AMERICAN UNIVERSITY OF BEIRUT

URBAN DESIGN INVITATION QUALITIES TOWARDS AN AGING-FRIENDLY COMMUNITY; CASE OF "RAS EL NABAA", BEIRUT

by
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AN ABSTRACT OF THE THESIS OF

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Title: Using urban design invitation qualities towards an aging-friendly community; Case of "Ras El Nabaa", Beirut

The Lebanese demography is facing an unprecedented change towards a rapidly growing aging population. Older adults, currently constituting 9% of the population, are expected to reach 25.7% by 2050; these form a large portion of Lebanon's future social structure. In order to remain active community contributors, older adults require appropriate urban settings that address their physical ability limits to access the outdoor urban environments. However, in Beirut, the urban fabric lacks older adults' required physical accessibility characteristics. Thus, if the issue remains unaddressed, older adults' risk of losing their autonomy and community connection is anticipated. In order to overcome this issue, existing literature has addressed it through multiple separate fields, such as public health and gerontology. This study promotes an interdisciplinary approach by applying public health concerns of a healthy community design to provide older adults' access to urban public places. The contribution of this project is a contextualized urban design solution to the existing body of knowledge as a new design strategy for older adults' communities, which proposes the ageing-friendly community design for a case study of the "Ras El Nabaa" neighborhood in Beirut. Accordingly, this thesis follows a design through research approach, which aims at acquiring an in-depth understanding of the current neighborhood characteristics and the missing neighborhood features for older adults' accessibility. Then, it addresses aging-friendly characteristics through urban design concepts and design models to enable the studied neighborhood to function in an aging-friendly community.

CONTENTS

ILLUSTRATIONS

TABLES

ABBREVIATIONS

WHO	World Health Organization
LCTF	Long-Term Care Facilities
ADA	Americans with Disabilities Act
IQ	Invitation Quality
AUB	American University of Beirut
DGU	Directorate General of Urban Planning
GPS	Global Positioning System
GIS	Geographic Information System
SPSS	Statistical Package for the Social Sciences
(r)	Correlation Coefficient
Df	Degrees of Freedom
CBD	Central Business District
GF	Ground Floor
PT	Public Transportation
M	Means
SD	Standard Variances
P	p-value
BRT	Bus Rapid Transit System
CDR	Council for Development and Reconstruction

To My Beloved

Parents

CHAPTER 1

INTRODUCTION

One of the main events shaping 21st-century cities is the dynamic shift in demography leading to an aging population (WHO, 2007). Lebanon currently holds one of the fastest aging populations in the Middle East. Its percentage of older adults, which currently constitutes 9% of the population, is expected to increase to 25.7% by 2050. (Sibai, Rizk, and Kronfol 2014) This increase leads to a significant demographic shift resulting in the aging population replacing the younger population as the main cohort in the future community structure. This shift, along with the effects of modern life on Lebanese society, such as a change in family structure, longer life expectancies, and increase in living expenses, has created a need for older adults to become more active and independent. In order to remain so, they require appropriate urban physical settings that address their decreasing physical abilities to access the outdoor urban environment. (Madani and Mehio-Sibai, 2017)

This research focuses on the Lebanese capital Beirut. The city is witnessing a rapid population aging that belongs to a traditional context where older adults are expected to remain in their homes and neighborhoods as they age (Adra et al., 2015). Besides, the city lacks the proper urban physical infrastructure to provide both (1) the demand quality needed for older adults to access their neighborhoods and (2) the invitation quality needed to invite and encourage diverse socio-spatial activities. For instance, there is a lack of proper sidewalks, adequate pedestrian crossings, landscape buffers, and seating areas. This fact both discourages them from accessing the urban

fabric to acquire their needs and also denies them a place of their own to socialize, which may put their autonomy and social connections at risk. To further exacerbate the matter, those needs are being completely ignored by local authorities, such as the municipality, for no urban design or planning policy has been adopted to face this issue (Kronfol, 2001; CSA, 2011). This gap in policy-making denies older adults their rights to the city and threatens their autonomy and community connections (Andrews & Phillips, 2005). Thus, this fact creates a need for older adults to gain more autonomy by acquiring access to their urban fabric and performing daily activities in their neighborhoods. As such, cross-disciplinary research between various fields has emerged in an attempt to find solutions for this matter.

Accordingly, research between gerontology and various disciplines such as environmental design, sociology, and public health have all attempted to propose solutions for the stated problem through new concepts. Among the emerging concepts is "Aging in Place" (Glass & Balfour, 2003; Hodge, 2008; Scharlach & Lehning, 2016), which merged the two disciplines of environmental design and gerontology. It focuses on modifying both older adults' urban fabric and homes in such a way that encourages them to remain autonomous and reside in their homes and neighborhoods as they age. (Andrews & Phillips, 2005) In order to do so, various architecture concepts were developed to modify one's home space. Additionally, in order to modify the urban fabric, the concept of aging-friendly cities was developed by the World Health Organization (WHO), which mentions the field of environmental design and its urban design branch. (WHO, 2007; Greenfield, Oberlink, Scharlach, Neal, & Stafford, 2015). As such, this urban design thesis focuses on the concept of aging-friendly cities concerning the urban fabric.

The concept of aging-friendly cities is one created by scholars, primarily sociology Professor Andrew Scharlach, and developed by numerous organizations such as the WHO. The WHO developed its guide of creating a global network of aging-friendly cities and communities. The concept mainly focuses on encouraging cities to adapt their physical and social services and structures to be accessible to and inclusive of older adults, hence enabling active aging through optimizing opportunities of security, health, and participation. It serves older adults on the layers of transportation, outdoor spaces and buildings, housing, social participation, respect and social inclusion, civic participation and employment, community support and health services, as well as communication and information. For example, on the level of outdoor spaces and buildings, the concept mentions the importance of older adults' accessibility to the urban fabric and the presence of green spaces and outdoor sitting areas (WHO, 2007; Hodge, 2018; Gehl, 2011; Ball, 2017). As a result, this encourages access to the urban environment, therefore, preserving their autonomy and life-long connections (WHO, 2007; Greenfield, Oberlink, Scharlach, Neal, & Stafford, 2015).

These mentioned layers of transportation, housing, and outdoor spaces and buildings are part of the outdoor physical environment which may be modified through urban design. However, the existing literature fails to integrate specific urban design tools in its proposal, which is because the scholars and organizations, which have so far worked on aging-friendly cities, all come from either public health or social studies background. As such, no specific urban design strategy exists for modifying the outdoor physical urban features and achieving an aging-friendly city. As a result, older adults are being denied the benefits of inviting aging-friendly outdoor physical urban features, which have been studied to influence their neighborhood accessibility and community

connections. Therefore, a gap in the literature exists in gerontology, public health, and urban design.

Researchers have studied the effects of the outdoor physical urban features on a neighborhood's invitation quality for older adults. For example, Hodge (2008) studied how a selected urban space's features such as transportation, walkability, and spatial connectivity, hold value in inviting older adults into the urban fabric. These features can then be modified as per the older adults' needs, rendering that space inviting for them. (Hodge, 2018; Gehl, 2011) Also, Gehl (2011) argued that urban design could influence socio-spatial relationships in the urban fabric. It can provide older adults with the benefits of belonging to an urban place and can influence a neighborhood's invitation quality, therefore, preserving older adults' autonomy and social connections (Gehl, 2011).

As previously mentioned, two main gaps exist. The first gap is the fact that Beirut lacks the needed outdoor physical urban features to accommodate older adults and provide a place for them. The second gap is that the existing literature lacks specific urban design tools to modify these outdoor physical urban features and enable the development of an aging-friendly city. Accordingly, this thesis introduces an urban design solution as a means to promote older adults' accessibility to the urban fabric and maintain their social connections. It conceptualizes the aging-friendly city characteristics into a design solution which might enable an aging-friendly community in the "Ras El Nabaa" neighborhood in Beirut. It transforms the conceptual framework into a practical urban design solution. It aims to provide older adults with both accessibility and a place in the urban fabric, which facilitates their autonomy and

preserves their social connections. The proposed urban design solution is tested through the developed methodology (Hodge, 2018; Gehl, 2011).

The study follows a case study design through research strategy which quantifies qualitative data in an attempt to achieve an in-depth understanding of the urban fabric. (Yin, 2004). Consequently, an idea of the physical constraints facing older adults in the urban fabric is formed and assessed. Then, it targets the identified constraints by incorporating aging-friendly city characteristics with urban design elements, which might enable an aging-friendly community. It results in a proposed urban master plan design.

CHAPTER 2

RESEARCH BACKGROUND

2.1. Lebanese Aging Population

The 21st century is marked by an increase in the number of older adults, aged 65 and above, resulting in a worldwide "aging population" (a population whose proportion of elderly is increasing). This occurrence is strongly present in developing countries such as Lebanon (Figure 1), which, due to reasons such as decreased fertility rates, high rates of out-migration and longer life expectancies, holds one of the fastest aging population ratios in the Middle East (Abdulrahim et al., 2015; United Nations Statistics, 2014; Andrews & Phillips, 2005). This leads to the aging population replacing the younger population as the main cohort in the future community structure (Sibai, Rizk, and Kronfol, 2014). As such, older adults are forced to remain active and autonomous instead of depending on younger generations for support. Furthermore, the country is part of a traditional context which dictates specific values whereby older adults remain in their homes as they age instead of moving away to assisted living facilities or nursing homes, further amplifying their need for autonomy (WHO, 2005).

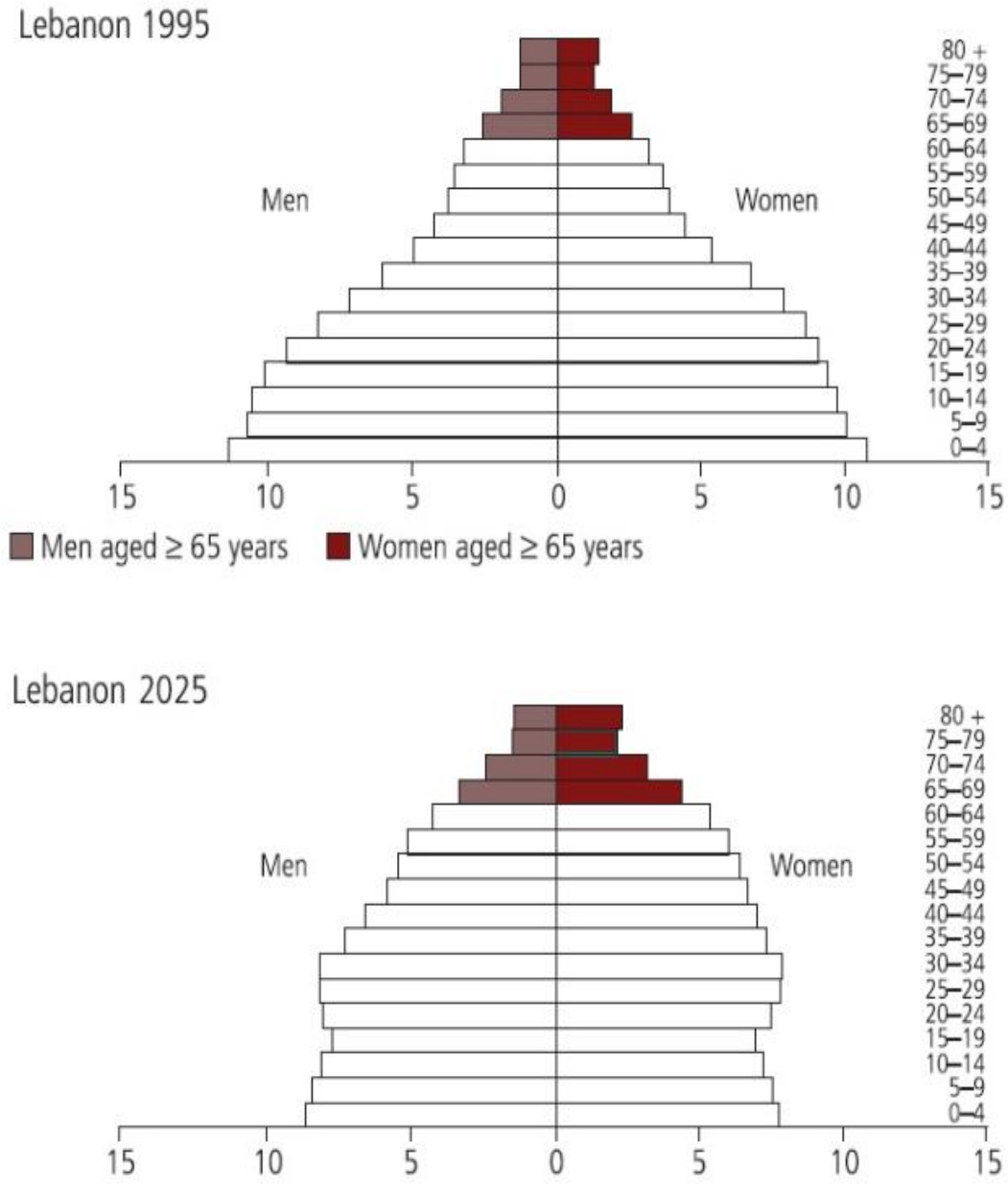


Figure 1: [Age-sex structure and change in population pyramid in Lebanon 1995-2025] , Al Asmar 2018 based on Centers for Studies on Aging 2009

2.2. Cultural Significance of "Aging in Place"

"Aging in place" is currently a popular expression in aging policy. It is defined as older adults' ability to remain living in the same place they did when they were younger - with some level of independence - rather than in residential care (Wiles, Leibing, Guberman, Reeve & Allen, 2012). This includes older adults having the proper physical environment and needed access to services, both of which encourage them to remain autonomous and connected to their communities. As such, researchers and organizations developed multiple programs which include disciplines such as public health and environmental design (mainly its branches of architecture and urban design) in order to fulfill the older adults' needs (Ball, 2018). For instance, on the architecture level, some modifications need to be made inside older adults' homes in order to allow them to "age in place". These architectural modifications allow them to keep on utilizing their interior home space safely and easily without the need to relocate. As for the urban design level, older adults need modifications in urban elements such as pedestrian networks, transportation, and services in order to "age in place". These modifications facilitate their access to the required services and encourage them to stay connected to their communities, hence preserving their autonomy. Accordingly, older adults are able to remain in their homes as they age without having to relocate to long-term care facilities (LCTF), which is generally undesirable in the Lebanese traditional context (Scharlach, 2017).

The Lebanese family structure is a traditional and religious one where multigenerational living is the expected norm and moving into LCTF is considered undesirable in terms of social context and costly for the families. As a result, the majority, almost 77%, of all older adults keep on utilizing the same home and urban

fabric that they did when they were younger (Adra et al., 2015). Unfortunately, due to the lack of awareness of designers and policymakers, no modifications are made to their urban fabric to answer their needs. Older adults thus lack both the basic demand quality and invitation quality urban design features which allows them to access the urban fabric and creates a place for them respectively. For instance, the demand quality for urban adults as per the Americans with Disabilities Act (ADA) regulations specifies a certain sidewalk clearance width and curb cuts clearance in order for older adults to have the ability to access the urban fabric and acquire their needs and services and therefore remaining autonomous. (ADA, 2018) As for the invitation quality, it is determined through elements which invite older adults into the urban fabric and encourage diverse socio-spatial communal activities, hence strengthening their community connections. For example, embellishing the urban fabric and providing spaces for socialization through furnished public places, landscape buffer, and streetscape cleanliness, encourages older adults to access the urban fabric and socialize. (Gehl, 2011) As such, the lack of both demand and invitation qualities can discourage older adults from accessing their urban fabrics and socializing. Hence, they are less likely to remain autonomous and maintain their community connections (Kronfol, 2011).

2.3. Aging and the Sense of Community Through Urban Design Invitation Quality

The word “Community” is most notably defined as a space containing a certain population and offering them all the needed services, resources, and social relationships. (Chaskin, Brown Venkatesh, & Vidal, 2001; Mancini, Martin, & Bowen, 2003). It

holds both physical and social values. Accordingly, a "sense of community" is defined as the feeling that one is part of that available community.

The sense of community or community inclusion is of utmost importance to older adults. For example, in some contexts such as in Lebanon, it is considered as "the axis of Lebanese values, beliefs, and culture", and is linked to a better functional capacity (Abdulrahim, 2015). In addition, being included in a community has been proven to improve older adults' physical and psychological well-being. (Scharlach & Lehning, 2013) For instance, it decreases the likelihood of dementia, depression, and morbidity. (Novek, Menek, Tran, & Bell, 2013) As such, it improves the older adults' quality of life and allows them to remain autonomous. Furthermore, community inclusion changes older adults' relationships with their communities from need-based to asset-based. They hence become assets to their communities, families, and economy and assist in constructing a strong community from within. (Brossoie, 2013) Accordingly, researchers have recognized the importance of the sense of community. Therefore, various professionals, including urban designers, attempt to study the concept through different disciplines. (Spretnak, 2017)

For instance, Gehl (2011) argues that the field of urban design can empower a certain group's sense of community. He stresses that urban designers have the ability to encourage a neighborhood - a geographical construct - into becoming a community - a social construct. This is due to the fact that when urban designers re-design an urban space such as a neighborhood to accommodate and improve the quality of communal activities, that space is encouraged to become a communal place for a certain group of people leading to their having a sense of community. In addition, he mentions that a neighborhood with increased communal activities is more likely to become a

community. This enforces a sense of community and a perceived boundary in the neighborhood. (Gehl, 2011) We can then conclude that if the urban fabric is re-structured as per the needs of older adults, it may become inclusive of them and create a sense of place for them. This, therefore, strengthens their sense of community. However, the urban fabric in Beirut disregards the suitable infrastructure needs for older adults and as a result, discourages them from accessing it. This results in older adults being discouraged from accessing the urban fabric and conducting socio-spatial activities, hence most likely worsening their quality of life. (Scharlach & Lehning, 2013).

2.4. Aging-Friendly Communities in Relation to Urban Design Invitation Quality

The concept of aging-friendly communities is one developed by various researchers and WHO (Scharlach and Lehning, 2013; WHO, 2007). It encourages making a city's social and physical services and resources inclusive of and accessible to older adults therefore encouraging a sense of community (Chaskin, Brown Venkatesh, & Vidal, 2001; Mancini, Martin, & Bowen, 2003). Accordingly, it allows its members to age in place while answering to their needs of community life participation, hence promoting their active aging. In order to do so, it focuses on making various urban layers (Figure 2) such as transportation, outdoor spaces and buildings, social inclusion, community support, and health services accessible and inclusive of older adults (WHO, 2007). As such, the field of urban design, which includes the mentioned layers of transportation and outdoor spaces and buildings, is of utmost importance. It has the ability to modify the urban physical outdoor features in such a way as to provide the basic demand quality required for older adults and to render the neighborhood inviting

for them, hence improving its overall invitation quality. As a result, it encourages older adults' accessibility and social inclusion in their urban environment, hence preserving their autonomy and community connections (Scharlach & Lehning, 2013).

