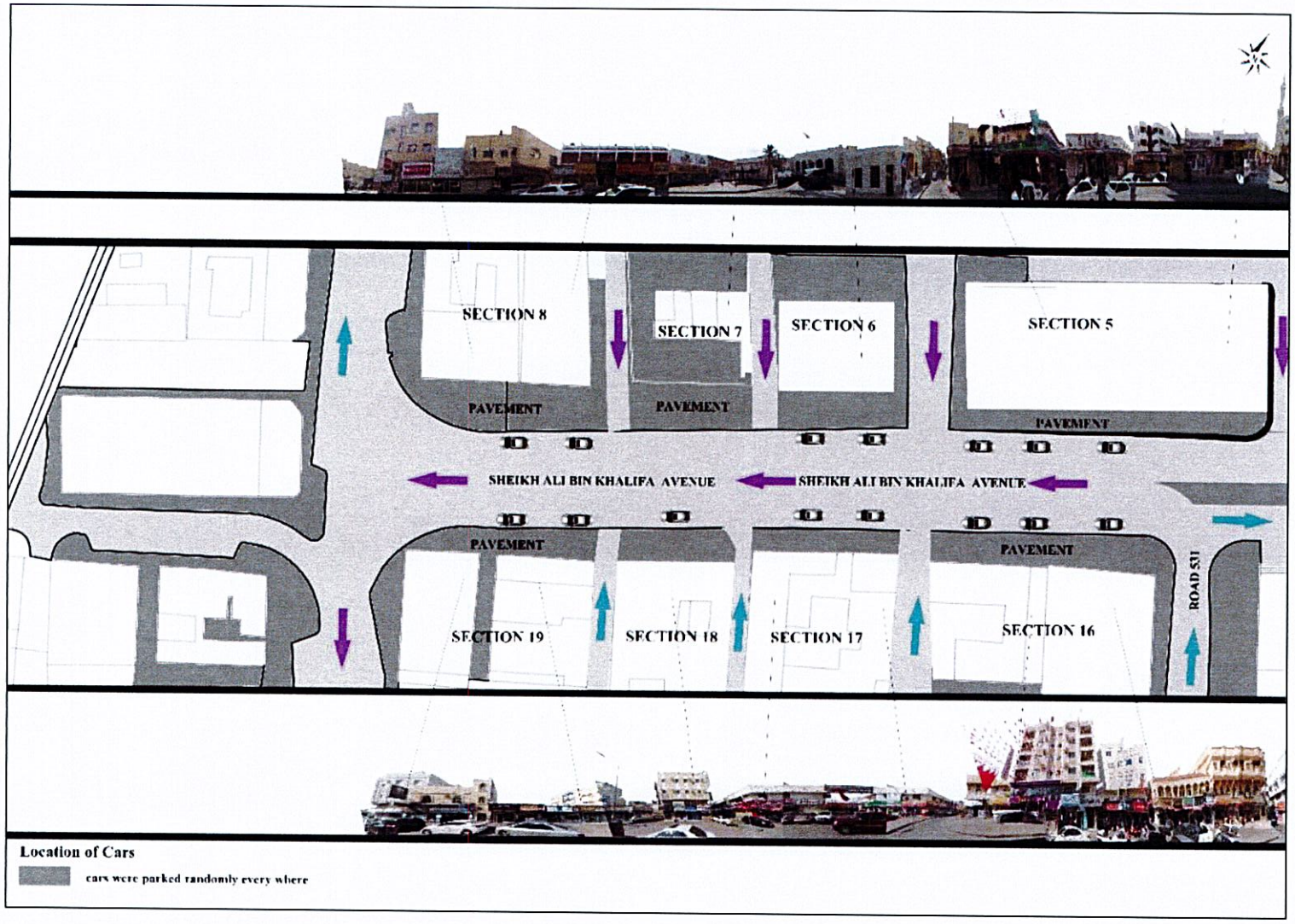



Fig. 4.133: Presence of cars in the Sheikh Ali Bin Khalifa Avenue part-3 in Riffa
Source: Author

### 4.5.1.3 Characteristics of the pavements

Overall, the pavements in the Sheikh Ali Bin Khalifa Avenue in Riffa are dull, non-appealing, and with little or no vegetation. However, changing the asphalt material of the road to pavement attracts visitors' visual stimuli. Most pavements have herringbone pavement blocks with bollards to stop the direct entries of cars. Pedestrians use these streets for safe passage.

Part 1 of the Riffa street, as shown in Figs 4.134 and 4.135, shows the irregular width of pavements. There are blockades of the street with bollards and herringbone pattern pavements in sections S01, S02, S09 & S12. The blockade of the street restricts the direct entry of the vehicles. The pavement road partition allows two-way vehicular access in this street. There are broken pavements in sections S02 & S12 as informal cars were parked on the pavement creating a visual barrier.

Similar to part 1 of this street, Part 2, as shown in Figs 4.136 and 4.137, shows the irregular width of pavements with cars parked over them. The pavements are dull, visually more negligible appealing and have no vegetation. However, the changing material from road to pavement attracts visual stimuli. There is no lighting or marking to direct pedestrians. The internal partition between the road has been removed to increase the movement of cars and informal car parking. A mixture of old and new pavement styles has been used. However, this part of the street uses an overall herringbone pattern.

Part 3 of this street, as shown in Figs 4.138 and 4.139, indicates a pavement accompanied by urban furniture and shades for visitors' social interactions in section 7. In addition, there are varying widths

of the pavement with width increased where there is allocation of shading sitting area. The parking allocation and sidewalks in all the parts of this street have been indicated by changes in the material from asphalt to herringbone pattern concrete. The increased width of pavement in this part of the street provides a friendly atmosphere to the visitors, thus increasing social interactions.

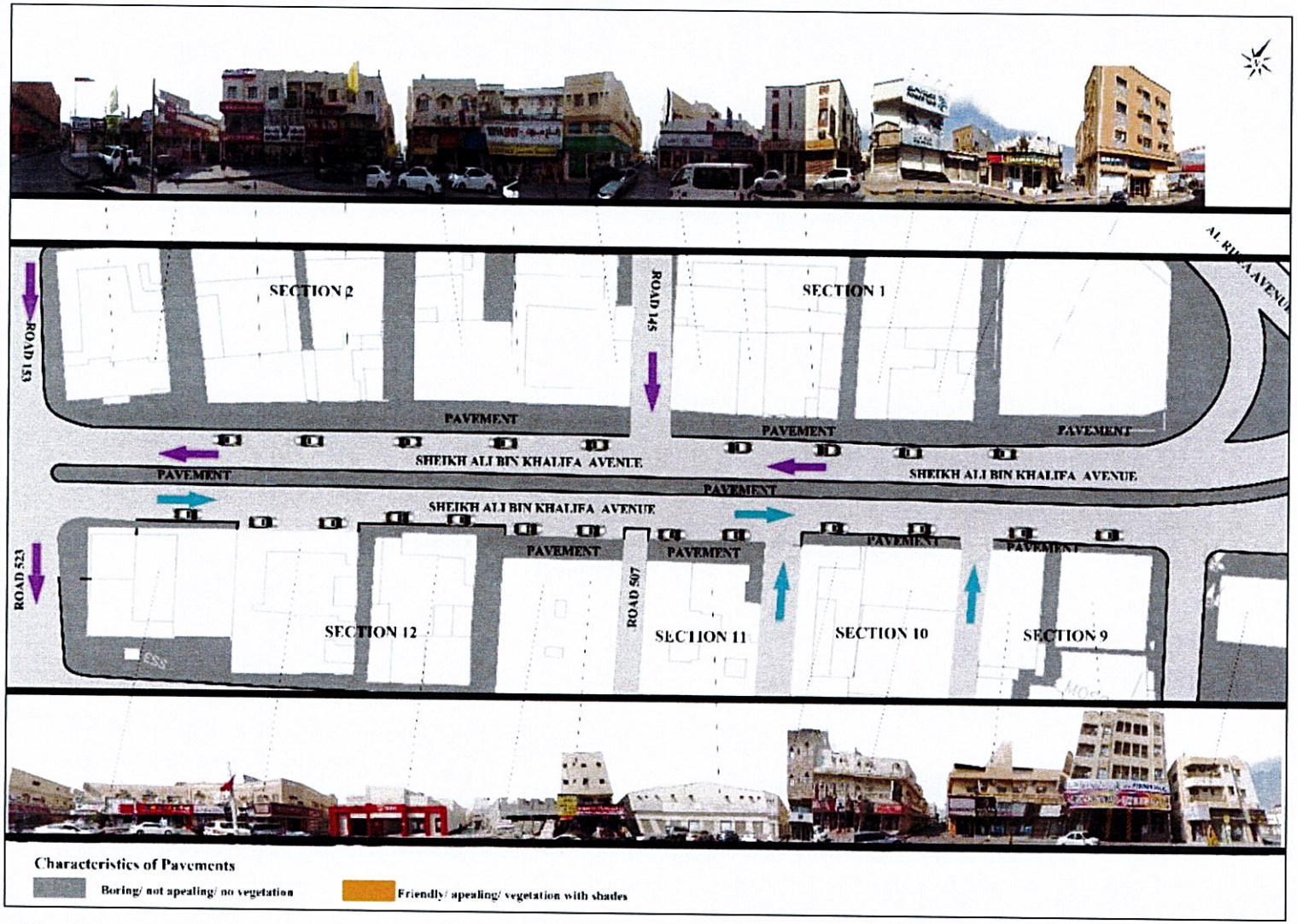
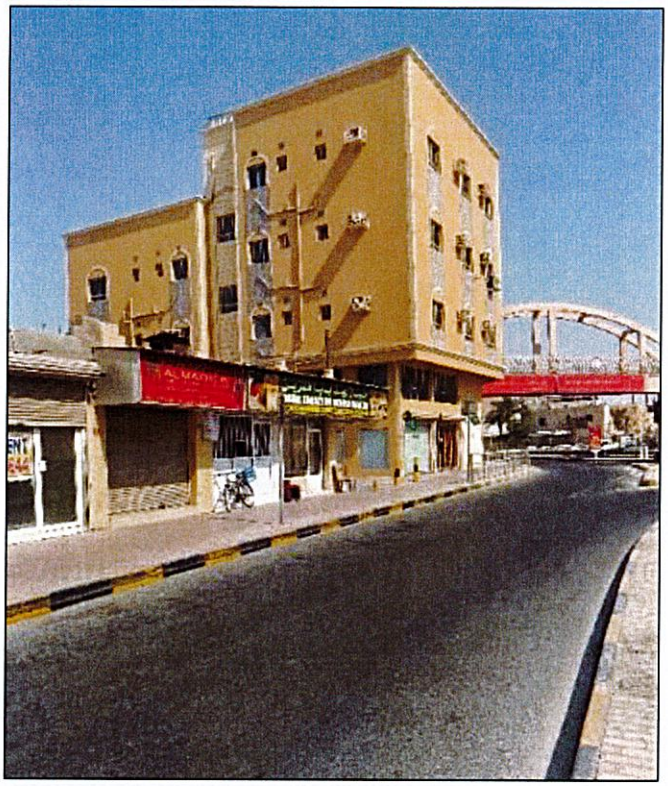
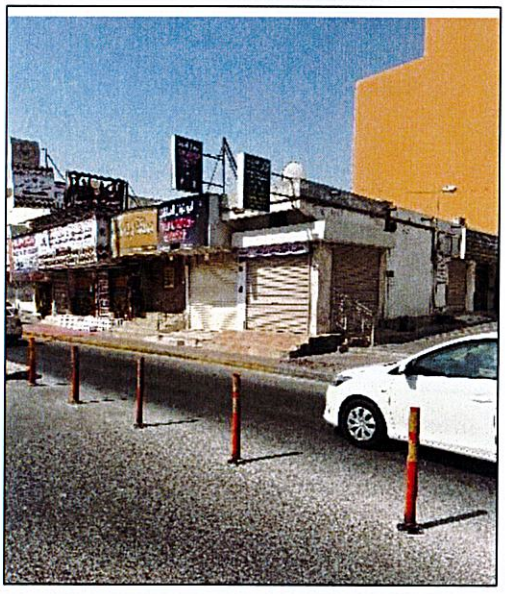



Fig. 4.134: Characteristics of the pavements in the Sheikh Ali Bin Khalifa Avenue part-1 in Riffa
Source: Author





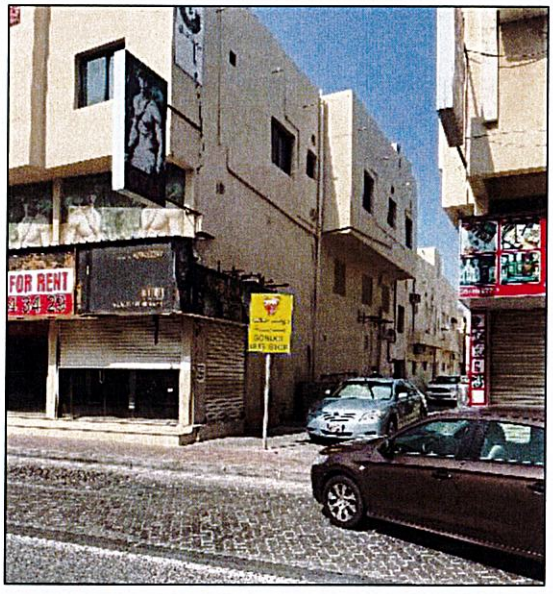



Fig. 4.135: Characteristics of the pavements in the Sheikh Ali Bin Khalifa Avenue part-1 in Riffa
Source: Author

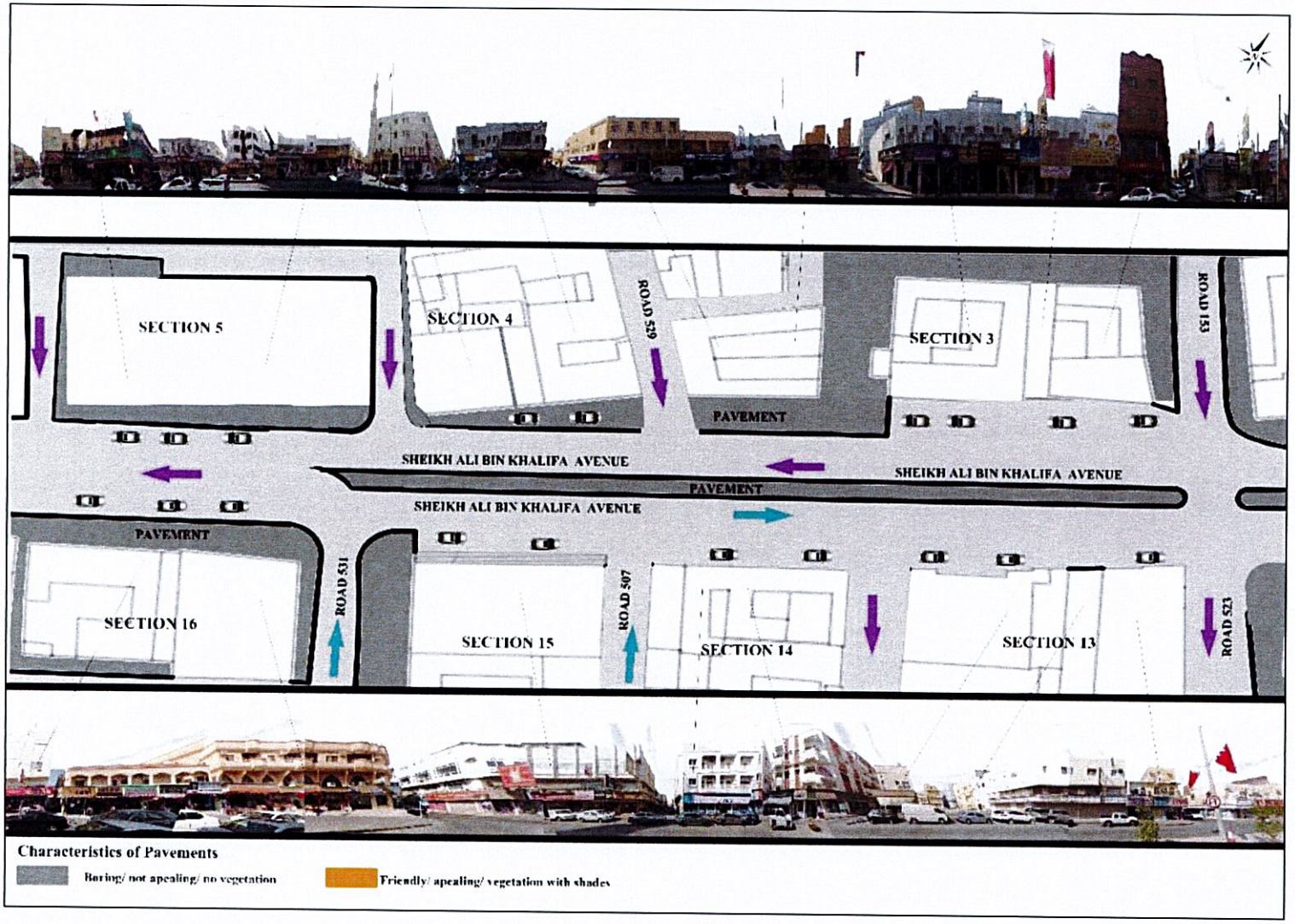



Fig. 4.136: Characteristics of the pavements in the Sheikh Ali Bin Khalifa Avenue part-2 in Riffa
Source: Author

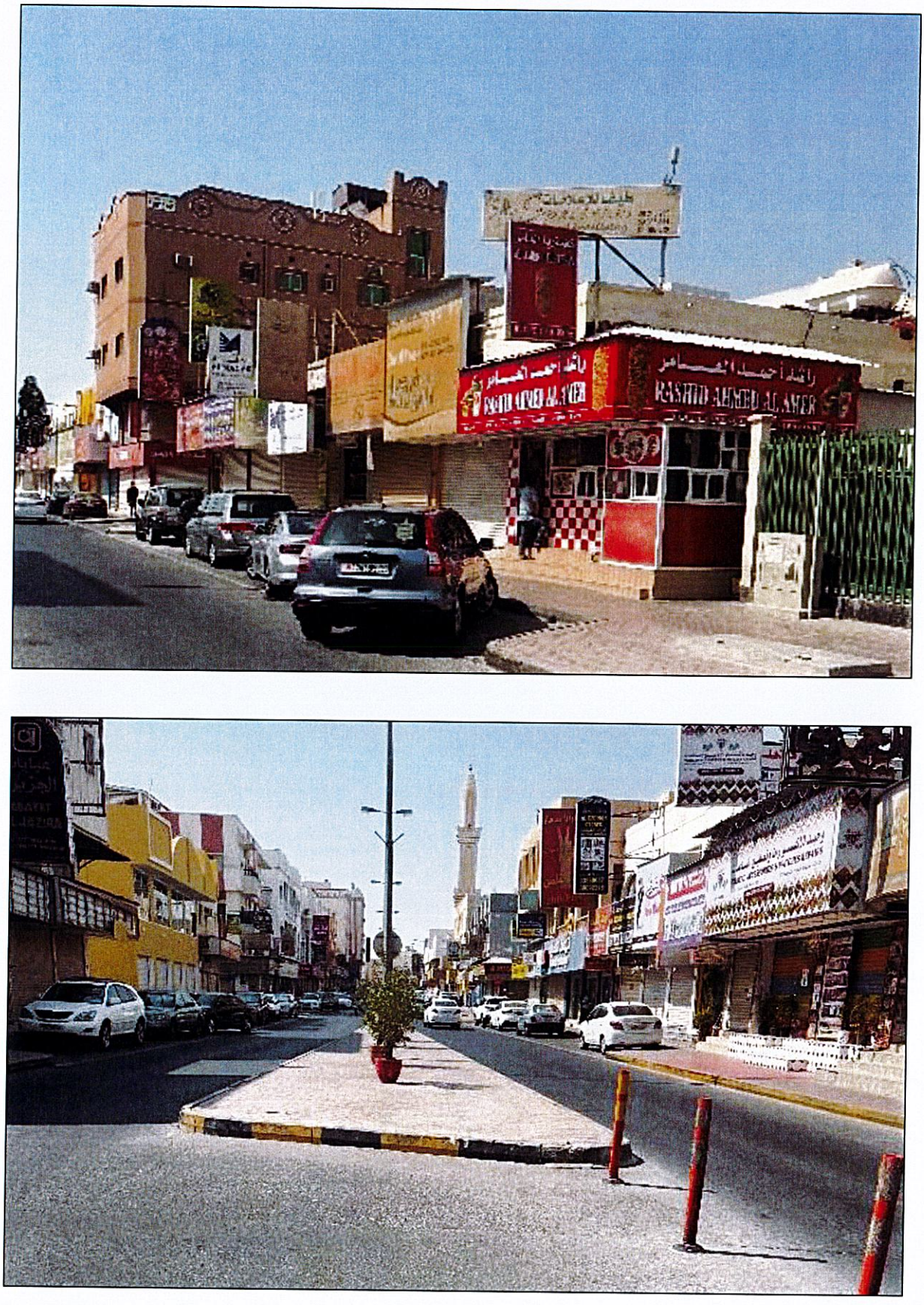



Fig. 4.137: Characteristics of the pavement in the Sheikh Ali Bin Khalifa Avenue part-2 in Riffa
Source: Author

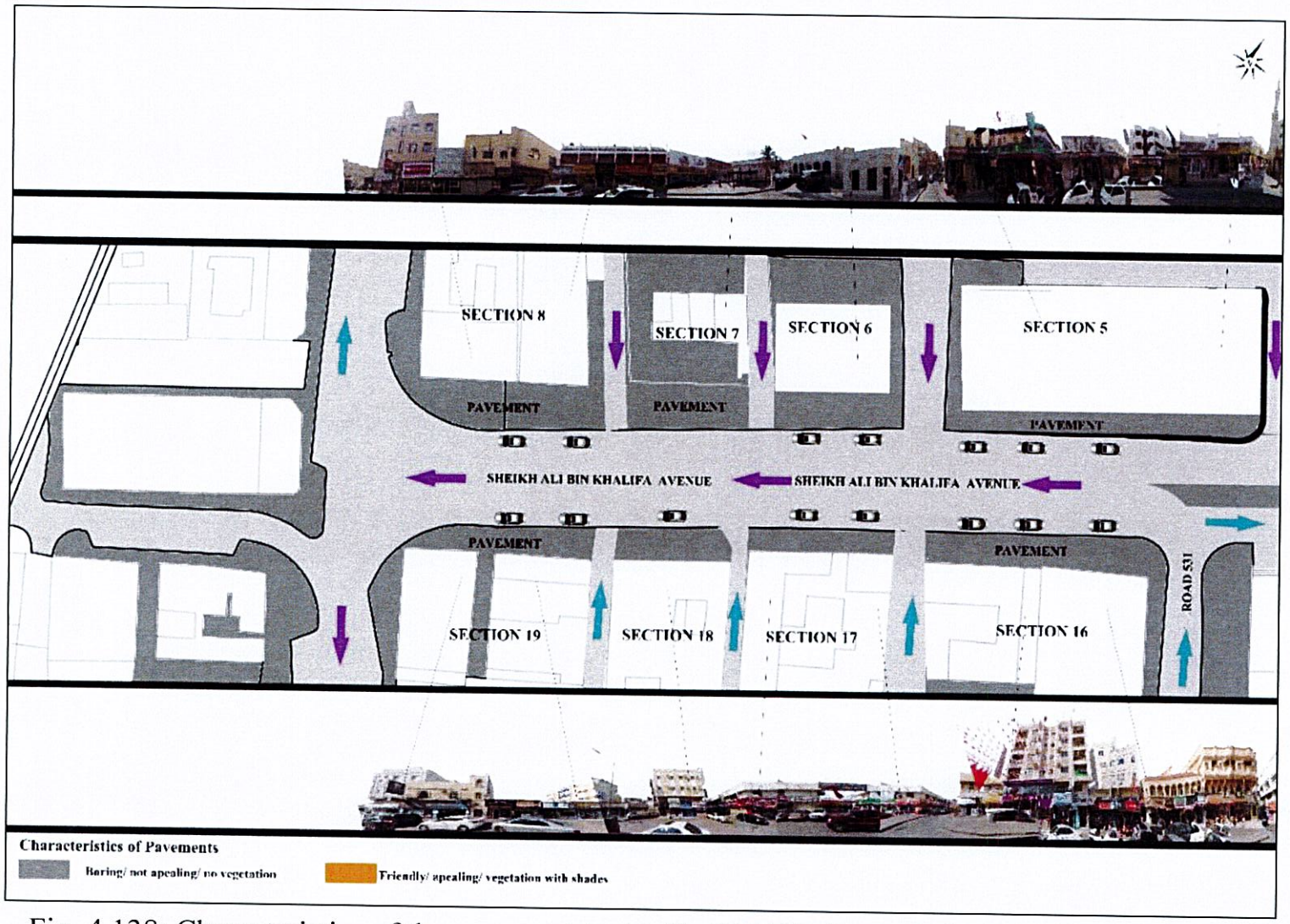



Fig. 4.138: Characteristics of the pavement in the Sheikh Ali Bin Khalifa Avenue part-3 in Riffa
Source: Author



Fig. 4.139: Characteristics of the pavement in the Sheikh Ali Bin Khalifa Avenue part-3 in Riffa
Source: Author

### 4.5.1.4 Effect of visual stimuli on social interactions

Generally, in terms of façade character, there was a link between social interactions and façades classified as friendly, active, or mixed. As shown in Figs 4.140 and 4.141part 1 of the street, mostly standing, working, and sitting, while chatting occurred in front of active and mixture facades. Walking and talking usually happened in front of dull facades with less pavement width and more obstruction of cars. However, the function of the space might enhance the façade. For instance, the façade of the Café and bakery is categorized as dull, although people were standing and informally sitting and socializing here. Even passers-by would stop and stand to speak with customers seated on the outside steps. This third space's usage and purpose impacted this case's social interactions.

Part 2 of the street, as shown in Figs 4.142 and 4.143, mostly had standing, sitting and chatting in front of the active and mixture facades. In addition, working, talking, standing, sitting and chatting between customers and shop owners. This interaction is primarily because of retail spaces, although the façade characteristics were boring. The attractive ground floors, the term is given where social interactions occurred due to retail spaces of the ground floor. The intensity of interactions varied from weekday to weekends, with interactions increasing during the weekends.

In Part 3 of the street, as shown in Fig. 4.144 and 4.145, the nature of the façades shifted from somewhat dull and inert to dynamic, fascinating, and friendly. This resulted in either exciting or monotonous visual environments, connected to street vibrancy depending on the locations of social interaction occurrences, which

varied accordingly. While functions of the street upgraded the façade character, people were sitting, standing and engaging in this part of the street characteristics and width of pavements and the roadway. The availability of urban furniture and shaded areas increased social interactions in this part of the street. However, it is observed that there was an absence of outstanding visual landmarks in all parts of the street, attracting visitors towards them to create space affiliation.

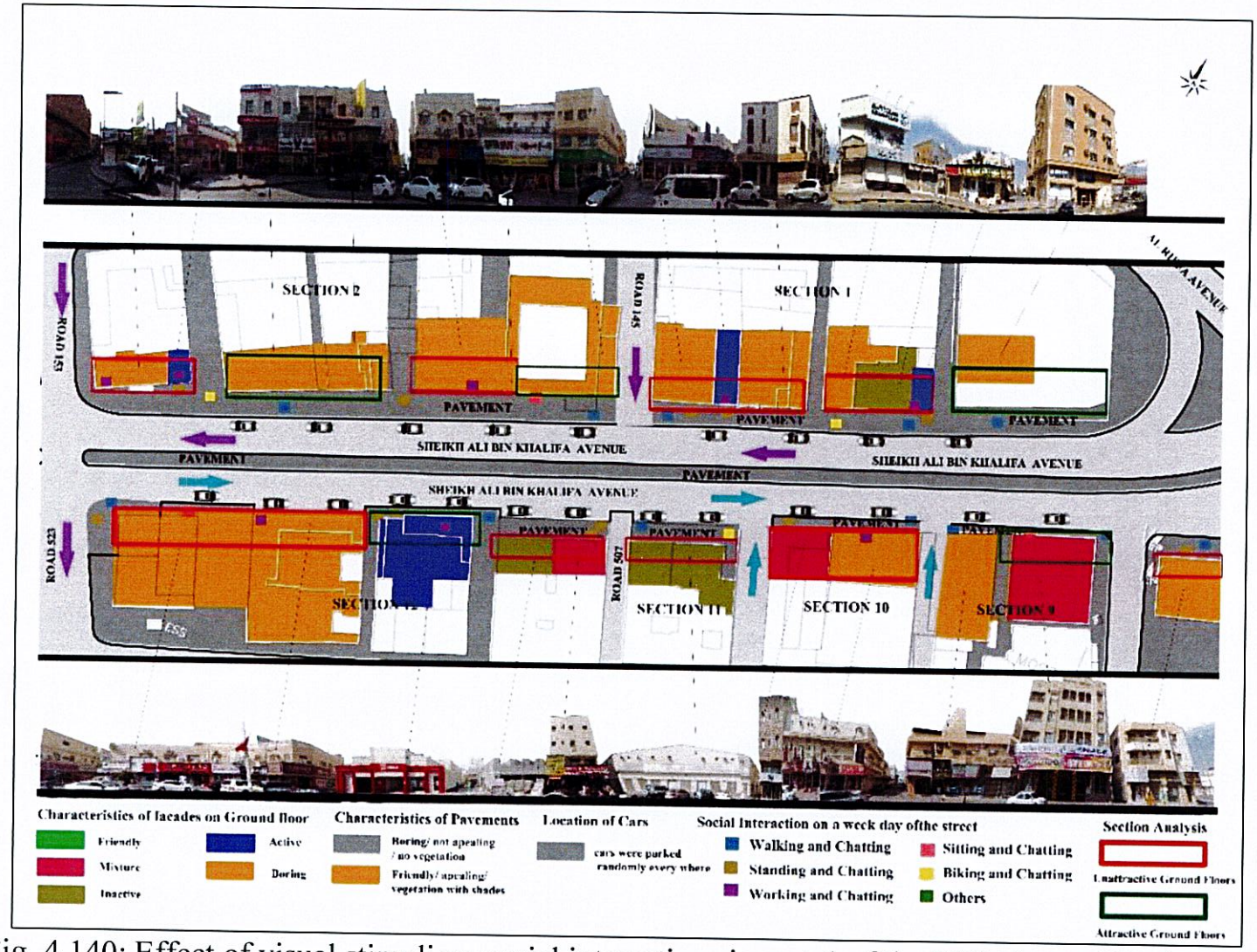



Fig. 4.140: Effect of visual stimuli on social interactions in part-1 of the Riffa Street- Week Day
Source: Author

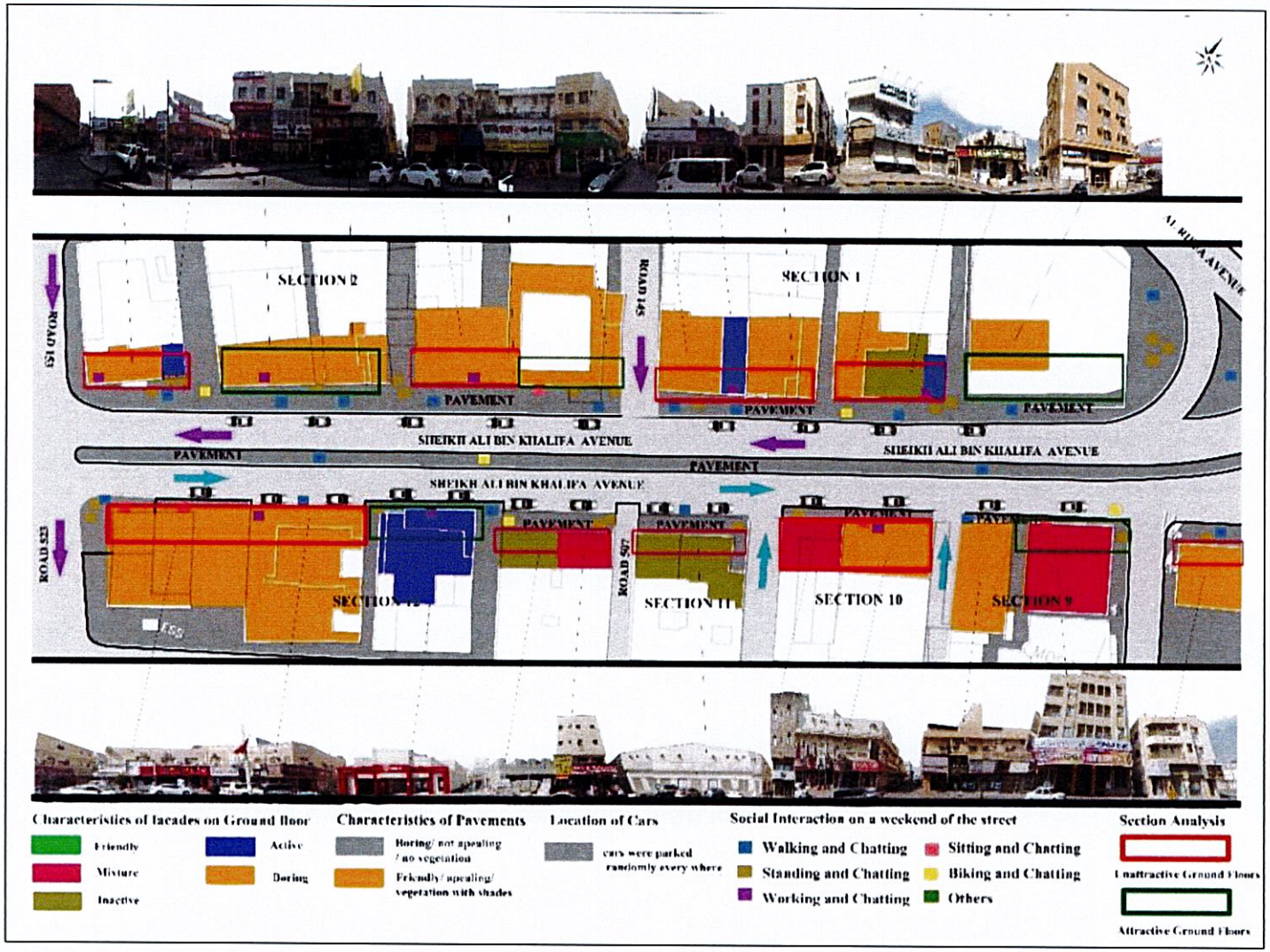



Fig. 4.141: Effect of visual stimuli on social interactions in part-1 of the Riffa Street- Weekend
Source: Author

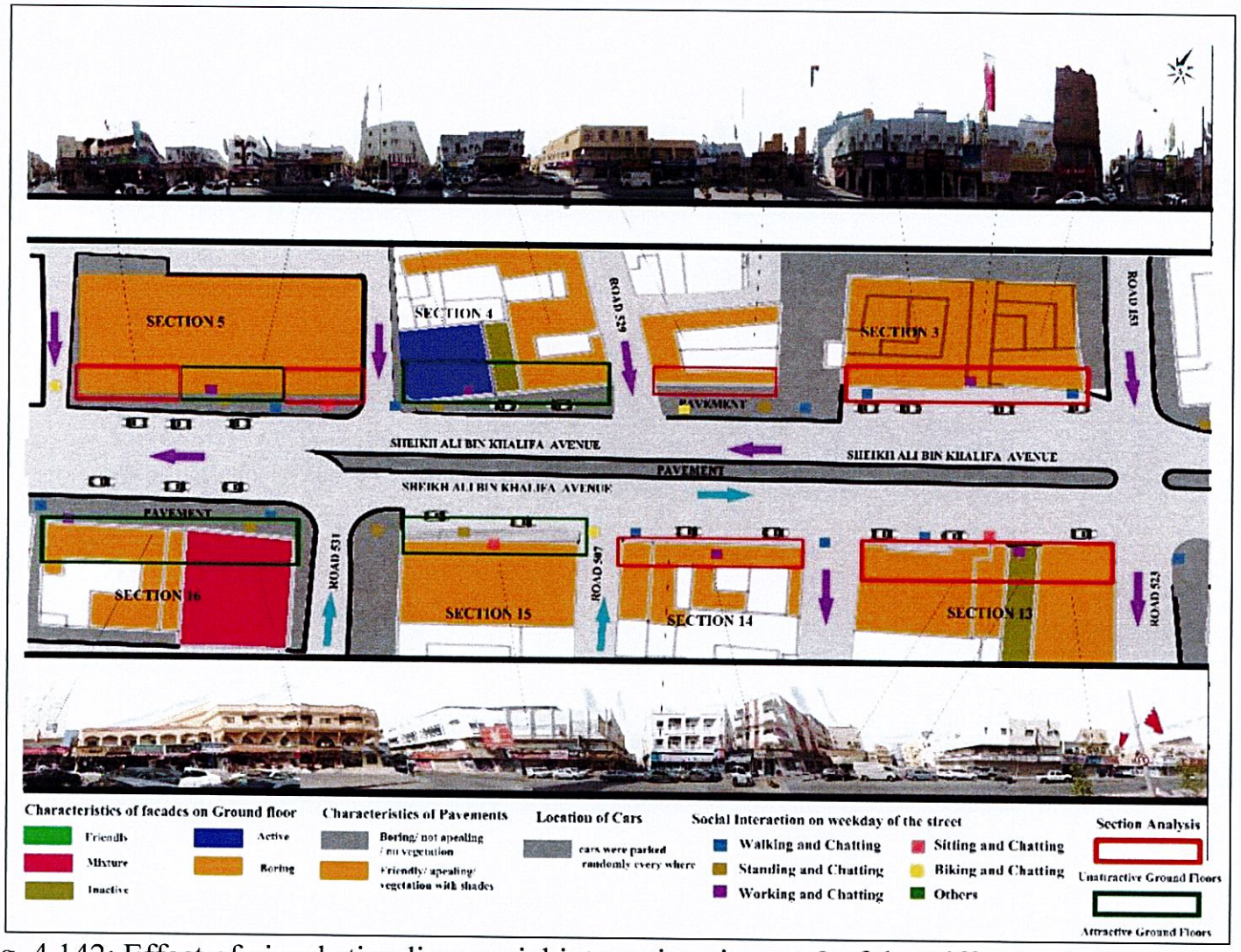



Fig. 4.142: Effect of visual stimuli on social interactions in part-2 of the Riffa Street- Week Day
Source: Author

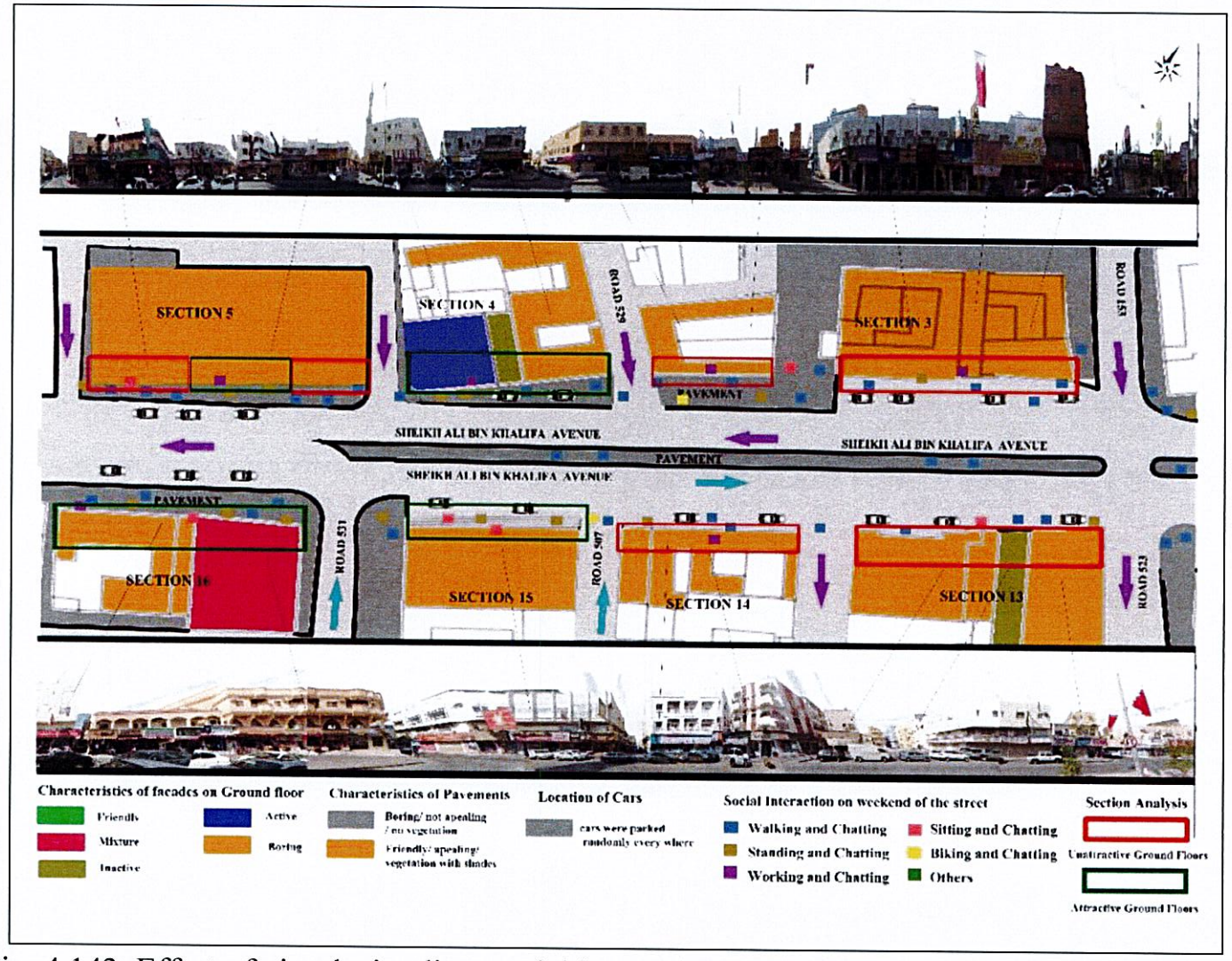



Fig. 4.143: Effect of visual stimuli on social interactions in part-2 of the Riffa Street- Weekend
Source: Author

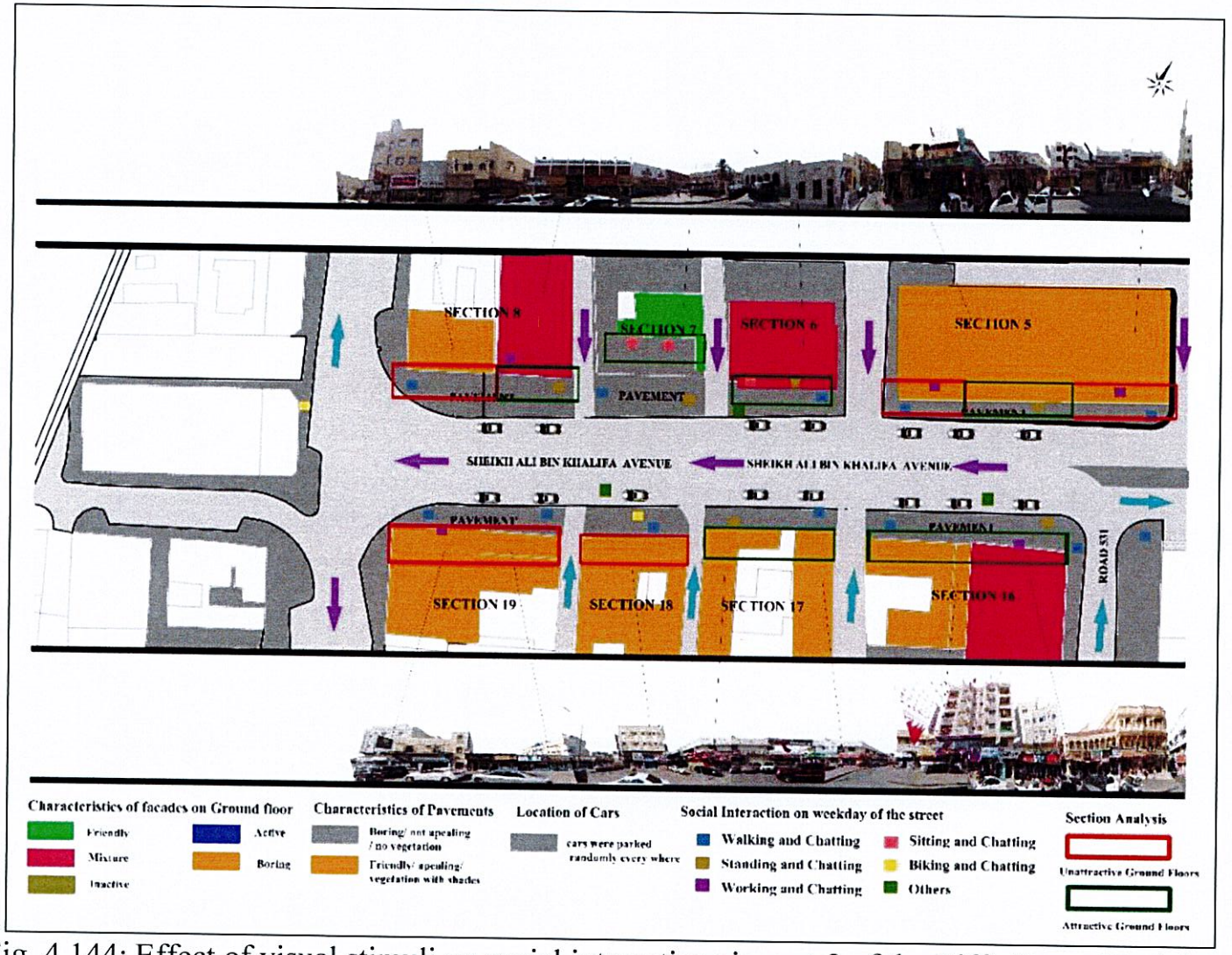



Fig. 4.144: Effect of visual stimuli on social interactions in part-3 of the Riffa Street-Weekday
Source: Author

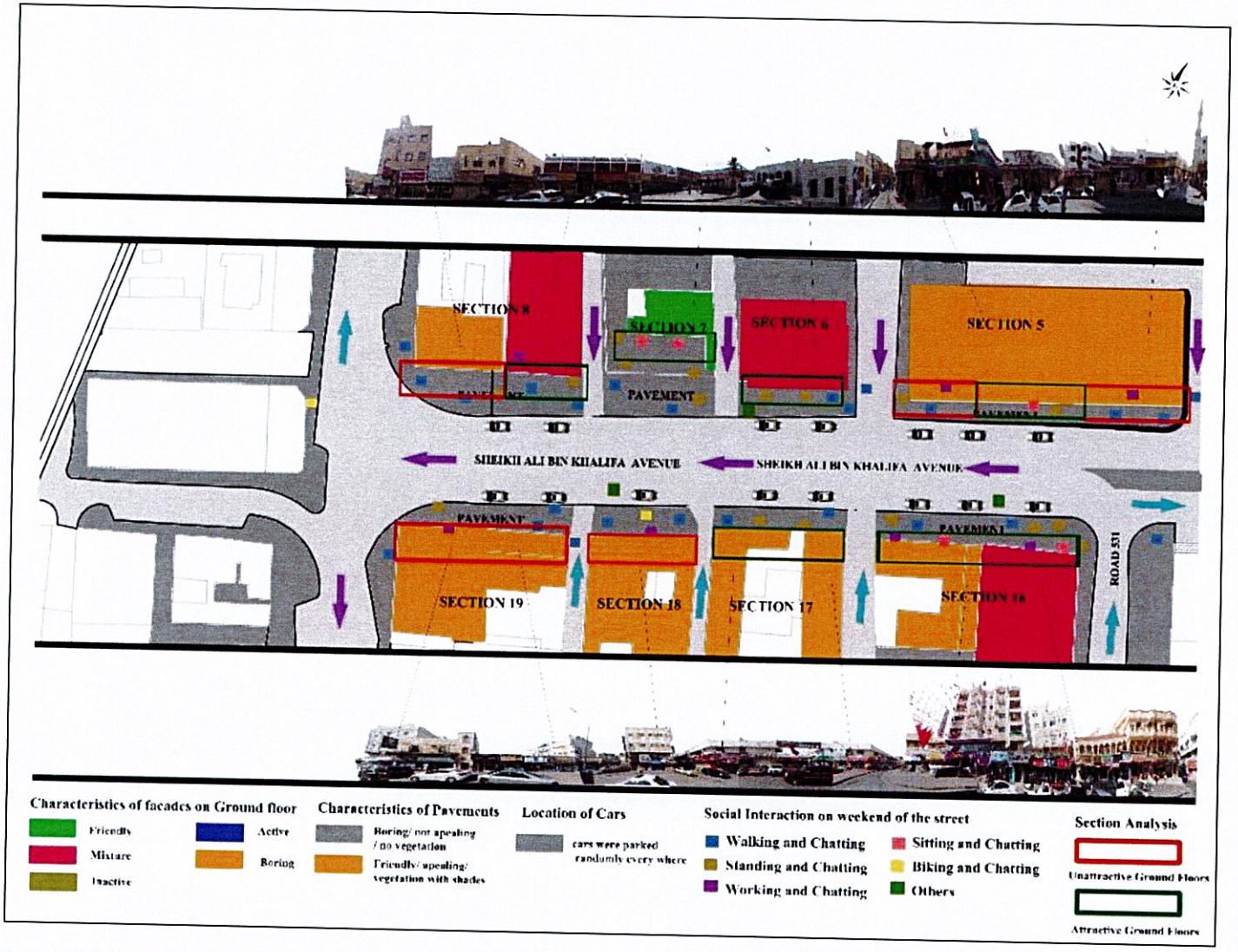



Fig. 4.145: Effect of visual stimuli on social interactions in part-3 of the Riffa Street-Weekend
Source: Author

### 4.5.2 Soundscapes

As an auditory atmospheric stimulus, the soundscape of the street changes during the day, than over the week. Fig. 4.146 shows the general sounds in Riffa Street. However, in general, there is continuous whirring and sweeping background sound. One may hear several sound sources in terms of passing vehicles, people conversing, the regular and periodic sound of the electric machines and prayers from the Mosque repeatedly throughout the week and on weekends.

