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# Enhancing Livability of Squares and Streets:

The Case of *Romanat* District, Mekelle CBD, Mekelle, Tigray.

M.Sc. thesis in Environmental Planning and Landscape Design

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the case of *Romanat* District, Mekelle CBD, Tigray.

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

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## ABSTRACT

Livability of CBD squares and streets should be enhanced; so that, the users' dependency on the indoor catering facilities to spend time and the preference of motorized modes even for short trips will be optional or based on specific personal preferences. This study aims to understand the livability problems of *Romanat* district and to be familiar with the design which is proposed to reduce the livability problems. This study has adapted a case study based exploratory and quasi-experimental research approach, to draw a comprehensive result. The analysis, discussion and interpretation of the study results are made according to the theory which focuses mainly on the livability variables, on the public space user groups and activity groups.

The study findings indicate that the existing livability problem of the district is because of the lack of spatial attributes such as safety, amenities, aesthetics, identity, diversity in space uses and users, variety in the accommodating activities, accessibility, linkage, inclusive environment and talk-scape environment. The findings also indicate that comfort, image, use and activities of the district are the most preferred spatial attributes which have to be incorporated in the design of future livable district. In line with those findings, this study has proposed four major conceptual design objectives: to produce a comfortable district with its own unique image; to produce a district with multiple uses and diversity of activities; to produce an accessible district with good linkage; and to produce a district that can reinforce social interactions. Besides, the study has proposed possible implementation and management options, which can be responsive to the produced design.

**Keywords:** Livability, spatial attribute, comfort, image, use, activity, access, linkage, sociability

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# ACRONYMS

**a.s.l.:** above sea level

**CBD:** Central Business District

**GIS:** Geographic Information System

**LDP:** Local Development Plan

**MCA:** Mekelle City Administration

**MCCDPPP:** Mekelle City Committee for Development Plan Preparation Project

**MCI:** Millennium Cities Initiative

**MCPPO:** Mekelle City Plan Preparation Project Office

**PEST:** Physical and Environmental Study Team

**PPS:** Project for Public Spaces

**Sq.:** Square

**St.:** Street

**Sts.:** Streets

# CHAPTER ONE

## 1. INTRODUCTION

### 1.1. Background of the Study

Mekelle<sup>1</sup>, capital of the National and Regional State of Tigray, is the first rapidly developing city of the Northern Ethiopia which brings it to be named as “the Northern Star” (MCCDPPP, 2011). At the same time, the city is in dynamic expansion; now the sixth largest city in Ethiopia (Cannon, 2009) (fig: 3.3). However, it is still highly centralized; the “old town of Mekelle” being the city CBD (Rumi, 2009) (fig: 1.1a). This CBD or locally called ‘*Ketema*<sup>2</sup> is where the highest traffic flow exists from all corners of the city, as it is the hub of commercial and non-commercial activities. The CBD is also relatively the most easily accessible place for all inhabitants of the city. It is “a convenient place to be anywhere” in the city; i.e., someone in the CBD can be easily available in any other neighborhood with in a short time just having one taxi<sup>3</sup> (Rumi, 2009). Because, it is from this CBD that all public transport routes radiate to all neighborhoods of the city (MCP PPO, 2006) (fig: 3.10a).

In such kind of highly contested CBDs, proper functionality of their squares and streets is strictly needed to impress visitors at the first visit, to value the district for all users and to balance the highest flow of users from all neighborhoods of the city (Katie, 2006). The square should be above roundabout- only designed to slow traffic flow and the street should be above traffic channel- only designed to move from A to B (Norberg-Schulz, 1971). They should be places that foster social interaction. However, in the developing cities, the stakeholders’ emphasis has been on cars “...neglect[ing] the social context, the meaning of squares and streets is lost” (Krier, 1979; Madanipour, 1996).

CBD of Mekelle is not exceptional to the above situation; that its CBD squares and streets particularly those which are found at the main center-*Romanat* district<sup>4</sup>, don’t consider the social interest (fig: 1.1b). They are poor in welcoming the CBD visitors<sup>5</sup> stays. That is, it is not unusual to see people in rush to get away of those open public spaces indifferent cases. This lack of the peoples’ interest to use those squares and streets for an expanded time can be easily understood in relation to the stays and walks in

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<sup>1</sup> Mekelle can also be spelled as Me’kelle, Mekele and Meqelle (Cannon, 2009).

<sup>2</sup> ‘*Ketma*’ a place locally understood as center of recreational and commercial activities. One can easily investigate this local and common naming of the CBD by listening to taxi driver assistances when they call their customers from any neighborhood.

<sup>3</sup> One taxi: - possible to reach the CBD being loaded in one taxi only from any other areas of the city.

<sup>4</sup> *Romanat* district - *Romant* square and its radiating primary streets(*Selam, Hakfen, Alula and Agazi*).

<sup>5</sup> Visitor is a word interchangeably used with user to mean a person which is found in a place for any case.

*Sew'at* avenue<sup>6</sup> (fig: 4.13). In the CBD, visitors prefer to pay for their stays by heading toward the indoor catering facilities<sup>7</sup> and for their moves<sup>8</sup> by using motorized modes even for short trips than using of those free but unwelcoming CBD squares and streets. So, the people are becoming dependent on those catering facilities to spend their leisure time and preferring the motorized modes to access functions of the CBD.



**Figure 1.1:** (a) CBD location in relation to city landmarks and city administrations. Source: Google map of Mekelle, 2009; (b) Location of *Romanat* district's square and streets within the CBD. Source: Mekelle city map.

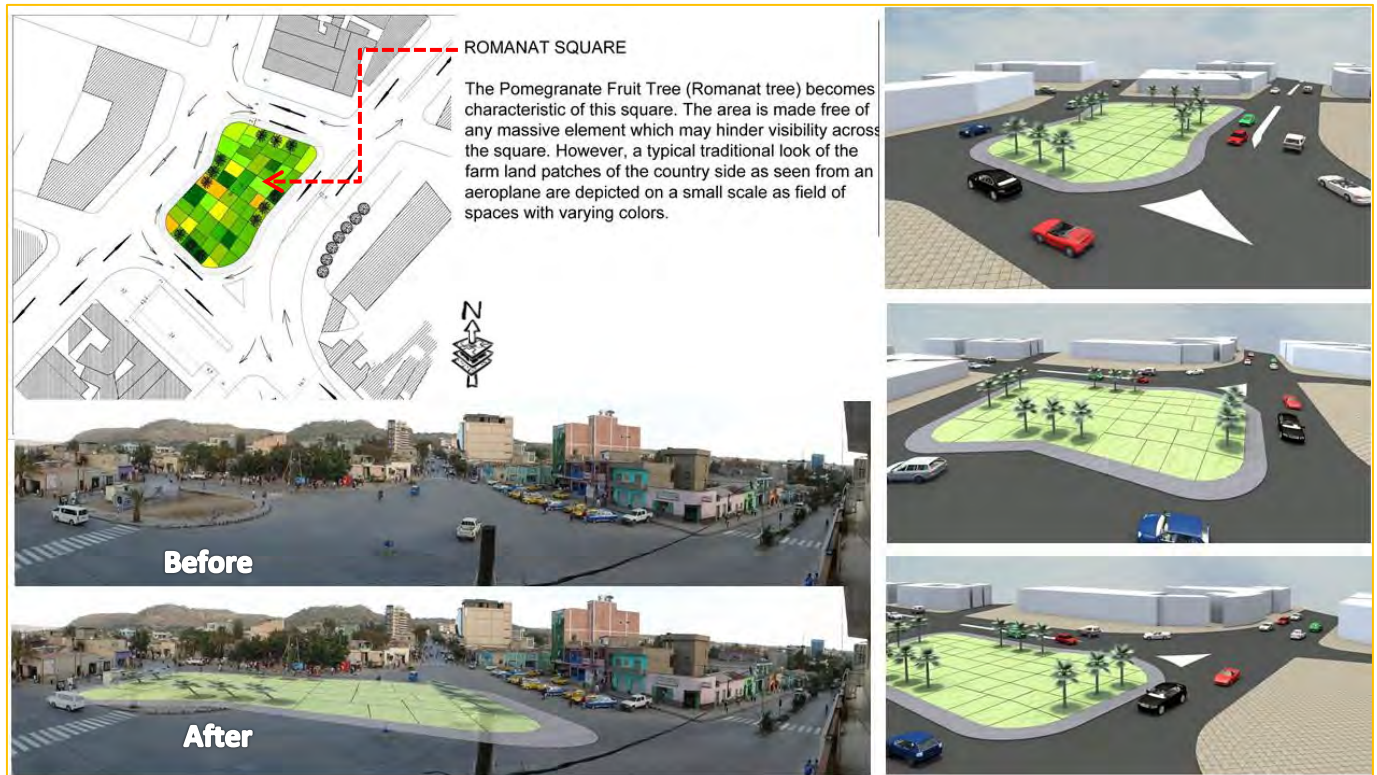
Different contextual studies have been done to improve livability of the city. The study on the city spatial growth is one, which studied on the city dynamic expansion and recommended the new center creations to balance the CBDs' existing traffic flow (MCP PPO, 2006). The study on the city road network is another which investigated on the drawbacks; and recommended: the widening of narrow streets to accommodate pedestrian paths, the provision of adequate on and off street parking, provision of drainage lines, improvement of junctions and connectivity, management of street utilization, introducing traffic calming mechanisms, widening of the inner city transit road and provision of new roads in the built and expansion area (MCP PPO, 2005). This study also recommended the replacement of *Romanat* square with an efficient roundabout. Besides, Fasil Giorghis Consult has tried to design the square for an ease circulation of vehicles (fig: 1.2). Transportation of the city is also studied to investigate the public transport routes and modes throughout the city; and proposed an extension of the existing and creation of new routes for train, bus, taxi, cycle and pedestrian (MCCDPPP, 2011). This study also recommended

<sup>6</sup> The *Sewat* avenue – a lot of inhabitants of all income groups use this street to meet their friends, walk, play and experience the sunset or evening condition for an expanded time, even it is located one taxi away to the CBD which is in un-equal access like that of the CBD to all neighborhoods and most of its adjacent buildings are in construction which are not functional yet.

<sup>7</sup> The indoor catering facilities are hospitality places such as coffee houses, cafés, restaurants, bars, hotels, etc.

<sup>8</sup> Pay for a move is to mean to use motorized mode.

an improvement of existing pedestrian routes which are found around the city center. The city greenery coverage is studied; and appropriate tree species and spacing standards for a good integration with other infrastructures is recommended to reduce the investigated weaknesses (MCPPO, 2006). There is also a study on local traditions and cultures of the city. In this study, the traditional and cultural activities of the people are identified, but no focus is given to the spatial needs of those activities (PEST, 2005).



**Figure 1.2:** Design proposal for the *Romanat* square by Fasil Giorghis Consult. Source: Fasil Giorghis Consult, 2011. Mekelle city squares project.

Those all studies indicate that, an improvement on the physical environment of the city is a current issue in order to make the city for all. Those all are citywide studies, which are not specific to the study area and which are mostly based on the investigation on the physical dimensions not on the social dimensions. But, this study investigates the existing livability problems of the district in the eye of the inhabitants and proposes a user responsive design that can reduce the existing livability problems or that can enhance livability of the district.

## 1.2. Statement of the problem

The CBD of Mekelle is the most dominant place of the city, where a lot of inhabitants flow from all corners of the city, to do their commercial and noncommercial activities. Despite this fact, the inhabitants are lacking an interest to stay and walk in the squares and streets of the CBD for an expanded time. This

lack of interest can be clearly understood by looking to the users which are showing a wish to get away of those open public spaces in different cases. That is, seeing more users which are searching for or moving to indoor catering facilities when they need to spend their leisure time or when they need to wait for someone is becoming usual. There is also a clearly seen motorized mode preferences than walking, to move through and even to move within the district.

Those two, the dependencies on indoor catering facilities to spend time and the preferences on motorized modes, mostly *bajajs*<sup>9</sup> to travel, are causes for different socio-environmental consequences in the city. First, everyone has to order something and pay for, whenever he/she need to take a seat in those catering facilities. This raises a question of affordability. In addition, there is and there will be difficulty to find un-congested catering places specially in leisure times, since the availability and capacity of those places are unbalanced to the number of the district users. I.e. "...Mekelle lacks hospitality facilities to meet expected future demand" (Cannon, 2009). Second, the preference on motorized modes to move within the district square and streets even for short distances can evoke high traffic congestion as they are part the primary public routes of the city. This congestion will in turn be a cause for an occurrence of annoying feelings and conflicts between pedestrians and vehicles, in addition to polluting of the environment. That is, pedestrians will take them long time to cross streets just waiting for the crowd to lessen, and even may totally isolate themselves from the street picture in fear of the congestion and car accident. This will also be a threat to vehicles in getting ease circulation and movement like the practical situation faced by the vehicle drivers in Addis Ababa.

Keeping those socio-environmental impacts in mind, the author has found that, investigating the livability problems behind the lack of staying and walking interests in the CBD squares and streets, particularly in the *Romant* district's square and streets, is a critical issue to be studied. That is, in order to propose a design that can reduce the livability problems or that can enhance livability of the district. In other words, to produce a design that can create a pleasant environment within, an environment that invites and welcomes the users or visitors of the district to engage in different activities of whatever their desires are. In this aspect, the peoples' culture of recreating in open public spaces will be enhanced, and at least the necessity on catering places and on motorized modes will be optional or will be based on specific personal preferences. City wide, the district dominancy in case of its accessibility and usability to all inhabitants of the city will be continued in an enhanced way.

### **1.3. Objective of the study**

#### **1.3.1. General objective**

The main objectives are to study the existing livability problems behind the lack of staying and walking interests in the district, and to propose a design that can reduce the livability problems or that can

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<sup>9</sup> *Bajaj*- three wheeled motorbike, with a capacity of lifting three travelers.

enhance the livability of the district. The design proposal should also be a design that can emphasize the socio-cultural, economic, environmental and political roles of the district.

### **1.3.2. Specific objectives**

To achieve the general objective, it is important to:-

- Understand the theoretical and contextual concepts of livability.
- Explore the potentials of the Likert-scale rating method in investigating the existing livability problems.
- Investigate the existing livability problems of the district in terms of the users' perception, the professionals' view, the author's investigation and the archival analysis.
- Explore future preferences of the users' and professionals' on making the district livable.
- Distinguish design solutions that can reduce the existing livability problems of the district.

### **1.4. Research questions**

- What are the theoretical and contextual concepts livability?
- What are the potentials of the Likert-scale rating method in investigating the existing livability problems?
- What are the livability problems of the district in terms of the users' perception, the professionals' view, the author's investigation and the archival analysis?
- What are the future preferences of the users' and professionals' on making the district livable?
- What design solutions can reduce the existing livability problems of the district?

### **1.5. Significance of the study**

This study is important to address livability issue of the district. There are different reasons of why livability becomes a priority issue of this study. To mention some, one is the socio-environmental impacts due to the lack of staying and walking interest in the district. The other is "the city's livability concept in developing countries" such as Ethiopia is "the city's infrastructure" <sup>10</sup> (Changcheng & Hai-jun, 2011). And it is well known that, poor infrastructure is the major urban problem of Ethiopian cities such as Mekelle; that, it is "50% of the productivity handicap faced by Ethiopian firms" (MCI, 2012). Furthermore, livability here is sustainability there or livability now is sustainability later (Alireza & Azadeh, 2012).

This study can have its own contributions, academically as well as socially. In the academic context, it defines the theoretical and contextual concepts of livability. It explores the potentials of Likert-scale rating

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<sup>10</sup> The city's infrastructure is composed of transport infrastructure (road and public transport), green infrastructure (public parks, open green spaces and street trees), water supply and sanitation infrastructure and so on.

method in investigating livability problems, which is a methodological contribution. It gives advancement to the local knowledge of the livability problems behind the lack of staying and walking interest in the district through the inhabitants' eye. It highlights the users' aspect of space making and reveals the preferred attributes of the future district users. It distinguishes design solutions which are specific to the study area, and by which the *Romanat* square project (fig: 1.2) can be revised to become more responsive to users' preferences. In the social context, this study gives a big opportunity for the society in exploring their problems with livability of their area and in making their spaces based on their preferences. This is an important asset, which gives value for the target group, and which can build sense of pride and ownership among the society. Further, this study provides the future livability image of the district that may induce awareness among local developers and communities to do more in enhancing the CBD livability and further in the city livability. On the other hand, the study also opened up new areas for further investigations.

## **1.6. Scope and limitations**

### **1.6.1. Scope of the study**

In literature the term livability is defined as quality of life in a city. That is, a livable city is a city that provides walkable and stayable spaces, affordable houses, strong neighborhoods and connectivity in public realm. But, this study addresses the walkability and stayability requirements of livable public spaces in consideration to the type of users and their activity interests in the district. The design proposals are specially for the situations of the district that require landscaping and somewhat environmental planning.

Spatially, the study is for the *Romanat* square and for the radiating primary streets and is bounded by the property lines of adjacent buildings. Thematically, the study of the district livability condition encompass all the previous studies regarding the context in addition to the existing, and the design proposal considers the objectives of the 10 year city development plan (2005-2015).

### **1.6.2. Limitation of the study**

The study has faced to different limitations that have influenced its extensiveness. Some of them are: the lack of related thesis books within the Ababa University library, shortage of budget, time limit and the regular cutting of power.

## **1.7. Organization of the paper**

The paper is organized in to seven chapters. The first four chapters are: introduction, research methodology, literature review and contextual review. The outputs of the research: the result and

analysis, the discussion and proposal, and the conclusion and recommendations are included in the rest three chapters.

Under the first four chapters of this paper, chapter one introduces the background of the study, the statement of the problem, the research objectives and questions, the significance of the study, the scope and limitations of the study and finally the organization of the paper. Methodology of the research is discussed in chapter two. This chapter presents the selection of method and the design of such method to the way it can address the research objectives. Chapter three and four are concerned on building theoretical and contextual understanding of the research issue; those are, the literature review and the contextual review.

Under the last three chapters of this paper, the study result is analyzed and presented in chapter five. The discussion and proposal of the study is under chapter six. In this chapter, conceptual design solutions are distinguished; proposed design images, drawings and details are presented in reference to the conceptual design objectives. Possible implementation and management options are also explored in this chapter. Finally, the conclusion and the recommendations are included under the last chapter.

# CHAPTER TWO

## 2. RESEARCH METHODOLOGY

### 2.1. The research issue

There are literatures that explain livability theories, principles, variables and approaches. Those theories are in the context of the developed cities, such as: Copenhagen, Sydney, Melbourne etc., as they are the result of the studies on those livable cities. Those literatures can be general references for the developing cities, in this study case, city of Mekelle, but can't be applied as they are. Therefore, there was a need to localize those general concepts of livability; and to discover new ideas which are specific to the case area. This was the reason why the study conducts a research on the site.

### 2.2. Selection of research method

Under this topic: what general methods are selected, how they were selected and the characteristics of those methods with regard to the requirements of the research problem are discussed.

The research used a place making approach that engages the users in making of their place. Place making is a "multi-faceted approach to the planning, design and management of public spaces" (PPS, 2000). It involves an investigation of activities such as "looking at, listening to and asking questions" to discover the peoples' needs and aspirations (PPS, 2000). This approach was selected according to the major objectives of the study. For example, if we see the approach according to the proposing of a design that can enhance livability of the district, such an enhancement requires an investigation on the need/interest and activity of the specific user of the particular space. PPS in their book "How to turn a place around" (2000), support this idea as, "to increase livability of a space the first step is listening to best experts in the field—the people who live, work and play in that particular place" (PPS, 2000). Jane Jacobs (1961) also magnifies the importance of users' engagement, by forwarding an idea that "cities have the capability of providing something for everybody, only because and only when they are created by everybody" (Jacobs, 1961).

Once the general approach is identified, the next step was searching possible specific approaches to address the specific research questions. Since the research questions focus was on investigation: what is going on the site and what new ideas can be discovered to address them; methods that have such purposes were advisable to use. On searching according to the purpose of the methods, a case study based exploratory and quasi-experimental were found as the compatible research approaches to achieve the study objectives.

Exploratory was selected as it is a method which "seeks to find out how people get along in the setting under question, what meanings they give to their actions, and what issues concern them", and how those

issues can be addressed (Schutt, 2006). It was used to diagnose situations. Whereas quasi-experimental was selected as it is a method to investigate the causes and causal relationships of the issues that are concerning them. Quasi experiments are 'near' experiments or approximations to an experiment (Hesse & Leavy, 2008). In landscape architecture, the metaphor of experimentation is adopted as a way of exploring and testing an idea through design activity (Sternberg, 2000). The focus was typically upon investigating sensual aspects of human relationships with a space landscape.

## **2.3. Research design**

Designing the methods specifically for the problem of the study was the next step done after the selection of the appropriate methods. This is about how the selected methods were designed for their application in the investigation. Methodology design incorporates identification of "major steps and creating a logical sequence by which the research question, the empirical data and finally the proposal are included" (Yin 1994 cited in Heyaw, 2005). In this study, designing of the methods go through steps of case selection, sampling, data collection and data analysis techniques (fig: 2.1).

### **2.3.1. Case selection**

The research was conducted in the *Romanat* district, CBD of the city Mekelle, the capital city of Tigray. There are reasons for why the researcher made her study on Mekelle. Those are: the dynamic spatial growth of the city, presence of the 10 years development program towards making the city for all and the availability of development policies on squares and streets. Being the researcher's familiar city was also another reason to study in Mekelle. The *Romant* district was selected because of the existence of planned development project which is started by Fasil Giorghis Consult. Being it is found in the CBD and being it is the central public route distributor are also another advantages. In addition, the study area is located in an area selected by most of the inhabitants for commercial and noncommercial activities, where enhancing the livability of the district is feasible and an opportunity for all the users.

### **2.3.2. Data types**

The study has investigated the qualitative and quantitative type of data under the exploratory and quasi-experimental methods respectively in consecutive timing through the concurrent mixed method research approach. The final output was expected to be a qualitative type. In this case, the quantitative data from the quasi-experimental was used to enhance and advance the qualitative data from the exploratory. That is, both the qualitative and quantitative in a mixed form finally become an input to draw a qualitative conclusion. This mixed data helped the study to have a comprehensive output.

### **2.3.3. Data sources**

Data was collected from primary as well as secondary data sources.

### **2.3.3.1. Primary data sources**

The investigation on the existing livability problems (based on the users' perception, the professionals' view and the author's investigation), and the investigation on the future preferences of the users' and professionals' were the primary data sources.

### **2.3.3.2. Secondary data sources**

Documented data which are related to the regional overview and to the livability issues of the city were the secondary data sources. The major sources of archival materials were individuals, NGOs and governmental institutions. Thesis studies from individuals, magazines, newspapers and audio documents from NGO mass-medias were provided. Prevalent published materials, planning reports, design proposals, newspapers, documentary videos and maps were also provided from the government institutions/ municipality.

Documents gathered in connection to the objective of exploring the existing livability problems were paper studies: on spatial growth, on road network, on street legibility, on environmental study, on transport planning, on spatial growth, on history, culture and tourism, on green infrastructure and so on. Relevant magazines, newspapers, audio and video documents were also gathered from the city Mass media bureau and from the FM 104.4. Studies on local development plans and on green and landscape design were the documents collected from the city Municipality, and were references to deal on the future livability of the district. The 10 year development plan of the city (2005-2015) was a reference for the investigation of the existing livability problems and for the exploration of the future livability attributes of the district.

### **2.3.4. Sampling and Respondents**

The research was carried out with 30 users of different age, gender, income and occupation groups who came from different neighborhoods and which were available in *Romant* district during the data collection times<sup>11</sup>. It was also with 10 key informants. Age groups of the respondents were in categories of (13-17), (18-24), (25-65) and (65 and above). About 75% of the respondents were in the age groups of (18-24) and (25-65). The sampling has 53% men by 47% women gender composition. When we see about the occupational group composition of the respondents, 15% were students, 12% were from the business, 10% were from the design profession and 63% were from other occupations and from the unemployed population. Majority of the user respondents, which is about 27%, were from *Adi haki* and *05 kebele*. The rest were from different neighborhoods of the city.

The sampling was taken based on the user groups of public spaces and their expected activities in the public space, as defined by Lars Gemzøe (Gemzøe, 2008) (table: 3.1 & table: 3.2). Among the user groups, the recreational visitor group is excluded in this sampling, as their expected activity is a daily

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<sup>11</sup> The data collection times were in the morning, noon, afternoon and evening time durations of a day; i.e. (5am-10pm), also include working days, weekends and public event days.

recreational activity in the street environment; the type of activity which is not practical yet in the case area. The percentage given to each user groups were based on the categories of necessary (the daily coming from/going to and daily transit activities) and optional activities (the daily recreational and planned activities). Since the goal of the research is to propose a design that can enhance the quality of the spaces to the extent the district become livable, the sampling took more from the actors of optional activities; the activities which are in big requirement of the space quality. That is, it took more from the users that were performing optional activities than from the users that were performing necessary activities. Key informants were from the staff of city beautification, city planning, staff of culture and tourism and from the staff of Architecture and urban planning in Mekelle University.

The study had 40 participants; of those, 10 respondents were key informants. The questionnaires prepared for each group of the key informants were based on their specific knowledge to the context; 5 of them respond to a full format whereas the rest respond to 2-3 questions. The other, 30 respondents were from the user groups of the district that were performing their specific activities in the district spaces; and each of them had participated/responded to all sections of the questionnaire (the in-depth interview, map making and the Likert scale rating). The researcher also made discussions on different context related issues with friends, colleagues and officers; which are out of the formal participants. The researcher was also another respondent, who participated on the site observation.

The sampling was taken within each defined boundaries<sup>12</sup>. Each respondent was expected to respond the questions based on the specific boundary he/she was available in by the time of the interview. But there were some mixing up or kind of seeing in totality by some respondents in the in depth and Likert-scale rating sections of the data collection. The researcher had tried to extract the boundary specific answers from the totality answers by cross checking with the map made by that specific respondent in the map making section. This was because there was minimum or no mixings in this section, as it needs strict visual contact of the respondent to the specific area of investigation. The need of getting boundary specific answers was to help the researcher to react on a space in consideration to the specific needs of the particular space users.

### **2.3.5. Data collection techniques**

The questionnaire for the investigation of the existing livability problems and the future preferences were prepared in 4 types: the in depth interview, map making, Likert-scale rating and site observation. Every interviewee from the users was made to respond to all types. The researcher used this approach in order to help the respondent to develop his/her understanding throughout, and to make extracting the inconsistent ideas or the totality responses easy in the analysis stage. The key design professionals were made to respond to the in-depth interview and map making type whereas the city planners, experts of city

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<sup>12</sup> The defined boundaries are clearly seen in the map making section; they are represented as overlay of square pieces on the case area map.

beatification and experts of culture and tourism were made to respond only to the in depth interview part. The author has made a direct contact to answer questions of the site observation.

#### **2.3.5.1. *In-depth interview***

In-depth interviews were semi-structured and un-structured; they were extensive interviews that encourage a respondent to talk freely and in depth about a topic (appendix I- part 1A, B, C, D & E). This investigation was made to explore the perceptions of the users' and the views of the professionals' on the existing livability problems and on the future livability situations of the district. Semi- structured interviews were used to the users; whereas key questions and unstructured discussions were made with the professionals from the municipality. The data collection with the users and design professionals was conducted in each particular parcels/boundaries of the study site, but with the key informants from the municipality it was conducted in their offices.

All interviews were conducted face to face; and the letter of support the researcher had from her study University- Ethiopian institute of Architecture, Building construction and city development (EiABC), Addis Ababa University, was sufficient to create the degree of trust needed to establish first contact. In every meeting with interviewee, the researcher began with the introduction of herself and the objective of the study followed by the perspective needed from each interviewee.

#### **2.3.5.2. *Map making***

This graphical representation of future livability of the district was conducted with the users and design professionals right after the in-depth interview (appendix I- part 2). In this section, each interviewee was supposed to put or map his/her idea of enhancing the space livability in reference to the idea said in the in-depth interview. In this part, some of the interviewee who were able to sketch, made their map by themselves. Some of, who were not able to sketch, complete this step by the help of the interviewer; and some of them put their idea by point representations and writing the legend to every point.

The researcher/interviewer began the map making section by explaining the purpose of the respondent's map to the study and by making sure that the respondent had understanding of the target area.

#### **2.3.5.3. *Likert scale rating***

This was the third section of the data collection which was conducted with the user respondents only. In this section, the respondents were asked to rate the statements under each livability variable according to their degree of satisfaction on the particular area (appendix I- part 3). The Likert scale is "a scale showing respondents agreement or disagreement" or a scale measuring the degree to which respondents agree or disagree with the statements of the questioner in a defined point scale (Friedman, 1998).

#### **2.3.5.4. Site observation**

This approach was conducted by the researcher's direct visual contact with the study site. It was an investigation on the district conditions which can affect the walkability and stayability of a space. This was the data source for the site inventory and analysis. This technique included recording of data in the already prepared table of site investigation (appendix I- part 4), taking existing pictures and videos, and sketching to grasp the overall situations.

#### **2.3.6. Data analysis and interpretation**

The study used mixed data analysis techniques to analyze the data which were collected using the mixed data collection methods. Understanding the 4 steps of qualitative data analysis approaches used by Heyaw (2005), "categorization" and "subjective interpretation and analysis" were the major two steps adapted in this study (Heyaw, 2005).

After the data collection, categorization was the first stage made under this section. In this stage, data related to the context and to the issue of the investigation were separated. The data categorized under the context were: the historical background, climatic condition, spatial growth, transport planning, local cultures and traditions, road network and green infrastructure of the city. Those data were analyzed and used to construct the context of the research at the city and study level. Whereas the data categorized under the issue of the investigation, the data collected by the questionnaire and from the observation, were separated in to qualitative and quantitative information for further analysis.

##### **2.3.6.1. Analysis techniques**

For the analysis of the qualitative data, content analysis was the one used to analyze the data collected through the in-depth interview. This analysis method helped "to observe the frequency of mentioning of particular [idea]", to make objective conclusions, and "to identify specific characteristics of messages systematically" (Holsti, 1969). For example if we take (table: 5.2) made for the means of travel from the analysis part, the percentage of respondents that mention a particular means (e.g. walking) was made firstly, and secondly, the percentages were made according to the mentions of particular reason to the use of walking as particular means of travel. The shared cognitive map was the other method of qualitative analysis, which was used to analyze the maps created by individuals under the map making section. This was done by overlying the individual maps of a particular space to create a collective and comprehensive preference map of the respondents for that particular space. SWOT analysis was also another analysis method used to analyze the data collected through site observation. This was done by identifying the strengths and weaknesses the case area has, and by identifying the opportunities and threats of the city that can influence the case area.

Descriptive statistics and multiple regression analysis were the methods used to analyze the quantitative data gathered in the Likert-scale rating. Descriptive statistics was used to describe "the basic features of the data" by providing "simple summaries" about the rating (Friedman, 1998). The summaries were made

according to the ratings to the defined 5 point scales (very strongly agree, strongly agree, agree, fairly agree and don't agree). In this case, the ratings to the first three scales made the summary of livability whereas the ratings to the last two scales made the summary of un-livability in terms of a particular variable (e.g. comfort and image). Multiple regressions were used after the summary was made in the descriptive analysis. This method was used to give final summaries of space livability (e.g. *Romanat* square) in terms of all livability variables (table: 5.8). Then after, it was used to examine the causal relationship between single "dependent variable" (livability) and several "independent variables" (livability variables and attributes, as defined from the literature). In other words, it was used to define the degree of livability or un-livability of a space and extract the factors that imply such degree of livability or un-livability.

The subjective interpretation and final analysis stage was the main and final part of the analysis. That is, re-contextualization of the statements obtained from all the analysis data with the theoretical reference, which was made to construct the design solutions for the design phase of the study.

### **2.3.7. Presentation technique**

The study has used software like Microsoft excel and SPSS in the analysis part, MS Word and MS power point in editing of simple graphics. GIS was used to overlay, extract, rectify and produce maps of the study site from Google images of the city and from the city map. AutoCAD was used to prepare the 2D design drawings, and sketch-up was used to produce the 3D images. Then after, Realtime Landscaping Architect was used to render the 3D images. Finally, Photoshop was used for final renderings and exporting of image files.

### **2.3.8. Output and reporting**

This thesis paper is the output of the study and is submitted to Ethiopian institute of Architecture, Building construction and City development (EiABC), Addis Ababa University; in hardcopy and softcopy. This paper document contains maps, pictures, figures, tables, 2D drawings and 3D images in addition to the verbal expressions.



## CHAPTER THREE

### 3. LITERATURE REVIEW

#### 3.1. Introduction

The purpose of this review is to gain an understanding of the existing wealth of knowledge which currently exists related to the field of public space livability. By examining the related scholarly contexts of the study issue, the researcher has determined what information and research into this field is already available. In addition, the literary study will also identify issues and concepts which have not yet been adequately explored in the literature to date and which are in need of future research. The theoretical insights gained as a result of this process will be applied later in this research project to analyze the study findings.

#### 3.2. Livability, livable city

The word 'livability' comes from the word 'livable'; and it is a spatial attribute in landscape architecture (Sahasrabudhe, 2010). Livability is to say live-ability, which literarily means ability of a space to live in it or to make life in it. It is basically an urban design issue of bringing people to public spaces.

The seeds of "livable city" concept can be traced back to ancient Greece who promotes the ideology and the concept of fairness and justice. That is, in 19th century, Howard (1902) proposed "garden city", in his book named "Garden Cities of Tomorrow"; which is considered as the shoot of the modern idea of livable cities (Howard, 1902). After the 1980s, researchers from different disciplines presented the concept of a variety of livable cities, such as new urbanism ideology, the concept of healthy cities, building garden cities etc. From the late 20th century, the world city movements get a larger development, especially in developing countries. In a way that, "the city's livability is the city's infrastructure, which is it should allow people to feel natural, comfortable, friendly; all things in the city as in a harmony" (Changcheng & Hai-jun, 2011). In referring to the recent also, to be livable is one of the most critical aspects of the 21st century city (Casellati, 1997).