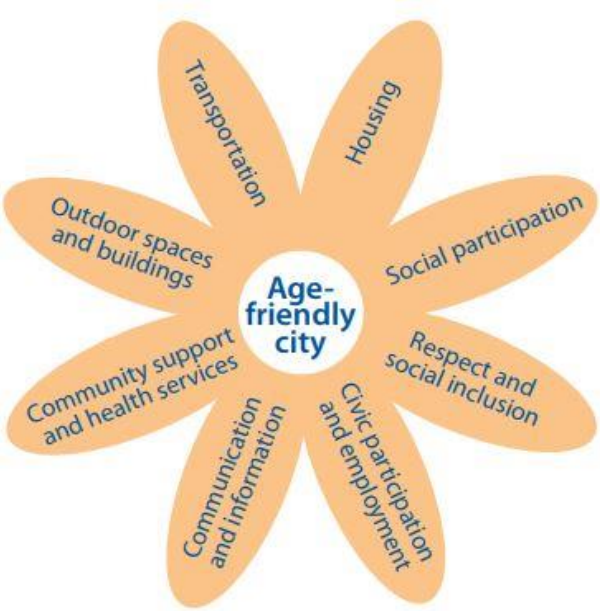


Figure 2: [Aging-Friendly Cities and Communities Topic Areas], WHO 2007

2.5. Aging-Friendly Communities as an Urban Design Approach to Public Health

Developed by the WHO (2007), the policy of "active aging" enhances the quality of life as people age by optimizing opportunities for health, participation, and security. The term "active" refers to the continued participation of older adults in spiritual, social, civic, economic and cultural affairs even after they retire. It results in extending life expectancy, improving health, and promoting autonomy for older adults. (Andrews & Phillips, 2005) Multiple determinants like the physical environment and socio-economic factors affect an individual's ability to age actively (Figure 3). In addition, the course of active aging starts occurring throughout a person's life course,

and thus in order for these determinants to be understood, they should be recognized from a life course perspective. (Figure 4). (Kallash & Kickbusch, 1997) As such, in order to improve the process of active aging in individuals, policies targeting the entire life-course were considered. Among the developed policies are aging-friendly communities (WHO, 2007; Scharlach & Lehning, 2013).

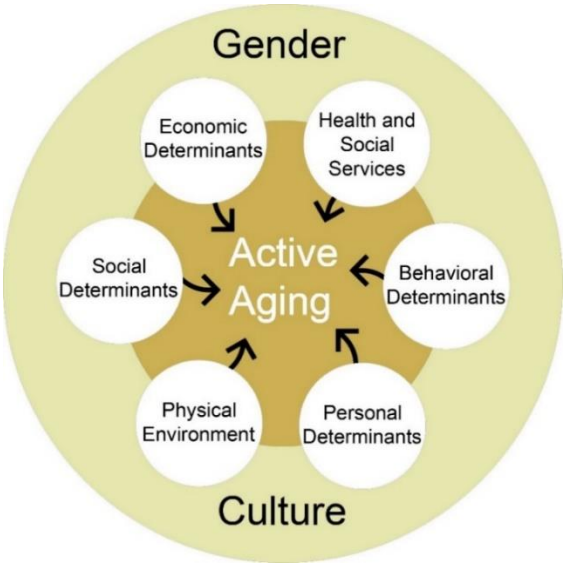


Figure 3: [Determinants of Active Aging], Al Asmar 2018

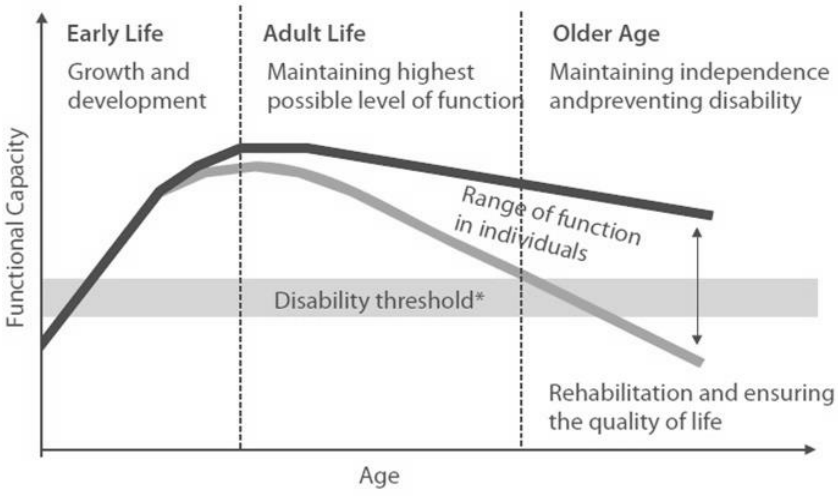


Figure 4: [Maintaining Functional Capacity Over a Life Course Through Active Aging], WHO 2007

As per WHO (2007), the elderly's decline in functional capacity can be influenced and reversed through the adaptation of aging-friendly community measures. The mentioned concept benefits individuals throughout their entire life course, and therefore affects their ability to age actively. It targets improved quality of public space, safety, community inclusion, and increased autonomy, which not only affect older adults but also the society as a whole, hence promoting active aging. (Andrews & Phillips, 2005; WHO, 2007)

As previously mentioned, public space is of utmost importance in creating aging-friendly communities (WHO, 2007; Greenfield, Oberlink, Scharlach, Neal, & Stafford, 2015). It is the place where older adults are provided with the means to stay autonomous and maintain their relationships outside of their homes. As such, the field of urban design, which focuses on the outdoor physical environment is of utmost importance. For instance, Gehl (2011) argued that it can effectively re-structure the outdoor urban physical features to center on the socio-spatial needs of their inhabitants, therefore encouraging socio-spatial practices. Hence, by effectively re-designing the outdoor urban physical features to center around the socio-spatial needs of older adults, urban design can ease accessibility and inclusion to the urban fabric (the main goals of aging-friendly cities). By doing so, urban design enables the urban fabric into an aging-friendly community. (Gehl, 2011; Scharlach, 2017). It thus promotes older adults' active-aging, encourages their autonomy, and allows them to maintain their social connections (WHO, 2007).

CHAPTER 3

RESEARCH DESIGN

3.1. Research Hypothesis and Questions

This research demonstrates that by re-designing the physical features of the open public urban space in the "Ras El Nabaa" neighborhood in Beirut as per the socio-spatial needs of older adults, an aging-friendly design may be acquired. Accordingly, if that neighborhood enables older adults to have access to their needs in the outdoor environment, it can convey the perception of a community. This potential aging-friendly community is able to enhance older adults' physical and social well-being.

As such, the main research question is: What are the urban physical settings and neighborhood features required to enable older adults' outdoor environment to become an aging-friendly community?

In order to answer the main question, the following sub-questions need to be answered:

What are the urban physical features that should be targeted to both provide the basic demand quality and to improve the neighborhood invitation quality for older adults?

Why and how should they be modified?

3.2 Research Methodology

The research follows the case study research strategy, choosing two blocks in Beirut as its study area (Figure 5) in order to assess the socio-spatial relationships for urban design. The strategy is utilized to investigate real-time occurrences and to provide a way of integrating qualitative and quantitative methods into an empirical study and allowing the investigator to retain meaningful neighborhood qualities (Yin, 2004). The following methodology was developed in order to answer my research questions.

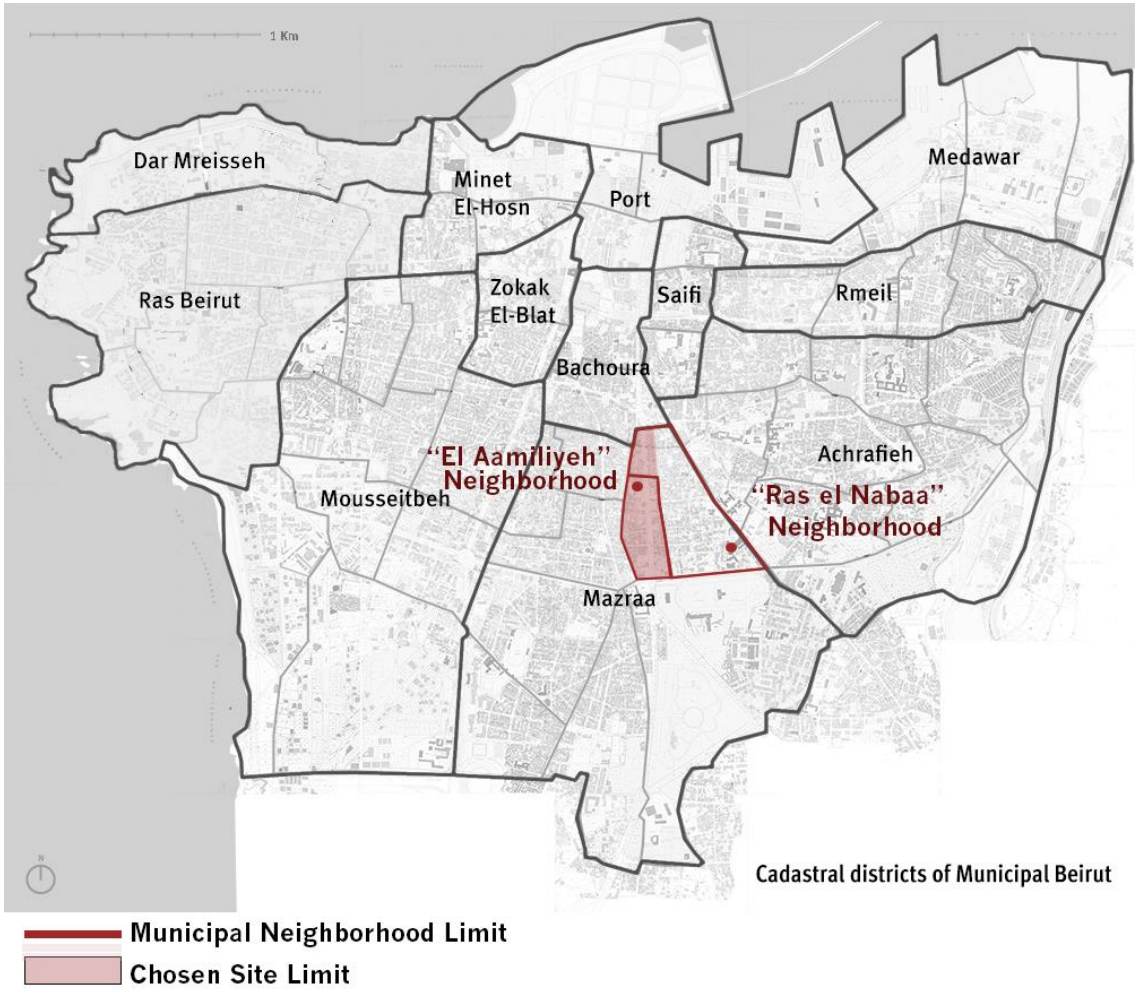


Figure 5: ["Ras El Nabaa" Neighborhood Location in Beirut], Al Asmar 2018

3.2.1. Research Variables/ Assessment Criteria

The assessment was conducted through the SAFE Assessment Tool which has been utilized for multiple design projects worldwide. The assessment criteria for this thesis consist of two sets of dependent and independent variables. The first set consists of 25 independent variables (qualities of the neighborhood features) to measure 4 dependent variables of safety, attractiveness, friendliness, and efficiency. The second set consists of 4 independent variables of safety, attractiveness, friendliness, and efficiency to measure the dependent variable of Invitation Quality (IQ). The scores given to the independent variables add up to determine the values of the dependent ones. (Curtin University & Geografia, 2006; Madani & Mehio-Sibai, 2017).

The following variables were assessed in order to acquire a detailed understanding of the accessibility of older adults to adjacent streets:

- Safety: The safety measure (Figure 6) was developed to measure the quality of the streets and pedestrian footpaths and to assess the level of active or passive surveillance in open public spaces. It consisted of 8 criteria with four valid ratings (good=3, average=2, poor=1, N/A=0) for every determined independent variable. The safety assessment could ideally amount to a score of 24 (Curtin University & Geografia 2006). For example, the criterion for rating the level of passive surveillance of a study area is as follows. If there were 3 or more active land-uses, the observer would rate a three, a street with a high level of passive surveillance. If there was two or one, the observer would rate as 2 or 1 respectively. The score of 0 was given only if a street had no active land-use at all.

Measures	Criteria
Score	
Safety	
Safety Assessment Components	
1- Level of passive surveillance (from surrounding land use) in the neighborhood	Number of active land use in the study area
2- Level of passive surveillance (from vehicle traffic speed) in surrounding streets	Lower vehicle traffic speed makes higher passive surveillance
3- Level of active surveillance (police, security personnel, cameras) around neighborhood	Presence of surveillance camera, security personnel, & Police) in study area
4- Level of neighborhood residential unit density that generates a feeling of personal security for older adults	Average residential unit/Ha in study area
5- Adequacy of sidewalks and curb-cuts for older adults using mobility aids	Disconnection/lack of pavement or missing curb cut/any obstruction
6- Adequacy of landscape provides buffer between pedestrians and passing vehicle traffic around neighborhood	Presence of landscape buffer along the street
7- Adequacy of sidewalk slope for older adults	ADA regulations
8- Adequacy of traffic flow around neighborhood	Safe for older adults

Figure 6: [Safety Assessment Criteria], Madani 2015

- Attractiveness: The attractiveness measure (Figure 7) was developed to evaluate neighborhood appropriateness and aesthetic appeal for older adults. It assessed street features such as the quality of streetscape and footpath, human scale elements, design features and landmarks, and building frontage and transparency. This measure features six independent variables which amount, in ideal circumstances, to a total score of 18 (Curtin University & Geografia 2006). For example, if a study area's landscape buffer is continuous on both sides of the street, the observer would rate the street as 3, a significant condition for the quality of the

landscape buffer. If only one street side contained a continuous landscape buffer, the score would be 2. If only one street side partially contained some landscape buffer, then the score would be 1. The score of 0 was only given when the street had no landscape buffer at all.

Measures	**Criteria**
Score	
Attractiveness	
Attractiveness Assessment Components	
1- Range of building frontage around neighborhood	Building frontage width along the street
2- Building transparency around neighborhood	Window/door proportion along the street in study area
3- Building height is human scale in neighborhood	Buildings' average height along the street
4- Remarkable Architectural Buildings/visible landmarks around neighborhood	Number of unique architecture and landmarks in the study area
5- Cleanliness of streetscape around neighborhood	Litter/graffiti in study area
6- Range of inviting landscape around neighborhood	Presence of landscape along the street in study area

Figure 7: [Attractiveness Assessment Criteria], Madani 2015

- Friendliness: This friendliness measure (Figure 8) addresses the quality of street social life and activities. It consists of six criteria and measures up to a score of 18 in ideal situations. (Curtin University & Geografia 2006) It measures criteria such as neighborhood public spaces, type of land-use, level of active surveillance, and inviting sounds and smells. For instance, if there were three or more active outdoor

public spaces around the neighborhood, then the observer should give a score of 3, a significant level. If there were two or one, then a score of 2 or 1 would be given respectively. A score of 0 would be given if the study area had no active outdoor public spaces at all.

Measures	**Criteria**
Score	
Friendliness	
Friendliness Assessment Components	
1- Adequacy of sidewalk and curb-cut quality for older adults	Disconnection/lack of pavement or missing curbcut/any obstruction
2-Sidewalk clearance adequacy for older adults using mobility aids	ADA regulation for sidewalk width using mobility aids
3- Adequecy of sidewalk slope for older adults	ADA regulations
4- Active outdoor public spaces around neighborhood	Opportunities to encourage older adults to go outside for people watching in study area
5- Active land uses in neighborhood	Number of active continuous land use along the street to invite older adults to be outside, such as commercial retail stores and residential land use
6- Range of comfortable outdoor sitting area around neighborhood	Number of comfortable sitting areas along the street considering ADA regulations

Figure 8: [Friendliness Assessment Criteria], Madani 2015

- Efficiency: The efficiency measure (Figure 9) focuses on pedestrian amenities and crossing times. It consists of five criteria which amount to a score of 15 in ideal circumstances. (Curtin University & Geografia 2006). The criteria measured involve the number and adequacy of pedestrian crossings, the nearby transportation options, the pedestrian crossing time, and the ease of navigating to destinations.

For instance, if older adults were able to cross the street without waiting at all, then the pedestrian crossing time variable would be given a score of 3, an ideal situation. If older adults wait less than a minute before crossing, then the score would be 2. If they had to wait between 1 and 2 minutes before crossing the street, then the score would be 1. If the waiting time exceeded 3 minutes, then the score would be 0.

Measures	**Criteria**
Score	
Efficiency	
Efficiency Assessment Components	
1- The pedestrian routes are easy to navigate	Existence of pedestrian signs or patterns for easy access to destinations such as transit stops and activity areas
2- There are adequate designated pedestrian crossings for older adults	Number of pedestrian passage in study area
3- Time that older adults need to wait before crossing the street	Time of waiting before crossing
4- Adequacy of pedestrian crossing signal/sign for older adults	Visible, audible, and tactile
5- There are nearby public transport options	Distance to bus or other services

Figure 9: [Efficiency Assessment Criteria], Madani 2015

- Invitation Quality: The invitation quality consists of the overall sum of safety, attractiveness, friendliness and efficiency variables. It gives an overall understanding of the invitation quality of a street for older adults. In ideal circumstances, the invitation quality of each study area could add up to 78.

The search variables assess both demand quality and invitation quality for the neighborhood physical features. For instance, the sidewalk clearance and slope, quality of crossings, and sidewalk obstructions are all assessed, hence acquiring an understanding of the basic demand quality identifiers for older adults in the neighborhood. As for the rest of the variables, they determine the invitation quality identifiers.

3.2.2. Data Collection Instruments

Data was collected from multiple sources for this thesis, and multiple instruments were used for organizing it in order to maintain a database for the data analyzing procedure. This data was be collected through empirical data collection methods and direct observation. Archival records were used to collect existing study area data, while direct observation was conducted to collect data for the study area's outdoor urban environment.

Through Archival Records, diverse types of data were collected and documented for this study:

- Maps and drawings, detailing the existing urban fabric, were collected from the American University of Beirut's (AUB) database. The Geographic Information System (GIS) data were gathered from classified information prepared by AUB's Neighborhood Initiatives (2010). The layers included diverse GIS layers: building footprints, topographic contour lines, roads, landmarks, etc. (American University of Beirut 2010).

- Interviews conducted by the Department of Public Health at AUB and related to urban studies, were acquired from researchers. The questionnaire targeted older adults (age 65 and above) residing in the chosen study area limit.
- Urban planning regulations such as legislative texts, decrees, zoning maps and regulations, as well as urban codes were acquired from the Directorate General of Urban Planning (DGU) and municipality and other authorities responsible for planning.
- Regional and global cases studying the issue and assessing "aging-friendly" components were utilized.

In addition, data collection was also conducted through directly observing the neighborhood:

Study area observation was conducted for 4 weeks in order to identify the needed neighborhood features for the study, according to the necessary assessment criteria. The first stage of the observation was done by taking street photos on both sides of the access way along every street within the chosen study area boundaries. In addition, any barrier blocking the sidewalk as per ADA regulations was documented by Global Positioning System (GPS) location and pictures.

During the second stage, street sections were drawn to evaluate each street type, its components and how they relate to each other. The sections concentrated on the size and presence of the components. The main components or outdoor physical features are the car lanes, parking lanes, sidewalks, landscape buffers, and land-use typology. Sections made justifying the rating scores undemanding by providing a complete review of each street and its assessment quality criteria. For example, adequacy of sidewalk

curb cuts was assessed based on the observations made in the study area. It based the score on the presence of sidewalk disconnections or any type of obstacles which made older adults' movement awkward or impossible based on the minimum requirements for users with mobility aids.

A total of twenty-five assessment criteria was generated for each street. The observational data from each street were translated into scores for the independent variables for every street component, based on the SAFE assessment criteria. As for the dependent variables, each measure consisted of the total of the scores given for the independent variables. The mentioned variables directed me to compare the qualities of each street in relation to their outdoor physical features according to statistical analysis tools and the neighborhood quality index.

In addition, the existing urban fabric such as land-use maps, circulation, socio-spatial practices, greenery, circulation, and spatial patterns were generated through direct observation and represented through visuals such as maps, sections, sketches, 3D representations, and photos.

3.2.3. Data Analysis Tools

The aim of the analysis stage is to translate the collected data into meaningful conclusions that determine the relationships between the data and can be interpreted into findings (Lyons and Doueck, 2010; Silverman; 2000; Yin, 2003). In addition, we can deduce the relationship between different variables within the study area. Therefore, this thesis determines the correlation between each independent variable and its relative dependent variable for all the streets within the neighborhood. The analysis tools consist

of GIS Spatial Analysis and statistical Package for the Social Sciences (SPSS) Regression Analysis.

GIS spatial analysis allows the translation of analytical data into visual maps; therefore, it allows the identification of spatial patterns. (Karimi, 2012 & Lloyd 2012). It was conducted to understand where different features are located, how they relate, what they mean, what is needed and what the action that needs to be taken is (Madani and Mehio-Sibai, 2017).