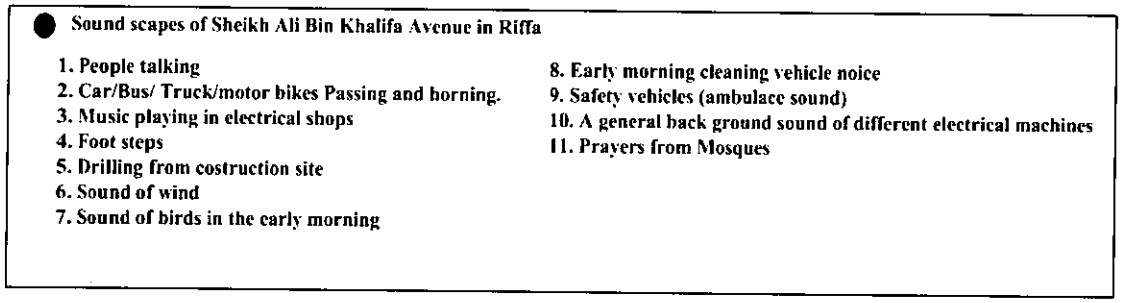



Fig. 4.146: General Sounds in the Riffa Street
Source: Author

#### 4.5.2.1 Weekday soundscapes of Riffa Street at spot 1

On the morning of a weekday (about 7.00 a.m.), the soundscape in spot 1 at the Riffa street, as shown in Fig. 4.147, is considerably quieter and calmer, where one can hear the sound of winds, birds, and footsteps. However, during the midday hour (about 9.00 a.m.to 1.00 p.m), spot 1 is significantly noisier with more vehicles passing, music playing from electronic shops, drilling from the construction site and people talking. Spot 1 becomes calmer again at noon (about 1.00 p.m. to 3.00 p.m.) with fewer people talking, reduced vehicles and partially closed shops.

Closer to the first part of the Riffa street, one could hear increased traffic and sound from passing automobiles in the soundscapes due to

its proximity to the Al Riffa avenue. Bumping sounds from cars are heard more frequently in spot one throughout the week than on the weekends. The bakery and cafeteria make the street lively on particular day hours with people chatting.

#### 4.5.2.2 1 Weekend soundscapes of the Riffa street at spot

As shown in Fig. 4.148, spot 1 is significantly louder during the weekend, with most of the sound generated by vehicles. On the other hand, one can hear the high volume of people chatting while performing their activities. In addition, there were Friday prayers and window shoppers on the street at the sound recording time(noon). The noise on the spot one on the weekend is louder and dispersed with a scattered peak from car sounds, social scapes and events on the ground floor.

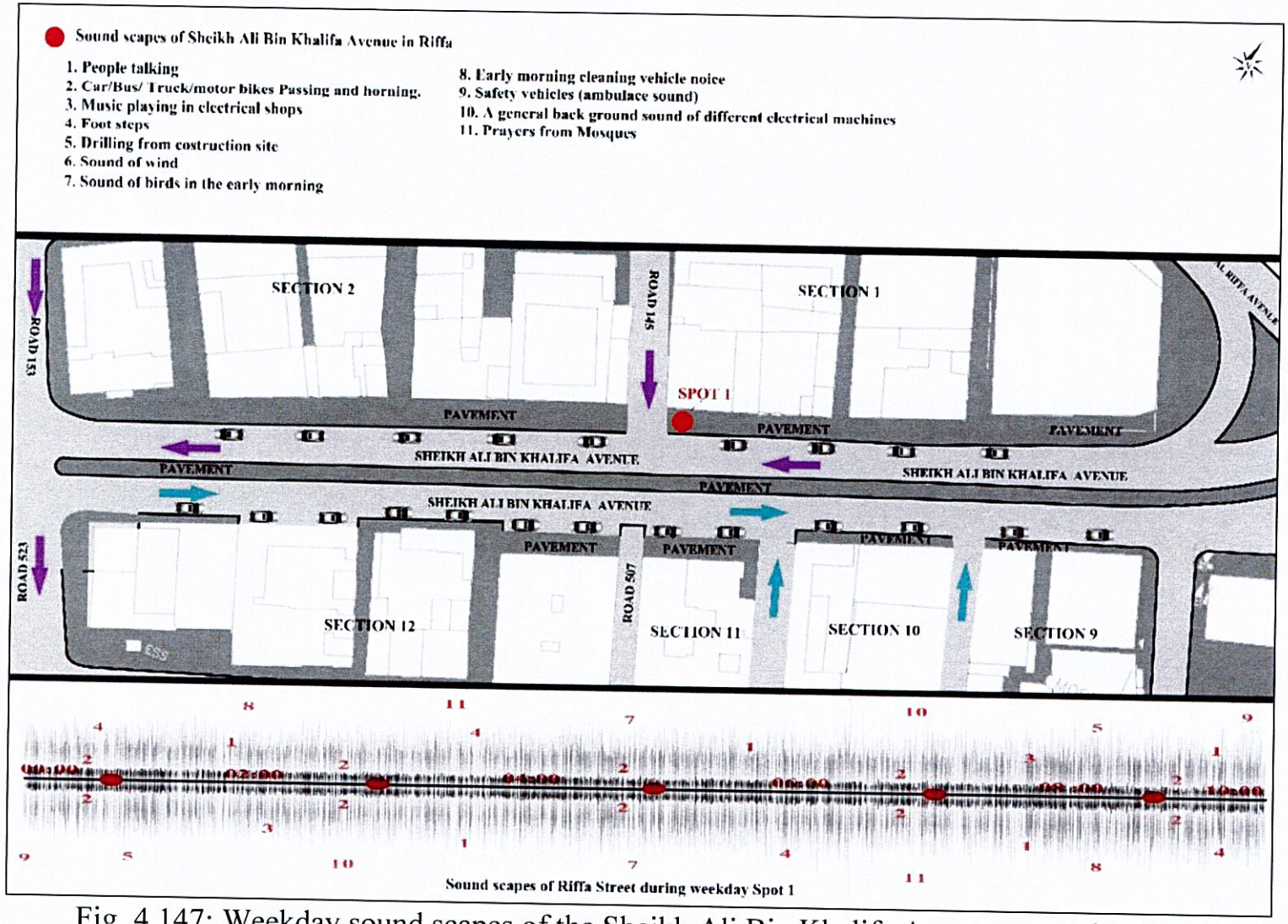



Fig. 4.147: Weekday sound scapes of the Sheikh Ali Bin Khalifa Avenue spot 1 in Riffa
Source: Author

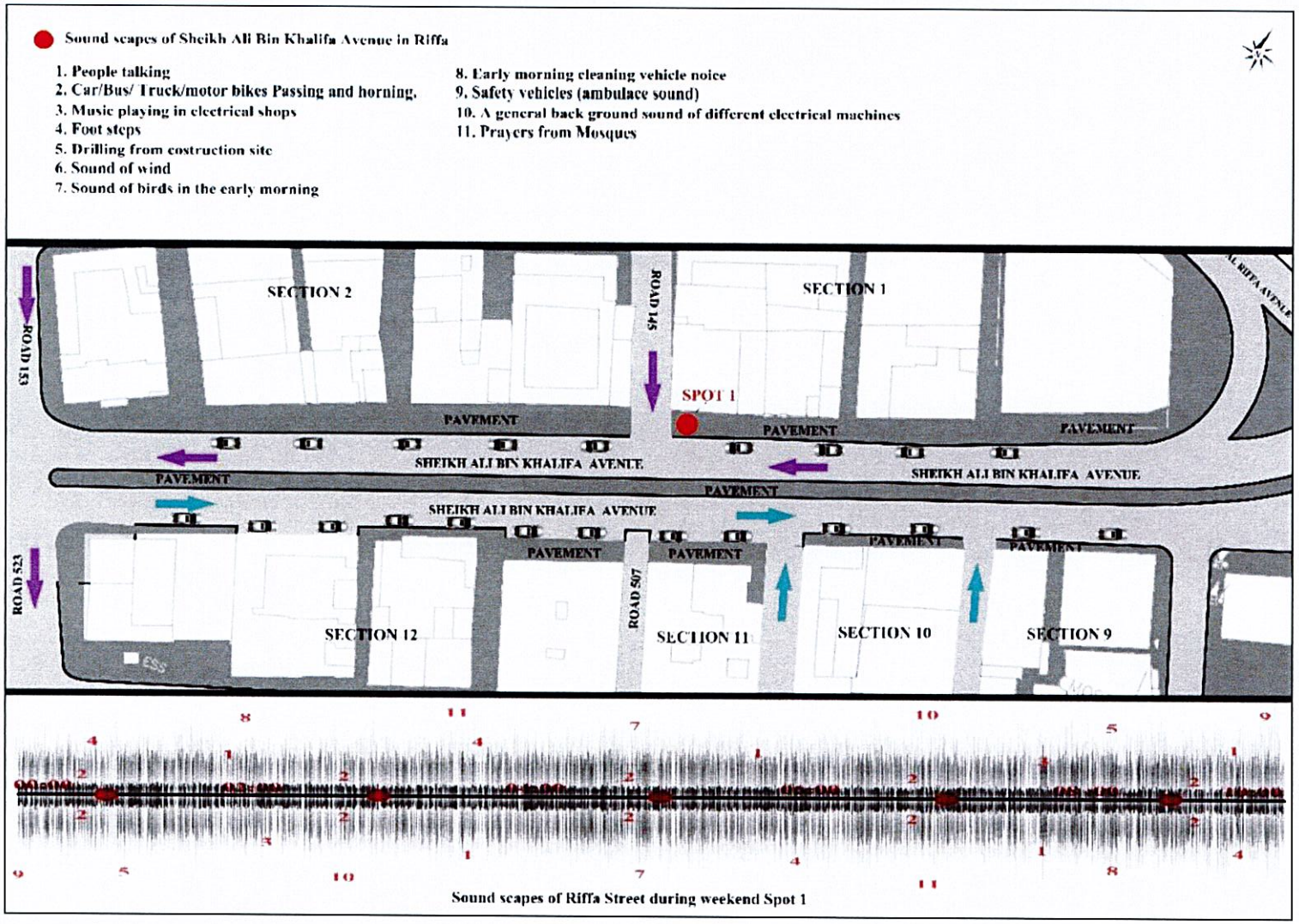



Fig. 4.148: Weekend sound scapes of the Sheikh Ali Bin Khalifa Avenue spot 1 in Riffa
Source: Author

### 4.5.2.3 Weekday soundscapes of the Riffa Street at spots 2 & 3

On a weekday morning (about 7.00 a.m.) at spots 2 and 3, as shown in Fig. 4.149, the soundscape is calmer and quieter with the sound of birds, winds, simple footsteps passing, and the occasional sound of cleaning vehicles. However, during the midday hour (about 9.00 a.m.to 1.00 p.m), spots 2 and 3 become noisier, with sounds emerging from vehicles passing, people chatting and noon prayer. The pitch of voice arising from noon prayer and people speaking is higher in spot 3 than in spot 2. There is a drilling sound that can be heard far from spot 1.

The spot becomes calmer again in the afternoon (about 1.00 p.m.to 3.00 p.m) due to fewer movements of people and less noise from vehicles. While both Spots 2 and 3 are calmer than spot 1 due to their less proximity to Al Riffa avenue. Spot 3 is more peaceful than spot 2 due to more open space. In spot 2 of this street, the sound of people chatting is higher due to banks and retail services. The change in sound levels indicates that the activity level rises throughout the day.

### 4.5.2.4 Weekend soundscapes of Riffa Street at spots 2 & 3

During the midday hour of the weekend, as depicted in Fig. 4.150, it is observed that spot 2 is louder than spot 3 due to the proximity of mosques and Friday prayer being held at the time of recording. However, spot 3 has more piercing sounds during the noon due to several retail shopping activities and people chatting in this spot. Sounds in both Spot 2 and 3 are higher than spot 1. However,

the background sound of cars is reduced in these spots as compared to spot 1.

Spots 2 and 3 generally have dispersed sound and higher peaks than other spots. In addition, the regular background sounds of electrical machines are usually unheard-of during noon due to many activities happening at both locations. The sound intensity might be attributed to a dense building framework in the center of the segment and fewer crossings or at both ends of streets where the sounds could disperse.

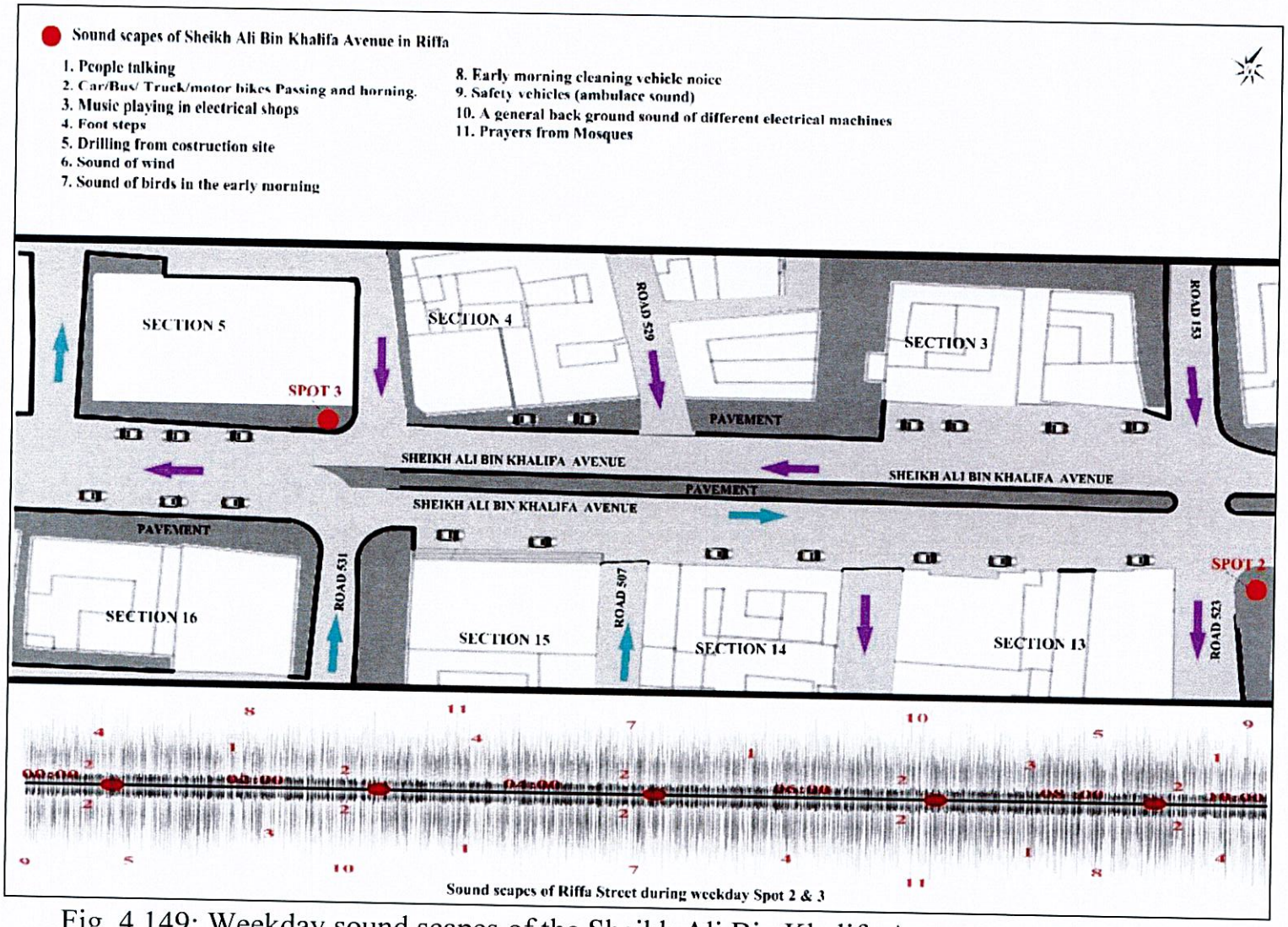



Fig. 4.149: Weekday sound scapes of the Sheikh Ali Bin Khalifa Avenue spot 2 &3 in Riffa
Source: Author

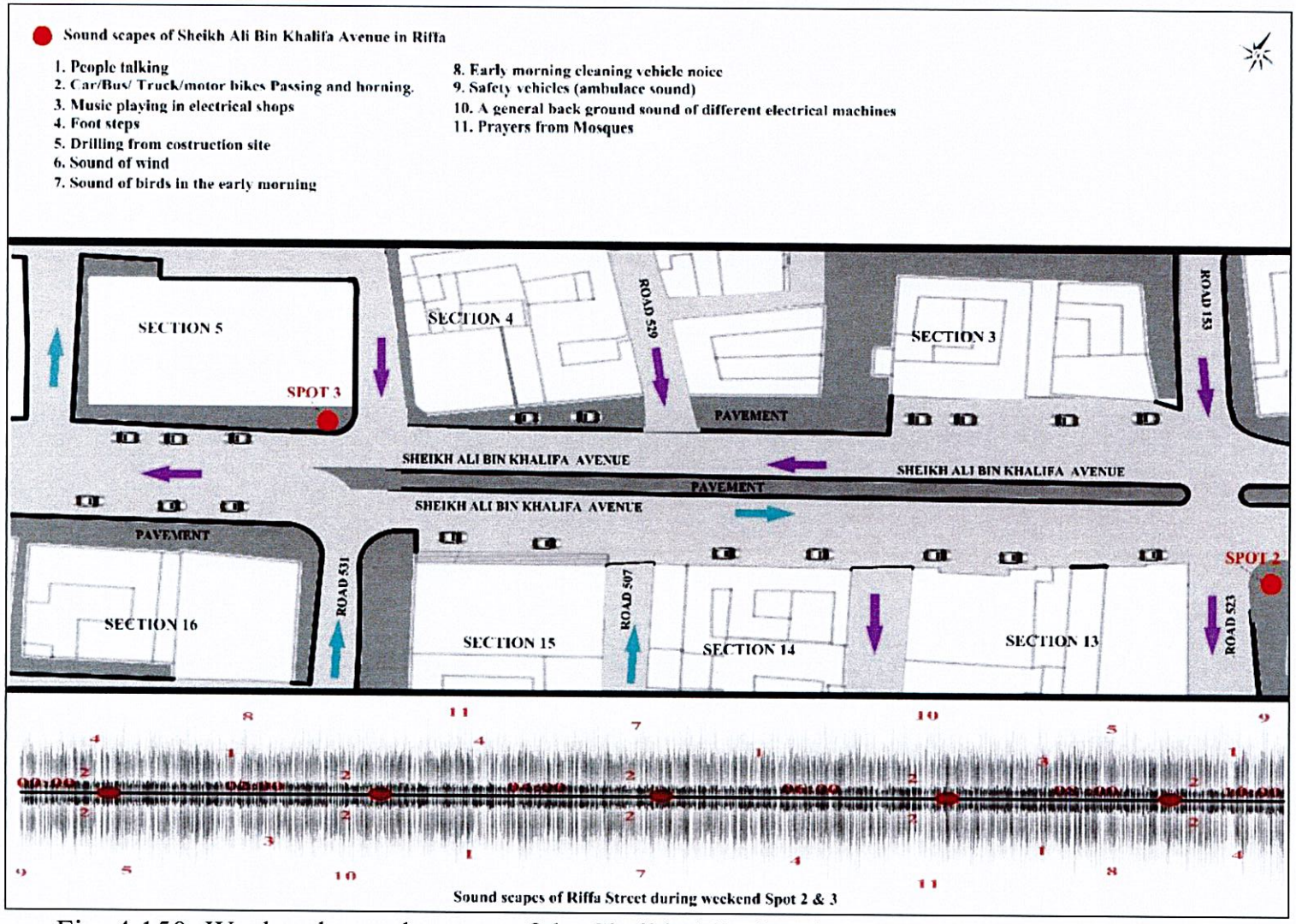



Fig. 4.150: Weekend sound scapes of the Sheikh Ali Bin Khalifa Avenue spot 2 &3 in Riffa
Source: Author

### 4.5.2.5 Soundscapes of the Riffa Street - Weekdays at spot 4

Overall, the soundscapes at spot 4 as shown in Fig. 4.151, are much quieter and calmer than spots 1, 2 & 3 during the weekday. The greater width of the road reduces the sounds of vehicles compared to other locations. On a typical morning of a weekday (about 7.00 a.m.), there is a higher sound of birds due to a lot of food being given at section 6 of the street.

The sound of the wind is partially heard due to more open space in the street. During the midday hour (about 9.00 a.m.to 1.00 p.m), a general sound of people chatting is heard due to the availability of a shaded sitting area. The continuous background sounds of cars can be heard with dispersed sounds. There are not too many scattered sounds in this spot. The street becomes calmer from noon (about 1.00 p.m.to 3.00 p.m) due to the partial closure of the shops. The movements of people are reduced during this time.

### 4.5.2.6 Soundscapes of the Riffa street during the weekend at spot 4

Spot 4 as shown in Fig. 4.152, is usually louder during the noon due to the availability of a shaded sitting area. The sound of birds and winds can be heard frequently in this spot. In addition, traffic sounds were lower in this spot compared to spots 3 and 4. Conversations could be held without raising one's voice at these spots. The street's soundscape changes across this street, with louder sounds from vehicles in the South.

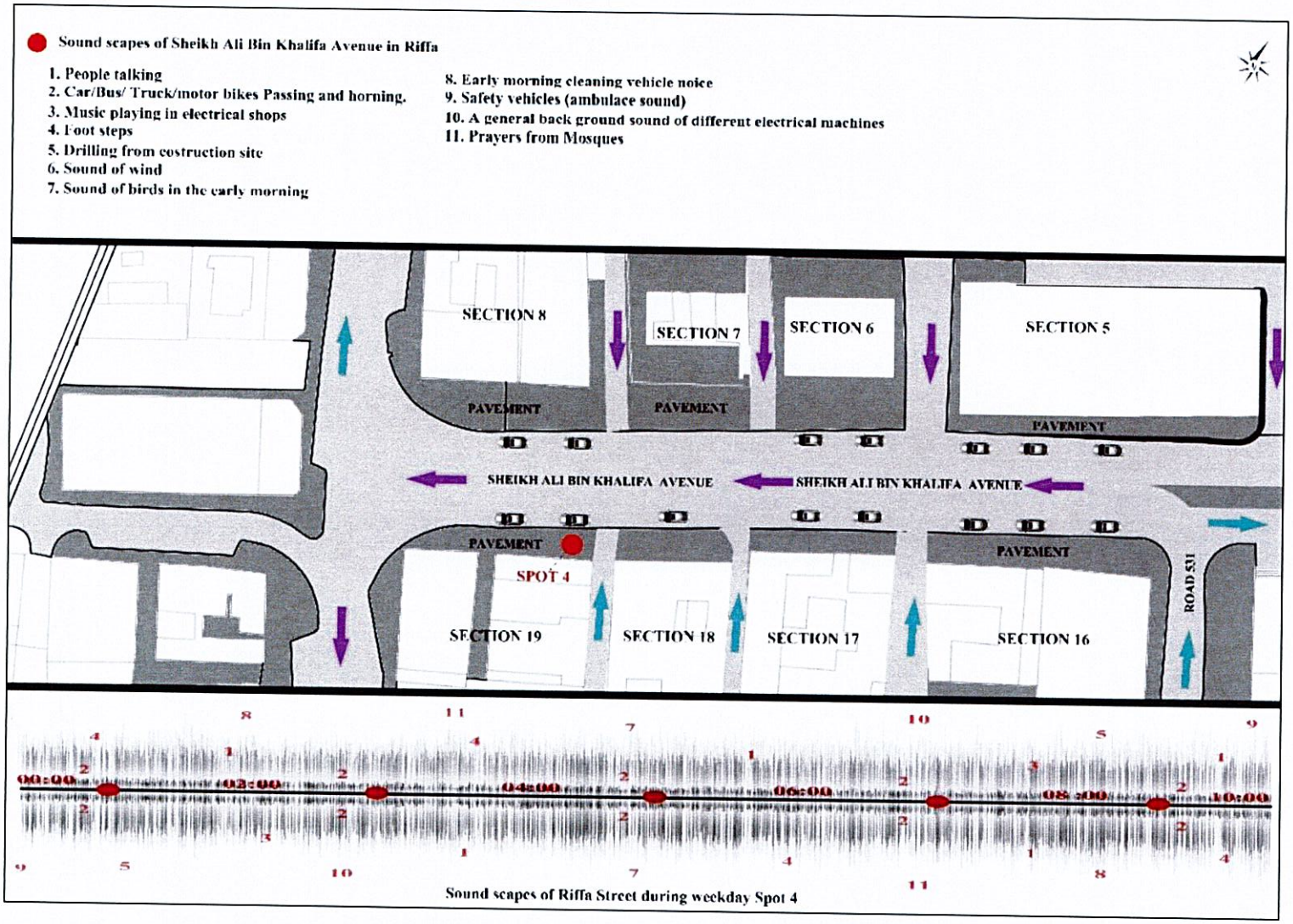



Fig. 4.151: Weekday sound scapes of the Sheikh Ali Bin Khalifa Avenue spot 4 in Riffa
Source: Author

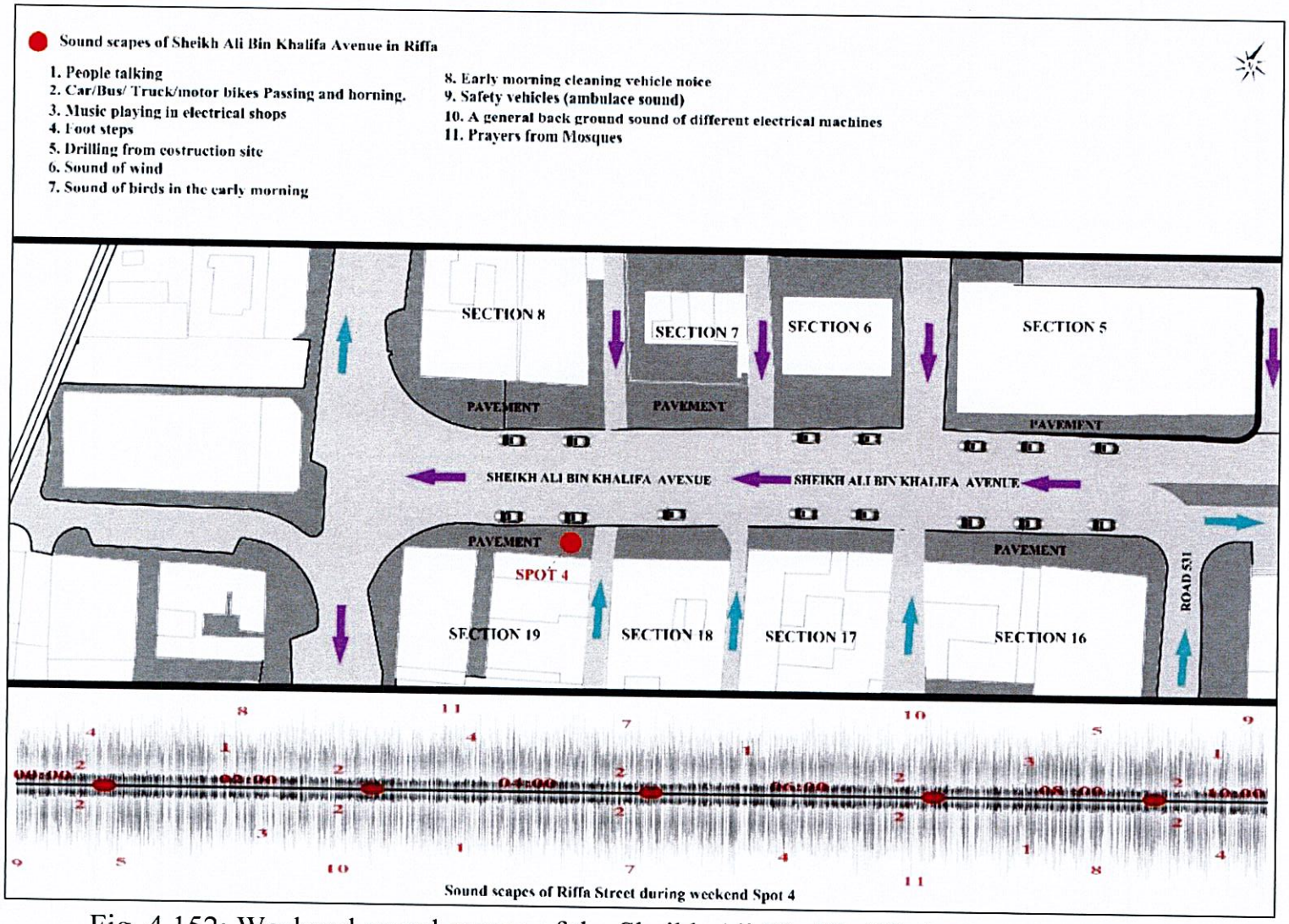



Fig. 4.152: Weekend sound scapes of the Sheikh Ali Bin Khalifa Avenue spot 4 in Riffa
Source: Author

#### 4.5.2.7 Effect of sound stimuli on social interactions

The Sheikh Ali Bin Khalifa Avenue sounds were substantially higher in the upper half of the street (spots 1 and 2) than in the lower parts of the street (spots 3 and 4). The sound is significantly dispersed in spots 2 and 3 than in spots 1 and 4. In terms of soundscape, the sound appears more dispersed on weekends than throughout the week. This is true for most locations except point 4, which may be attributed to a more significant number of people on weekends than the sound source during the week. The auditory ambiance of Riffa Street fluctuates during the day and throughout the week. While traffic sounds produce an urban or unpleasant environment, other people's voices contribute to the vibrant atmosphere of the street.

### 4.5.3 Tactility

#### 4.5.3.1 Weather conditions and the shaded areas

The solar altitude, as shown in Figs 4.153 – 4.161, illustrates the lighting condition of part 1, 2 and 3 of Riffa Street during the day. In addition, it represents the thermal characteristics of light physically felt through tactile perceptions. The unavailability of shaded sitting areas to protect from the warm weather conditions reduces the liveliness of the street. Furthermore, based on the solar altitude, a changing movement pattern of the people in response to the changing conditions is observed. Social interactions tend to happen in the opposite direction of solar length on an unformal shading area.

## a. Weather conditions and the shaded areas of part 1 of the street

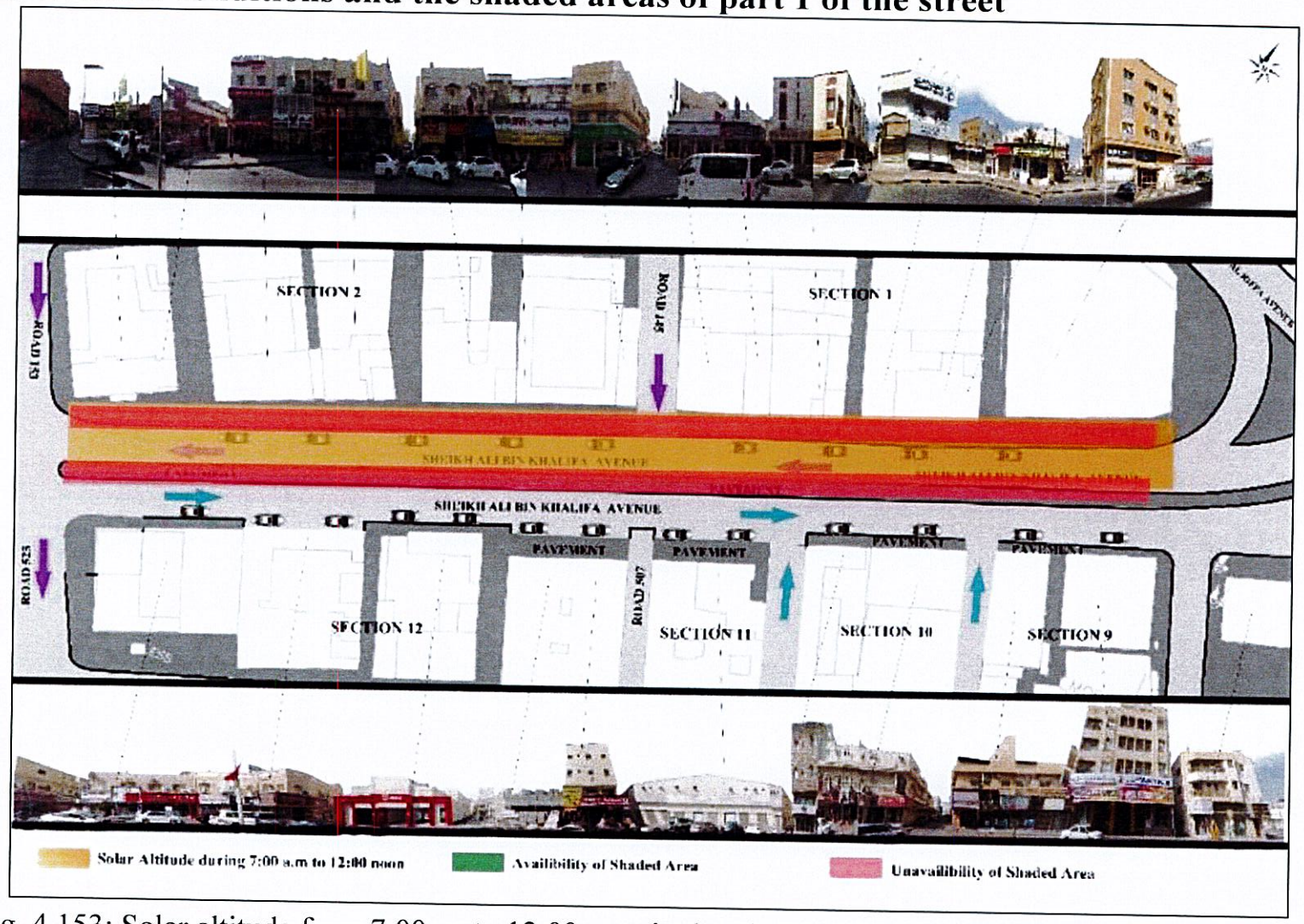



Fig. 4.153: Solar altitude from 7:00am to 12:00 p.m. in the Sheikh Ali Bin Khalifa Avenue part 1 in Riffa
Source: Author




Fig. 4.154: Solar altitude at 12: 00p.m. in the Sheikh Ali Bin Khalifa Avenue part 1 in Riffa
Source: Author

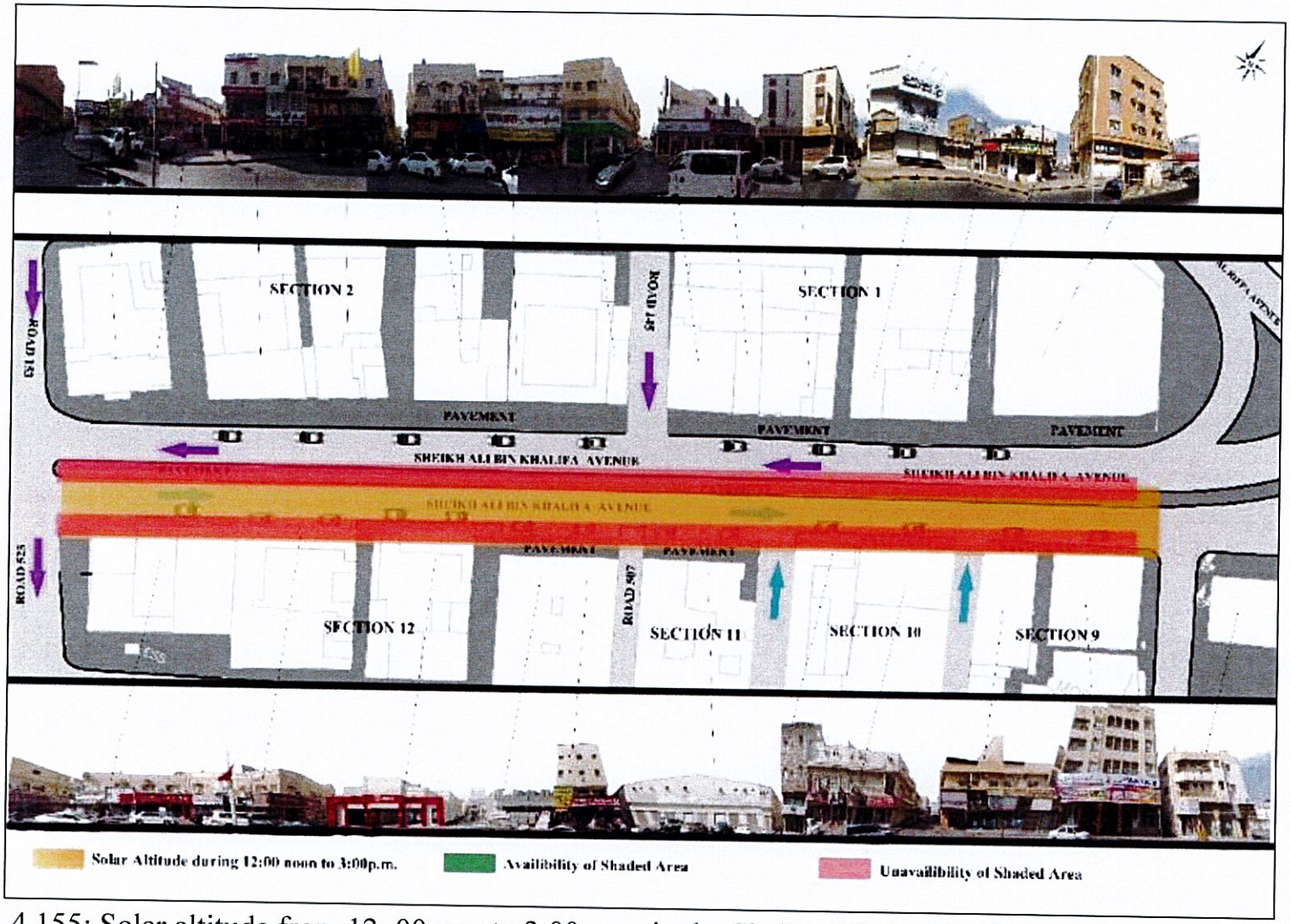



Fig. 4.155: Solar altitude from 12: 00 p.m to 3:00 p.m. in the Sheikh Ali Bin Khalifa Avenue part 1 in Riffa
Source: Author