#### **Livable city in relation to compact city, vibrant city, eco city and sustainable city**

A sustainable city can be achieved by applying the compact structure to the city form and attributes such as livability, vibrancy, and eco-friendly (fig: 3.1).

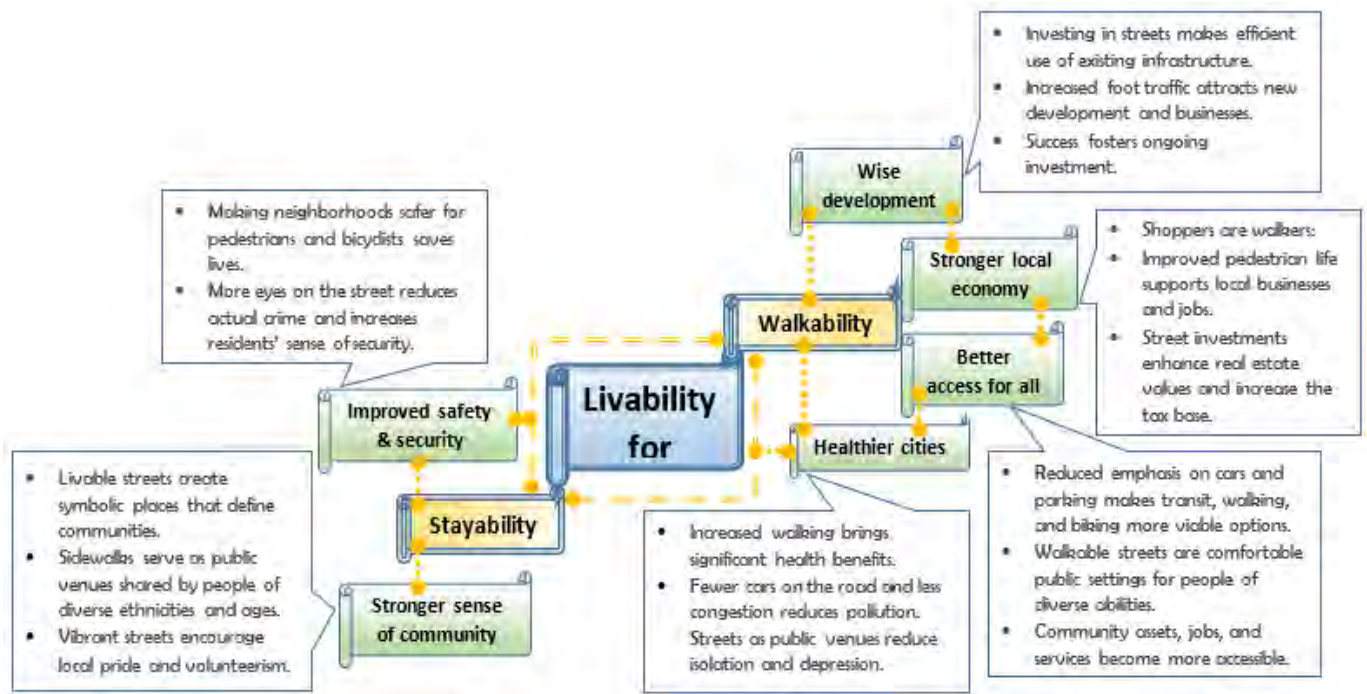


off to the edges, and in most places bicyclists are given no space at all. Specially, in city CBDs, sidewalks are only wide enough to accommodate forward motion (Lusher et al, 2008). They lack infrastructures to permit crossing of street safely, pedestrian support infrastructure such as street lighting, seating; protection against harsh climate and are with extreme levels of noise and air pollution. In such kind of pedestrian environment, motorization is most probably the mode of travel even for very short distances. People are always in rush to indoor spaces to get away of the pedestrian environments, and make their stay in some enclosed and mostly privatized spaces. This all situations robbed open air life in the street (Wright, 2005).

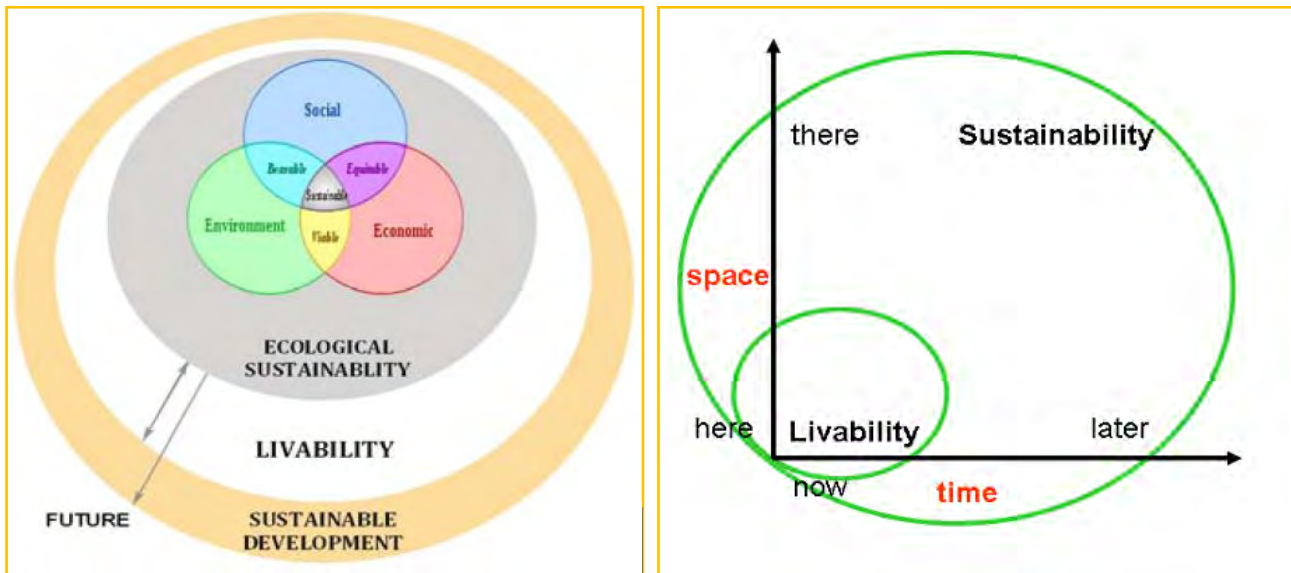
Keeping that in mind, the changes in the attitude toward city life over the past 25 years have supported considerable design, planning, and management activity in transforming urban streets into more safe, secure, and comfortable places. As the result, different new forms of urban streets have emerged, including livable street. Those are: complete street, successful street, democratic street, Social Street, Ideal Street, pedestrianized street, car free street or auto restricted street, etc. and most recently “privatized” indoor commercial streets (Francis, 1988; Appleyard, 1981). Those are street redesign movements that have changed street environment of many Europe cities.

Livability assures presence of healthy open-air recreations and access to outdoor spaces; and such opportunities are basic for activities that are important part of many people’s daily life. They provide “scope for relaxation, refreshment, escape from the everyday life and a chance to form social relationships”, and this is all to create enjoyable life and make people happy (Gehl, 2010). Livability is significant since it is important to people’s wellbeing. Livability is all about quality of life and is defined by Okulicz-Kozaryn (2011) as the “standard of living or general well-being of a population in an area”. Livability is important for businesses as “happy people are better workers” and also important for city governments as good workers and businesses can attract investors. Furthermore, if you live in a livable city where most people are happy, you are likely to become happy as well (Okulicz-Kozaryn, 2011).

Livability provides a reasonable cohesive structure that offer short walking distances, attractive public spaces and a variation of urban functions to invite people to walk and stay. Inviting more people for walking and staying activities is as the result of the welcoming situation to have “direct contact to the people and the surrounding community, fresh air, time outdoors, the free pleasures of life, experiences and information”. Walkability and stayability are indicators of the place’s healthy “Open-air recreations and access to outdoor spaces” (Gehl, 2010). Figure (3.3) summarizes the livability benefits in relation to walkability and stayability.



**Figure 3.3:** Set of benefits related to the walkability and stayability goals of livability. Source: Adapted from NYC Streets Renaissance, 2006. Livable streets: form an auto-centric policy to a city of great streets.



**Figure 3.4:** Livability and sustainability inter-relation, Livability towards sustainability. Source: (a) Mansee BAL, 2008. Planning and Principles of Public Open Spaces. (b) Alireza & Azadeh, 2012. Livable Street in Urban Environment.

Furthermore, livability now is sustainability for the future, as figure (3.4) illustrates. Livability refers to the subset of sustainability goals and impacts which mostly fall in to the social impacts realm of sustainability. It reflects sustainability impacts that directly affect community members, including local economic development and environmental quality, equity, affordability, basic mobility for non-drivers, public safety

and health, and community cohesion. Often, researchers discussed livability principles as ways to support overall sustainability goals (Litman, 2013).

Livability and sustainability may operate on different scales, but both can achieve similar outcomes. Rue and Rooney et al (2011) proposed that both livability and sustainability support economic development and environmentally sustainable travel options, and address social equity issues and human health (Rue & Rooney et al, 2011). In addition, the Project for Public Spaces argued that the creation of more livable places is linked to an increase in environmental benefits (PPS, 2011). In sum, implementing a green streets initiative that adds more street trees can increase the livability by making the street more inviting to pedestrians, and also the sustainability of that street because of the environmental, air quality and storm water runoff benefits provided by the additional tree canopy (NARC, 2012).

### **3.4. Livability of outdoor public spaces**

Open public spaces are all open areas within a community visible to the public for public gathering or assembly. They are all exterior places, linkages and built form elements that are physically and/or visually accessible regardless of ownership. Those are: streets, squares, pedestrian ways, bikeways, bridges, plazas, nodes, transportation hubs, gateways, parks, waterfronts, natural features, view corridors, landmarks and building edges and so on (ADUPCI, 2012).

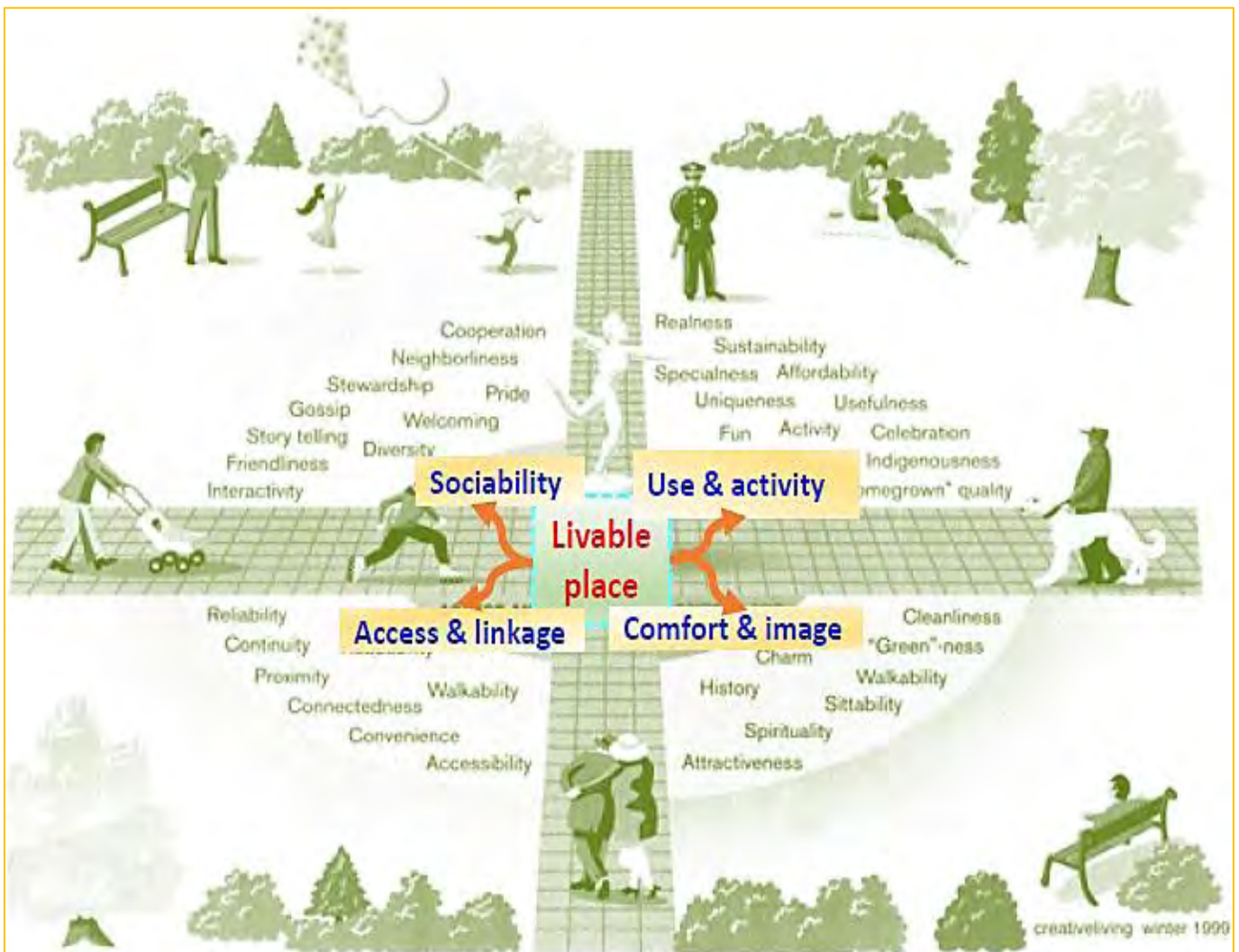
Livable spaces are spaces in which their streets are with acceptable “pedestrian volume, stationary activities and pedestrian diversity” for an enhanced open air life (Gehl 2004 cited in Lusher et al, 2008). Pedestrian volume is pedestrian counts taken at various times of the day and night, on weekends as well as weekdays, and also on summers and winters (Gehl 2004 cited in Lusher et al, 2008). Stationary activities are count of peoples engaging in variety of activities that require an expanded time. Those are activities such as: standing, waiting for transport, sitting on benches, sitting on cafe chairs, sitting on secondary sitting-possibilities, sitting on folding chairs, lying down, children playing and people engaged in commercial, cultural, and physical activities (Gehl 2004 cited in Lusher et al, 2008). Pedestrian diversity is measures of livability by comparing the population distribution of pedestrians by age and gender on a particular street or square against neighborhood or city distributions (Gehl 2004 cited in Lusher et al, 2008). Women, children and the elderly may be more sensitive than others to street qualities such as comfort, safety and accessibility. For this reason, streets that attract a diverse cross-section of the population – including women, children and the elderly are more likely to be livable (Ethan Kent 2008 cited in Lusher et al, 2008).

Different renowned researchers have defined livable open public spaces as great and successful places based on their own space quality indicators on the evaluations of public domain quality. The members of

Project for Public Space (PPS), Jan Gehl, Swati Sahsrabudhe, and Shaftoe are among, which their works are discussed here under.

**Project for public space Inc. (PPS)**

In studying how public spaces are used, PPS has extracted the qualities that define a great place: “comfort and image”, “use and activity”, “access and linkage”, and “sociability”. This means, Livable places are comfortable spaces having unique image. They have linkage- they can lead a user to different directions. They have various uses and are accessible- where people are engaged in activities there. After all, livable spaces are sociable places where people meet each other and take people when they come to visit (PPS 1999 cited in Carmona et al, 2003). PPS has produced a place diagram that incorporates those all variable groups and the various attributes with those variables (fig: 3.5).



**Figure 3.5:** The Place diagram, a tool to evaluate great places. NB. The inner ring represents key attributes, the middle ring -intangible qualities, and the outer ring- measurable data or image. Source: Project for public space Inc., 2005. How to Turn a Place around.

## **Jan Gehl**

Gehl has pointed out 12 quality criteria, concerning the pedestrian landscape in urban public spaces, which are categorized in to three major groups: “protection”, “comfort” and “enjoyment”. As Gehl describes, to define a place as quality pedestrian landscape, checking those qualities step by step is critical. That is; to ensure reasonable “protection” against risk, physical injury, insecurity and unpleasant sensory influences, the negative aspects of climate in particular is first. The next step is to ensure whether spaces offer good “comfort” and invite people to the most important activities such as walking, standing, sitting, seeing, talking, hearing, self-expression and so on. Good architecture and design are part of last group criterion-delight or “enjoyment”. This criterion should be seen as “an umbrella concept” that should include all of the other areas. Nothing must be left out unfulfilled, that is, careful treatment of all the 12 criteria is must to create successful pedestrian landscape (Gehl, 2010).

## **Swati Sahasrabudhe**

Sahasrabudhe (2010) has extracted 4 major indicators of livable urban public open space. Those are: “functional”, “ecological”, “perceptual” and “cultural”. Space functionality is concerned in the multi-uses, and in the influencing situations that affect the usability of a space; accessibility, connectivity, proximity, safety, climate comfort and flexibility. The eco-friendly indicators are like the availability of fresh air, water, land and vegetation; opportunity to experience nature in cities, and awareness of the natural landscape parameters of land, water and vegetation. Attributes under perceptual indicator are: visually pleasing ambience, visual linkages to landscape and built landmarks, real quality, temporal character, humane scale, sociological and psychological security and readable visual identity. Presence of cultural association, sense of place, sense of belonging, opportunity for social interaction, opportunity for participation in the making and maintaining the space and readable vocabulary of the spaces are under the cultural indicator (Sahasrabudhe, 2010).

## **Henry Shaftoe and others**

Shaftoe (2008) has made classifications on aspects of successful place as: “geographical”, “physical”, “behavioral and psychological”, and “managerial aspects” (Shaftoe, 2008). Adapting those classifications, Basak (2011) has developed attributes under those aspects from various researchers that study within the context. The geographical aspect responds the question of “where?” deals with the location of the place, its accessibility and the catchment area. Physical aspect covers the form of the square, its size, and visual complexity (visual and aesthetic elements, from seating, public art, landscaping to subspaces, shelter and protection – from sun and cold, lighting, human scale etc.). Behavioral and psychological aspects deal with the users’ needs that are to be satisfied in a public space. Managerial aspects include strategies and programs in order to provide and sustain the success of the place focusing mainly on diversification of uses and with respect to the diversity of users from different cultures, different genders

and age groups; and deals with eating and drinking opportunities, vending, and maintenance issues (Shaftoe, 2008; Whyte, 2009; Francis, 2003 cited in Basak, 2011).

### **3.4.1. Livable Square and Livable Street**

Square and street are the most important structural components of a city. Streets make the unification visible by tying one square to another square and further one area to another area (Davies, 2010; Cullity, 2010). Squares are open areas found at the meeting or convergence of two or more streets, whereas streets are connectivity corridors of squares (Transportation for a Livable City, 2002).

Squares and streets have functional roles and challenges that vary according to cultural contexts (Sivam & Karippanan, 2013). For example if we take the Asian cases in comparative to the Western cases, the physical quality of Asian streets is low. Streets are rarely used for public activities in western cities, but in Asian cities; streets are used for religious events, socializing, exchanges of ideas, public shows, play areas for children, meeting places for adults and shelter for homeless people. The relationship between streets and economic activities is weak in western cities; they are mostly used as an access to retails and commercial activities. Whereas in Asian cities, streets are used as an access to formal and informal shopping experiences, which can attract people from various income groups, there are kiosks, movable shops and vendors. Western city streets are with high environmental quality, because people generally follow civic rules and laws with selling of goods. But, streets are with low environmental quality in Asian cities, because there are encroachments on public places by retail shops, parking spaces, kiosks and movable shops that make sanitation systems comparatively crowded (Sivam & Karippanan, 2013; Mateo-Babiano & Ieda, 2005).

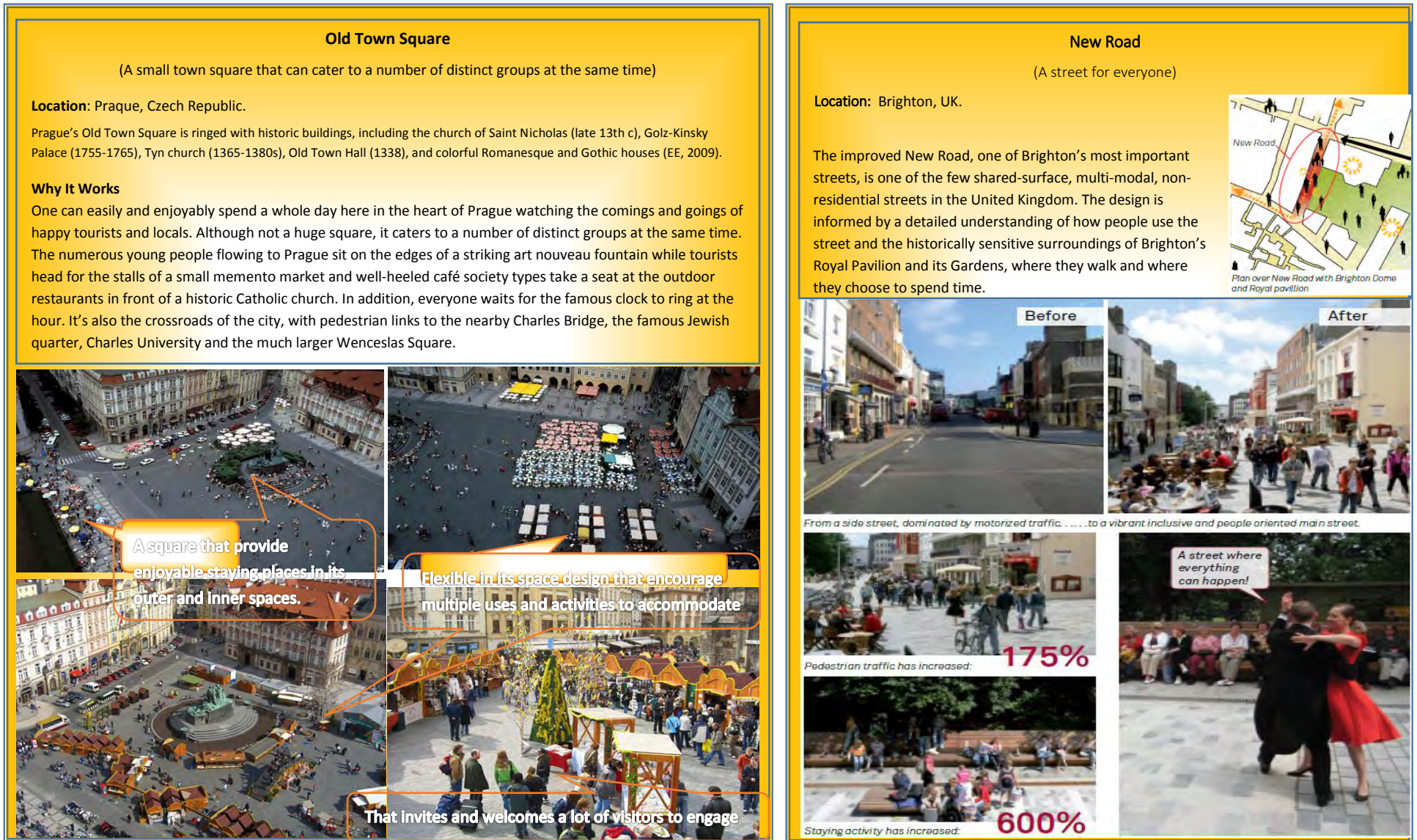
Western city streets provide good access and mobility without any conflict between vehicular and pedestrian movement because of the very good quality in transportation aspects, vehicular movement, pedestrian movement, pedestrian crossings, formal parking, and transportation management and regulation. Whereas, in Asian city streets, not only a conflict between pedestrian and vehicular but also with parking because of the attitude of the government and the people reflect what is believed culturally normal and accepted. Role of sidewalks also vary from culture to culture. In Western cities, sidewalks are used only as footpaths for pedestrians, where as in Asian, footpaths are used by pedestrians, motorcyclists, for parking as well as for informal markets. A contrast to the monoculture of the western, Asian streets are flexible and adaptable to various activities without any change in physical attributes of the street. Sidewalk activities changes over the course of the day, for example, in the morning fruit and vegetable vendors and people sitting and reading newspapers is a common sight, where as in the evening and night, the sidewalks are occupied by fast food vendors (Sivam & Karippanan, 2013; Mateo-Babiano & Ieda, 2005). Western cities practice horizontal segregation of spaces prescribing a one-space

one-function design of spaces (this-Evensen, 1992), whereas in Asian; vertical segregation (multi-functional dimension wherein each function is segregated by time) design of spaces is practiced (Hall, 1990).

In the past, squares and streets were “small universes” where the character of the district and of the town as a whole was presented to the visitor in condensed form as they are the “activity focuses” of urban areas (Lynch, 1981). They used to represent a section of life (Norberg-Schulz, 1971). For many generations they have been providing urban communities with public open space right outside homes. But it is such common practice in modern city to regard the square as a roundabout to serve as traffic island and to regard the street as a road for motor vehicles as traffic channel. That is, their functions as a place have been quite overlooked. They are facilitating movements rather than facilitating communication and interaction between people and groups (Moughtin, 2003). They are primarily designed by the engineer to serve so many car units per hour, which facilitates the efficient movement of overflow (Moughtin, 2003). So they have become places of danger for citizens or so unattractive that forces people to stay within the privacy of their homes and move about in the relative sanctuary of the private motor car (Alexander et al, 1977).

Taking that situation in to consideration, livability concept is introduced through the changes in attitude towards city life to get the robed life back to the squares and streets. Livability let squares and streets to become important setting of city buildings, principal meeting and at the same time urban traffic junction and channels. They become places of great ceremonial occasions, spaces of an entertainment and spaces for cafes, restaurants, shopping and markets and green lots (Gehl, 1987). They are easily accessible and provide a variety of nested or interconnected spaces. They have a broad range of public amenities. They provide good access to sunshine, shade from sun, shelter from wind and rain, and generous greenery to rest the mind. They are flexible spaces that can be used for a wide variety of activities such as, reading, dancing, listening to music, people-watching, exercise and even informal street vending and farmer’s markets, and are complemented by sympathetic commercial uses e.g. cafes (Basak, 2011; Lusher et al, 2008). They provide “quality environmental conditions that support independence and freedom of choice; provide orientation, safety and comfort; encourage a sense of community yet provide sufficient privacy; foster a sense of neighborly ownership and responsibility; avoid disturbing nuisances; and enhance the economic value of adjacent property” (Metro, 1997). Livable squares and streets are places where more people want to walk and stay (Sitte, 1965).

### 3.5. International case studies on livable square and street



**Figure 3.6:** International case studies (a) The Old town square in Prague, Czech Republic. Source: <http://www.pps.inc>. accessed in 11/5/2013. (b) The New road in Brighton, UK. Source: Gehl Architects, 2010. Our cities ourselves: 10 principles for transport in urban life.

### **3.6. Theoretical framework**

There are number of studies dealing with the success of urban places; some have a physical approach (Cullen, 1961), and some others have a psychological approach (Alexander, 1977; Lynch, 1960). On the other hand, there are also studies such as PPS, 1983; Shofte, 2008; Gehl, 2010; Sahasrabudhe, 2011 and so on that provide an approach which is a combination of both physical and psychological approaches. In this section the concepts, variables and attributes which are introduced in various studies within the context of successful open public spaces are comprehensively categorized in to four basic livability variable groups. Those are: comfort & image, use & activity, access & linkage and sociability; regarding also the classification made by Project for Public Spaces (PPS, 2005). The data briefed in this section is the basis for the analyses, interpretations and discussions of the study.

#### **3.6.1. Comfort and image**

Comfort is about the feeling of physical relaxation and psychological satisfaction (Francis, 2009). The physical relaxation is due to the design of a place with proper physical setting and management strategies (Basak, 2011). It requires the availabilities of well designed and maintained physical elements such as seating<sup>13</sup>, shade trees, food and magazine kiosks, bulletin boards... in a right place (Francis, 2009). Mind relaxation or psychological satisfaction is directly related with “psychological comfort” and it is about being in a relaxing environment. It focuses on the safety issues<sup>14</sup>, on the size or scale of a space<sup>15</sup> and proper use of natural elements (Carr et al, 1992). Image is regarding the identity and the “ambiance of a space” (Carmona et al, 2003). It is a combination of “what a place is actually like” (signifying the identity of a place or its physical form and setting) and “how a place is perceived” (Montgomery, 1998). In other words, it is a sense of place considered as the character or atmosphere of a place and the connection felt by people with that place.

Comfort and image are indicators of space livability whether local and cultural identity of the space is reflected; good seating, lighting, trees and other amenities are provided having a clear signage with local

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<sup>13</sup> Seating can be primary/formal like chairs and benches or secondary/informal like ledges, steps and bollards.

Informal seating can provide additional seating in peak periods and the choice to sit where we want (Katie, 2006).

<sup>14</sup> Both ‘perceived’ and ‘actual’ safety issues. That is, even locations that are free from crime may still feel unpleasant or dangerous to users, mainly due to the absence of pleasant microclimate conditions and management issues (Katie, 2006).

<sup>15</sup> For example in case of a square; where ever the square is, its dimensions represent the character of its space whether it is friendly, cozy, intimate, political, unfriendly etc. That is, “very large spaces” may feel unfriendly, and “too small spaces” on the other side may feel claustrophobic (Shaftoe, 2008).

information (NYCSR, 2006). Perceptions included under those variables are: safeness, greenness, cleanness, attractiveness, historicalness, walkability, sittability and stayability (PPS, 1983; Shofte, 2008; Gehl, 2010 & Sahasrabudhe, 2010). In relation to those perceptions, PPS has developed questions to be answered in an investigation of a place's comfort and image. Those are: *Does the place make a good first impression? Are there more women than men? Are there enough places to sit? Are seats conveniently located? Do people have a choice of places to sit, either in the sun or shade? Are spaces clean and free of litter? Who is responsible for maintenance? What do they do? When? Does the area feel safe? Is there a security presence? If so, what do these people do? When are they on duty? Are people taking pictures? Are there many photo opportunities available? And do vehicles dominate pedestrian use of the space, or prevent them from easily getting to the space?*

(<http://www.pps.org/reference/grplacefeat/> retrieved in 08/11/2012).




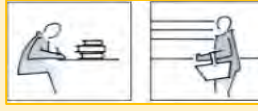

### **3.6.2. Use and activity**

Uses are to mean the purposes of a space or a space usability, and it is must to ask a question like 'who are the users?' when we talk about space uses. Lars Gemzøe in his book, "People and public spaces" (2008), has categorized users of open public spaces in to five user groups (Gemzøe, 2008). One, "The everyday users", peoples that lives and works in the area of focus. Two, "The passers-by" or the pedestrians in transit; they are peoples in passing through the area. Three, "the recreational visitors"; which are in use of the area in relation to recreation and pleasure. Four, "The visitors or customers" are peoples that visit the functions in the area. There are also "visitors to planned activity", peoples which are in visit of the area in relation to social events (Gemzøe, 2008). Table (3.1) shows the graphical presentations of the five user groups.

Public space activities are also grouped by Jan Gehl into three major activity types: "necessary activities", "optional activities" and "social activities"; based on their physical quality requirements, time spans, their obligatory situations, user groups and the life they produce in the space (Gehl, 2010). Necessary activities are the most obligatory activities regardless of the physical quality. They include daily activities such as the daily comings and goings, and the daily transit. They produce negligible life as the user groups or actors of such activity types are in rush which wish to perform their activities as soon as possible. Optional activities are hobby activities and are very much dependent on the place's physical quality. Activities such as, daily recreational, recreational and planned are included under this category. Such activities are the most life enhancing activities. Because, user groups of such activities wish to enjoy their activities for an extended time. Social activities are also the other categories of activities that can be produced spontaneously from the existence of those two- the necessary and optional activities. Social activities include children on play, greetings and conversations, communal activities of various




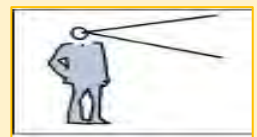
kinds. The most widespread social activity is passive contacts, that is, simply seeing and hearing of other people (Gehl, 2010). Figure (3.7) shows the interrelationships of the physical environment to those three major types of activities.

**Table 3.1:** User groups of public spaces

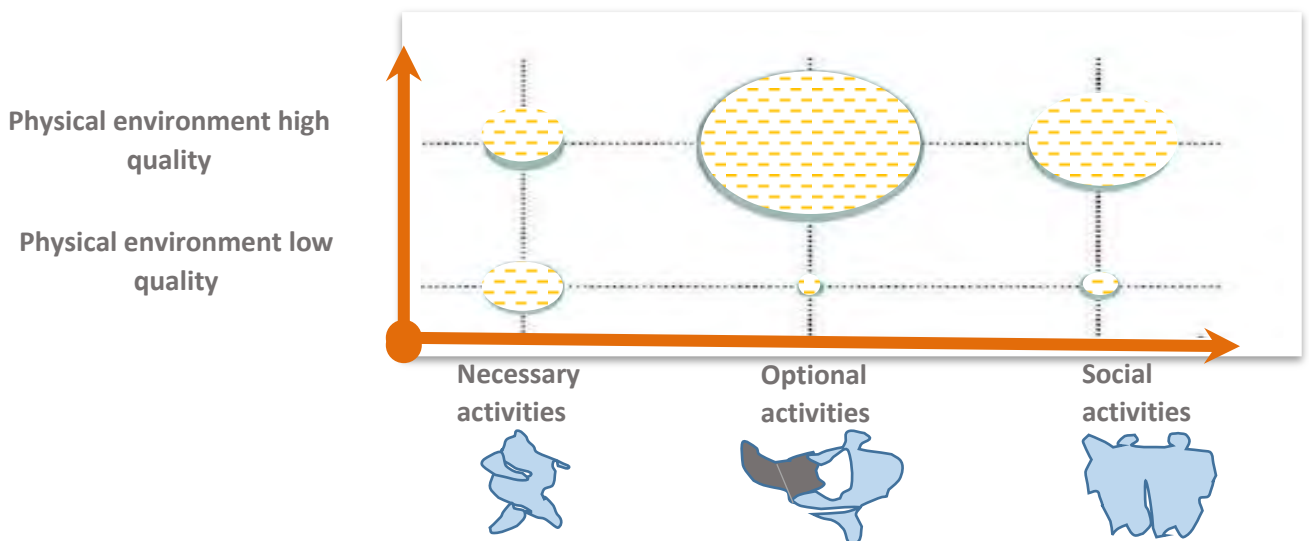
Which user groups can be expected to use the public space?				
<b>1. The everyday users</b>	<b>2. The passers-by</b>	<b>3. The recreational visitors</b>	<b>4. The visitors/ customers</b>	<b>5. The visitors to Planned activity</b>
				

Source: Adapted from Gemzøe, L., 2008. People and Public Space.