Accordingly, GIS assists in:

- Verifying the study area's location within its context
- Defining the characteristics of the study area's main elements
- Determining their spatial relationship
- Determining and quantifying data patterns and how they can be used in locating hot spots for critical study area issues
- Determining predictions that need design solutions

(Madani and Mehio-Sibai, 2017)

In addition, SPSS regression analysis was conducted in order to answer the research questions and to determine exactly what physical features are to be modified. In order to do so, independent and dependent variables were quantified and statistically analyzed. Multiple regression analysis was conducted to find the correlation between each dependent criteria (Safety, attractiveness, friendliness, and efficiency) and its independent variables in urban form (i.e., 1- relation between sidewalk slope and safety …). In addition, linear regression analysis was conducted to determine the relationship between each independent variable of safety, attractiveness, friendliness, and efficiency,

and the overall dependent variable of IQ. Hence, the correlation coefficient (r) which determines the level at which each set of data relates to the other was determined.

- Correlation Coefficient (r): (r) Measures the linear correlation between two variables. It ranges between 1 and -1, where 1 is a complete positive linear correlation, 0 a complete lack of linear correlation, and -1 a complete negative linear correlation. Both the degrees of freedom (df) and the p-value are needed to calculate the correlation coefficient (r). If $p< 0.05$, then the study is 95% sure that a relationship exists. If $p>0.05$, then the study cannot be 95% sure that a relationship exists (Madani, 2015).

CHAPTER 4

CASE STUDY

4.1. Study Area Location and Boundary

The chosen study area is located in the Lebanese capital Beirut (Figure 5), and it extends along 2 blocks located around “Bechara el Khoury” highway (Figure 10). The study area was chosen for multiple reasons. Two main reasons exist; the first is the physical divide caused by “Bechara El Khoury” highway between the two sides of the area. The second reason is the collaboration with the Public Health Department, which is also working on the same study area boundary in order to promote active aging.

First, the study area was chosen due to the existence of “Bechara El Khoury” highway along its center. The highway was constructed during Lebanon’s high modernization period in the 1950-60s as part of the road building schemes in Beirut to facilitate access in and out of the city (Saliba & Al-Tayeb, 2014). It has since disconnected the social ties and the physical fabric in the area. For instance, an interview with a relative in the neighborhood said that older adult sisters living on different sides of the highway were physically unable to cross and visit each other after the highway was constructed. Additionally, interviews conducted in the study area claimed that many residents found it unsafe to cross the highway and accidents occurred regularly while people were crossing, thus increasing both physical and social divides between both sides.

The second reason why I chose this study area is my collaboration with Prof. Abla Mehio-Sibai from the Public Health Department at AUB. She is currently working

on promoting active aging in the same study area boundary through public health services. As such, being in the same study area, my research introduces an urban design dimension to active aging complementary to that of public health.

The study area consists of a combination between parts of the “Ras El Nabaa” neighborhood and “Al Amiliyeh” neighborhood (Figure 11). With its majority being inside “Ras El Nabaa,” this study refers to the study area as the “Ras El Nabaa” neighborhood. The area is limited by Independence Street to the north and Abdallah Al Yafi Ring Road to the south. At its center lies the “Bechara El Khoury” highway (Figures 12 & 13) which divides it into two and creates a direct connection with the Central Business District (CBD) to the north and the pine forest know as “Horsh Beirut” to the south. At its proximity to the East exists the Damascus Road that, during the Civil War, was a demarcation line between East and West Beirut.

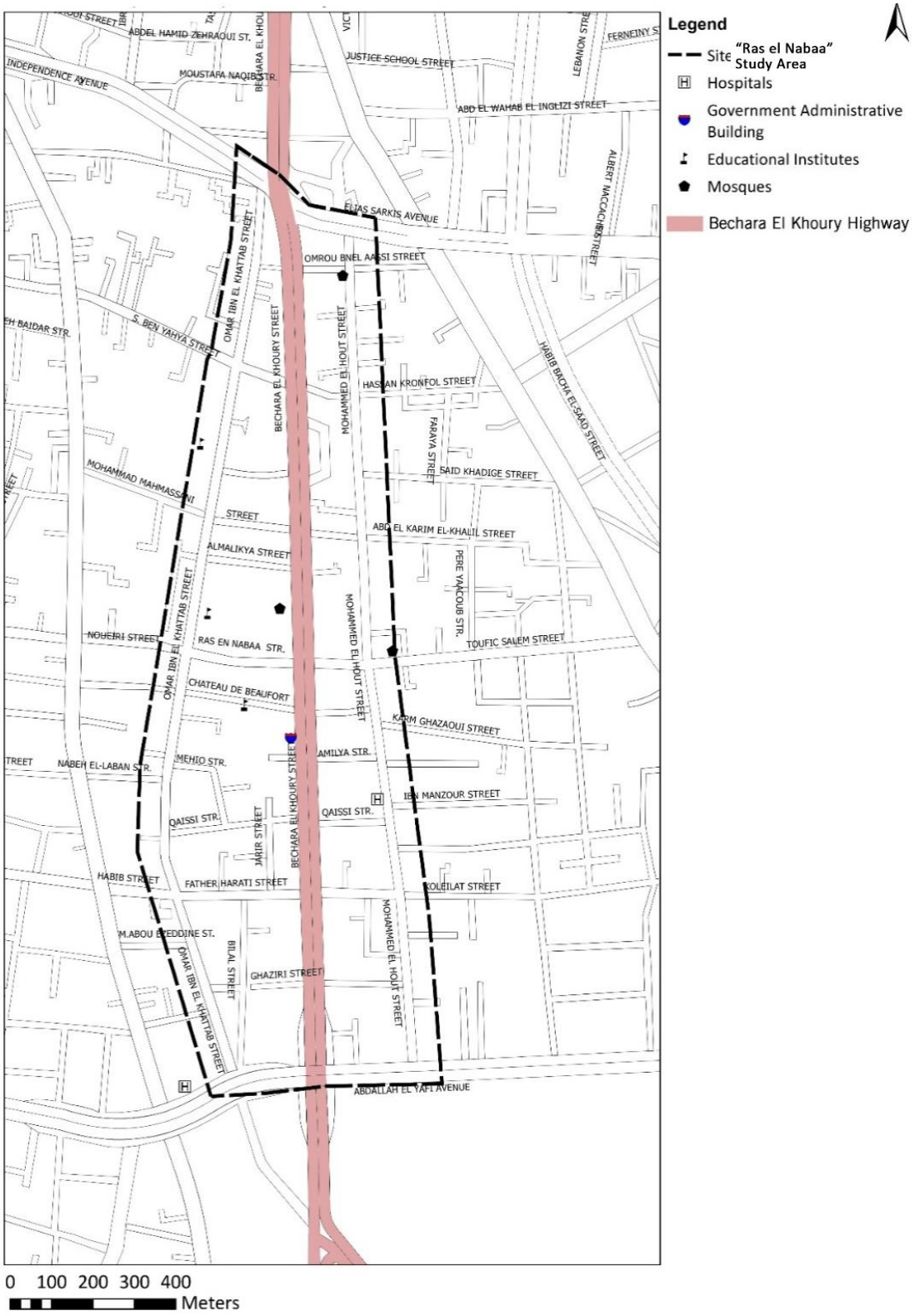


Figure 10: ["Ras el Nabaa" Chosen Study Area Boundary and Studied Roads], Al Asmar 2018

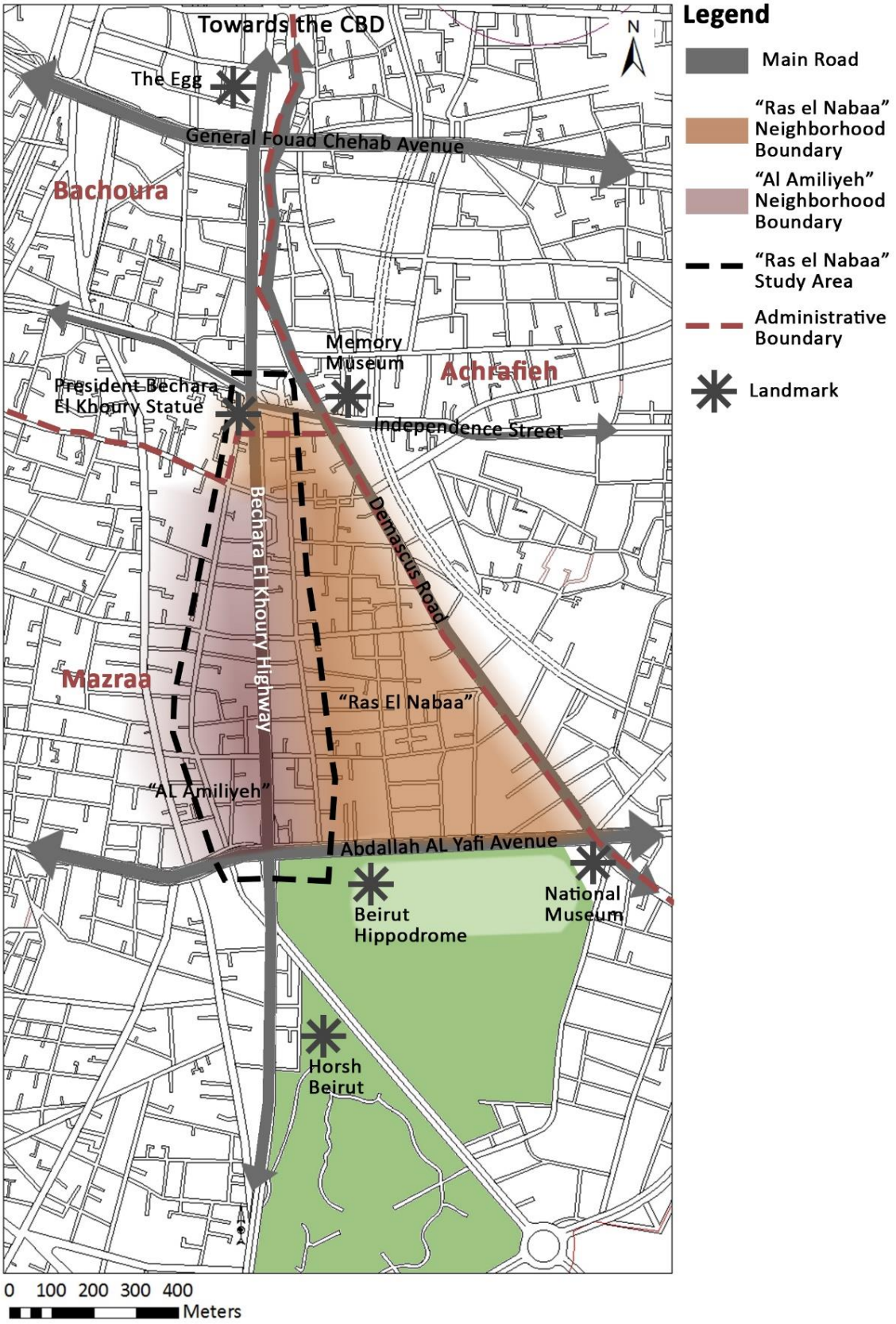


Figure 11: [Chosen Study Area Location Boundary], Al Asmar 2018

Figure 12: [“Bechara El Khoury” Highway], Al Asmar 2018

Figure 13: [“Bechara El Khoury” Highway], Al Asmar 2018

4.2. Neighborhood Characteristics

Today, the neighborhood is limited by two main avenues, “Elias Sarkis” from the north and “Abdallah Yafi” from the south. Its diverse land-use, closeness to and richness in both community scale and city scale landmarks such as the Hippodrome make it a lively location and attraction spot. As such, it is being accessed by different demographic and social groups. In addition, this hub contains multiple public transportation lines which connect it to other neighborhoods in Beirut and other cities in Lebanon. This level of connectivity has made the neighborhood easily accessible; however, it has caused a high level of traffic congestion. All the above-mentioned factors have rendered the neighborhood a vibrant, dense, and connected hub; however, they have caused damage to the pedestrian network.

The neighborhood’s pedestrian network is being affected by the land-use diversity of the neighborhood. For instance, the diverse land-use, which includes military bases and places of residence for political figures, has caused an increased level of military security in the area. Hence, concrete barriers and security guards hijack parts of the sidewalks and make it difficult for pedestrians to walk. Additionally, commercial shops along the streets are using the sidewalks to install tables and chairs and sometimes to display their merchandise. This is causing outdoor seating areas to be created; however, it often results in the blocking of the sidewalks. More so, due to the lack of ample parking spaces, cars park on the sidewalks and hinder their use. All these factors affect the circulation and the socio-spatial practices of the neighborhood for older adults; hence, this creates a need for improved pedestrian and connective amenities to ensure access to services.

Accordingly, I was able to draft the legibility study below (Figure 14) for a more comprehensive reading of the study area using the five major elements of design: paths edges, nodes, districts, and landmarks. (Lynch, 1960)