## b. Weather condition and shaded area at part 2 of the street




Fig. 4.156: Solar altitude from 7:00am to 12: 00 p.m in the Sheikh Ali Bin Khalifa Avenue part 2 in Riffa
Source: Author

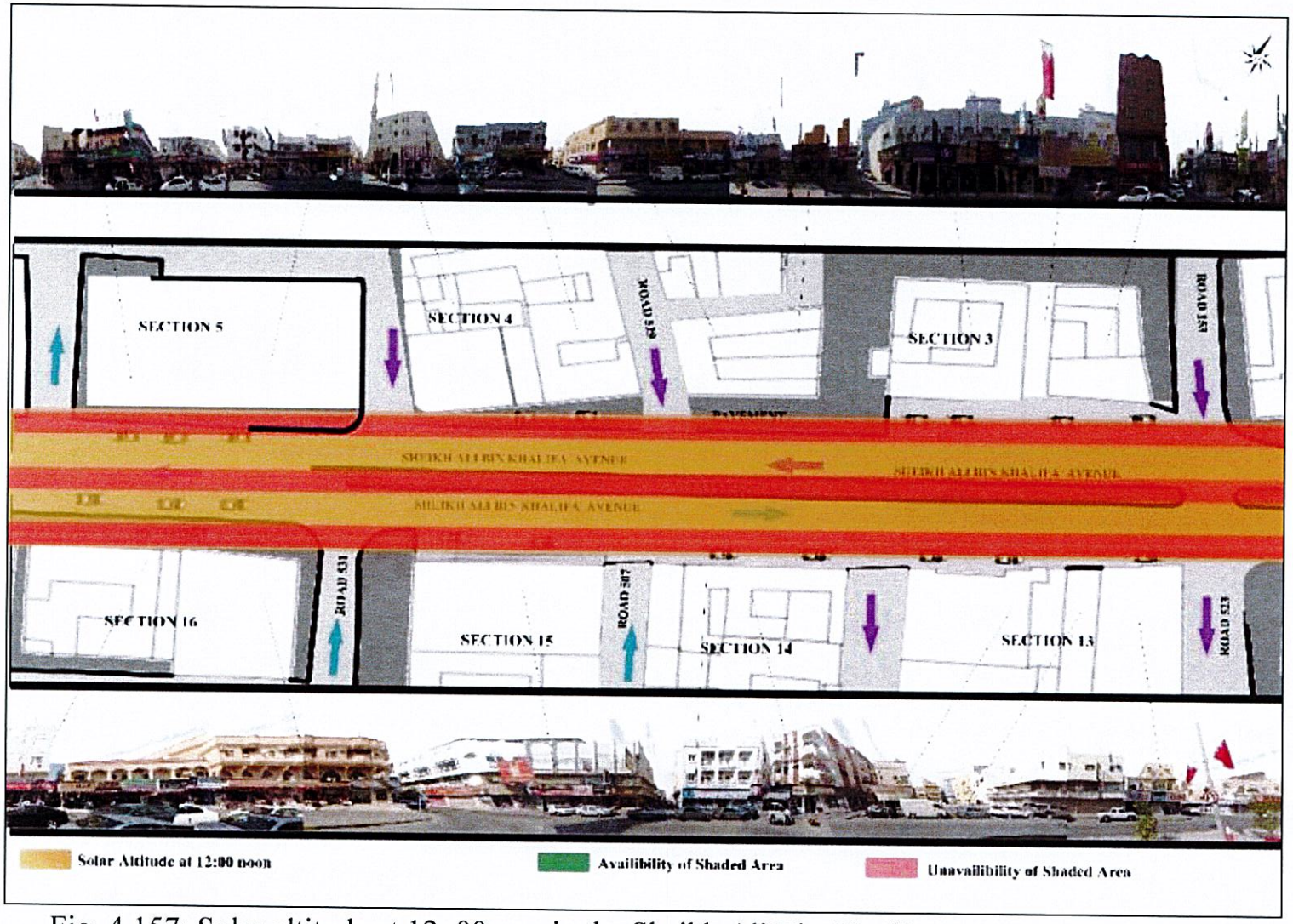



Fig. 4.157: Solar altitude at 12: 00 p.m in the Sheikh Ali Bin Khalifa Avenue part 2 in Riffa
Source: Author




Fig. 4.158: Solar altitude from 12: 00 p.m to 3:00 p.m. in the Sheikh Ali Bin Khalifa Avenue part 2 in Riffa
Source: Author

## c. Weather conditions and the shaded areas of part 3 of the street

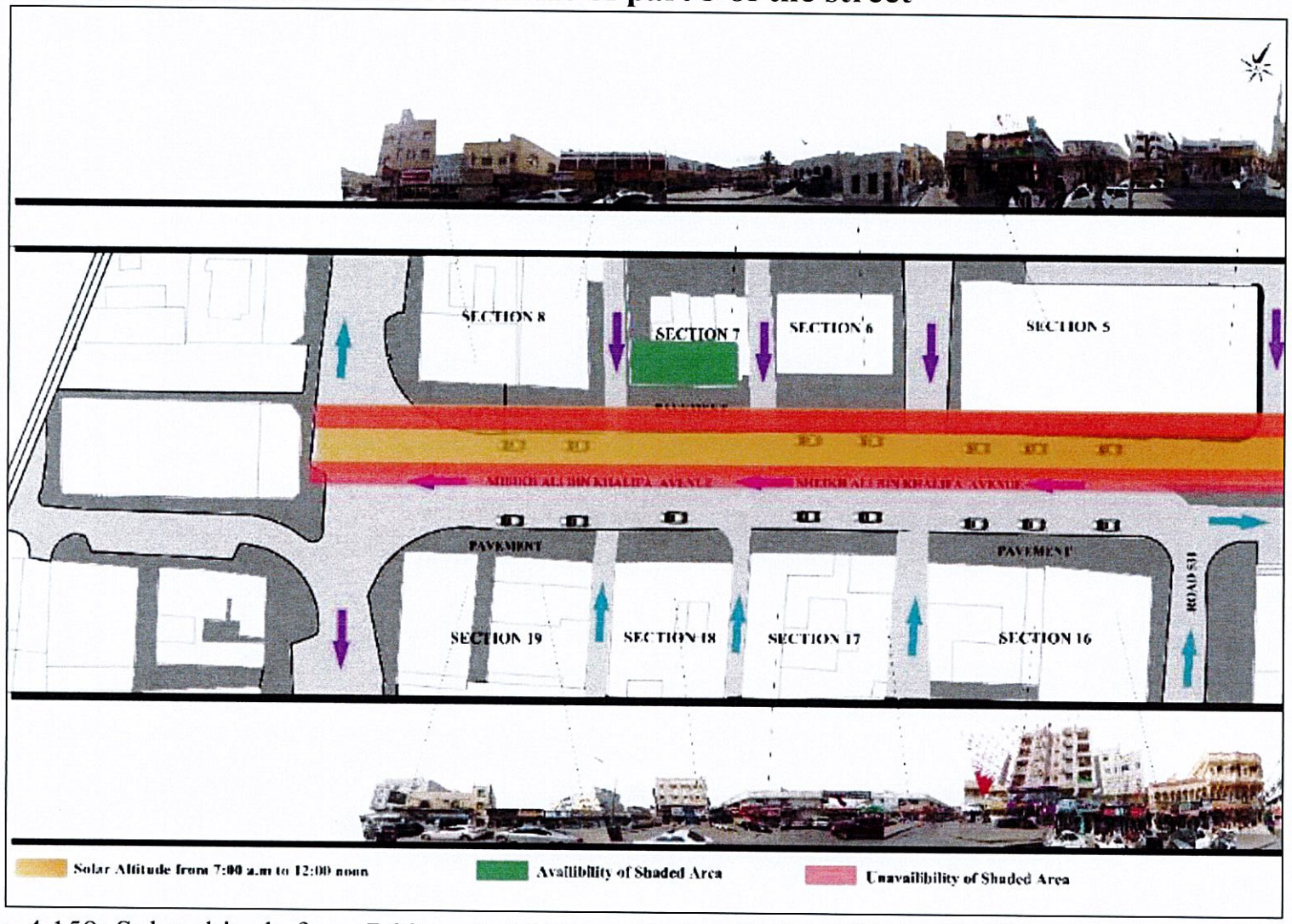



Fig. 4.159: Solar altitude from 7:00 am to 12:00 p.m in the Sheikh Ali Bin Khalifa Avenue part 3 in Riffa
Source: Author

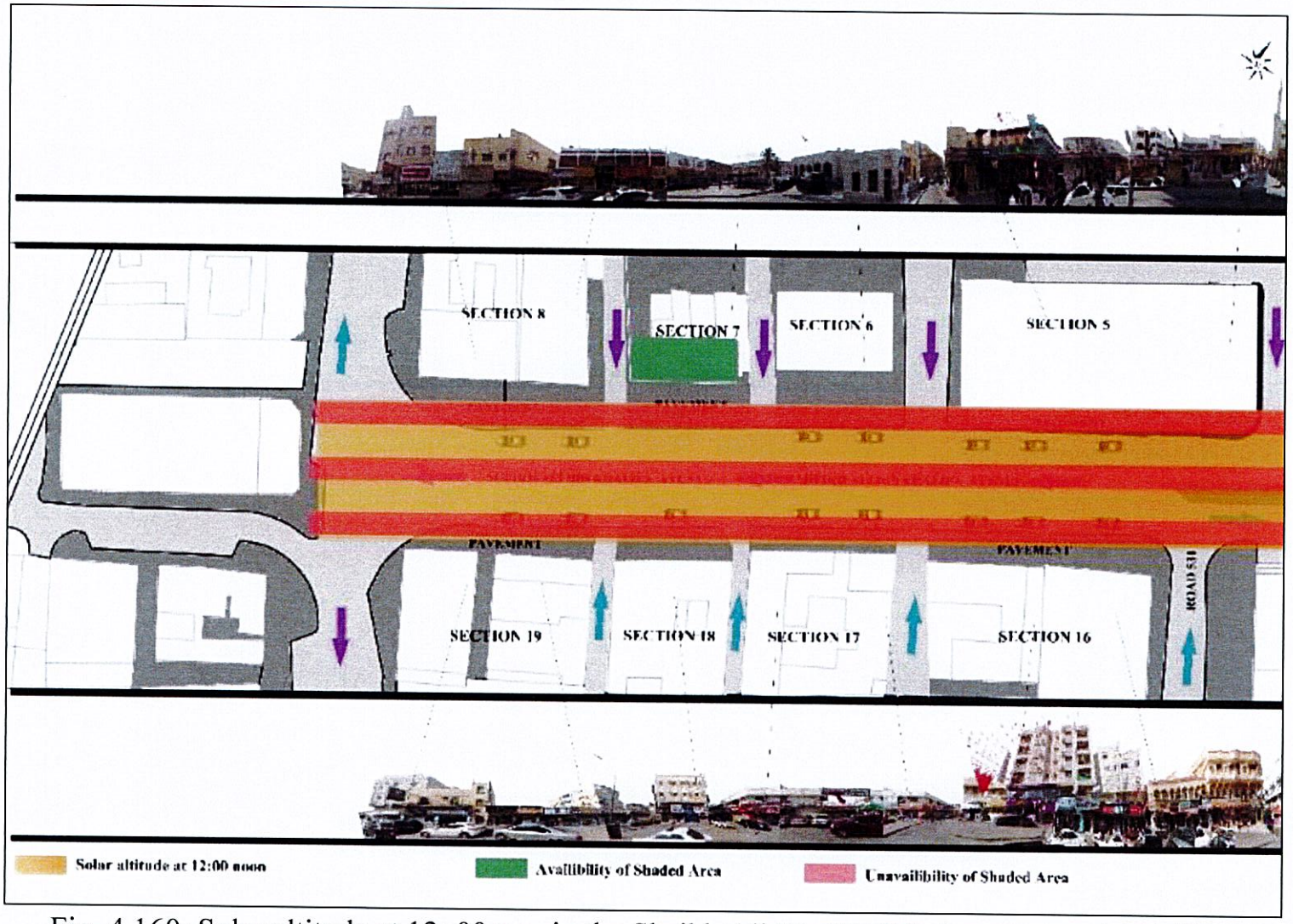



Fig. 4.160: Solar altitude at 12: 00 p.m in the Sheikh Ali Bin Khalifa Avenue part 3 in Riffa
Source: Author

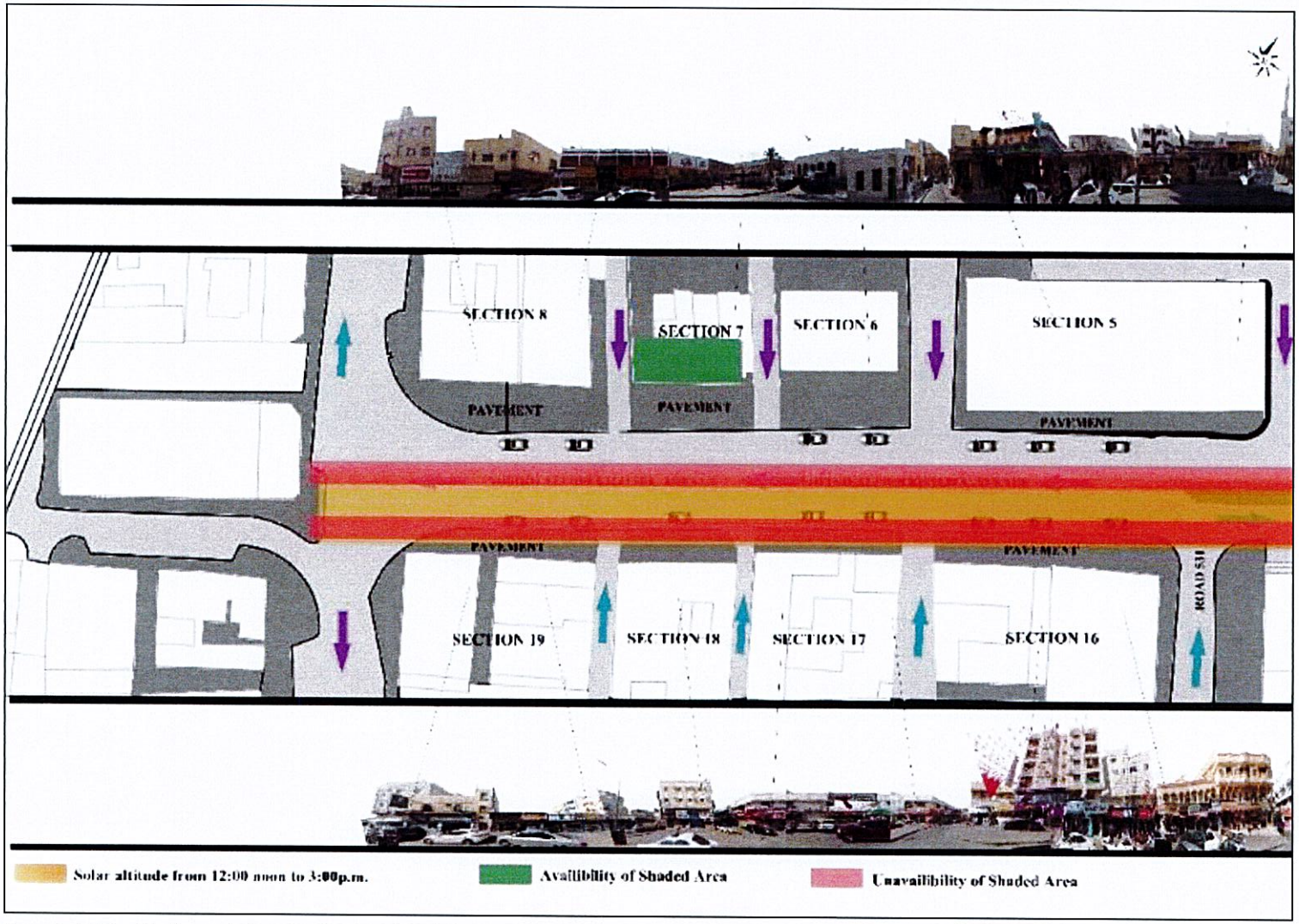



Fig. 4.161: Solar altitude from 12:00 p.m to 3:00 p.m. in the Sheikh Ali Bin Khalifa Avenue part 3 in Riffa
Source: Author

### 4.5.3.2 Material texture

Similar to other streets, Part 1 of this street, as shown in Figs 4.162 and 4.163, consists of more newly constructed buildings aged between ten and 15 years. The freshly built area has a more smooth concrete finish than old tarnished buildings. Stainless steel is used for lighting polls, signage, dustbins, etc. At the same time, concrete bollards are used to restrict the direct entrance of vehicles. The material transition from asphalt to grey herringbone guides the user to parking while changing color from grey to red and yellow guides the pedestrian movement.

'Part 2, as shown in Figs 4.164 and 4.165, consists of concrete buildings above 10 to 15 years of age. The facades are more tarnished in this part of the street. There are movable plants in the partition of the road. Stainless steel lighting polls are equally distributed. There is no public sitting. Part 3 of this street, as shown in Figs 4.166 and 4.167, consists of fewer buildings constructed in concrete. There is a wooden shaded area with concrete public benches. Stainless steel lighting polls, dustbins and signages are disturbed overall in this part street. This part of the street is friendlier due to the availability of a shaded sitting area.

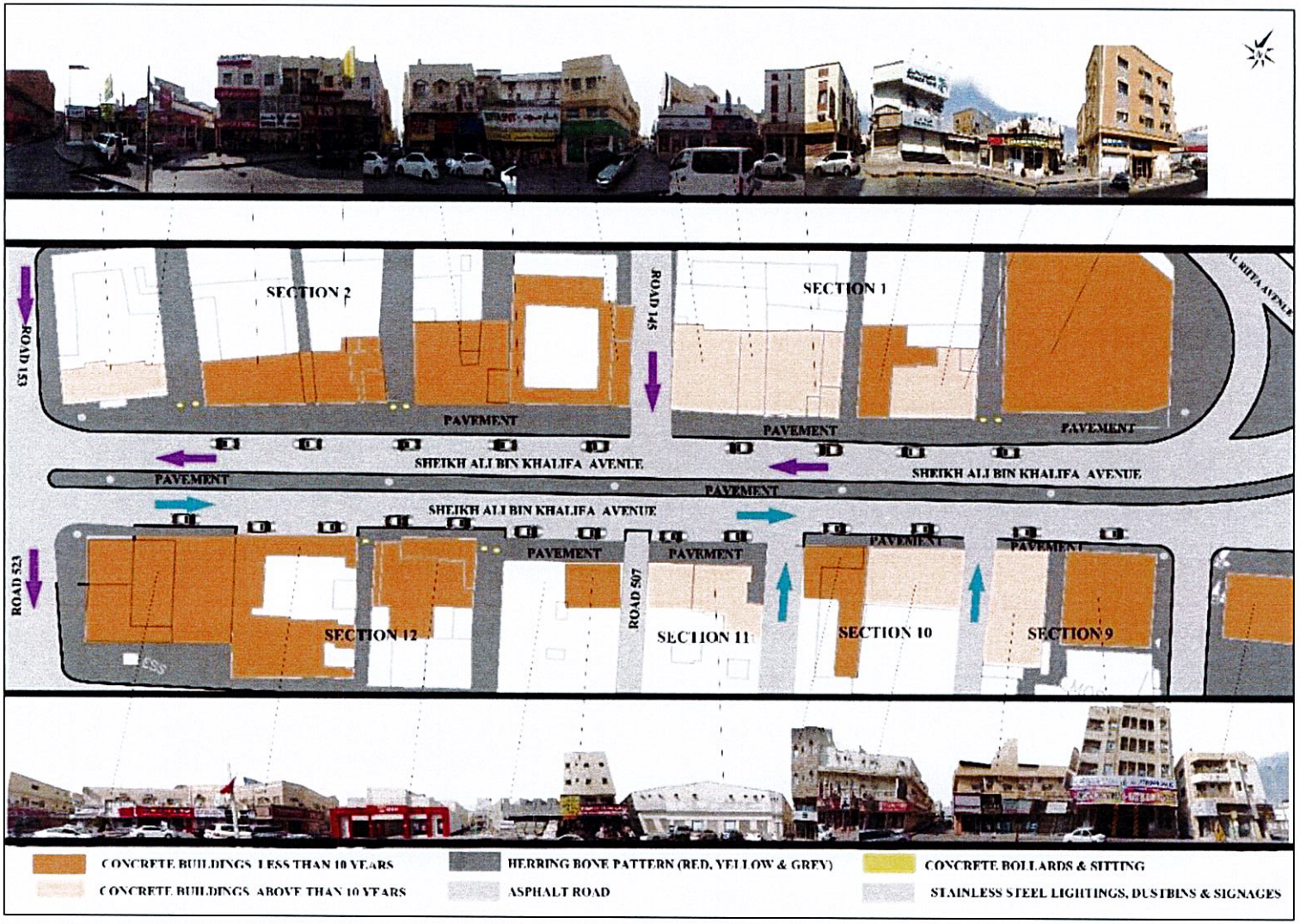



Fig. 4.162: Different material texture of the Sheikh Ali Bin Khalifa Avenue at part 1 in Riffa
Source: Author







Fig. 4.163: Different material texture of the Sheikh Ali Bin Khalifa Avenue at part 1 in Riffa
Source: Author

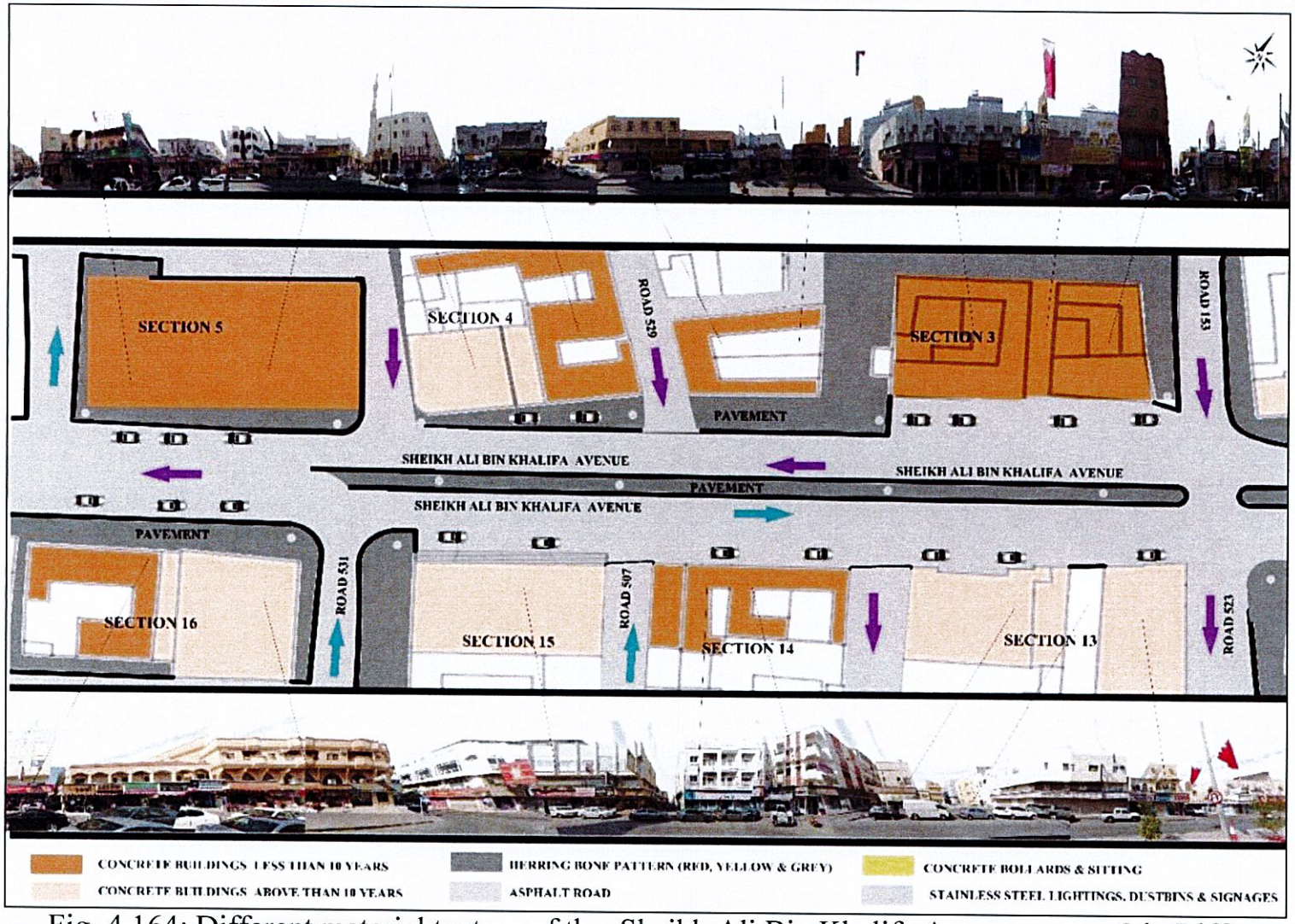



Fig. 4.164: Different material texture of the Sheikh Ali Bin Khalifa Avenue at part 2 in Riffa
Source: Author

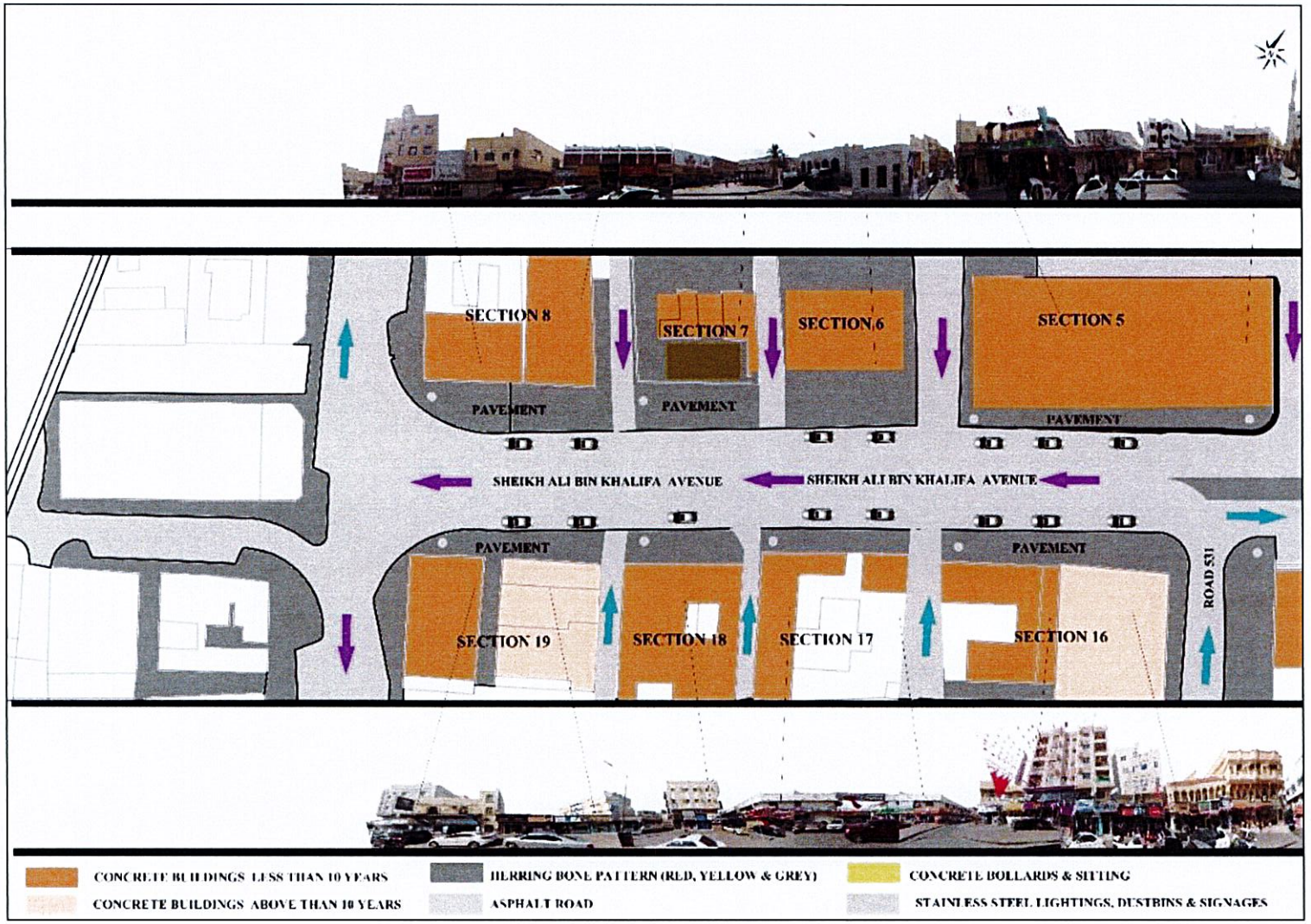



Fig. 4.165: Different material texture of the Sheikh Ali Bin Khalifa Avenue at part 3 in Riffa
Source: Author

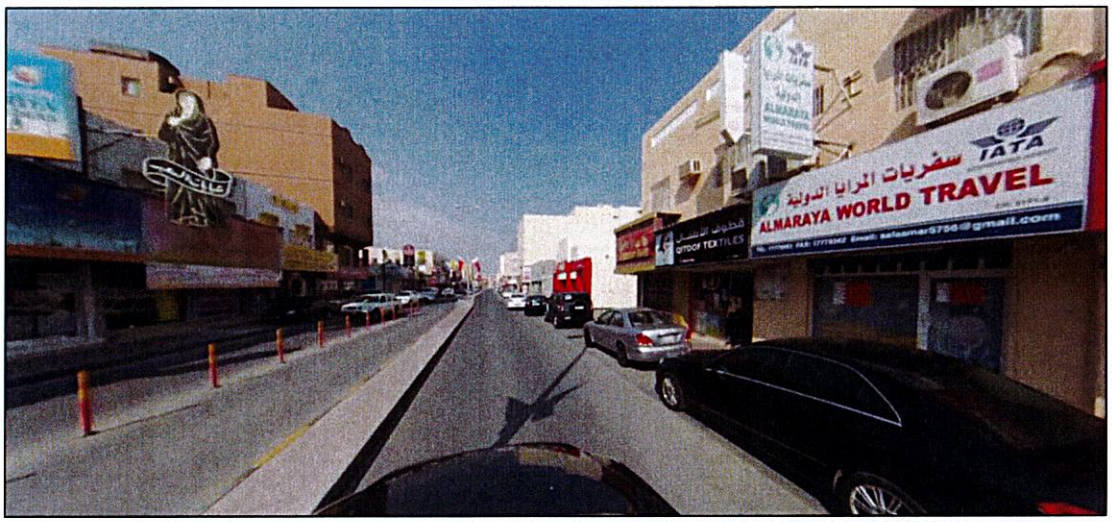



Fig. 4.166: Different material texture of the Sheikh Ali Bin Khalifa Avenue at part 3 in Riffa
Source: Author



Fig. 4.167: Different material texture of the Sheikh Ali Bin Khalifa Avenue at part 3 in Riffa
Source: Author

#### 4.5.3.3 Effect bodily perception stimuli on Social Interactions

The atmosphere of Riffa Street becomes livelier as the sun is less warm, both during the day and the year-round, depending on the physical stimulation generated by the solar altitude. As the number of daylight hours and the sun's temperature rises, fewer people come out onto the pavements and sit in the outdoor sitting areas of the eateries on Riffa street. The location of social contact in Riffa Street can be connected to the sun's position since more individuals participate in social interactions by standing or sitting on the shaded side of the pavements.

### 4.5.4 Olfactory experience and its effect on social interaction

Even though one could establish no unique smell scape or olfactory environment across the studied stretch of the Sheikh Ali Bin Khalifa Avenue in Riffa, one can still discover that the street had more olfactory diversity than visual variations. Apart from a relatively scent-neutral ambiance, this street's olfactory characteristics were heavily impacted by the usages and occupancies of the ground floor levels of the adjoining buildings, such as the bakery, the fruit shop, and the restaurant, the café. They are the sources of fragrance leading to the olfactory experience.

On the other hand, vehicle emissions, the smells of rotten materials from the dustbins, and the hot weather's precipitations were sources of foul odor. However, the steady, moderate winds quickly blew away most of the smells. Neither pleasant nor disagreeable odors lingered for long or were particularly identifiable within the roadway.

The smell was the most missing stimulus in the street, making it difficult to assess how much this specific sense contributes to the experience and subsequent social interactions.

### 4.5.5 Mehta's sociability factor

#### 4.5.5.1 Usages of the ground floors of adjoining buildings

Based on the observations, the uses and occupancy of the Sheikh Ali Bin Khalifa Avenue ground floors in Riffa were seen as stimulating sociability and liveliness. Most of the ground floors in part 1 of Riffa street, as shown in Fig. 4.168 and 4.169, are occupied by businesses connected to retailing (blue) and services (purple). The third-largest category is allocated to the third space (green), including caféterias, bakeries, and bookstores. There are fewer empty spaces (beige) in this part.

In contrast, the least occupancy is in housing (brown) and gastronomy (pink). As shown in Figs 4.170 – 4.173, parts 2 and 3 of the ground floor areas are retail (blue) and services (purple). In part 2 of this street, there is a vacant space. At the same time, there is gastronomy in the Riffa food square. The functions are mixed in the various parts of the street. Retail and services predominate in usage in each part of the street.




Fig. 4.168: Usage of the ground floor of the Sheikh Ali Bin Khalifa Avenue Part 1 in Riffa
Source: Author

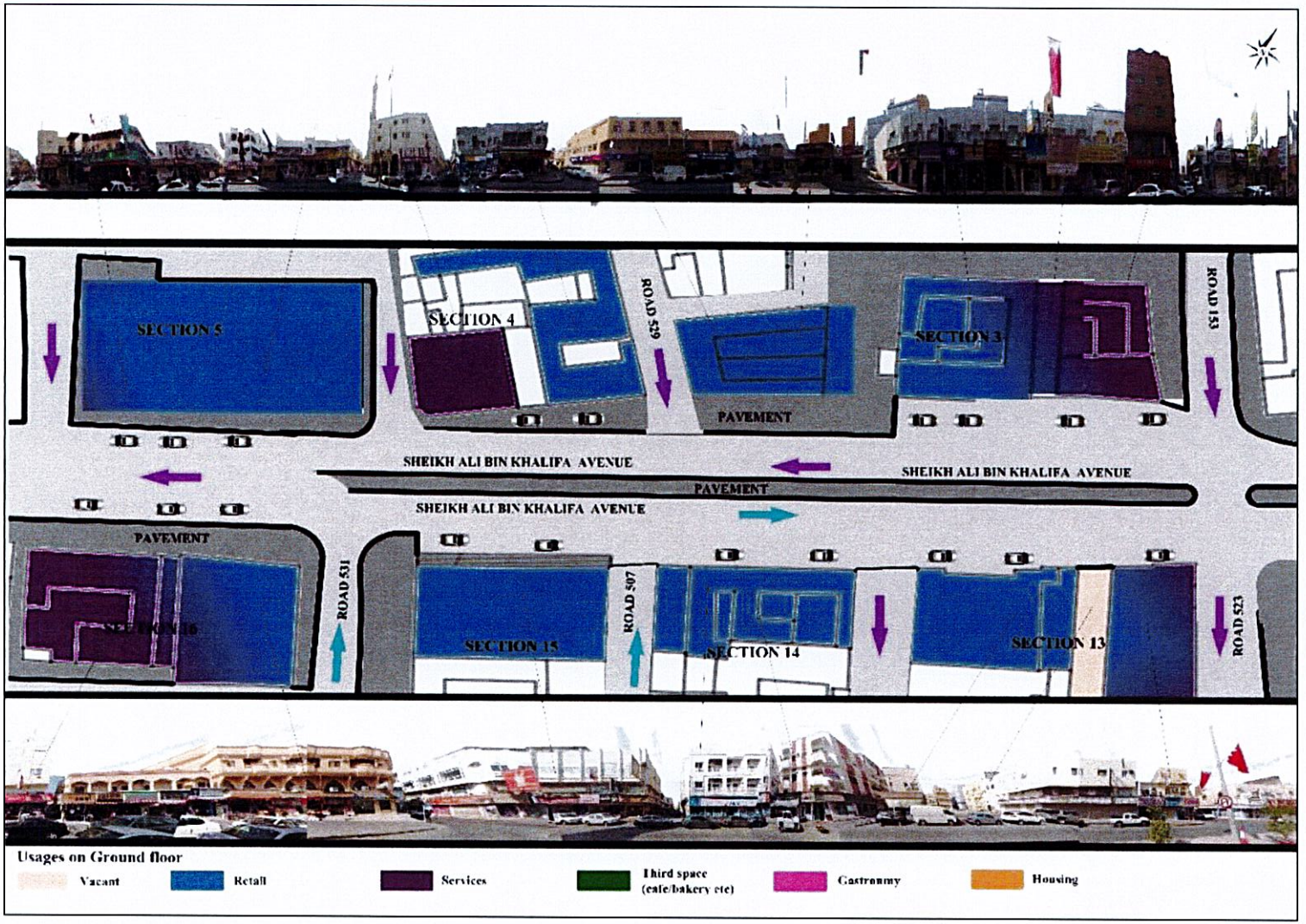



Fig. 4.169: Usage of the ground floor of the Sheikh Ali Bin Khalifa Avenue Part 2 in Riffa
Source: Author

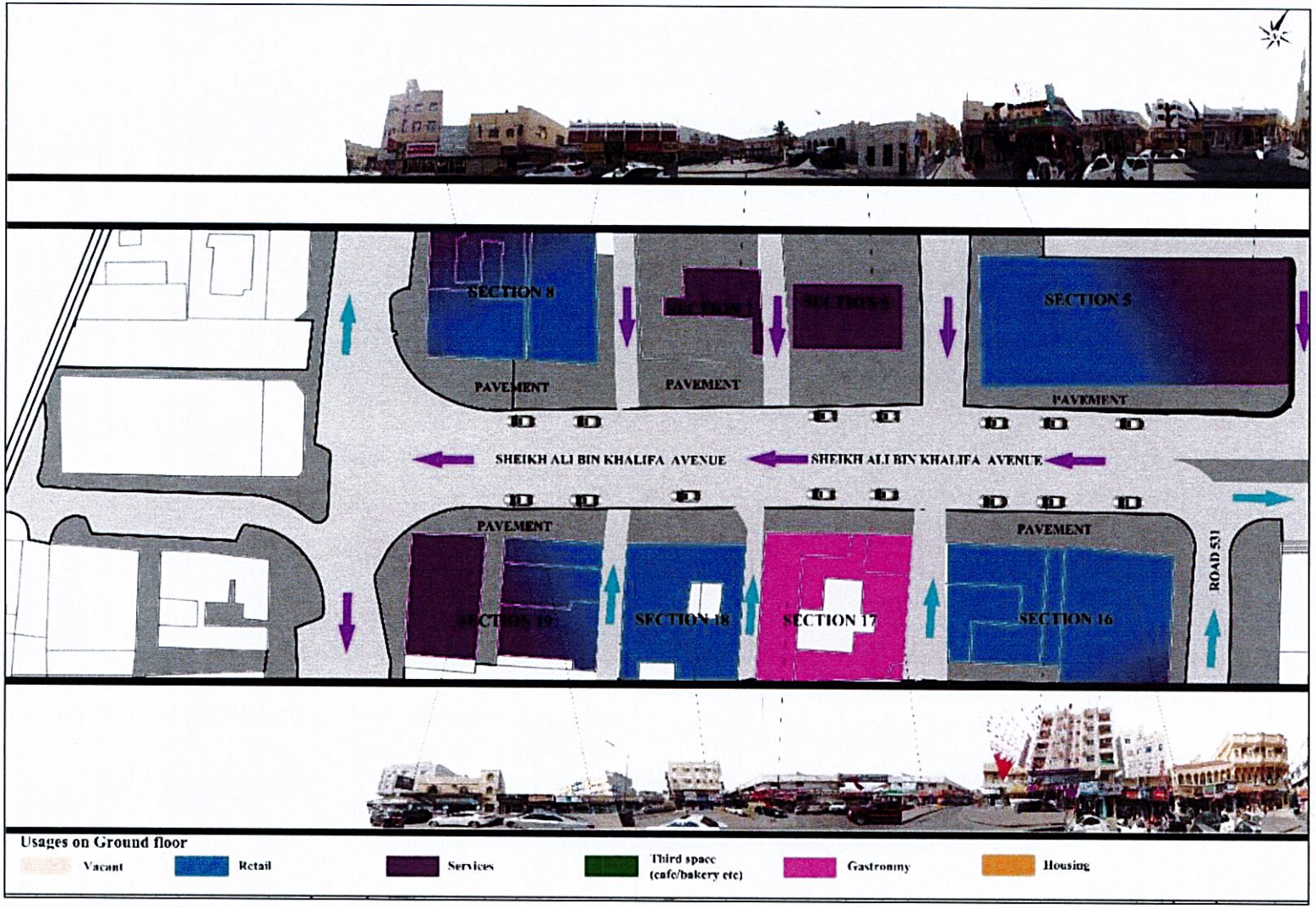



Fig. 4.170: Usage of the ground floor of the Sheikh Ali Bin Khalifa Avenue Part 3 in Riffa
Source: Author



Fig. 4.171: Usage of the ground floor of the Sheikh Ali Bin Khalifa Avenue Part 1 in Riffa
Source: Author



Fig. 4.172: Usage of the ground floor of the Sheikh Ali Bin Khalifa Avenue Part 2 in Riffa
Source: Author



Fig. 4.173: Usage of the ground floor of the Sheikh Ali Bin Khalifa Avenue Part 3 in Riffa
Source: Author

### 4.5.5.2 Occupancy of the ground floors of the adjoining buildings

As an influencing factor on the Sheikh Ali Bin Khalifa Avenue sociability in Riffa, ground floor occupancy may be divided into four categories: local businesses, international firms, houses, and vacant spaces. Part 1, as shown in Fig. 4.174, most ground floors are occupied by small, independent companies indicated in dark green: small, primarily local, businesses with less than five branch stores in Bahrain. Secondly, small chains and international banks with more than five branches in other streets in Bahrain highlighted in light green are allocated in this street. There are also vacant spaces highlighted in beige on this street. At the same time, doors that lead to the upper floor residential and office flats are also located in some buildings.

Parts 2 & 3, as shown in Figs 4.175 and 4.176, have many small local businesses occupying the ground floors of buildings on this street. However, this part of the street consists of fewer vacant spaces highlighted in beige. Public buildings such as post offices and mosques are highlighted in orange on both roads. Part two of the street consists of fewer small chain businesses with more than five branches in different streets in Bahrain. In Part 3 of Riffa Street, no international chain is located. There are residential flats and offices on the ground floors of both street parts.




Fig. 4.174: Occupancy of the ground floors of the Sheikh Ali Bin Khalifa Avenue part 1 in Riffa
Source: Author




Fig. 4.175: Occupancy of the ground floors of Sheikh Ali Bin Khalifa Avenue part 2 in Riffa
Source: Author




Fig. 4.176: Occupancy of the ground floors of the Sheikh Ali Bin Khalifa Avenue part 3 in Riffa
Source: Author

### 4.5.5.3 Effect on Social interaction through the presence of Usages on the Ground Floor

Multisensorial stimuli affect street vibrancy, but so are usage and small businesses. Local shops on Riffa Street are discovered to generate sociability and a "small neighborhood" feel. Figs 4.177 – 4.188 in all street parts show standing or sitting and conversing was common, particularly in front of the Caféterias, the bakeries and the local stores. People gathered for informal sitting outside these places. People were merely passing by in front of ground levels with more small pavements or no pavements in front of shops, socially engaging and conversing as they walked by.