**Table 3.2:** Expected types of activities in the public space

What kind of activities can be expected in the public spaces?				
<b>1. Daily Comings &amp; goings</b>	<b>2. Daily transit activity</b>	<b>3. Daily recreational activity</b>	<b>4. Recreational activity</b>	<b>5. Planned activity</b>
				

Source: Adapted from Gemzøe, L., 2008. People and Public Space.



**Figure 3.7:** The outdoor quality and outdoor activity graphical relationships. Source: Adapted from Gehl, J., 2010. Cities for people.

Presence of multiple uses and diversity of activities are indicators of space livability. Livable spaces have an accommodation of pedestrians<sup>16</sup> and friendly activities on their sidewalks and edges; which are reasons to linger; their ground floors are mix of restaurants, stores and services; and are welcoming to passers-by (NYCSR, 2006). It is about having a balanced mix of different user groups and activities and this is tied with the presence of people who can stay for a long time (Francis, 2009). Perceptions included under this variable group are: usability, affordability, friendly activity, fun/recreational, diversity and celebrity (PPS, 1983; Shofte, 2008; Gehl, 2010 & Sahasrabudhe, 2010). PPS has point out some questions that should be considered in evaluating place's use and activity. Those are: *Are people using the space or is it empty? Is it used by people of different ages? Are people in groups? How many different types of activities are occurring – people walking, eating, playing baseball, chess, relaxing, reading? Which parts of the space are used and which are not? Are there choices of things to do? And Is there a management presence, or can you identify anyone who is in charge of the space?* (<http://www.pps.org/reference/grplacefeat/> retrieved in 08/11/2012).

### **3.6.3. Access and linkage**

Access is an opportunity and means of entering and approaching a place. Access can be categorized in to social, visual and physical access<sup>17</sup>. Access can be defined as actual and perceived access. Actual access, is an open access that can be achieved through the physical and visual access whereas the perceived access is for the psychological moods which can be affected by the feelings related to the space walkway comfort-ability and safety (Francis, 2009). Accessibility is equity of access to all activities, people and places within the urban center. It considers a reliable and convenient access between places on foot and places by public transportation modes for the most vulnerable groups within the population (Francis, 2009). Linkage expresses the connectedness of a place to the ways that take to different directions. It assures the possibilities of logical navigation throughout the urban center, supported by way finding mechanisms such as signage, landmarks and a legible street network (Katie, 2006).

Access and linkage are the livability variables about the ease to cross the street, the access to the pedestrians and comfortable activities on sidewalks and the provision of multiple transportation options (NYCSR, 2006). Accessibility, continuity/proximity, readability/legibility, walkability and suitability are perceptions included under the access and linkage (PPS, 1983; Shofte, 2008; Gehl, 2010 & Sahasrabudhe, 2010). According to the PPS, there are some questions which should be kept in mind to

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<sup>16</sup> Users of both gender groups, different age and income groups that have different social backgrounds.

<sup>17</sup> Social access is the openness of a place to different class of users. Visual access is having a clear view. Physical access is an access due to the physical connection.

evaluate the access and linkage of a place. Those are: *Can you see the space from a distance? Is its interior visible from the outside? Is there a good connection between the space and the adjacent buildings, or is it surrounded by blank walls? Do occupants of adjacent buildings use the space? Can people easily walk to the place? For example, do they have to circulate between moving cars to get to the place? Do sidewalks lead to and from the adjacent areas? Does the space function for people with special needs? Do the roads and paths through the space take people where they actually want to go? Can people use a variety of transportation options – bus train, car, bicycle, etc. – to reach the place? Are transit stops conveniently located next to destinations such as libraries, post offices, park entrances, etc.?* <http://www.pps.org/reference/grplacefeat/> retrieved in 08/11/2012.

#### **3.6.4. Sociability**

Space sociability is the ability of place to enforce social interaction among the users. A sociable place is one where people want to go to observe the passing scene, meet friends, and interact with a wide range of people that are different from themselves. Because it sends friendly and welcoming signals with the promise of social interaction by stimulating both passive (such as conversation) and active (such as playing a game) engagements (Gehl, 2010). This requires a design of space which assures that human activity and socialization is not hindered by means such as excessive noise, poor seating design or cluttered footpaths. Also, their primary, secondary as well as landscape seating are arranged in talk-scape and community-scape seating arrangements to enhance sociability (Katie, 2006).

Sociability is an indicator of people's presence; whether inclined, seating, walking or playing together. It is about presence of children and seniors and the sense of pride and ownership the people or the user had (NYCSR, 2006). It is also about the welcoming, friendly, interactivity, pride and diversity perceptions (PPS, 1983; Shofte, 2008; Gehl, 2010 & Sahasrabudhe, 2010). It is also possible to have the following questions answered in order to talk about the place's sociability. Those are: *Is this a place where you would choose to meet your friends? Are others meeting friends here or running into them? Are people in groups? Are they talking with one another? Do people seem to know each other by face or by name? Do people bring their friends and relatives to see the place or do they point to one of its features with pride? Are people smiling? Do people make eye contact with each other? Do people use the place regularly and by choice? Is there a mix of ages and ethnic groups that generally reflect the community at large? Do people tend to pick up litter when they see it?* <http://www.pps.org/reference/grplacefeat/> retrieved in 08/11/2012.

### **3.7. Recent approaches towards livable squares and streets**

Gehl has pointed out design approaches in his book “Cities for all” (2010); approaches that are applied in making cities such as Copenhagen more lively, healthy and sustainable. Among the approaches, those which are directly related to outdoor livability of public spaces are briefly discussed here under. Those are: landscaping at eye level, ground floor architecture and introducing traffic calming tools (Gehl, 2010).

#### **3.7.1. Landscaping at eye level**

Landscaping at eye level is to mean working with human scale or small scale, in a scale of detail not in an overview scale. In here, it is not the large lines of the city (city scale) or spectacular placement of buildings (site scale) that are interesting. It is rather the quality of the human landscape as perceived by people walking and staying in the city that matters. In other words, it is working to provide good city spaces for pedestrians that respect the possibilities and limitations dedicated by the human body. It is working with architecture of 400m walking length, possible with in 5minutes at 5 km/h speed or for expanded minutes at 3m/h speed, a design which its detail is possible to be perceived by people walking nature. Creating human scale subspaces with in a space, introducing human scale site furniture, public arts, greeneries, pavements, building edge details are approaches of landscaping at eye level.

In other words, landscaping at eye level means working in consideration of the possibilities and limitations dedicated by the human body due to the sensory feelings. Those are about the senses at distance and the senses at close or at near distances. One can have seeing, hearing and smelling senses at distance. Whereas at close it is possible to have feeling and testing which are related to skin touches such as feeling of cold, heat and pain as well as texture and shape. We have distance limits at which we are able to visualize things in various levels of perception which is called social field of vision. The limit of this field is 100 meters- the point at which seeing people at motion is possible. At distance of 25m is also another field of limit at which we can start decoding emotions and facial expressions and as we go more close to 7m, all of the senses can be used, all details experienced and the most intense feelings exchanged. The social field of vision is an important concept in design where the focus is on watching people like an enhancing of space livability.

In relation to social field of vision, we have horizontal field of vision- a vertical distance field of limit at which we can perceive vertical structures. That means we have limits of visualizing building stories and activities taken place. For example, when we are walking along building facades, only the ground floors can offer us interest and intensity. We can only experience with difficulty events that take place higher up in buildings. The higher up, the more difficult it is to see. We have to move further and further back to look up, distances become greater and greater, and what we see and experience diminishes. Therefore, the details of the building facades in the lower floors are what matters to the street visual aesthetic look.

Edward (1990) has extracted four distinct communication distances through the changes we encounter in voice levels. Those are, the intimate (0-45cm), personal (45 cm-1.20 m), social (1.20-3.70 m) and public distances (> 3.70 m) (Hall, 1990). This can be also based on “the principle of arm's length” distance or at the very least “don't touch distance” which can be seen at peoples seating in bench, in parks, in waiting for someone or something or in a row waiting for the bus. Wherever physically possible the individual seeks to maintain the narrow but vital distance that keeps the situation secure and comfortable.

### **3.7.2. Ground floor Architecture**

Ground floors are the lower floors of building blocks that frame and face to the squares or streets, and ground floor architecture is an art of designing and detailing the ground floor uses and activities. As stated in the above, when we are walking along building facades, only the ground floors can offer us interest and intensity. So, mixing of uses in the three dimensions of the ground floor as shown in figure (3.8) is important for the attractiveness and functionality of streets, squares and further, cities.

Ground floors are “the edge where building and city meet”. They are places where activities like, “chatting by, entering and leaving, walking, standing alongside, taking a break by, standing in doorways, shopping next to, interacting with, looking at displays with, sitting on, sitting next to, looking in and out of” are held in public (Gehl, 2010). The edges “define space” by limiting the “visual field” and are like walls of our home that “support activities and communicate a sense of wellbeing” and offer feeling of “organization, comfort and security”. Ground floors are zones of exchanges, stays and experiences.

The edges are as “exchange zones” where activities of indoor and outdoor meet for different interactions. They are “staying zones” that give “opportunities for seating and standing” in comfortable and safe situation. In here the “microclimate is best”, our backs are protected that “no unpleasant surprises from behind” and we have “full view of everything” that happens in the space. The edges are also “experience zones”. They are places of visual experiences: appreciation of all the details of the facades and display windows, the seating, standing and walking activities, and other types of experiences.

Ground floors are experience of two livability extremes. Soft edge is one extreme, where many seeing and touching opportunities are provided by the presence of “shops lined up, transparent facades, large windows, many openings and goods on display” to slow down or take pauses. Soft edges have a significant influence on activity patterns and the attractiveness of city space. As activities can supplement each other, the wealth of experience increases, walking becomes safer and distances seem shorter. There are soft edges’ principles developed by Gehl (2010) that slow down speedy movements to 5 km/h - 3m/h (a walking speed possible to have much more experiences of the place). Those are narrow units-many doors instead of dead or long closed, active ground floors instead of passive, mixed functionality instead of uniform, transparent or open ground floors instead of closed and vertical detailing of ground

floors instead of horizontal (Gehl 2006 cited in Gehl, 2010). The other extreme is the street with a "hard edge", which is a "diametrical contrast". In here the ground floors are closed and the pedestrian walks past long sections of facades of black glass, concrete or masonry. There are few or no doors and there is little to experience or even necessity is a reason to choose this particular street. Streets with such edges signal "move on" by exposing pedestrians to numerous reasons of give up and go home.



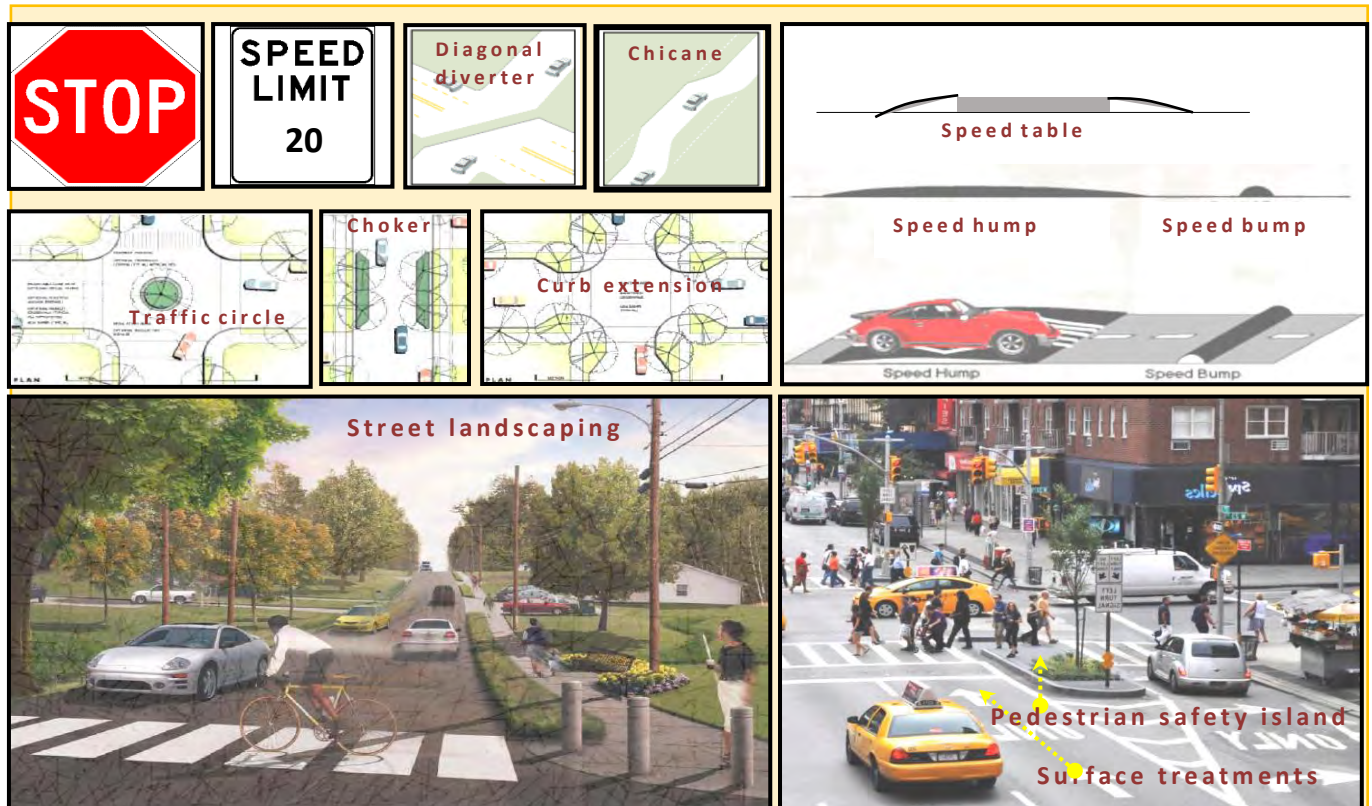
**Figure 3.8:** Ground floor, a media to mix people and activities, buildings and spaces. Source: Gehl Architects, 2010. Our cities ourselves: 10 principles for transport in urban life.

### 3.7.3. Introducing traffic calming mechanisms

Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users (Lockwood, 1997). The main objective of traffic calming is to reduce the speed and volume of traffic to acceptable levels (acceptable for the functional class of a street and the nature of bordering activity (Appleyard, 1981). It is intended to slow speeding vehicles down, reduce collision frequency, and enhance the safety

and perception of safety for pedestrians (City of Saskatoon, 2013). In other word, it is a means to traffic safety and active street life, which is one requirement of livability.

The Institute of Transportation Engineers (ITE) subcommittee categorizes the traffic calming physical measures in to: traffic control devices, street landscaping and route modification (fig: 3.9). Traffic control devices are traffic signs and signals that give an advance notice to entering pedestrian priority. They are mostly the STOP and speed limit signs and signals, rumble strips and other surface treatments such as painting lines, colors and patterns (Lockwood, 1997; City of Saskatoon, 2013). Street landscaping includes street trees, street lighting, street furniture, gateway monuments and other streetscape elements (Lockwood, 1997; PPS, 1998; Caltrans, 2005). Those landscape treatments reduce accident rates both in terms of severity and frequency and increases multi-modal user perception of accessibility and sidewalk activities (Naderi, 2001). Route modification measures are measures taken to modify driver routing options and pedestrian circulations. Those are, such as diverters or pedestrian islands, street closures (reducing the number of lanes and lane widths), roundabouts or traffic circles, eliminating or adding street parking, raised median islands or center islands, curb bulb-outs or sidewalk extensions, speed humps and tables, and turn restrictions( like chicanes) (Transport for Missouri, 2011; Lockwood, 1997; PPS, 1998; Caltrans, 2005).



**Figure 3.9:** Traffic calming tools and Calmed streets in New York and Missouri. Source: pictures collected from Robert, 2003. Livable Streets Initiative: Pedestrians are the Focus; NYCDOT, 2012. Safe streets for seniors; Transport for Missouri, 2011. Missouri livable street design guide lines.

## Conclusion

Livability feature is one of the recent movements' focuses on street design in order to get back the social context in to consideration, a life context which is lost in modern cities image. A Street designed with respect to the social context enhances the street life by sending welcoming signals to diversity of peoples and activates; in order to bring the people to public spaces. Livability is an important concept, because it enhances the economical, socio-cultural, political and environmental aspects of a city; as it is a movement towards sustainability. Livability has four spatial variable groups; those are: comfort & image, use & activity, access & linkage, and sociability. There are recently used design approaches of achieving livability in street and square design in developed cities. Among them, the landscaping at eye level, the ground floor architecture and traffic calming mechanisms are the most street life influencing approaches. Researches on contextualization of those livability variables and design approaches to apply and practice on the developing cities are still in progress. This study contributes in filling this gap. That is, it will contextualize the predefined livability variables and approaches in the eye of the inhabitants; and will generate the contextual design attributes for the design of the *Romant* district.

# CHAPTER FOUR

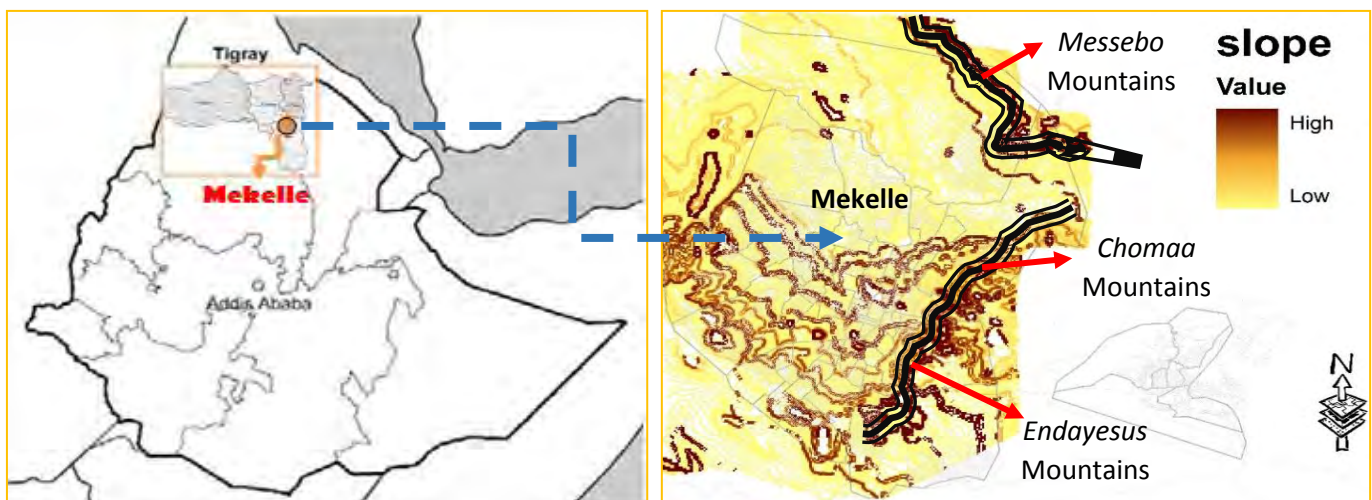
## 4. CONTEXTUAL REVIEW

### 4.1. Tigray overview

Tigray is the Ethiopian Northernmost region, Mekelle being the capital city (fig: 4.1). It borders Ethiopia's Afar region to the east, the Amahara region to the south, and the countries of Sudan and Eritrea to the west and the north respectively. The surface area of the region is 53,638km<sup>2</sup>. The topography of the region is a combination of highland plateau, mountains and lowland plains. The elevation ranges from 500m a.s.l in the west (Humera) to nearly 4000m a.s.l in the south (Tsibet Mountains). As elsewhere in Ethiopia, the climate varies somewhat in accordance with altitude, the lowland areas of Humera being notably warmer than the highlands of Mekelle. The population of the region was somewhat 4.5 million according to the last census carried out in 2007-2008. About 20% of the population is urban and 80% rural. The ethnic composition, which is about 95%, is Tigrayan. Among the tourist attractions of the Tigray region, the rock hewn churches, Axum stales, cultural festivities (such as 'Ashenda', 'Karsa'), and cultural foods (such as 'Tihlo', 'Ambasha') are some (MCI, 2012).

### 4.2. Introducing Mekelle

Mekelle is the capital city of national and regional state of Tigray with an administrative, trade, manufacturing, service and cultural center functional roles (Ykum, 2011; MCCDPPP, 2011). Mekelle is found 783km to the north of Addis Ababa (fig: 4.1); and is situated on flat plate surrounded by *Endayesus* and *Choma* mountains to the east side and by *Messebo* Mountains to the north side (Aklilu, 2008) (fig: 4.2). The eastern side- *Choma* Mountain is the highest peak of the city (MCPppo, 2006).



**Figure 4.1:** Location map of Mekelle city within Tigray region, Ethiopia. Source: Adapted from Rumi, O., 2009.

**Figure 4.2:** Topography of the city and the surrounding mountains. Source: Produced by the author.

Mekelle is the largest city in the northern Ethiopia and the six largest in Ethiopia (Cannon, 2009). According to the administration setup of 2004, the city of Mekelle includes towns of *Quiha*, *Aynalem* and several other villages: *Lachi*, *Adikenfero*, *Feleg Daero*, *Endamariam Dehan*, *Adi Daero*, *Adi Kolomey*, *Serawat*, *Adi Wolel*, *Adi Ha* and *May Alem* (Castro, Maoulidi & MCI, 2009). The city had an estimated area of 28km<sup>2</sup>, which gives a density of 6,923.4 people per 1km<sup>2</sup>. But, according to the 10 year city development, the city is expanding to 25km radius which gives an area of around 1965km<sup>2</sup>. The annual average population growth ranges between 5-7%. Currently the city has population size of around 300,000. Of the 1994 population housing census, the largest ethnic group of the city was Tigrayan (96.4%), with the minor of Amhara (1.6%), Oromo (0.15%) nationalities and other ethnic groups in combination comprised (1.85%). Majority of the city population, which is the 91.3%, was Orthodox Christian follower, 7.7% was Muslim and the remaining 5% was Protestant, Catholic and other religion follower (Aklilu, 2008). *Semen* sub city has the highest population density followed by *hadinet* and *kedamay weyane*.

As it is stated in the 10 year strategic plan of Mekelle, taking legend and senior citizens as reference, the naming of the city get back to the time of Atse Seyfu Ared (1352-1379). It was at this time that, the monk Aba Absdi from Gerealta came to the area of early settlement *Enda medhanialem*. There was a competition among the religious students of this church in searching of their daily food from the residents. Then, it was to avoid this competition that Aba Absadi divided/parceled the settlements to each of them. Since that time using the word '*mekelle*' which literally mean 'he divided' became regular in daily communication, then after an official name of the city. Before the name Mekelle, the city used to be called *Meam ambesa* (land for lion inhabitation) due to its wealth of wild life and *Endameskel* during the coming of true cross locally known '*Gmade Meskel*' (MCPppo, 2006; G/Giorgis & Mruts, 2012).

Geographically, the city is found in 39° 28' east and 13° 29' of north with an elevation of 2084m a.s.l (Aklilu, 2008). The city has plain topography with an east west gentle sloping. As of the city's environmental study (2006), the land form of the city is categorized in to four slope types: flat to gentle sloping, gentle sloping to rolling, sloping to moderate steep and steep to a very steep (MCPppo, 2006).

Mekelle is traditionally divided in to two agro climatic zones; lowland (Mekelle), and highland (*Endayesus* and around Mekelle university) (Matiwos Consult, 2008). In general, the city has a dry *weyna dega* agro climatic zone, which is characterized by summer rain season with erratic rainfall distribution, temperature fluctuation and dry season easterlies speedy wind. The city has two rainy seasons, the summer and spring, with an average annual rainfall of 618mm. the rainy season is characterized by unreliable and unevenly distributed. Mekelle experiences warm climatic condition with average annual temperature range of (11.11-24.1) °c and with annual average wind speed range of 3-5m/sec. The prevailing wind

direction during the dry season (Sep-Jun) is angled (11-163)<sup>0</sup> in the east to west direction and during the summer season on the contrary, it blows from west to east angled (210-250)<sup>0</sup> (MCP PPO, 2006).

### **4.3. The issue of livability in the city CBD**

Why is livability an issue? Livability issue of the city is previously stated by many researchers in different cases. Among them, the cases which are contextual to the issue of stayability and walkability are reviewed here under.

#### **4.3.1. City formation and spatial growth**

As the spatial growth trend of the city shows (fig: 4.3), the city has expanded dynamically towards the west, south-west and north-west. That is, by engulfing many small villages and towns which are found within (5-25)km surrounding the palace of Atse Yohanes IV (MCP PPO, 2006). Though, the city is still centralized that the old town of the city is still the only central business district (CBD) of the city. The centrality featured in Mekelle is the totality found in the nodes, corridors that connect those nodes and the surrounding areas which are under influence.

The CBD is almost situated in the sub city called *Kedamay weyane*<sup>18</sup>-locally called '*ketema*' (fig: 4.4). This is the core of the city where one or more urban activities are held with a city wide effect and service charge. This is relatively the most accessible place to and from any sub cities as taxi stations to all corners of the city found in here. Rumi (2009) used to describe this district as "a convenient place to be anywhere" in the city (Rumi, 2009). In other words, since anyone in the CBD can easily be available in any other neighborhood with in short time, being in the CBD is just like being in anywhere.

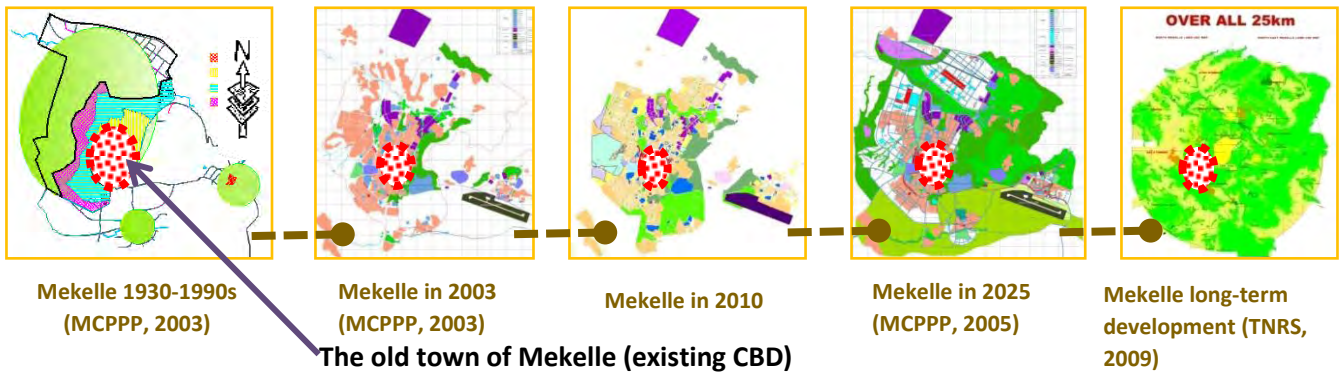
As of the existing situation of Mekelle, this urban center has "fairly allowable mix of functions and intensity of uses". It delivers its uses to the city all over the days of each year. It stays relatively active at almost the 16 hours of a day. Though those all, the CBD is facing challenges like traffic congestions, infrastructure competition among users, customer congestions in hospitality facilities- it "lacks hospitality facilities to meet expected future demand" and so on (MCP PPO, 2006; Cannon, 2009).

To overcome those challenges of the CBD, the city development has proposed new center creations to be incorporated as part of the LDP structure. In addition, setting the building code definition and supporting the plan of the existing center with regulations and detail implementation manuals are

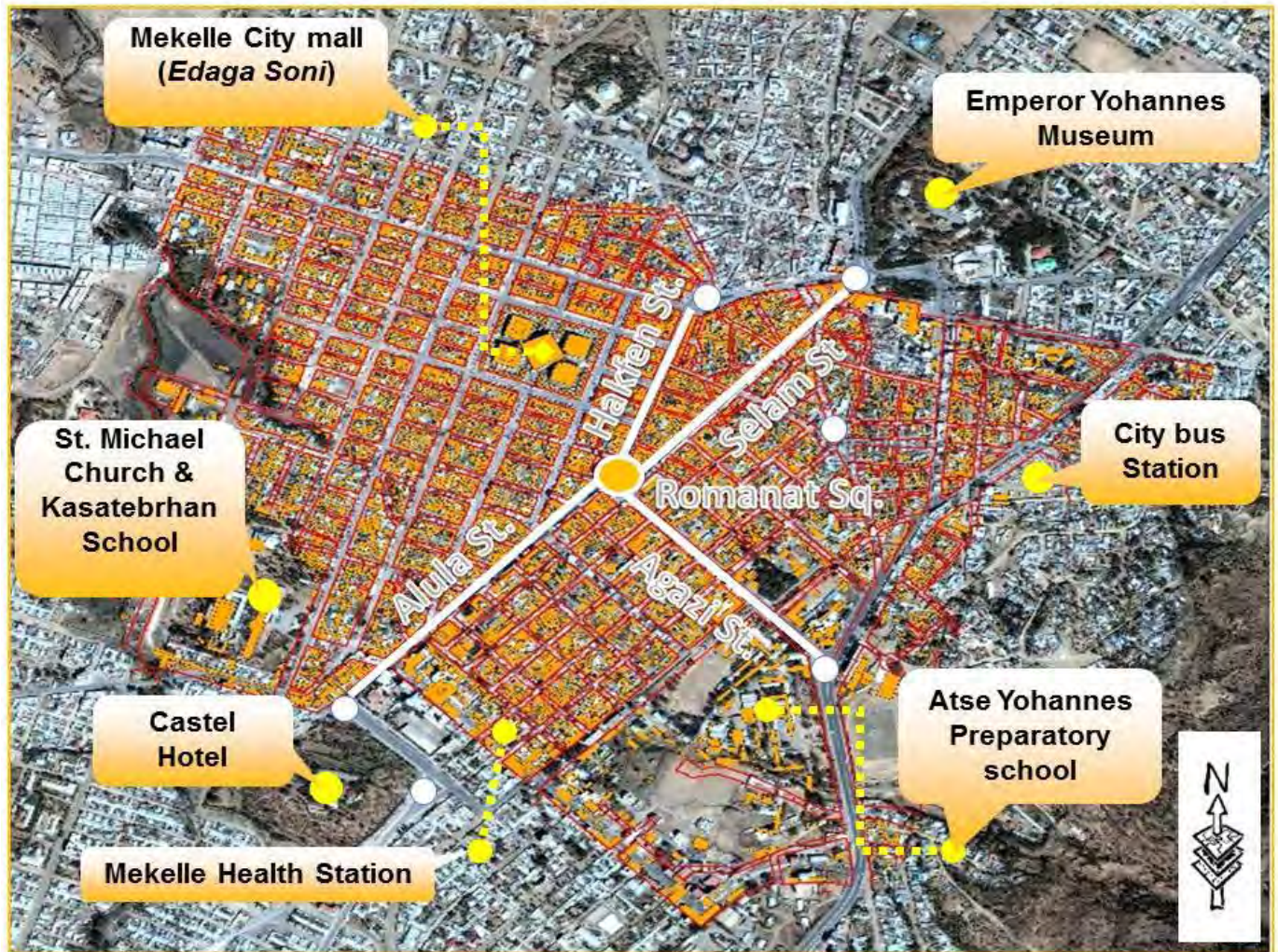
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<sup>18</sup> The naming of this sub city was after the straggle of *Kedamay weyane* in 1940. This was when 270 Tigrayans were killed and wounded by airplane attack while they were in the open market of the sub city-'*Edaga soni*'. This market was developed by Raesi Mengesha in 1973. it was a large and open weekly market area until the construction of the '*deffeo*' houses (houses constructed in memory of the *Kedamay weyane* martyrs) and lately the construction of the city mall (existing Mekelle *merkato*) (PEST, 2005).

proposed. Those all programs are towards the visionary setup of its future in creating favorable living environment (MCPPO, 2006).



**Figure 4.3:** Mekelle city spatial growth trend maps in relation to the CBD. Source: MCCDP, 2011. Transportation plan, implementation strategies and land acquisition of Mekelle city.



**Figure 4.4:** Overlay of CBD road networks, existing buildings and major landmarks in Google image. Source: Google map of Mekelle, 2009.