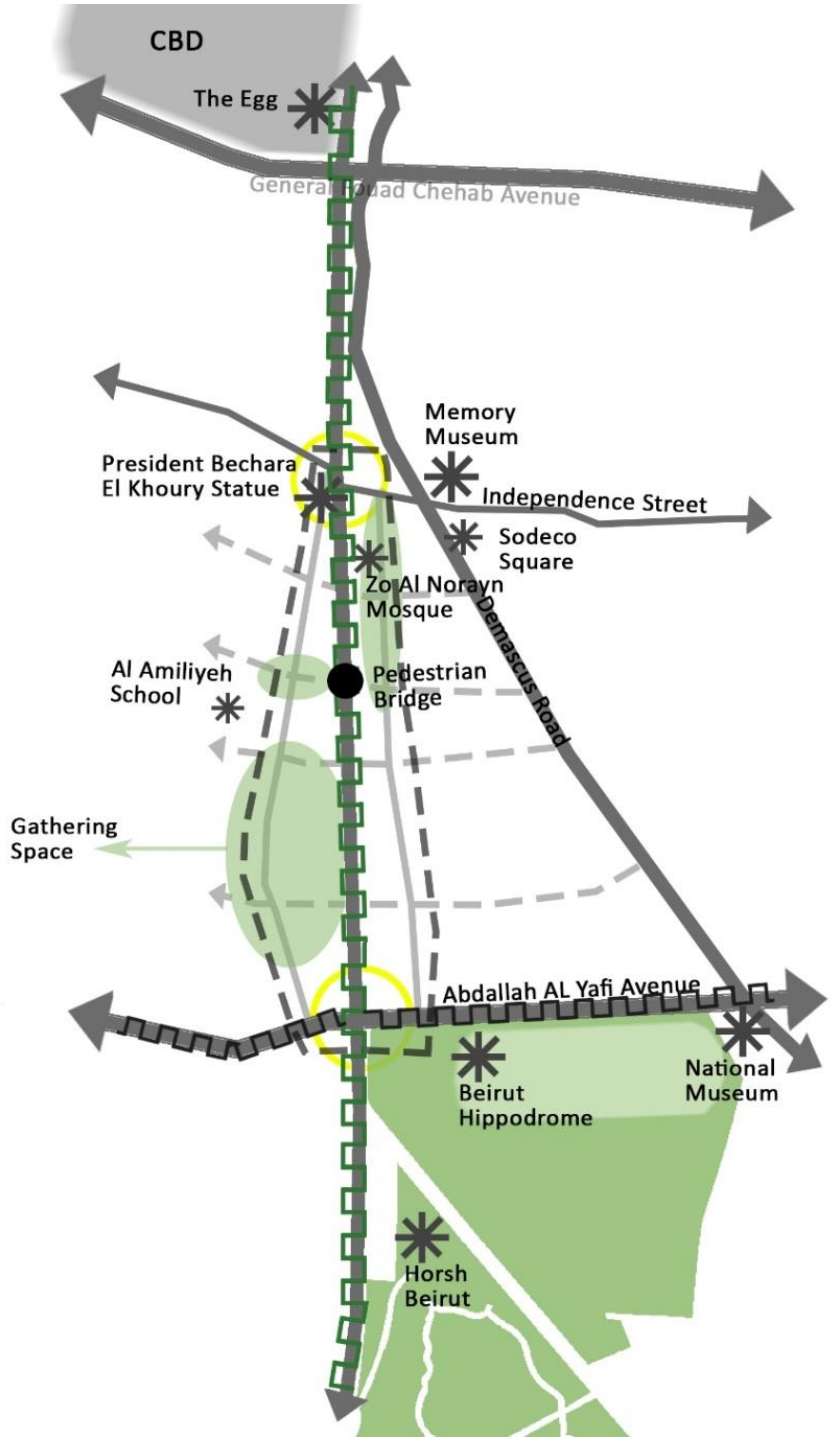


Figure 14: [Legibility Study for the Chosen Study Area], Al Asmar 2018

4.2.1. Land-Use and Zoning

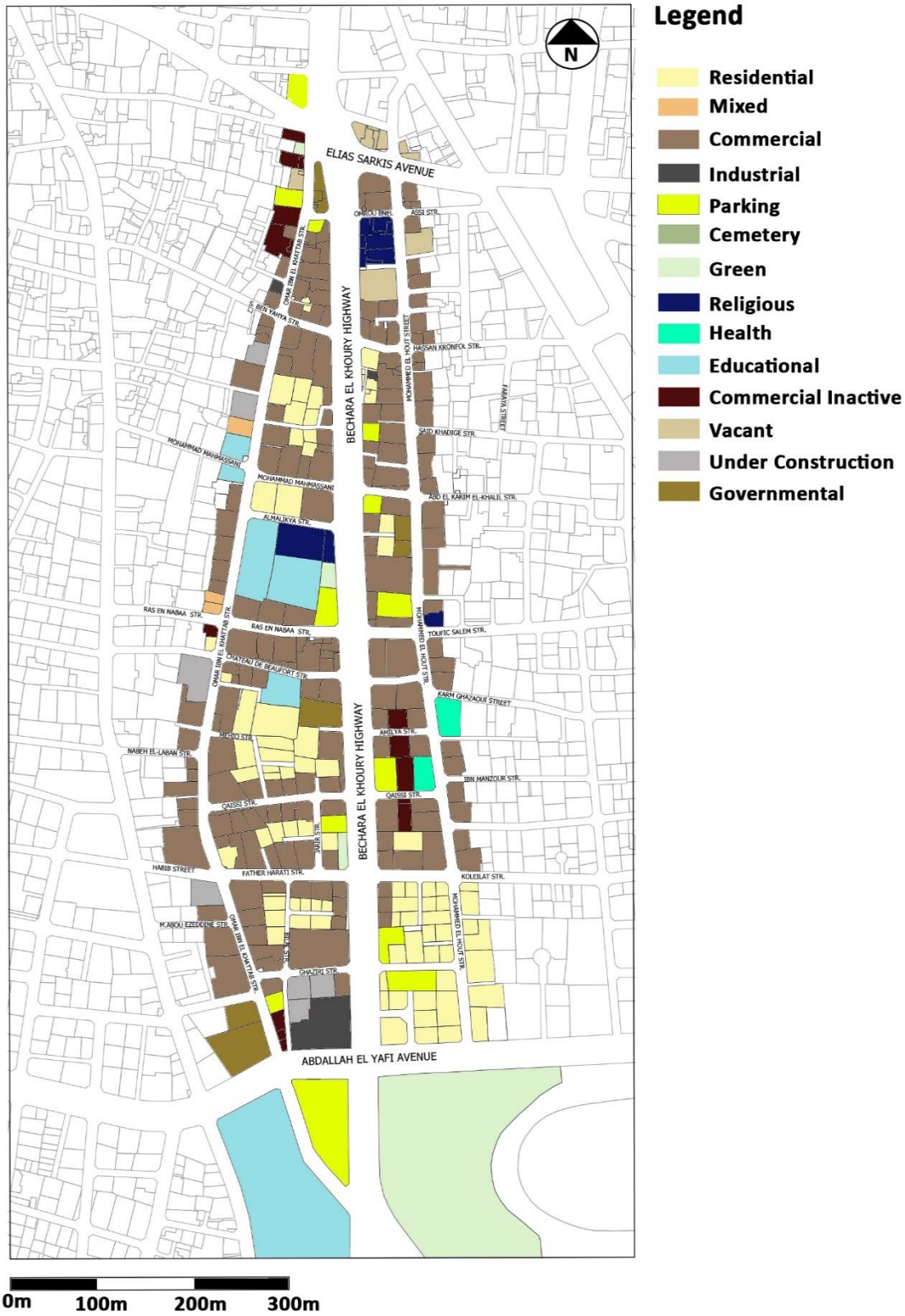


Figure 15: [“Ras El Nabaa” Ground Floor Level Land-Use], Al Asmar 2018

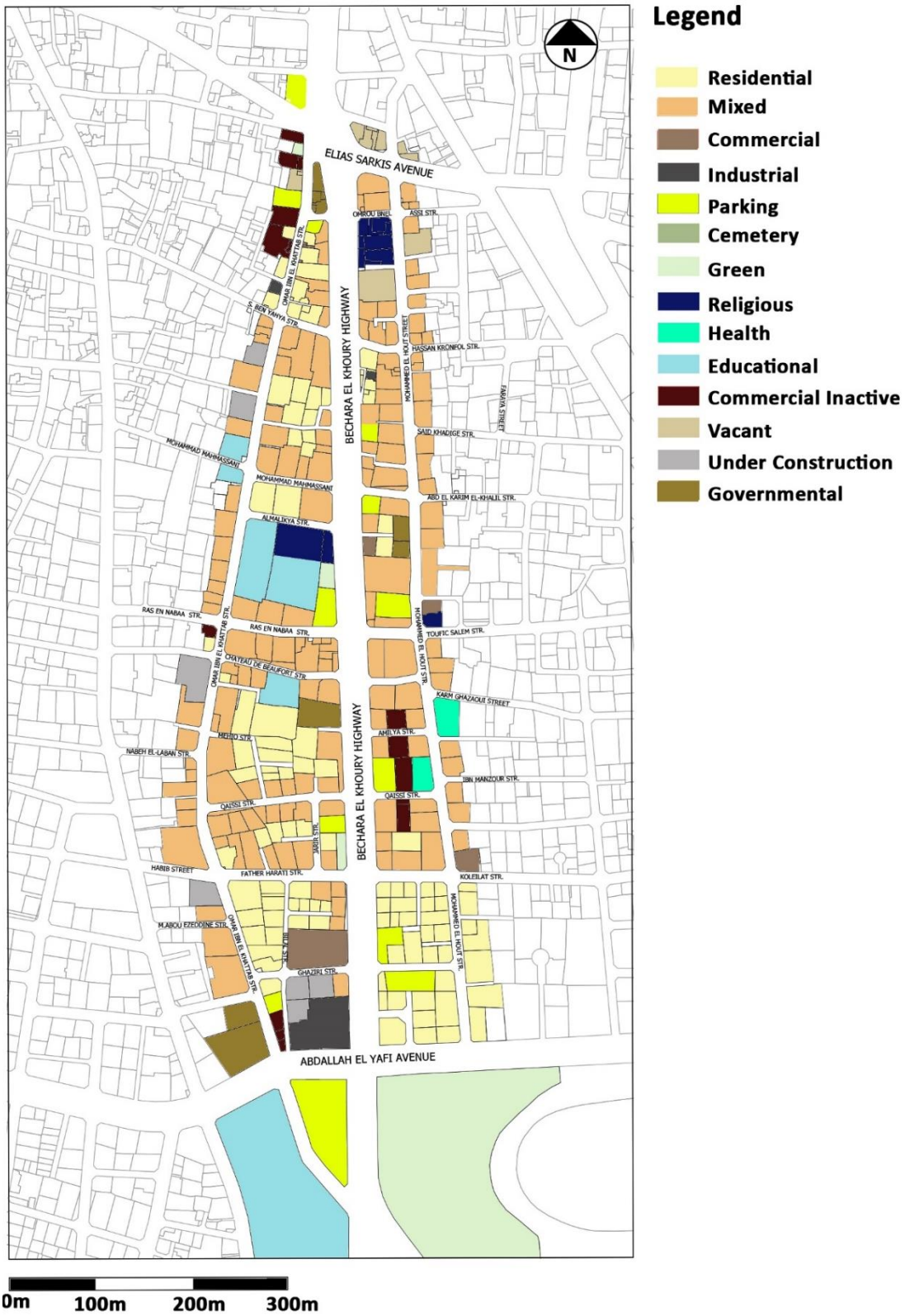


Figure 16: [“Ras El Nabaa” Neighborhood Upper Floor Level Land-Use], Al Asmar 2018

The neighborhood ground floor land-use is diverse in educational, religious, governmental, commercial, and residential usage (Figure 15). The upper floor levels (Figure 16) are mostly for mixed use with both residential apartments and offices. This land-use character and diversity is generally dominant in Beirut. It provides an active space day-round along with access to close services for the neighborhood residents.

Three main streets stand out with a dominant active commercial character throughout the day, “Bechara El Koury”, “Mohammed El Hout”, and “Omar Ibn El Khattab”. Their land-use, being mostly commercial with some educational, health, and religious functions, makes them attraction points for different groups of people. This fact results in them being strong commercial arteries. The shops along those streets are diverse and provide different types of merchandise and services such as grocery, food and drinks, clothes, light industry, beauty products, gas stations, and drug stores, etc... Some of these shops use the sidewalk to display their merchandise or to install seating areas. As such, diverse groups of people going to different stores, ranging from men targeting car shops to women going to beauty salons, can be seen sitting on the sidewalk.

As per the remaining streets, some of the ones that intersect with “Bechara El Koury”, “Mohammed El Hout”, and “Omar Ibn El Khattab”, have active commercial land-uses. As such, the neighborhood is a strong commercial hub. However, its commercial activity is limited by various factors. From the north, the “Elias Sarkis” Avenue creates an infrastructure break separating the neighborhood from its surroundings. As a result, the land-use on the avenue’s northern and southern edges is either vacant, used as parking spaces or has inactive commercial shops. This results in a northern isolating edge, which interrupts the commercial activity. As for the southern

part of the neighborhood, the main commercial streets contain a dominant secured residential ground floor (GF) area, where a politician resides to the east. As for the west, a military base exists just adjacent to a light industrial area. This reduces all ground floor activity in those zones. In addition, “Abdallah El Yafi” Avenue provides a second infrastructure break separating the neighborhood from its southern surroundings. The existing functions on the opposite side of the avenue are “Al Makassed” school, “Beirut Hippodrome”, and a parking area, with all three land-uses having a concrete edge in the form of a fence. Accordingly, the character zones are defined in the neighborhood (Figure 17).

In addition, a main educational hub, including “Al Amilieh” School, “Ras El Nabaa” Public School, and Beirut School, exists along “Omar Ibn El Khattab” Street. Moreover, a health hub containing Al Ghorayib Hospital lies on “Mohammed El Hout” Street. In conclusion, this commercial and land-use diversity attracts different demographic and social groups to the neighborhood. Therefore, this fact creates a need for improved pedestrian and connective amenities to ensure access to commercial services and community facilities.

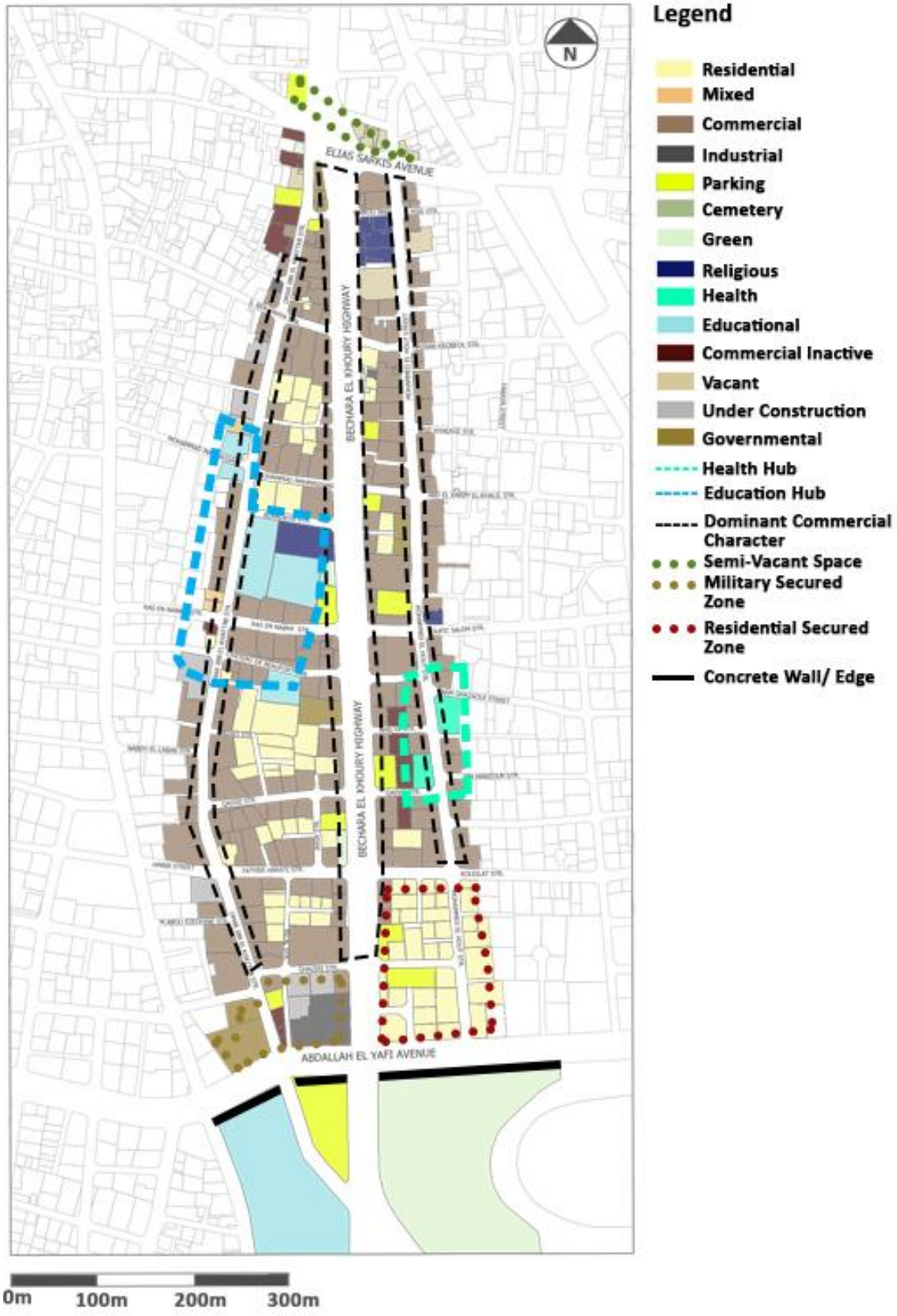


Figure 17: [Land-Use Character Map], Al Asmar 2018

4.2.2. Landmarks

Several community scale landmarks and city scale landmarks exist in and around the neighborhood (Figure 18). These landmarks create navigation way finding points around the neighborhood, which causes the streets to be easily navigated by older adults. As for the city scale landmarks, Sodeco, which contains the famous Memory Museum, borders the study area from the north-east. In addition, the "Bechara El Khoury" statue exists at the northern part of the study area, while the Beirut Hippodrome exists to the south. In addition to city scale attraction destinations, the study area contains multiple community scale landmarks, which vary in land-use. They are mostly community facilities such as schools, mosques, hospitals, and administrative buildings. A total of five different schools, three mosques, and two hospitals are located in the neighborhood. This land-use diversity gives the neighborhood its distinct character. It creates destination attraction points for different social groups and age groups, hence creating a need for pedestrian amenities.

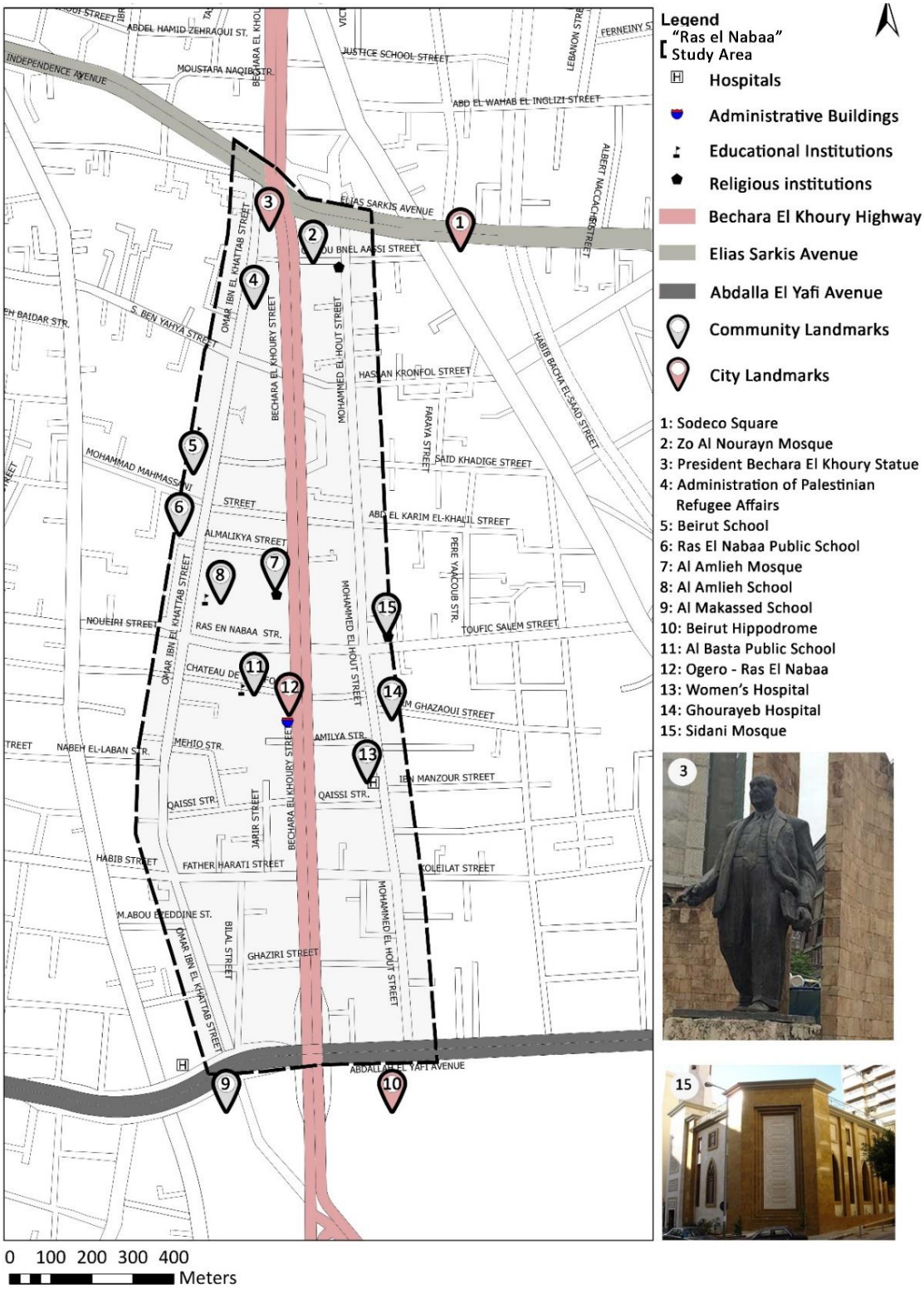


Figure 18: ["Ras El Nabaa" Neighborhood Landmarks], Al Asmar 2018

4.2.3. Vehicular Networks

The study area's vehicular network is a spine configuration containing mainly 4 types of roads - the primary roads, the secondary roads, the tertiary roads, and the cul de sacs (Figure 19). The most prominent primary road in the neighborhood is "Bechara El Khoury" highway which is the main artery dividing the neighborhood in the middle and distributing the circulation to the rest of the streets. In addition, two primary roads, the "Elias Sarkis" and "Abdallah El Yafi" Avenues, limit the study area from the north and south respectively. The intersection of these three main streets creates main traffic nodes which distribute traffic in and out of the study area. In addition, the main circulation roads directly feed into the remaining secondary and tertiary streets. As such, all the mentioned streets' traffic congestion level is high (Figure 20).

As for the secondary streets, "Mohammed El Hout" and "Omar Ibn El Khattab" are the most prominent, each on an opposing side of the highway. They are both one-way streets, similar in size, and form main commercial spines. Their intersection with "Abdallah El Yafi" and "Elias Sarkis" Avenues creates traffic nodes that feed vehicular traffic in and out of the study area. As such, the main circulation nodes and access nodes in the neighborhood are determined.

The tertiary streets are mainly streets perpendicular to "Bechara El Khoury" highway; they connect the surrounding neighborhoods and blocks with the highway, "Mohammed El Hout" and "Omar Ibn El Khattab" streets. They are mostly quiet and calm in general and have low traffic intensity. As for the cul de sacs, they are used as parking areas or pedestrian pathways between parallel streets.