The effect of the usage and the occupancy of the ground floors suggest that the environment in or around local companies that enable social encounters, either through purchasing or through their social contribution, encourages more interactions. The following Figs show the effect of usage and occupancy on social interactions during the weekdays and weekends.

a) Effect of usage on social interactions during weekday.

b) Effect of usage on social interactions during a weekend.

c) Effect of occupancy on social interactions during the weekday.

d) Effect of occupancy on social interactions during the weekend.

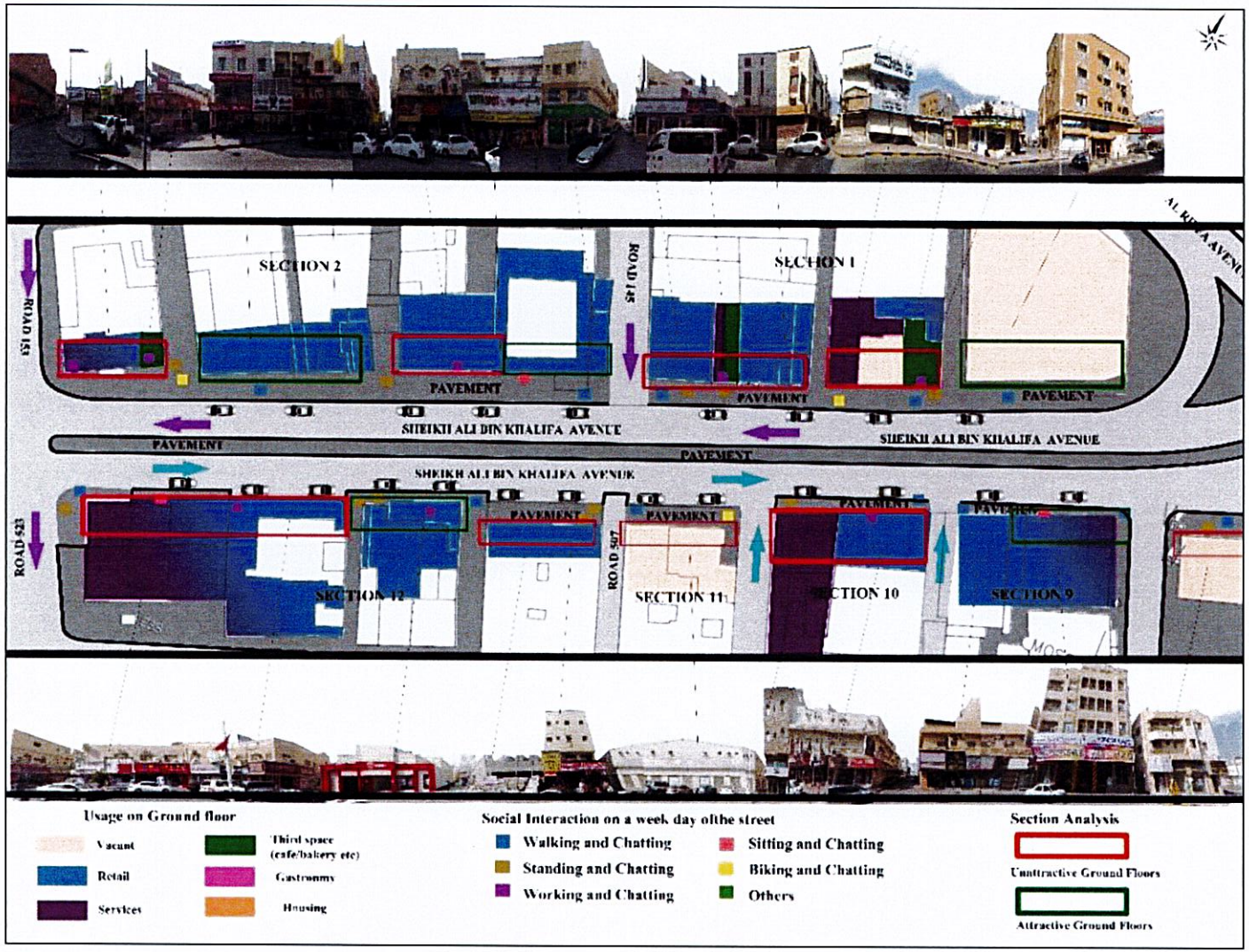



Fig. 4.177: Sitting and standing while engaging socially occur in relation to retail outlets and third places during the week in the Sheikh Ali Bin Khalifa Avenue part 1 in Riffa
Source: Author

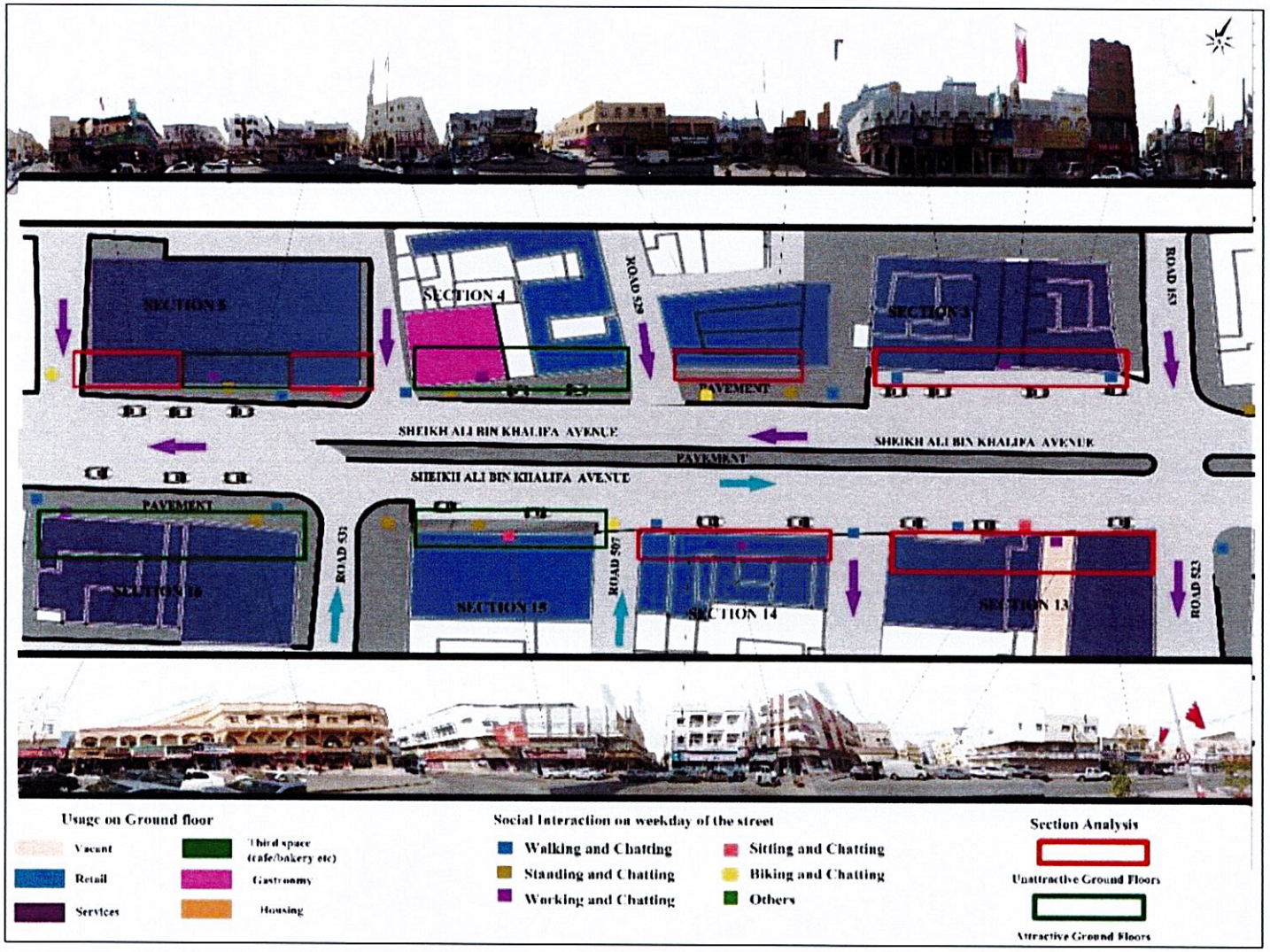



Fig. 4.178: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the week in the Sheikh Ali Bin Khalifa Avenue part 2 in Riffa
Source: Author

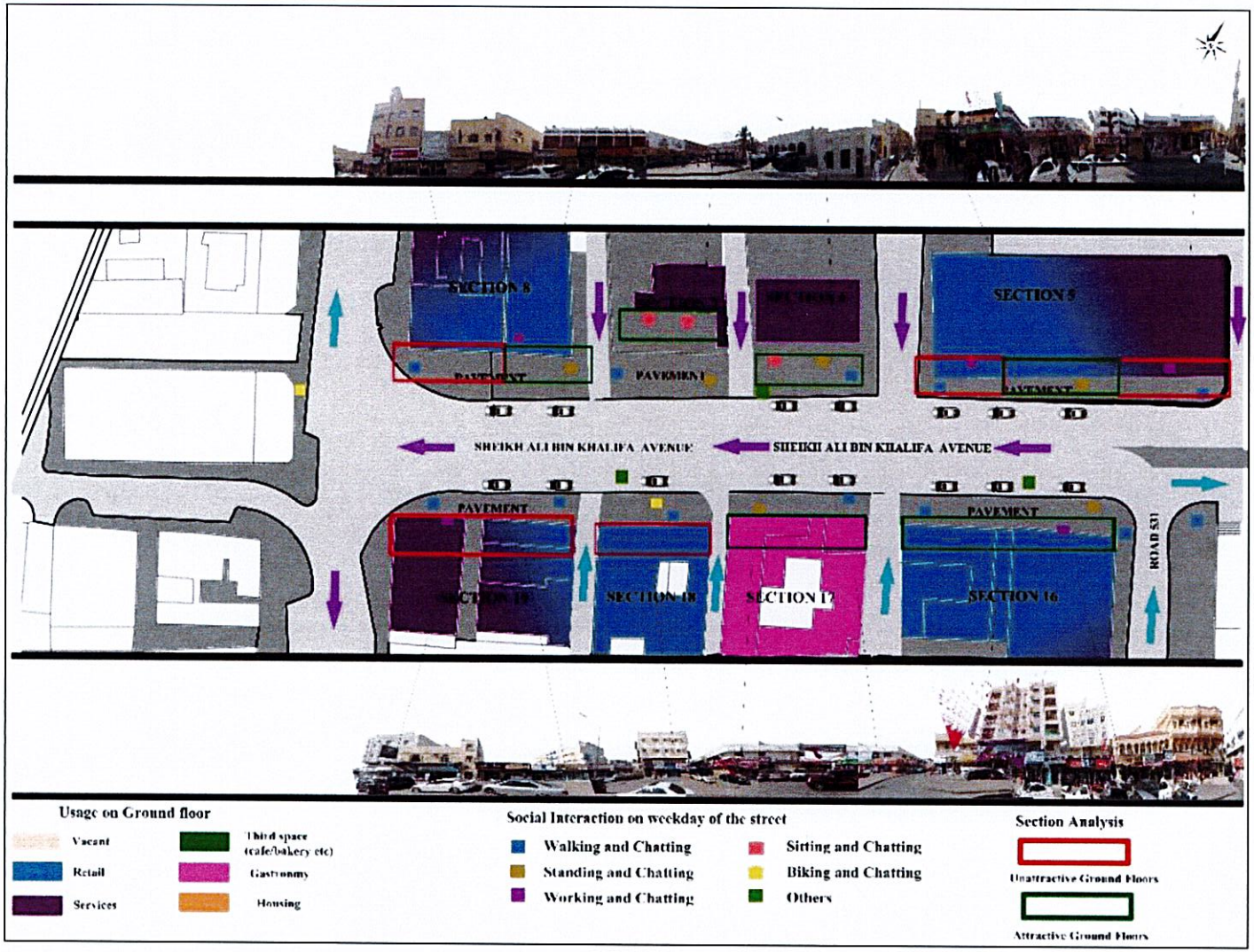



Fig. 4.179: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the week in the Sheikh Ali Bin Khalifa Avenue part 3 in Riffa
Source: Author

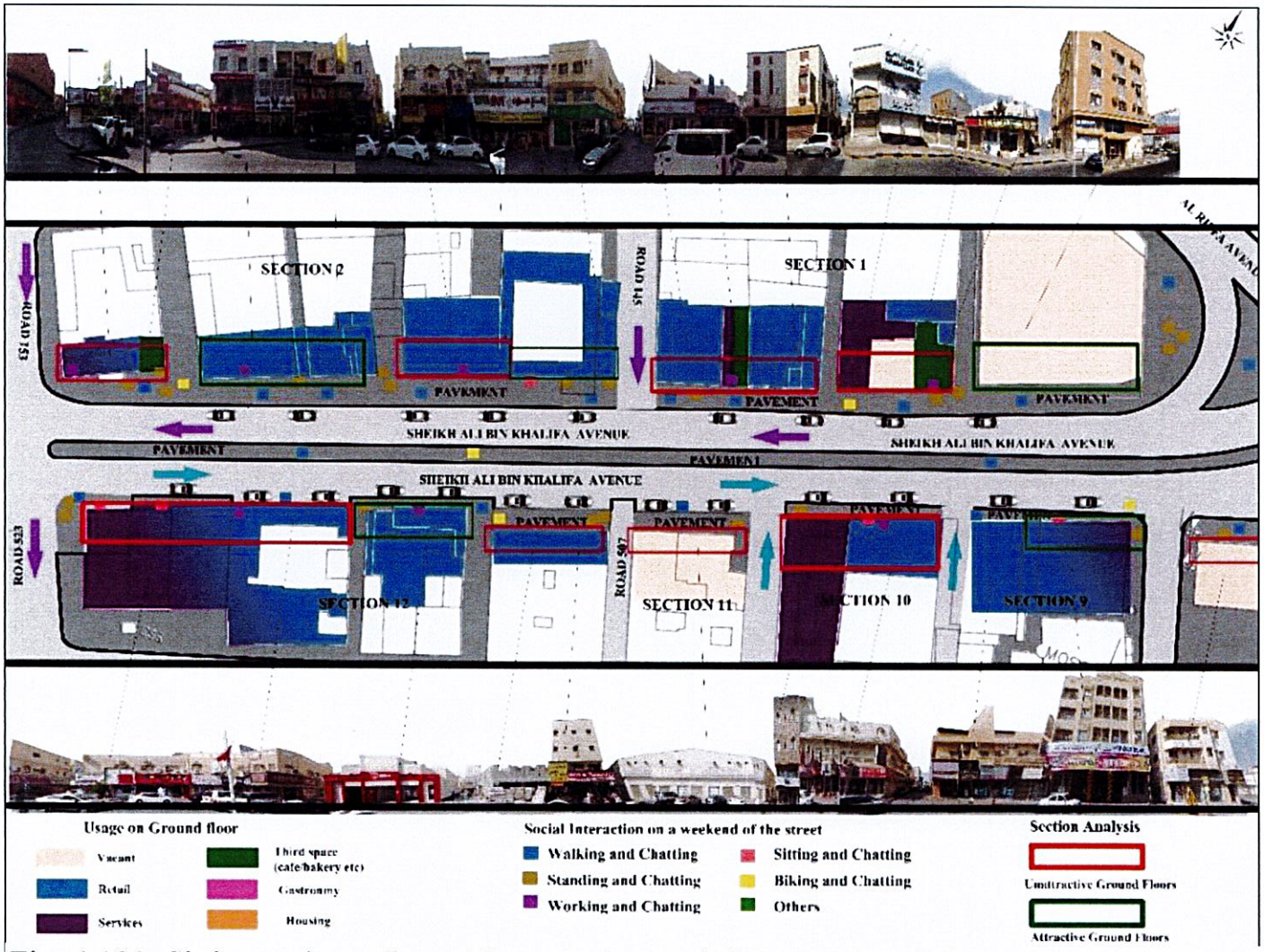



Fig. 4.180: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the weekend, in the Sheikh Ali Bin Khalifa Avenue part 1 in Riffa
Source: Author

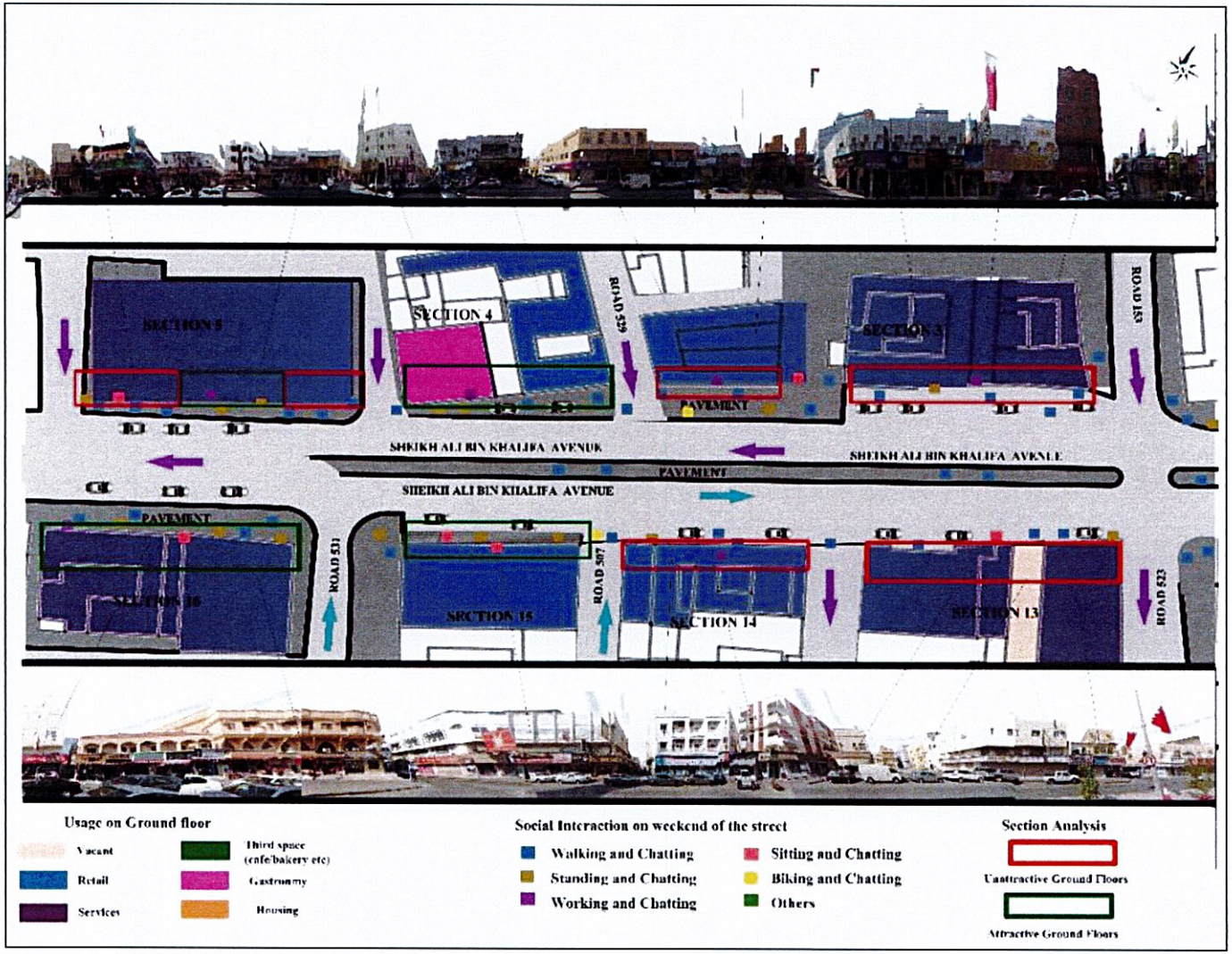



Fig. 4.181: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the weekend on Sheikh Ali Bin Khalifa Avenue part 2 in Riffa
Source: Author

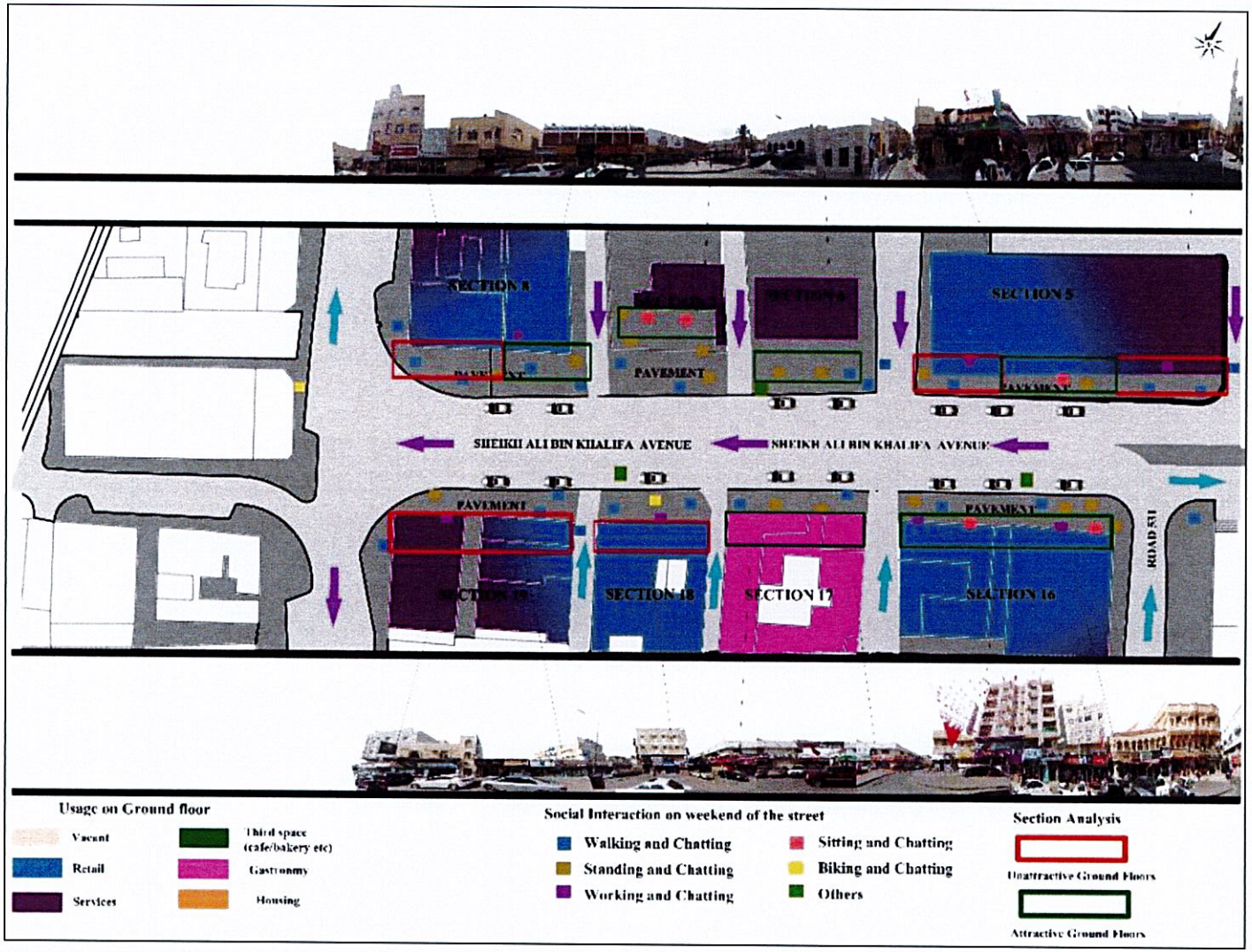



Fig. 4.182: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the week, in the Sheikh Ali Bin Khalifa Avenue part 3 in Riffa
Source: Author

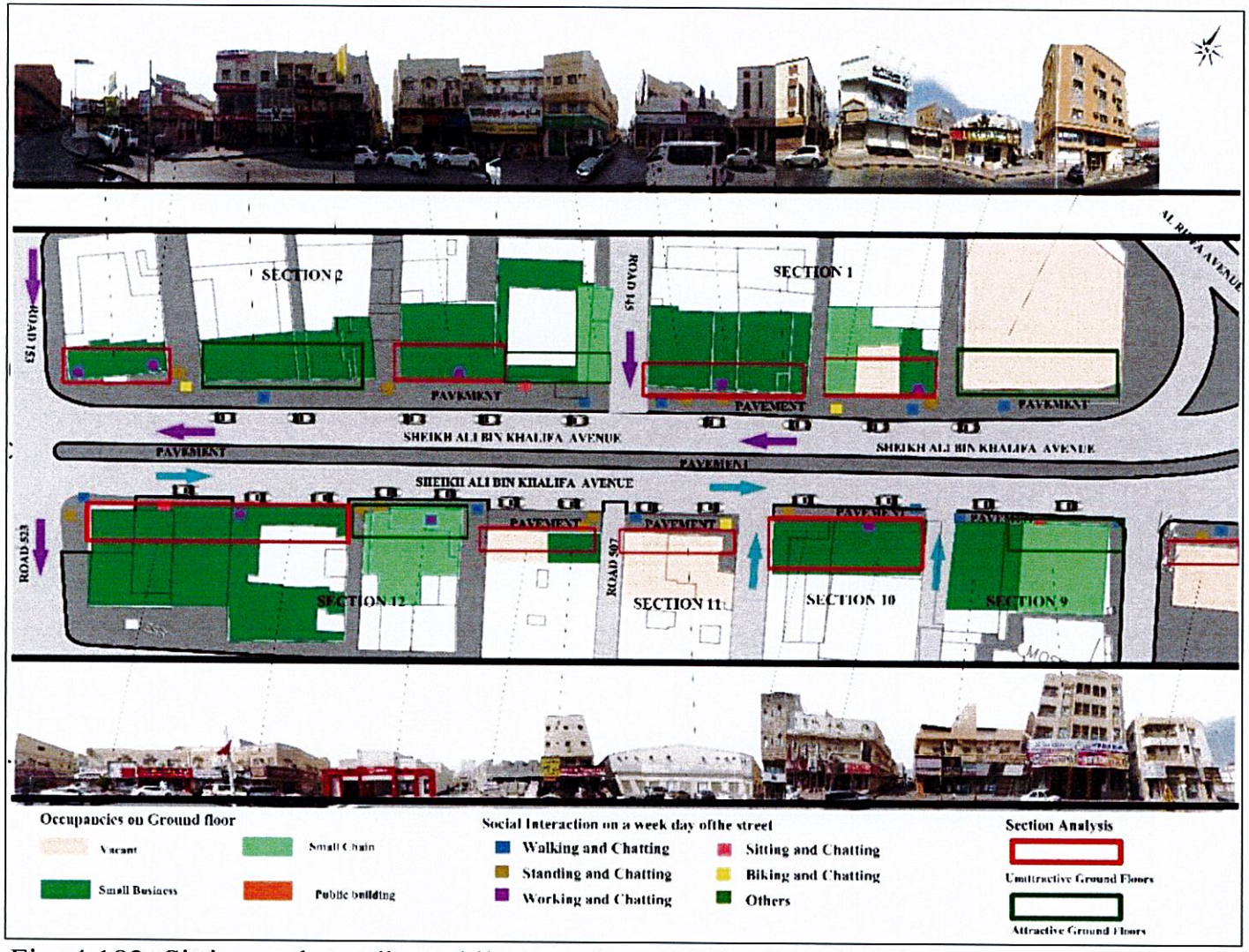



Fig. 4.183: Sitting and standing while engaging socially occur in relation to retail outlets and third places; during the week on Sheikh Ali Bin Khalifa Avenue part 1 in Riffa
Source: author

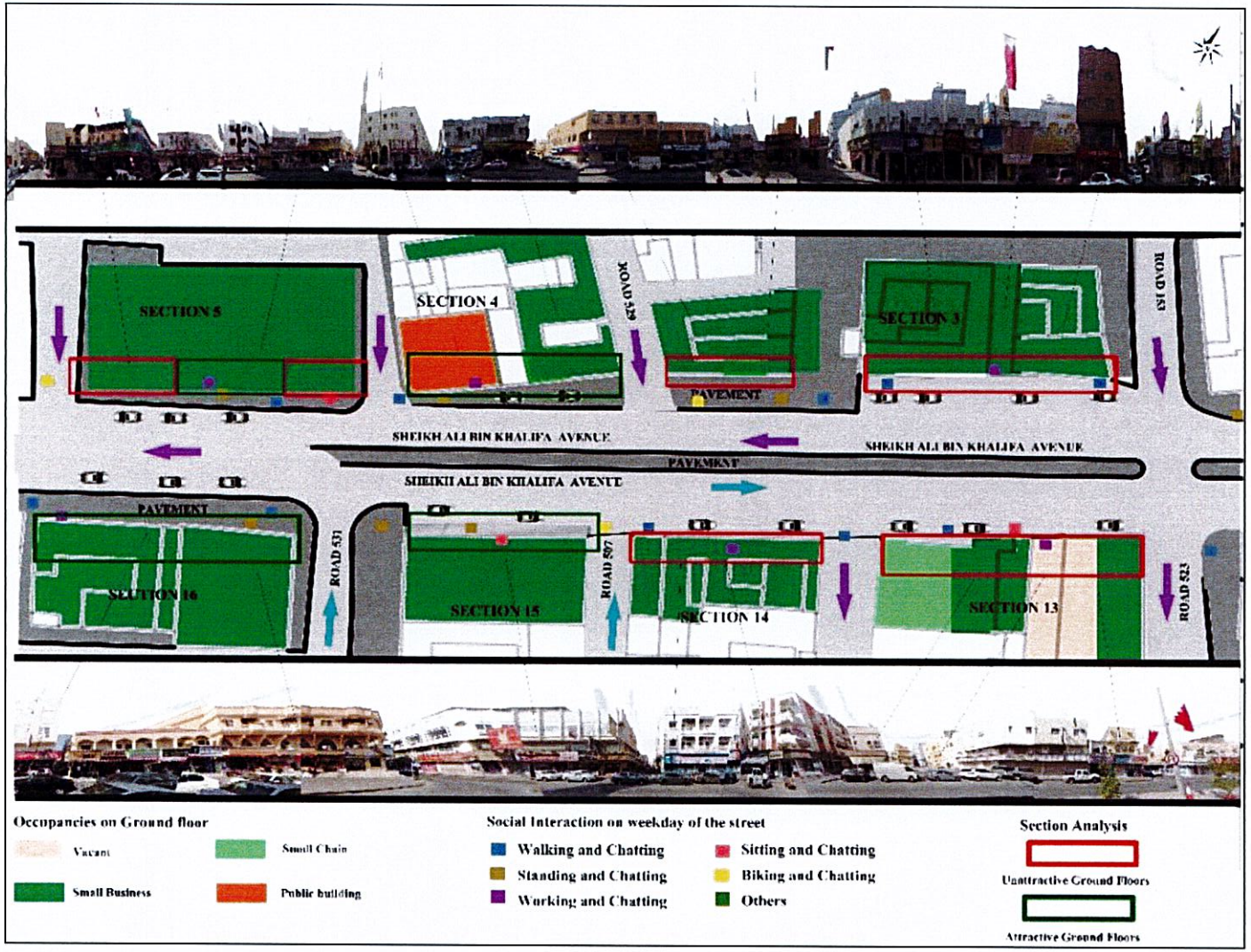



Fig. 4.184: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the week, in the Sheikh Ali Bin Khalifa Avenue part 2 in Riffa
Source: Author

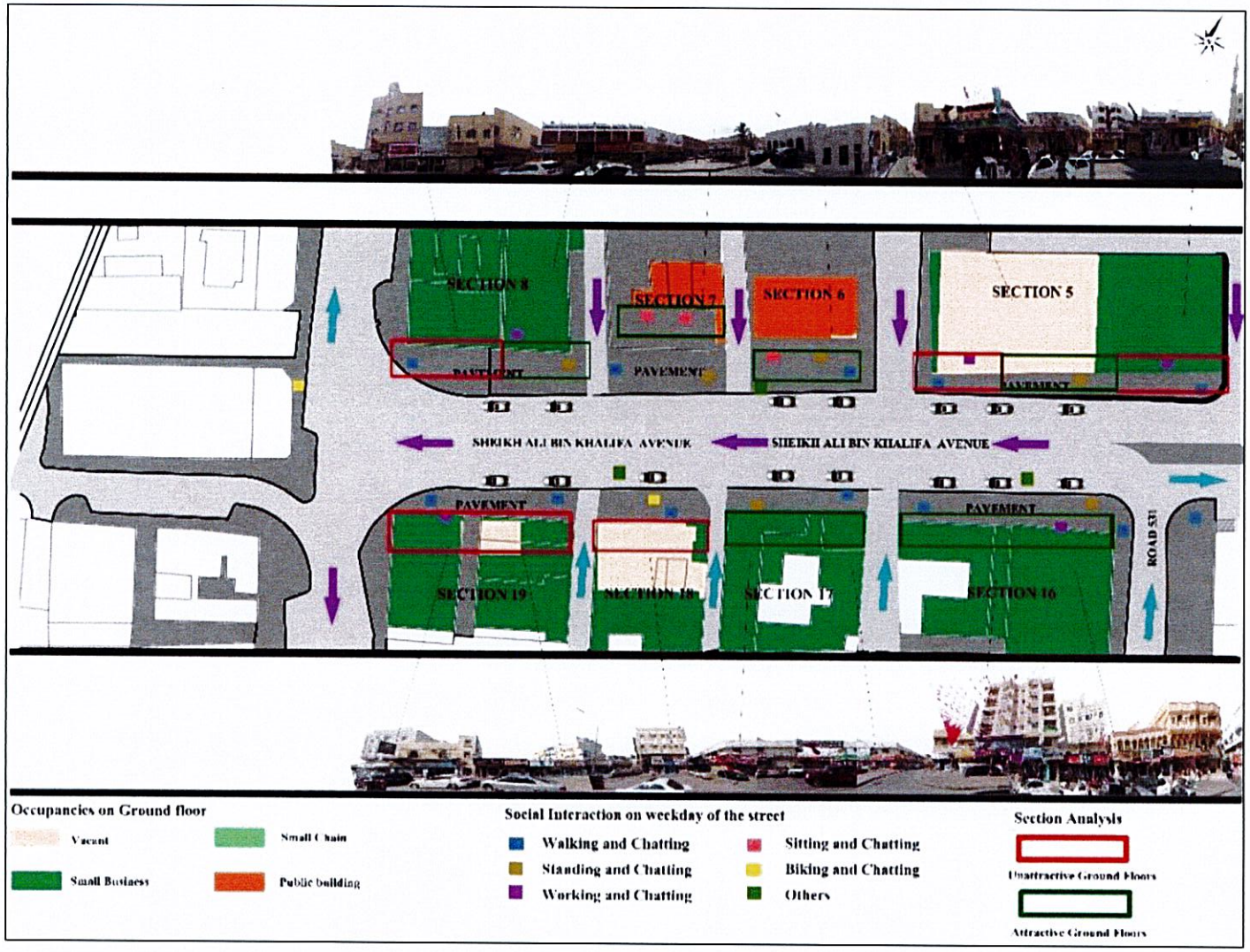



Fig. 4.185: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the week, in the Sheikh Ali Bin Khalifa Avenue part 3 in Riffa
Source: Author

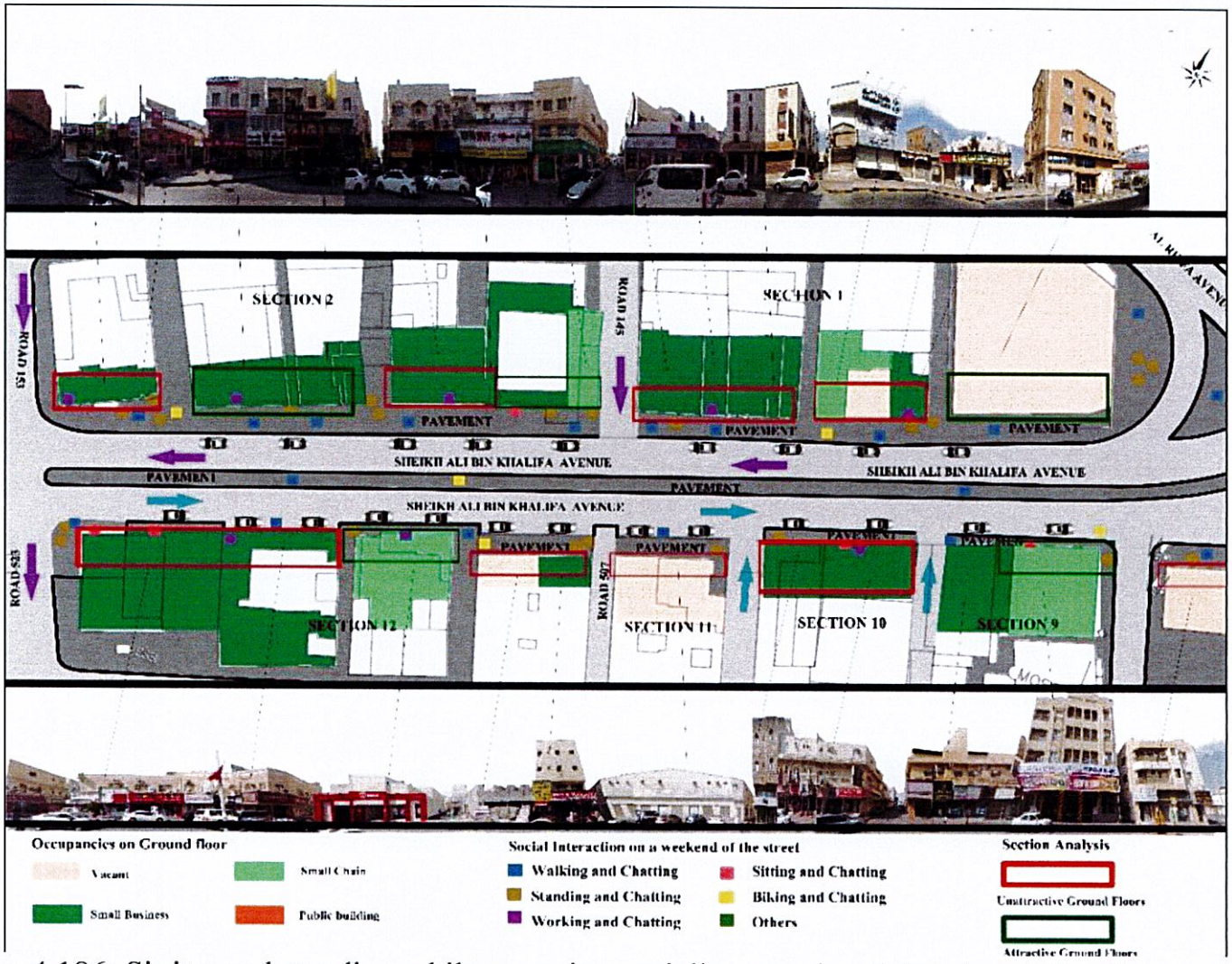



Fig. 4.186: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the weekend, in Sheikh Ali Bin Khalifa Avenue part 1 in Riffa
Source: Author

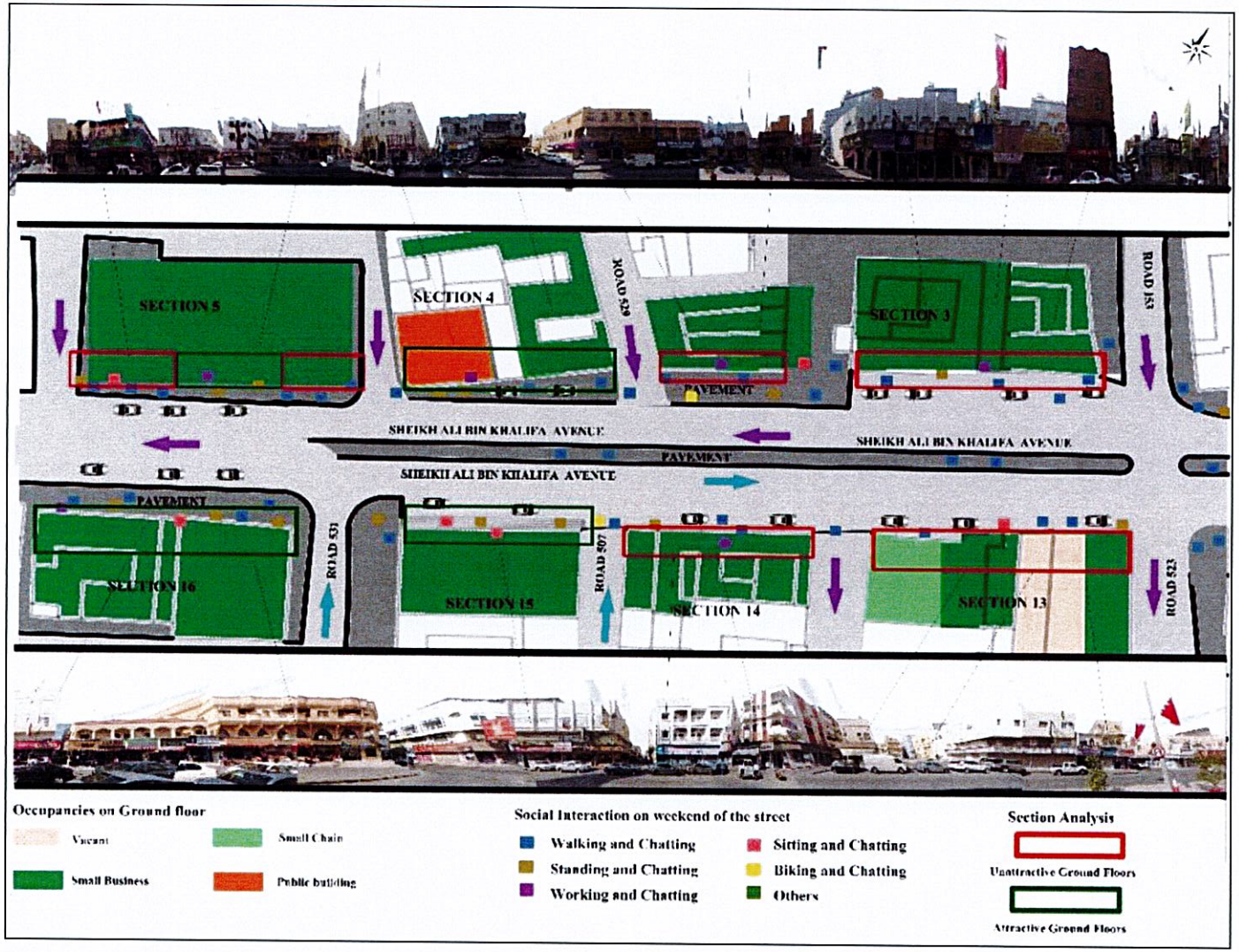



Fig. 4.187: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the weekend, in Sheikh Ali Bin Khalifa Avenue part 2 in Riffa
Source: Author

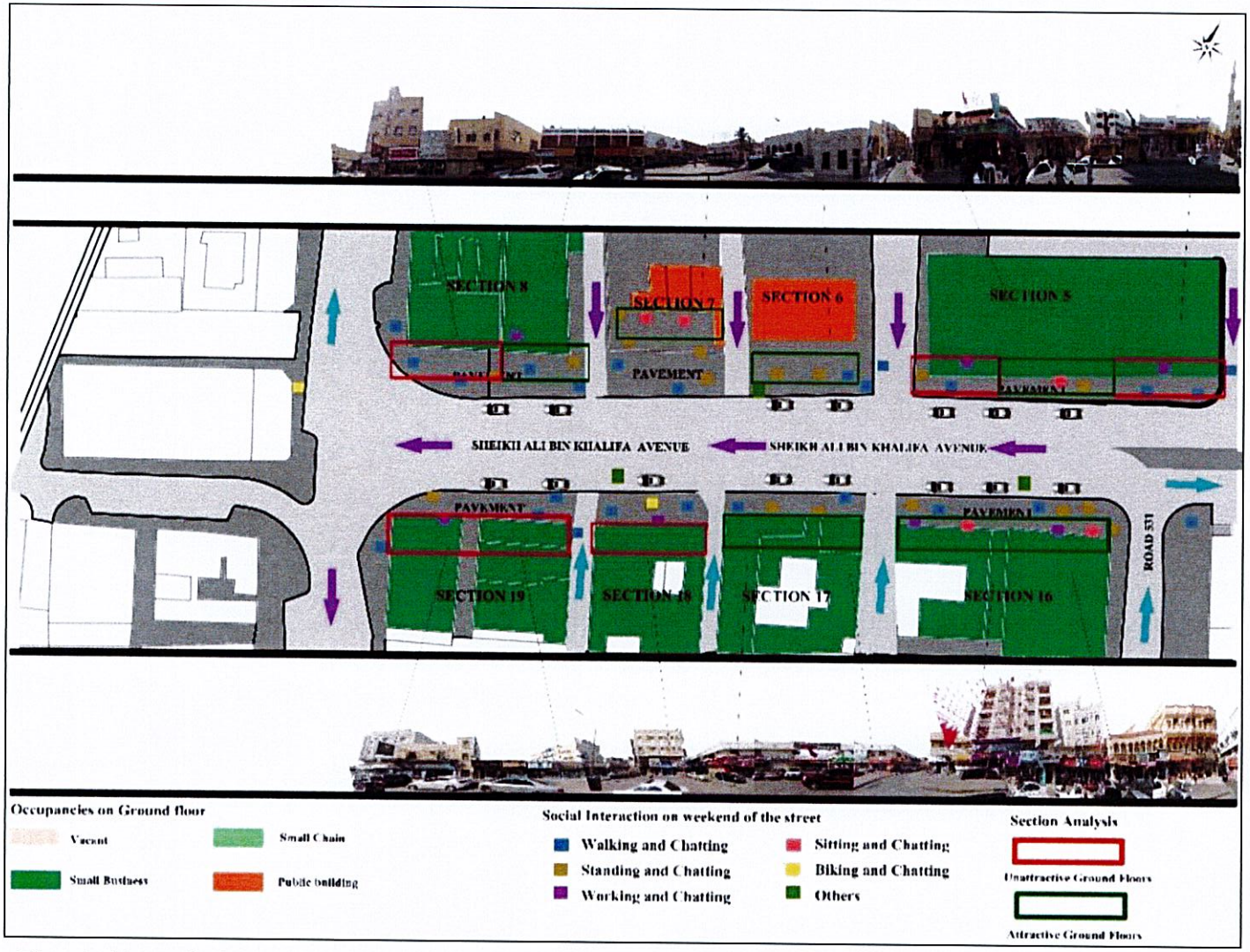



Fig. 4.188: Sitting and standing while engaging socially occur in relation to retail outlets and third places, during the weekend in the Sheikh Ali Bin Khalifa Avenue part 3 in Riffa
Source: Author

### 4.5.6 Social Interactions

Like other streets, people chatting while walking, sitting while talking (particularly on a springy day), and standing while speaking are the most common social interactions on Sheikh Ali Bin Khalifa Avenue in Riffa.