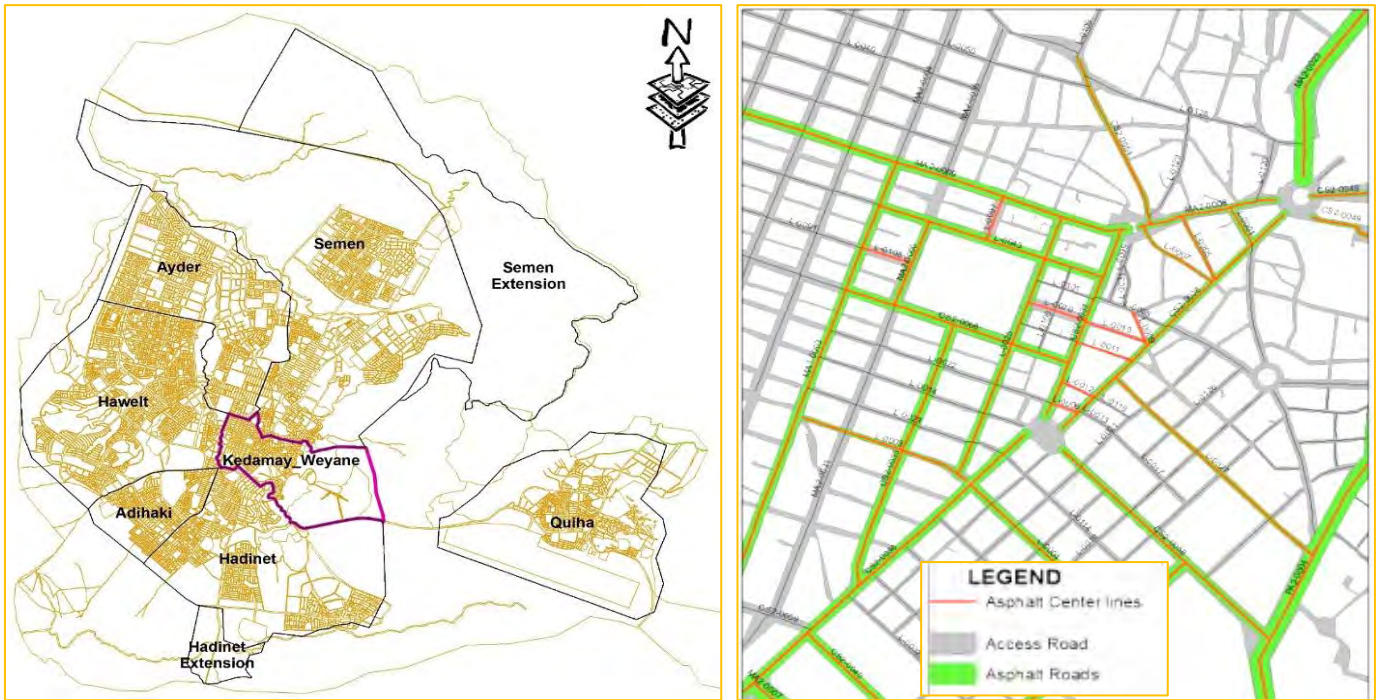
### 4.3.2. Road network

According to the city development plan, the city's road network system (fig: 4.5) has failed to add up to a traffic network functionality for the complete urban area. The road inventory result conducted by the MCCDPPP (2011) showed that, the city has limited number of asphalt roads, out of which only 20% have appropriate walkways, the rest are narrow, high and inconvenient (MCCDPPP, 2011). Existing roads in current built-up and future expansion areas are found to be narrow. Besides, they lack proper hierarchy, functional classification, proper facility and shape for the extended function (fig: 4.6). There are grid block edges and dead end streets which limit the connectivity of the network and hinder the traffic mobility. It is also common problem to have very sharp corners and limited sight distances due to poor geometry and the culture of building tall compound walls. The inconvenient junctions and crossings in *Kebelle 18*, *Romanat Sq.*, *Hawzen Sq.*, Atse Yohanes hotel , Milano hotel, Axum Hotel, *Ajip*, Tembien and Adigrat exits are the main examples (MCCDPPP, 2011) (fig: 4.7a).

Moreover, there are drainage lines in a very small portion of the roads which are almost out of function. That is, due to the reasons that the drainage system is not well networked, most of the manholes and surface drains are buried with boulders and debris from the surface of the road or feeder roads. Also, there is no proper maintenance and follow-ups, that is, even those which are constructed recently are out of function due to improper design and networking. As of the study on the city transportation also, shortage of commercial and non-commercial parking spaces is observed in the city especially at the city core. The existing commercial parking areas are on street, which create constraints on mobility (fig: 4.7b). There are low number of parking areas as compared to commercial and office spaces. For example, the new '*Edaga Sony*' market has only 53 parking, poor enforcement and management of parking areas (MCCDPPP, 2011). There is also a problem of ground floor relationship, which is an access and linkage difficulty that some buildings are buried by road level and others are suspended below and above the road surface due to miss alignment and wrong road geometry.

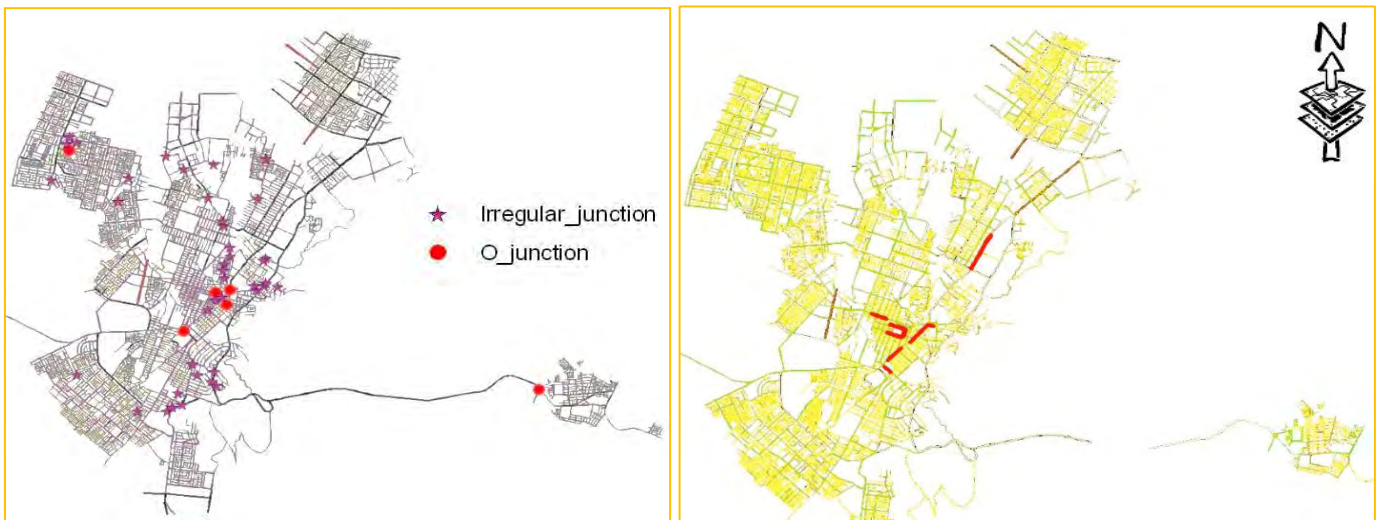
The city development committee has recalled the absence of comprehensive plan as well as lack of coordination among the infrastructure providers as the main reasons for the failure of the road network (MCP PPO, 2005). Besides, the city development has recommended a lot of accessibility and mobility improvements on the road network. Among, provision of walkways, adequate on and off street parking, provision of drainage lines, improve junctions and management of street utilization, improve connectivity, introducing traffic calming mechanisms, widening the inner city transit road and providing new roads in the built and expansion area are the major proposals that are given priority. A replacement of *Romanat* square with an efficient roundabout of proper geometric design is clearly specified, having major aims of modifying the gradient, lessening the traffic and providing more open space (MCP PPO, 2005). For the street legibility, the prime consult has studied and recommended the naming and numbering of streets

(fig: 4.8a), and also the sign placements (fig: 4.8b). It is based on those numberings that official naming will be given for each street and square (Prime Consult, 2011).

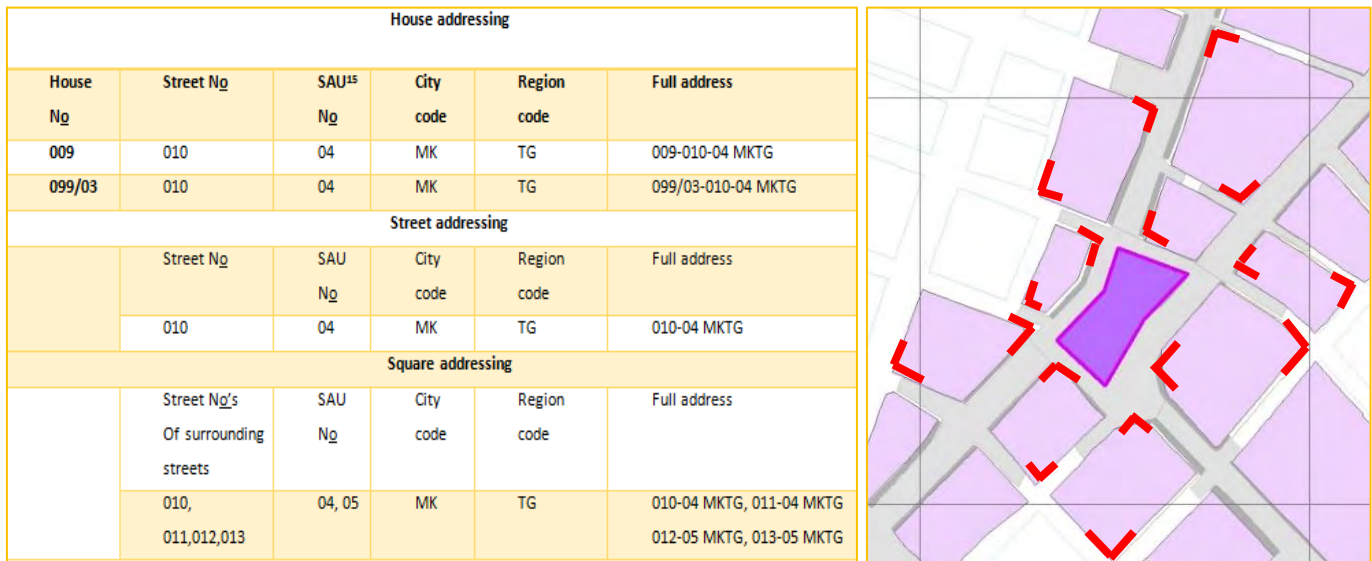


**Figure 4.5:** City road network and sub city boundaries. Source: produced by the author.

**Figure 4.6:** City road properties in the CBD. Source: Prepared by TH Consult, 2013.



**Figure 4.7:** (a) Road junctions (b) commercial and non-commercial parking spaces. Source: MCCDPPP, 2011. Transportation plan, implementation strategies and land acquisition of Mekelle city.



**Figure 4.8:** (a) Street naming and numbering components and addressing order (b) Sign placement. Source: adapted form Prime Consult, 2011.

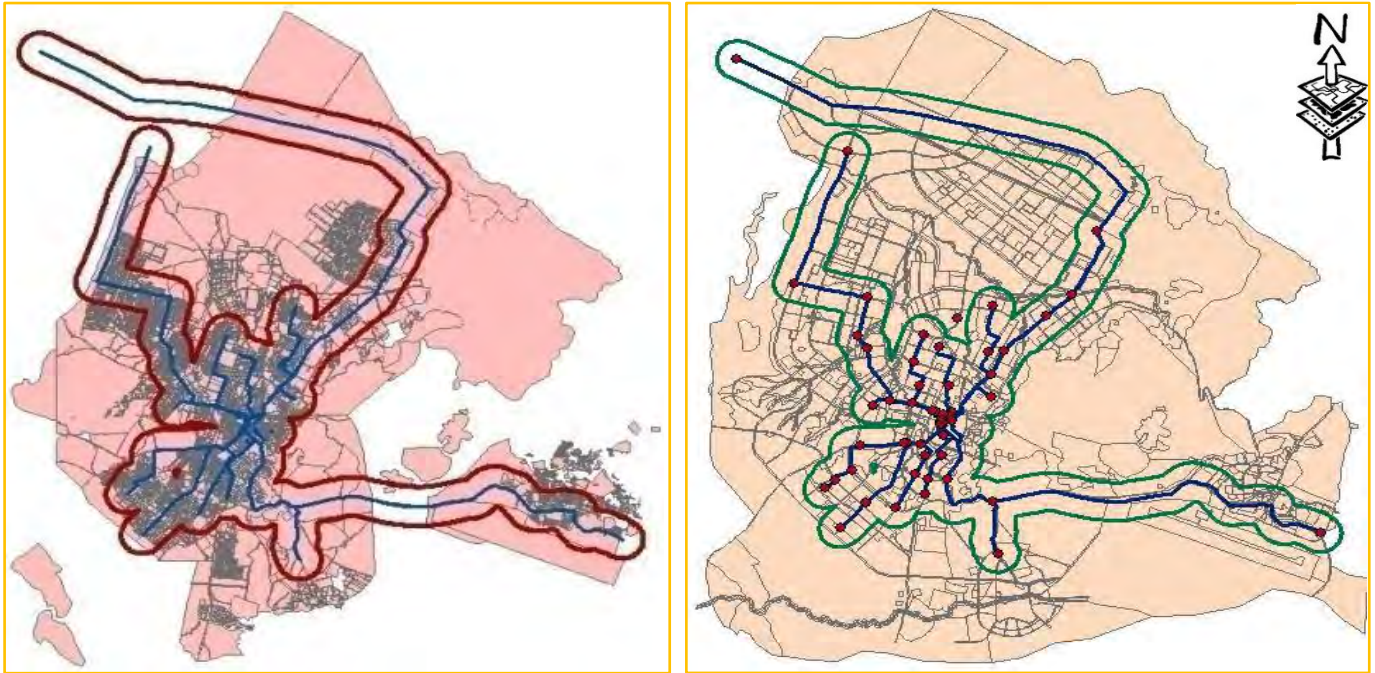
### 4.3.3. City transportation and traffic conditions

#### 4.3.3.1. Transportation

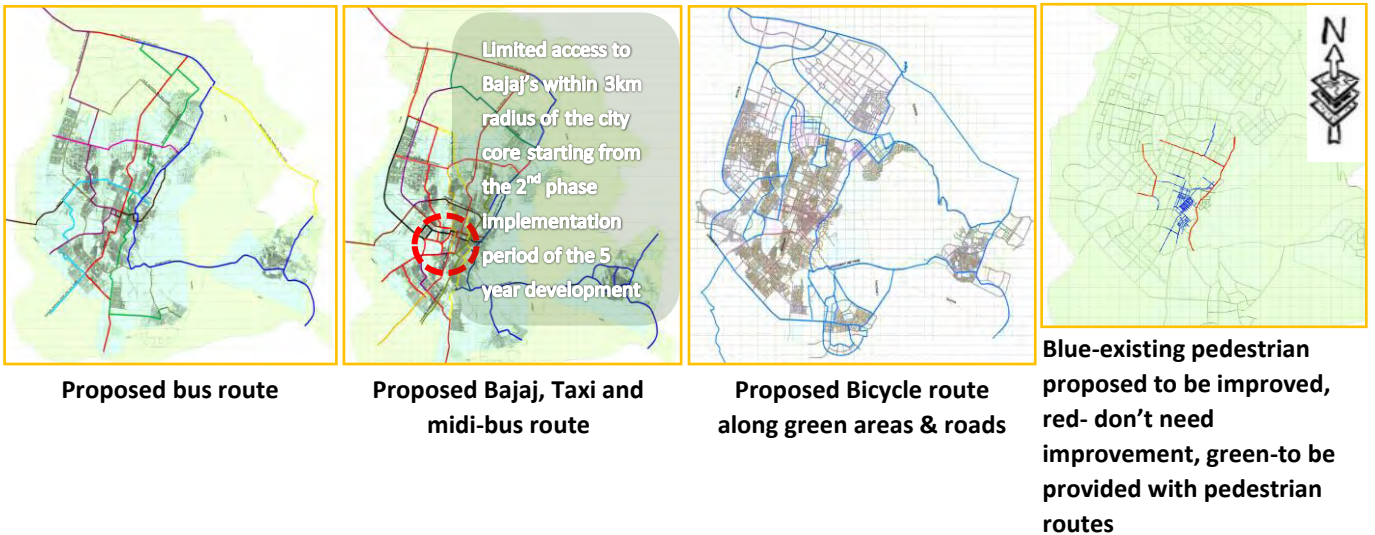
As of the study made by MCCDPPP (2011), motorized mode of transport in Mekelle include private car, bajaj, small taxis, minibus taxis and code 3 minibuses, buses, small trucks, large trucks with trolleys, land cruisers, pickup and motorbikes. Hors drawn carts, bicycles, animals, pedestrians and hand pushed trolleys are types of non- motorized transport. Private car, taxis/bajajs, mini buses are the mostly used motorized modes of transport with respective percentage coverage of 3%, 53.6%, 25.8% and walking and cycling is from the non-motorized mode which cover the 8.6% and 3.6% of the city transportation respectively. Those who walk on foot are found to get lower income than those using public transport. The study also showed that the level of car ownership in the city is 4.3%. 2.4 people /household, a total of 110,400 people use public transport daily (MCCDPPP, 2011). Moreover, taking the size of people who use walking as their main mode of travel; the size, condition and number of walkways is found to be very low.

The area of the city served by public transport routes projected at 500m from transport routes is 53km<sup>2</sup> or a total route length of 53km excluding overlaps (fig: 4.9a). The total area served is 44.2% of the city. In accordance to the proposed land use of the city, an area of 206.45km<sup>2</sup> is delineated for the city by 2025. If the existing transport service is considered with this area coverage, the transport service coverage will be much lower i.e. 25.7% (at 500m) and 20.5% (at 400m) distance from the transport routes of the city (fig: 4.9b). This shows that there is a need of improving the existing transport service in the city in order to increase accessibility and make it function more efficiently. This increasing demand of infrastructure

and transport services can also be seen in relation to the future density of the CBD which is expected to double as the result of the existing trend on the concentration of commercial, recreational and educational uses (MCCDPPP, 2011).



**Figure 4.9:** Current public transport coverage (a) from the existing city area and (b) from the future master plan at 500m distance from routes. Source: MCCDPPP, 2011. Transportation plan, implementation strategies and land acquisition of Mekelle city.



**Figure 4.10:** Mekelle proposed route networks for motorized (Bus, Midi-bus, Taxi, Bajaj) and non-motorized (Bicycle, pedestrian). Source: MCCDPPP, 2011. Transportation plan, implementation strategies and land acquisition of Mekelle city.

There are 18 existing public transport routes which originate from the city center around ‘*Edaga Soni*’<sup>19</sup> (fig: 4.9a). That is, once taxis are fully loaded at ‘*Edaga Soni*’, it is difficult for people to get service within at least 2km radius. Everybody has to come to the center to get taxi, which takes time and energy and also creates congestion. There are 55 stations; of which 60% of the stations are located around ‘*Edaga Soni*’ and the remaining stations are distributed at distance of (400-3000m), an average distance of 1060m from each other. This distance is more than twice of the reasonable walking distance standard (400-500m). This situation as a whole resulted in misuse of roads and inconvenience to users of public transport. Generally, problems such as lack of accessibility, poor connectivity, long waiting time and mismanagement of existing transport services and types of transport in the city are extracted (MCCDPPP, 2011).

Keeping those shortcomings of the city transportation in mind, the development committee has recommended an extension of the existing and creation of new routes to address the needs of people going and leaving the city center by connecting selected routes to the main city center bus and taxi station. Among the recommendations, figure (4.10) shows the selected public transport routes for the widely used modes of transport, regarding the current trend. Regarding the pedestrian routes, improvements such as widening, pavement renewal and height and curb stone adjustments are proposed in all pedestrian walkways of the city core to meet medium flow (fig: 4.10d). In addition, all existing and proposed roads of more than 6m width are proposed to be provided with pedestrian walkways in accordance with the city plan and the road cross section standards proposed by the (MCPPO, 2005).

#### **4.3.3.2. Traffic conditions**

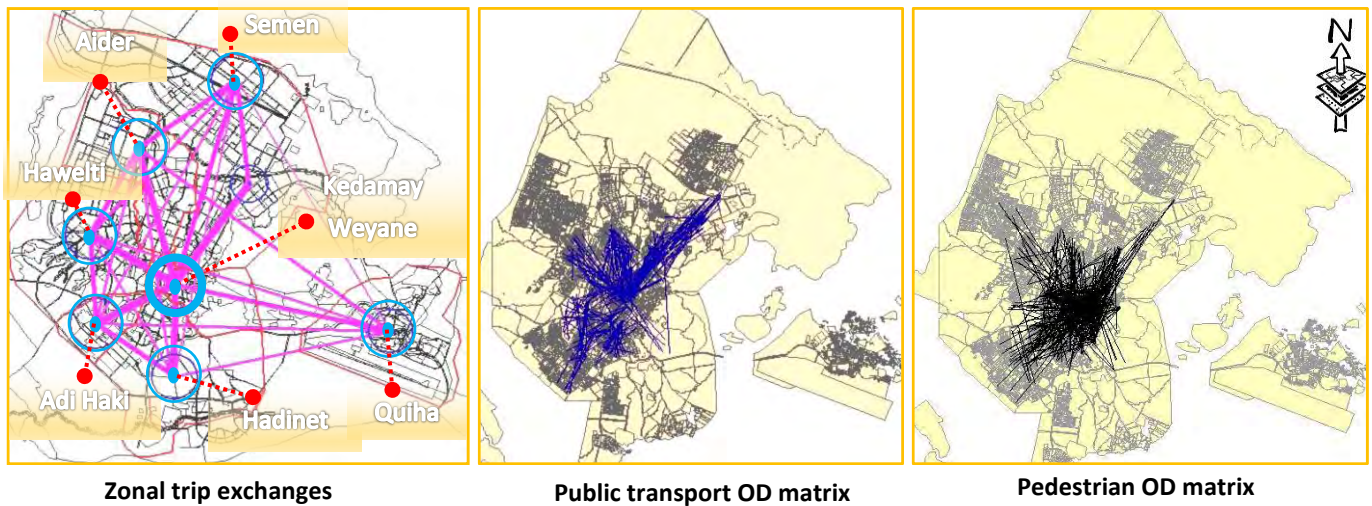
As shown in the zonal trip interchange (fig: 4.11a), *Kedamay Weyane* attracts the highest number of trips from all sub-cities followed by *Semen* and *Hadenet* sub-city. *Quiha* attracts the smallest number of trips, out of which the largest trip is from and to *Kedamay Weyane* sub-city.

The public and pedestrian OD matrix produced by the development committee also show that, most of the trips originate from the intermediate and periphery areas and are destined to the core and to other zones via the core. The existing transport routes are radiating from the core to almost all sub-cities separately. As of the Public transport OD matrix (fig: 4.11b), 70% of the trips are made to and back from the center, and the purpose of 59.6% of the trips are for going to/ from work, 9.7% for shopping, 11.7% for visiting relatives and friends, 5.4% for recreation and 13.7% for others including follow-up of different cases. According to the same survey, length of public transport trips is found to be as far as 15km, which can also increase with the expansion of the city to the peripheries. As shown in the map, almost all trips

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<sup>19</sup> Also called ‘*edaga Kedamay weyane*’, *kedamay weyane* market or Mekelle city mall

are destined or pass by the city core. This is mainly due to lack and shortage of transport services that take people to different destinations other than the city core. This situation created congestion at the city core, as well as inconvenience and wastage of time for residents of the city. According to the pedestrian OD, the main purposes of trips which are through the core (fig: 4.11c), include going to/from work (30.5%), shopping (12%), visiting relatives and friends (14%), recreation (16.5%) others including follow-up of different cases (27%). Length of pedestrian trips reaches up to 9 km, which is tiring and time taking. Main problems are found to be the lack of alternative affordable transport, narrow and poor condition of walkways (MCCDPPP, 2011).



**Figure 4.11:** Zonal trip interchanges and origin destination matrices in Mekelle city. Source: MCCDPPP, 2011. Transportation plan, implementation strategies and land acquisition of Mekelle city.

### Traffic conditions, accidents and major reasons

Based on the existing and potential transport routes, spatial proximity, population and land use distribution 7 traffic analysis zones are identified in Mekelle city. Among *Kedamay Weyane* is nominated as internal and the remaining 6 as external traffic analysis zones. According to the inner city traffic survey held in 7 days/week, 16hrs/day, and in 3 shifts (6am-2pm, 2pm-8pm and 8pm-10pm), a traffic volume of 1159/hr. is recorded by all transport types. 62.24% is made by non-motorized, out of which 93.11% are pedestrians. Pedestrians account for 62.6%, followed by Bajajs (9.55%), minibus taxis (8%), land cruisers/pickups (7.5%), bicycles (2.86%) and private cars (2.5%). 37.5% of all pedestrians are from DHL count stations, followed by *Hawelti* (10.5%), *Amanuel* (8.7%) and *Merkeb* (7.8%). Saturday (42.9%) is the peak day for pedestrians also followed by Monday (10.7%), and Friday (10.6%). Monday is a peak day for motorized. Saturday is also the peak day for all modes. There is high traffic data at peak hours (8am-9am and 5pm-6pm).

The study on the existing traffic management level of traffic accidents shows that, there is poor management of traffic in the city mainly due to lack and shortage of manpower, signs and signals. Main causes of accident are found to be problem of drivers not giving priority for the pedestrians, and inappropriate junctions, roundabouts and road slopes. Major locations of accidents are: *Encodo*, *Arid*, entrance from Addis Ababa around United fuel station and *Romanat* (MCCDPPP, 2011).

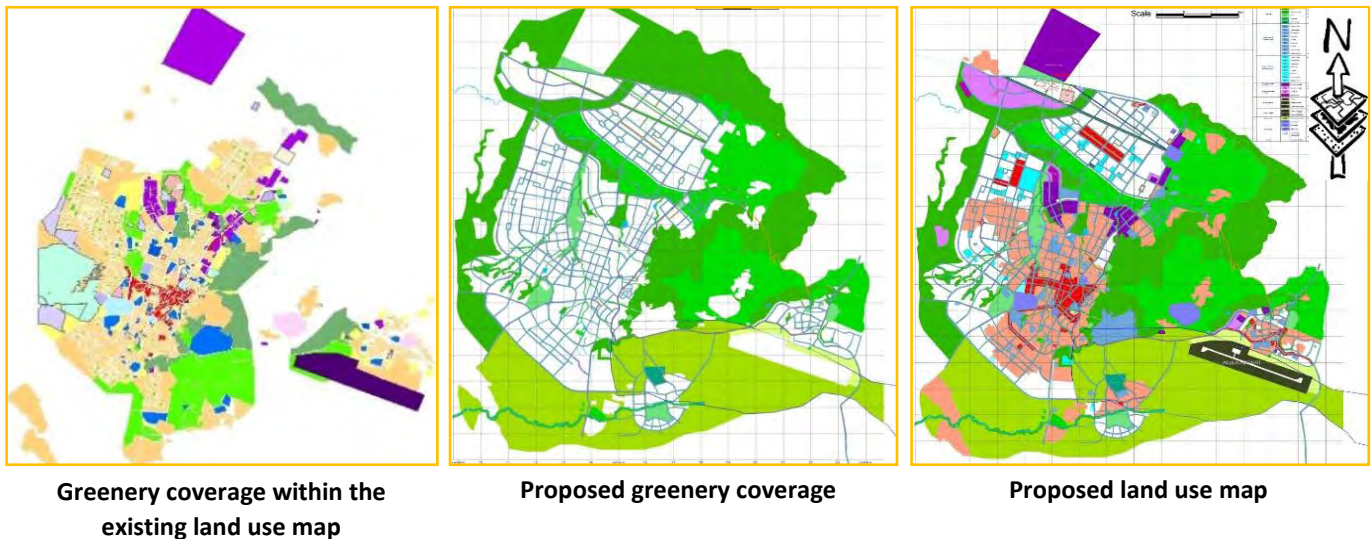
#### **4.3.4. Existing and proposed city greenery**

During the foundation of the city by Atse yohannes IV, it was rich in flora, fauna and water resource springs. It was covered by a jungle of natural forest like oli Africana, ficuse vasta, ficus sure, junuperios proserrea, dedenuim vasca, pejume Africana, salix sabestretea etc. The remnant forests in *Endaraesi* recreational park and in church yards which are recorded as a genetic reserved area by Ethiopian genetic authority can be evidences. Historically, there were 42 springs with plenty of wild life such as loin. But, according to the current situation, the city is facing the increased wind and heightened temperature levels as the result of increased levels of deforestation and desertification (MCP PPO, 2006).

Several plantation practices are being practiced. Though, the extent of vegetation coverage on the city and its periphery is still low. This is due to the problem on follow up and technical support. For example if we take the road side plantation of the city, there is less plantation coverage, which is estimated only (10-15)% of the existing roads are beautified with street greeneries (fig: 4.12a). In addition there is lack of appropriate tree species selection, lack of patterned plantation, tree line spacing not to the standard and lack of integration with other infrastructures such as utilities and property lines. There is also use of less drought hardy leaves species (e.g. spatodim ephrobea) and improper size of seedling plantation. Those all are causes for the high mortality of trees and unsuitable look or decayed aesthetical look which affect the environmental and visual conditions of the street environment and makes the city to offer the “unfavorable environment” to its inhabitants (MCP PPO, 2006).

To mitigate the environmental problems of the city and to make the city an ecologically and environmentally friendly city, the city development plan (2005-2015) had proposed greenery promotion to maximize the vegetation coverage from 15.4 to 35.8% (MCP PPO, 2006) (fig: 4.12b). Furthermore, it is to provide wind break plants, to reduce dust, thermal, noise pollution and environmental sanitations. For the purpose of avoiding visual pollution, providing recreational environment, shaded areas and so on are benefits expected under the socio economic objectives of the green promotion.

The green promotion program includes: the road plantation, road side parks and out/indoor garden plantations (fig: 4.12c). The appropriate species selection and tree spacing standards are defined. As the environmental study of the city the ever green species, flowering for long period of the year, higher bole height, deep root system and fast growth rate are the characteristics of appropriate tree species for the road side plantation and road side parks but with an exception of fruit trees for the garden plantation.



**Figure 4.12:** Existing and proposed greenery coverage. Source: compiled from MCCDPPP, 2011. Transportation plan, implementation strategies and land acquisition of Mekelle city, and presentation papers by the author.

#### 4.3.5. Local cultures and traditions

Cultures and traditions are activities or practices that a society is accustomed to. Understanding those local cultures and traditions of the city is an important input to know how to develop or enhance the city, which in turn helps to build the city's identity of place (PEST, 2005). That is, proper investigation of the people's spatial culture<sup>20</sup> in celebrating or practicing their tradition and culture is strictly needed. Celebrations can be indoor or outdoor, in neighborhood level or in city level.

Festivities like *Ashenda*<sup>21</sup>, *Meskel*<sup>22</sup>, *Timket*<sup>23</sup> and *Maryam gnbot*<sup>24</sup> are the major religious and socio cultural celebrations in the city. Among, *Meskel* and *Timkel* have their own place of celebration which is preserved open space. This makes the society to be very familiar to and to have memory of the celebration tide with the place of celebration. *Ashenda* festivities take place in an informal way temporarily in undefined streets. Place of celebration varies from time to time and this is becoming confusing for the society to sense the celebration with its place of celebration. There is also a celebration called *Maryam gnbot* which the society celebrates on its own neighborhood open space. There is also open air cultural games like 'gebeta', 'tibo', 'byi', 'gemed zlay', 'suzi', 'maekel wesen', 'dimo' and 'brim' that are being practiced by youngsters of both gender groups in their house compound ad neighborhood.

<sup>20</sup> Spatial culture- culture of using spaces or culture of managing spaces.

<sup>21</sup> '*Ashenda*' is a traditional girl's festivity which has been celebrated in Aug 22, to honor the Virgin Marya. *Ashenda* is tigrigna word meaning 'tall green grass' (UNMEE News, 2007).

<sup>22</sup> '*Meskel*'- a religious cultural festivity in celebration of the day the true cross found- Sep 27.

<sup>23</sup> '*Timket*'- an Ethiopian epiphany day in celebration of the Christ baptism day- Jan19.

<sup>24</sup> '*Maryam gnbot*'- an Orthodox Christians festivity to honor Marya- May 09.

#### 4.4. Local case study on livable street

##### Sew'at Avenue

(A walkable and stayable street environment in the city)

Location: Mekelle, Tigray, Ethiopia.

The corridor was covered by residential area, but demolished before 14 years for the primary purpose of creating visibility from the martyrs' monument to the office of the state president (civil service office). The street scape is designed and constructed by Awassa green wood plc; Mekelle Municipality being the owner. It is usable and accessible since June 29/2009, the day of its opening to public. The name *Sew'at* is a Tigrigna word to mean *sema'etat* in Amharic or Martyrs in English and is named because it emerges from the Martyrs' monument compound.

The street now is becoming the corridor of large business centers, hotels, offices and stadium Mekelle. Though it is located far away from the city core and also its adjacent buildings are mostly under construction, a lot of users visit it, and stay here for an expanded time. The street has more walkability and usability, and is active for about 18 hours a day (5am in the morning up to 10pm night). The street has streetscape elements which consider both the pedestrian and vehicle interests. Those are, such as street greenery (street trees, grasses and flowers), vehicle and pedestrian lighting, seating (primary and secondary), pavements, routs (pedestrian, cycle and vehicle) and parking.



Figure 4.13: Local case study on the *Sew'at* Avenue in the city of Mekelle, Tigray. Source: prepared by the author.

# CHAPTER FIVE

## 5. RESULT AND ANALYSIS

Under this section, all the study results through the data collection methods of the in-depth interview, map making, Likert-scale rating and site observation are analyzed and presented.

### 5.1. Results explored through the in-depth interview

The results explored through the in-depth interview are analyzed and presented here under (appendix I- part 1A & B). The key informants' answers to the questions in the (appendix I- part 1C, D & E) are analyzed and interpreted to develop a general understanding on both the existing and future conditions of the district.

#### 5.1.1. Type of activities in the study area

The data up on the users' answer to why they were in the study area during the interview is investigated to expose the type of activities which are being practiced (table: 5.1).

It is analyzed by categorizing the practiced activities under the group of activities predefined in the sampling of the study. Those are: "daily coming/going", "daily transit", "recreational" and "planned" activity. Activities categorized under the daily comings and goings are activities that are being practiced by persons who live, work and learn in the study area. Those are the daily going to and coming from home, work place, and school or college. Activities that are being practiced by persons who were not from or to the study area but passing through are categorized under the daily transit activities. Those are like using the study area as transit from one neighborhood to another. Activities practiced by persons who were shopping, visiting café/restaurant/coffee house etc. and visiting functional spaces such as banks and offices are categorized under the recreational activity. Activities practiced by persons who came to celebrate occasions, to participate on public demonstrations and to watch concerts or football games on screen are activities categorized under the planned activity group.