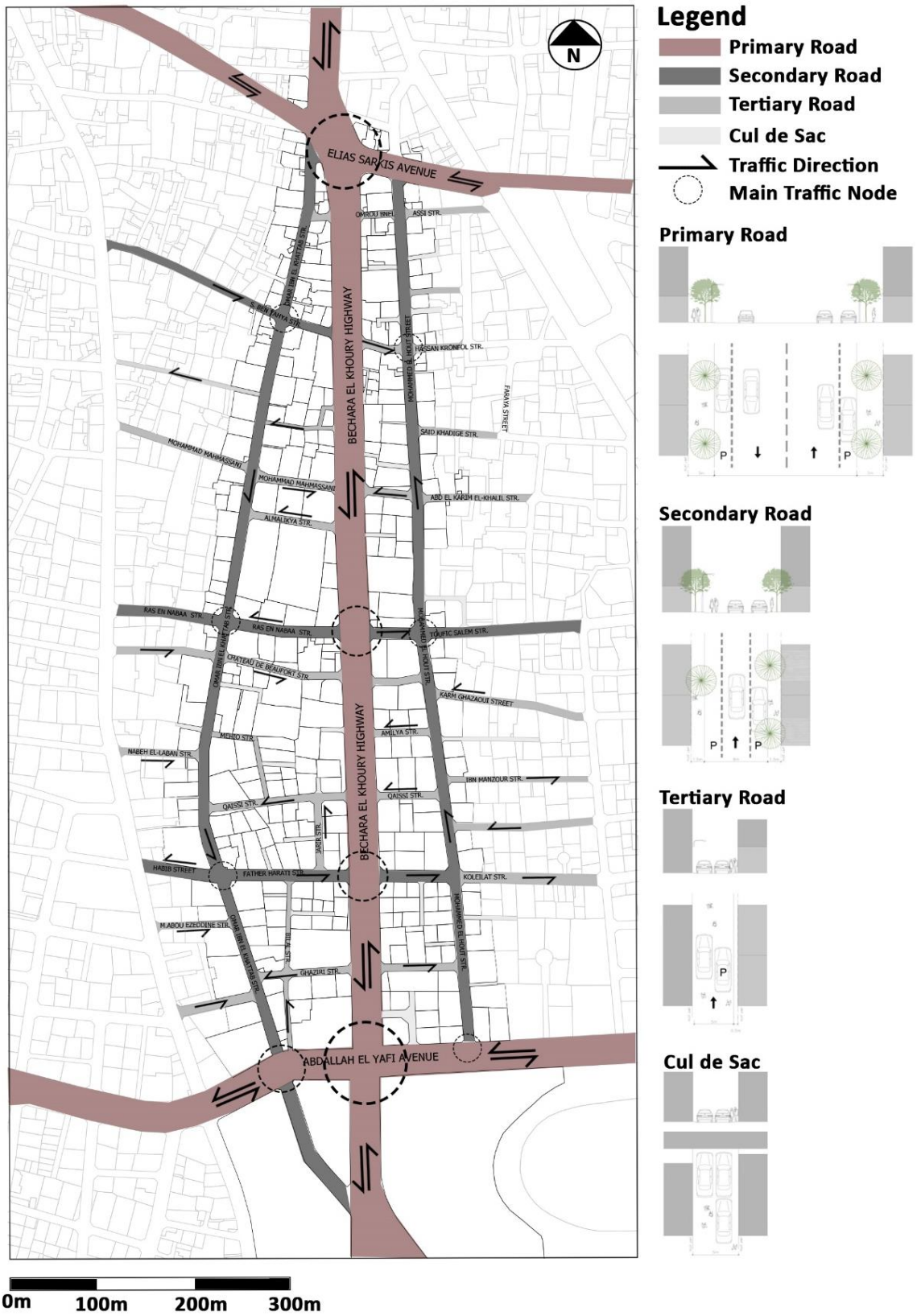


Figure 19: [“Ras El Nabaa” Street Hierarchy], Al Asmar 2018

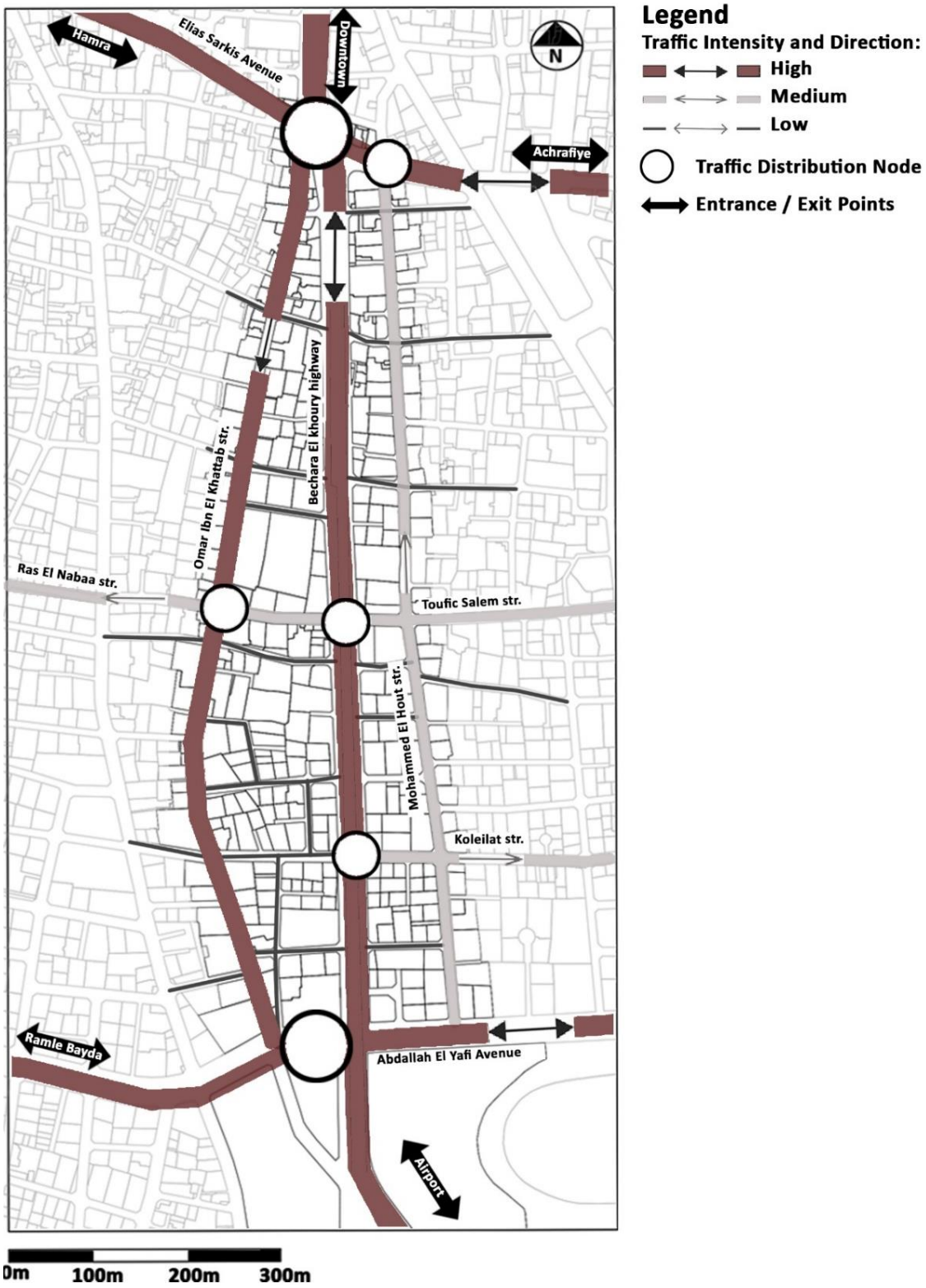


Figure 20: [“Ras El Nabaa” Neighborhood Traffic Intensity], Al Asmar 2018

4.2.4. Public Transportation

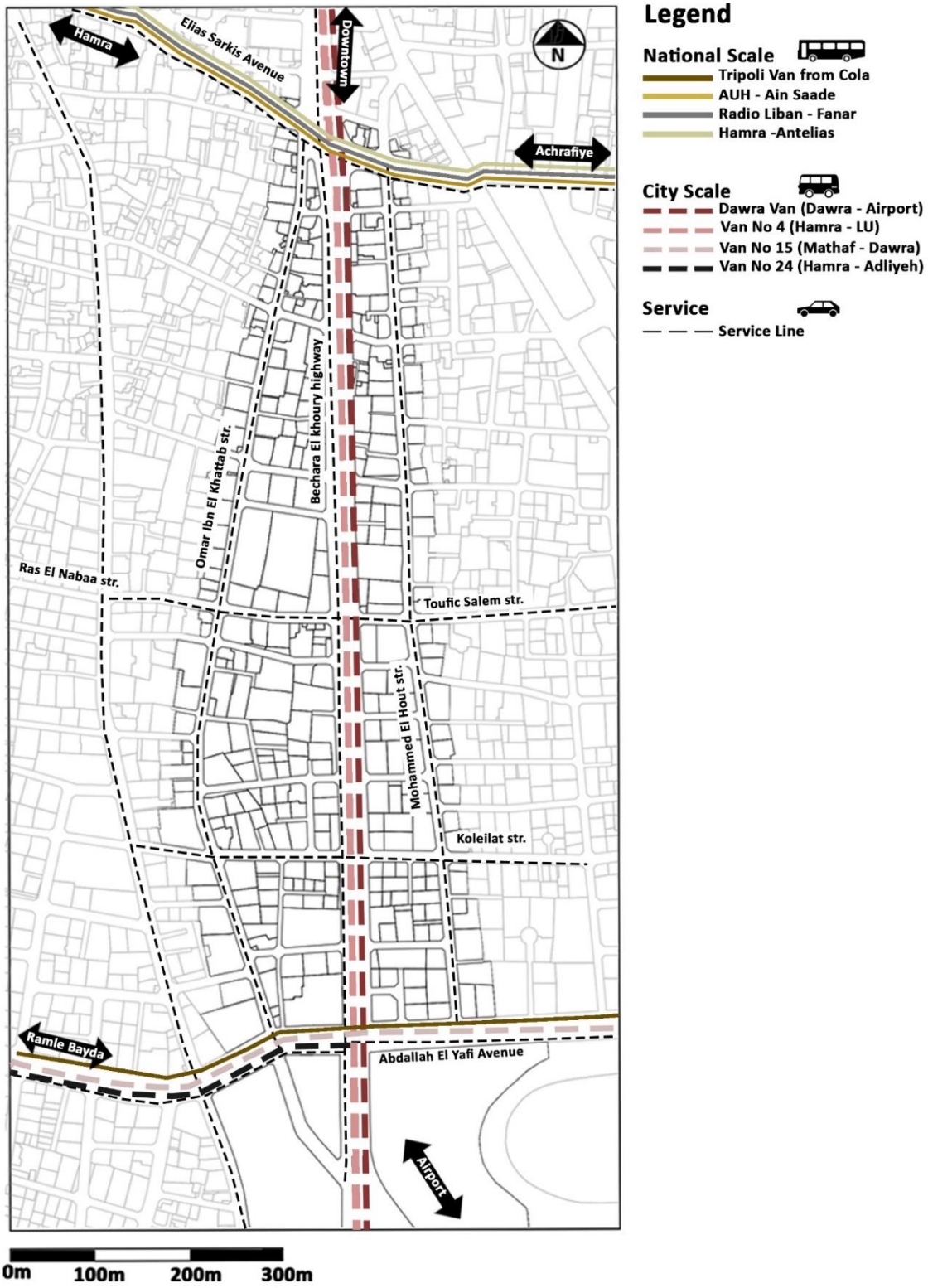


Figure 21: [“Ras El Nabaa” Public Transportation], Al Asmar 2018

The neighborhood includes 3 main arteries for public transportation (PT), “Bechara El Khoury” highway, the “Elias Sarkis” Avenue, and the “Abdallah El Yafi” Avenue. “Bechara EL Khoury” highway has always been and still is a transport infrastructure corridor. It is also a part of the service shared taxis commuting from the southern suburbs and public minibus Line 4. Besides, it is a route for the “Dawra” van, thus connecting people to the northern part of Lebanon. It, therefore, provides city scale PT; while the two avenues provide national scale PT. The rest of the streets only provide short-ranged service lines. We can thus conclude that the neighborhood is firmly connected to Beirut and the rest of the country (Figure 21).

4.2.5. Pedestrian Networks

The pedestrian network and sidewalk quality in the neighborhood show multiple disconnections and barriers on almost every street (Figure 22). The type of disconnections vary, for some sidewalks are broken down while others are completely non-existent along the roads (Figure 23). As per the barriers, they are mainly public amenities, vehicular obstructions, and commercial amenities (Figure 24). In addition, "Bechara El Khoury" street is the hardest one to cross for pedestrians. The entire highway has 3 pedestrian crossings (Figure 25), which are spread almost evenly along the 1 km stretch of road. The first is a zebra pedestrian crossing with a signal, the second a pedestrian bridge, and the third a zebra crossing with minimal lighting and no signal. The crossings are non-compliant with ADA regulations. For example, the pedestrian bridge is not well lit, and one of the zebra crossings does not provide a 1.2 m passageway clearance between the road and the connecting sidewalk. As such, the highway is unsafe and therefore unfavorable to cross, further increasing the divide in the neighborhood.

These factors discourage not only older adults from accessing the streets (Sibai, 2018) but also the entire neighborhood residents.

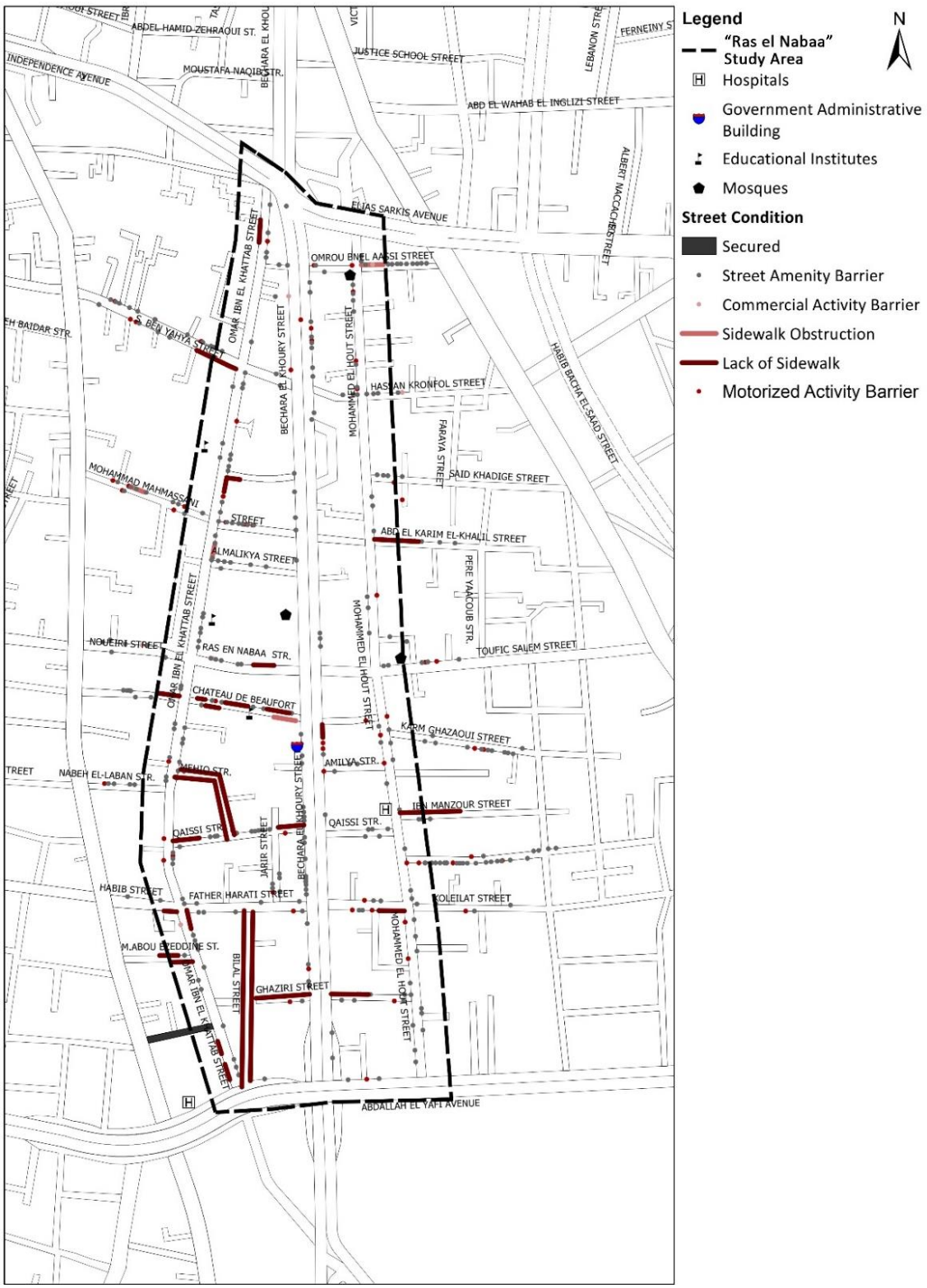


Figure 22: [“Ras El Nabaa” Sidewalk Conditions], Al Asmar 2018

Figure 23: [Sidewalk Disconnections], Al Asmar 2018

Figure 24: [Sidewalk Barriers: from left to right, Commercial Amenity Barrier, Street Amenity Barrier, Motorized Vehicular Barrier], Al Asmar 2018

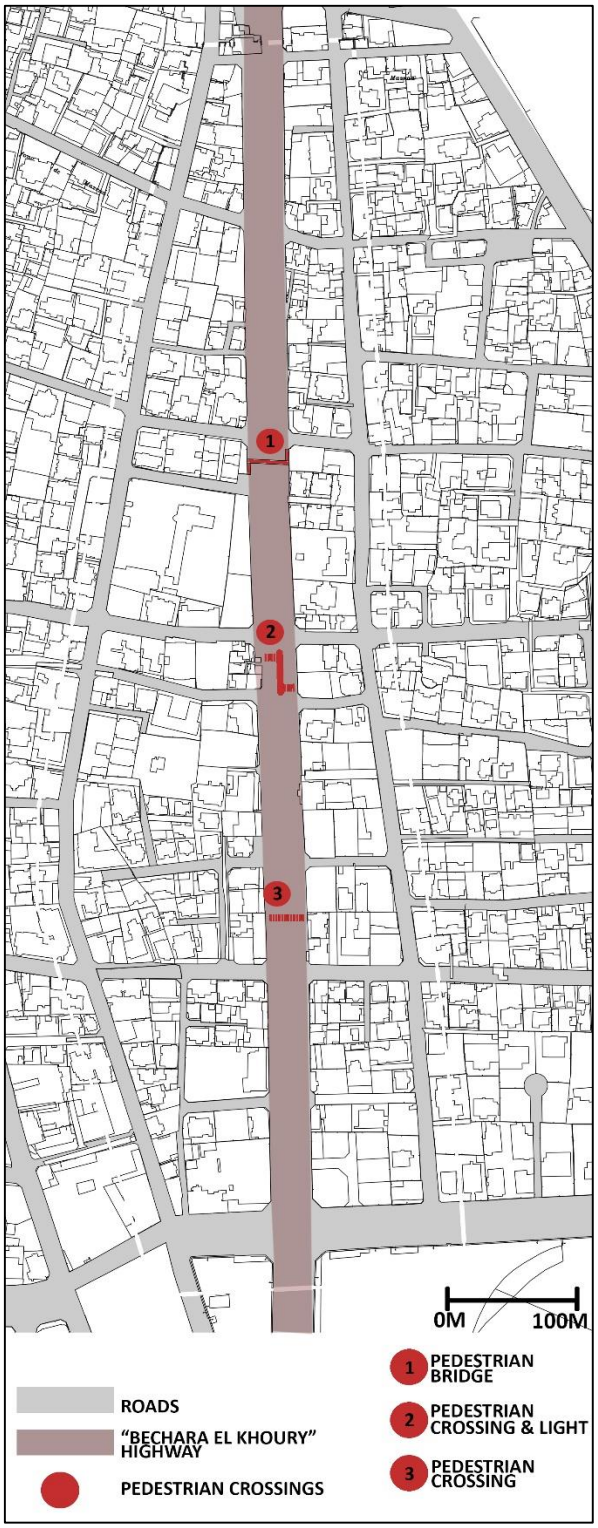


Figure 25: [Pedestrian Crossing Location Along "Bechara El Khoury" Highway], Al Asmar 2018

4.2.6. Building Heights and Density

The neighborhood buildings show a general variance in heights; however, the majority are high and medium rise between 3-10 floors (Figure 26). In addition, new gated high-rise buildings reaching up to 25 floors are emerging right next to old low rise ones. This fact creates building height diversity along the streetscape. Additionally, it signifies an economic diversity in the neighborhood and implies variety in different social classes utilizing the same urban fabric. This building height variety is directly related to the building density variety in the neighborhood. It is causing the rise of different building densities with various residential density units.

The neighborhood building density (Figure 27) ranges between low to very high densities; however, the majority of the buildings have medium to high densities. This fact implies that the neighborhood residential units hold medium to high counts and therefore have a medium to high population count, which generates a feeling of security for older adults. As such, we can conclude that the neighborhood's urban fabric is being used by a high number of people from diverse social groups.