There is a difference in the social interactions on Sheikh Ali Bin Khalifa Avenue on weekends and weekdays and at different hours of the day and places within the street context. The weekend and weekday variations suggest that the environment is also changing.

#### 4.5.6.1 Social interaction during the week

During the week, a distinct pattern emerged. As shown in Fig. 4.189, the largest concentrations of people interacting were observed in front of the shops in Section 1 at the bakery and cafeteria shops and front of section 12 next to the bank and everyday services. Most social contacts occurred on both sides of the street, at the typical retail and service shops. Surprisingly, there was minimal contact on the eastern side of Riffa Street in sections S09, S10 & S11. This might be due to the short width of the pavement or the less attractive shops. Walking and chatting happen as social interactions in these sections of the street.

In part 2 of this street, as shown in Fig. 4.190, most of the social interaction during the week occurred in sections S04, S05 & S16 due to the availability of mosques, banks and currency exchanges. The least amount of social interactions happened in sections S13, S14 &S15 since they mainly consisted of retailer shoppers where buyers are usually active during the evening or on the weekends.

In part 3 of this street, as shown in Fig. 4.191, a generous amount of social interactions occurred in sections 7 and 8 due to the availability of a shaded sitting area. Social interactions occurred randomly with drivers waiting outside sections 17 & 19. Surprisingly, there were minimum social interactions in this part of the street.

Throughout the day, in all the three parts of Sheikh Ali Bin Khalifa Avenue in Riffa, until noon, social interactions increased and then decreased slowly. In the morning, between 7.00 and 10.00 a.m., most social contacts took place at the beginning of this street, where bakeries and cafeterias are located (sections 1 & 2). In terms of movement, these encounters included standing and conversing (5 interactions of people) at the bakery and cafeteria shop and walking and chatting (5 interactions of people) and working and talking (2 interactions of people). One biking and chatting movement were also observed in this section.

More interactions were observed in the mornings, with a peak at 12.30 p.m, including 30 exchanges on part 1 of the Riffa street (sections S01-S02, & S09-S12). In contrast, twenty interactions in part 2 occurred in sections S03-S05 & S13-S16. Most conversations on the eastern side of the street happened until early afternoon. In the afternoon, social contacts began to dwindle again. However, the most prevalent type of social connection was walking while chatting, which can be found all along the street, especially around traffic crossings.

Chatting while sitting was observed at the informal outside seating at the steps of the shops in section 15, the shaded seating area in section 7, and the Riffa Food Court in section 18. Standing and speaking can be found on both sides of Riffa Street. The higher level of standing and chatting occurred in sections outside shops, banks, and

money exchanges. In addition, people would stop in front of the bakeries and cafeterias to speak with those they knew standing outside the restaurants and bakeries.

Like other streets, there were many activities around the cafeterias, bakeries, marts, banks and intersections where other streets intersected with Sheikh Ali Bin Khalifa Avenue. This might be attributed to people taking their time orienting themselves, debating which route to go after exiting the street, or to people knowing one other by sight and participating in informal conversations as they passed the eateries and everyday services.

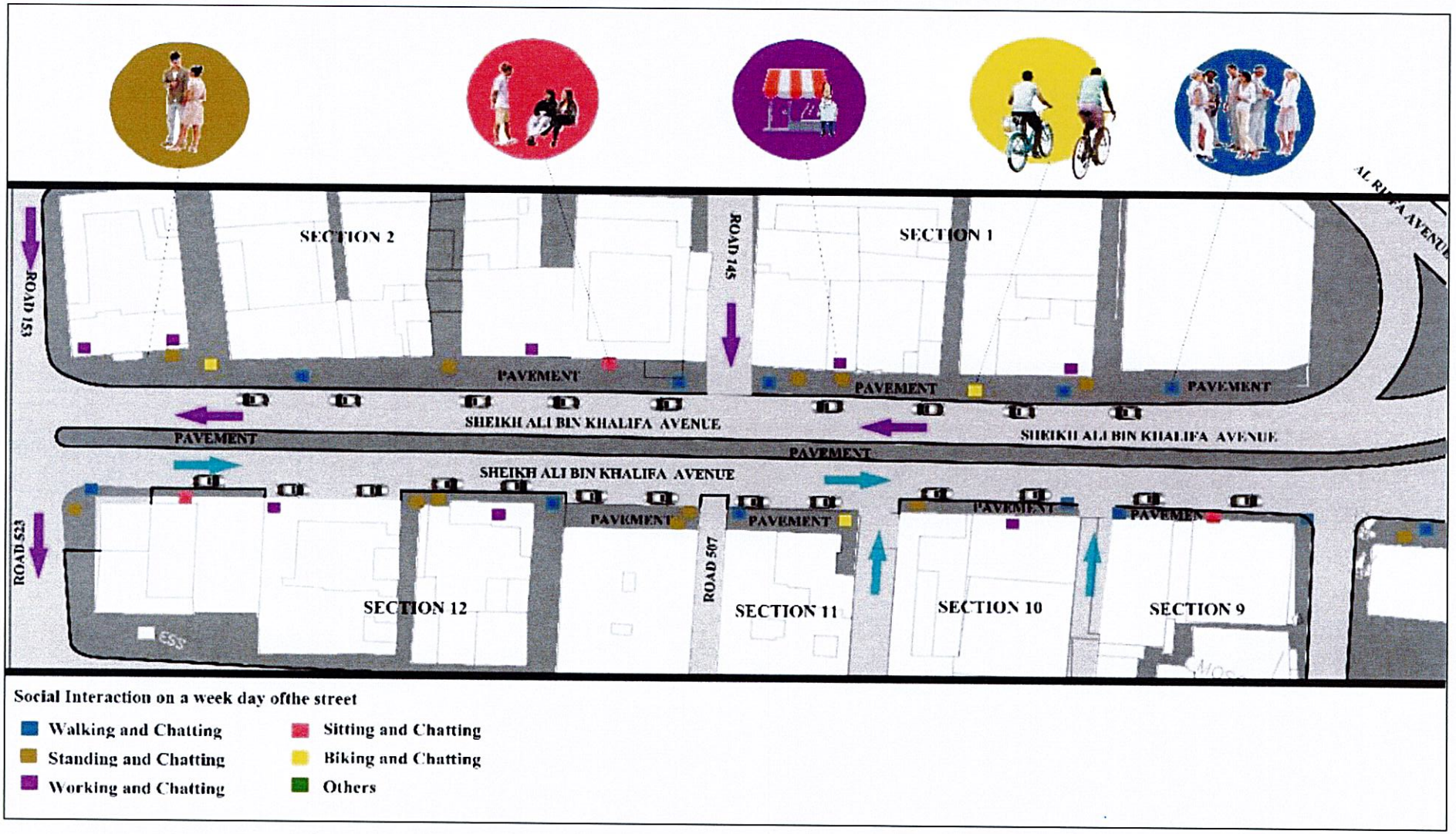



Fig. 4.189: Social interactions on weekdays in the Sheikh Ali Bin Khalifa Avenue part 1 in Riffa
Source: Author

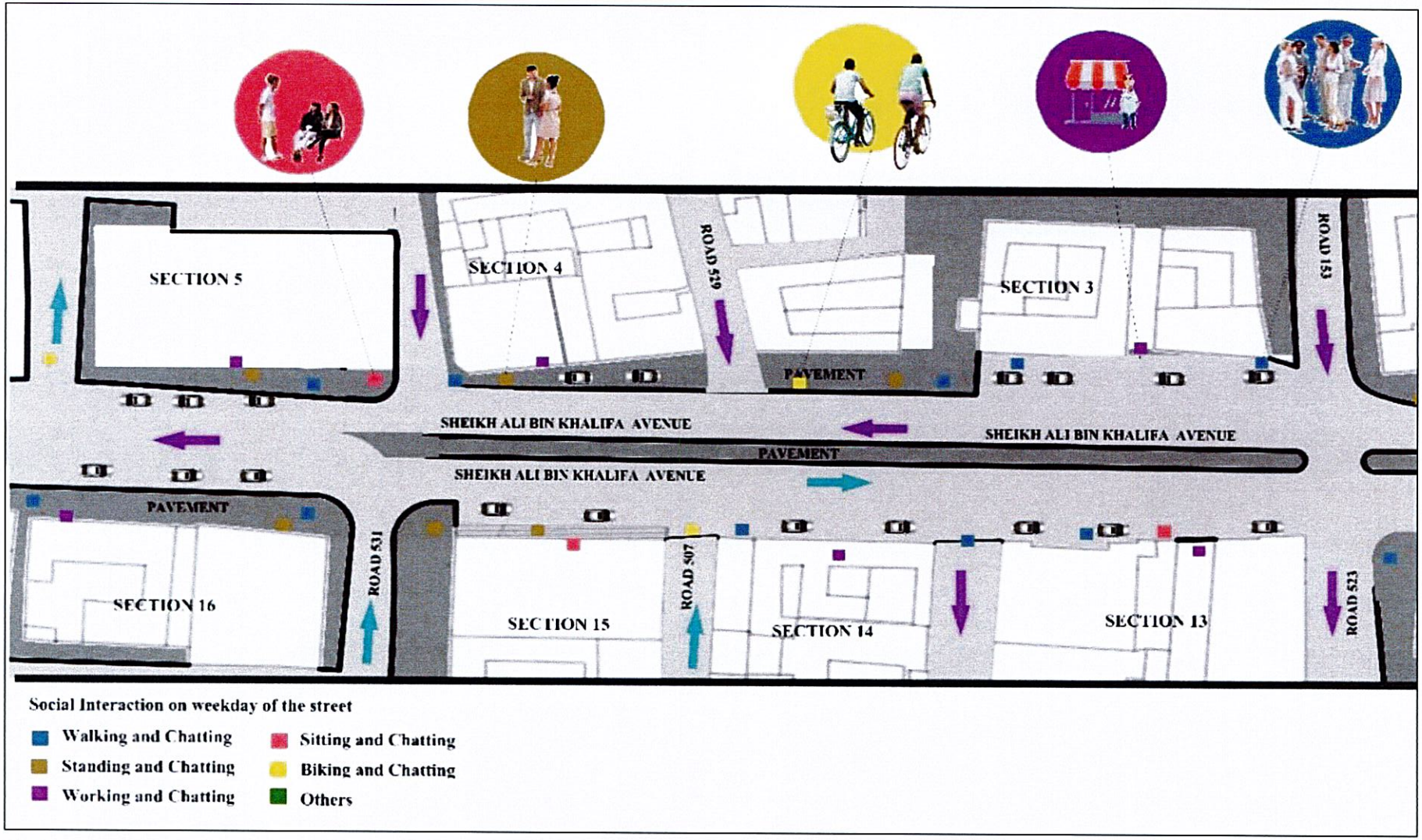



Fig. 4.190: Social interactions on a weekday in the Sheikh Ali Bin Khalifa Avenue part 2 in Riffa
Source: Author

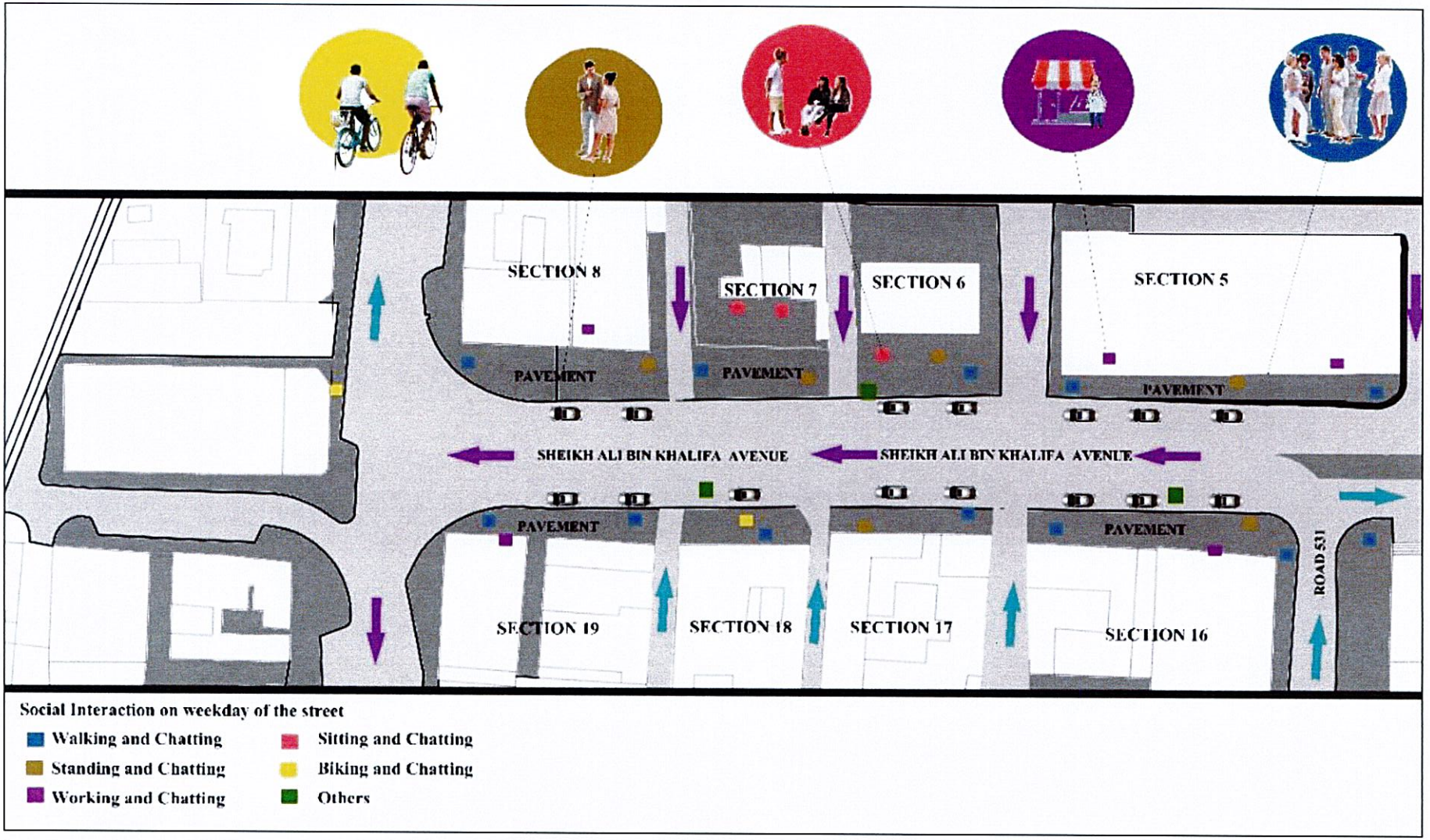



Fig. 4.191: Social interactions on a weekday in the Sheikh Ali Bin Khalifa Avenue part 3 in Riffa
Source: Author

### 4.5.6.2 Social interactions during the weekend

During the weekend, most people were seen engaging socially in front of the retail shops and mosques on Sheikh Ali Bin Khalifa Avenue (part 2). There are many retail shops in sections 2 and 12, part 1 of the street. While in sections 8 and 20 in part 3, dispersed social interactions were observed. Many social contacts took place in the middle, entrance and corners of intersections of streets and along the partition until part 2. Interactions also occurred in the junction on the opposite side of the street and along with the general store.

However, around 12.00 P.M, social contacts shifted from the street section's entrances (both North and South) to the street section's center (part 2) of the street and the area surrounding the crossing at part 2 in the Riffa Street (section 3 and 7). Regarding the social scape, most of the social contacts occurred on Friday at 11.00 a.m. and 5.00p.m, with 20 interactions each. In addition, the timing of the peaks and a movement in the social scape towards sections S04 & S05 and sections S15 & S16, where the Mosque and the shops are located, in the afternoon, imply a connection to window shoppers are popular social activities, especially on weekends.

In part 1 of the street as shown in Fig. 4.192 at 9.00 a.m., the most common interaction was standing while speaking, followed by strolling while chatting, which increased from 11:00 a.m. There were a minimum of five contacts in which individuals sat in front of shops to talk. At 2.00 a.m., there were just five pupils' encounters, including two standing while speaking (between sections 12 and 13 and between sections 1 and 2; both at the junction). At the same time, three walking and chatting interactions at the street entrance in sections 1 and 9.

Part 2 of the street, as shown in Fig. 4.193 at 9.00 a.m., was quiet, with the most common interaction being standing while speaking. However, from 11.00 a.m, the most common interaction was strolling while chatting, also standing, sitting and talking in which individuals sat and stood in front of the shops to speak. At 2.00 a.m., there were just five pupils' encounters, which included three meetings of walking and chatting at the junction of sections S04 & S05 and section S15 & S16 of the street, while there was one encounter of people talking at a partition of the two streets.

In part 3 of the street, as shown in Fig. 4.194, the most common social interaction was sitting and chatting in the shaded sitting area, followed by walking-talking people towards part 3 of the street. There were a minimum of three encounters of people standing and chatting in sections S07 & S08 and sections S17 & S20. This part of the street is usually quieter than other parts, with people coming for particular purposes to gold shops or nearby Riffa Food Court in section 18.

It's also worth noting that four larger groups of four or more people in all parts of the street were strolling along the street, engaging and conversing in sections S01, S02, S04, S05, S08, S09, S12, S15, S16 and S20. This variation suggests that the congestion of the sidewalk affects standing while interacting. The more people walked on the sidewalk while conversing. The fewer people remained for an encounter. Pedestrian movements generate a collective flow at weekends when social scape peaks (12.30 and 4.30 p.m), making it difficult to stop and linger on the sidewalk.

One is instead pulled. Sitting and conversing took place where outdoor seating was available, such as in front of the section7 (part 3) of this street or informal sitting on the steps in front of the shops in

sections S05, S09, S15 & S16. Surprisingly, many did stop and stand at the part 3 area for a talk (sections S01, S02, S03, S06 and S07). People generally walked past the buildings after the intersection while conversing with their companion (s). Fewer interactions could be attributed to ground-floor uses and a lack of small enterprises.

Surprisingly, the areas with the most significant difference in social contacts between weekends and weekdays between part 1 sections S02 & S12, part 2 sections S04, S05, S13, S15 and part 3 sections S05, S08, S18, and S20. These areas appear extremely busy during the weekend, both by people strolling and those remaining to socialize. During the week, however, there is virtually little social interaction. The fewer social interactions might be related to the façade character, mixed and uninteresting in these specific parts and their purposes, including services and retail. However, they are primarily local businesses and do not provide everyday necessities. There are more interactions on weekends in these retail stores during the weekend compared to the week.

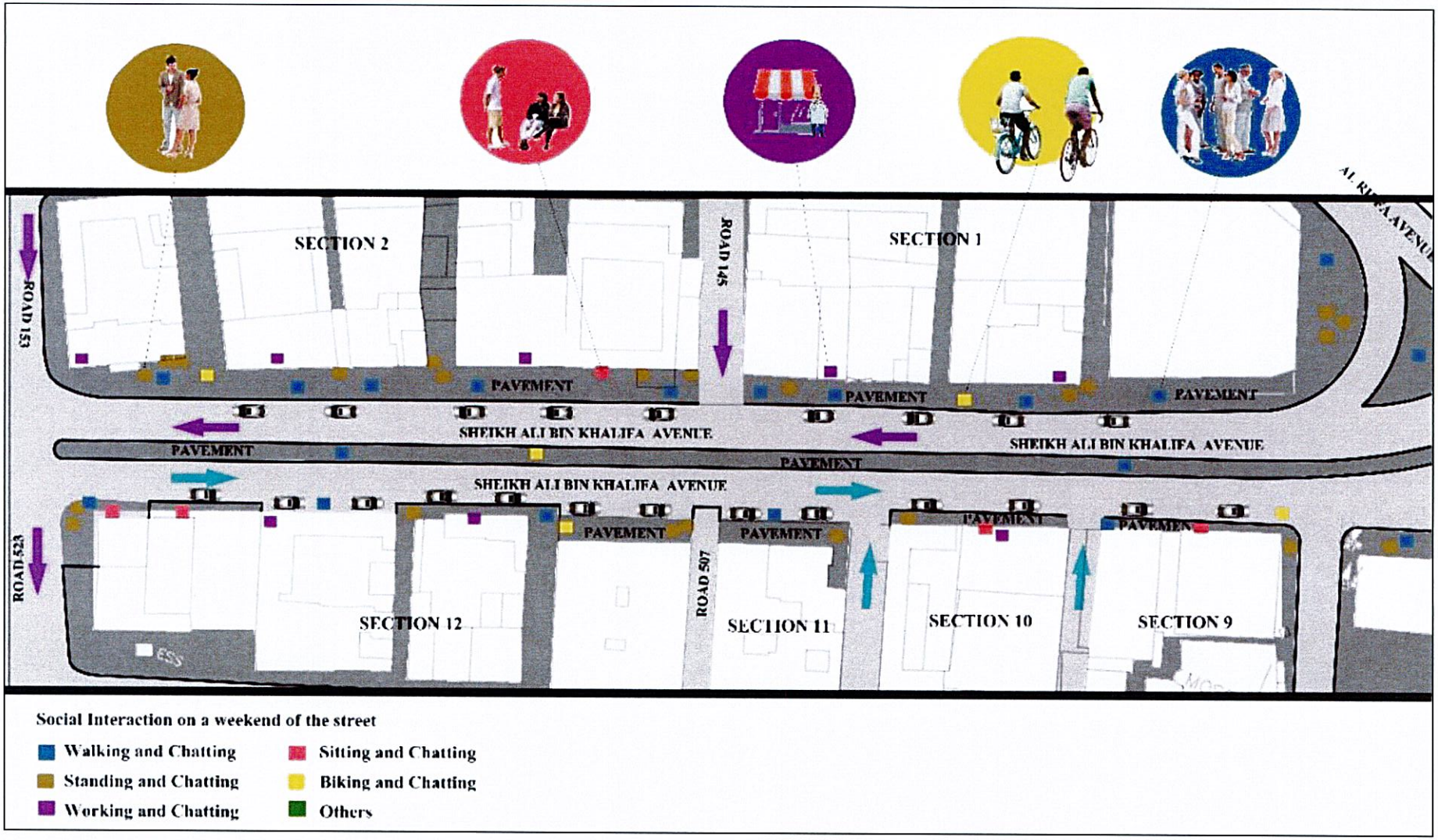



Fig. 4.192: Social interactions in the weekend in the Sheikh Ali Bin Khalifa Avenue part 1 in Riffa
Source: Author

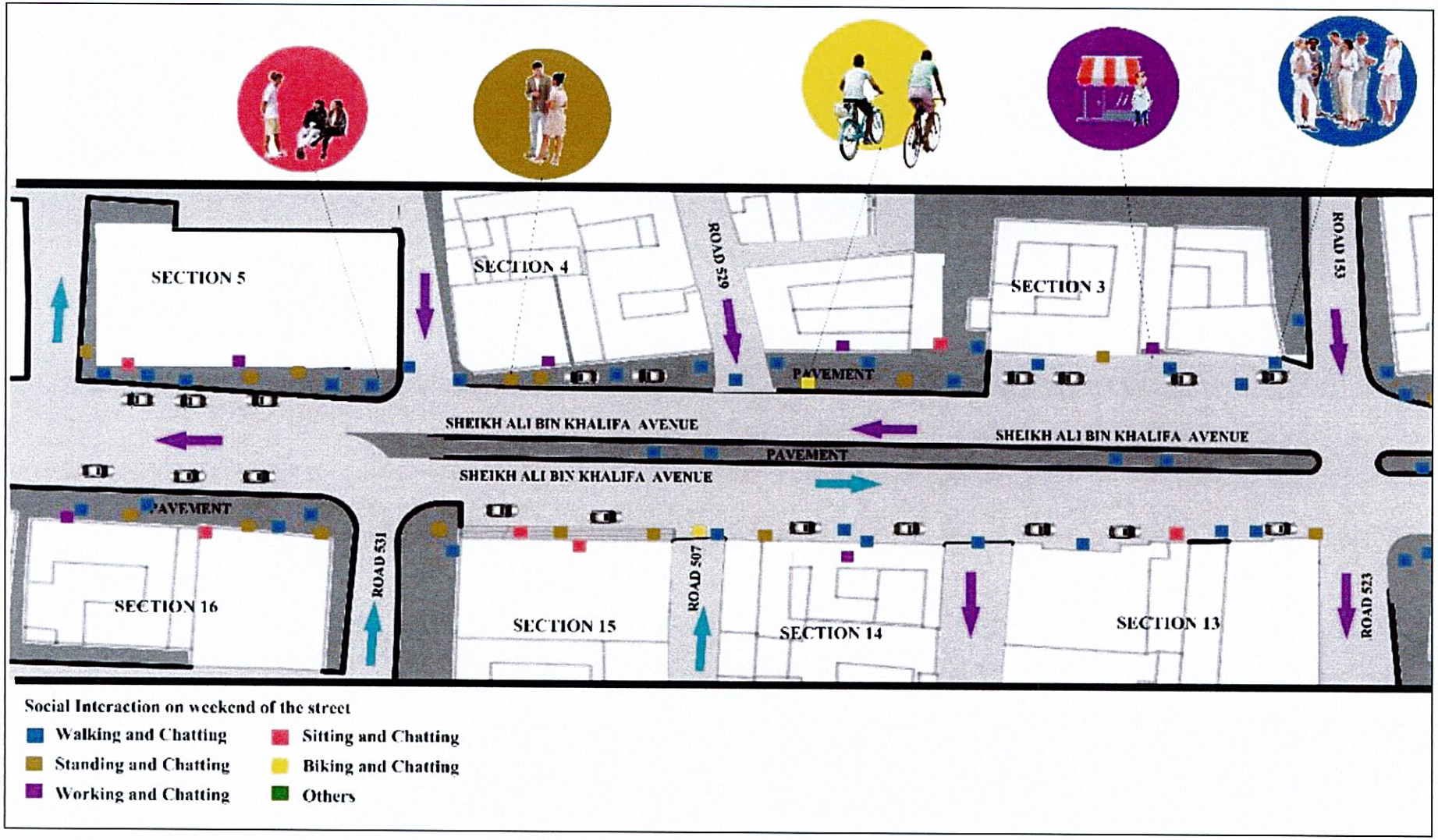



Fig. 4.193: Social interactions in the weekend in the Sheikh Ali Bin Khalifa Avenue part 2 in Riffa
Source: Author

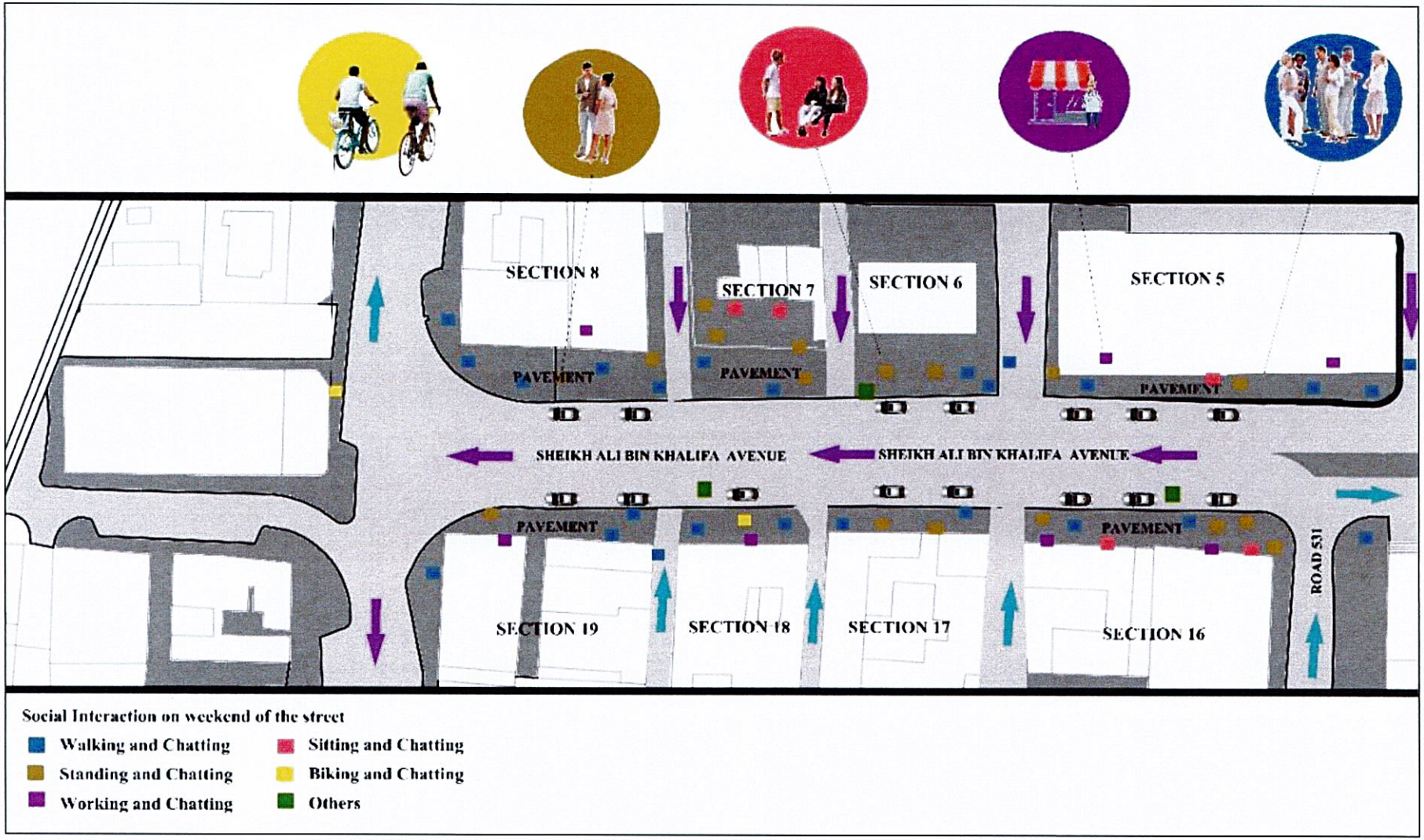



Fig. 4.194: Social interactions in the weekends in the Sheikh Ali Bin Khalifa Avenue part 3 in Riffa
Source: Author

## 4.5.7 Notes from the field

The field notes on Sheikh Ali Bin Khalifa Avenue, as shown in Fig. 4.195 and 4.196 show meteorological and sun conditions and the researcher's moods, ideas, and pre-conception of the site

**FIELDNOTES :1**

- Observation notes
- Date: 8/06/2021
- Day: Tuesday
- Time: 11:00 a.m. – 1:30 p.m.
- Warm weather
- Bright sun shining temperature felt 50 degrees centigrade

I am feeling it is boiling. I am tired and exhausted and feeling a lot dirty. When the sun shines, I can feel the warmness and heat on my face. I think how much I miss the springtime or wintertime when the weather is friendly for walking, sitting, and chatting.

I am feeling insecure as if people are wondering what I am doing. I feel uncomfortable observing them because of the questionable cold looks I am getting from them most of the time. I am feeling a stranger that has poked in their privacy.

While there are no benches on the sidewalks and people stand and observe or chit chat. However, by the end of the street, there were folded benches lying on the sidewalk due to Covid -19 restrictions in the country. I have seen most of the people were sitting on steps outside their enterprises. Some people were standing outside of bakery shops at 11:00 a.m. Sitting and chatting were not so common during this day.

The most common form of social interaction seems to be walking and chatting in the street. Pedestrians seem to recognize people that walk towards them to pass them. However, there is no interaction between them. The only interaction is between people who walk together. Or smokers, bikers, rent a car driver, and between shop owners and regular customers who have known each other for a long time.

At noon, the sun is shining the brightest; one can feel the warmth on the body and face. There is a prayer from the mosque that I can hear. The retail activity on the street is slowly getting reduced while people are visiting the road for services. Fewer people are standing and sitting outside of the cafeteria and cold stores informally. I am also getting hungry and bored. I am going to put forward 3 -4 observation sessions for another visit. Despite me, I can observe there were few people on the street.

Fig. 4.195: Field note: 1 on Sheikh Ali Bin Khalifa Avenue in Riffa
Source: Author

**FIELD NOTES: 2**

- Observation notes
- Date: 2/07/2021
- Day: Friday
- Time: 11:00 a.m. – 2:00 p.m.
- Warm weather
- Bright sun shining temperature felt 50 degrees centigrade

I reached the street at 11:00 a.m. and it seemed it was very early. I am feeling sleepy, tired and a bit dizzy. The sun is shining very bright, and it is hard to collect data in extreme weather conditions. Reaching the street, I had immediately started documenting my variables of observation, including social interaction. As the day passed, more people were on the street, mostly going towards the mosque for Friday prayers. It's a covid -19 days people come early for their placement in the mosque.

I was surprised that most retail shops, money exchange shops, bakeries and cafeterias were open. I planned that after completing my observation to visit the mobile shop to repair my phone. Interestingly, people had started recognizing me after my first visit. Surprisingly, more police patrols cars could be seen monitoring the street to avoid any mishaps during the weekend.

Sitting on an informal Step of an enterprise, I am working on my job application as well while also waiting for the street to come to life. More and more people are visiting the street to attend the Friday prayer or taking necessities. People were standing, walking, sitting, and chatting during this time. At around 12:30, I started to walk towards the middle of the street to convince people for an interview. I found a few people interested in participating at around 12:45. I am done and have seven discussions now. I need to reorganize them and transcribe them for better understanding.

I wanted to wait till 3:00 p.m. for the last observation, but dizziness due to hot weather is increasing. I am getting a headache and have consciously kept the car start so that the car's air condition keeps my body temperature regular. I decided to call it a day by 2:00 p.m. after taking some photos and waiting some time in the sun. I fell the temperature at this time to be above 50 degrees centigrade.

Fig. 4.196: Field note: 2 on Sheikh Ali Bin Khalifa Avenue in Riffa
Source: Author

## 4.6 Interviews

The interviews provide detailed and personal viewpoints on how people perceive the streets in Bahrain (Manama, Muharraq and Riffa). Interviews conducted in conjunction with observations can indicate how a street's environment is perceived multisensorial, which sensory contributes to dynamic urban environments (findings from interviews).

As the observations show, the characteristics of facades on the ground floor of adjoining buildings or aesthetic aspect encourages social interactions the most during the week. However, the usage on the ground floor levels seemed to impact. The findings of the interviews, a more particular and subjective viewpoint on the environment of the three streets (Manama, Muharraq and Riffa) is provided.

The results are distinguished by their street connections, revealing variations in sensory perceptions between the two groups. In addition, to illustrate the findings, quotes from the interviews are used anonymously, with the alphabet A and B referring to the association groups with the place and no affiliation, respectively. Numbers were provided to the interview respondents in the sequence of the discussions in each street.

## 4.7 Government Avenue Street Manama Interviews

Group A: People (local or expatriates) have visited the street less than a year or are regular visitors.

Group B: People (local or expatriates) that have not seen the street in less than a year.

**Table (4.4): Interviews for Government Avenue Street Manama**

### 4.7.1.1 Visual

Participants were asked to link their experiences on Government Avenue with their visual observations to comprehend the visitors' visible remarks better. They were asked to associate their experiences with the following visual stimuli.

| Group A | Group B |
|---|---|
| (A1-A3). | (B1-B2). |

1. Characteristics of facades on the ground floor,
2. Location of cars and
3. Characteristics of pavements.

The participants in both groups associated a sense of freedom with a high vision, evidenced by light and clear perspective. In addition, they associated a combination of sight, touch, and perceptions of freshness and warmth with a sense of freedom, which is enhanced by smell.

### 4.7.1.2 Characteristics of facades on the ground floor

Group A participants in Government Avenue were pleased with the contemporary mixed with the refurbished traditional visual sensory characteristic of facades on the Ground floor.

Participant A1 responded that

"*there is a fair variety of translucent, permeable façades, as well as various forms of overflow activities and edge expansions. Besides inside and outside interaction between the stores and sides walks*

*makes the street life throughout the day."*

In addition, A2 stated that

*"the ground floor of the street is largely commercial, with a diverse range of enterprises such as clothing businesses, jewelry stores, bakeries, commercial banks, sidewalk cafés, restaurants, and services along the street. The range of businesses contributes to the street's liveliness."*

On the other hand, A3 described that

*"his observations indicated that sidewalk activities were frequently connected to the unique type of building ground-floor functions. Sidewalk portions with the most staying action were more likely to include a variety of building ground-floor uses as well as the presence of one or more food shops or cafés."*

At the same time, B1 stated that "*ground-floor façade features play a significant impact in the incidence of sidewalk lingering activities such as building facades with niches connected or uneven edges much-staying activity can be recorded."*

B2 emphasized the point by saying that

*"It was discovered that the design of a building's ground-floor façade might encourage the expansion of interior activities to the sidewalk, such as the temporary sitting of café s on the sidewalks, therefore, contributing to an increased presence of people on the sidewalk."*

### 4.7.1.3 Presence of Vehicles

Participants in both groups were concerned with randomly parked cars obstructing the view. However, the vehicles were parked

at specific locations due to the sidewalks and continuous monitoring by police vehicles.

A1 described that *"here mostly multistorey parking facility is available for 4-star hotel residents. There is a vast government vacant space available for Bab al Bahrain customers."*

A2 connects the lack of signages and road markings for parking spaces as a concern. The familiar people can reach without hazard. A3 adds up that *"at night the place is blocked with cars as it's a well-known place for gold souq and walking foot becomes barely tricky."*

B1 described cars, buses, and different transportation vehicles coming at random and obstructing the view. B2 said he would prefer if the vehicles could obstruct the view and vegetation added. It would change the nature of the street more favorably considerably, having more open space with much greenery.

#### 4.7.1.4 Characteristics of pavement

Both participant groups were generally satisfied with the characteristics of the pavement. However, the overall layout of pavements was typical as found in other streets.

A1 described that

*"In parts where the street was most lively such as those toward the Bab Al Bahrain area or before the Manama bus station, the sidewalk width ranged from three to five meters. Externality seats and product displays were generally set up within this sidewalk width range, leaving a one- to a two-meter-wide path in the front of the sidewalk for pedestrian circulation."*

On the other hand, A2 added that

*"Minimal staying activity was recorded on pavements less than three meters wide. These small walkways could not support any more activity than shop owners sitting or standing in front of their businesses."* A3 stated that *"it is not just the width of the pavements that may produce street vibrancy. The presence of trees, appropriately parked vehicles, and shop canopies all influence the street's vitality."*

Participant B1 described,

*"the highest levels of social interaction were seen in locations where cafés and food businesses provided external seats. There is a famous qawah shop where many people come during the evening to enjoy the street view. Furthermore, different sorts of seating options such as public seating next to bus stations aided in the presence of people on the street."*

On the other hand, B2 raised the concern that there are no public benches on the sidewalks, with very few exceptions. In addition, façade designs in low-staying activity areas typically did not include any edges, steps, or other components that could be used as seats. As a result, the availability of moveable chairs provided by food shops and cafés, as well as the presence of parked automobiles, essentially determined social interactions in front of such facades.

### 4.7.1.5 Soundscapes

Regarding sound, respondents of both groups identified typical vehicle horns, children playing, dog barking, drilling at construction sites, engine humming, jackhammers, police sirens and street music from electronic shops during different hours of the day.

Respondent A1 described, *"Several individuals are standing, sitting, walking, conversing, and socializing in the street section next to Bab Al Bahrain."*

On the other hand, A2 described the traffic noise, including horn blowing, bus operator yelling, and security vehicle patrolling, which can be heard at random hours. Additionally, A3 describes that mobile merchants ringing bicycle bells or ice cream vendors' cars blowing horns can be heard occasionally.

Group B participants describe the sound on the street as relatable to activities. B1 explains that

*" The shift in activities provides alteration in the sound. In addition, the road is quite congested and relatively noisy. The vehicle is the most audible. There is typically a lot of activity on the street, although it is currently rather calm. A lot is going on outside in the bars, cafés, and bakeries, especially as the weather warms up."*

On the other hand, B2 described that he enjoyed it when activities occurred in the street when people stroll outside, or when a vehicle passed by you. He further adds that he enjoys hearing other people's conversations, which keeps the street lively. However, the street sound and energy change with the seasons and time.

#### 4.7.1.6 Tactility

Both group participants described scorching weather conditions, the difference in the level of building surfaces, and the absence of shading devices impacted both group's experience on the street

A1 reported the street's atmosphere as shifting in response to weather conditions. *"When it has rained, the street is charming during*

*the winter months of November, December, and January since everything is clean, and the shops look even more gorgeous. It's peaceful and wonderful."*

On the other hand, an A2 respondent admits that the weather influences the whole experience of the street: *"With little sunshine and nice weather, everything seems more lovely."*

A3 added that the solar height was something people with street connections were aware of. The sun also impacted respondents' behavior and cognitive decisions about their choices of strolling on the pavement side or lingering in cafeterias. Some even knew which café or sheesha shops had outside seating, received more or less sunshine at what time of day, and chose a café based on this knowledge.

B1 participants responded that weather and seasons also impacted the amount of time spent outside, with mild temperatures increasing the amount of time spent outdoors on the street. People appeared to be unconsciously impacted by the heat. When the sun shines, the environment of the street is said to be more lively and pleasant.