**Table 5.1:** Type of activities in the study area in terms of the predefined activity groups

Case area	Type of activities in the district in terms of the predefined activity groups No (%)			
	Daily coming and going activity	Daily transit activity	Visits to recreational	Visits to planned activity
<i>Romanat Sq.</i>	22.22	61.16	5.5	11.11
<i>Selam St.</i>	40	10	48.5	1.5
<i>Hakfen St.</i>	20	20	59	1
<i>Alula St.</i>	33.33	16.67	48.5	1.5
<i>Agazi St.</i>	30	60	8.2	1.8
	145.55	167.83	169.7	16.91

Source: Field survey/in-depth interview/

To begin with *Romanat* Sq., the majority which is 61.16% of the respondents was in the area to pass through and 22.22% of the respondents were performing their daily coming and going activity. 48.5% of the respondents for *Selam* St. were in their recreational activity and 33.33% were performing their daily coming and going. Out of the respondents in *hakfen* St., 59% were in their recreational activity and 20% were in daily coming/going and the same too who were in passing through. 48.5% of the respondents in *Alula* St. were in their recreational activity and 33.33% were in their daily coming/going activity. From the respondents in *Agazi* St., 60% were in passing through and 30% were in their daily coming/going activities.

### 5.1.2. Means of travel in the study area

This is a data on means of travel used by the users to access the spaces and functions of the district while they are within the CBD. The investigation on this issue is needed in order to get the optional modes used and to extract the major mode of travel among. It also exposes the related activities and site conditions as reasons of choosing a particular means of travel (table: 5.2).

**Table 5.2** : Means of travel in the district and the related reasons of choice.

Case area	Means of travel	No (%)	Reason	No (%)
<b>Romanat</b>	Walking	67	Shopping activities, when there is an event.	22
			No option in the CBD to access places in it/ since spaces are nearby or within short distances	45
	Taxi, service, private car	33	Bad weather condition, sunny and windy. Personal reasons	28 5
<b>Selam</b>	Walking	40	No option, shopping /stationaries, spare parts.../	40
	Motor bike, bicycle	10	Less traffic	10
	Taxi, service, private car	50	To and from work, from and to another neighborhood.	50
<b>Hakfen</b>	Walking	80	Shopping activities, visit to cafés, restaurants, super markets, shaded walk ways	65
			No option	15
	Taxi, service, private car	20	High traffic of pedestrian, walkway space competition by the street vendors, by plots under construction.	20
<b>Agazi</b>	Walking	92	Less traffic and enough defined room for walking	52
			No option (our area taxi doesn't access this street)	40
	Cycling	8	Wide enough to bicycle, less traffic	8
<b>Alula</b>	Walking	64	Entertaining displays- active ground floors, shops, side walk cafés. High possibility of meeting friends, good shade.	38
			No option-If they are nearby	36
	Taxi, service, private car	24	To and from work, from and to another neighborhood.	24
			Walking space competition by the plots in construction, street vendors	12

Source: Field survey/in-depth interview/

The physical conditions of sidewalks (width/capacity, pavement, nearby ground floor activities and space competitions in the sidewalks), environmental conditions of sidewalks (such as presence of shaded areas) and the users' activity are the major categories of users' reasoning to choose a particular means. Walking is the major means used by the respondents of all case areas; it is a means for 40%-92% of the travels in the study area. But the reason of why they walk varies from case area to another case area. The respondents of *Romanat sq.* walk when they are in shopping activity, when there is an event or celebration in the square etc. But above all, they walk in all case areas because they have no another optional means to access the functions within the study area.



**Figure 5.1:** Side walk picture taken from (a) *Romanat Sq.* (b) *Hakfen St.* Source: Picture taken by Selemun Kahsay in 2012.



**Figure 5.2:** Street sidewalk conditions (a) space competition on walkways of *Hakfen St.* (b) One side walk way in *Agazi St.* Source: street pictures taken by the author in February/March 2013.

### 5.1.3. The time interval in which the study area is active

This is a data of users' answer to a question 'when is your convenient time to visit this square/street, why?' and it is analyzed according to their reason of choosing the specific time interval. The investigation on this issue is to investigate the time interval in which the particular area is active as the result of the presence of users (table: 5.3).

**Table 5.3:** The time interval in which the study area is active and the reasons behind.

	Time interval	No (%)	Reason	No (%)
<b>Romanat</b>	Before 9am and after 6pm	90	Good weather/no glare, wind becomes stable/	47
			Time of coming from and going to work, school	43
	occasionally	10	When there is an event celebration concert, watching football, exhibitions ...	10
<b>Selam</b>	Before 9am and after 5pm	100	Good weather, more pedestrian	75
			Personal reasons	25
<b>Hakfen</b>	Before 10am and after 5pm	100	Good weather	35
			Personal reasons e.g. free time, business running...	65
<b>Agazi</b>	Before 9am and after 5pm	80	Good weather	40
			Time of coming from and going to work, school	40
			Leisure time to refresh with families and friends	15
	weekend	20	Personal reasons	5
<b>Alula</b>	After 5 or 6pm	100	Good weather-To watch Sunset from the sidewalk coffee house, walkways got shaded comfortable to walk, shop, To meet friends.	100

Source: Field survey/in-depth interview/



**Figure 5.3:** Romanat Sq. pictures (a) Stage making for occasional celebration (b) Tents for mini public exhibitions and health consultancies. Source: street pictures taken by the author in February/March 2013.



**Figure 5.4:** Pictures taken from Romant sq. (a) when users begin to occupy the square as visitors to planned activities. (b) Prime Minister Meles’s tribute by the people of Mekelle at Romanat sq. (c) street vendors at the negative space of Romanat Sq. Source: pictures taken by the author in August 2012 and in March 2013.

#### 5.1.4. The users' safety in crossing

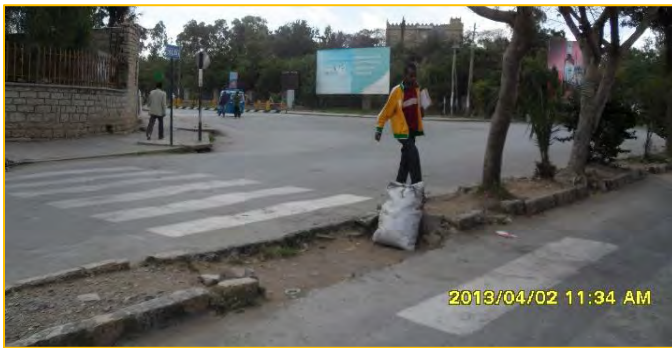
This was an investigation on the issue of walking safety related to car accidents; as street crossing is part of walking. It helped to understand the trend of using crosswalks of the study area and identify the causes behind (table: 5.4). This is analyzed according to the grades of very good, good, fair, bad and too bad.

**Table 5.4 :** The users' safety in crossing and the culture of using crosswalks.

Case area	Culture of using cross walks	No (%)	Reasons behind	No (%)
<b>Romanat</b>	Good	9	Awareness creation and traffic trainings by the traffic police.	3
			Become a habit	2
			Fear of accident	4
	Fair	27	Not to be punished by the traffic police in duty	27
Too bad	64	Zebra cross location do not invite to - its orientation according to the functional spaces nearby and its availability according to the area coverage of the square.	64	
<b>Selam</b>	Good	25	Habit	25
	Fair	75	Carelessly crossing when there is less traffic, long distances between zebra crosses.	75
<b>Hakfen</b>	Good	80	Habit, there is high traffic, cars move fast (in case of fear of accident)	80
	Fair	20	Not visible zebra paints, Car or group of people park at the entry or exit of zebra crosses.	20
<b>Agazi</b>	Good	40	Awareness creation by the traffic police, more traffic police movement, since their office is along this street.	30
			Volunteer traffic students from Atse yohannes primary school	10
	Fair	60	Car or group of people park at the entry or exit of zebra crosses	30
			Not clearly painted/not visible- not maintained regularly	20
Alula	Good	9	Habit	9
	Fair	19	When there is high traffic	19
	Bad	72	Not smoothly accessible-It is blocked by the median tree bed.	27
The distance between is long to reach.			45	

Source: Field survey/in-depth interview/

The users' culture of using crosswalks ranges from good to too bad. As table 5.4 shows, the main reason mentioned behind this range is in relation to the physical conditions of the crosswalk (their visibility, intervals among, their locations in relation to nearby functional spaces, availability in relation to the route length). Reasons in relation to the presence of traffic police and the existing traffic conditions and the users' awareness are also mentioned. For example when we take the reasons behind the two extreme grades, some respondents have good culture because they make it their habit, in fear of accident, the regular awareness creation programs held by traffic police and volunteer students; and some have too bad culture of using crosswalk, because of the physical condition of crosswalks (such as the orientation) don't invite them to use.



**Figure 5.5:** zebra cross conditions (a) Example of zebra cross obstacle in *Alula St.* (b) Example of washed-out zebra crosses in *Hakfen St.* Source: street pictures taken by the author in February/March 2013.

### 5.1.5. The extent of visits made by the users to the study area

This is summarized and analyzed responses of the users to the question- ‘how often do you visit this square/street, mostly for what purpose?’ The purpose of the investigation on this issue is to understand the regularity of users and their activities on the study area (table: 5.5).

**Table 5.5 :** The extent of visits to the study area and the regular purposes.

Case area	Frequency of visit	No (%)	Reason	No (%)
<b>Romanat</b>	2-4 times a day	45	As living area for the street children, Work place, way to work, school, to pass by etc.	45
	daily	34	To visit functions like café, offices, to pass by etc.	34
	Weekly	18	Shopping, to pass by	18
	Occasionally	3	To watch football, celebrate events	3
<b>Selam</b>	Daily	45	Visit café, restaurants; way to work, school, church; work place	45
	3-4days/ week up to weekly	55	Shopping /stationaries, spare parts, electronics.../	65
<b>Hakfen</b>	hourly	25	Work place	25
	daily	65	Way to work, school...to pass by	65
	weekly	10	To visit café and restaurants, supermarkets & shopping activities	10
<b>Agazi</b>	Up to twice/ day	60	Work place, way to work, school, church etc. to pass by	60
	daily	25	To visit functions like bank, café, digital studios, offices etc.	40
	Weekly	15	Way to school- university, to pass by	
<b>Alula</b>	Up to twice/ day	42	Work place, way to work, college, etc. to pass by	42
	daily	40	To visit sidewalk cafes, to walk, way to work, church -pass by	40
	Weekly	18	To visit banks, shopping, meet friends	18

Source: Field survey/in-depth interview/

As the table shows, the respondents visit the study area at most daily (2-3 times) and at least weekly. The major raised users’ activities of in those regular times are, such as visiting of the area as work place, as place of recreational/commercial activity, as a way to work/school/church, etc.

### 5.1.6. The users' experience of the study area

This is the data of users' response to a question-'what is your experience of this square/street, do you have any positive or negative memories? This is an investigation on the users' perceived image of the case area to expose the critical happenings of the square/street that make the respondent to have such memory on the area. This also helps to identify the opportunities and constraints of that particular area that may in turn clarify the image of that particular space. It helps in identifying of which one has to be emphasized and which one has to be removed (table: 5.6).

**Table 5.6:** Users' experience of the study area and reasons behind.

Case area	Users' experience	No (%)	Reason	No (%)
<b>Romanat</b>	Good	16	There is occasional celebration	16
	Bad	12	Fear of accident, appearance of mad people	12
	Too bad	72	Highly exposed to sun/wind, Feel depressed as the result of the pedestrians' informal crossings and conflicts with vehicles and traffic police.	72
<b>Selam</b>	Good	25	View to <i>Zes/asae</i> square and the palace (Atse Yohannes Museum)	25
	Bad	75	The safety and accessibility questions due to the walkway risings, open manholes.	45
			The median shrubs with expanded branches make difficult to view vehicles when crossing.	30
<b>Hakfen</b>	Good	70	Active frontages, taxi stations along and nearby.	
	Fair	30	Speedy vehicles, fear of accident, not enough room for walking compared to the number of pedestrian in addition to the space competition by the street vendors.	
<b>Agazi</b>	Good	65	Pedestrian stream at peak hours, e.g. the uniformed students of Aste yohannes school.	15
			The fenced wide walkway makes you feel secured even at peak hours.	45
	Fair	35	No functional varieties, major space along is covered by bank, offices and schools	25
			The informal settlement, as an obstacle	10
<b>Alula</b>	Good	88	The pedestrian stream at evening time, presence of window displays, shaded walkway.	100
	Fair	12	Congestion due to the sidewalk low capacity.	

Source: Field survey/in-depth interview/

The major reasons raised by the respondents behind those good, fair, bad and too bad image, are categories of the Sq. /St. physical environment conditions (the capacity, nearby ground floor condition, the scenic views and the microclimate), the existing activities, the traffic conditions and the pedestrian streams. Among, the existing pedestrian streams at peak hours and evening times are the reasons that create good image. The congestions due to sidewalk low capacity, the sidewalk geometry and the lack of

functional variety, the fear of traffic accidents(fig 5.6b & 5.7a) and being exposed to sun/windy conditions (fig 5.7b) are reasons for the other image grades.



**Figure 5.6:** (a) active frontages along Hakfen st. (b) People crossing *Romanat sq.* informally and conflicts with traffic police. Source: pictures taken by the author in February/March 2013.



**Figure 5.7:** *Romant Sq.* pictures (a) Picture that shows the undefined priority between the pedestrians and the vehicles (b) an area exposed to sun and (c) lighting at night. Source: Pictures taken (a) by Selemun Kahsay in 2012; (b) by the author in March 2013.



**Figure 5.8:** Picture that shows the *Romant* music shop and the Italian building style in *Romanat Sq.* Source: picture taken by Selemun Kahsay in 2012.

### 5.1.7. The users' and professionals' future preferences which have to be fulfilled in the district design

This is based on the question on the future livability of the district. It helped to extract the user preferred design attributes by noting at the frequency of mentioning of a particular attribute (table: 5.7).

**Table 5.7:** The users’ and professionals’ preferred design attributes to enhance livability of the district.

	<b>Case areas</b>				
	<b>Romanat Sq.</b>	<b>Selam St.</b>	<b>Hakfen St.</b>	<b>Alula St.</b>	<b>Agazi St.</b>
<b>The preferred design attributes</b>	<ul style="list-style-type: none"> <li>• Widening the walkway</li> <li>• Safety (physical isolation of pedestrian from vehicular, awareness creation, zebra cross at pedestrian desired lines, street lights, controlling the happening of mad people)</li> <li>• Greenery (sidewalk plantings for shading and to decrease the hotness)</li> <li>• Defined spots for street vendors (shoe shiners)</li> <li>• Amenity (seating bench, display screens, fountain)</li> <li>• Active frontages (catering services)</li> <li>• Maintenance (traffic lights and signs)</li> <li>• Supporting services or Uses (book and magazine stores, mini shops, mini café, play stations(table tens, pool house, display screens)</li> <li>• Access (clear circulation for vehicles)</li> </ul>	<ul style="list-style-type: none"> <li>• Widening sidewalk</li> <li>• Defined standing and seating spots</li> <li>• Avoiding over privatization of sidewalks by the sidewalk cafes</li> <li>• Integrating the street trees with street poles, traffic signs</li> <li>• Smooth crosswalks</li> <li>• Enough defined car parking</li> <li>• Unity and continuity in sidewalk pavements</li> <li>• Maintenance (median trees which are covering the view to the vehicles and blocking the zebra crosses, specified interval of plantation)</li> <li>• Plantation on sidewalks</li> <li>• Defined space for street vendors with good view of pedestrians (shoe shiners, book sellers)</li> <li>• Defined space for notice boards</li> </ul>	<ul style="list-style-type: none"> <li>• Widening Walkway</li> <li>• Defined spots for meeting</li> <li>• Strictly prohibiting to stand or park on zebra cross</li> <li>• Defined parking area</li> <li>• Uses (sidewalk cafes, shops)</li> <li>• Amenity (seating benches)</li> <li>• Active and visible traffic signs and signals</li> <li>• Enough space to watch the billboards (spaces to stand)</li> <li>• Good location of dust bins</li> <li>• Relocation of the electric poles which are now the obstacles of walkways.</li> <li>• Management (Controlling the street children from harming or violating the pedestrians)</li> </ul>	<ul style="list-style-type: none"> <li>• Widening the walk way</li> <li>• incorporate openings in the existing fenced walls</li> <li>• Removing the median that block the zebra cross</li> <li>• Maintaining the midway tree bed</li> <li>• Infrastructures has to be integrated with street trees</li> <li>• Appropriate distribution and placement of dust bins at least at every 3 openings</li> <li>• Car parking</li> <li>• Active traffic light</li> <li>• Uses (more sidewalk cafes)</li> <li>• Public seating along, Seating on edges</li> <li>• Clear layout of drainage line</li> <li>• Proper selection and placement of plantings</li> <li>• Emphasizing the functional variety</li> <li>• Maintaining the visual aesthetic of edges by removing the informal hanging shades</li> <li>• Maintaining aesthetical view of the street by fixing the color mixes using the color codes, banner posting and walkway pavement.</li> </ul>	<ul style="list-style-type: none"> <li>• Emphasizing the fenced wide walkway</li> <li>• Adjusting the tree lines to one defined line</li> <li>• Seating under shades (as waiting and staying spots specially for students, notice board readers, for the customers of the supreme court)</li> <li>• Clearly painting of zebra cross</li> <li>• Uses (newspaper, magazine and food kiosks, mini-public libraries to support the nearby school students)</li> <li>• Properly located and maintained shoe shiners</li> <li>• Visible traffic signs</li> </ul>

## 5.2. Images produced through the map-making

### 5.2.1. The image of the district made by users and professionals

In this section the illustrated graphical representation of the future district image as of the respondents' eye is presented. It is compiled form of the shared cognitive maps of all case areas; which are processed from the overlays of each maps made by users, professionals and key informants on the map making part of the data collection (appendix I- part 2).

The images are important in exposing the users' desires or preferences on each particular space. By incorporating the preferences on the design of each particular space, producing a user responsive design will be is possible.

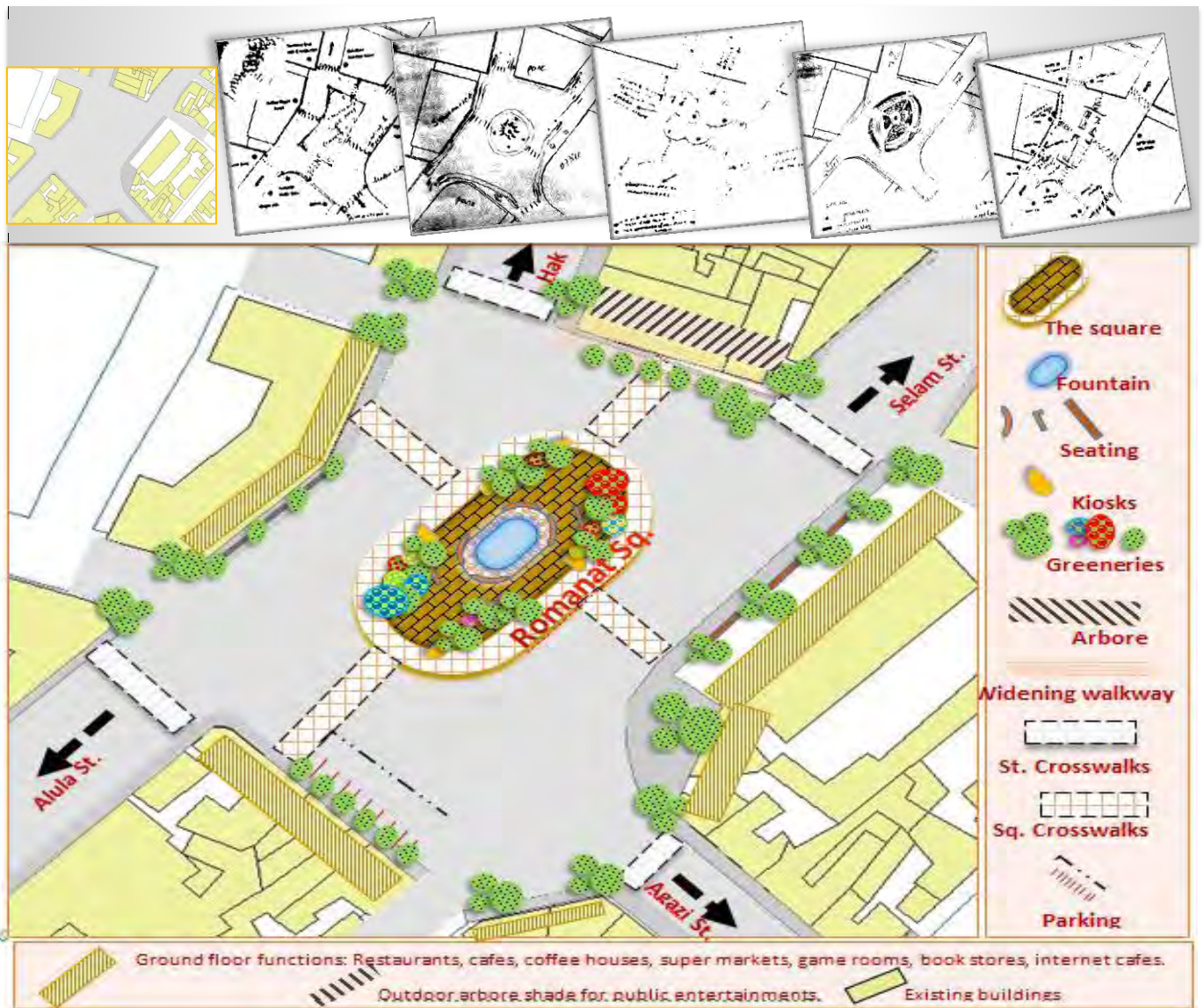


**Figure 5.9:** Compiled shared cognitive map of the district. Source: Shared cognitive maps of *Romanat* square and streets as illustrated by the author.

The graphical representations show the injections; such as functional proposals for the ground floors along, convenient locations for zebra crosses, pedestrian amenities like seating and standing, street

greeneries in different styles, supporting services such as food, newsletter and shoe shiner kiosks, and open air shades. Lightings, traffic signs and signals are considered in all illustrations.

The following images show the shared cognitive maps of each case area as demonstrated by the author. The sample original maps made by the respondents for each case area are illustrated in black and white image pieces and are pasted either in the top or in the right side of the demonstrated images.



**Figure 5.10:** Shared cognitive map for *Romanat* square. Source: Field survey/map making/

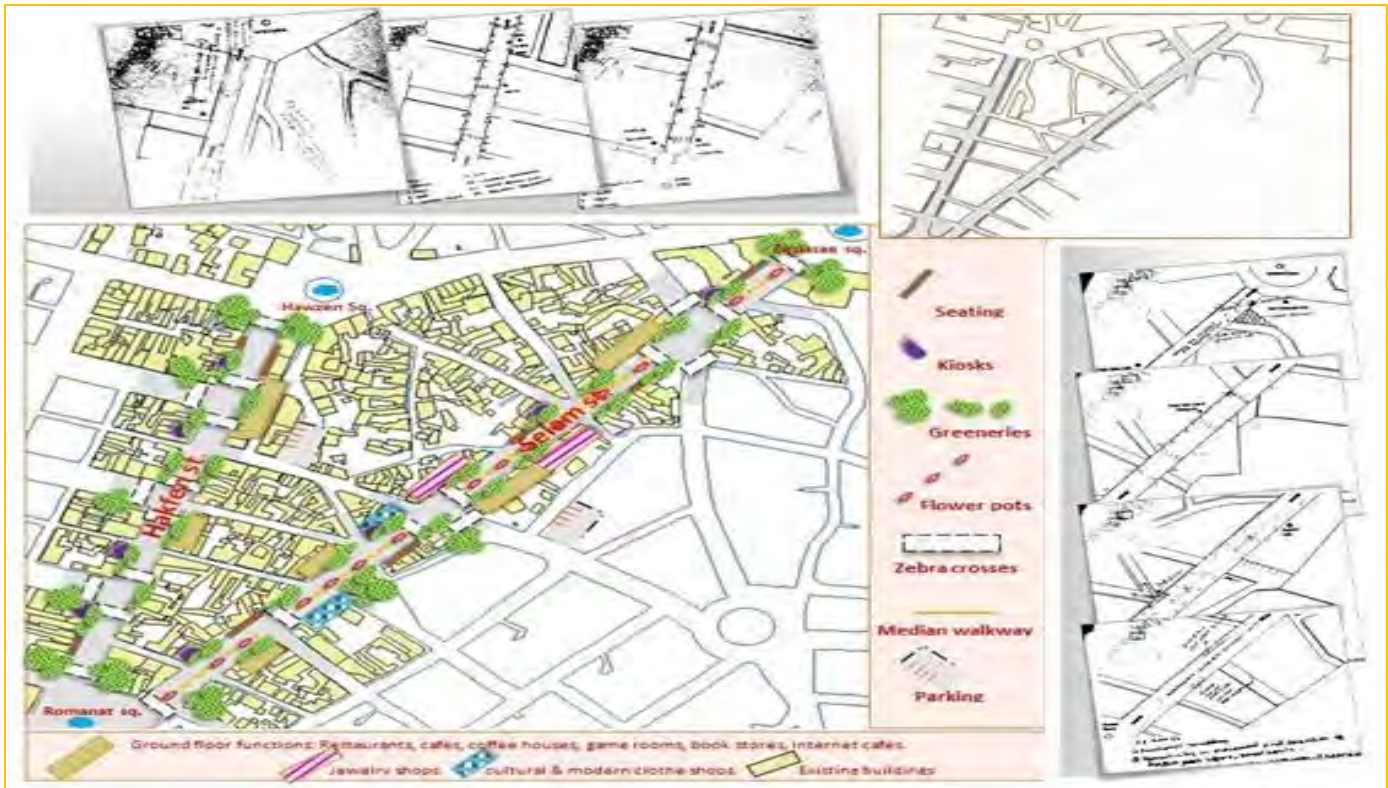


Figure 5.11: Shared cognitive map for *Hakfen* and *Selam* Sts. Source: Field survey/ map making /

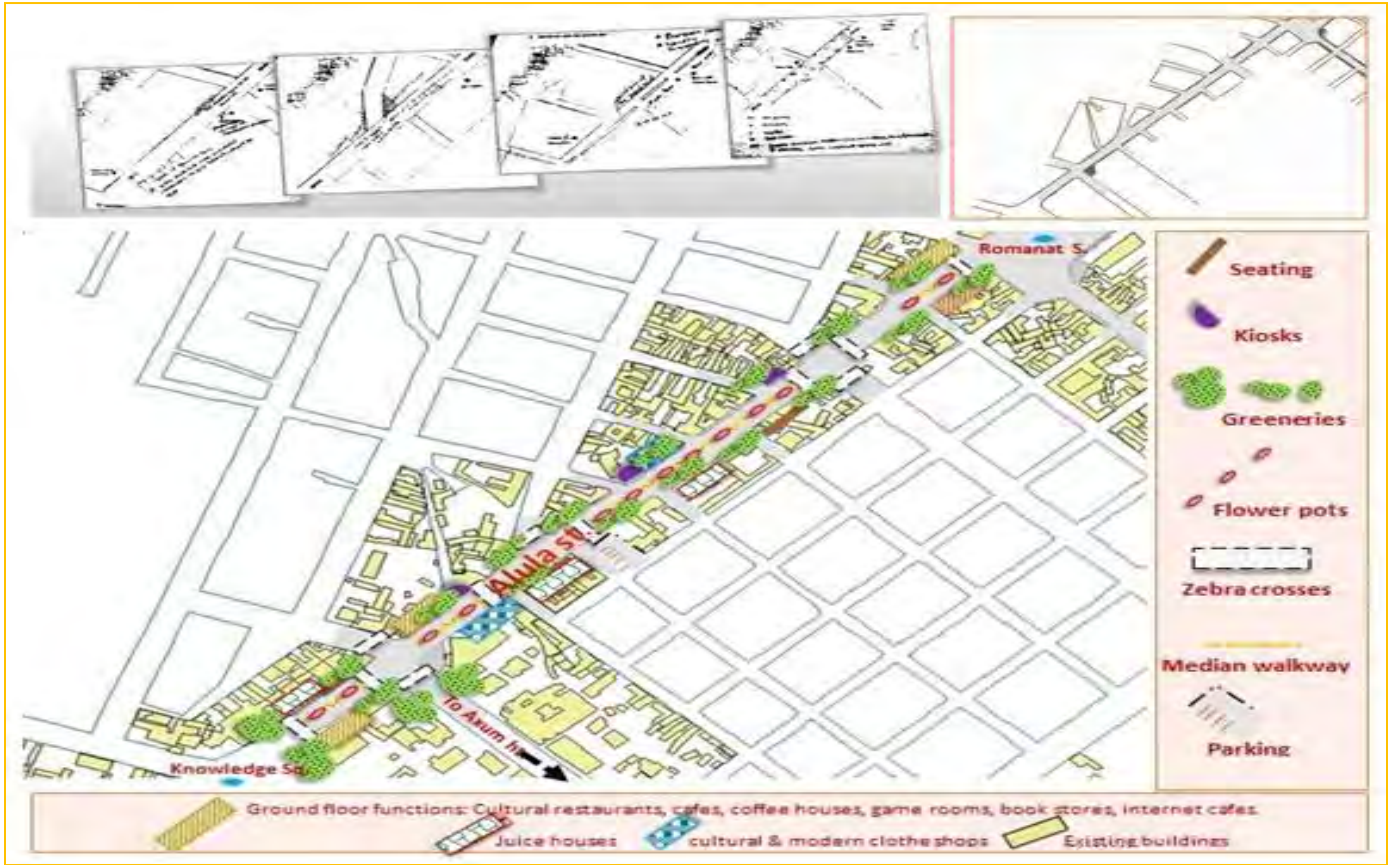
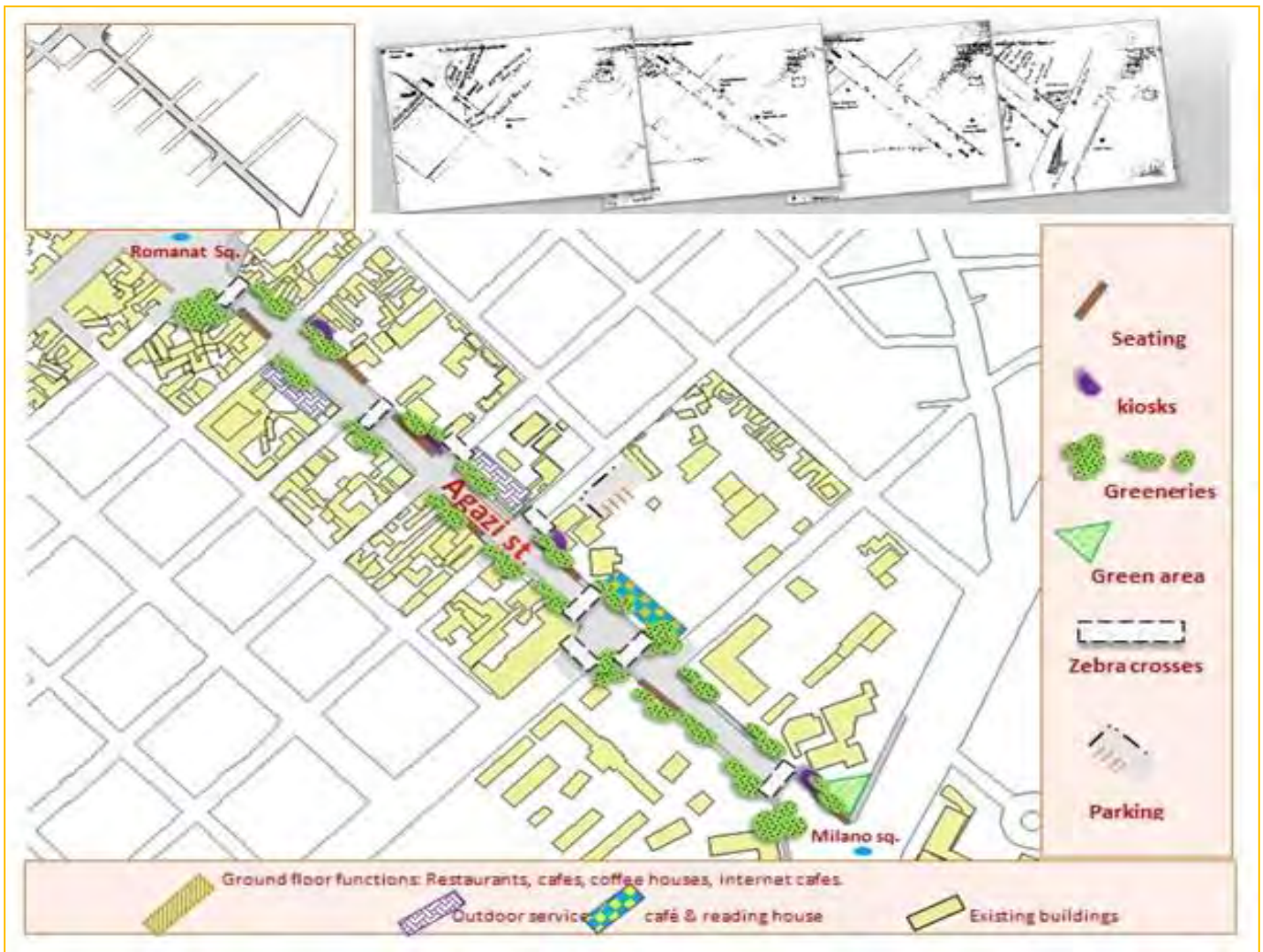


Figure 5.12: Shared cognitive map for *Alula* Street. Source: Field survey/map making /



**Figure 5.13:** Shared cognitive map for Agazi Street. Source: Field survey/map making/

### 5.3. Results found through the Likert-scale rating

#### 5.3.1. Checking livability of the District

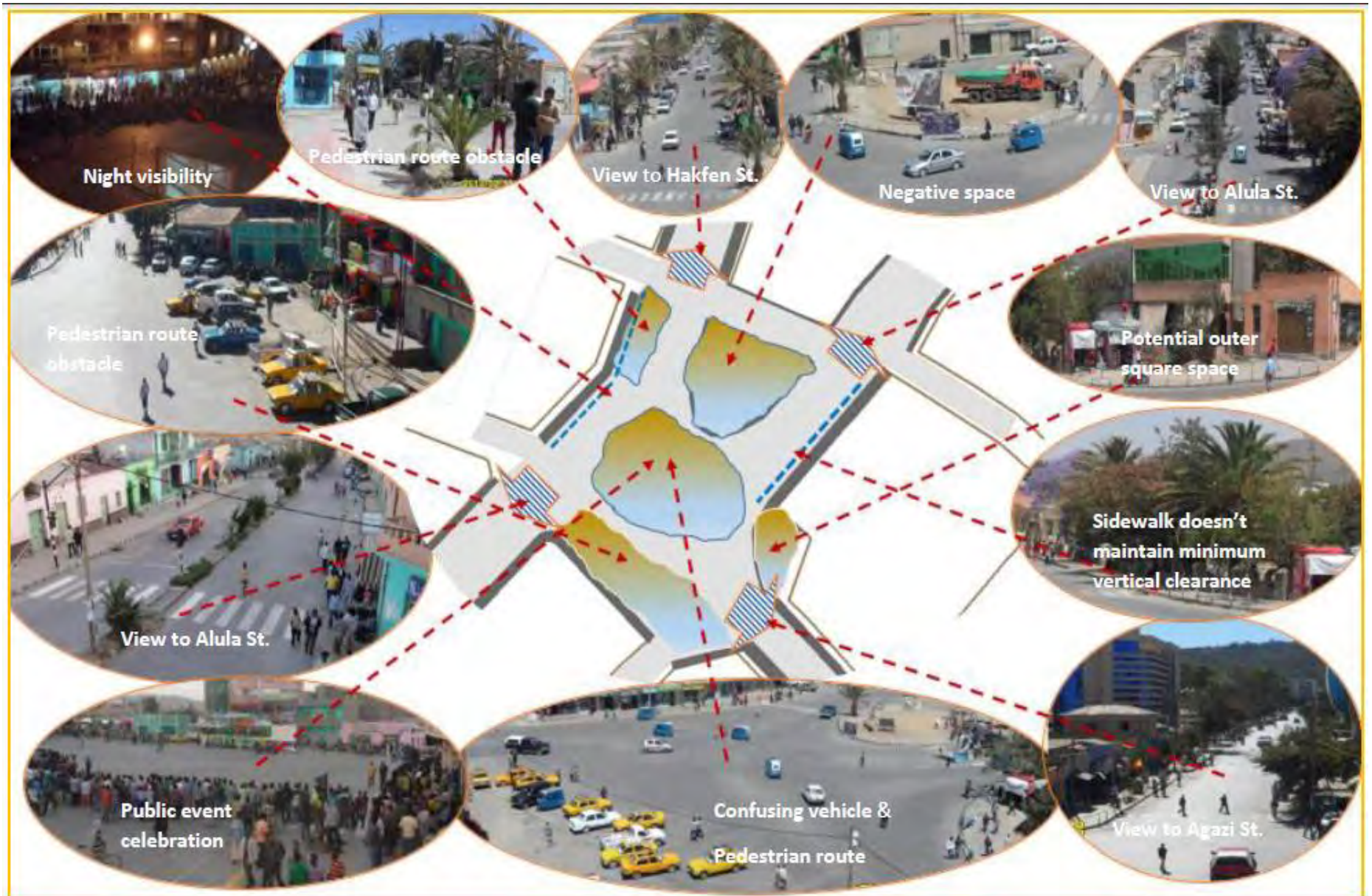
This is the analysis data of the quantitative data gathered in the Likert-scale rating; which is graded using the predefined variables of livability: comfort and image, use and activity, access and linkage and sociability (appendix I- part 3). It is all about checking the livability of square/street in terms of each livability variables and then in terms of livability in totality. The following tables have answers to the questions of: how much percent the area is livable or not livable? What are the factors that make the area livable? Why the area is not livable and what are the factors of un-livability?