Figure 26: [“Ras El Nabaa” Neighborhood Building Heights], Al Asmar 2018

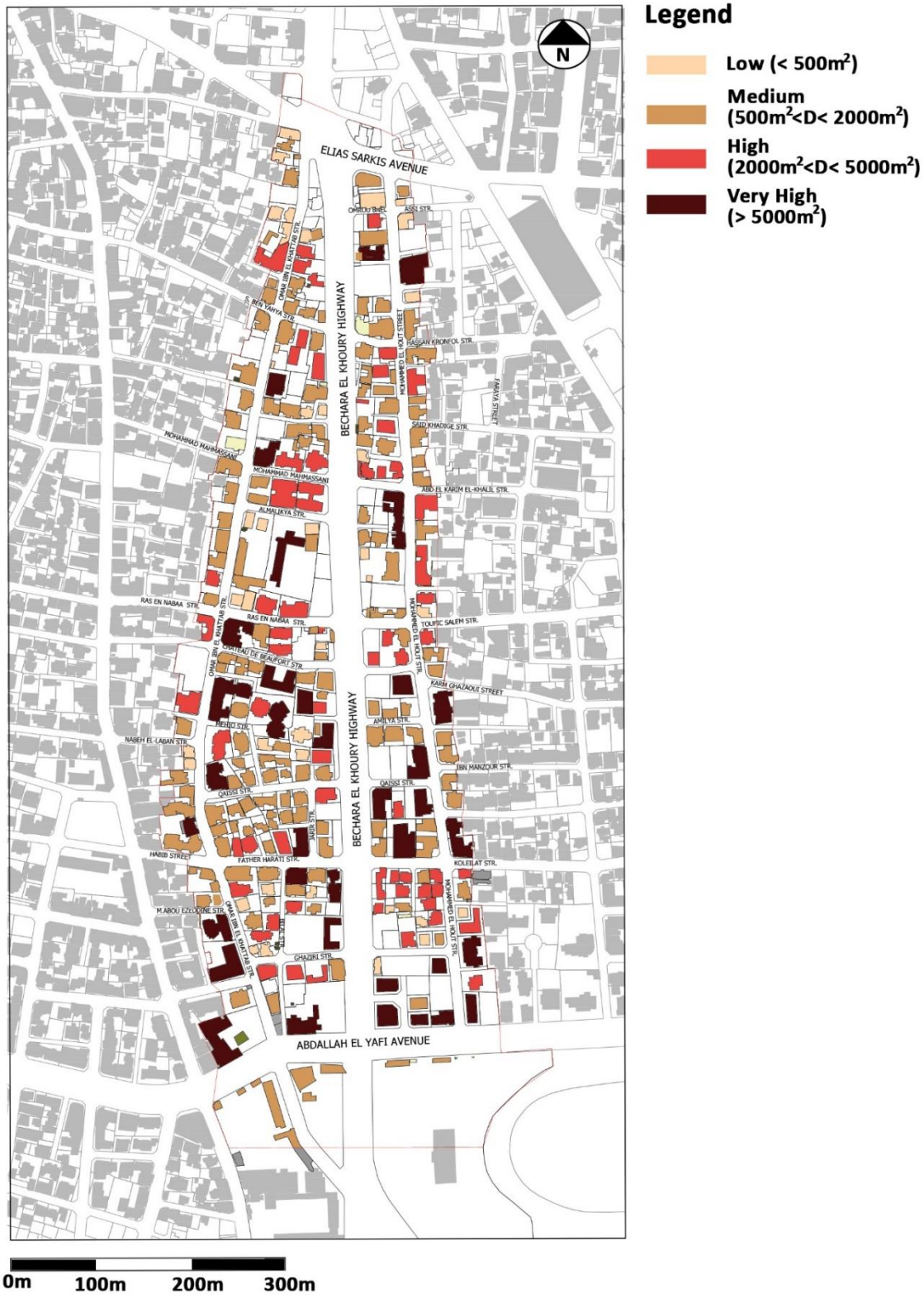


Figure 27: [“Ras El Nabaa” Neighborhood Building Density], Al Asmar 2018

4.2.7. Ground Level Streetscape Frontage

The land-use diversity in the neighborhood has led to multiple ground-floor building frontages such as glass or concrete building facades as well as metallic or concrete fences (Figure 28). These frontage types are highly related to the plots' land-uses. For instance, ground floor commercial land-uses have a dominant glass façade, while residential, religious, and health land-uses have dominant concrete ones. Additionally, more segregated land-uses such as schools, governmental, industrial, and parking areas are bordered by concrete fences, while more inviting land-uses such as green spaces and residential units are bordered by metallic ones. These types of frontages affect a streetscape's visual transparency and continuity for older adults. As such, they affect the neighborhood's invitation quality and socio-spatial practices.

The types of building frontages affect how inviting a certain street is for older adults and therefore, the activities provided. This is due to the fact that streetscapes with increased visual continuity are more inviting for older adults. For example, concrete fences and concrete-dominated building facades create a visual barrier along the streetscape, while glass facades and metallic fences provide visual continuity. As such, people are more likely to walk or sit in front of a more inviting frontage, such as a metal fence or a glass-dominated façade. These mentioned frontage types are all found in the neighborhood; however, glass-dominated frontages are the most prominent and lead to a generally inviting streetscape. However, multiple uninviting concrete edges exist along the streetscape. These concrete edges border both highly guarded land-uses, such as governmental areas, and less guarded ones, such as schools, parking lots, and light industrial zones. As such, they can be replaced by metallic fences in less guarded areas

where there is no need to block the view for security reasons or they can be covered by greenery in highly guarded areas where they are required.

Figure 28: [“Ras El Nabaa” neighborhood Building Frontage], AL Asmar 2018

4.2.8. Socio-Spatial Practices

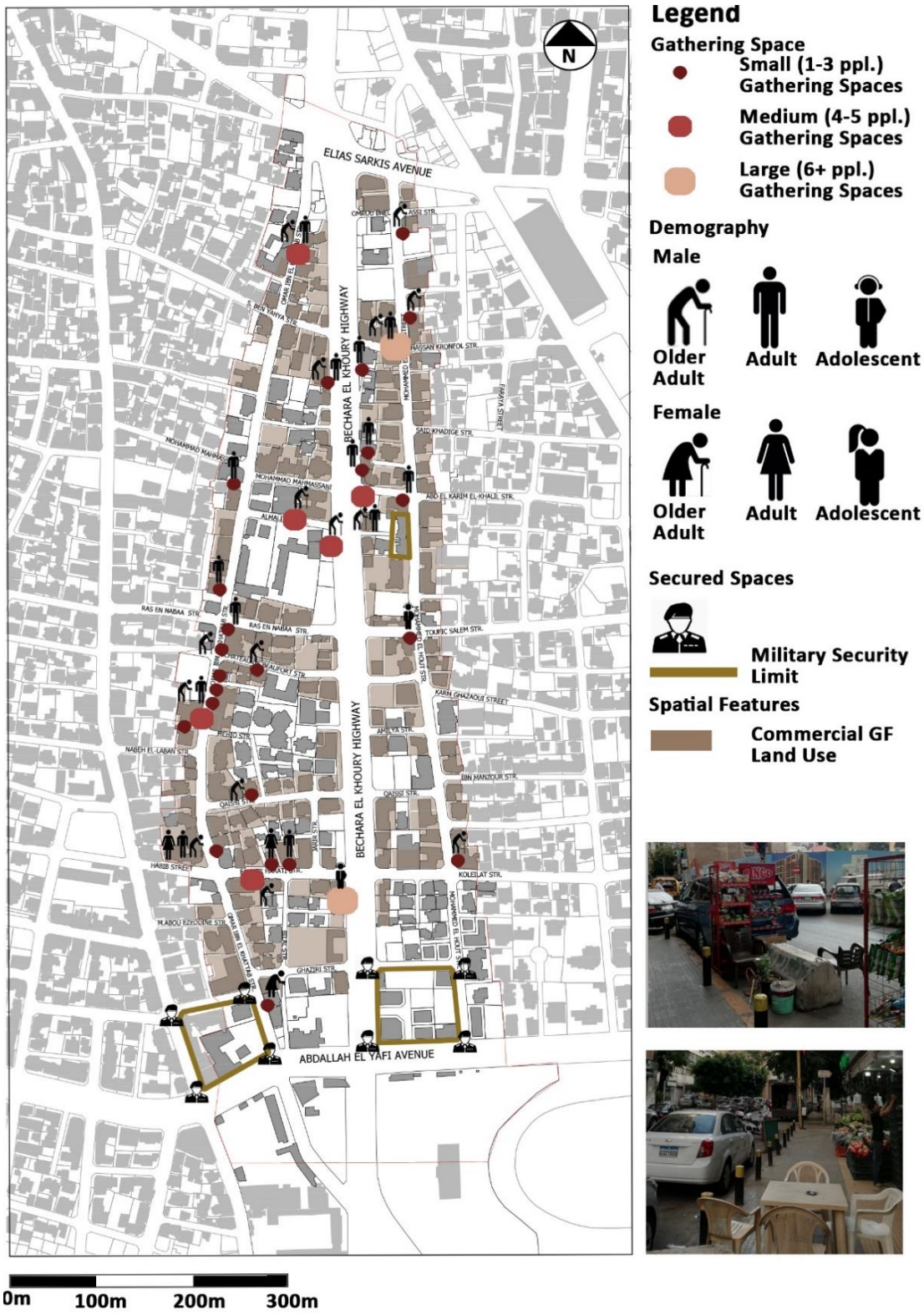


Figure 29: [“Ras El Nabaa” neighborhood Socio-Spatial Practices], Al Asmar 2018

The street level socio-spatial practices vary between the types of gathering spaces. They vary in size, demography, and type as some are extensions to commercial shops, while others are gatherings for older adults in front of mosques, and still, others are set up by gatekeepers in front of residential buildings (Figure 29). However, what is clear is that they are mainly concentrated around “Omar Ibn El Khattab” Street, “Bechara El Khoury” highway, and the northern part of “Mohammed El Hout” Street where there is a dominance in ground-floor commercial shops and mosques. The neighborhood residents and shop owners have set up plastic and wooden chairs and tables in order to create these spaces (Figure 30). They gather daily for various activities such as having coffee, sharing food, playing dice, smoking chichi, or just socializing. When interviewed, the gathered groups stated that they come from all over the area as they seldom cross the highway to reach their gathering locations. Some reside in “Ras El Nabaa” and “Amiliyeh” while others reside in locations such as “Basta”, “Bachoura” and “Khandaa El Ghamii”. This fact shows that even though the highway has physically divided the neighborhood, strong social connections still exist between both of its sides, therefore forming a tight-knit community. Furthermore, these activities demonstrate that a community exists along these gatherings.

In addition, some socio-spatial practices differ from the usual gatherings among certain groups. Around a street corner in front of a small grocery shop, the shop owner placed a small stand carrying an urn of drinking water for passersby (Figure 31). This furthermore goes to show the existence of friendliness and community ties between neighborhood residents. It is important to note that the grocery shop sells plastic water bottles, but still took the initiative of providing free water for pedestrians.

Figure 30: [Seating Area Created by the Neighborhood Older Adults], Al Asmar 2018

Figure 31: [A Drinking Water Urn Placed on the Street Corner for Passersby], Al Asmar 2018

4.3. Neighborhood Perception

For the study conducted in the Public Health Department, older adults residing in the neighborhood were interviewed regarding their access to the urban fabric and their neighborhood boundaries. A total number of 54 older adults aging between 63 and 87 years were interviewed in their homes for this study. Almost 75% of them were females. When asked about their perception of the neighborhood invitation, they replied as follows:

Most of the interviewed adults (58.3%) leave the house almost every day, while 16.7% leave the house between 3 and 6 days per week, and 25% go out less than twice per week. Most participants (91.7%) can walk outside without any form of assistance, be it a person, a cane, crutches, or a wheelchair. However, 73.7 % and 54.6% of older adults reported the bad quality of pavements and roads respectively. In addition, they mentioned the need to improve the cleanliness of the neighborhood's pavements and roads. Others were more concerned regarding infrastructural improvements such as water and electricity services, road conditions, and available green spaces. In addition, some older adults mentioned that if outdoor physical seating spaces were provided in the neighborhood, they would be encouraged to use them. Additionally, nuisance caused by motorcycles and the lack of sufficient lighting at night was also mentioned as needing improvement. Moreover, older adults were asked to draw mental maps of their neighborhood boundary. These maps allowed me to understand their perception of their neighborhood limits.

Some interviewed older adults were asked to draw a limit of their neighborhood physical boundary. Even though they mentioned that they have social relationships on both sides of the highway, they regarded "Bechara El Khoury" highway to be their

neighborhood's physical limit. The results were almost identical regarding "Bechara El Khoury" being considered as a neighborhood physical border. Their answers allowed me to update my legibility map as seen in figure 33. In addition, this shows that for older adults the highway is a clear physical and social break in the neighborhood.

In conclusion, most of the interviewed older adults (91%) are still active and able to leave the house without any physical assistance. Furthermore, they mentioned that if neighborhood seating areas were provided, they would be encouraged to use them. However, they described their urban physical settings as being dilapidated, filthy, dangerous, and in need of improvement, which seldom discourages them from accessing their neighborhood areas. In addition, they described the highway as being a strong physical barrier and separator which is influencing their neighborhood limit perception boundary and pedestrian connectivity. This goes to show that designing age-friendly physical settings in the neighborhood results in encouraging older adults to access the urban fabric, cross the highway, and socialize in the neighborhood.

Figure 32: [An Older Adult Accessing the Neighborhood], Al Asmar 2018

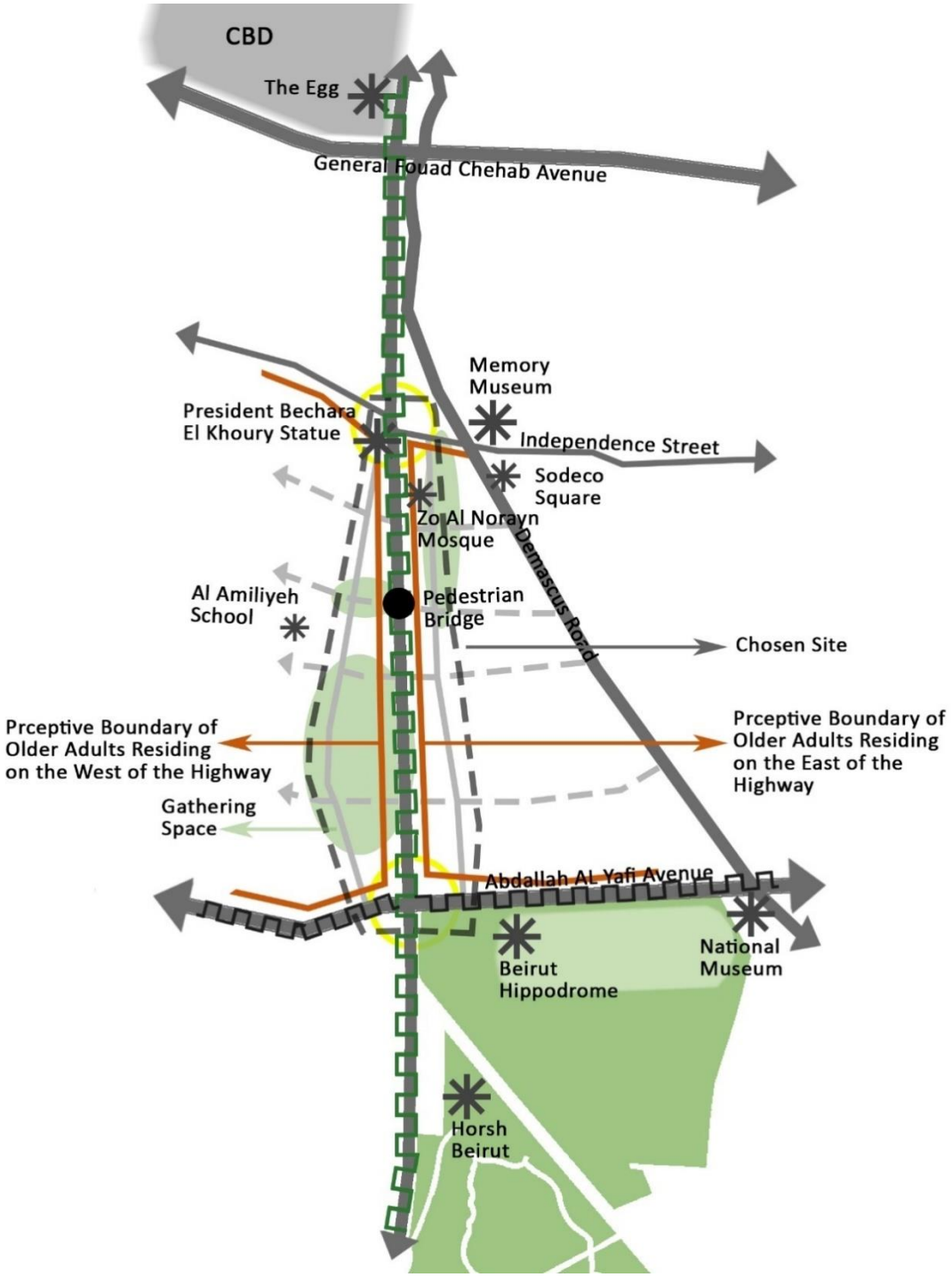


Figure 33: [Perceptive Neighborhood Physical Boundary of Older Adults Residing in the Chosen Study Area], Al Asmar 2018

CHAPTER 5

NEIGHBORHOOD ASSESSMENT

The neighborhood physical features were assessed on site as part of the data collection using the SAFE assessment sheet in order to determine the neighborhood IQ. The findings showed that the "Ras El Nabaa" neighborhood has a remarkably lower IQ than the current index for SAFE assessment (Madani, 2017). This reveals that the studied streets rarely provide the minimum demand quality of neighborhood physical features necessary to accommodate the activities of the general population, let alone older adults. In addition, data analysis findings revealed that while safety, attractiveness, friendliness, and efficiency have significant correlations with the IQ, friendliness, and attractiveness were more highly correlated. This means that a street with higher levels of friendliness and attractiveness has a higher IQ. In order to further understand these findings and the neighborhood features, comparisons between the highest and lowest ranking streets for each dependent variable were conducted in terms of the relationship between the assessment criteria (independent variables) and the quality measures (dependent variables).

5.1. Findings from Spatial Analysis

As previously mentioned, the main measures (Safety, Attractiveness, Friendliness, and Efficiency) of the neighborhood IQ were determined using the SAFE

assessment tool in the neighborhood. As such, the IQ for each street, being total of the four main measures, was determined as illustrated in figure 34.

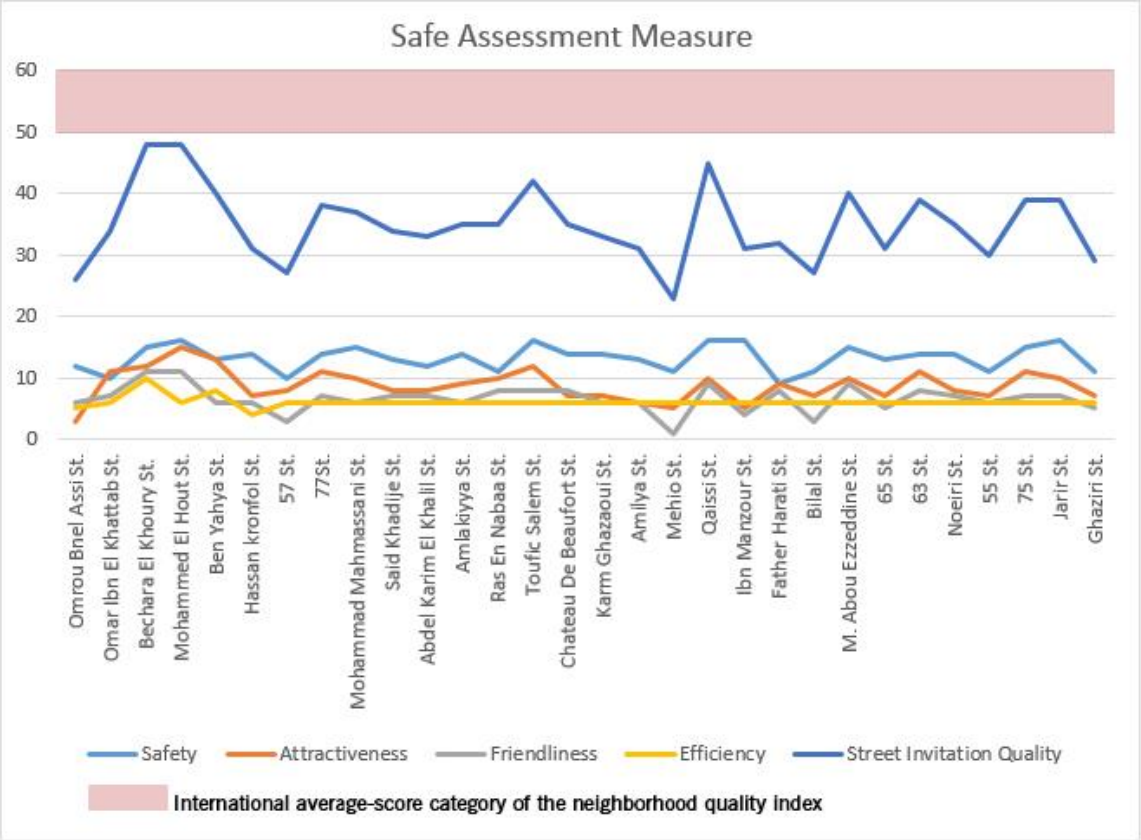


Figure 34: [Streets' Invitation Qualities and the Assessment Measures' Scores], Al Asmar 2018

To sum it up, the average IQ of all streets (Figure 35) is in the low rating of the neighborhood quality index. However, both "Bechara El Khoury" (Figure 36) and "Mohammed El Hout" (Figure 37) Streets have scores of 48/75 respectively, and this is close to the international average-score category of the neighborhood quality index (rating score between 50 and 60), when compared to "Bilal" (Figure 38), "Mehio", and "Omrou Bnel Assi" Streets which had an average score of 25. As per the means (M) and standard variances (SD) of the invitation qualities of all thirty surveyed streets,

"Bechara El Khoury" and "Mohammed El Hout" could be categorized very close to the moderate-rating neighborhood quality index. The remaining streets were in the low-rating category of the neighborhood quality index.