B2 added that *"When the sun sets, the street comes alive because so many people go to it to enjoy it. When the weather is nice, the street and the people are happier."* In addition, the participants also noted feeling differences in the texture and haptic of the pavements.

#### 4.7.1.7 Smellscape

Participants identified different functions as sources of the varying smell and attributed a neutral smell on the street during the absence of functions. A1 participants described the smell as only

perceived in conjunction with functions on the ground floor of adjoining buildings, such as bakeries, cafeterias and restaurants: a specialized source of the scent. Adding to this, A3 ascribed that the outside display of certain shops resulted in a consistent scent sensation owing to, for example, fast-food restaurants and cafes.

According to group B, seasons and weather impact the scent. Participants indicated that it was too hot to perceive odors at the interview as body odor prevails any other smells. B1 described that *"there's no countryside aroma here in government avenue street. It just smells like fresh air in the absence of a car during the morning timings."* Participants also described quick expulsion of odors due to enough vacant spaces on the street. (B2) agreed, however, that *" there is more olfactory variety than visual variation"* while describing the smell environment of the street.

#### 4.7.1.8 Small-medium enterprises

The cafés, fast food chains, and traditional restaurants in the street were essential to both parties. Small, independent establishments such as retail shops, currency exchanges, boutiques, and local and international gold shops were also pleasant and added unique characters to the street environment. Respondent from Group B describes that the traditional outside sitting coffee shops and restaurants are unique to this street, not usually found in other adjacent streets. In addition, B2 added that the retail shops in the Bab al Bahrain area attract many visitors due to being local shops.

Another participant adds that the street is unique, comprising a 4-star hotel, a governmental building, a well-known gold souq, and local shops and restaurants. A different variety in layout entertains

different types of customers during different day hours. B2 describes the difference in the variety of shops that make the street very lively, which is why people from all around Bahrain and outside are here to hop. Group A resident described that people buy daily necessities and maintain healthy social relationships with the business owners/keepers. They recognize one other by sight since the locals regularly visit a shop.

#### 4.7.1.9 Government Avenue Manama multisensory urban environment

Participants in the two groups had opposing views on the overall environment of Government Avenue Manama. Group A described the environment on Manama Street as vibrant during different hours of the day.

Participant characterized her street perspective as a multi-sensorial experience via all senses, but some senses are perceived rather consciously than others:

A3 described

*"Whole, all of the senses work together to produce something like to a sense of well-being, and as a result, I would say that the senses that one employs subconsciously, or things that one experiences unconsciously, such as odors, also influence the overall situation."* The visual experience of the street has greater awareness than other sensory inputs, that are often seen subconsciously.

When strolling down the street, the perspective was primarily limited to the Ground floors. According to one respondent, B2, *"The perceptual field is mostly restricted to the ground floor. "There is no looking up."* In terms of the street's character, interviewers who had

no association with Government Avenue Street Manama B1 described it as *"a standard street, nothing exceptional."* Group A interviewers on the other hand, who connected to Manama Street because they lived on or near it, appeared to notice and appreciate minor details more finely and uniquely.

Both parties criticized the absence of trees, flowers, and bushes on the street, highlighting greenery's sensory and emotional benefits. According to *A2, "When there are more plants or when the environment is more colorful, people are more excited about life. You feel different when it's green."*

Another group B interviewee indicated that more trees and green made a region more appealing to her (B2). Both groups criticized the street's lack of green (trees, flowers, etc.), emphasizing green's sensory and emotional well-being.

## 4.8 Sheikh Hamad Avenue Muharraq Interviews

Group A: People (local or expatriates) have visited the street less than a year or are regular visitors.

Group B: People (local or expatriates) who have not seen the street in less than a year.

**Table (4.5): Interviews for Sheikh Hamad Avenue Muharraq**

| **Group A** | **Group B** |
|---|---|
| (A4-A6). | (B3-B5). |

### 4.8.1.1 Visual

Participants were asked to link their experiences in Muharraq souq with their visual observations to comprehend the visitors' visible

remarks better.

Participants in both groups linked a sense of freedom with clear eyesight, as evidenced by the light. Furthermore, they related a sensation of space with a combination of sight, touch, and perceptions of freshness and warmth, heightened by fragrance.

### 4.8.1.2 Characteristics of facades on the ground floor

For visionary, group participants in Muharraq street were more satisfied with the visual sensory characteristics of Facades. The facades on the ground floor of the street were more appealing and dynamic than on Riffa street. People were highly familiar with this street as compared to other streets.

When questioned about what he observes on the street, A4 said

*"Everything is visible to me. That's what makes it so appealing. You may encounter various fascinating items, shops, and people as you travel down the street. Besides, some stores are traditionally refurbished in Muharraq souq, making it quite youthful as compared to the overall perception of street aging."*

While A5 expresses his love for the local businesses and individuals strolling, he describes the street's visual environment as attractive due to the nature of the small shops and the people that reside here. Overall, participants from group B liked the street's outlay and the one flow of vehicles street direction.

B3 described that

*"I like the various paintings and textures of the buildings. They are lovely. The colors and textures make it more attractive. In addition, the mixture of old buildings and new buildings is pleasant to*

*look at. However, I like older buildings with their beauty and details simply because they provide more visual stimulation."*

B4 stated,

*"The facades are lovely when they're ancient, or when anything pops at you, like the contemporary Muharraq library, it's simply unusual since it's not so typical for the structures that stand here."*

### 4.8.1.3 Presence of Vehicles

Both participants were highly concerned about the vehicles being obstructing and acting as a visual barrier. Participants described the visual orientation as imprecise, with practically no visible landmarks.

B3 states that

*"You have to glance at every junction to check if you're already where you want to be since there aren't many road markings or visible light corners that assist you to find your way when you look down the street."*

Repeating the statement, B4 affirms that a lack of street signs and a navigation system. In addition, there are insufficient pedestrian circulation and road crossings.

B5 says that

*"The road's varying width is narrow in some places and broad in others, which becomes a significant reason for traffic congestion."* he further adds that *"the excessive use of automobiles discourages walking and causes traffic congestion and noise. It jeopardizes pedestrian safety."*

### 4.8.1.4 Characteristics of pavements

Both groups described the pavement characteristics as dull and less appealing with fewer exceptions where the new contemporary library of Muharraq has been built and other refurbishments have taken place.

Participant in group A3 describes that

*"There is a lack of public facilities and street furnishings for pedestrians and bicyclists. Amenities and facilities include seating areas, public restrooms, water features, parks, shaded walkable streets, and easily accessible paved pathways are missing in this street".*

At the same time, A4 describes no uniformity in the width of pavements and overall land use, which discourages pedestrians in the street. B4 says that the pavements were dirty and broken with cars parked on pavements. At the same time, B5 describes that the lack of vegetation, car pollution, and congestion are the primary reasons for rising temperature and the lack of pedestrians in the street.

#### 4.8.1.5 Soundscapes

The interview includes a direct question regarding the sound that both group respondents most identify with the Muharraq Souq to evaluate how the hearing sense is involved in their experience.

A4 described an amplified noise of salespeople chatting with people and prevalent music emanating from electronic shops. The traffic noise, including horn, blowing, and police vehicle whistles, is also audible, with security vehicle noise that can be heard primarily during specific hours.

A5 describes

*"random loud music scumming from electronic shops, which mixes with the noises of people chatting, street vendor yells, and continual road noise disrupts street's many activities. The noise makes it hard to walk straight; instead, one is "forced" to meander through street vendors and the numerous activity zones."*

Group B describes the entrance of the street to be more lively and noisy compared to the end of the street, which includes the school and the mosque. According to B3, one of the most prominent sounds in this street is coming from the mosque since the street consists of two to three mosques along the way. B4 adds that as the street adjoins the main road, there are sounds of car horns and beeping or small vendors chatting occasionally. The school wall becomes the quietest during the evening where people stand and overview street liveliness and chat with people around.

#### 4.8.1.6 Tactility

Both group participants described the sun, the difference in levels of the surfaces of buildings, ground hump, breeze, shadow, and wind all impacted both groups' street experiences. Group A participants described a sense of security, freshness, pleasantness, pleasure, joy, and liveliness in excellent weather or during the afternoons. In contrast, they thought of quietness, sadness/Nostalgia, heat, calmness and avoidance when the sun is bright during hot weather seasons and in the absence of shading devices.

A4 described that *"the sensation of freedom and security was formed by combining the three senses of seeing, touch, and smell."*

A6 explained, *"when the sunset, the street comes alive because so many people go to it to enjoy it. When the weather is nice, the street*

*and the people are happier."*

Group B described the tarnished surfaces of buildings, flat pavements, the hot peak sun altitudes, and shadows created lifelessness, discomfort, displeasure and unlivable atmosphere of the street. On the contrary, good weather conditions made happiness, pleasantness, calmness, and security.

B3 described that *"I usually go to this Muharraq street in the afternoon when the sun is less bright and when there is less congestion of cars."*

On the other hand, B4 *"heat is one indicator that enhances his touch sensation through which I feel pleasant or sad."*

B5 stated that *"One feels the shift of pavement due to a driveway; from regular paving stones to dynamic pavements and back."*

### 4.8.1.7 Smellscape

Both groups identified various odors classified into the main groups listed below.

A3 recalled that *"there are vehicle-generated emissions, including emissions from automobiles, buses, and street-cleaning devices throughout the day."*

A5, on the other hand, described an odor coming from food and beverages shops such as those containing fruits and vegetables, culturally associated snacks, restaurants, fast-food outlets and cafés. Instead, A5 also identified that *"I could smell Tabbcoo smell on this street such as filtered and roll-up cigarettes, cigars and hookah."*

Group B said they could smell some particular odor from this site instead of a typical smell, such as artificial odors from perfumes.

B3 explained, "*I can smell non-food items including cardboard and leather from furniture and book shops.*"

B4 described, "*I could smell odors from drains, dust, pavement, wood, and building sites. Instead, there were prominent people odor such as body odor, fragrances, burp, smoker's odor that I can smell.*"

B5 stated that waste smells were present in this street, such as from garbage cans, trash, urine, excrement of animals and vomiting. Group B described in general that they could smell cleaning material odors such as coming from public toilets, bleach, and citrus cleaning fluid.

Both group participants agreed that there were no natural odors such as those coming from trees, flowers, gardening, and clean air. They even agreed that some of these odors, such as those linked with cigarette smoke, vehicle emissions, or food, reoccurred in all settings. While others were more particularly connected with specific locations, such as some of the chemical odors (perfumes) generated by particular enterprises or the strong smell of the street market were location specified.

#### 4.8.1.8 Small-medium enterprises

Both parties had a positive perception of small-medium enterprises. Both groups valued that the variety of local shops from retail, services, cafés, restaurants and bakeries give a unique urban character to the street, which is different from other streets.

A3 described, "*Small local businesses are more linked to their*

*communities and have a greater understanding of local requirements."*

Adding to this, A4 said that the good thing about this street is that *"The Muharraq street is unique in that it has small enterprises on the ground level as well as residences buildings on this street as well as the adjacent street. The variety in land use makes the street extremely vibrant and vital, more specifically since layout there is commerce in the street, which is why the residents of the street, as well as the adjacent streets, are all here to shop."*

Group B participants described that particular shops are unique in this street and they come here to shop for these specific shops.

B4 explained that *"the Muharraq sweet shops such the showiters are unique to this street and I like to visit this street to buy traditional Arabic sweets and pickles."*

B5 described this street as a high tourist attraction because these local vendor shops are not usually found in other adjacent streets.

B6 explained that *"the Zahoor al Muharraq sweets and Hassan Mohammed showaiter are some shops I regularly visit to buy Arabic sweets. The vendors are very cheerful and sweet, which encourages buying. He further added that "some of the traditional Arabic sweets vendors sell the best sweets which are not sold anywhere else. However, there are many showaiter shops available in different streets of Bahrain".*

### 4.8.1.9 Sheikh Hamad Avenue in Muharraq multisensory urban environment

Participants in the two groups had opposing views on the general atmosphere of Sheikh Hamad Avenue in Muharraq. Group A

described the environment on Sheikh Hamad Avenue in Muharraq as active, even at different times of the day. A9 explained, "*When there are more plants or the environment is more colorful, people are more excited about life. You feel different when it's green.*"

Another contends that *A7 "if trees were present in the street, it would have a favorable effect on perception: streets that still have trees are much prettier and simple to recognize. " You create little shading, it is beautiful and then the birds come and settle down, making the street better." Muharraq's streets are mostly devoid of trees. There is also much concrete."*

A responder from Group B responded that the number of trees and vegetation made a place more pleasant. (B2). *"In the area where I live, in the Amwaj, it is greener, which I find adorable and pleasant."* Furthermore, during the day, as it sunlight it light up various places at various times, and various street sides receive sunlight. The availability of shading can increase the vibrancy of this street. Since the street's beauty and vitality are influenced by the sunshine and shade. Based on overall acquaintance with the street, individuals are either unconsciously or deliberately influenced by the sunlight.

In contrast to other adjacent streets, Sheikh Hamad Avenue Muharraq Street features a variety of uses on the ground floor. Still, the dwelling function is most prevalent on the ground floor in parallel and crossing streets, creating a distinct, livelier environment.

A6 said, *"locals and small businesses converted the streets into the shopping district, making it unique compared to other streets that run parallel to Sheikh Hamad Avenue Muharraq Street. The Sheikh Hamad Avenue Muharraq Street is unique because it has both*

*residential residences and modest stores on the ground floors of adjoining buildings, making it extraordinarily alive and vital for everyday users. The residents of the neighborhood and the residents of neighboring streets are here to shop. "*

However, compared to other major arterials in Muharraq Street, the Muharraq Souq and Al Qasariya Souq have been rated as more pleasant and intriguing than Sheikh Hamad Avenue Muharraq Street. According to group B interviewees, B7 Sheikh Hamad Avenue Muharraq Street is "just a typical street."

## 4.9 Sheikh Ali Avenue Riffa Interviews

Group A: People (local or expatriates) have visited the street less than a year or are regular visitors.

Group B: People(local or expatriates) that have not seen the street in less than a year.

**Table (4.6): Interviews for Sheikh Ali Avenue Riffa Street**

| Group A | Group B |
|---|---|
| (A7-A9). | (B6-B7). |

### 4.9.1.1 Visual

Participants were asked to connect their experiences of Riffa Street with their visual observations to understand the visible remarks of the visitors better.

### 4.9.1.2 Characteristics of facades ground floor

For vision, all the group participants talked about building façades. The facades were usually found to be boring and repetitive,

with small exceptions. A7 liked the building with traditional Arabic detailing on the facades, while A8 liked the more contemporary facades.

A9 emphasized that *"facades are essential and can affect people positively and negatively."*

B6 mentioned, *"the overall outlay of the stores is satisfying."* He liked the asymmetry in the building facades and described that the textures and different colors give life to buildings. B7 explains that he still wants old buildings rather than new ones due to their relief and features since they provide more visual stimulation than new ones. Most people in both groups liked detailing on facades, bringing liveliness to the street.

#### 4.9.1.3 Presence of Vehicles

Both groups described the randomly parked cars as being obstructive. Group A participants referred to vehicles as a visual barrier. In contrast, B8 said that the street's nature would alter more favorably if the vehicles disappeared. It would have been more open, less grey. Both groups said that the excessive use of cars discourages walking, causing traffic congestion and sound and jeopardizing pedestrian safety.

#### 4.9.1.4 Characteristics of pavements

Both groups described the pavement characteristics as boring, monotonous and less appealing. A7 said that pavements are not continuous and are broken. A7 was also concerned with the varying widths of pavements. A8 described that it would have been more appealing if vegetation were added alongside the pavements or, more specifically, road partitions.

A9 stated that *"he is concerned with a lot of using concrete and asphalt, affecting the climate of the street."*

Participants in Group B also suggested that pavements should be adjoined with lighting for more appeal and pavements could be more attractive and dynamic to enhance their visual characteristics.

### 4.9.1.5 Soundscapes

Both groups described traffic sound as being loud in terms of the auditory environment, particularly the vehicles. Group A's respondents contextualize how they have embraced these sounds as a regular part of their everyday auditory perception. A7 described that *"he appreciates urban sound."* He enjoys it when something happens, such as when people are outside or when a car comes.

A8 further states that *"he likes hearing what other people say, which makes the street more alive."*

On the other hand, A9 described that street sound varies depending on time and weather conditions. The street is usually noisier during peak hours. You can hear different sounds from cars passing by to people chatting and many more.

Participants in group B described the traffic noise as usually higher when the Riffa Souq meets the adjacent main road. B6 found the sound of traffic disturbing when people talk to each other because it makes one speak louder for conversation to go on. B7 liked the sound of prayers five times during the day as it allowed for social interactions and the hustle and bustle in the street.

### 4.9.1.6 Tactility

Weather, temperature, seasons and appropriate use of shading

devices impacted both groups' experiences and street usage. Participants described the street's environment as shifting according to the weather. Participant A7 explained that the street ambiance is much better during the winter and spring months. There are more people outdoors. The clouds act as shading and from the hot sun, and overall the street and shops become more beautiful.

A8 showed that the absence of appropriate shading devices in the street in the scorching weather is alarming. A9 described that naturally, people go towards informal shading created by the sun's altitude and usually, people tend to move in the opposite direction of solar length. People typically come more outdoors in non-peak hours of the sun, such as early mornings or late evenings.

Participants in Group B described huge concrete masses with no vegetation as dead, isolated spaces. B7 and B8 explained that they felt the touch difference in different materials used on streets from pavements, driveways, street lighting poles and other urban furniture.

#### 4.9.1.7 Smelling

Both interviewees agreed the street had no particular odor. The odor is only experienced in conjunction with a ground-floor function, which is a distinctive source of the pleasing scent. At the same time, the odors of cars or the dustbins were a source of the unpleasant smell.

A7 described that some of the smells are constant and are there during the same hours each day. For instance, the baking of loaves of bread during the mornings or in the afternoon is continuous and has become part of street liveliness. Similarly, the odor of CO2 gas from cars is regular. Group B participants explained the smell alteration

during different weather conditions, such as in hot weather, scoring weather conditions surpass smell.

### 4.9.1.8 Small-medium enterprises

Both parties valued small, individual businesses as being pleasant and adding character to the street. Group A respondents underlined the importance of local businesses in their daily lives.

According to A8, *"it's the inhabitants here. The street is a little business and shopping street."*

On the other hand, a participant in group B described that they know Riffa souq for a prominent location of local mobile shops and gold shops. They go there mainly to buy them. A9 explained that the presence of local shops makes the street extremely vibrant and vital, so the residents of the quarter and the adjacent streets are all here to shop.

### 4.9.1.9 Sheikh Ali Avenue Riffa multisensory urban environment

Participants in the two groups had opposing opinions on the general ambiance of Sheikh Ali Avenue Riffa Street. Group A regarded the Sheikh Ali Avenue, Riffa Street atmosphere as lively, even at different hours of the day. One participant described the street as an experience through all senses, with some being perceived more consciously than others. On the other hand, they are perceived subconsciously.

A6 describes,

*"On the whole, all the senses are combined in perceiving a sense of well-being in urban spaces. However, some senses perceive urban*

*spaces consciously while others perceive rather unconsciously, such as smells, also impact the overall situation however vision is more intensively perceived."*

This demonstrates a more extensive awareness of the visual experience and stimulus than other sensory inputs, which are unconsciously received.

In terms of the street's personality, interviewees who had no prior knowledge of B7 described it as *"a standard street, nothing extraordinary."* On the other hand, Group A interviewees tended to notice and appreciate minute features more finely and vividly since they resided on or near the Sheikh Hamad Avenue Muharraq Street.

A7 described *"People are more thrilled about life when there are more plants or when the surroundings are more colorful.When it's green, you feel different."* Another thinks that

A8 describes. "*if trees were present in the street, it would have a positive effect on perception: streets with trees are much beautiful and easier to recognize.They provide some shade, it's green, it rustles, and then a bird comes and sits, which enhances the road. In general, there aren't many trees on Riffa's streets. There is also a lot of asphalt."*

Another participant of Group B said that having plants and greenery made the spaces more desirable B6: *"In the quarter where I reside, in the Riffa views, it is much greener, which I find nice and delightful."* The availability of shade can boost the brightness of this street because the light and shadow impact the beauty and vitality of the street. Depending on their familiarity with the street, people are either unconsciously or deliberately influenced by the sun.

In contrast to other nearby streets, the Sheikh Ali Avenue Riffa

Street has a range of uses in the ground floor. Still, the residential function is more frequent in parallel and crossing streets, providing a different, livelier environment.

On the other hand, A8 describes.

*"It's the locals, and the street is a small commercial and shopping sector. Riffa Street is distinct from the other streets parallel to Sheikh Ali Avenue. There are both private houses and tiny retailers on the bottom level of Sheikh Ali Avenue Riffa Street. This makes it highly alive and crucial for the construction because there is commerce here, which is why the people of the neighborhood and nearby streets are all here, all of them to shop."*

According to B7 interviewees, Riffa street is "just a typical street." On the other hand, B8 "*Saw a decent mix of pedestrians; diverse age groups, parents with children on the street and moving through it.*" Riffa Street seemed more pleasant and desirable for most group B participants. The ambiance of the street was regarded as more welcoming on springy days, although the street was usually described as anonymous and devoid of distinguishing qualities.

## 4.10 The important classification made by respondents of all three streets

The points that impacted both group participants in all three streets were: Characteristics of facades on the ground floor of adjoining buildings, Presence of vehicles, Lack of vegetation, greenery, unpleasant sound scape of vehicles while pleasant sound of people, birds and living things, pleasant, unpleasant odor, sunshine and weather conditions usages and occupancy on ground floor and presence of urban furniture.

# CHAPTER FIVE
# THE DATA ANALYSIS

# CHAPTER FIVE
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## 5.1 Introduction

The environments of the three streets (Manama, Muharraq and Riffa) have been researched using all sensory stimuli, ground floor usage, and occupancy. In addition, characteristics of facades, ground floor usage, and occupancy have also been investigated in terms of social interactions. The following table lists the attributes researched in the three streets.

**Table (5.1): Detailed Observation table on the three streets of Bahrain**

| **The Manama, Muharraq and Riffa Street** | | |
|---|---|---|
| **Multi-sensory perceptions** | | |
| **1** | **Visual** | Characteristics of facades of the ground floors of the adjoining buildings. |
| | | Presence of Vehicles. |
| | | Characteristics of pavements. |
| | Effects of visual stimuli on social interactions | |
| **2** | **Soundscapes** | Sound recordings at spots 1, 2, 3 & 4 during the weekdays. |
| | | Sound recordings at spots 1, 2, 3 & 4 during the weekends. |
| | Effects of sound stimuli on social interactions | |
| **3** | **Tactility** | Weather condition and shaded areas. |
| | | Material texture. |
| | Effects of tactility on social interactions | |
| **4** | **Olfactory** | smell |
| | Effects of olfactory stimuli on social interactions | |
| Other sociability Factor | | |
| **5** | **Mehta's sociability factor** | Usages of the ground floors of the adjoining buildings. |
| | | Occupancy of the ground floors of the adjoining buildings. |
| | Effect of Mehta's sociability factor on social interactions | |
| **6** | **Social interaction** | Social interactions during the week. |
| | | Social interactions during the weekends. |
| **7** | **Field notes** | In-the-field recording of information by means of writing and sketching. |
| **The lively atmosphere of the Manama Street** | | |

According to the findings (Chapter 4), the environments of the three streets (Manama, Muharraq and Riffa) depend on many sensory inputs. They comprise of the usages and occupancy of the adjoining buildings' ground floors, small businesses' existence, and the presence of other people, all of which contribute to dynamic atmospheres. Respondents were specifically questioned about their sensorial experience on the streets mentioned above. They all (100%) highlighted street usages, occupancies, facade characteristics and the presence of other people as essential characteristics and multisensory stimuli for experiencing the liveliness of the streets.

## 5.2 Manama Street Analysis

### 5.2.1 The visual experience

Both the interviews and the observations identified the visual appearance of Manama Street as being the most powerful sense of perception that contributed to the spatial experience. Street visual experiences inspired the designs and impressions of the ground-level façades. As discovered, older, refurbished and historical façades from the 1970s and 1980s representing Bahrain's history were more intriguing and appealing, providing a beautiful environment to the street than newer plain façades.



Fig. 5.1: Images of attractive façades from Manama Street Part1
Source: Author

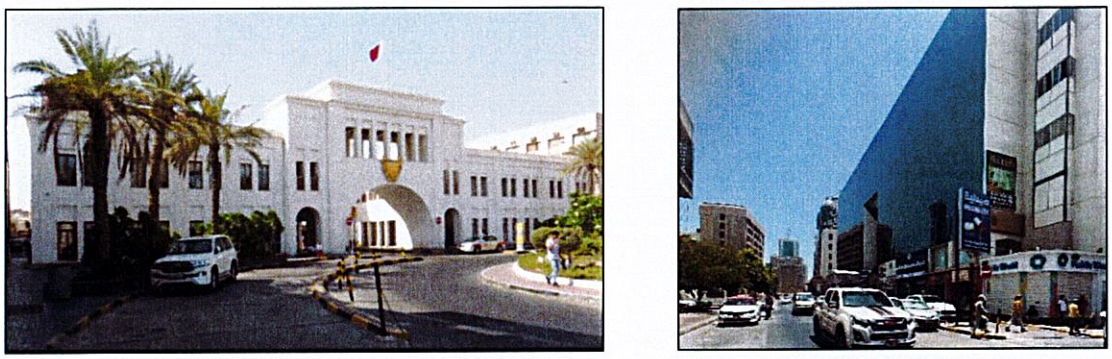


Fig. 5.2: Images of the attractive façades of the Manama Street Part 2
Source: Author

As shown in Figs 5.1 and 5.2, for example, the Bab Al Bahrain, the Manama Post Office, and the traditional stores, restaurants, and coffee shops are located in Part 1 (sections S04, S10, S11 & S12) and Part 2 (section 6) of this street. On the other hand, buildings with modern façades with glass cladding details in part 1 sections S02, S03, S13 &S14 were also visually appealing during observation.

In addition, four out of five Participants found buildings with detailed compositions, niches, edges, and plaster walls more appealing. Newer, decorated façades appeared as an alternative to homogeneous, monotonous, and uninteresting façades. Not all historical façades were regarded as visually appealing or pleasant, but only those with an organized, articulated exterior were.

Regarding façade character, there was a link between social interactions and façades classifieds as active, mixed and friendly (part 1; section S02, S03, S10, S11, S12 &S14); (part 2; section S06, S08 & S15). People would spend more time in front of those appealing facades. Instead of passing by, they lingered for the social connections. Other sections had less social interactions with largely uninteresting and inactive façades and a few mixed façades, but not for long such as in part1 (sections S01, S02, S04, S13 & S14) and in

part 2 (Sections S07, S09, S16, S17, S18, S19 & S20). The exchanges here were identified as 'conversing while moving' (walking or riding) but not staying.

From north to south, the characteristics of the façades changed from colorful, engaging, and pleasant to rather dull and dormant. Changes in facade characteristics resulted in either intriguing or dull visual street environments that could be associated with the vibrancy based on the social interaction locations, which changed correspondingly.

All respondents, however, agreed that the functions on the ground floor of adjoining buildings might improve the façades even though they are not appealing. For instance, facades of cafeterias, bakeries, and traditional Arabic coffee shops (part 2; sections 16 & 17) were described as dull, although people gathered and socialized in front of these facades at different times. Visitors would even stop and stand to speak with customers seated on the outside chairs or standing in front of the cafeteria and bakeries. In this case, this third space (cafes, bakeries, restaurants, etc) was used for social purposes, rather than the only fascinating façade character on the ground level, impacting social interaction.

Furthermore, Group A and B participants stated that parking vehicles negatively affected their visual experiences. Parking cars, particularly delivery vehicles, formed a visual barrier by obscuring views of the other side of the street and the façades on the ground floors of adjoining buildings and walkways.

### 5.2.2 The aural experience

In terms of the sensory environment of the street, auditory stimuli were discovered to be second after the visual, both through interviews and observations. As per the findings from the interviews, the perception of sounds varied depending on the participants' identification with the streets since they are used to them. Interviewees in Group A found the traffic sounds to be somewhat oppressive.

In addition, it was found that the soundscape of Manama Street changes throughout the day, with typical sound rising to the highest levels in rush hours in the early mornings and late afternoons. Since individual sounds are identical throughout the weekday and on weekends, there is greater auditory variety during the whole day than during the week. However, sounds associated with product delivery are usually audible on weekdays.

The interviewees considered the sounds substantially more robust in the entrance portion of the street (spots 1 and 2) than in the existing section (spots 3 and 4). The soundscape recordings show that the sounds are distributed more in spots 2 and 3 than in spots 1 and 4. According to the interviewees, Spots 1 and 4 had more sounds of people conversing on Manama Street due to the availability of urban furniture compared to spots 2 and 3. Overall, the sounds are more dispersed on weekends than throughout the week on this street.

The auditory environment of Manama Street fluctuates during the day and throughout the week. At the same time, traffic sound generates an unpleasant environment. On the other hand, people's voices contributed to a vibrant atmosphere.

### 5.2.3 The tactile experience

The term "tactility" was given to the bodily experience of the urban environment arising from temperature, weather, seasons, and the materials of the sidewalks. Throughout the year, seasons and weather events such as summer, spring and winter change the atmosphere of the streets.

Manama Street's environment becomes more lively when the sun is less bright throughout the day and the year, based on the sensory stimulus caused by the solar positions. In the spring and summer, as the number of daylight hours and the sun's temperature rises, relatively few individuals flow out onto the pavements and sit in the outdoor seating of cafés, restaurants, and public seats.

The location of the social contact is connected to the sun's position since more individuals participate in social interactions by sitting or standing on the shady sides of the pavements. Tenants of building adjoining the street and other street users indicated that the sun location influences their choice of cafés. While participants did not identify tactility as the major method of experiencing the street, sensory experiences, for instance, weather temperatures, humidity, and seasonal changes, particularly daylight, greatly influenced respondents' behavior and the street environment, although unconsciously.

### 5.2.4 The Olfactory experience

Although no unique smell scape or odor environment can be recognized throughout the studied area of Manama Street, respondents observed that these streets had more odor variety than visual variability.

Aside from a reasonably neutral-scent environment, the usages and occupancies on the ground floors of adjoining buildings significantly influenced the olfactory characteristics of Manama Street. Bakeries and vegetable shops, restaurants, cafés, and Arabic scent shops, were sources of pleasant smells. While vehicle emissions, the rotting stench from trash cans, and precipitation in hot weather, on the other hand, were sources of unpleasant odors. However, the constant, mild breeze immediately blew away most aromas.

Notably, neither pleasant nor disagreeable odors lingered for long or were particularly identifiable within the street. The smell was the most missing stimulation on this street, making it difficult to assess how much this specific sense generates the experience.

Although, participants of Manama Street noted that when the temperatures rose in the summer, scents in the street became more prominent than in the spring or winter. However, it is questionable if Manama Street has its distinct smell-scape because of the frequent mild wind. The olfactory environment of Manama Street can be defined by the general lack of scent and periodic olfactory stimulations.

### 5.2.5 Small-medium enterprises

Small-medium firms and other people's presence and multisensory stimuli are identified to influence the street experience. They provide a "compact neighborhood" feel that impacts social interactions. Moreover, people perceived this street as livelier than others having just residential on the ground floor of adjoining buildings to the street, but this specific street was less vibrant than

other notable streets such as the Exhibition Road in Manama, having more local & international companies. While still being one of the most well-known streets in Manama, retail stores also impact the street's environment.

Group A participants spoke about their satisfaction with distinctive stores available on this street. Still, they were concerned about missing everyday service stores such as grocery shops, pharmacies, and other local retailers. Group B participants expressed their appreciation for the modest, unusual, distinctive, and specialized stores, such as the gold souqs, 4-star hotels, traditional restaurants, cafes, and traditional retail stores.

They also expressed satisfaction in the local retail stores while speaking about something special in the street. For instance, the gold souq, Bab al Bahrain, presents a place identity and boosts tourism. Four out of five participants agreed that the presence of local enterprises generates a village atmosphere in which people know each other and the store owners/keepers. Most of the inhabitants shop in the street for their daily necessities. It creates a sense of belonging for people in this place.

In addition, due to the cafés and restaurants (part 1; sections S11, S12 and part 2; sections S15, S16 & S17), people stopped when engaged in social contact, particularly in front of cafés, restaurants, bakeries and outside of retail outlets. Standing or sitting and speaking was common, particularly in front of the café and the bakery with extensive formal and informal outside seating.

People were observed generally going by in the front of the ground floors of adjoining buildings of this street with the intention of

dwelling, socially engaging and speaking as they strolled by. This implies that the environment within or in front of the local businesses facilitates social encounters, whether through buying or through their public functions, which correlates to higher social engagements.

### 5.2.6 The social environment

The results of studies of social interactions on Manama Street show that the street is livelier on weekends than on weekdays. Generally, the number of social encounters, primarily strolling while conversing, is higher on weekdays on this street. Walking down the street implies a destination-oriented usage of streets as a mobility corridor. Manama Street is less congested during the week as compared to weekends. There are more exchanges in which individuals stopped and lingered while conversing on weekends rather than on weekdays. Thus, a more slowed-down, relaxing environment in Manama Street can be found.

Aside from variations over the week, the vibrancy of Manama Street varies during the day. There are distinct peaks in social encounters from 11 a.m. till 1.00 p.m and 4.00 p.m till 9.00 p.m, which coincide with the Friday prayers, typical brunch, coffee periods and dinner timings when the street is more congested during weekends. A high number of social encounters are occurring on the pavements of Manama Street, particularly when the pavement width exceeds 3.0 meters or where there is public seating.

On weekdays, the activity on the street and social encounters gradually rise from early morning until midday, with a peak at 1.00 p.m. Midday is a traditional lunchtime peak when workers go to a cafe or restaurant to order or take out to eat at work. The energy level

steadily decreases till 5.00 p.m.

Observations and interviews suggest that people in the street create a dynamic environment, producing these atmospheres. These vibrant environments change during the day based on rhythms and patterns of work and social activities like brunch and teatime. People would just stand, sit, and stroll in front of the dynamic and welcoming façades to converse, and the characteristics of the façades were related to social interactions.

## 5.3 Muharraq Street Analysis

### 5.3.1 The Visual experience

Similar to Manama Street, interviews and observations identified Muharraq Street's visual appearance as the key sensation in experiencing the street. The design and look of the facades on the ground floor of adjoining buildings were inspired by the sense of vision of the street. Older, historical façades with a touch of modernity from the mid-1980s that depict Bahrain's heritage were fascinating and enticing, offering a more lovely atmosphere than modern plain facades.

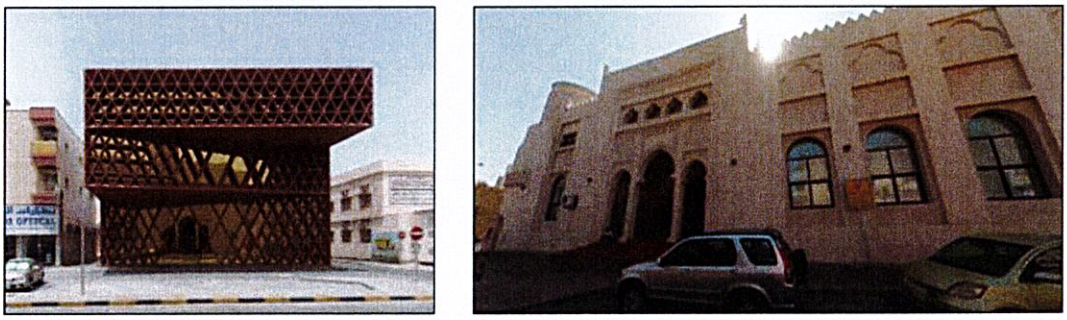


Fig. 5.3: Images of attractive façades from the Muharraq Street Part-1
Source: author

As shown in Fig. 5.3, part 1 of the street sections (S17, S18, S19), such as the Al Qasariya Souq façade, has a terrazzo finish with

traditional wooden foldable doors. In contrast, the Muharraq Souq had plain concrete finishes with niches and traditional Arabic detailing on windows and doors.



Fig. 5.4: Images of attractive façades from the Muharraq Street Part-2&3
Source: Author

On the other hand, as shown in Fig. 5.4 in part 3 of the street section (8 &11), the Muharraq library facades have aluminum and glass cladding. In contrast, the Mosque has traditional Arabic detailing on the façade. Part 2 of the street had no remarkable facade.

In general, buildings with intricate compositions with niches, edges, and plaster walls were more appealing to the participants. At the same time, observers admired bright, plastered, contemporary façades with glass and aluminum that appeared to be a change from regular, repetitive, and uninteresting façades. While not all historical façades transited were regarded as visually appealing or attractive, only those with a structured, articulated façade that was refurbished were chosen.

There was a relationship between social contacts and façades defined as friendly, active or a mixture of façade characters (part 1; sections S17, S18, S19; Part 2; section S6 and part 3; sections S8 & S11). People would devote significant time in front of all those façades rather than simply passing by to develop a social connection. Other areas had fewer social contacts due to generally unattractive and inactive façades and a few dispersed mixed façades. The

conversations here were classified as chatting while moving (walking or riding) but not staying.

The characteristics of the façades on adjoining buildings on the ground floor in all three parts of the street changed throughout, from colorful, engaging, and pleasant to rather dull. The change in the characteristics of facades resulted in either intriguing facades or dull visual ambiance, which can be connected to the liveliness based on the location of social interactions that changed correspondingly similar to Manama Street. However, all respondents agreed that the functions such as local businesses, café restaurants etc. might improve the façade.

For example, cafeterias, retail stores, restaurants and bakeries and old retail shops are allocated in (part1; sections S01, S02, S18, S20; part 2; sections S03, S04, S05, S06, S14, S15 &S16 and part 3; sections S07, S08, S09, S10, S12 & S13) are regarded as dull facades, despite people assembling and socializing there. Passers-by would stand or instead stop to converse with customers sitting on the outdoor public benches and chairs or standing in front of cafeterias and bakeries. In this example, rather than the façade character on the ground level, this third area's utilization and social purpose influenced social interactions.

Furthermore, participants in Groups A and B of this street also noticed that parking vehicles had a detrimental impact on their visual perception of the road. Parking automobiles, particularly delivery vehicles on this street, formed a visual barrier by obstructing views of opposite streets and the façades on ground floors of adjoining buildings and pavements.

### 5.3.2 The aural experience

Similar to Manama street, the soundscape of Muharraq Street fluctuates throughout the day, with typical sound spikes occurring around rush hours in the late mornings and late afternoons. Since individual sounds during the day and on weekends are very similar, there is a greater auditory variety during the day than throughout the week. However, a sound related to goods delivery is generally noticeable on this street during the week.

The interviewees thought the sounds were more significant in the entry part of the street (spots 1 and 2) than in the existing street segment (spots 3 and 4). The soundscape recordings demonstrate that the sound is more evenly distributed in locations 2 and 3 than in spots 1 and 4. According to interviewees, due to the availability of urban furniture, Spots 1 and 2 on Muharraq Street had more individuals speaking sounds. At the same time, there were more sounds of birds on Spots 3 and 4. In terms of the soundscape, the sound is more diffused on weekends than throughout the week in this Bahraini street.

The acoustic environment of Muharraq Street changes throughout the day and week. Whereas traffic noise creates an urban or unpleasant ambiance in this street, other people's voices create a vibrant ambiance.

### 5.3.3 The tactile experience

Like Manama street, Muharraq Street's atmosphere becomes more lively when the weather is pleasant, with little humidity and sunshine during the day and during the year. As the daylight hours and the sun's temperature grows in the summer, fewer visitors visit this street out walking or standing on the pavement, or sitting in the

outdoor areas of cafés, restaurants, and public seats.

More people participate in social interactions on the shady side of the pavements by standing or sitting. Social contacts can also be linked to the sun's position. Residents and other participants with a link to this street, in particular, reported that the solar altitude influences their choice of cafés or visiting the retail shops. Although respondents in this street did not identify tactility as a dominant technique of experiencing the street, physical senses such as temperature, seasons, and weather, notably sunlight, significantly influenced interviewees' behavior and the street atmosphere, albeit unconsciously.

### 5.3.4 The Olfactory experience

Similar to Manama street no distinct scent scape or olfactory ambiance could be identified over the selected Muharraq Street. However, Respondents discovered that this street also had greater smell variety than a visual variance. The usages greatly influenced the olfactory characteristics of the Muharraq street on the ground floors of adjoining buildings, such as the bakery, the vegetable stores, the restaurant, the café, Arabic perfume shops and Showalter shops, which were the sources of pleasant smells. In contrast, car emissions, the decaying stink from garbage cans, and precipitation in hot weather were sources of unpleasant odor. The steady, gentle wind, on the other hand, quickly blew away the majority of the scents providing a reasonably neutral-scented environment on the street.

It must be emphasized that neither pleasant nor repulsive scents persisted for long or were easily identified along the road. The smell

was the most lacking sensation in this street, making it impossible to estimate how much of the experience is generated by this sense. However, the Muharraq Street participants noticed that as the temperatures rise in the summer, odors on the street become more noticeable than in the spring or winter seasons. Because of the frequent gentle winds, it is debatable whether Muharraq Street has its particular odors-cape. Muharraq Street's olfactory ambiance may be characterized by a general absence of aroma and occasional olfactory stimulation.

### 5.3.5 Small-medium enterprises

In addition to multisensory inputs, people and small enterprises influence street liveliness. It has been discovered that small and medium-sized businesses give both sociability and a "small neighborhood" atmosphere. People considered this street to be livelier than others, with just housing as a purpose on the ground floor, but less enthusiastic than other important streets like as Muharraq Souq itself or Al Qasariya Souq. Local businesses were discovered to influence the street's ecology. Participants in Group A expressed gratitude for the small and uncommon, distinctive, specialized stores found here.

Despite their contentment with the local retail businesses, Group B participants voiced that the Muharraq library provided uniqueness in this street, enhancing place identification and tourism. Two members of Group A also connected the businesses on this street to those in smaller towns. Local business creates a feeling in which store owners and regular buyers know each other. The majority of the residents buy along with the shops in the street for their daily essentials.

Furthermore, because of the availability of cafés and restaurants (part1, sections S02, S18 & S19; part 2; sections S03 & S16; part 3; sections S07), sweet shops and retail (part1; sections S01, S02, S17 & S20; part 2; sections S04, S05, S06, S14 & S15; part 3; sections S07, S08, S09, S10, S12 & S13) people came to a halt when engaging in social contacts, notably in front of third places and outside of retail establishments.

Speaking while standing or sitting was frequent, especially in front of the cafe and its vast outside seating and in front of the bakery. It was also noted that people were walking by in front of the ground floors for dwelling, socially mixing and speaking while they did so. This implies that the street environment within or in front of the local enterprises facilitates social interactions, whether by purchasing or their social function on the ground floors of adjoining buildings, increases social engagement.

### 5.3.6 The social environment

According to the findings of social interaction research on Muharraq Street, the street is significantly busier on weekends than on weekdays. On weekends on this street, the number of social meetings, notably strolling while speaking, is higher. Walking along the street means streets are used as mobility corridors with a specific goal. As a result, Muharraq Street is less congested during the week, and more interactions occur during the week in which people stop and stay while speaking than on weekends. As a result, Muharraq Street has a more relaxed and slowed-down atmosphere.

Aside from variations during the weekdays, Muharraq Street's liveliness also varies during the day. During weekends, the vibrancy

of Muharraq street remarkably peaks from around 11:30 a.m. till 1.00 p.m. and from 4.00 p.m. till 9.00 p.m., which correspond to Friday prayers, traditional brunch, coffee intervals, and dinner timings, when the street is more congested. Social interactions occur on the edges of the sidewalks of Muharraq Street and where public seating is available, particularly in bigger groups. During the week, street activity and social interactions rise progressively from early morning until noon, with a peak at about noon.