**Table 5.8:** Livability rating for *Romant square*.

<b>28.13% livability in Romanat Square</b>		
<b>Comfort and image</b>	<b>25% Livable</b>	<b>75% Un-Livable</b>
		<ul style="list-style-type: none"> <li>• The square is not protected from traffic accidents, fear of accident...</li> <li>• It doesn't offer possibilities to stand(attractive edges/"edge effect", defined spots, stand bollards or supports for staying)</li> <li>• It is not inviting to stay or to sit.</li> <li>• It doesn't have aesthetic quality (good architectural design details, trees, plants, water)</li> <li>• It doesn't offer protection against unpleasant climatic conditions (wind, glare, dust, cold, storm water)</li> <li>• It doesn't connect human generations through its trees, building finish, pavements etc.</li> </ul>
<b>Use and activity</b>	<b>35% Livable</b>	<b>65% Un-livable</b>
	<ul style="list-style-type: none"> <li>• It is a space for celebrations, public events, meetings, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• It doesn't offer inviting spaces for people activities(sport activities, playing)</li> <li>• It doesn't have supporting services(café, pushcarts, food and newspaper/magazine kiosks)</li> </ul>
<b>Access and linkage</b>	<b>37% Livable</b>	<b>63% Un-livable</b>
	<ul style="list-style-type: none"> <li>• It offers possibilities to see (seeing distances, lighting/when dark)</li> </ul>	<ul style="list-style-type: none"> <li>• It doesn't offer good view (interesting views, vistas)</li> <li>• It doesn't have clear layout (signage).</li> <li>• It doesn't have harmony of connectedness/linkage.</li> <li>• It doesn't offer nice walking environment(room for walking, untiring layout of streets, good surfaces or good pavements)</li> </ul>
<b>Sociability</b>	<b>15.5% Livable</b>	<b>84.5% Un-livable</b>
	<ul style="list-style-type: none"> <li>• It can serve for different cultural activities, games, celebrations etc.</li> </ul>	<ul style="list-style-type: none"> <li>• It doesn't maintain a noise free environment or low noise level</li> <li>• It doesn't have bench arrangements, "talkscape" seating</li> </ul>

Source: Field survey/Likert-scale rating for *Romanat Sq.* /

As it is shown in table (5.8), *Romanat Sq.* is 25% livable in terms of comfort and image; 35% livable in terms of use and activity; 37% livable in terms of access and linkage; and 15.5% livable in terms of sociability. In average it is 28.13% livable.



**Figure 5.14:** Pictorial evidences of *Romanat* square and its converging primary streets. Source: Pictures taken by the author in February/March 2013.

**Table 5.9:** Livability rating for *Hakfen* Street

<b>25.6% livability in <i>Hakfen</i> street</b>		
<b>Comfort and Image</b>	<b>31.5% Livable</b>	<b>68.5% Un-Livable</b>
	<ul style="list-style-type: none"> <li>• It offers a safe environment, free of crime and violence (there is eyes on the street, good lightings from the adjacent buildings or along the street)</li> <li>• It offers protection against unpleasant climatic conditions (wind, glare, dust, cold, storm water)</li> </ul>	<ul style="list-style-type: none"> <li>• It doesn't offer possibilities to stand (attractive edges/ good "edge effect", defined spots, standing bollards or supports)</li> <li>• It isn't inviting to stay or to sit /seating furniture or defined spots that are welcoming to sit down/</li> <li>• It doesn't connect human generations through its trees, adjacent building finish, pavements etc.</li> <li>• The street isn't protected from traffic accidents, fear of accident</li> </ul>
<b>Use and Activity</b>	<b>10% Livable</b>	<b>90 % Un-Livable</b>
		<ul style="list-style-type: none"> <li>• It doesn't offer inviting spaces for people activities(sport activities, playing)</li> <li>• It doesn't have supporting services(café, pushcarts, food and newspaper/magazine kiosks)</li> <li>• It isn't a space for celebrations, public events, meetings, etc.</li> </ul>
<b>Access and Linkage</b>	<b>46% Livable</b>	<b>54% Un-Livable</b>
	<ul style="list-style-type: none"> <li>• It offers possibilities to see (seeing distances, lighting/when dark)</li> </ul>	<ul style="list-style-type: none"> <li>• It doesn't have clear layout (signage).</li> <li>• It doesn't offer a nice walking environment (room for walking, obstacles, poor pavements)</li> </ul>
<b>Sociability</b>	<b>15% Livable</b>	<b>85% Un-Livable</b>
	<ul style="list-style-type: none"> <li>• It maintains a noise free environment or low noise level, where one can able to listen and be listened.</li> </ul>	<ul style="list-style-type: none"> <li>• It doesn't have bench arrangements suitable to talk in group/ "talkscape" seating/</li> <li>• It doesn't offer inviting spaces for social activities.</li> <li>• It doesn't serve for different cultural activities, games, celebrations etc.</li> </ul>

Source: Field survey/ Likert-scale rating for *Hakfen* St. /

As it is shown in table (5.9), *Hakfen* St. is 31.5% livable in terms of comfort and image; 10% livable in terms of use and activity; 46% livable in terms of access and linkage; and 15% livable in terms of sociability. In average it is 25.6% livable.

**Table 5.10:** Livability rating for *Selam* Street

<b>24.6% livability in <i>Selam</i> street</b>		
	<b>15.75% Livable</b>	<b>84.25% Un-Livable</b>
<b>Comfort and Image</b>		<ul style="list-style-type: none"> <li>• The street isn't protected from traffic accidents, fear of accident...</li> <li>• It doesn't offer a safe environment, not free of crime and violence (there is limited eyes on the street, no lightings from the adjacent buildings)</li> <li>• It doesn't offer protection against unpleasant climatic conditions (wind, glare, dust, cold, storm water)</li> <li>• It doesn't offer possibilities to stand (attractive edges/ good "edge effect", defined spots, standing bollards or supports)</li> <li>• It isn't inviting to stay or to sit /seating furniture or defined spots that are welcoming to sit down/</li> <li>• It doesn't have aesthetic quality</li> <li>• It doesn't connect human generations through its trees, adjacent building finish, pavements etc.</li> </ul>
<b>Use and Activity</b>	<b>13.25% Livable</b>	<b>86.75% Un-Livable</b>
		<ul style="list-style-type: none"> <li>• It doesn't offer inviting spaces for people activities (sport activities, playing)</li> <li>• It doesn't have supporting services(caf�, pushcarts, food and newspaper/magazine kiosks)</li> <li>• It isn't a space for celebrations, public events, meetings, etc.</li> </ul>
<b>Access and Linkage</b>	<b>42% Livable</b>	<b>58% Un-Livable</b>
	<ul style="list-style-type: none"> <li>• It offers a good view of zeslasae square and the palace</li> </ul>	<ul style="list-style-type: none"> <li>• It doesn't offer possibilities to see (seeing distances within the street)</li> <li>• It doesn't have clear layout (signage).</li> <li>• It doesn't have harmony of connectedness/linkage.</li> <li>• It doesn't offer a nice walking environment(room for walking, un acceptable rising of walkways, tiring layout of the street, obstacles, poor pavements)</li> </ul>
<b>Sociability</b>	<b>27.5% Livable</b>	<b>72.5% Un-Livable</b>
	<ul style="list-style-type: none"> <li>• It maintains a noise free environment or low noise level, where one can able to listen and be listened.</li> </ul>	<ul style="list-style-type: none"> <li>• It doesn't have bench arrangements suitable to talk in group/ "talkscape" seating/</li> <li>• It doesn't offer inviting spaces for social activities.</li> <li>• It doesn't serve for different cultural activities, games, celebrations etc.</li> </ul>

Source: Field survey/Likert-scale rating for *Selam* St. /

As it is shown in table (5.10), *Selam* St. is 15.75% livable in terms of comfort and image; 13.25% livable in terms of use and activity; 42% livable in terms of access and linkage; and 27.5% livable in terms of sociability. In average it is 24.6% livable.

**Table 5.11: Livability rating for *Alula* Street**

<b>31.06 % livability in Alula street</b>		
	<b>31% Livable</b>	<b>69% Un-Livable</b>
<b>Comfort and Image</b>	<ul style="list-style-type: none"> <li>• The street is protected from traffic accidents, fear of accident...</li> <li>• It offers a safe environment, free of crime and violence (there is eyes on the street, good lightings from the adjacent buildings and along the street)</li> <li>• It offers protection against unpleasant climatic conditions (wind, glare, dust, cold, storm water)</li> </ul>	<ul style="list-style-type: none"> <li>• It doesn't offer possibilities to stand (no attractive edge/ good "edge effect", defined spots, standing bollards or supports)</li> <li>• It doesn't invite to stay or to sit /no seating furniture or defined spots that are welcoming to sit down/</li> <li>• It doesn't have aesthetic quality (poor space design, use of trees, plants)</li> <li>• It doesn't connect human generations through its trees, adjacent building finish, pavements etc.</li> </ul>
	<b>20.75% Livable</b>	<b>79.25% Un-Livable</b>
<b>Use and Activity</b>		<ul style="list-style-type: none"> <li>• It doesn't offer inviting spaces for people activities(sport activities, playing)</li> <li>• It doesn't have supporting services(café, pushcarts, food and newspaper/magazine kiosks)</li> <li>• It isn't a space for celebrations, public events, meetings, etc.</li> </ul>
	<b>46.5% Livable</b>	<b>54.5% Un-Livable</b>
<b>Access and Linkage</b>	<ul style="list-style-type: none"> <li>• It has clear layout (signage).</li> <li>• It offers possibilities to see (seeing distances, there is lighting when dark)</li> <li>• It offers a nice walking environment (room for walking, untiring layout of streets)</li> </ul>	<ul style="list-style-type: none"> <li>• It doesn't offer a good view</li> <li>• It doesn't have harmony of connectedness/linkage with the ground floor functions along the street.</li> </ul>
	<b>26% Livable</b>	<b>74% Un-Livable</b>
<b>Sociability</b>	<ul style="list-style-type: none"> <li>• It maintains a noise free environment or low noise level, where one can able to listen and be listened.</li> </ul>	<ul style="list-style-type: none"> <li>• It doesn't have bench arrangements suitable to talk in group/ "talkscape" seating/</li> <li>• It doesn't offer inviting spaces for social activities.</li> <li>• It doesn't serve for different cultural activities, games, celebrations etc.</li> </ul>

Source: Field survey/Likert-scale rating for *Alula* St. /

As it is shown in table (5.11), *Alula* St. is 31% livable in terms of comfort and image; 20.75% livable in terms of use and activity; 46.5% livable in terms of access and linkage; and 26% livable in terms of sociability. In average it is 31.06% livable.

**Table 5.12:** Livability rating for *Agazi Street*

<b>31.75% Livability in <i>Agazi street</i></b>		
<b>Comfort and Image</b>	<b>25% Livable</b>	<b>75% Un-Livable</b>
	The street is protected from traffic accidents, fear of accident...	<ul style="list-style-type: none"> <li>• It doesn't offer protection against unpleasant climatic conditions (wind, glare, dust, cold, storm water)</li> <li>• It doesn't offer possibilities to stand (attractive edges/ good "edge effect", defined spots, standing bollards or supports)</li> <li>• It doesn't invite to stay or to sit /seating furniture or defined spots that are welcoming to sit down/</li> <li>• It doesn't have aesthetic quality (poor space design, use of trees, plants)</li> <li>• It doesn't connect human generations through its trees, adjacent building finish, pavements etc.</li> </ul>
<b>Use and Activity</b>	<b>28% Livable</b>	<b>72% Un-Livable</b>
		<ul style="list-style-type: none"> <li>• It doesn't offer inviting spaces for people activities(sport activities, playing)</li> <li>• It doesn't have supporting services(caf�, pushcarts, food and newspaper/magazine kiosks)</li> <li>• It is not a space for celebrations, public events, meetings, etc.</li> </ul>
<b>Access and Linkage</b>	<b>44% Livable</b>	<b>56% Un-Livable</b>
	<ul style="list-style-type: none"> <li>• It has clear layout (signage).</li> <li>• It offers possibilities to see (seeing distances, there is lighting when dark)</li> </ul>	<ul style="list-style-type: none"> <li>• It doesn't offer a good view (interesting views, vistas)</li> <li>• It doesn't offer a nice walking environment(tiring layout of street, obstacles)</li> <li>• It doesn't have harmony of connectedness with the ground floor spaces.</li> </ul>
<b>Sociability</b>	<b>30% Livable</b>	<b>70% Un-Livable</b>
	<ul style="list-style-type: none"> <li>• It maintains a noise free environment or low noise level, where one can able to listen and be listened.</li> </ul>	<ul style="list-style-type: none"> <li>• It doesn't have bench arrangements suitable to talk in group/ "talk-scape" seating/</li> <li>• It doesn't offer inviting spaces for social activities.</li> <li>• It doesn't serve for different cultural activities, games, celebrations etc.</li> </ul>

Source: Field Survey/ Likert-scale rating for *Agazi St.* /

As it is shown in table (5.12), *Agazi St.* is 25% livable in terms of comfort and image; 28% livable in terms of use and activity' 44% livable in terms of access and linkage; and 30% livable in terms of sociability. In average it is 31.75% livable.

#### **5.4. Results investigated through the site observation**

The study results of the author's investigation on the district conditions that can influence the lack of staying and walking interest using the table of variables (appendix I- part 4), are analyzed and presented here under.

### 5.4.1. The physical environment of the study area



Figure 5.15: Environmental inventory and analysis. Source: Site observation

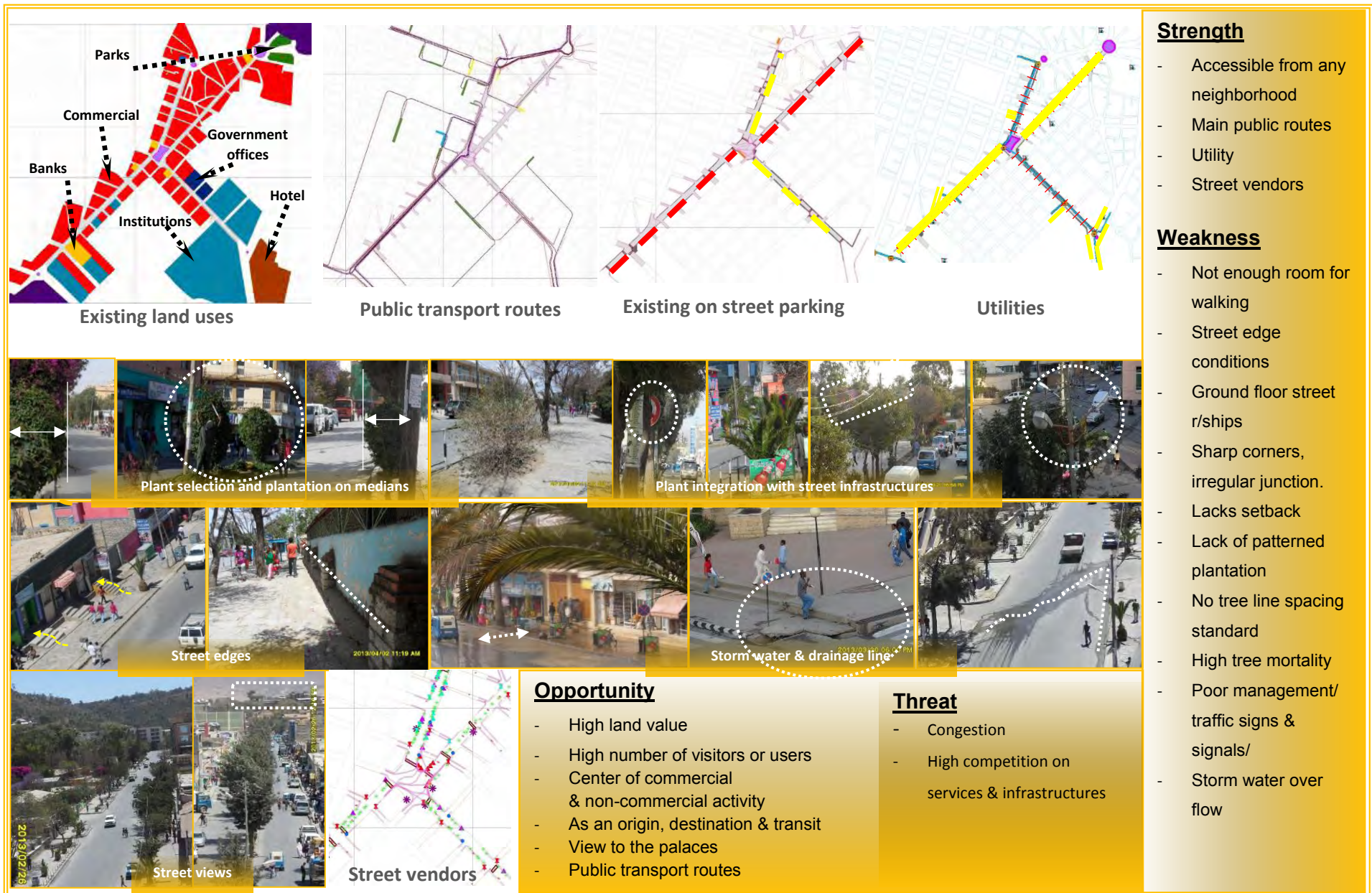


Figure 5.16: Physical and social inventory and analysis. Source: Site observation.

# CHAPTER SIX

## 6. DISCUSSION AND PROPOSAL

### 6.1. Discussion

In this chapter, all the study findings which are analyzed and presented individually are discussed and interpreted collectively; under the category of existing livability problem investigation and future preference exploration, the case of *Romanat Sq.* and *Romanat Sts.*<sup>25</sup>. In here, the livability variables which are briefly discussed under the theoretical framework of the study are the basics of the interpretation.

#### 6.1.1. Existing livability problems of the district

In this section, all the analyzed data under the in-depth interview, the Likert-scale rating and the site observation, which are related to the existing livability problems, are discussed and interpreted.

##### 6.1.1.1. Comfort & image

For the purpose of this discussion, attributes of this variable are regrouped in to safety, provision of amenities, and attractiveness and image.

**Safety:** - The safety of a place is prove of being; free of crime and violence, protected from traffic accidents/fear of accidents and protected from unpleasant climatic conditions (sun/wind/rain, glare, dust, cold /warm and storm water) (Gehl, 2010). When we see the safety of the district according to those safety requirements:

***Romanat Sq.*** has a safe environment in the case of crime and violence, as there are eyes on the square and night light from the adjacent buildings. But, there is fear of accidents as it is not protected from traffic accidents. Also, it doesn't offer protection against unpleasant climatic conditions as it is exposed to excessive sun, wind, glare, cold, warm, and there is multi directional storm water.

***Romanat Sts.*** are free of crime and violence except those *Selam* and *Agazi Sts.*, which are not safe at night as there is no active night light along, both from the street and from the adjacent buildings. *Alula* and *Agazi Sts.* are relatively protected from traffic accidents than those of *Selam* and *Hakfen Sts.*, where there is fear of accidents. All are exposed to unpleasant climatic conditions except *Hakfen St.*, the street relatively with good shades from the street trees.

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<sup>25</sup> *Romanat Sts.* - the group of primary streets converging to the *Romanat* square.

The safety of the district in case of the traffic accident can also be clear by understanding the users' safety in crossing. It is fact that, the primary purpose of crosswalks is to provide safe crossing for pedestrians by informing the drivers to lessen their speed or stop and give first priority. Despite this fact, as we can see from table (5.4), majority of the users don't prefer to use crosswalks due to the disorientation of crosswalks in relation to active nodes, where the lack of awareness and the physical quality of the crosswalk are another reasons. So pedestrians are easily exposed to traffic accidents in this district.

The lack of pleasant microclimate affects safety of the district, directly by exposing the users to excessive sun/wind, affecting the users' health; and indirectly, by limiting the time interval that the district becomes active. That is, the district streets are active in the morning time before 9 and evening time after 5 and the major reason mentioned behind was, the relative good microclimate of the area at those times (table: 5.3). It is at those times when the users are happy to visit the district for the purpose of different recreational and commercial activities. So it is easy to understand that the district is highly exposed to excessive sun and wind out of those time intervals. It is difficult to walk or to take stop; so that users prefer to be out of those outdoor spaces as soon as in any case, either they get in to motorized options or in to catering facilities.

**Provision of amenities:** - public amenities are the availabilities of physical elements, such as: seating, shade trees, places offering food, bike racks, and bulletin boards, well designed and in the right place (Francis, 2009). At least it requires the availability of public seating that send welcoming signals to take a seat. Those can be primary (benches, chairs) and secondary (seating landscapes such as stairs, curbstones, and defined platforms).

**Romanat Sq.** doesn't invite to have a seat; in here neither seating benches nor seating landscapes are provided.

**Romanat Sts.** among, *Selam* and *Hakfen* have seating benches owned by the shoe shiners that sometimes pedestrian can take a seat when there aren't occupied by customers, but even those are rare for *Alula* and *Agazi* Sts.

As we can understand from the above, the district is not provided with public amenities, which means there is nothing that attracts you to stay there. So you simply pass by to indoor catering facilities such as cafes, restaurants, hotels and so on. This is the other reason in addition to the lack of unpleasant microclimate that made the district streets' major use to be a transit.

**Aesthetical attractiveness and image:** -It is an attractive and inviting quality that a place can reflect due to the presence of details and uniqueness in its design.

**Romanat square-** though the majority couldn't notice it, this square connect human generations because of the presence of the Italian building style in one of the adjacent buildings and the long time presence of the *Romant* music shop that became a reason to name the square as *Romanat* square<sup>26</sup>(fig: 5.8). But, it is not with good architectural design details that it doesn't have attractive edges (such as in their building finishes and openings), and detailed hardscapes and softscapes that invite pauses and stays.

**Romanat streets** don't have tangible evidences that connect the current generation with the past. However, there is a legend for *Selam* and *Alula* street, the streets that were supposed to be in one line in order to connect the two places (Emperior yohannes and Dejach Abrha), but not constructed as they are supposed to be<sup>27</sup>. All streets don't have good architectural detail in their street environment, that they don't invite to take stops and experience, but relatively *Hakfen* St. does because of the presence of the street trees.

The users' experience of the study area was dependent to this visual attractiveness and image quality. Majority of the users didn't have a good memory related to the study area, due to the lack of quality physical environment (in the walkways, nearby ground floors, views and microclimate) and traffic conditions.

The choice on the means of travel to access the district was also dependent to the visual attractiveness of the district. That is, though there are many opportunities that can make walking as major means of access, some users prefer to take contract taxis or private cars even for short distance. The major reason behind this case is the lack of eye taking space qualities that let you entertain your walking activity. The condition that decreases the space quality is the poor physical environmental condition of the sidewalks (regarding their width/capacity, pavement, nearby ground floor activities, the space competitions by the street vendors and limited presence of shaded areas.

In general the comfortability and imagability of the study area was highly dependent on the safety issues such as the protection from traffic accidents, fear of accidents and from unpleasant climatic conditions. Also, it was dependent on the provision of amenities and visual attractiveness. Therefore, those all issues should be addressed in specific to the individual case area's degree of requirement in order to enhance the comfortability and imagability of the study area. That is to enhance the walkability of the district, to make visits more enjoyable, to make the district active at all times or at least for 18 hours a day and to experience the district in an enjoyable and relaxing way.

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<sup>26</sup> Legend behind the naming of the square

<sup>27</sup> *Ras Mengesha Siyum* the fourth grandson of Emperor yohannes IV had designed *Selam* St. and *Alula* St. to be in a one direct road which is to connect the two palaces. But not implemented as per the design and this was because to keep the individual interests of those who were in power, who their home found around *Romanat* square (Legend history).

### 6.1.1.2. Use & Activity

This is a demand on a balanced mix of different user groups and activities and this is tied with the presence of people who can stay for a long time doing their preferred activities (Francis, 2009).

**Uses and users:** - It is about the flexibility and adaptability of a space to accommodate multi uses and users.

**Romanat sq.** can have space uses such as for public events, celebrations, public mini-exhibitions, meetings and for street vendors (shoe shiners, book/newspaper/magazine sellers and others) but doesn't have defined spots. There is lack of supporting services such as cafes, pushcarts and food/ newspaper/magazine kiosks. City wide role, it is the central node or central route distributor.

**Romanat Sts.** don't have spaces for public events as *Romanat sq.* does, and don't have supporting services such as cafes, pushcarts and food/ newspaper/magazine kiosks. They all are the major public transport routes of the city, especially those *Hakfen* and *Alula* streets.

**Activities:** -It is about the presence of diversity in activities which are friendly and welcoming to all groups of people. According to the illustration in figure (3.7), high range of necessary activities (the daily coming/goings and the daily transit activities) can be expected in low physical environment quality, but it is not as such possible to expect optional activities (daily recreational, visits to recreational spaces and visits to planned activities). Optional activities are highly dependent on the quality of physical environment (Gemzøe, 2008; Gehl, 2010).

**Romanat Sq.** doesn't offer inviting spaces for people friendly activities such as sport exercises and plays, but does for celebration activities and shopping activities in their street vendors and edges. There are high range of daily transit activities followed by daily coming/going activities, and to some extent, the visits to recreational (visits by customers to the adjacent functional buildings) and visits to planned activities.

**Romanat Sts.** do offer shopping activities in their ground floors, especially *Hakfen* Street. All don't have inviting edges and street spaces that accommodate people friendly activities such as sport exercises, plays and social meetings. The visits to recreational spaces have the highest range for *Hakfen*, *Alula* and *Selam* Sts. followed by the daily coming/going and daily transit activities. For *Agazi* St. there were daily transit activities followed by daily coming/going activities.

As the streets in this district are the major public transport route distributors of the city, a lot of users flow to the district for different activities. Despite this fact, their stay in those outdoor public spaces is negligible when we take in case of individual users or friends in groups; they simply appear in and

disappear out of those spaces. This can be easily understood in relation to the investigated case-frequency of visitation, under the in depth interview. The users visit frequently as much as (2-3) times a day or at least weakly mostly for the purpose of daily coming/going as work place followed by the visits for recreational and commercial activities and for the purpose of daily transit to work/school/church. As of the zonal trip exchange and OD matrix survey (fig: 4.11) made by the MCCDPPP (2011) also, more than (2/3) of the public transport trips are made to and back from the center (to and around the study area). And the purposes of above (1/2) of the trips are for going to/from work, and the others are for the purpose of visits to recreational spaces and follow-up of different cases. In relation to the pedestrian OD, the main purposes of the (1/3) trips made through the core are to and from work, and others are made for visits to recreational spaces including follow-up of different cases. Those all show that, the highest range of activity took place in the district is the daily coming from and going to, which is an obligatory activity. In other words, majority of the users visit this area to perform their obligatory or routine activities. So, as of the illustration (fig: 3.7) made by Gehl (2010), the district is with low physical environment quality.

### **6.1.1.3. Access & Linkage**

Access and linkage are the livability variables about the ease to cross the street, the access to the pedestrians and comfortable activities on sidewalks and the provision of multiple transportation options (NYCSR, 2006).

**Access:** -Access is an opportunity and means of entering and approaching a place. It can be categorized in to visual, physical and social access or in to perceived and actual access (Francis, 2009).

**Romant Sq.** offers possibilities to see distances within, as it is free of permanent structures. There are difficulties of crossing the square and even ambiguous priority between the vehicles and pedestrians. It is with uncomfortable walking environment that its sidewalks haven't enough room for walking, no comfort and unity in the pavements and are obstructed by the parking lot, street vendors and the free standing street poles.

**Romanat Sts.** offer possibilities to see distances within each at day time. But, the over scaled sidewalk trees in *Hakfen St.* and median trees in *Selam* and *Alula Sts.* are limiting the quality of visibility in addition to the sharp block corners. All except *Agazi St.* don't offer a good visual contact, although there are interesting places to view from each street, especially for the *Selam* street. Also, All don't have a nice walking environment, but *Hakfen* and *Alula Sts.* are relatively with good walking environment as their sidewalks are shaded to some extent.

**Linkage:** - It is the ability of a space layout to direct or lead movements in to different ways and harmonious functions. It signifies the presence of information provider signage and signs. It is also about

the smooth ground floor street relationship (such as function compatibility, entry and edge effect) (Katie, 2006).

**Romant Sq.** doesn't have clear layouts and signage within and doesn't have harmony of connectedness with the emerging local streets in its surface treatments but it can direct the movement flows to four primary routes and to four access routes (fig: 4.6b).

**Romant Sts.** have harmony of connectedness in their pavements, except *Selam* street. All have clear layout, and can lead to respective squares and to various access routes (fig: 4.6b).

Access to the crosswalks was investigated under the in-depth interview in the culture of using crosswalks. Majority of the users don't use crosswalks and the mentioned reasons behind in relation to the accessibility are the physical conditions of the crosswalk (their visibility, intervals among, orientation in relation to nearby functional spaces and their availability in relation to the route length). In other words, some crosswalks are washed out; some are oriented to dead places that don't attract to cross, in some the distance between two crosswalks is long and even there are limited numbers of crosswalks. Those all cases show that, accessibility of the crosswalks are poor in this district.

In case of the transport options also, as of the MCCDPPP (2011) study in the city level, non-motorized (walking and cycling) covers 12.2% and the length of pedestrian trips reaches up to 9 km, which is tiring and time taking. The main problems found by the MCCDPPP behind such walking situation are the narrow and poor condition of walkways and the lack of alternative affordable transport as most of the pedestrians are found to be with low income. That is, there are places where walking is the only option unless it is possible to afford contracting *bajaj* services. Those places are within 2km radius of the taxi station, where it is difficult to find taxi service once it is fully loaded at the city core taxi stations. Also, since the taxi stations are distributed with an average spacing of (1060m) more than twice of the reasonable walking distance- 400m, it is must to walk. In line with this, this study has found walking as a major means of travel through the *Romanat* district (40-92%). This study has also explored the lack of soft street edges and friendly activities in sidewalks to be a reason of why walking become tiring in addition to the reasons mentioned by the MCCDPPP. Thus, it is difficult to say that the district is with provision of multiple transport options if it is not provided with nice walking environment.