Figure 35: ["Ras El Nabaa" Street Ranking Evaluation Based on the IQ Score], Al Asmar 2018

Figure 36: [“Bechara El Khoury” Street Section], Al Asmar 2018

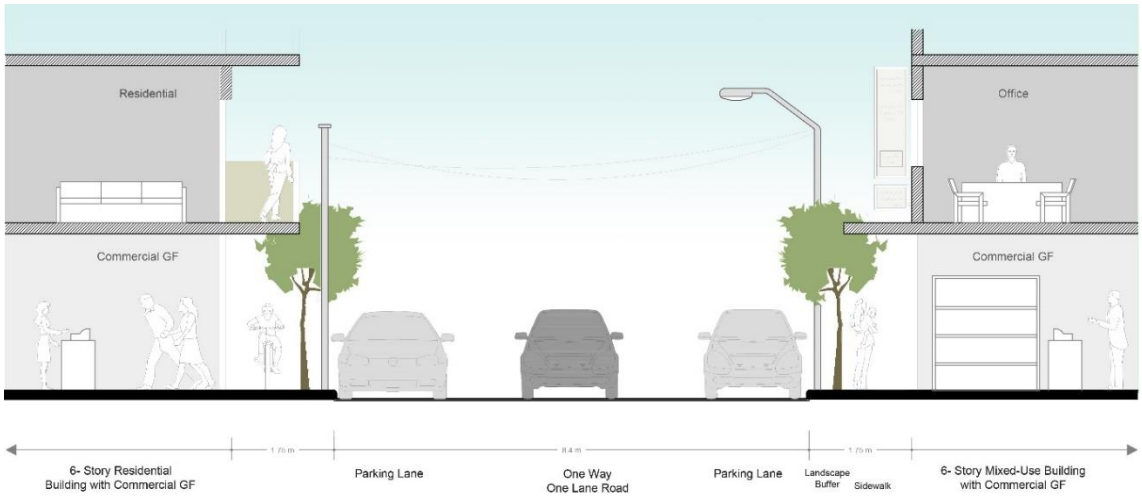
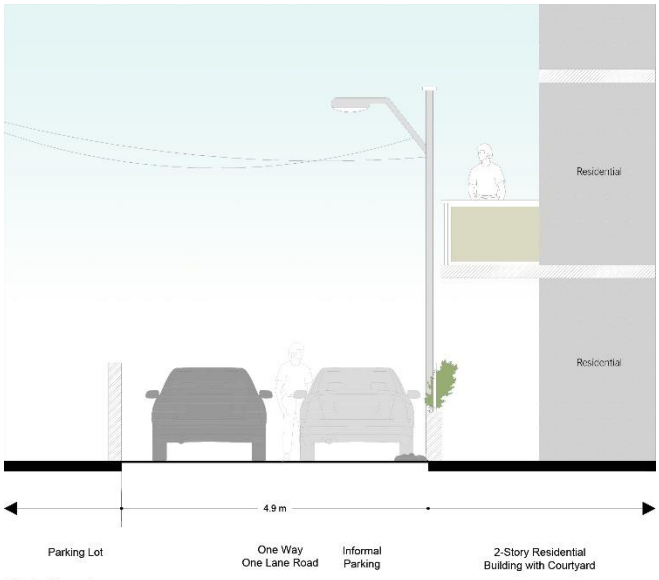


Figure 37: [“Mohammed El Hout” Street Section], Al Asmar 2018



Bilal Street

Figure 38: [“Bilal” Street Section], Al Asmar 2018

"Mohammed El Hout" (Figure 39) and "Qaissi" Streets showed the highest levels of safety on the site (16/24 & 16/24 respectively), in contrast to "Father Harathi" Street which showed the lowest (9/24) (Figure 40). As per the collected data, the major differences in the physical characteristics of both streets were the adequacy of landscape buffers between pedestrians and vehicles, adequacy of sidewalk slopes, and the adequacy of traffic flow and passive surveillance from vehicles in the neighborhood. Unfortunately, all the streets had the same poor sidewalk quality.

Figure 39: ["Mohammed El Hout" Street Photo], Al Asmar 2018

Figure 40: ["Father Harathi" Street Photo], Al Asmar 2018

In addition, "Mohammed El Hout" Street had the highest attractiveness (15/18) and friendliness (11/18) scores, in contrast to "Omrou Bnel Assi" Street, which had the lowest attractiveness score (3/18) and "Mehio" Street which had the lowest friendliness scores (1/18). This is due to the fact that "Mohamed El Hout" Street had more than 50%

ground floor building transparency, a higher number of community landmarks and active land-uses, a larger coverage of landscape buffers, better sidewalk clearances and slope percentages, and more comfortable seating areas than “Omrou Bnel Assi” (Figure 41) and “Mehio” (Figure 42) streets. However, all three streets had no active outdoor public spaces.

Figure 41:[“Omrou Bnel Assi” Street Photo], Al Asmar 2018

Figure 42: [“Mehio” Street Photo], Al Asmar 2018

Furthermore, “Bechara El Khoury” highway had the highest efficiency score of 6/15, while the rest of the streets had an average of 6/15 (Figure 49). “Bechara El Khoury” highway had more pedestrian signs, designated pedestrian crossings, and nearby public transportation options. However, since it is a highway, and pedestrians need to wait for the pedestrian traffic light to turn green in order to cross, the designated waiting time for crossing the street was the highest among all streets (Figures 43, 44, 45, 46, 47, 48 & 49).

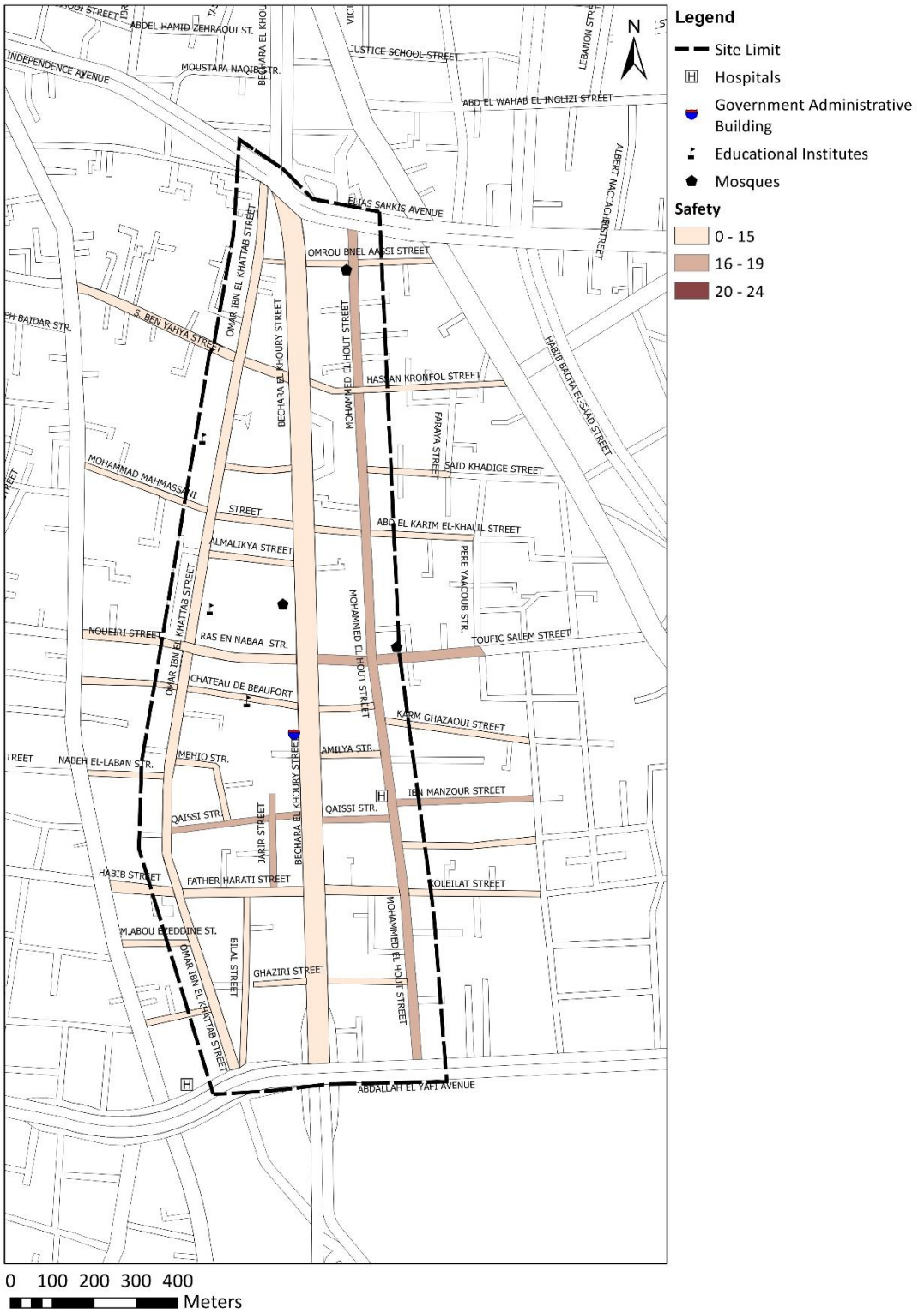


Figure 43: [Site Street Hierarchy as per Safety Scores], Al Asmar 2018

“Mohammed El Hout” and “Qaissi” Streets had average safety scores.

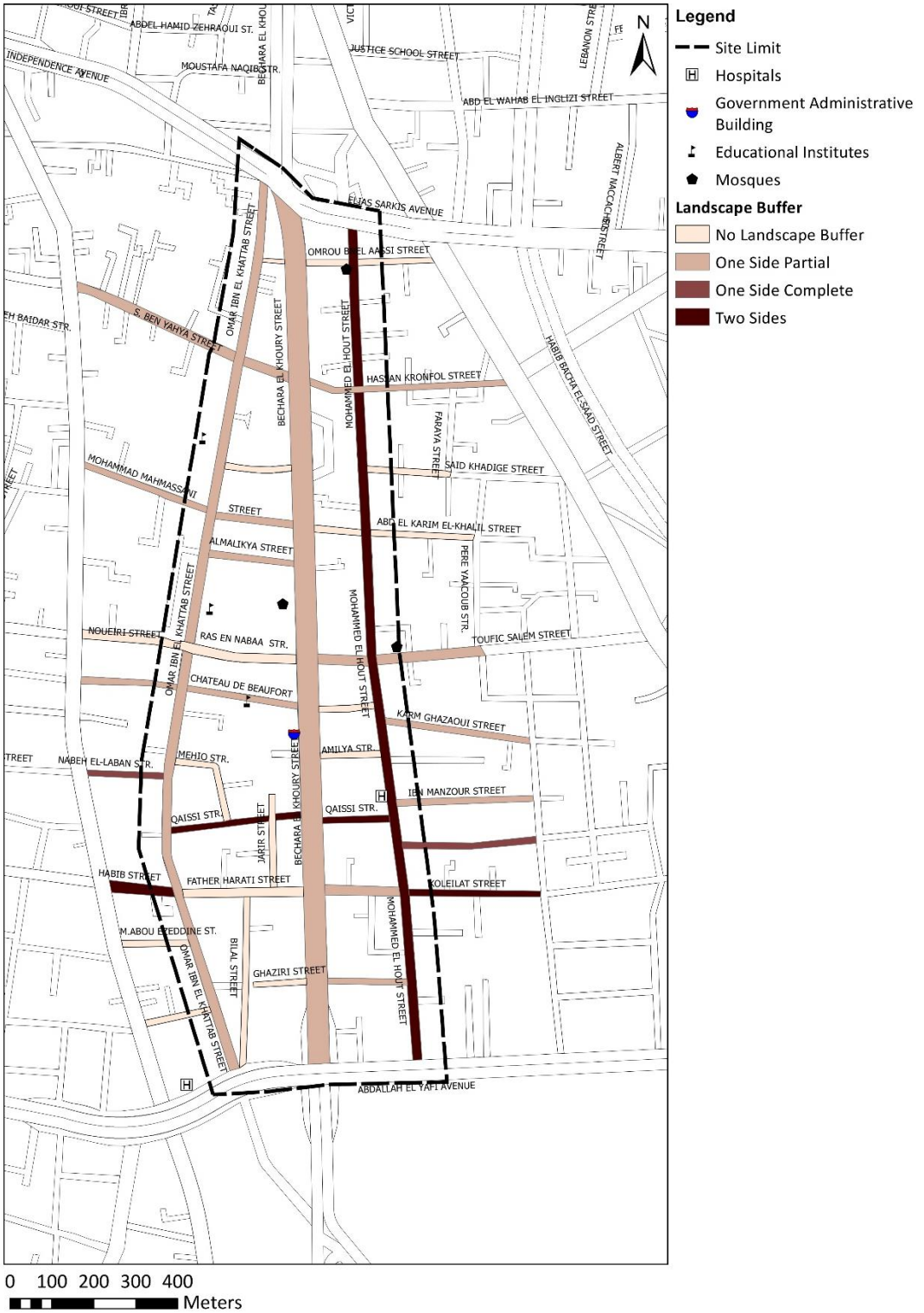


Figure 44: [Site Street Hierarchy as per Landscape Buffer], Al Asmar 2018

"Mohammed El Hout" and "Qaissi" Streets had continuous landscape buffers on two sides of the streets.

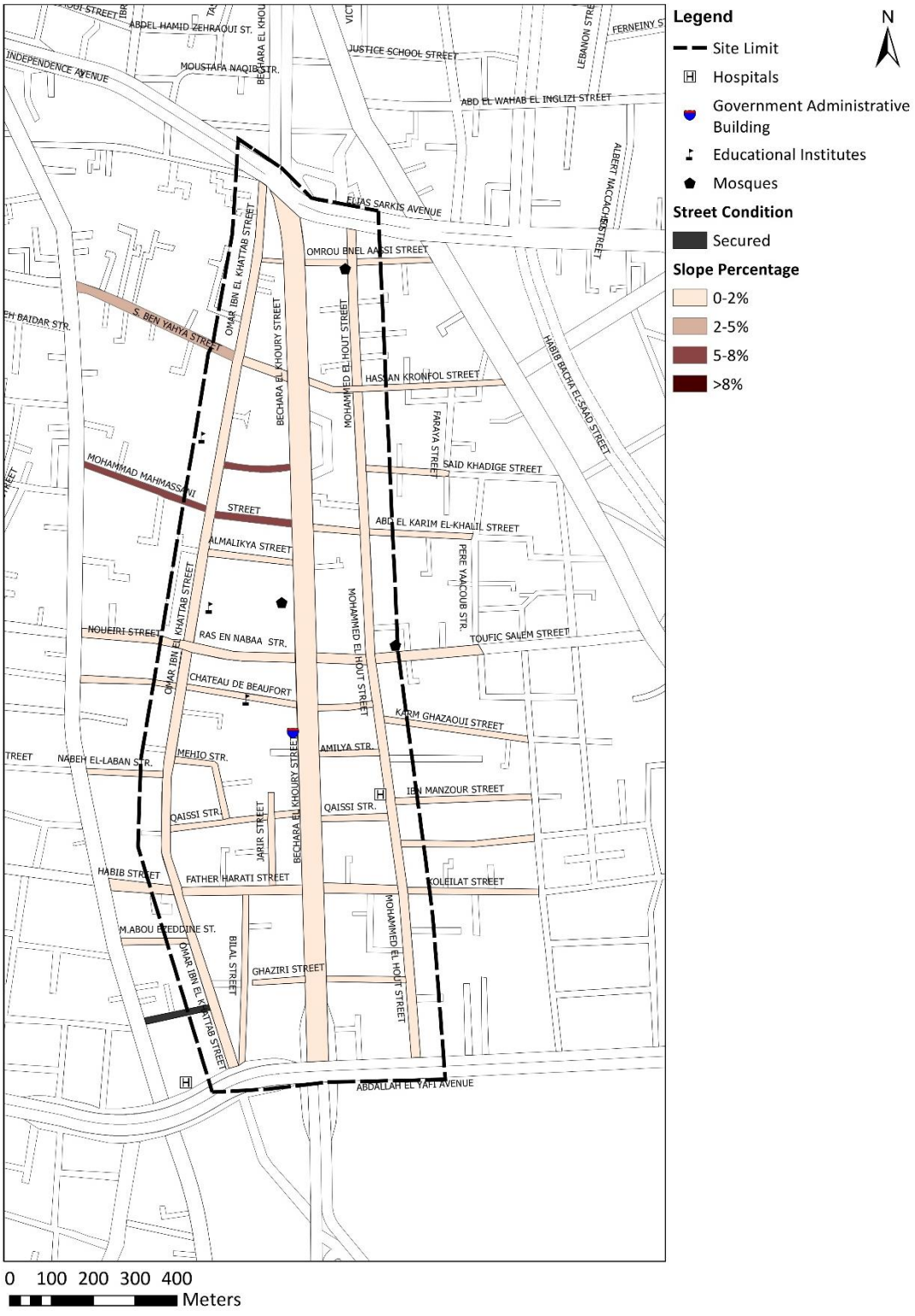


Figure 45: [Site Street Hierarchy as Slope Percentage], Al Asmar 2018

All streets have an adequate slope percentage for older adults (<8%).