Like Manama street, this vibrancy is typical because of lunch breaks when workers/owners/ buyers eat at a restaurant's cafeterias or take out to eat at their stations at shops or offices. From then on, the energy level of people steadily decreases till 4.00 p.m and then rises again. These vivacious surroundings change based on work rhythms and social activities like lunch and tea time throughout the day. People would stand and converse in front of the dynamic and welcoming façades, and the character of the façades was tied to the nature of the social interactions.

## 5.4 Riffa Street Analysis

### 5.4.1 The Visual experience

Riffa Street's aesthetic look, like that of Manama and Muharraq Street, was recognized as a powerful sense of experience through interviews and observations. The visual perception of this street influenced the style and form of the ground floor façades of adjoining buildings. Like other streets older, historical façades with a modern touch from the 1990s depicting Bahrain's past were more intriguing and engaging and provided a wonderful ambiance than newer ones. However, this street had more newly constructed

buildings.

As shown in Fig. 5.5 in part 1 of the street sections S01, S02, S09 & S12, primarily privately owned properties with little detailing, concrete finishes could be seen. No specific landmarks could be observed in this part of the street.

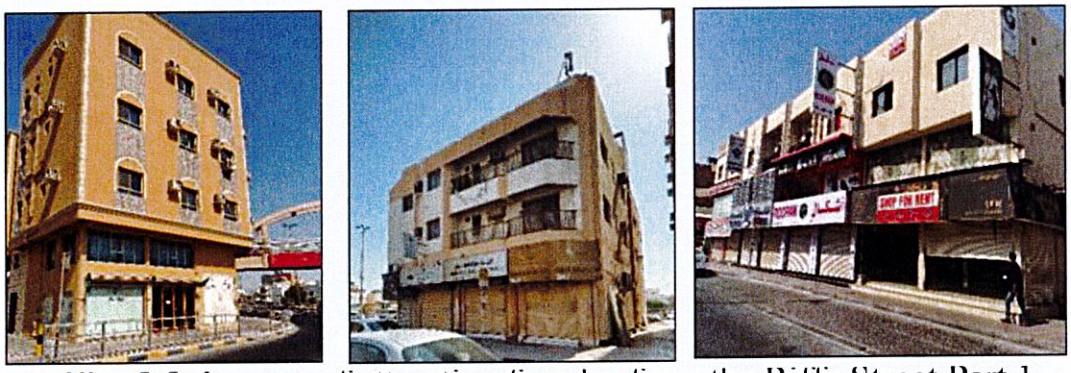


Fig. 5.5: Images of attractive facades from the Riffa Street Part 1
Source: Author

Part 2 and part 3 of the street, as shown in Fig. 5.6, had no remarkable façades. Here, simple concrete finish buildings with paint and less detailing could be observed. However, in part 3, as shown in Fig. 5.7, the Riffa post office had traditional Arabic detailing. At the same time, no significant landmark could be observed in the street.

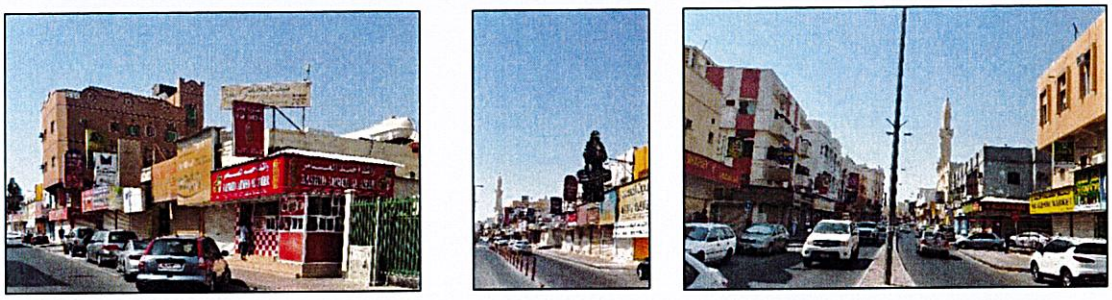


Fig. 5.6: Images of attractive façades from the Riffa Street part-2
Source: Author

In general, buildings with elaborate compositions with niches, edges, and plaster walls were more appealing to participants, as were colorful, painted-on, newer façades that appeared to be a break from uniform, boring, and uninteresting façades. Surprisingly, not all

transited historical façades were deemed visually pleasing or beautiful; instead, only those with structured, articulated façades that had been renovated were chosen.

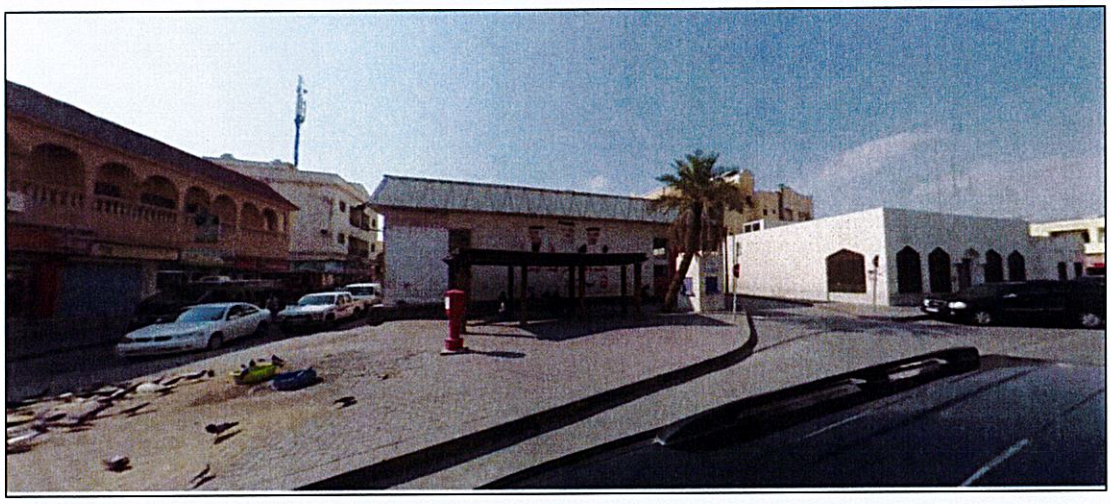


Fig. 5.7: An image of an attractive façades from the Riffa Street part-3
Source: Author

There was a link between social interactions and façades classified as friendly, active, or a mixture of the two (part 1; section S01, S02, S09, 10, 12; Part 2; section 04 and 16 and part 3; section S06, S07, S08 & 16). Visitors would spend considerable time besides these façades. Other sections saw fewer social contacts due mainly to unappealing and inactive façades and a few dispersed mixed façades. However, these contacts were brief. The talks that took place here were conversing while on the move (walking or riding) but not staying.

It is to be noted that from North to the South, the nature of the façades altered from bright, engaging, and pleasant to quite dull and inactive. This is due to either interesting or dull visual atmospheres relating to the liveliness of social interactions. The facade's characteristics, as well as social interactions, are altering proportionally.

All interviewees agreed that the function might improve the façade. For example, people gather and socialize in front of dull, boring facades. The façades of cafeterias, retail stores, restaurants, bakeries, and old retail shops are allocated in parts 1; sections S01, S02, & 12; part 2; sections S04, S05, 15 & 16 and part 3; sections 17 & 18 are regarded as dull. People passing would pause and converse with people seated on the outside public resting chairs or in front of cafeterias and bakeries. In this case, rather than the façade character on the ground level, this third space's usage and social purpose impact social interaction. Furthermore, Groups A and B participants found that parking cars negatively influenced their visual perception of the road. Parking automobiles, particularly delivery trucks, created a visual barrier in this area by obstructing views of the street floor facades and pavements.

### 5.4.2 The aural experience

In terms of the sensory environment of Riffa Street, audio inputs were assessed to be second in dominance after the visual. The participants' perception of sounds and noises varies depending on their relationship to the streets. Because they were used to them, interviewees in Group A found the traffic sounds somewhat distressing.

Furthermore, Riffa Street's soundscape fluctuates during the day, with typical noise surges occurring around busy times in the late mornings and later afternoons. Because individual noises are similar throughout the day and on weekends, there is more auditory variation during the day than throughout the week. During the week, however, a hammering sound associated with goods delivery is frequently audible on this street.

Though the interviewees perceived the noises to be more significant at the entry segment of the street (spots 1 and 2) than in the existing part of the street (spots 3 and 4), the soundscape recordings show that the sound is more evenly distributed in spots 2 and 3 than in spots 1 and 4. According to the interviewees, spots 1 and 2 on Riffa Street had more people speaking sound, owing to urban furniture. Spots 3 and 4 have more noisy birds than Spots 1 and 2. In terms of soundscape, sound in this street is more spread on weekends than during the week.

Riffa Street's acoustic environment fluctuates throughout the day and week. Whereas traffic noise generates an urban or unpleasant ambiance on Bahrain's street, other people's voices create a dynamic ambiance.

### 5.4.3 The tactile experience

Similar to other streets observed, Riffa Street's atmosphere also becomes livelier when it is relatively less hot and humid during the day and the year. Fewer people are observed on the pavements and outdoor areas of cafés, restaurants, and public seats as the temperatures of the sun grow in the spring and summer,

The location of social contacts can also be linked to the sun's position, as more people engage in social interactions on the shaded side of the street pavements. Visitors and other street regular users indicated that the sun's position influences their choice of a café.

While respondents did not identify tactility as the fundamental mode of experiencing the ambiance of the street, temperatures, hot and cold weather, and different seasons, mainly sunshine, had a substantial, if subconscious, influence on interviewees' behavior and

atmosphere the street.

### 5.4.4 The Olfactory experience

Similar to other streets observed, even though no specific fragrance scape or olfactory atmosphere could be recognized across the examined area of Riffa Street, participants observed that this street had more smell diversity than visual variation. Aside from a generally neutral-scented environment, the olfactory character of Riffa Street was highly impacted by ground-floor usages, such as the bakery, the fruit store, the restaurant, the café, and the sources of fragrance, such as the Arabic perfume were sources of pleasant smells. Car emissions, the decomposing odor from garbage cans, and rains in hot weather, on the other hand, were sources of unpleasant odor. On the other hand, the wind swiftly swept away most odors.

It should be noted that neither pleasant nor disagreeable odors lingered long or were easily distinguished along the way. The sense of smell was the most deficient on this street, making it hard to assess how much of the experience was created by this sense. On the other hand, participants of Riffa Street reported that when the temperature increases in the summer, scents on the street become more prominent than in the spring or winter seasons. However, it is unclear if Riffa Street has its distinct scents cape due to the steady, moderate breeze. The olfactory atmosphere of Riffa Street may be described by a general lack of fragrance and occasional olfactory stimulation.

### 5.4.5 Small-medium enterprises

In addition to multisensory inputs, people and small businesses impact street life. It has been observed that small and relatively medium-sized enterprises provide both sociability and a compact

neighborhood feel where people know each other. People believed this street to be more lively than others, with just houses at the bottom level, but less lively than other prominent streets such as the Bukuwarah Road or the Al Mashtan Avenue. Local businesses were revealed to impact the ecosystem of the street.

Participants of Group A expressed appreciation for the small and unusual, distinctive, and specialized stores. Despite their satisfaction with the local retail establishments, Group B members noted a profound, unique feature on this street, except the Riffa post office, which can aid in place identification and tourism.

Group A also linked the shops on this street to those available in neighboring cities. Small local businesses generate an atmosphere where people know each other. Most of the inhabitants acquire their daily necessities from the shops on the street. Furthermore, due to the availability of cafés and restaurants (part 1; section S01 & S02; part 2; section 4; part 3; section 17), retail stores (part 1; sections S02,S12 &S15; part 3; sections S05, S06, S07, 16 &17), people came to a halt when engaging in social contacts, particularly in front of third places and outside retail establishments.

Speaking while standing or sitting was common, particularly in front of the cafe and its extensive outside seating and in front of the bakery. It was also observed that people were going past in front of the ground floor dwellings, socializing and conversing as they did so. Similar to other streets, the environment within or in front of the small companies fosters social contacts, whether by purchasing or their social purpose, enhancing social engagement.

### 5.4.6 The social environment

According to the findings of social interactions in Riffa Street, it was found that this street is substantially busier on weekends than it is during the week. On weekends, the frequency of social gatherings on this street is larger, with many people strolling while discussing. Walking down the street implies that roadways are being used as a mobility corridor with a clear purpose.

As a result, Riffa Street is less congested during the week, and more interactions occur during the week, with people stopping and staying to converse than on weekends. Consequently, Riffa Street now has a more calm and slowed-down feel. Aside from variations over the week, the liveliness of Riffa Street varies during the day. There are notable peaks between 11 a.m. and 1 p.m. and 4 p.m. and 9.00 p.m., which coincide with Friday prayers, traditional brunch, coffee breaks, and dinner timings when this street is more congested.

People took part in social interactions on the edges of Riffa Street's sidewalks and where public seating is accessible. During the week, street activity and social contacts increase gradually from early morning until noon, peaking about lunchtime. Like other streets, this is a typical midday rush when employees eat in cafeterias and local restaurants or order takeout to eat at their workstations in stores or offices. The energy level of people gradually declines until4.00 p.m, when it begins to climb again.

The research findings indicate that urban people on the street create a dynamic environment, making these atmospheres. These vibrant surroundings alter throughout the day in response to work rhythms and social events such as lunch and teatime. People would like to spend more time in front of rich and attractive facades that are active. The character of the façades was linked to the nature of the

social interactions.

## 5.5 Overall, vibrant atmosphere in Manama, Muharraq and Riffa street

Aside from multisensory inputs that impact the street's pleasantness, local stores on the ground floors of the adjoining buildings and other people's presence all contribute to the street's bustling ambiance. Even though vision and hearing were considered the primary sense inputs, the weather had a significant behavioral impact. On the other hand, tactility was not as vividly perceived as the other senses perceived the ambiance of the street. Participants recognized experiencing the streets as a whole by merging several sensory stimuli in contrast to only visual dominance. Small and medium-sized businesses and third spaces enhanced the street's social role by providing possibilities for people to meet socially. Other people's presence seemed to make streets livelier in and of themselves and should thus be considered a maker of bright atmospheres.

# CHAPTER SIX
# DISCUSSION AND CONCLUSIONS

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# DISCUSSION AND CONCLUSIONS

## 6.1 Introduction

The following conclusions can be drawn by applying the data outcomes and analysis from the interviews and observations done on the three potential study contexts(Manama, Muharraq and Riffa). This thesis aimed to examine how the urban environments, such as the streets of Bahrain, are perceived as multisensorial. Secondly, how do these senses or experiences impact social interactions on the streets of Bahrain?

## 6.2 Multisensory perception

### 6.2.1 Visual

The data analysis reveals that the atmospheres of observed (Manama, Muharraq and Riffa) streets in Bahrain are experienced through several senses. However, there is a distinction between the importance of various senses when experiencing multisensorial.

Aside from auditory perception of the street, the vision was the most prominent sense of perception when experiencing the street multisensorial. The variant characteristics of the façades (dull, active, friendly, mixed and inactive) on the ground floors of adjoining buildings were determined to have the most critical effect on the multisensorial experience of the street. It was followed by the presence of different activities occurring on the ground floor of adjoining buildings. The data findings reveal that the visual perception of the variant façade's characteristics positively or negatively impacted social interactions. For instance, sitting or

standing while conversing was observed in front of active mixed and friendly facades while strolling and mobility while conversing was observed in front of dull, monotonous facades of the ground floor of the street and its adjoining areas.

As shown in the Figs above, the research findings reveal a relationship between the variant façade characteristics on the ground floor of adjoining buildings and the vitality of the space (the street). People perceive a space, for instance, the street, as secure, pleasant, energetic, friendly, attractive, socially dynamic, and engaging as the quality of positively impacted active facades on the ground floor of the adjoining building improves. For example, in all the three streets in Bahrain, staying while socially interacting happened in front of these active, friendly and mixed façades, such as in the Manama Street (part 1; section S02, 03, S10, S11, S12 & S14 and part 2; section 06, S08 & S15), the Muharraq Street (part 1: sections S17, S18, S19; Part 2; section 06 and part 3; section 08 & S11), the Riffa Street(part 1: sections S01, S02, S09, S10, S12; Part 2; section 04 and 16 and part 3; section S06, S07, S08 & S16).

On the other hand, most of these streets (Manama, Muharraq and Riffa) have largely inactive and uninteresting exterior façades, with some mixed façades scattered here and there. For instance, Manama Street (part1; sections S01, S02, S04, S13 &S14 and part 2: sections S07, S09, S16, S17, S18,S19 & S20), Muharraq Street (part1; sections S01, S02, S18, S20; part 2; sections S03, S04, S05, S06, S14, S15 & S16 and part 3; sections S07, S08, S09, S10, S12 & S13), The Riffa Street (part 1; section S01, S02, & S12; part 2; section S04, S05, S15 & S16 and part 3; section S17 & S18) less social interactions, occurred and mainly individuals passed by in front of these facades

(mobility while conversing) was observed instead of lingering for a long time.

It is noted that appealing façades generate aesthetic transition and unique environments when walking through the streets. On the other hand, the inactive and monotonous façades on Manama's Government Avenue, Muharraq's Sheikh Hamad Avenue, and Riffa's Sheikh Ali Avenue do not provide any visual stimulation to encourage visitors to spend more time in front of these facades. Instead, these monotonous facades appear to promote the movement of people.

While variant façade characteristics on the ground floor of adjoining buildings produce diverse atmospheres along the streets, such as the Government Avenue Street in Manama from North to South (part 1; section S02, S03, S10, S11, S12 &S14 and part 2; section S06, S08 & S15), the Sheikh Hamad Avenue in Muharraq North to South (part 1; section S17, S18, S19; Part 2; section 06 and part 3; section 08 & 11) and Sheikh Ali avenue: North to South (part 1; section S01, S02, S09, S10, S12; part 2; section 04 and 16 and part 3; section S06, S07, S08 & S16) they encompass an environment of lingering and mobility while conversing. Unappealing façades, on the other hand, still are improved in some instances by the functions on the Ground floor. The various activities on the ground floor of adjoining buildings energize the overall environment on the streets of Bahrain.

For example, respondent A1 stated that the façades of the Government Avenue Street that had traditional Arabic restaurants had been characterized as dull or mixed (observations) and described as barely attractive or aesthetically not attractive, which can be valued by the functions and activities of the café and restaurants serves.

While in the Sheikh Hamad Avenue Street in Muharraq, the resident of old tarnished facades described it as unpleasant or old; however, the presence of traditional retail spaces and cafeterias increased the duration of social interactions (walking, sitting and standing while conversing) in this zone.

On the other hand, respondents on A8 described the facades with no detailing as dead, dull and monotonous; however, cafeterias, bakeries, and outdoor seating increased the social interactions in this zone. The utilization and social purpose of these third spaces that exist on the ground floor of adjoining buildings (café, bakery, store, outdoor sitting) are the creators of vibrant streets instead of just the façade characteristics on the ground floor of adjoining buildings, influencing social interactions in these three case scenarios.

However, due to the prolonged record of visual design in urban design and planning, vision can still control the perception of urban environments in the street of Bahrain. Urban designers and city dwellers are used to visually stimulating and pleasing urban environments. Both participants have long been conditioned to have a visual sense and visual supremacy applied in a layout inside streets. Several scholars presented this visual framework in these disciplines to provide a city impression. Furthermore, technological advancements may have increased visual dominance and top-down urban planning approaches.

The sense's technical advancements in the discipline have also strengthened the supremacy of vision. It is to be noted that the careful use of the new technologies could still be used to re-balance the sense domains via supplementary originality in which hearing experiences emerge again in experiencing the streets multisensory.

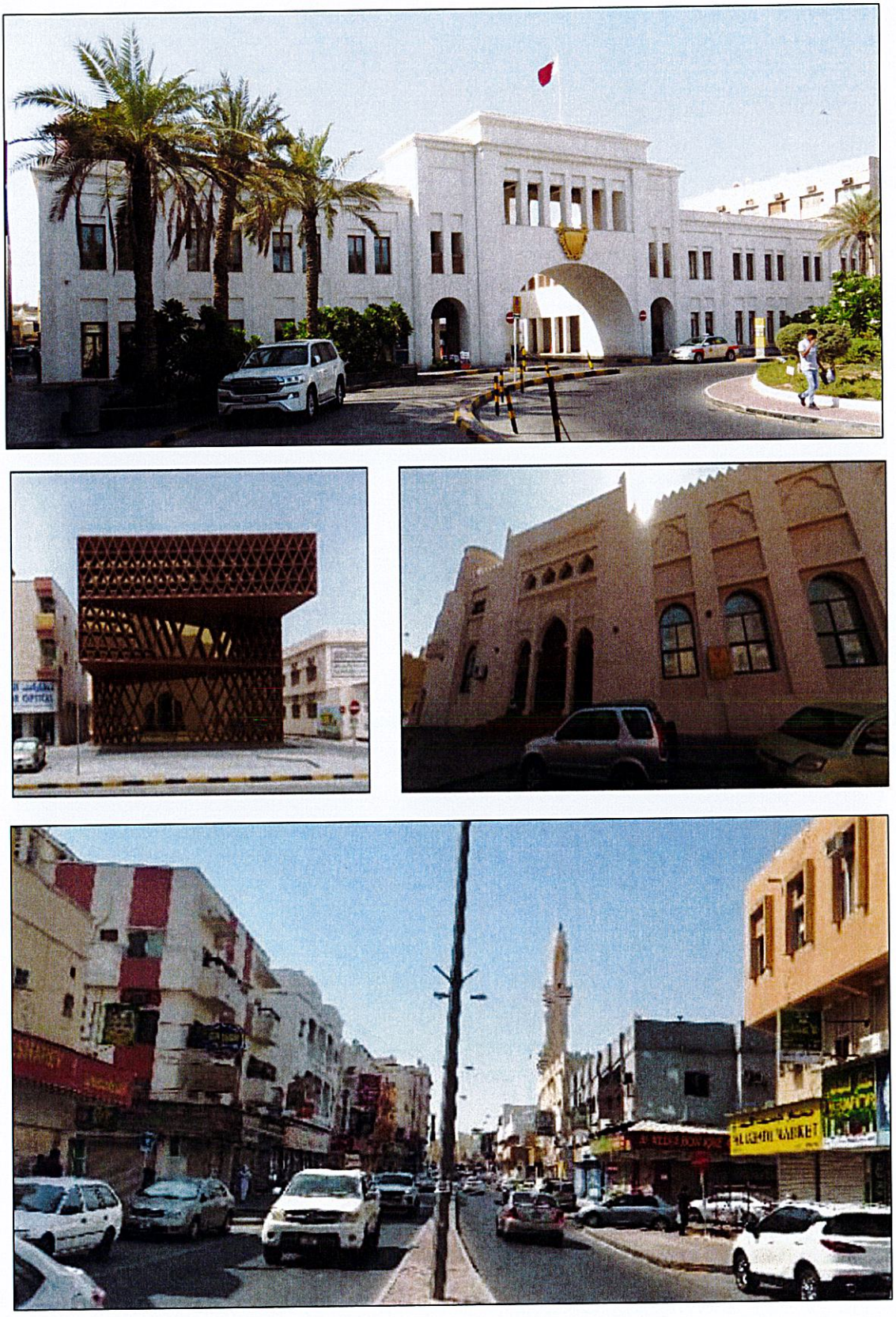


Fig.6.1: Thehe visual experience of Manama, Muharraq and Riffa Street
Source: Author

### 6.2.2 Hearing (Auditory)

Apart from the visual experience of the streets (Manama, Muharraq, and Riffa), the auditory experience of the streets was recognized as the second most prominent experience in the multisensory perception of the street. The data findings of the soundscape of all three streets (Manama, Muharraq, and Riffa) reveal several intriguing and unusual rhythms during the week, on weekends, and at different times of the day. While during the week, not an extraordinary sound is perceived, but the sound perceived is more typical that is heard every day, including recognizable sounds from product delivery, prayer sounds, familiar periodic sounds and vehicular sounds. It is to be noted that individuals conversing sounds increases throughout the day and are higher on middays compared to the morning, indicating a lunchtime surge when people visit restaurants, cafeterias, or grocery stores taking a break from their work or office.

The data also reveals an increased number of people going through the street on weekends appears to scatter sound more than it typically does during the week. In general, interviewees perceive the streets in Government Avenue Street in Manama to be noisier in the southern and middle sections than in the northern or exist. On the other hand, Sheikh Hamad Avenue in Muharraq Street is louder at the entranceway than on the exit. At the same time, the entrance and the middle way in Sheikh Ali Avenue Riffa street are noisier than towards the exit. This sound might be attributed to the street's active environment shifting from South to North or the existing entrance. In comparison, the sound also peaked due to the usages, occupancies and façade characteristics on the ground floors of adjoining buildings that

increased the social interactions in front of these spaces.

Participants in all the three streets (Manama, Muharraq and Riffa) like hearing what others say. People who communicated with one another while socializing created a dynamic, urban vibe. Interestingly, persons connected to these streets had a higher tolerance for loudness since they lived on or near them, indicating a certain familiarity. On the other hand, Group B respondents in all three streets primarily identify vehicular sounds as causes of annoying sounds.

Due to shifting conditions of people movements, vehicular movements, usages, and occupancies of groundfloors of adjoining buildings, the ecological sound of the streets may vary. As a result, while noise and sound are determined to be the second most vigorous sensory stimulation, they may also lose their atmospheric significance as more urban people use headphones or are in personal spaces to create their soundscapes. The rising usage of headphones or compact personal spaces to conceal environmental sounds produces private and self-determined auditory areas inside the urban environment, referred to as headspaces. It should be highlighted that this creates an intimate, soul-sound environment in which the urban acoustic environment fades away and is replaced by intricately constructed sensations.

While many experts assume that the disagreeable sense of sight has always dominated the urban environment, they believe that all urban perceptions, and even our memories, are built mainly on pictures or cognitive mapping in our brain. However, findings reveal that visual supremacy is followed by the systematic exclusion of odors and sounds. Even though we seldom associate our urban experiences with the odor of plantation and food, the sound of vehicles, or the sound of languages. On the contrary, while we seek to create visually

diversified urban environments, we imagine quietness and the absence of any scents in these urban environments.

Therefore, the priority of vision and sound in the multisensorial experience of the street opens up the issue of distinct perception top-down approaches in urban design and planning, distance design strategies and a sensory hierarchy(vision). Most designers and design theories concentrate on hearing and vision as key components in designing urban environments, while touching and odor have historically been considered lesser sense. As a result, because visual and aural perceptions have been valued in urban design and planning, the conclusions of this thesis must be seen by balancing visual and auditory dominance as compared to other senses for the multi-sensorial experience of streets and their impact on social interactions.

### 6.2.3 Tactility (bodily perception)

According to several pieces of research, bodily perception supposedly occurs unconsciously but powerfully in urban inhabitants' behavior and decision-making due to the high history of visual dominance in experiencing the urban environments. Furthermore, the data findings reveal that bodily sensing of the streets' environments has been overlooked mainly in the experience of urban environments. However, respondents did not define tactility as a dominant method of experiencing urban street environments and its impact on social interactions, the physical sensations such as temperature, warmth, and seasonality, particularly daylight, significantly impacted respondents' behavior and the environment of the Bahraini street.

In terms of social interactions, the solar altitude, in particular, influenced the liveliness of the streets (Manama, Muharraq, and

Riffa) during the week and weekend and at different hours of the day. However, urban dwellers somewhat unconsciously preferred the walkway on the shadow side of the street pavements rather than on the sunny side. Some participants also mentioned that their choice of visiting caféterias, bakeries, restaurants, and retail stores on the street (Manama, Muharraq, and Riffa) is influenced by the time of day, the sun position and the presence of shading materials at the specific café, bakery restaurant outside seating and shaded parking areas.

For instance, the restaurants next to Bab Al Bahrain or traditional coffee shops at the end of the street in Manama, the shaded parking area of the Gold Souq, and the shaded sitting area at the bus station were the favored places until the afternoon. In the late afternoon, however, the traditional coffee shops, restaurants, and hotels on the opposite side of the street would be favored since the sun is shining either on the northwestern or northeastern side, decreasing the sun's heat.

Similarly, in Muharraq, sweet shops on the North westside were favored until afternoon. The traditional Arabic coffee and showaiter shops were preferred late afternoon, depending on the sun. On the other hand, the Riffa street bakery and cafeteria allocated on the northwest side are selected during the early afternoon. The restaurants, bakeries, and cafes distributed on the east side were preferred during the late afternoon, depending on the sun's position and shading materials.

In general, because the sun's warmth and brightness decrease later in the afternoon compared to lunchtime and midday, outdoor seating at cafés on the East side could be more popular than on the West. Several interview participants in all three streets agreed

unanimously that these streets' microclimatic conditions and sensory environment (Manama, Muharraq, and Riffa) could be enhanced by planting trees, increasing shaded pathways and shaded public and private seating areas to improve the street's ambiance and sensory well-being. Respondents noted that trees not only give shade and green beauty but can also provide visual and auditory comfort by allowing flocks of birds to tweet in different branches and breeze to rustle the petals, while shaded sitting areas and pathways protect individuals from dazzling sun heat, providing a lively urban street environment.

As the data show, respondents perceive the vitality of the three streets (Manama, Muharraq, and Riffa) to be higher during the spring than in hot, humid summers. However, the streets should benefit from planning for different seasons. Concepts for summer might produce comfortable summer environments while offering shelter from the sun could boost liveliness. On the other hand, current architects and designers were not trained in a culture that promotes thinking seasonally (summer, winter, spring etc.), highlighting the significance of seasonal design in urban design.

### 6.2.4 Olfactory

In terms of olfactory perception of the three streets(Manama, Muharraq and Riffa), the scent was discovered to be relatively neutral in all the three streets of Bahrain, and the severe temperature and constant little mist buried away from the smells in all the three streets of Bahrain. The findings indicate that odor perception is very transitory, reliant on weather conditions, wind conditions, variant activities and different usages and occupancies on ground floors of adjoining buildings, with air temperatures directly influencing odor

strength and dispersion. Despite the hot air temperature, olfactory stimulation was found on all three streets of Bahrain (Manama, Muharraq, and Riffa) in conjunction with varied ground floor activities such as bakeries and cafés, and restaurants, commercial shops, and retail services.

## 6.3 Ground floor evaluation concerning the environment

The multisensorial experience and usage on the ground floors of adjoining buildings create a dynamic urban street ambiance. Unique patterns of social interactions concerning the ground floor uses have been discovered to impact the experience and generation of social interactions on the three streets of Bahrain (Manama, Muharraq, and Riffa). Small businesses, especially locals, were discovered to impact the ambiance of all three streets, making them unique and vibrant. In general, social interactions occurred only between those who knew each other and between shopkeepers and customers.

Small local firms occupied most of the occupancies on the ground floor of adjoining buildings in all three streets of Bahrain, which the respondents highly valued. Participants in both groups favor all three streets (Manama, Muharraq, and Riffa) for visiting as small, independent businesses create a unique character in these streets. Participants mentioned that the small fruit and vegetable stores, retail shops, and services bring out a unique atmosphere. In addition, respondents said they appreciated the lack of international enterprises on the streets. Residents and visitors agree that more local businesses are needed to create unique place identities. However, they appear to like the presence of international businesses on these streets, rather than preferring to shop for them elsewhere to save time and

congestion.

According to the interviewees, social connections are facilitated by cafés or businesses offering everyday necessities on all three streets of Bahrain. The findings show that third spaces such as cafeterias, bakeries, retail stores, and services have a social role. Traditional coffee shops, showaiters and restaurants created dynamic urban environments, especially during weekends and at different day hours. However, most participants do not consider streets with only housing functions on the ground floor as it impacts the street vibrancy and unique character.

## 6.4 People's presence generates an environment.

In addition to multisensory stimulation and small local enterprises on the ground floors of the adjoining building of the three streets in Bahrain, the presence of other people also contributes mainly to the dynamic environment of a street. As shown from the findings, the presence of both active and passive urban inhabitants shapes a place's perception, environment, and experience.

Observations found that social interactions varied between weekdays and weekends and during different day hours in all three streets (Manama, Muharraq, and Riffa). The data outcomes reveal that social interactions create two distinct environments in these streets. Firstly, the daily life environments with people associated with the streets and their position as a transportation route bordering other streets. Secondly, more visitors use the streets during the weekend rather than during the week, mainly as a transit corridor and a shopping arcade unique to those streets.

Generally, the movement in public space (streets) flows along

dominating movement corridors or desire lines running directly through spaces, and from movement corridors to active usages and occupancies that exit on the ground floors of adjoining buildings and vice versa. For instance, the Government Avenue street of Manama may become a popular route for pedestrians to either the Bab Al Bahrain, the Manama post office, the four-star hotel and the Gold Souq nearby, or traditional cafés inside or near this street.

On the other hand, Muharraq Street has become a famous street for pedestrians to the Muharraq Souq, the Muharraq library, the al Qasariya souq, or traditional Arabic showaiter shops located inside this street. While Riffa Street has become famous for pedestrians on their way to the Riffa post office, retail stores and services are located inside this street.

The difference between weekday and weekend usage is pronounced in the Manama Street (part1; section S11, S12 and part 2; section S15, S16 & S17), in Muharraq street availability of cafés and restaurants (part1, section S02, S18 & S19; part 2; section S03 &S16; part 3; section 7), sweet shops and retail (part1; section S01, S02, S17 & 20; part 2; section S04, S05, S06, S14 & S15; part 3; section S07, S08, S09, S10, S12 &S13) and in Riffa street cafés and restaurants (part 1; section 01 & 02; part 2; section 04; part 3; section 17), retail stores (part 1; section S02,S12 & S15; part 3; section S05, S06, S07, S16 &S17), indicating that weekday usage has a greater effect on social engagements.

These locations become fairly crowded on weekends, and the movement of others pushes forward individuals. It is more challenging to linger and rest on the pavements, public seating available, or private seating in front of cafes and restaurants than

during the week. The difference between weekdays and weekends can be attributed to a change in the ever-changing characteristics of the streets on weekdays, weekends and at different hours of the day.

It is to be noted that usually, the street is occupied primarily by the residents during the week. It serves as a significant axis of movement on weekends by connecting the city centers with the prominent locations on each street. It should be emphasized that the characteristics of the overall environment and the nature of areas can alter around famous heritage and social centers (such as the mosques, libraries, traditional shopping arcades and many more) and governmental and academic facilities such as the municipalities, (schools, post offices, banks and many more) based on that day, week and weekends, and holiday rhythms of study context for instance Bahrain.

## 6.5 Concluding remarks about the multi sensorial preception

The findings clearly show that all senses are required to experience urban street environments. However, both observations and interviews demonstrated the dominance of visual and auditory perceptions in experiencing urban street vibrancy. The findings might further emphasize the relevance of small local businesses contributing to the dynamic environment that leads to the unique place identity in all of Bahrain's three streets (Manama, Muharraq, and Riffa) and thus enhancing social interaction in all the three streets of Bahrain. Further data collected from the respondents in all three streets reveal that auditory and tactile experiences such as the sound of the sun, birds, wind, and trees are equally important to enable users to feel comfortable on all three streets of Bahrain.

On a tactical level, everyone felt the warmth and the sunlight very strongly and purposefully. However, shifting to the shady side of the streets, pavements and outdoor seating areas where sun warmth is less felt, as well as picking which café, retail shops, and restaurants to visit based on the sun/shadow situation, all had a substantial impact on the urban street environment and users behavior on all the three Bahraini streets. As a result, in response to the excessive sunlight and warmth in the streets, respondents altered their behavior. Nonetheless, respondents did not consider tactile sensation a significant sensual experience when perceiving streets multisensorial.

Instead, tactility is unknowingly perceived through different weather, temperatures, seasons and the presence of different shading materials in all the three streets of Bahrain. The supremacy of sight in urban design heritage, academics, technology advancements, and advertising may contribute to vision dominance. As a result, small local businesses and active and passive urban inhabitants during weekends, weekdays and at different hours of the day should be included in an urban sensory environment idea to promote social interactions. In addition to multisensory stimuli that generate a dynamic urban environment. usages and occupancies on the Ground floors of adjoining buildings change people's perceptions of the street and boost social interactions and vitality.

In response to the topic under the study of how multisensorial approaches in urban design and planning could lead to a dynamic urban streets environment and promote social interactions in all the three streets of Bahrain, the following conclusion are proposed:

A multisensory approach to urban street environments can contribute to a better understanding of local business presence,

various usage and occupancies on the ground floor of adjoining buildings, and various façade characteristics on the ground floor of adjoining streets. This approach also highlighted a new perspective on the perception of day-to-day living patterns. Rather than seeing these techniques as antagonistic, empirical data reveal that merging and applying local businesses and façade characteristics on the ground of adjoining buildings into a multisensorial strategy allows for an experiential investigation of a street's urban environment from the perspective of urban dwellers. These techniques might be employed to comprehend the same outcomes in all Bahrain's streets.

The unique characteristics of a space such as the streets can be increased by multisensorial approaches, which lead to dynamic place identity, such as the notion of the Bahrain street urban environment. For instance, it improves the sensory well-being of urban inhabitants while improving the overall well-being of the streets through social interactions and cohesiveness. Various social engagements can allow community formations and the accumulation of social capital on the streets of Bahrain. One of the most vital duties of a street is its sociability, which must be maintained and preserved when the overuse of commercialization threatens its place identity and unique characteristics.

## 6.6 Suggestions for using creators of atmosphere as a tool in future urban planning and design practices.

As we know, various senses perceive urban environments, leading to vibrant, lively streets. As a result, focusing on the creators of the atmosphere (lighting, olfactory, tactility and auditory) in the urban environments may be employed in urban design and planning

to create vibrant cities and social interactions in the streets of Bahrain. The data findings reveal that the circumstances under which environments of a specific kind could be generated are produced by analyzing environmental formation from the object's side, i.e., through urban design, in this case, the streets of Bahrain.

Such an environment is generated in urban design, namely via the use of innovative technologies. Dynamic urban environments are aesthetical, sensory ideas that are purposely constructed inside spaces in different disciplines such as landscape architecture, sound design, farming, cinematography, auditorium design, interior design, urban design and many more.

Professionals in these fields are taught to generate individual psychological environments where they are exposed to particular aiming based on their preferences. Professionals design these environments considering these holistic feelings to establish intriguing circumstances for dramatic temptation. Such intentionally planned environments generate sentiments that may be collected and developed so that the people can tune in harmoniously with their physical states.

In terms of designing urban environments, liveliness and safety in these environments are two essential components that urban designers and planners strive to create via the design of physical spaces. The city's atmosphere refers to the psychological sense of city reality that urban residents share and perceive as something objective. The design of urban environments might substantially impact the quality of a city through carefully understanding and utilization of environmental creators.

However, it should be stressed that environments may only be employed as a targeted instrument in urban design if the effects and interactions of atmosphere creators are studied. Thus, urban planning can affect individuals and their activities purposefully and subconsciously. Atmospheric arrangements presented in this manner are defined because they blend practical, commercial, and artistic features. As a result, explicit knowledge of the evolving nature of urban design is essential. Urban designers must recognize that they have the potential to coordinate or indeed restrict certain sorts of positive and negative existence.

Intentionally created surroundings reveal its strength by engaging people subjected to them through the effect of the developed city's natural atmosphere, i.e., their environment. In urban design, multisensory design strategies enable urban environment makers to create atmospheres purposefully while generating their impacts on sensory perceptions when experiencing these urban spaces. As a result, the task of architects and urban designers is to determine which characteristics of the items they can use to modify or build cities, so that life in cities becomes livable and attractive and could contribute to the dynamic place identity of these urban spaces.

Different professions with a greater understanding of these things and atmospheres in urban spaces can explain how they are used in urban design. This thesis' empirical findings show the interplay of various sensorial experiences in creating the dynamic urban street environment in the context of Bahrain. Visual perceptions of façades, auditory perceptions of sounds, physical perceptions of the sun, weather and shading materials and the presence of small local shops on the ground floors have all been recognized as atmosphere

creators with others that contribute to the vibrancy and enhanced social interactions in a street environment in Bahrain. The following proposals advocate for introducing the concept of using various sensory systems in creating dynamic urban environments within the profession of urban design and planning.

Urban planning and zoning regulations can influence small local business distribution and limit enterprise usage and occupancy on the ground floors of adjoining buildings. Although Bahrain currently employs such a strategic planning tool as part of the central concept, the size and kind of enterprises aim to ensure long-term development in everyday amenities.

Bahrain as a study concept could be evidence of an important tool to steer competitive forces and maintain a healthy variety of local and international enterprises resulting in appealing communities.

It is also proposed to incorporate physical aspects that impact the environment and behaviors on the ground floors of adjoining buildings on the streets of Bahrain. During the interviews, the significance of governmental and private seating on the pavements of Bahrain was highlighted as particularly essential for promoting social interactions in the streets of Bahrain. Trees and vegetation contribute to sensory well-being and bodily comfort, managing the microclimate and giving shade on hot summer days.

Both shaded outdoor seatings and vegetation boost the vitality and social interactions in streets, primarily commercial. Planning for recreational activities on the ground floor of adjoining buildings and convenience during different times of the year is recommended to ensure liveliness. Aside from vegetation (trees, shrubs and plants) and

shading seating areas in the summertime, building structural components shall be used to protect urban residents from scorching and humid weather, improving the number of hours spent outdoors.

Physical comfort planning also takes into account the haptic sensations of urban environments. Outdoor seating areas, pavements, and façade characteristics on the ground floor of adjoining buildings should be designed not just for aesthetic purposes but also to increase the comfort of city dwellers in order to stimulate and promote social interaction via an extended length of stay. Furthermore, physical and ecological requirements should be considered while constructing street furniture, keeping in mind that street furniture forms are utilized in various ways during different weathers, temperatures and seasons, as evidenced by findings in this study.

On the other hand, some interviewees described sound pollution from traffic as annoying and unpleasant and as a rather dispersed soundscape in the middle of all three streets (Manama, Muharraq, and Riffa). Architectural design, façade characteristics, and structural improvements in building design are recommended to limit sound dispersal and generate pleasant soundscapes. Sound dispersal in urban environments directly impacts the street environment, where sound-absorbing materials could be employed to reduce dispersion.

Furthermore, different vegetation forms, such as bushes, plants, wall greenery schemes, and roof gardens, provide excellent sound absorbance and dispersion and a pleasing urban environment. Planting trees is another suggestion for providing shade and generating satisfaction for the sensory organs and living things that may inhabit the plants. The sounds of animals tweeting and groping and the wind

rustling the leaves contribute to the sensory overload providing a pleasant atmosphere in the streets of Bahrain.

Working with excellent tools of creators of atmosphere and using information from other relevant professions and disciplines, the design of urban environments can be created to generate vibrant cities and social interactions in the street of Bahrain. The emergence of tactical urbanism points to the need for a paradigm shift in urban design and planning practices away from vision-dominated approaches and toward multisensory perception design approaches.

In addition, considering the ground floor activities, local businesses and consumer movement when designing urban environments is increasing worldwide as people continue to demand an alternate approach to street planning. Social interactions also influence multi-sensorial perceptional methods. As a result, as claimed in this study, embracing urban environments as a tool for multisensorial perception in the streets of Bahrain may promote social interactions and the vibrancy of Bahrain's streets, mainly commercial streets.

The use of tools for dynamic urban environments design and planning practices, on the other hand, is founded on government and political choices that may be altered by multiple governmental, economic, and interpersonal roles (social, economic and environmental). Thus, it is unclear how far a multisensorial approach will penetrate the profession of urban design and planning in the context of Bahrain.

## 6.7 Future Recommendations

As articulated in this thesis, the notion of urban environments can contribute to a multisensorial design approach to create sensory perceptions of the street and thus promote social interactions in Bahrain's urban surroundings. The outcomes of this study can be used for future studies in Bahrain that focus on multisensory design approaches rather than the vision-dominant design of urban spaces. It is argued that urban environments can be employed to promote social interactions and vibrancy in Bahrain's streets, concentrating on the atmosphere's creators. Following that, suggestions for more empirical study and theoretical work in this field of study are required.