#### **6.1.1.4. Sociability**

It is about having maintained talkscape and inclusive environment that reinforce many more social interactions to take place. It is feeling of friendly and familiarity created due to the togetherness of the people (Katie, 2006).

**Talkscape environment:** - It is an environment with provision of talkscape seating arrangements, and an offer of low noise level environment in which it is possible to hear and be heard.

**Romanat Sq.** doesn't have bench arrangements since there is no seating provision and doesn't maintain noise free environment due to the traffic congestions and sirens, unless it is restricted for vehicles. The main reason to the existence of the noise pollution is the lack of noise screening soft-scaping elements such as trees.

**Romant Sts.** have relatively low noise level, but don't offer inviting spaces for social activities as there is no talkscape seating arrangements.

**Inclusive environment:** - It is an environment with diversity of activities that can belong to both gender groups, all age groups, all culture groups and to all income groups.

**Romanat sq.** relatively can serve public celebrations.

**Romanat sts.** don't serve for different cultural activities, games and celebration, as they aren't places designed for such activities at the first place.

In the case of the *Romanat* district sociability, inclusive environments with the provision talkscape environment are the users' critical issues. Noise level is not a serious case for the streets but for the square.

In general, the district has a city wide role, as central node and route distributor, and is supposed to be center of commercial and non-commercial activities. Despite this fact, the following critical issues are investigated regarding its existing livability situation. Those are; the safety issues, the lack of place identity, the poor walkability environment, the lack of public amenities, the lack of diversity in activities, the lack of affordable optional transport modes and the lack of inclusive talk-scape environment. It is due to those conditions that the physical environment of the district became discouraging to walk and stay. In other words, this is the condition that made the major uses and activities of district squares and streets to be only for passing by; the condition that made the users to be dependent on the indoor catering facilities such as cafes and restaurants for staying; the condition that made staying in the district impossible without paying and the condition that made users to be interested in choosing motorized mode of transportation even for short distances than walking.

### **6.1.2. The future preferences**

In this section, the recommended design ideas under the future preferences and the shared cognitive maps on enhancing livability of the district are discussed.

### **6.1.2.1. Comfort & Image**

**Romanat Sq.** - In case of the square safety; physical isolation of pedestrian from vehicular, awareness creation, provision of zebra cross at pedestrian desired lines, street lights, controlling the sudden presence of people with mental disorder that can harm users are proposed. There is a need of greenery provisions within and along the sidewalks of the square for the purpose of creating shades, decreasing the existing warmness and storm water management. The walk ways should be widened and amenities (seating benches, display screens and fountains) should be provided. Maintenance of the existing traffic lights and signs is also proposed in order to make them functional and active at all times.

**Romant Sts.** - Widening of the sidewalks and provision of amenities, defined standing and seating spots are proposed along all streets. For *Selam St.*, controlling the over privatization of sidewalks, maintaining unity and continuity in the sidewalk pavements, plantation along the sidewalks, integrating the street trees with street poles and traffic signs and avoiding the median trees which are covering the view to the vehicles and blocking the zebra crosses to a defined interval of plantation are proposed. For *Hakfen St.*, proper location of dustbins, active and visible traffic signs and signals, relocation of the electric poles which are now the obstacles of the walkways and controlling of the misbehaved street children from harming the pedestrians are proposed. For *Alula St.*, proper selection of plantings, active traffic lights along, and maintaining the visual aesthetic of edges by removing the informal hanging shades and by fixing the color mixes according to the color codes are proposed. Maintaining the banner posting, walkway pavements, the midway tree bed, and constructing clear storm water drainage layout and integrating the infrastructures with street trees. In the *Agazi St.*, adjusting the tree multi-lines to one defined line, emphasizing the fenced wide walkway, clear painting of zebra cross and maintaining clear visibility to the traffic signs are proposed. Also, provision of green area and seating for the purpose of waiting and staying activities are proposed, especially for the regular visitors of this street such as students, notice board readers and for the customers of the Supreme Court.

### **6.1.2.2. Use & activity**

**Romanat Sq.** - Provision of defined spots for street vendors (shoe shiners), active frontages (catering services), supporting services or uses (book and magazine stores, mini shops, mini café, play stations(table tents, pool house, display screens) and ground floor functions (restaurants, café, coffee houses, supermarkets, game rooms, book store, internet cafe) are proposed to enhance the use and activity of *Romanat Square*.

**Romanat Sts.** - Provision of enough defined spaces for car parking and street vendors are proposed along all streets. For *Selam St.*, provision of defined space for notice boards and kiosks, and ground floor functions such as restaurants, coffee houses, game rooms, book stores, internet cafes, jewelry shops, and modern and cultural cloth shops are recommended. The space to street vendors (shoe shiners and

book sellers) has to be with good view of pedestrians. For *Hakfen St.*, uses within such as kiosks and ground floor functions such as sidewalk cafes, restaurants, coffee houses, game rooms, book store, internet cafes, and shops are preferred. For *Selam St.*, incorporating openings on the existing long fenced walls, emphasizing the functional variety, ground floor functions such as cultural restaurant, coffee house, game room, book store, internet café, juice house, cultural and modern cloth shops, and provision of kiosks along are proposed. For *Agazi St.*, uses within such as newspaper, magazine and food kiosks, mini-public libraries to support the nearby school students, proper locating and maintaining of shoe shiners spaces, ground floor functions such as, restaurant, café, coffee house, internet café and reading café are preferred.

#### **6.1.2.3. Access & linkage**

**Romanat Sq.** - An easy access for clear circulation of the vehicles, and pedestrians and provision of crosswalks at pedestrian desired lines are preferred.

**Romant Sts.** - Provision of smooth crosswalks that are free from any obstacles and median walkways are proposed for *Selam Street*. Strictly prohibiting the standing or parking on the crosswalks is proposed for all streets.

#### **6.1.2.4. Sociability**

**Romanat Sq.** - To enhance the sociability of the square, provision of arbor shades for public entertainments is proposed.

**Romant Sts.** - An enough space to watch the billboards (spaces to stand) and defined seating spots for meeting are proposed along *Hakfen St.* regarding sociability.

To summarize, the most preferred design attributes which are recommended to be incorporated on the future design of the district are groups of comfort and image, and uses and activity. Under the first preferred variable group-comfort and image, the most preferred attributes are: provision of room for walking, properly selected and planted greenness, properly located amenities, visible and active traffic signs/signals, clear storm water drainage layout, and maintenance and management issues. That is, the respondents have stressed more on the walkability, sittability, greenery and safety issues. Provision of sidewalks with diversity of uses and activities, mixing up of functions in ground floors, provision of transparent ground floors with many units and provision of defined street parking places are proposed under the second preferred livability variable-use and activity. Whereas under the access and linkage variable group, an easy access for vehicular, provision of pedestrian crossings at desired lines that are free of obstacles, provision of median walkways, maintenance and management are the spatial attributes that become critical issues for the users. Provision of outdoor shades with defined seating spots for meeting and for standing are preferred to enhance sociability in the district. Final expectations of those all preferences are: to make staying in the district possible without paying; to provide reasonable walking

distances which are full of experiences and to make walking the first preferred optional means of travel within the district and further within the city CBD.

## **6.2. Proposal**

In order to use the livability concept in the landscape design, it is important to generate conceptual design objectives, principles, programs and tools, and design approaches; design solutions which are specific to the case area. In addition to the design solutions, possible implementation and management options are also highlighted in this section, proposals which can be responsive to the design and which are open to any modifications according to the situations of the construction time.

### **6.2.1. Design proposals**

#### **6.2.1.1. *Conceptual design solutions***

The following conceptual design solutions are proposed, design solutions that can reduce the existing livability problem or that can enhance livability of the district. The design solutions are composed of conceptual design objectives, principles, programs and tools. This study has adapted the three briefly explained design approaches (section 3.7), to achieve the generated design objectives. Those are: landscaping at eye level, ground floor architecture and introducing traffic calming tools. This study has fully applied the first and the third approaches in the design proposal; to create human scale spaces, users' desired spaces, to produce calmed streets and to increase pedestrian priorities. But the second approach is applied only to recommend the compatible ground floor functions, ground floor transparency, use of vertical garden and some details of ground floor facades for the future redevelopments.

In this section, the landscape layout, sectional elevations and details of the produced design are presented first. Then, the existing and proposed images of the district are presented in comparative form. Finally, the direct transformation of the generated conceptual design objectives, principles, programs and tools to the proposed images are presented in detail.

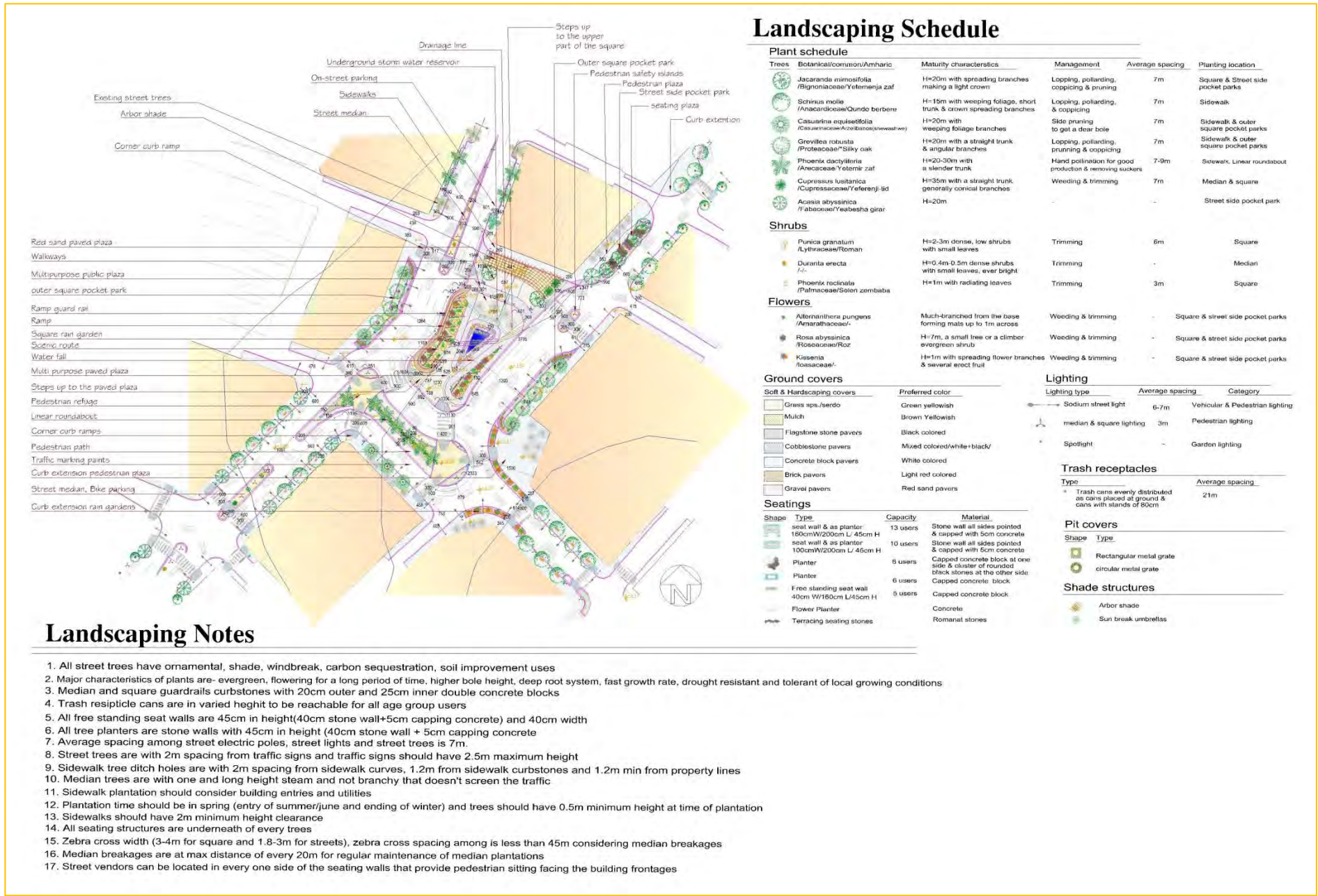


Figure 6.1: Landscape Layout plan

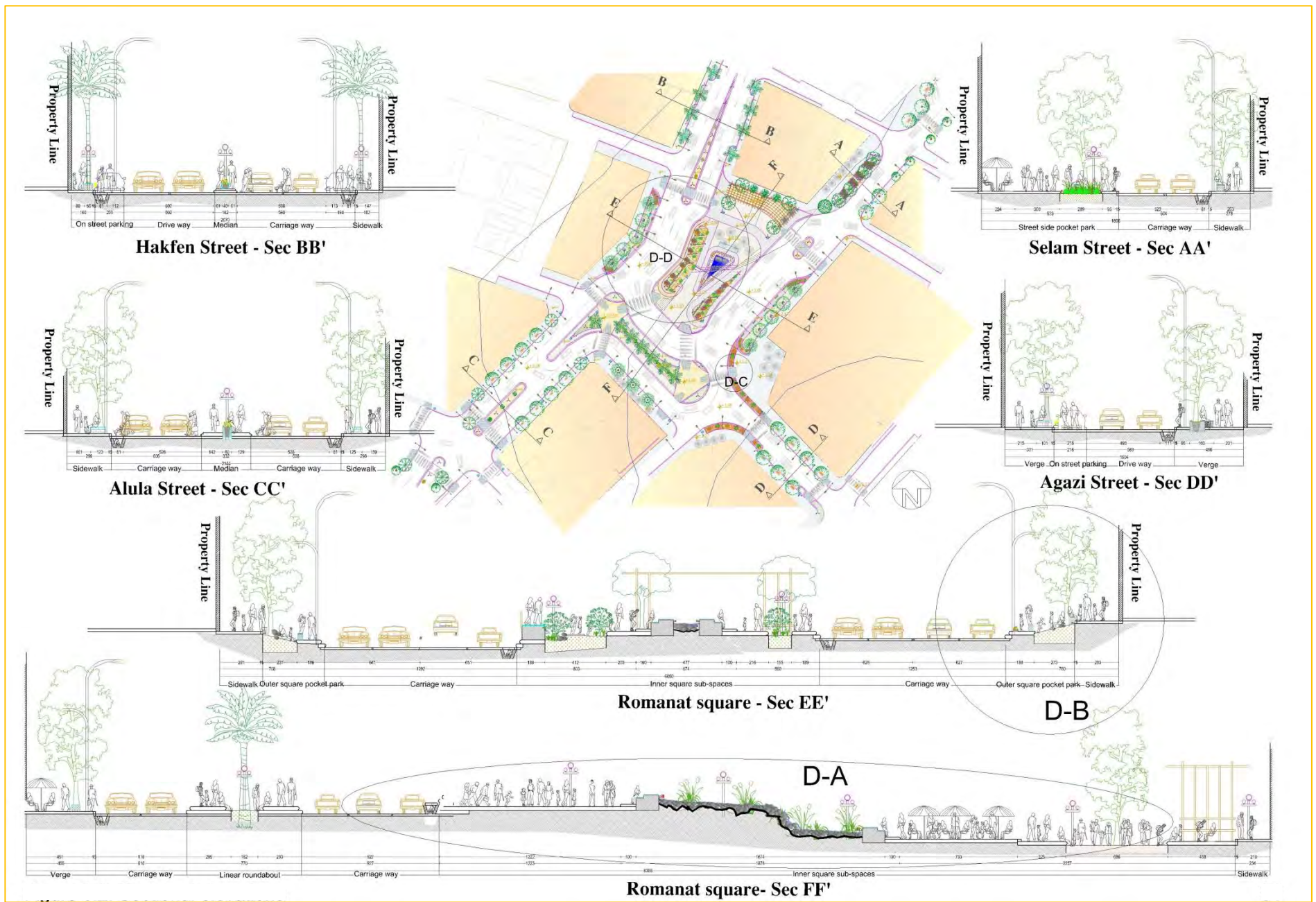


Figure 6.2: Sectional elevations

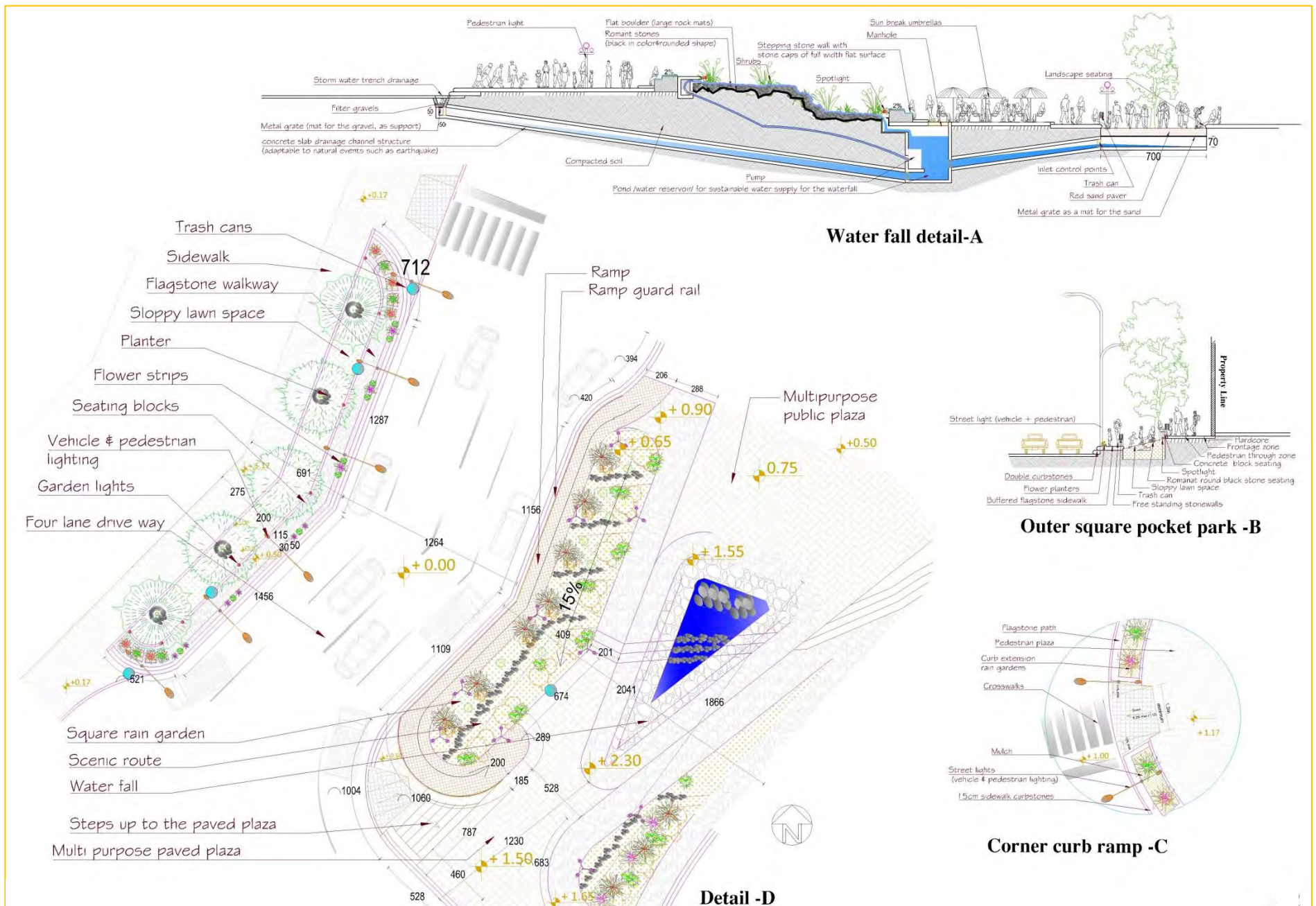


Figure 6.3: Details



Figure 6.4: Before and after image of Romanat Sq.



Figure 6.5: Before and after image of Romanat Sq.



**Figure 6.6:** Before and after image at the entry to *Romanat Sq.* from *Selam St.*



Figure 6.7: Before and after images



Figure 6.8: Before and after image at the entry to *Selam St.* from *Romanat Sq.*



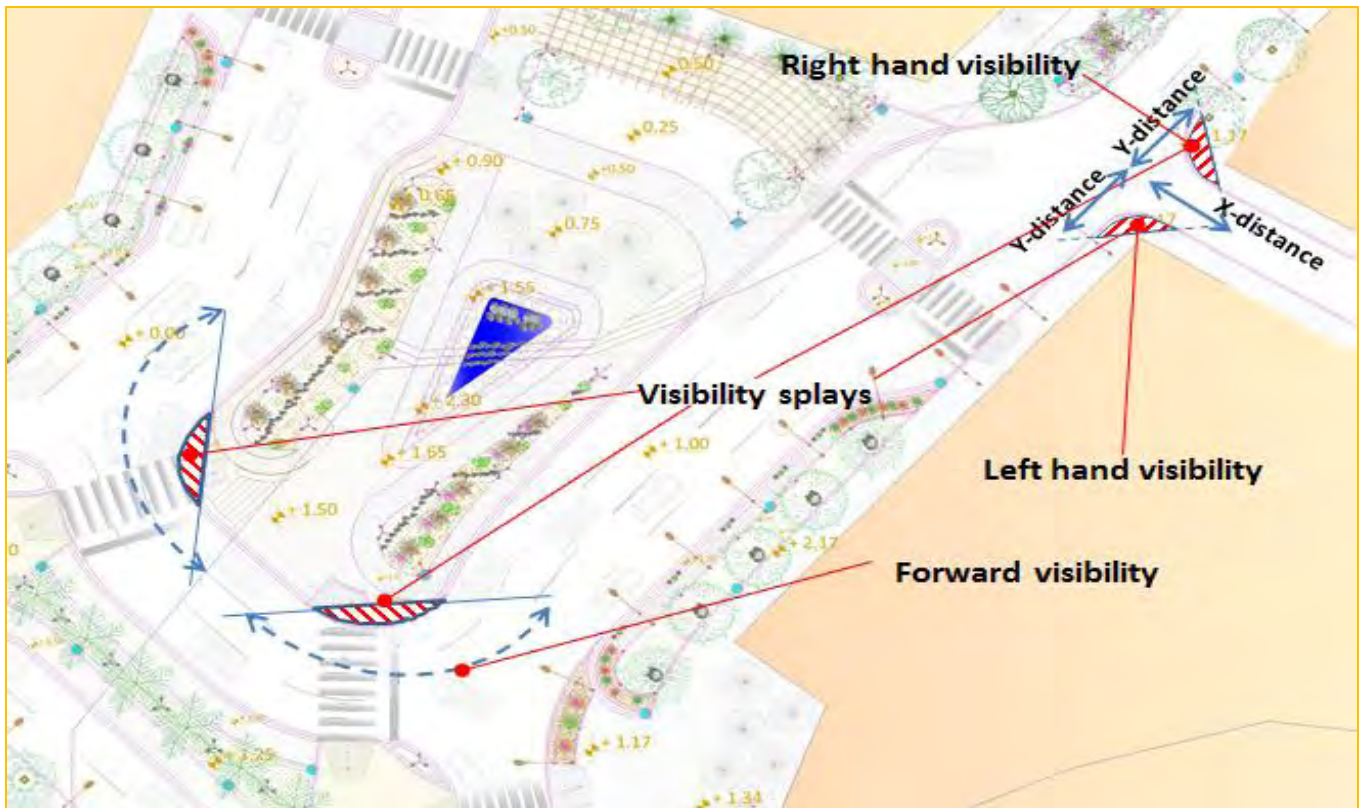
Figure 6.9: Before and image at the entry to *Hakfen St.* from *Romanat Sq.*

## Conceptual design objectives, principles, programs and tools

### Conceptual design objective 1: To produce a comfortable district with its own unique image.

#### Principle 1: Should provide safe environment

- ✚ Should be protected from traffic accidents and fear of accidents.
  - \* Traffic calming tools should be introduced in the design to influence driver's behavior in reducing vehicle speed to levels that are appropriate for the local context and deliver safe streets for all.
    - Maximum design speed should be limited to 30km/h.
    - Curb extensions, pedestrian islands, pavement markings, street closures (applied in *Selam* and *Agazi* Sts.) and street trees should be provided (see fig: 6.1 and fig: 6.12 )
    - Areas of visibility splays should be free from any obstacles to allow the inter-visibility between pedestrians and vehicles (fig: 6.8 and fig: 6.10).
    - Turning radius should be considered (fig: 6.3 (detail C and D)), for safe and convenient turnings.
  - \* There should be clear layout of vehicle and pedestrian routes (fig: 6.12).
  - \* There should be enough, safe and enhanced crosswalks at pedestrian desired lines and within desirable distances (fig: 6.5).
    - strictly prohibiting to stand or park on the crosswalks
    - Maintain the median to have breakages at every crosswalks (fig: 6.8)
  - \* There should be buffers or guard zones that protect pedestrian from vehicles (fig: 6.11).
  - \* Maintain the existing traffic lights and signs in order to make them functional and active at all times.
  - \* The misbehaved street children and the mentally disordered people should be controlled from harming the pedestrians.
- ✚ Should be responsive to the local climate and environmental constraints
  - \* Should offer protection from unpleasant climatic conditions
    - There should be wind/sun break plantings or structures (fig: 6.13).
    - There should be plantings that protect from the glazed buildings' glare.
  - \* Sustainable storm water treatment should be considered to manage the surface runoffs
    - Pervious ground covers should be provided (cobblestone, flagstone, red sand and turf and the rain gardens (fig: 6.1). In addition, the drainage gutters should be bedded with gravels to allow continuous absorption of water to the ground (fig: 6.2).
  - \* Topography should be considered to create an environment which is attractive and comfortable to users (fig: 6.14).



**Figure 6.10:** Visibility splays that should be kept clear of any barrier.

NB. Visibility from minor road: X-distance  $\leq 2.4\text{m}$ ; y-distance or SSD<sup>28</sup> = 9m-20m for design speed of 16km/h-30km/h

Visibility on priority road or forward visibility<sup>29</sup> is the distance tangent to the x and y-distance (RR Donnelley, 2010).



**Figure 6.11:** Buffered pedestrian paths

<sup>28</sup> SSD (stopping sight distance) is a distance within which drivers need to be able to see ahead and stop from a given speed.

<sup>29</sup> Forward visibility is the distance required to be able to see oncoming traffic and be seen by following traffic.



Figure 6.12: Image of the landscape layout

✚ Should be free of crime and vandalism

- \* There should be eyes on the streets (clear visibility should be maintained between the street environment and the adjacent buildings)
- \* Spaces should be well lit and should avoid hidden corners which enable antisocial behavior to occur undetected (fig: 6.22).
  - Vehicular as well as pedestrian lightings should be provided (fig: 6.3)
  - Police and or security guards should perform regular patrols to monitor space and discourage inappropriate behavior such as harassment or vandalism.

**Principle 2:** Should provide pleasant sense of experience

✚ Should provide sunny or shaded spaces based on the microclimate condition of the time

- \* Plantings or shade structures should consider sun orientation to the way they can maximize environmental benefits (fig: 6.13).

✚ Should provide a nice walking environment

- \* Ongoing maintenance of the district should ensure that, damage to furnishings, floor surfaces and manholes is repaired instantly to maintain the appearance of the space and most importantly for the safety of the pedestrians.
- \* There should be relevant parties responsible for basic services such as garbage collection and security services to provide clean and secured environment.
- \* The provision of ledges or bollard around building facades should be encouraged in new developments where it is appropriate. This provides greater opportunities to attract pauses and stays.
- \* Awnings should be mandatory in new development to enhance the pedestrian experience and provide protection from sun and rain.
- \* Vertical gardening should be applied in new development to increase the green look of the district. Such as roof gardens, climbing trees and cup trees in building facades.
- \* There should be sidewalks with plaza zone, pedestrian passing zone and street furniture zone (fig: 6.2 and fig: 6.15).
- \* There should be enough room for walking, clutter free and with good surface treatments.
- \* Street furniture should be located for maximum benefit
- \* Street lighting should be as discreet as possible, but provide adequate illumination for both the pedestrian and vehicle.
- \* Signs and street markings should be kept to a minimum to reduce pedestrian obstruction.

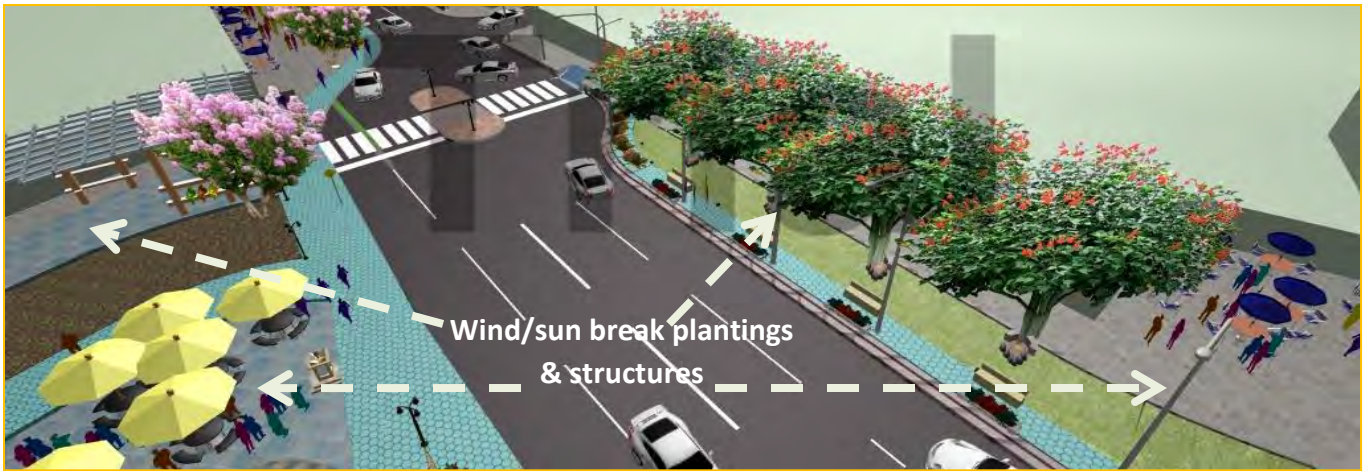


Figure 6.13: Protections from wind/sun/rain.



Figure 6.14: Adapting the topography to create interesting level changes



Figure 6.15: Comfortable walking environment



Figure 6.16: Primary and secondary sitting possibilities

### **Principle 3:** Should maximize sitting and staying opportunities

- \* There should be attractive edges that invite stays (fig: 6.16 and fig: 6.19)
- \* There should be seating zones that provide primary and secondary sitting possibilities. Furnishings should maximize comfort and usability for users within a space. Seating should be appropriately located (able to receive an appropriate level of solar access) and should be comfortable, particularly for the elderly to use to rest. Ledges, steps and bollards can also be used to provide additional informal or secondary seating in peak periods, as a place to lean and to rest goods upon (fig: 6.16).
- \* There should be supporting amenities and services such as trash cans, public telephones, public toilets and food kiosks.

### **Principle 4:** Should provide a unique image

- + Should provide local identity for the CBD (fig: 6.14). (reflects the image of the *Romanat* neighborhood's waterfall, Roman trees<sup>30</sup> are provided, stone terracing is used to emphasize the level changes of the scenic routes, the topping structures of the palaces are used as vertical structures for posting of historical and cultural photographs)
- + Should be designed to retain or create vistas and view corridors wherever possible.

### **Principle 5:** Should be visually attractive

- + Should be human scale
  - \* There should be human scale detailing that considers human senses, movement speeds and behaviors (fig: 6.5).
- + Should be aesthetically pleasing
  - \* Obstructing structures should be avoided or maintained to enhance an aesthetical look (ground floor frontage shade plastics, banners, shade structures etc.(fig: 2.2a & fig: 5.4c)
  - \* There should be good architectural detailing of softscapes and hardscapes
  - \* Materials should be unique, easily maintained, durable and responsive to local climate
  - \* Space details should be responsive to human feelings, in order to be psychologically appealing

## **Conceptual design objective 2: To produce a district that can reinforce diversity of uses and activities.**

### **Principle 1:** should be flexible in design for multiple uses or should provide subspaces

- + There should be multi-purpose spaces in the square suitable for commercial and recreational activities (mini-exhibitions, sport activities, cultural celebrations e.g. '*Ashenda*', wedding photograph studios, public events (using the arbor shade as a stage for different

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<sup>30</sup> The Italian invaders introduced and planted Roman trees along a river which is found in *Romanat* neighborhood. Presence of high coverage of this *Roman* tree become the legend behind the naming of the neighborhood; because, *Romanat* is the Plural form of *Roman* in Tigrigna (Mr. Grmay G/hiwot).

performances), and display screens for football and other live shows (fig: 6.18). The sidewalk should be suitable to the street vendors like shoe shiners and mini-boutique shops, but they should follow the spaces use regulations. For example they should be in line with the planter wall seating (fig: 6.17).

- \* Should be inclusive, provide space for all people regardless of age, cultural background or ability (should consider special interests)
- \* Should be kept active for at least 18 hours/day regardless of the seasonal changes.

**Principle 2:** The district's city wide role should be emphasized

- ✚ The Sq. use as central node should be enhanced
- ✚ Space uses both in the inner and outer Sq. should be harmonized
  - \* Outer square- ground floor functions (restaurants, café, coffee houses, supermarkets , bookstore, internet café)
  - \* Inner-square: defined spots for supporting services (book and magazine stores, mini shops or kiosks, cultural coffee shops, play stations (table tents, pool, cultural games like 'gebeta'). Provide such entertaining activity services to generate an income for the maintenance activities.

**Principle 3:** Should be inviting that welcomes friendly activities and enforces pauses.

- ✚ Ground floors should be transparent or with displays that allow visual access both from the street and to the street for functions such as window shopping
  - \* Functional spaces like offices and banks should be kept in the upper floors, and functions that emphasize the sidewalk environment should be in the lower floors. This should be taken as building code and should be enforced by the municipality.
  - \* Incorporating small openings on the existing long fenced walls along *Agazi* and *Alula* streets.

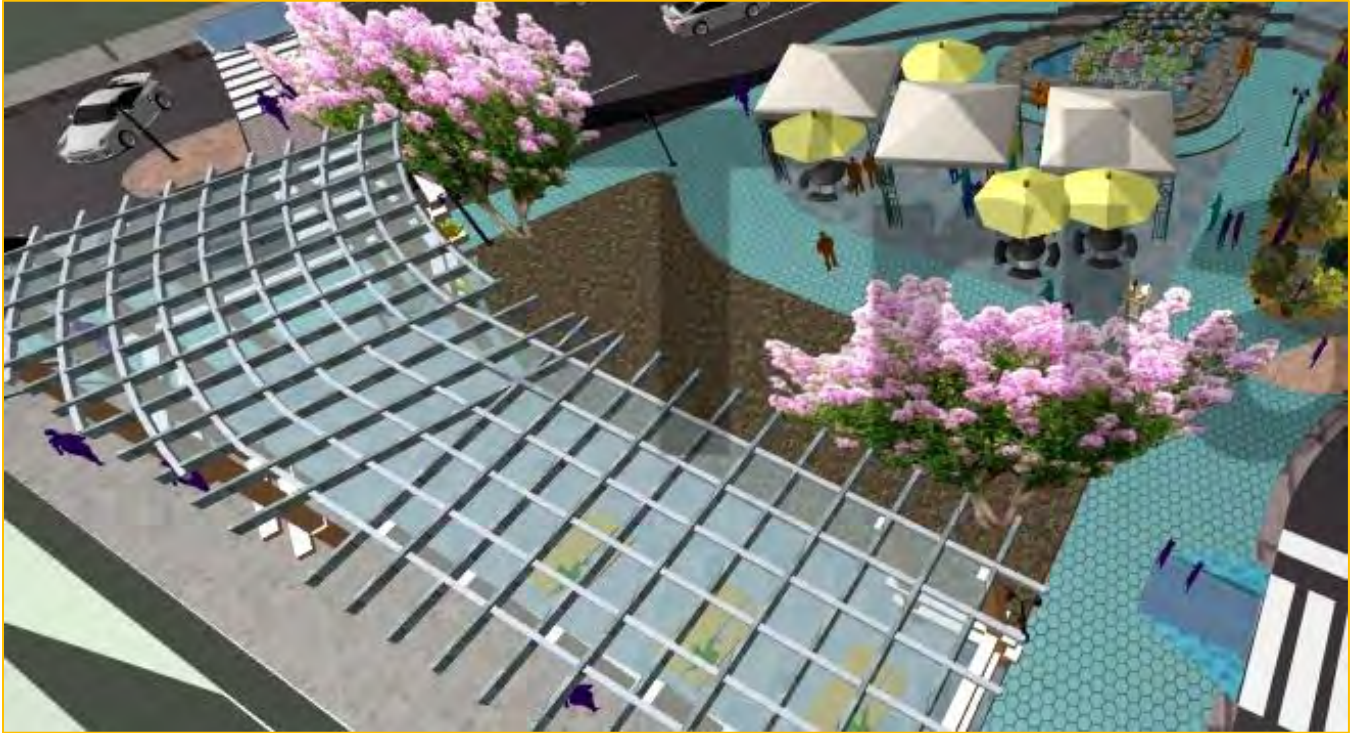
**Conceptual design objective 3: To produce a district that is accessible and legible**

**Principle 1:** Should provide both visual and physical access

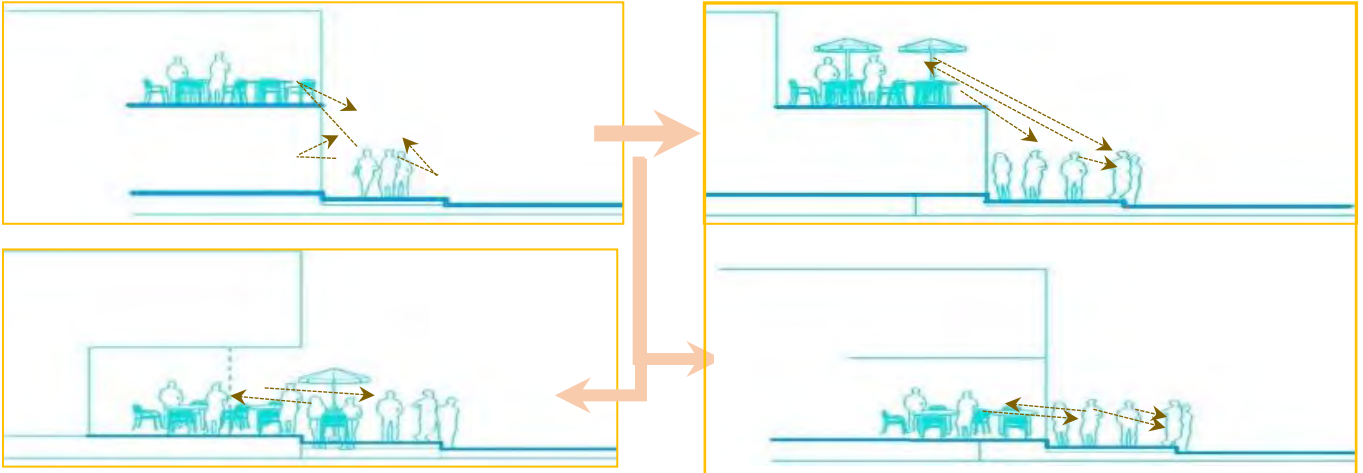
- ✚ A space should offer good views
  - \* From a square to another square.
  - \* Un-hindered/clear views of the space
  - \* Enhanced views of the mountains
- ✚ A space should provide possibilities to see distances
  - \* It should be free of obstacles that screen visual contacts
  - \* traffic signs and signals, signage, billboards should be maintained to be visible
- ✚ Street layouts should be configured to allow walkable access to amenities for all users



**Figure 6.17:** Designated spaces for street vendors



**Figure 6.18:** Suitable spaces for public meetings, cultural celebrations, exhibitions



**Figure 6.19:** design interventions that can be applied in the lower floors of the adjacent buildings (from an existing frontage that reject visual connection to a frontage that celebrate visual connection)

**Principle 2:** Should provide a consistent and convenient access between places by public transportation modes and by foot (fig: 6.20)

- ✚ Street design should provide good connectivity for all modes of movement and for all groups of street users, respecting diversity and inclusion.

**Principle 3:** Should consider an access for the most vulnerable groups within the users (children, pregnant women, the elderly and people with disabilities)

- ✚ Curb ramps should be provided at every level changes where crosswalks are installed (fig: 6.3 (detail C) and fig: 6.20).
- ✚ Detectable warnings should be provided at every curb ramps that inform the visually impaired people whether they are approaching to pedestrian paths or they are getting out of the pedestrian paths (fig: 6.3 (detail C)).

**Principle 4:** Street layouts should allow an access to emergency and service vehicles without compromising a positive sense of place

**Principle 5:** Logical navigation should be possible throughout the district

- ✚ A space should have harmony of connectedness
  - \* Corridors should give harmony of paving surfaces, greenery and amenities (fig: 6.20).
- ✚ A spaces should provide way finding mechanisms
  - \* Signage that direct or orient users
  - \* Signage that promote the functional spaces

**Conceptual design objective 4: To produce a district that encourages social interaction.**

**Principle 1:** Should provide talk-scape environment

- ✚ There should be talk-scape seating that support a wide variety of uses (fig: 6.16 & fig: 6.21).
  - \* bench arrangements
  - \* landscaping seating (stairs, curbstone)
  - \* Community seating (platform)
- ✚ Should maintain low noise environment that allow conversations
  - \* Noise screening plantings
- ✚ Should provide shaded spaces that support public entertainments
  - \* Shade structures such as arbor, sun break shades (fig: 6.13).

**Principle 2:** Should provide inclusive environment

- ✚ Should respond to different cultures, age groups and to both gender groups.



**Figure 6.20:** Accessible and legible space layouts



**Figure 6.21:** Pocket parks, talk-scape environments



**Figure 6.22:** Lighting effects

### **6.2.2. Implementation proposal**

This section gives an instruction on how to apply the produced design on the ground. This can also help to prove whether the design is feasible on the ground. It includes the major implementation phases before construction and during construction.

#### ***6.2.2.1. Implementation phases before construction***

1. The designer should present the design to the decision makers, professionals and to the users.
2. Some discussion meetings should be scheduled that can participate the users with the decision makers and professionals to evaluate the design and to provide final comments.
3. The design should be modified according to the final comments.
4. The designer should present the modified design to the decision makers, professionals and users. If there is any new idea, step 3 should be repeated. If not, should proceed to step 5.

5. Discussion meetings should be scheduled with an objective to decide on the implementation phases which are responsive to the situation of the construction time or to discuss on the importance and possibilities of the proposed implementation phases which are listed below according to the situations of the construction time.

#### **6.2.2.2. Implementation phases during construction**

**Phase 1:** site clearances

**Phase 2:** area designations on the ground based on the landscape layout

**Phase 3:** underground works such as installation of utilities, pond construction and networking of the pond with the rain gardens and drainage gutters by channels

**Phase 4:** finishing the spaces designated for vehicle circulation and installation of traffic signs, signals, street lights

**Phase 5:** paving the pedestrian paths and plazas

**Phase 6:** greenery works

#### **6.2.3. Management proposal**

Once physical improvements have been made to a place, they need to be maintained. They need to be cleaned, polished and shined. If they get cracked, they need to be repaired. In case of the city of Mekelle, the users' awareness on how to use public space is negligible (Sewe'at Avenue can be taken as an example). So, regular maintenance and follow up is strictly required. The major aims of management programs are maintenance, sanitation and security; but, good management means much more than that. Managers also arrange for the activities and events that make active public spaces and create an environment where people like to come. It also helps to have a visible presence on hand which promotes a place's security. These are the key elements of any management program, which usually involves joint funding and cooperative efforts of the private sector and city governments.

Management cost of public spaces is expensive if the government is the only responsible. But if we let the public participate on such activities, besides to the cost minimizing, it is helpful to build sense of pride and ownership among the inhabitants. So, this study has recommended four major management options with their respective advantages and disadvantages (table: 6.1). Choosing one of those proposed management options will be responsibility of the decision maker base on the preconditions. Any selected managers are responsible for the arrangement of activities to be held on in addition to the maintenances. The guidelines and principles that have to be followed by the maintainers should be based on the landscaping schedules and landscaping notes in the landscape layout plan (fig: 6.1). In addition, the municipality must have and provide contracting law that is clear and transparent to the public.

**Table 6.1:** Management proposals and their opportunities and constraints comparison

Recommendations	Opportunity	Constraint
<p>1. Making every ground floor owners to own and be responsible for the spaces in front of their property line.</p>	<ul style="list-style-type: none"> <li>• The space will get regular maintenance</li> <li>• The owner may get an advantage of promoting his/her production or an income generating by giving promotion services for others for a period of time.</li> <li>• Owner can also be benefited by taking the opportunity of giving services for the public users that are using the designed space under his/her management.</li> <li>• It strengths sense of ownership</li> </ul>	<ul style="list-style-type: none"> <li>• The space may be privatized or the user may see the spaces as his/her private space and the public may not feel free to have a stay using the space without paying.</li> <li>• If the owner doesn't have functions that require quality of his/her outdoor space that attract public users, it may be difficult to get his/her voluntariness and to make regular maintenance as this maintenance activity isn't an income generating activity.</li> </ul>
<p>NB: there should be professional follow ups and major maintenances by the municipality</p>		
<p>2. Giving the responsibility for the small enterprises or associations organized to beautify the city or giving contracts for defined period of time in a way that can create competition among associations.</p>	<ul style="list-style-type: none"> <li>• The space will get regular maintenance by the association professionals and this may minimize the cost for follow ups by the municipalities.</li> <li>• The association will be benefited, one it is paid and two it is promoting what the association is doing.</li> <li>• This is one way of reinforcing small enterprises and encourage other individuals to create such kind of associations</li> </ul>	<ul style="list-style-type: none"> <li>• The association requires strict payment-if not may leave it-the whole may be lost and the maintenance is dependent to the unity the association have.</li> </ul>
<p>3. Giving for the entrepreneurs or investors who are willing to take care of.</p>	<ul style="list-style-type: none"> <li>• May get regular maintenance</li> <li>• It will be as participation to the public use as well as to the city development for the entrepreneurs.</li> <li>• The developer may get advantage of promoting his/her products.</li> </ul>	<ul style="list-style-type: none"> <li>• It may depend on the success of the developer, since it is based on voluntary.</li> </ul>
<p>4. Public private partnership (PPP), an engagement and a relationship between the public (including development partners) and private sectors as well as civil society (including community beneficiaries, the poor and vulnerable groups).</p>	<ul style="list-style-type: none"> <li>• PPP offers a win-win benefit to both the public and private sectors in the delivery and management of public infrastructure, goods and services.</li> <li>• The maintenance and management of spaces will be regular, efficient, transparent and competitive.</li> </ul>	<ul style="list-style-type: none"> <li>• Since it is win-win, the public sector has to keep the private sector benefits.</li> </ul>

# CHAPTER SEVEN

## 7. CONCLUSION AND RECOMMENDATION

### 7.1. Conclusion

This study was made to investigate the *Romanat* district's existing livability problems and to propose a design that can reduce the district's livability problems. To do that, the study has investigated the existing livability problems through the inhabitants' eye as well as tested the validity of the previously defined attributes. Besides, it explored the users' and professionals' future preferences to propose a design solution that can enhance livability of the district. The results made important contribution in theoretical, methodological and practical professions. On the other hand, the study also opened up new areas for further investigations.

The in-depth description of the respondents' show that livable squares and streets should be composed of wide sidewalks, safe environment, greeneries, public amenities, supporting services and maintenance activities. The results confirm the findings of the existing literature. On the other hand, different from previous research, this study uncovers the importance of widening sidewalks in relation to the accommodation of friendly activities that made pedestrians to be more advantageous than those of vehicle users. Furthermore, different from the findings of the literature in comfort and image variables of livability, respondents emphasize the provision of greeneries and amenities in the mapping of livable squares and streets. Also, in the users' and professionals' preferences to provide inclusive environment, more focus is given to the mixing of different income groups than to the mixing of different age, culture and gender groups. On the other hand, respondents' ratings for the previously defined attributes of livability in the Likert-scale rating confirm the importance of all attributes. This validates the generalizability of perceived attributes extracted in previous research done in Western cities. Furthermore, quasi-experimental analyses show the significance of perceived attributes of comfort, image, use and activity than others in the context of Mekelle.

In response to those findings, this study proposed a design that can enhance livability of the district and furthermore that can facilitate the socio-cultural, economic, environmental and political roles of the district. The designed district provides open public space services, enjoyment places without any charge, walking spaces, accessible spaces, staying spaces with friendly activities, calmed streets, places for public celebrations and exhibitions, field studios for photographs and builds social healthiness by encouraging social interactions to enhance the socio-cultural roles. It gives an opportunity for kiosks, street vendors and exhibitions, and enhances the commercial activities of adjacent buildings to enhance the economy of the society. The diversity of trees, shrubs, flowers and the water feature enhances the biodiversity and microclimate by providing a cooling effect. They are also wind/sun breaks, and noise/

dust screens. The use of permeable pavements assures the sustainable storm water management and discharge of ground water. The design can also enhance the political roles by enhancing the inhabitants' sense of pride and ownership. This study also proposed possible implementation and management practices to make the proposed design solutions complete.

## **7.2. Recommendation**

This study has presented a scientific way of approaching livability in squares and streets, the case of *Romanat* district. That is, by introducing how a research on investigation of the existing livability problems and on the future preferences can reveal the significant design solutions for the design of the district.

This study included mainly respondents of those who were in the district during the field survey times. However, in order to broaden the understanding of the users' perceptions about livable squares and streets, and to reach more concrete and detailed results, further research can be carried out with the participation of larger respondent groups. I.e. further studies can be conducted in various case study areas, for specific age such as elderly and young, gender such as men and women and vulnerable groups such as disabled people and pregnant women or women with babies in hand. In this study, livability is defined as a spatial attribute of public space walkability and stayability, livability as quality of life at the city scale is another case for further research. The study has produced a design for the square and the streets, which mainly influence the public right of way; but including the frontages of the adjacent buildings is another important case. The study does not introduce a comparative analysis on how the Ethiopian urban square/street livability context or the city of Mekelle in particular differs from the developed cities' cases; yet this comparison can be further studied. In reference to the case study area and to the perceptions of the inhabitants for livable Sq. and St., the present study may lead to areas for further research on the inhabitants' need of livable public space.

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# ANNEX

## Appendix – I Data collection questioner forms

The questioner has three parts and is based on your perception of the existing situation and on your future preferences that have to be incorporated in the design of the district. The purpose of this questioner is for the completion of my MSc. thesis that I am doing in the department of environmental planning and landscape design in Ethiopian institute of Architecture, building construction and City development (EiABC).

So, I am glad to thank you for the meeting we are having to fill this questioner and I want to inform you that all the data that I am gathering is only for this thesis paper.

### Part -1 In-depth interview

#### **A. A sample form the case of Romanat square**

**Respondent No:** \_\_\_\_\_

Comment area: \_\_\_\_\_

- User group: \_\_\_\_\_
- Gender: M-----F-----
- Age group: 13-17----- 18-24----- 25-65-----65+-----
- Occupation: \_\_\_\_\_
- Coming From (neighborhood): \_\_\_\_\_

1. What are your reasons of coming/visiting this square? \_\_\_\_\_
2. What is your means of travel when you need to pass through this square, why? \_\_\_\_\_
3. When is your convenient time to visit/use this square? Why? \_\_\_\_\_
4. How is your culture of using cross walks while you cross this square? Any limitations or interventions that influence your crossing behavior? \_\_\_\_\_
5. How often do you visit this square? Hourly, Daily, weekly, monthly? Mostly for what purpose?  
\_\_\_\_\_
6. What is your experience of this square, any positive or negative memories? \_\_\_\_\_
7. What do you think livability of this square has to look like? Can u describe it considering your needs to be satisfied? \_\_\_\_\_

**B. A sample form the case of Romanat streets**

**Respondent No:** \_\_\_\_\_

Comment area: \_\_\_\_\_

- User group: \_\_\_\_\_
- Gender: M-----F-----
- Age group: 13-17-----18-24----- 25-65-----65+-----
- Occupation: \_\_\_\_\_
- Coming From (neighborhood): \_\_\_\_\_

1. What are your reasons of coming/visiting this street? \_\_\_\_\_
2. What is your means of travel when you need to pass through this street, why? \_\_\_\_\_
3. When is your convenient time to visit/use this street? Why? \_\_\_\_\_
4. How is your culture of using cross walks while you cross this street? Any limitations or interventions that influence your crossing behavior? \_\_\_\_\_
5. How often do you visit this street? Hourly, Daily, weekly, monthly? Mostly for what purpose?  
\_\_\_\_\_
6. What is your experience of this street, any positive or negative memories? \_\_\_\_\_
7. What do you think livability of this street has to look like? Can u describe it considering your needs to be satisfied? \_\_\_\_\_

**C. For key informants from the municipality**

**Respondent No:** \_\_\_\_\_

Gender: M-----F-----

Age group: 18-24----- 25-65-----65+-----

Occupation: \_\_\_\_\_

1. How do you describe the existing physical condition of the squares and streets? Based on the adjacent buildings, pavements, side walking/ bicycling space provision, public space amenities.
  - a. *Romanat Square* \_\_\_\_\_
  - b. *Romanat Streets* \_\_\_\_\_
2. How do you describe the existing environmental condition of the square and streets? Based on the greenery and pavement type effect.
  - a. *Romanat Square* \_\_\_\_\_

b. *Romanat* Streets \_\_\_\_\_

3. How do you describe the utilization of squares/streets? \_\_\_\_\_

a. *Romanat* Square \_\_\_\_\_

b. *Romanat* Streets \_\_\_\_\_

Do you think they are fully utilized? If yes, how? If not, why? \_\_\_\_\_

4. Is there any redevelopment strategy planned for the *Romant* square/streets? \_\_\_\_\_

If yes, who are the developers? What kind of redevelopments? \_\_\_\_\_

5. What was the intention of the developers while they introduce *Romanat* square project? \_\_\_\_\_

6. Is there any limitation/difficulty that can influence the redevelopment? \_\_\_\_\_



**For the key informant from Tigray Culture and Tourism Agency**

1. Do you think we have places to celebrate our cultural activities? Where? \_\_\_\_\_

2. Do our streets/squares value for cultural activities? \_\_\_\_\_

What are the roles of *Romanat* square and streets? \_\_\_\_\_

**E. For the key informant who study on Green infrastructure of the city**

1. What changes do you observe after your study on green infrastructure? On the squares and streets \_\_\_\_\_

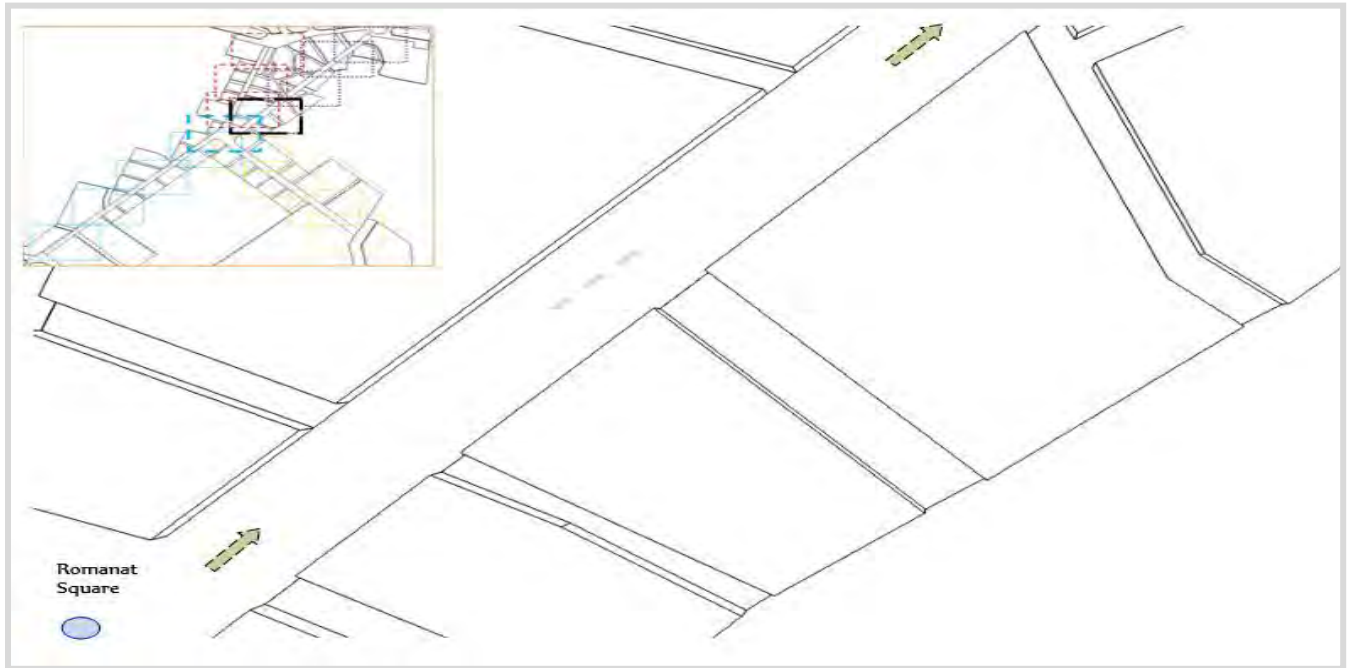
## Part -2 Map making

Q. Can you put your idea of the district's future livability graphically?

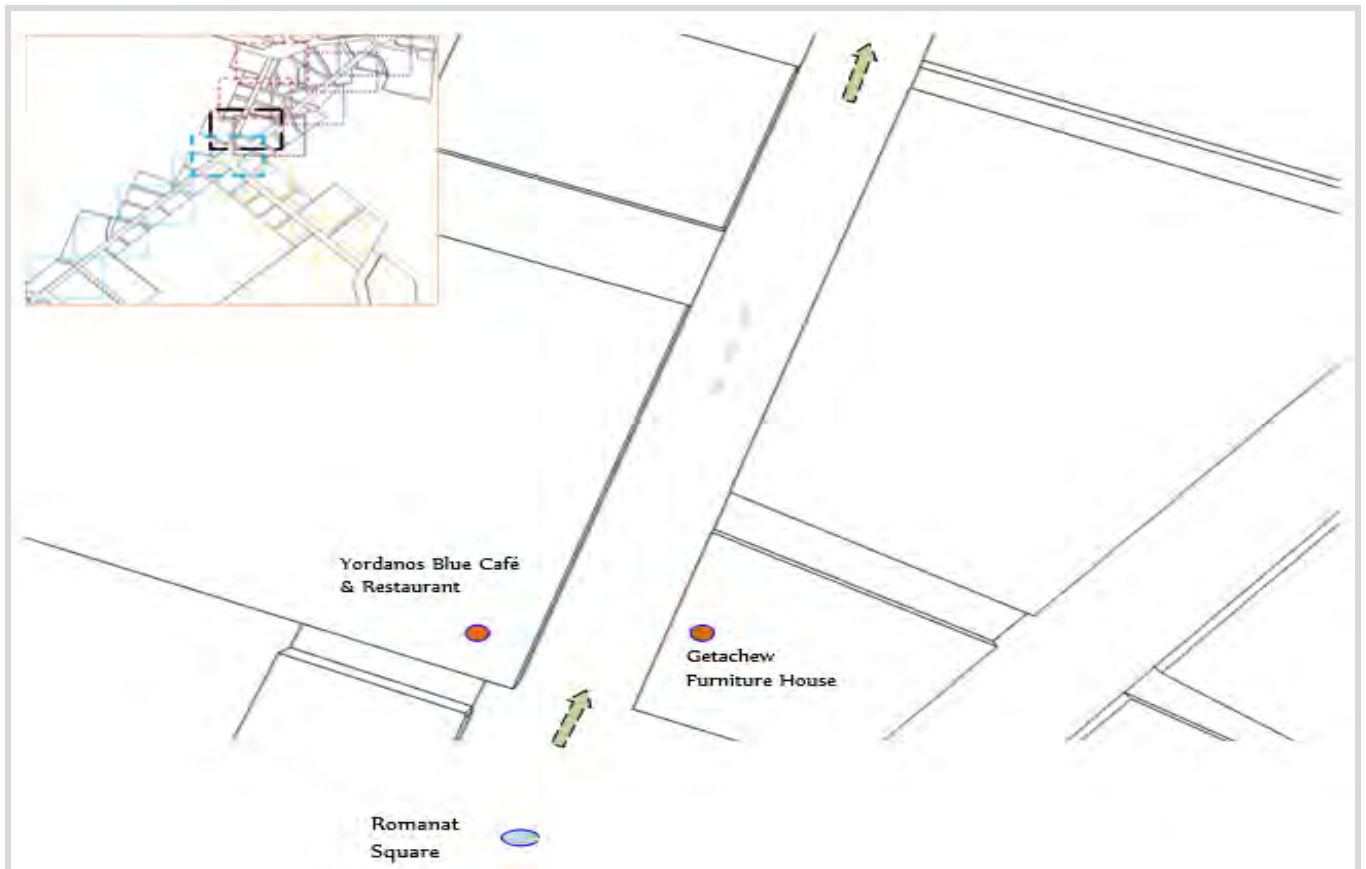
A. A sample form the case of Romanat square



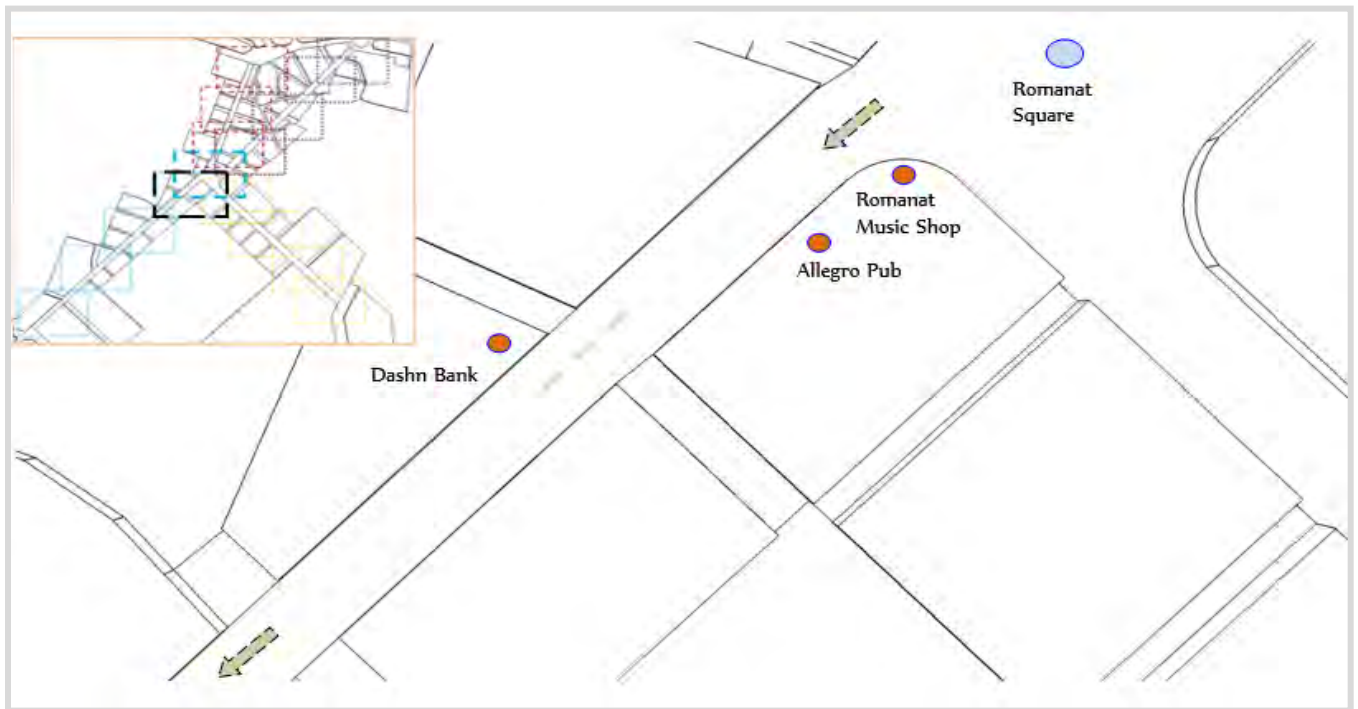
B. A sample form the case of *Selam* street



C. A sample form the case of *Hakfen* street



D. A sample form the case from of Alula street



E. A sample form the case of Agazi street



**Part -3 Likert-scale rating, a questionnaire**

**The case of Romanat square**

Q. The following statements are on livability of this square, Can you evaluate them according to your perception on its existing livability situation?

- 1) I very strongly agree    2) I strongly agree    3) I agree    4) I fairly agree    5) I don't agree

<b>Variables and attributes of Livability</b>		<b>Livability Grading</b>				
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Comfort and Image</b>						
1.	The square is protected from traffic accidents, fear of accident...					
2.	It offers a safe environment, free of crime and violence (there is eyes on the square, good lightings from the adjacent buildings or in the square)					
3.	It offers protection against unpleasant climatic conditions (wind, glare, dust, cold, storm water)					
4.	It offers possibilities to stand (attractive edges/ good "edge effect", defined spots, standing bollards or supports)					
5.	It is inviting to stay or to sit /seating furniture or defined spots that are welcoming to sit down/					
6.	It has aesthetic quality (good architectural space design, use of trees, plants, water feature)					
7.	It connects human generations through its trees, adjacent building finish, pavements etc.					
<b>Use and Activity</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
1.	It offers inviting spaces for people activities(sport exercises, playing)					
2.	It has supporting services(café, pushcarts, food and newspaper/magazine kiosks)					
3.	It is a space for celebrations, public events, meetings, etc.					
<b>Access and Linkage</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
1.	It offers a good view (interesting views, vistas)					
2.	It has clear layout (signage).					
3.	It has harmony of connectedness/linkage.					
4.	It offers possibilities to see (seeing distances, lighting/when dark)					
5.	It offers a nice walking environment(room for walking, no obstacles, good surfaces or good pavements)					
<b>Sociability</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
1.	It maintains a noise free environment or low noise level, where one can able to listen and be listened.					
2.	It has bench arrangements suitable to talk in group/ "talkscape" seating/					
3.	It offers inviting spaces for social activities.					
4.	It serves for different cultural activities, games, celebrations etc.					

**Part -4** Observation, site inventory

**Table 0.1:** Site inventory format

Site boundaries	Adjacent building con		Paving Mtl/ Con (G/F/P)	Lighting Mtl/ Con (G/F/P)	Drainage line/ M'hole/ (G/F/P)	Traffic sign Mes/ (G/F/P)	Traffic light Way/ (A/P)	Parking Cap/ Con (G/F/P)	Taxi station/ Cap/ (G/F/P)	Greenery Tree line /TH	Plant type /con (G/F/B)	Infrastructure integration					
	Left side G <sup>+</sup> /Fun/ con (G/F/P)	Right side G <sup>+</sup> /Fun /con (G/F/P)										P-L	P-TL	P-TS	P-EP		
Romanat Sq.																	
Selam St.																	
1se																	
2se																	
3se																	
4se																	
Hakfen St.																	
1hk																	
2hk																	
3hk																	
Alula St.																	
1al																	
2al																	
3al																	
4al																	
Agazi St.																	
1ag																	
2ag																	
3ag																	
4ag																	

- G<sup>+</sup> --Building story
- Mtl – material
- A/P – active/passive
- Cap – capacity
- TH – tree height
- Fun – function
- P-L - Plant- lighting distance
- P-TL - Plant-traffic light distance
- Con - condition
- G/F/p - good/fair/poor
- P-TS - Plant-traffic sign distance
- P-EP - Plant-electric pole distance