Regarding the dominance of vision within the urban design and planning field, it is advised that future studies strive toward multisensorial design methods. Future research can also reduce vision dominance and improve research on the urban environment's auditory, olfactory and bodily perceptions when experiencing the urban environments (streets). Furthermore, future research might concentrate on studies that investigated the sensory perceptions of urban environments by blind people using a phenomenological method to prepare for sensory stimulations other than vision in the context of Bahrain.

According to the data outcomes, the influence of different seasons such as hot, humid, winter and spring on physical and aromatic senses should be studied again at different times and during weathers and temeperatures to make specific assertions. Because the study was conducted during the summer, the sun's radiation was more significant than in the winter, when afternoons and evenings can still be relatively warm. According to interviewees, the street becomes

more lively in the spring, early summer and winter as the temperature and daylight hours reduce. As a result, to incorporate a season and microclimate adaptation, the solar altitude during different seasons and weather and its impact on social contacts, particularly while sitting or standing in a Café, restaurants, retail stores and services, must be investigated throughout the year.

The influence of physiological and meteorological conditions on social interactions and personal comforts while outdoors during various seasons should be investigated to create dynamic and sociable situations all year since temperature and environment influence the olfactory experiences of urban street environments. According to several participants, the experience of the urban environments via smell has been lacking owing to the summer weather. As a result, the olfactory experience should be studied further over the winter to fully understand the various sensory inputs' interactions.

As previously indicated, this dissertation did not address the overall perception of the three Bahrain streets(Manama, Muharraq and Riffa) in terms of illumination measured at various times of the day. Notably, fluctuations in illumination, such as dusk, have a considerable influence on an urban environment's atmosphere. As a result, it is suggested that future research concentrate on the perception during the late hours of the day.

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# APPENDIX
# DETAIL RESEARCH METHODS AND INSTRUMENTS

## A.1 In field observations

Field observations are carried out in the natural setting where the phenomena happen. They supply data and information to the researcher as it emerges in actual conditions, allowing her to investigate an event or occurrence by meticulously watching it (Denscombe, 2010). For example, by studying the impact on social interactions through the multi-sensorial experience of urban environments, the researcher understands the urban environment, its looks and qualities, and people's social behavior (Mehta, 2018).

Observation-based data is gathered using a participatory observation strategy, which entails reporting what is occurring and what is happening. In both cases, the researcher observes the occurrence directly, and data is empirically captured while being observed by the perceiving sight (Denscombe, 2010).However, the researcher's presence can alter the research settings since she may be viewed as intrusive or as a stranger by participants in their regular lives. Other limitations can include the researcher's potential bias, insufficient powers of observation, selective memory, divided attention, and exaggerated perception (Denscombe, 2010; Creswell, 2014).

The rejection of negative stimuli from previous experience and the researcher's current physical and emotional condition can influence perception. Furthermore, subjective written documents that provide the same facts about the research to other investigators, ensuring accountability and excellent cross reliability, are utilized to counter the researcher's biased judgment (Aspers, 2009; Denscombe, 2010).

Furthermore, there will always be a permanent record of the occurrences through such systematic observation plans, which must be consistent among researchers who utilize the schedule used in this research. That is because the elements in the program specify what is being watched. In addition, the frequency with which events occur in the field at any particular time, the period of a circumstance, or the sampling of people investigated throughout time may all influence the observation schedule (Denscombe, 2010).

Based on the literature review, several aspects have been recognized as generating sociability and creators of atmospheres in urban spaces. The factors will be investigated in three empirical case studies to investigate the experience of urban environments via different senses and which creator of the atmosphere promotes social interactions in Bahrain's streets. These characteristics include ground-floor usage and occupancy, façade characteristics, weather and sound, smell and lighting conditions as additional multisensorial atmosphere creators in urban environments.

However, due to this qualitative research's dense and complex nature, not all the material gathered can be utilized. Narrowing down or focusing on the part of the data pertinent to the research while discarding other data. This aids in reducing the quantity of data to the relevant one. According to Creswell (2014), the obtained data is grouped into five to seven smaller topics to handle and evaluate.

Data gathered while exploring the multi-sensorial of urban environments and their impact on social interactions in the streets of Bahrain through creators' atmospheres in urban spaces will be narrowed by collecting the following key attributes. These attributes are organized by the sensory system they perceive, such as the visual,

auditory, smell, scape, and olfactory. Furthermore, the observations' timeline for the three potential case studies will be based on the themes discussed above.

**Table (A.1): Detailed Research instruments in three case studies**

| | | |
|---|---|---|
| Observation | | |
| Multi-sensory perceptions | | |
| 1 | Visual | Characteristics of facades of the ground floors of the adjoining buildings. |
| | | Presence of Vehicles. |
| | | Characteristics of pavements. |
| | Effects of visual stimuli on social interactions | |
| 2 | Soundscapes | Sound recordings at spots 1, 2, 3 & 4 during the weekdays. |
| | | Sound recordings at spots 1, 2, 3 & 4 during the weekends. |
| | Effects of sound stimuli on social interactions | |
| 3 | Tactility | Weather condition and shaded areas. |
| | | Material texture. |
| | Effects of tactility on social interactions | |
| 4 | Olfactory | smell |
| | Effects of olfactory stimuli on social interactions | |
| Other sociability Factor | | |
| 5 | Mehta's sociability factor | Usages of the ground floors of the adjoining buildings. |
| | | Occupancy of the ground floors of the adjoining buildings. |
| | Effect of Mehta's sociability factor on social interactions | |
| 6 | Social interaction | Social interactions during the week. |
| | | Social interactions during the weekends. |
| 7 | Fieldnotes | In-the-field recording of information by means of writing and sketching. |
| The lively atmosphere of the Street | | |

### A.1.1 Visual

According to Gehl (2010), the characteristics of the façades were recognized and grouped retroactively after photographing the ground floors. He classifies façades according to the size and frequency of openings per 100 meters, the actively and passively engaged and direct open or blind character of the façade, horizontal and vertical

façade alignment, the diversity of activities on the ground floors of the adjoining buildings, façade height, and features. As a result, Gehl (2010) classifies façades as lively, friendly, mixed, dull, or boring, as shown in Fig A.1.

Facade images for three case studies were shot on different days during the day. For instance, Manama Street facades were shot on 08.07.2021 between 11.00-12.30 o'clock, Muharraq street facades were shot on 05.08.2021 between 11.30- 1.00 o'clock and Riffa street facades were shot on 03.09.2021 between 9.00-11.30 o'clock, for a total of 30 minutes. The photos were interrupted by the movement of vehicles and people passing on the street.

Gehl's facade categories are then captured in the three-case setting's base map. It will be connected to a visual impression of the case study setting in Bahrain and will be described more by the participants' interviews.

a) Active Engaged façades consist of compact components with several apertures at a rate of 15-20 openings per 100 meters. On the ground floor, they serve various functions, have no shutters and just a few inactive components. They have a lot of character and façade projections and mostly vertical façade articulation. Furthermore, good details and materials are abundant in dynamic façades.

b) Friendly Pleasant facades of small moderate buildings consist of openings at 10-14 per 100 m. The ground floors of adjoining buildings serve various functions and contain significantly fewer inactive and dormant units. Friendly, pleasant facades include a façade projection and a variety of characteristics.

c) Mixture façades are big and small units, with 6-10 openings per

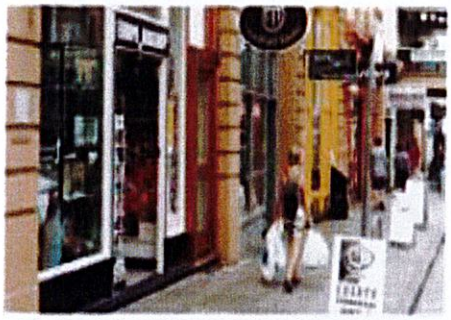
100 meters. Blind and passive units, as well as a minor façade projection, are present on such façades. There are just a few features on mixture façades.

d) Dull monotonous façades feature large units with a few openings, around 2-5 doors per 100 m, and no variation in floor activities. Boring façades continue to be made out of unattractive components with little or no design details on the façade.

e) Inactive passive façades are large units with no or little openings, with 0-two doors per 100 m. This sort of façade feature is not apparent, using blind or passive components. They are homogeneous, with no embellishments or exciting features.

# Façade Categories

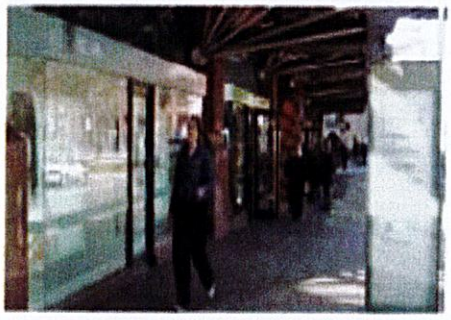
Jan Gehl, Cities for People, 2010"
(originally developed for public life study in Stockholm in 1990)"



A – active
Small units, many doors
(15-20 doors per 100 m/328 feet)
Large variation in function
No blind and few passive units
Lots of character in façade relief
Primarily vertical façade articulation
Good details and materials



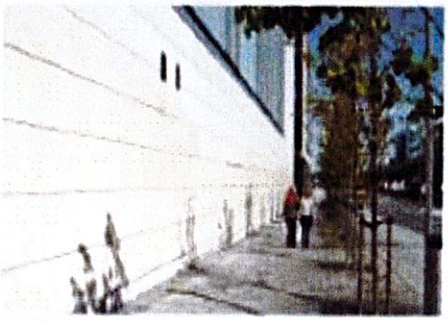
B – friendly
Relatively small units
(10-14 doors per 100 m/328 feet)
Some variation in function
Few blind and passive units
Façade relief
Many details



C – mixture
Large and small units
(6-10 doors per 100 m/328 feet)
Some blind and passive units
Modest façade relief
Few details



D – boring
Large units, few doors
(2-5 doors per 100 m/328 feet)
Almost no variation, uninteresting units
Few or no details



E – inactive
Large units, few or no doors
(0-2 doors per 100 m/328 feet)
No visible variation in function
Blind or passive units
Uniform façades, no details, nothing to look at

Fig A.1 : (Gehl 2010, p.241).

## A.1.2 Soundscapes

The sound scenario in the three case studies' research environment was monitored in four distinct spots along each street. The spots were picked for each street so that the audio could encompass a broader region and complete the length of each street. They were also done in locations where the author could stay for an extended period, given that each recording ranged from five to fifteen minutes long. Weekend and weekday audio were done in four distinct timelines:

- Daytime hours: 7 a.m. to 12 p.m.
- Noon: 12.30 p.m. to 1.30 p.m.
- Afternoon: from 2.30 to 4.00 p.m.
- Evening: 4.30 p.m. to 6.00 p.m.

The soundscapes were recorded in ten-minute intervals and evaluated for differences in the normal soundscape on work days and time. The loudness and diverse sound sources are detected and compared by time and location in the morning, noon, afternoon, and nighttime. These sound recordings are visually converted using software applications. The accompanying sound sources are categorized and added:

### a) Manama street sound scapes recording schedule

The Manama soundscape recording is divided into two weekdays recordings and four-weekend recordings during the morning, noon, afternoon and evening intervals, as shown in Fig A.2. A general graph depicting different sounds and peaks is then designed for weekdays and weekends.

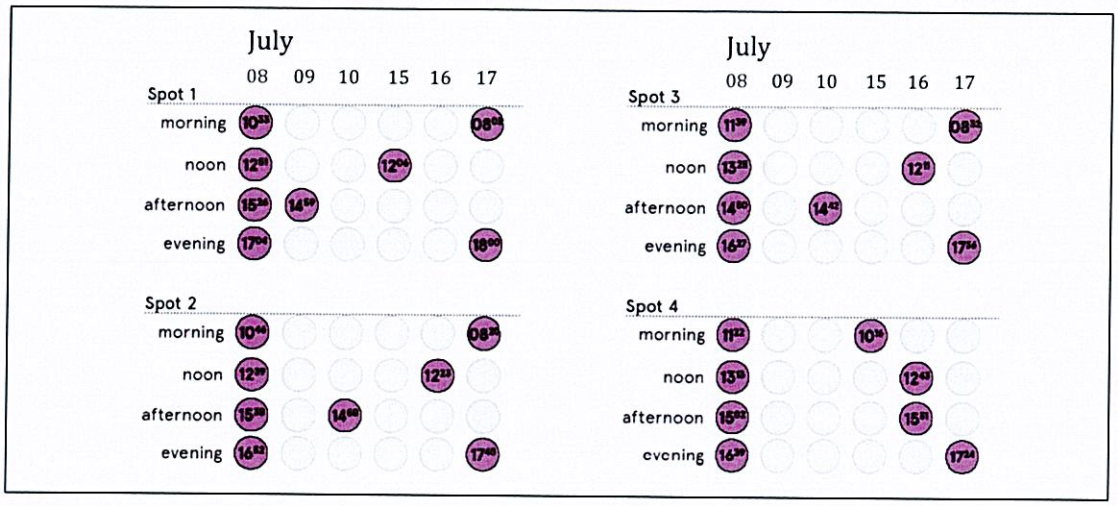



Fig A.2 : Sound overview, including audio location, date, and time in Manama
Source: author

## b) Muharraq street soundscapes recording schedule

Similarly, the Muharraq soundscape recordings are separated into four-weekday and two-weekend recordings throughout the morning, noon, afternoon, and evening intervals, as shown in Fig A.3. A comprehensive graph representing various noises and their peaks is created for weekdays and weekends.

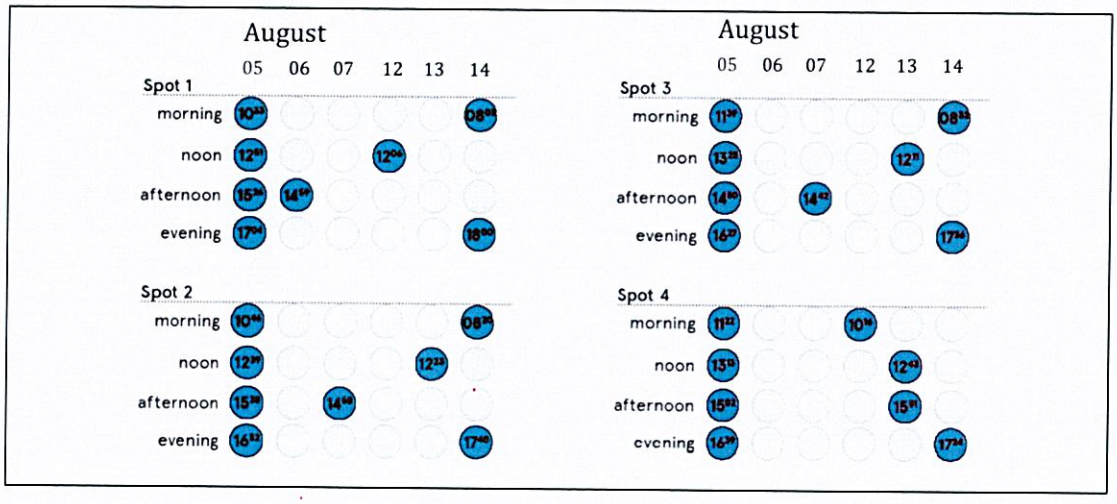



Fig A.3 : Sound overview, including audio location, date, and time in Muharraq
Source: author

### c) Riffa street soundscapes recording schedule

The Riffa soundscape recordings are arranged among two-weekday and four-weekend recordings, with morning, noon, afternoon, and evening intervals, as shown in Fig A.4. Then, a generic graph illustrating various noises and their peaks is created for weekdays and weekends.

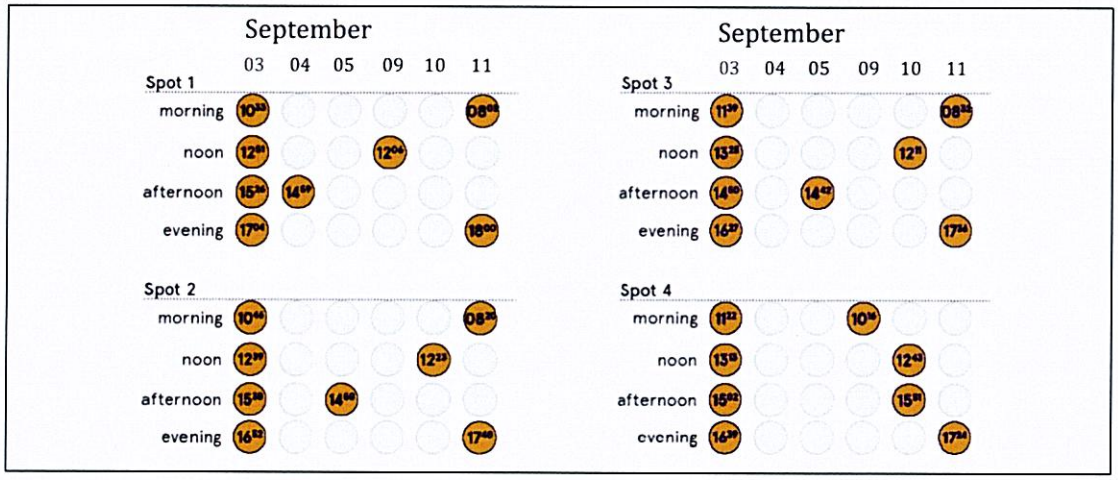



Fig A.4 : Sound overview, including audio location, date, and time in Riffa
Source: author

## A.1.3 In-depth site notes, solar altitude, and odor

Aside from the planned investigations, the researcher took notes on each street to remark on her views and document variables such as aroma and illumination. These reflect on-site notes taken while the investigator was in the field and subsequently conscious of the researcher's circumstances, such as tiredness, stress, or excitement (see Data finding chapter). The post-fieldwork notes aided in reflecting and noting the experience and overall impression of the outcomes on each street on a day. At the same time, it also helped notify external variables, such as sunny weather, cold, and an unusual traffic load on each street.

More specifically, the solar height within the three streets was

measured between 7 and 15 o'clock on two different days each. For instance, Manama street's solar height was measured on July 03 (at 7.00, 9.00, 11.00, 13.00, and 15.00 o'clock) and on August 10 at (at 7.00, 9.00, 11.00, 13.00, and 15.00 o'clock).In Muharraq solar height was measured July 31st (at 7.00, 9.00, 11.00, 13.00, and 15.00 o'clock) on August 15 at (at 7.00, 9.00, 11.00, 13.00, and 15.00 o'clock).

In Riffa, solar height was measured on June 30 (at 7.00, 9.00, 11.00, 13.00, and 15.00 o'clock) and on July 15 (at 7.00, 9.00, 11.00, 13.00, and 15.00 o'clock). With sunlight beaming on the west side of the streets, three different illumination and temperature scenarios might be observed (Manama, Muharraq and Riffa) until noon, sunlight highlighting the entire streets (Manama, Muharraq and Riffa) afternoon, and sunlight illuminating the eastern side between 13.00 and 15.00 o'clock, and after 15.00 o'clock.

Due to severe hot temperatures and moderate but steady humidity, odors were hard to distinguish throughout the field of study. When paired with activities on the ground floor of adjoining buildings, odors can be detected only in rare extreme cases. Initially, those features were planned to be included in the observations; however, subject to weather and temperature changes, monitoring the smells of the case studies proved difficult and time-consuming due to heat and high humidity. Illumination factors, such as solar angles, are also included in the data collected (Data finding chapter). However, these variables must be included in the research because of their climatic effect on the multisensorial experience of the street. However, data from interviews on these attributes support this choice.

## A.1.4 Usages and occupancies on ground floors of adjoining buildings

The usages and occupancies on the ground floors of the three case studies were categorized by photographing them on different days during the day. For instance, Manama Street facades were shot on 08.07.2021 between 11.00-12.30 o'clock, Muharraq street facades were shot on 05.08.2021 between 11.30- 1.00 o'clock and Riffa street facades were shot on 03.09.2021 between 9.00-11.30 o'clock, for a total of 30 minutes. The photos were interrupted by the movement of vehicles and people passing on the street.

After shooting each street's ground floor for thirty minutes, they were plotted and retroactively examined by examining the photographic data on the usages and occupancies rates, architectural features, and shops. This approach of retroactive classification was used since it was difficult to distinguish between small enterprises and international chains in terms of tenancy in some instances. In such circumstances, an internet search on the site produced more information about the tenants.

**Table (A.2): Details of Usages and occupancy on the Ground floor**

| **Usages and occupancy on the Ground floor** | | |
|---|---|---|
| 1. | **Retail** | Pharmacy, bakery, mobile shops, butcher, grocery store, repair shops, kiosk, traveling agency, clothing, electronic shops, sweet shops, showrooms, clothing |
| 2. | **services** | Parlor, laundry shops, tailoring, photocopy shops, institutes, travel agency, massage place, gaming center |
| 3. | **Third spaces** | Café, restaurants, bakeries, bookstores, coffee shops |
| 4. | **Vacant** | Unoccupied spaces |
| 5. | **Gastronomy** | Arabic traditional shops |
| 6. | **Housing** | Old and new houses |

Businesses with more than five branch stores in the different streets of Manama, Muharraq and Riffa or additional retail branches situated other than in these cities were designated as a chain. Because this information was readily available, no further inquiries with the entrepreneurs were necessary. Apart from franchises and local firms, houses and vacant storefronts were identified as occupation types.

Each enterprise's usage, such as bakery, dry cleaner, café, bookstore, and housing, was mentioned. Based on the researchers ' classification, these occupancies were summarized as commercial, services, residential, gastronomic, unoccupied, and third spaces. These third spaces were allotted to companies that provide a social function while also consuming or retailing, such as cafés, booksellers, and galleries.

### A.1.5 Socialscapes

The social scape was done using a concept of social interaction as human behavior focused on playing out other people's behavior. As a response, the engaged person's behaviors are constantly rebalanced and concentrated on one another (Weber, 1921). This fairly general, flexible definition was adopted to avoid confining the data to post domains of social interactions.

The location for every recorded social encounter on the weekends and throughout the week was registered and included in the street's site plan via softly strolling around the three streets from the entrance to the existing. Every location, sort of contact, and direction were all documented. Consequently, interactions on the street and between the street and the inner surface of the enterprises on the ground floors of adjoining buildings, such as conversing via an open

front door, were considered.

### a) Manama street recording schedule

The social scapes of Manama street, as shown in Fig A.5, were done on four weekends and two weekdays. The timings of observations done are as follows:

- July 08: 7:00 -17:00 o'clock.
- July 09: 13:00 -17:00 o'clock.
- July 10: 09.00 -13:00 o'clock.
- July 15: at 7:00 and 17.00 o'clock.
- July 16: at 11.00 and 15.00 o'clock.
- July 17: at 7:00 and 13.00 o'clock.

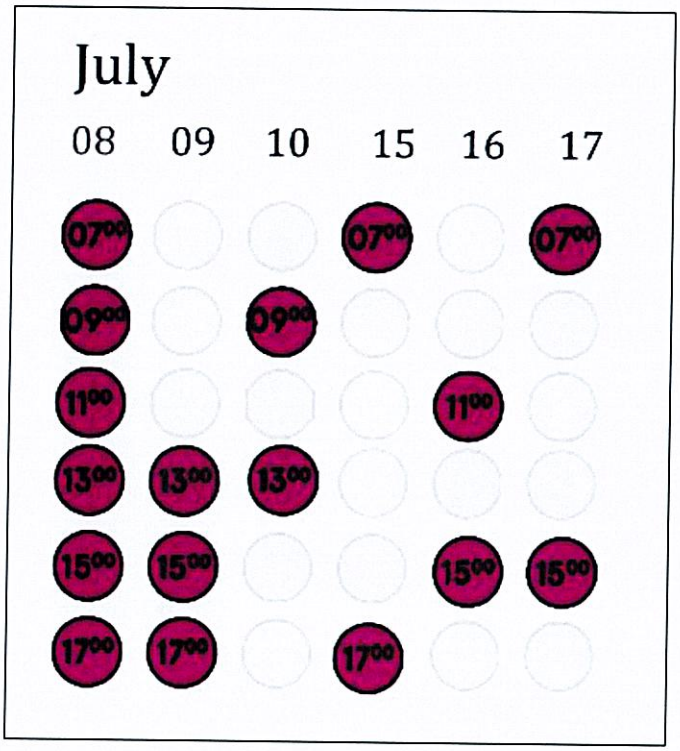



Fig A.5: Overview: StructuredObservations Date and Time at Manama
Source: author

## b) Muharraq street Social scapes schedule

The social scapes of Muharraq street, as shown in Fig A.6, were done on four weekends and two weekdays. The timings of observations done are as follows:

- August 05: 7:00-17:00 o'clock.
- August 06: 13:00- 17:00 o'clock.
- August 07: 09.00-13:00 o'clock.
- August 12: at 7:00 and 17.00 o'clock.
- August 13: at 11.00 and 15.00 o'clock.
- August 14: at 7:00 and 13.00 o'clock.

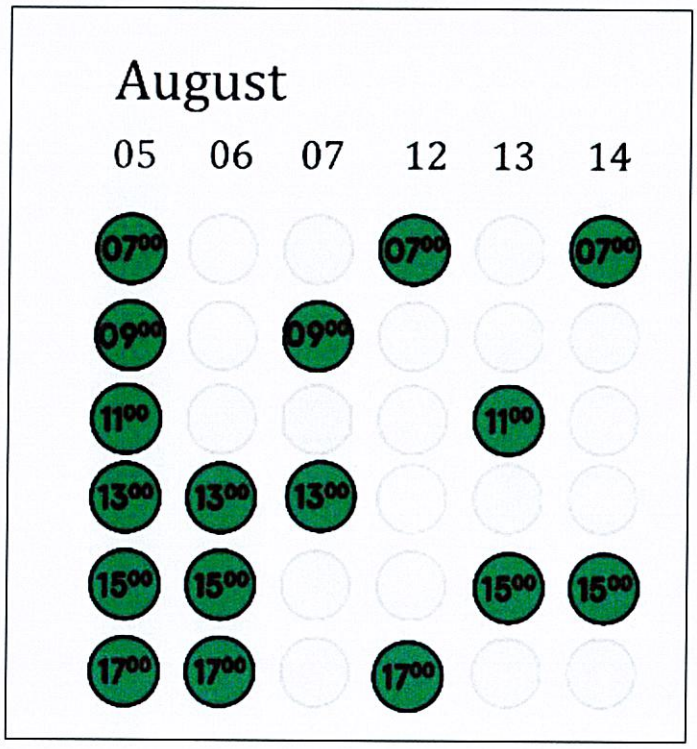



Fig A.6 : Overview: Structured Observations Date and Time at Muharraq
Source: author

## c) Riffa street Social scapes schedule

The social scapes of Riffa street, as shown in Fig A.7, were done on four weekends and two weekdays. The timings of observations done are as follows:

- September 03: 7:00-17:00 o'clock.
- September 04: 13:00- 17:00 o'clock.
- September 05: 09.00-13:00 o'clock.
- September 09: at 7:00 and 17.00 o'clock.
- September 10: at 11.00 and 15.00 o'clock.
- September 11: at 7:00 and 13.00 o'clock.

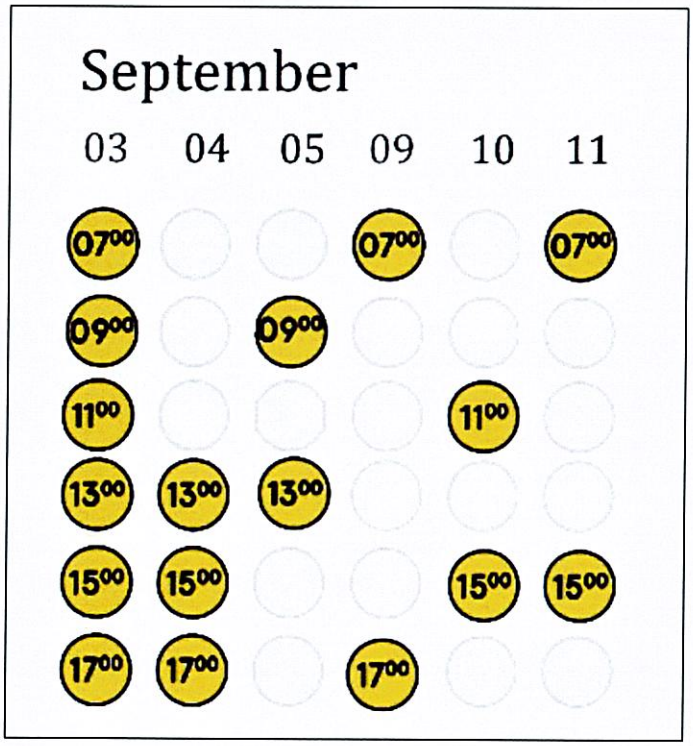



Fig A.7: Overview: Structured Observations Date and Time at Riffa
Source: author

In general, the time of observations in all the three streets was at:

- Every other hour from 7:00 to 17:00 p.m. (at 7:00, at 9:00, at 11:00, at at13:00, 15:00, and at 17:00 p.m.), for about 10

minutes.

• No additional observations were made at 19:00 o'clock due to the dusk between 18:00 and 19:00 o'clock during the observation period.

This is due to a difference in the urban environment's environmental quality and experience in morning or nighttime versus daylight experiences. Furthermore, the following interactional types were observed based on the social encounters seen, which were summed and grouped retrospectively in all three streets of Bahrain:

- Wandering and conversing
- Stopping and conversing
- Resting and conversing
- Cycling and conversing
- Functioning and conversing
- Miscellaneous (looking at someone else movement, talking on the phone while walking, sitting or riding)

During observations of the social scape on Manama, Muharraq and Riffa street, the only kind of social interaction that could be studied was conversation. However, this social engagement was found in conjunction with other activities.

## A.2 Interviews

Interviews are required to comprehend observations to fully understand persons' experiences and dispositions of urban environments from a perceptional standpoint. Interviews are a practical approach for directly addressing participants and learning

about their perceptions of the urban environment and its behavior and interaction. In-depth interviews, which allow for the interpretation and description of personal experiences from the interviewee's perspective, are a method extensively used in the phenomenological study to obtain an understanding of how people make sense of their daily experiences (Heirl, 2019)

Creswell (2014) claims that data collected through interviewing gives the investigator secondary knowledge that has been processed by the interviewees' specific thoughts and beliefs. Such information may include both normative and subjective weighting. Go-along, also known as walking-while-talking interviews, were initially employed in (sensory) ethnology to integrate experiences and interpretations simultaneously (Kusenbach, 2011).

According to Anderson (2004), Such methodologies consider a sensitivity for the fundamental co-ingredients' of individuals and space. As a result, this research approach combines relatively lengthy, telling narratives, and unstructured interviews in the field. Furthermore, he claims that by employing the chatting interview technique in urban settings, the investigator can uncover and analyze social and economic connections such as environments, emotions, reflections, beliefs, intellectual abilities, rationalizations, and philosophies.

Walking around the street is an active state of experiencing the urban environment, which involves all five senses in seeing and navigating urban spaces. Wandering in neighborhoods is a sensual and introspective engagement with the urban environments (streets). Wandering activities with a sense of place or space are inextricably linked, with the former influencing both (Wunderlich, 2008).

The investigator actively investigates the respondents' experiences and behaviors as they travel through the urban environment and engage with their cultural and psychosocial surroundings during go-along. This method can capture streams of sensations, emotions, and interpretations that would typically be difficult to access since people keep them to themselves (Kusenbach, 2011).

Non-structured interviews, according to Aspers (2009), explore the interviewee's meaning structure by offering rationale or justifications for their viewpoint. As a result, the interviewee guides these informal, in-person discussions by emphasizing and emphasizing issues that are significant to them. In cases of ambiguity, the interviewer may ultimately ask follow-up questions to fully understand the interviewee's viewpoint.

The questionnaires and survey design determine the features of the interviewees. Denscombe admits that there have been no hard and fast rules for picking eyewitnesses. Nonetheless, they are chosen with care since they have exceptional contributions and unique views or positions. Furthermore, the study's objective determines whether the results should be generally applicable or a specific circumstance or event should be extensively studied (Denscombe, 2010).

Generally, people were recruited by distributing flyers along the three case study streets and at junctions with the three intersecting streets. In addition, the booklet was shared on social media (Facebook, Instagram, WhatsApp). Young people, mainly expatriates connected to the researcher's connections, responded passionately to social networking sites because of entertainment and an approach to circulating the ad.

Because there was no reaction to the physical fliers distributed within and without work contexts, the researcher changed her strategy to directly address individuals at the Manama, Muharraq, and Riffa street entrances. On purpose, predominantly middle-aged and older Bahrainis were asked to recompense the younger volunteers who replied to the internet ad. These two categories frequently reflect city dwellers in the three case study locations, Bahrain's overall aging population, and a significant educational population.

Participants selected for interviews are separated into two groups to limit the potential impact on assessing a location due to place association and identification. Interviewees in the first group, Group A, connected to the street sections because they either lived in the neighborhood or visited it regularly. While Group B interviewees have not been there in a long time (more than a year) or occasionally visited the street for a specific purpose. Fifteen respondents from all three streets participated in the go-along, with eight allocated to Group A (participations with place connection) and seven assigned to group B (no connection with the selected streets). The categories were based in all three streets.

Three Group A and two participants from Group B participated in every three streets. This gap between the two categories stems from difficulties in finding people outside the study site and, as a result, enrolling volunteers near the study location, making it challenging to select respondents with no attachment to the place.

In all three streets, participants in both groups ranged from 20 to 65 years old. In group A, the ages range from 25 to 35 years of age (5 participants) and 50 to 65 years old (3 people). One remarkable participant was a 35-year-old mother prepared to wheel her baby

stroller along the street. Two people in the second category (group B) were between the ages of 25 and 35, two were between 30 and 40, and two were between 50 and 60.

Most younger individuals (20-30) were students, whereas those aged 35-55 were employed. Respondents in their 60s and older were primarily retired. Five of the nine participants were male, while four were female in group A. The interviews, which were conducted on different days and times, lasted between 5 and 20 minutes, depending on the respondents' responsiveness and chattiness. The following interviewees who took part in the go-along in the three streets in Group A and Group B are as follows:

- Manama Group A participants: A1 (15:00 minutes), A2 (13:00 minutes), A3 (16:14 minutes).
- Manama Group B participants: B1 (10:18 minutes), B2 (15:57 minutes).

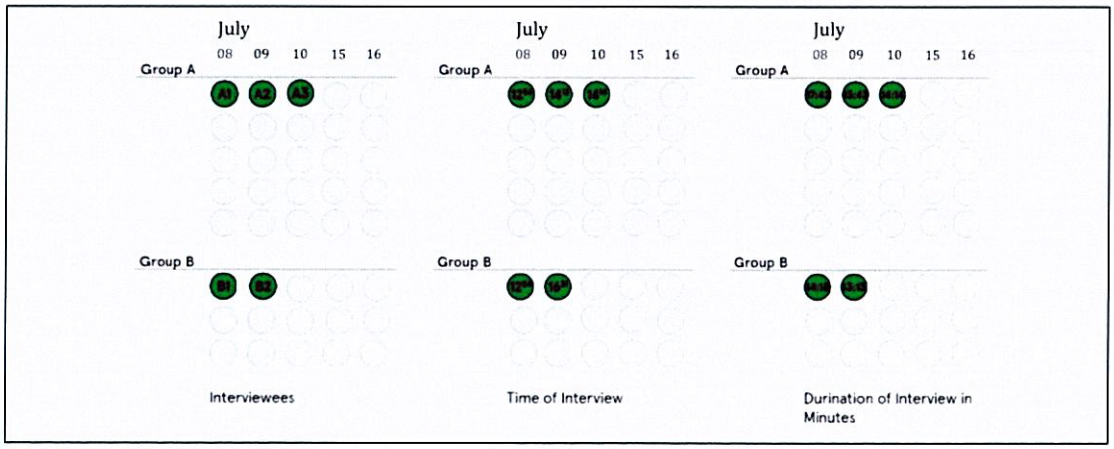



Fig A.8 : Breakdown of Interviews, including Interview participants, Date and Time of Interview, and Time in Minutes at Manama
Source: author

- Muharraq group A participants: A4 (15:14 minutes), A5 (9:14 minutes), A6 (15:09minutes).
- Muharraq group B participants: B3 (17:29 minutes), B4 (15:13 minutes).

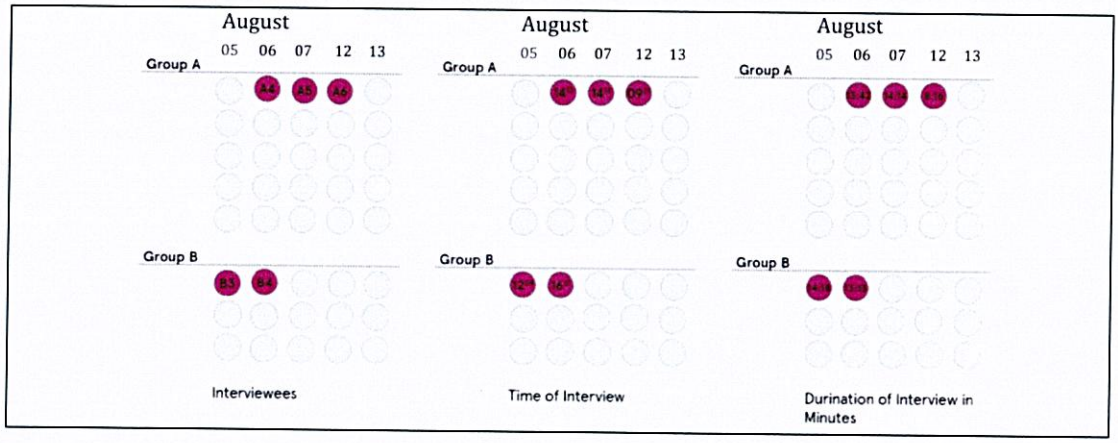



Fig A.9 : Breakdown of Interviews, including Interview participants, Date and Time of Interview, and Time in Minutes at Muharraq
Source: Author

- Riffa Group A participants: A7 (7:16 minutes), A8 (20:36 minutes), A9 (17:30 minutes).
- Riffa Group B participants: B5 (15:41 minutes), B6 (12:45 minutes).

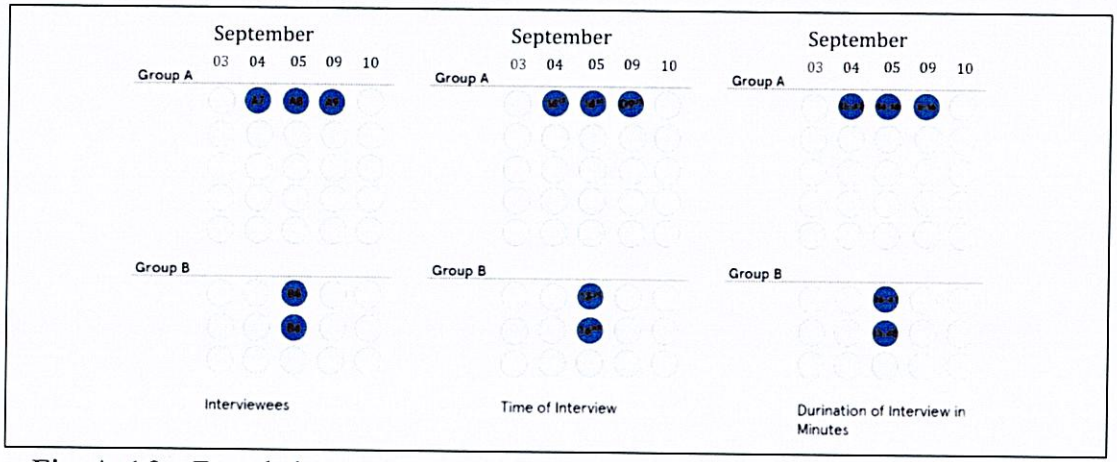



Fig A.10 : Breakdown of Interviews, including Interview participants, Date and Time of Interview, and Time in Minutes at Riffa
Source: Author

The interviews were conducted in English, Arabic, and Urdu the individuals' native languages. The researcher knows English and Arabic, the official languages, but she also speaks Urdu to address the Asian community. The Arabic language is tied to the cultural history and identity of the research setting as a social hub for the locals. Nonverbal communication and behavior which may arise during interviews and observations may also be understood since the researcher has been educated in this cultural context.

Participants in the interviews may feel more at ease if the researcher comes from their cultural background. They may be able to connect with the respondent more successfully if they do not view her as a foreigner or interference into their daily lives. Before the interview, participants were provided the following guidelines, which were followed by a brief introduction to the researcher and the observational research:

**English:**

We detect our environments using our five senses, including hearing, sight, smell, and touch. Try to pay attention to everything you listen, view, smell, and touch as you walk down the street. You are free to express yourself; what is essential is your subjective viewpoint.

**Arabic:**

نحن ندرك محيطنا من خلال كل حواسنا ، بما في ذلك السمع ، والرؤية ، والشم ، والشعور. أثناء نزولك إلى الشارع ، يرجى الانتباه إلى كل ما تسمعه وتراه وتشمه وتشعر به. أنت حر في التعبير عن نفسك ؛ ما يهم هو وجهة نظرك الشخصية.

**Urdu:**

ہم اپنے ارد گرد کو اپنے تمام حواس کے ذریعے محسوس کرتے ہیں، بشمول

سماعت، دیکھنا، سونگھنا اور محسوس کرنا۔ سڑک پر جاتے وقت، براہ کرم ہر اس چیز پر توجہ دیں جو آپ سنتے، دیکھتے، سونگھتے اور محسوس کرتے ہیں۔ آپ اپنے آپ کو اظہار کرنے کے لیے آزاد ہیں؛ آپ کا ساپیکش نقطہ نظر اہم ہے۔

The researcher queried more specifically in all three streets where respondents did not address any senses at all to discover to what degree the environmental nature of the street was perceived as multisensorial. To investigate a potential supremacy of one or or several senses regarding environmental characteristics, respondents were requested at the end of the session if there was any one sense with which they considered their environment much more powerful than others or if their perception was more multisensorial.

To preserve the respondents' anonymity, the instances used to illustrate the findings are coded with A or B, indicating ground association and a number dependent on the chronology of interviews inside every group.

# ملخص الدراسة

يتم تقديم التجربة متعددة الحواس للفضاء الحضري في هذه الدراسة كنموذج نظري في التخطيط والتصميم الحضريين يربط تصورات البيئة الحضرية بالتفاعل الاجتماعي. والغرض من ذلك هو دراسة كيف ترى الحواس المختلفة البيئات الحضرية ، مثل شوارع البحرين ، وما هي الأحاسيس المتعددة التي تعزز التفاعل الاجتماعي. تشير دراسات الحالة التي أجريت ضمن هذا البحث (الغنامة ، المحرق ، الرفاع) إلى تصور متعدد الحواس للشوارع وهيمنة الرؤية. تظهر الملاحظات والمقابلات التي أجريت في ثلاث دراسات حالة في البحرين أن دمج المدخلات الحسية المتعددة والشركات الصغيرة في الطوابق الأرضية ينتج بيئة ديناميكية تشجع التفاعل الاجتماعي. على الرغم من أن الرؤية تهيمن على الإدراك ، إلا أن هذه الدراسة تدعو إلى اتباع نهج متعدد الحواس للتخطيط والتصميم الحضري الذي يتضمن الشم واللمس والسمع لإنشاء مدن حيوية من خلال تعزيز الوظيفة الاجتماعية للشوارع من خلال خلق بيئات حضرية تشجع التفاعل الاجتماعي في الشوارع البحرين.

جامعة البحرين
كلية الهندسة
قسم الهندسة المعمارية والتصميم الداخلي

# تعزيز التجربة الحسية المتعددة لتعزيز التفاعلات الاجتماعية في شوارع البحرين

أطروحة مقدمة إلى قسم الهندسة المعمارية والتصميم الداخلي بجامعة البحرين
بتحصيل جزئي لدرجة ماجستير الهندسة المعمارية في التصميم العمراني

أعدت بواسطة :
**زهرة افتخار احمد**
**الرقم الجامعي:** ٢٠٠٧٤٣٨٧

إشـــــــــراف:
**أ . د. رانجيث دياراتني**
أستاذ مشارك في الهندسة المعمارية
جامعة البحرين

**مملكة البحرين**
**يونيو ٢٠٢٢**