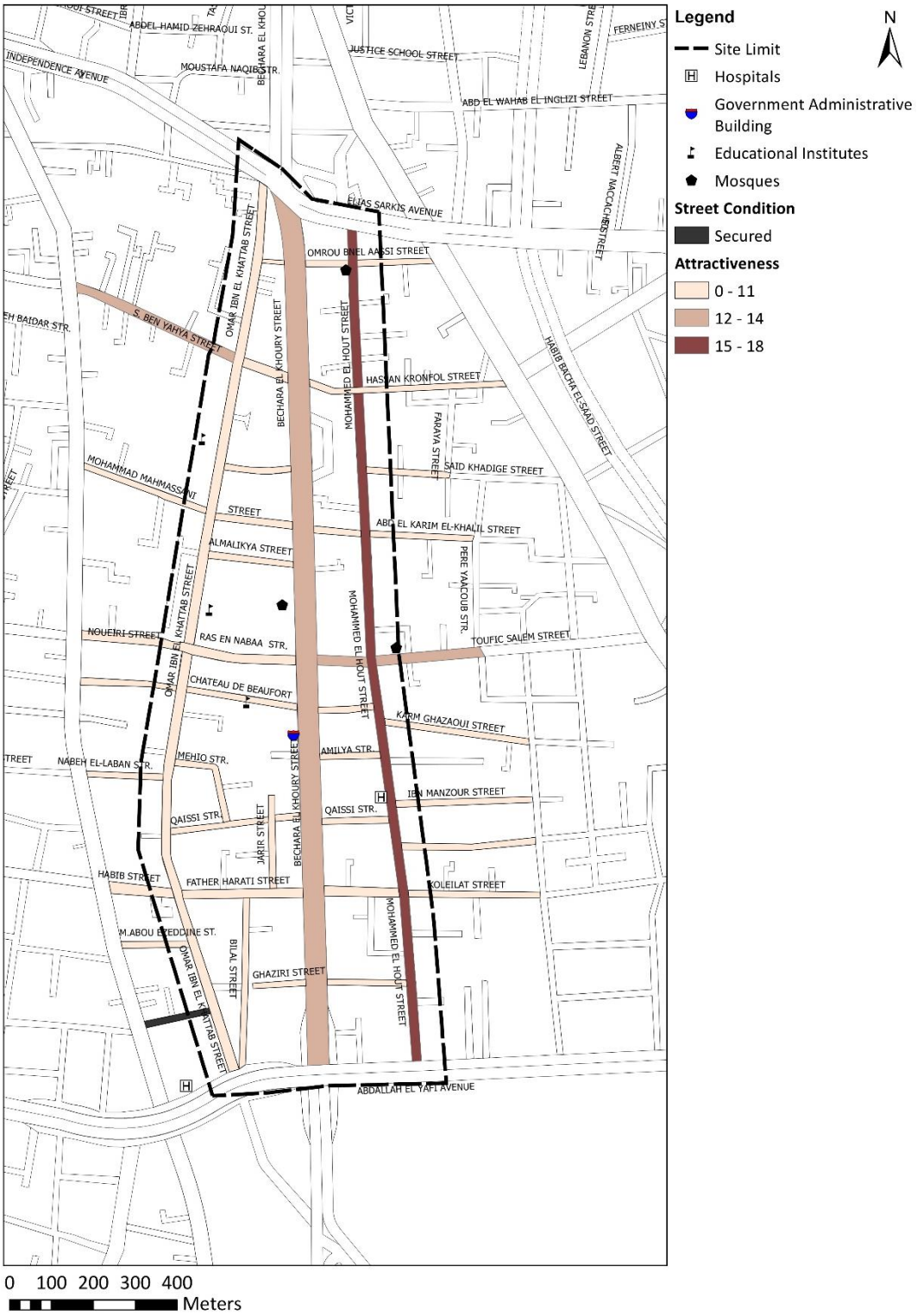


Figure 46: [Site Street Hierarchy as per Attractiveness], Al Asmar 2018

"Mohammed El Hout" had the highest score in attractiveness on site and was part of the high-score range in the neighborhood attractiveness index.

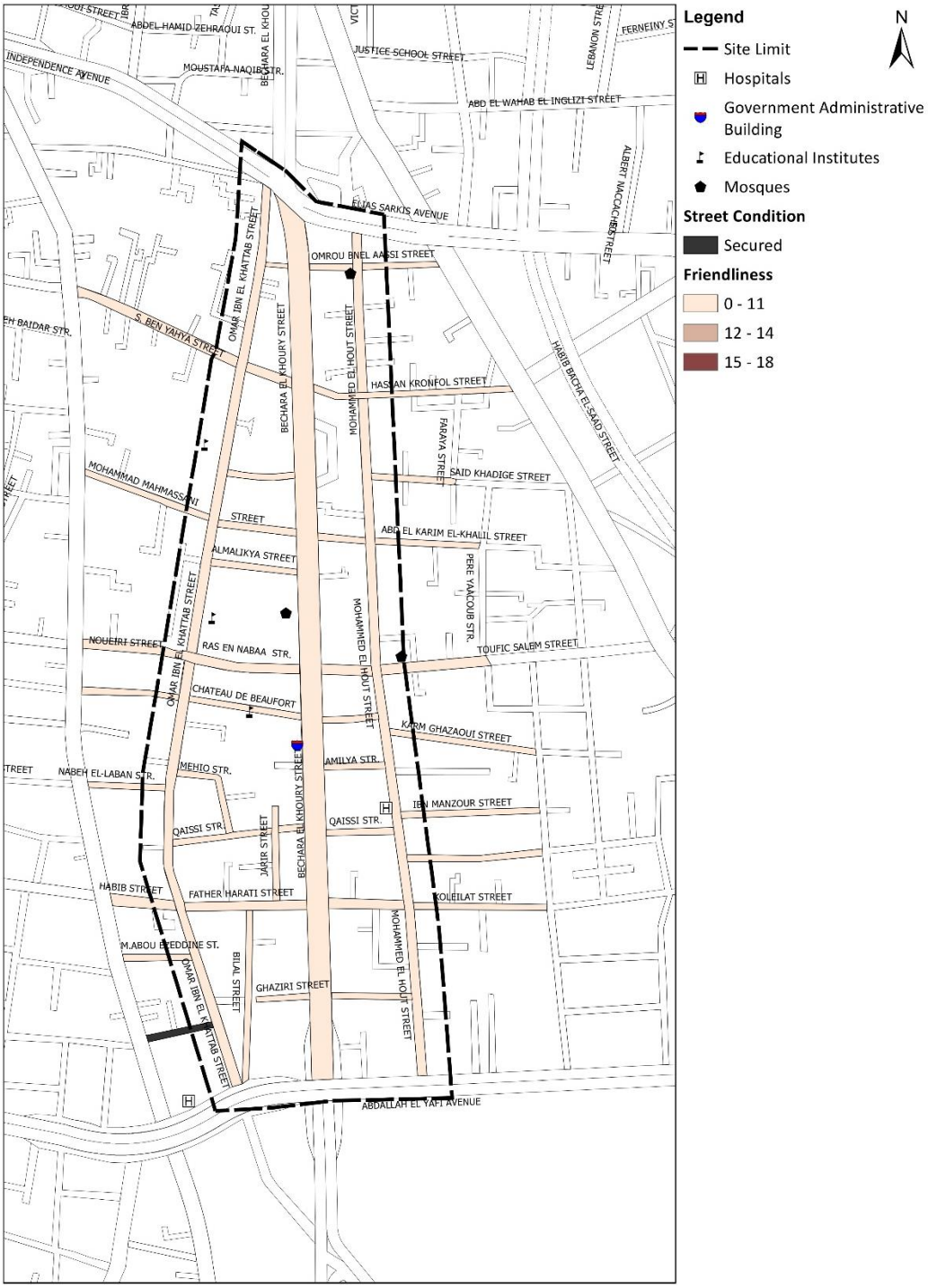


Figure 47: [Site Street Hierarchy as per Friendliness], Al Asmar 2018

The acquired friendliness scores ranged between 1 (“Mehio”) and 11 (“Mohammed El Hout”) for different streets; however, all the streets remained in the weak-score range of the neighborhood friendliness index.

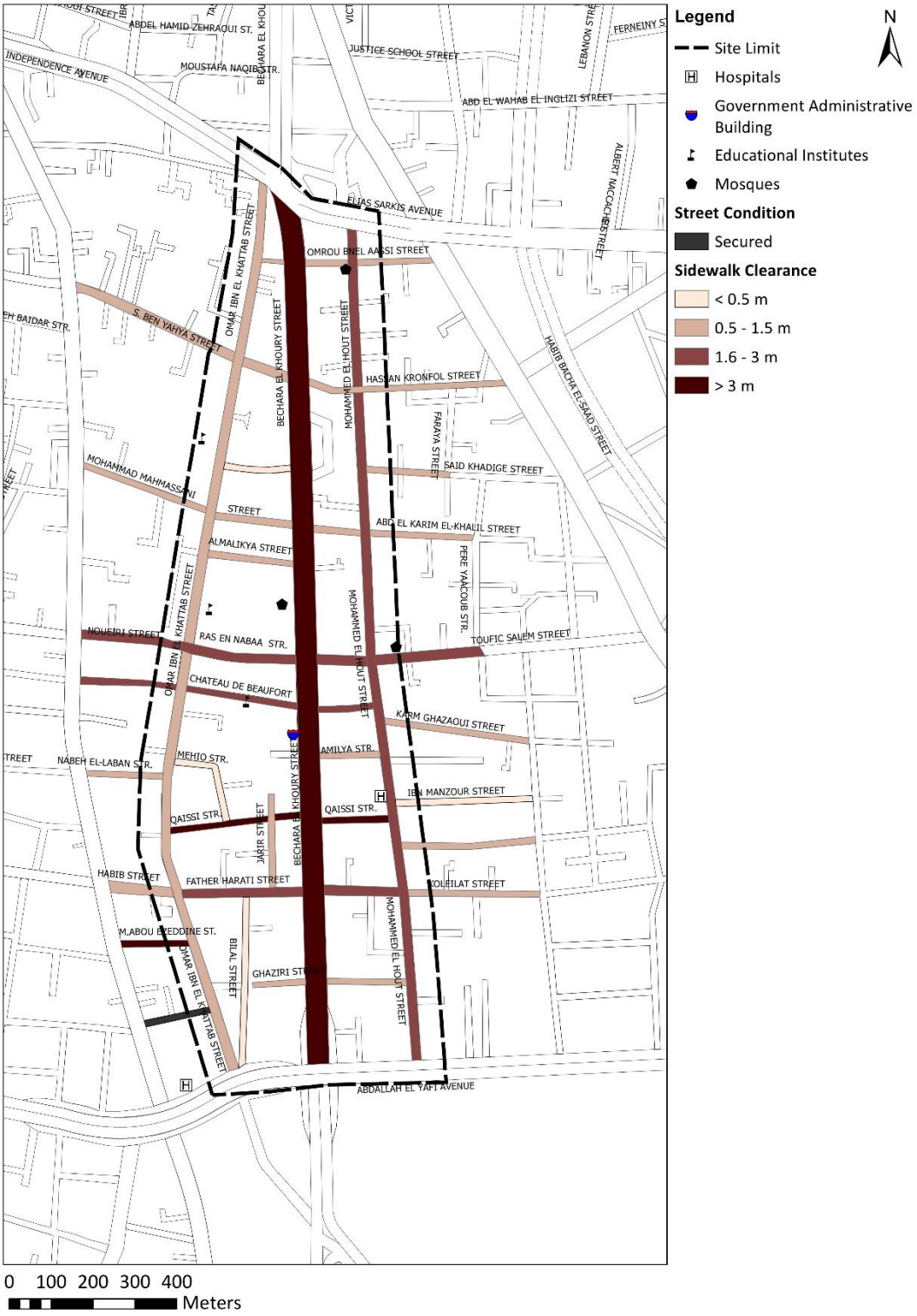


Figure 48: [Site Street Hierarchy as per Friendliness], Al Asmar 2018

“Bechara El Khoury” and “Qaissi” Streets have the widest sidewalks, while “Mehio”, “Bilal”, and “Ibn Manzour” Streets have none.

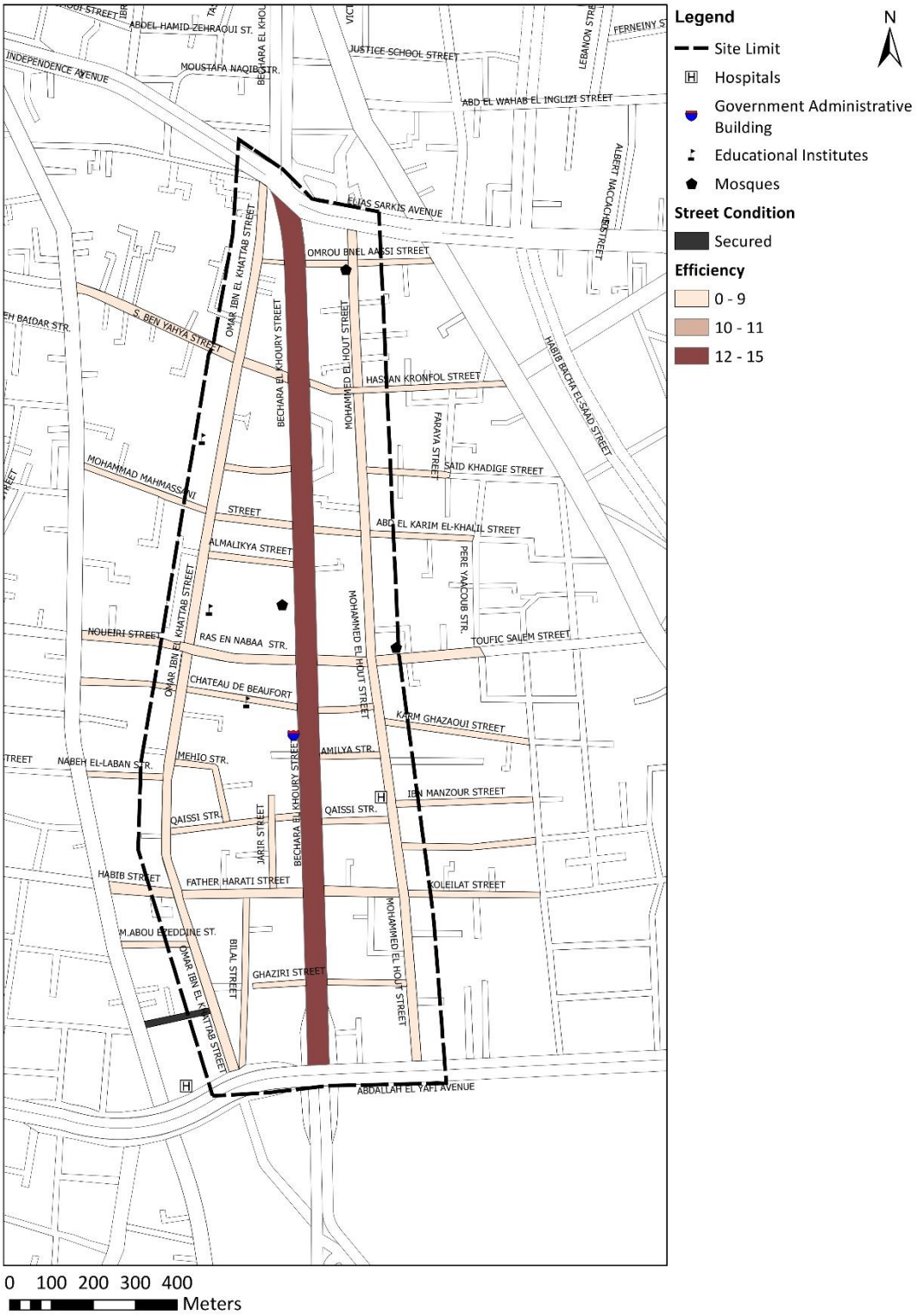


Figure 49: [Site Street Hierarchy as per Efficiency], Al Asmar 2018

"Bechara El Khoury" highway is the most efficient street on site. The rest of the streets are among the weak score range of the neighborhood efficiency index.

5.2. Findings from Statistical Analysis

SPSS regression analysis was conducted in order to establish the correlation coefficient and p-value (p); therefore determining first the statistical relationship between each SAFE assessment measure and the IQ, and second the statistical relationship between each outdoor quality and its relative safety, attractiveness, friendliness, and efficiency measure. Primarily, when the degree of freedom (DF = 28) for all observations was considered, the results determined the correlation between all SAFE measures and the IQ measure (safety r = 0.74, attractiveness r = 0.81, friendliness r = 0.87, and efficiency r = 0.46). All measures of safety, attractiveness, friendliness, and efficiency exceeded the critical value found in the table (0.361). In addition, with $p < .05$, the study was 95% confident that meaningful relationships existed between those assessment measures and the IQ.

In addition, the results attained validated what was concluded from the SAFE assessment sheet. They determined that except for the building heights and the time needed for older adults to cross the street, all independent variables have a 95% correlation with their dependent SAFE variables. In addition, almost half of the independent variables show a strong linear correlation with the SAFE variables ($r > 0.5$). Among the main features were sidewalk barriers, sidewalk slope, landscape buffer, building transparency, land-use diversity, adequate pedestrian crossings, and ease of navigation along pedestrian routes. Therefore, the main physical features affecting the SAFE dependent variables were deduced through GIS spatial analysis and validated through statistical analysis (Figures 50, 51, 52 & 53).

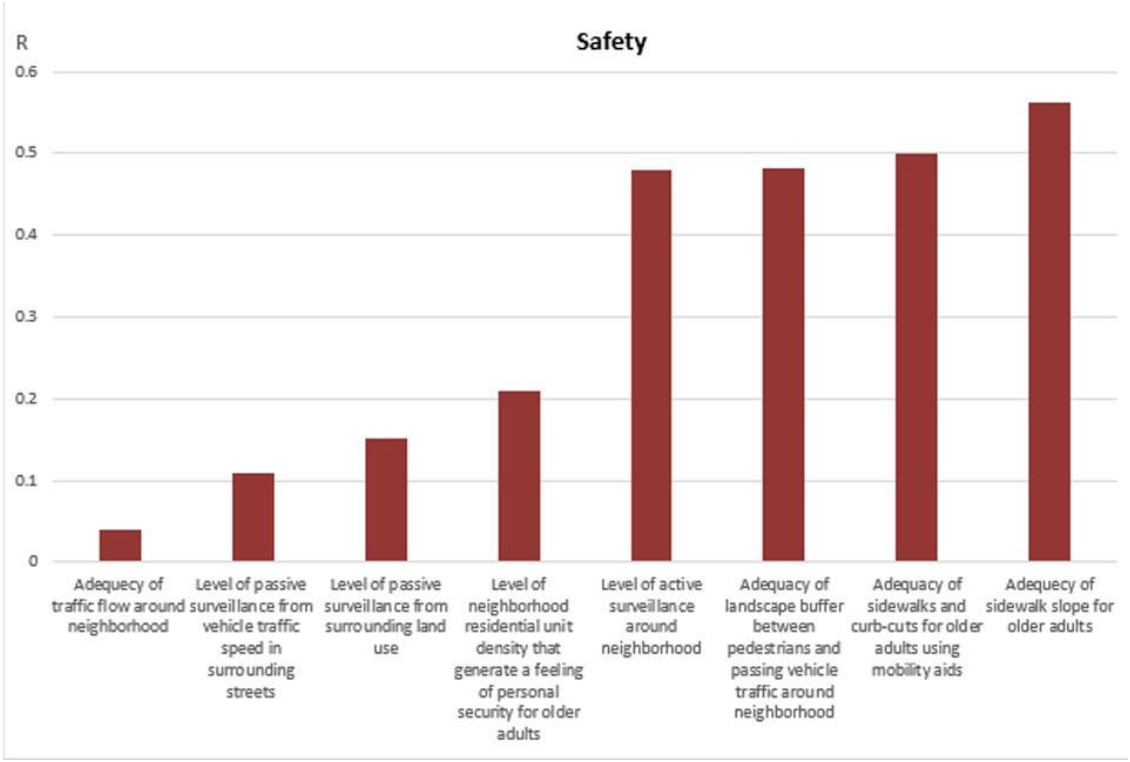


Figure 50: [Safety Correlation Coefficient to Urban Physical Features], Al Asmar 2018

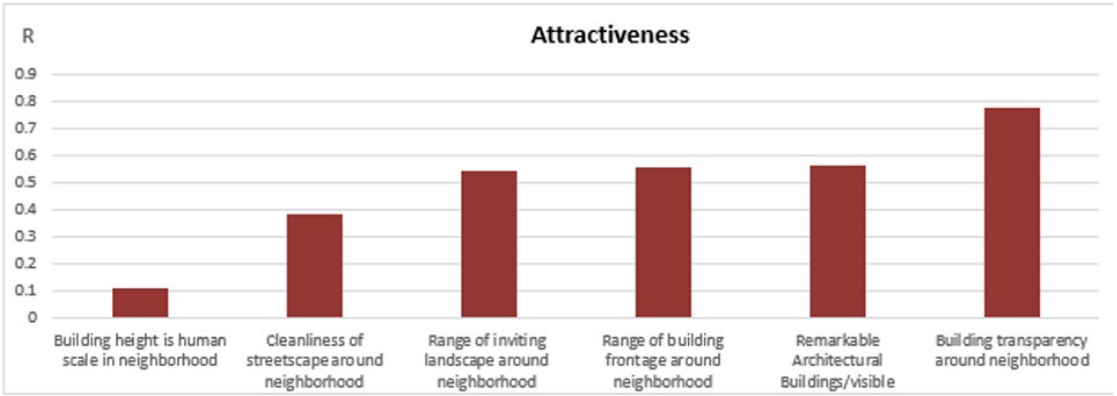


Figure 51: [Attractiveness Correlation Coefficient to Urban Physical Features], Al Asmar 2018

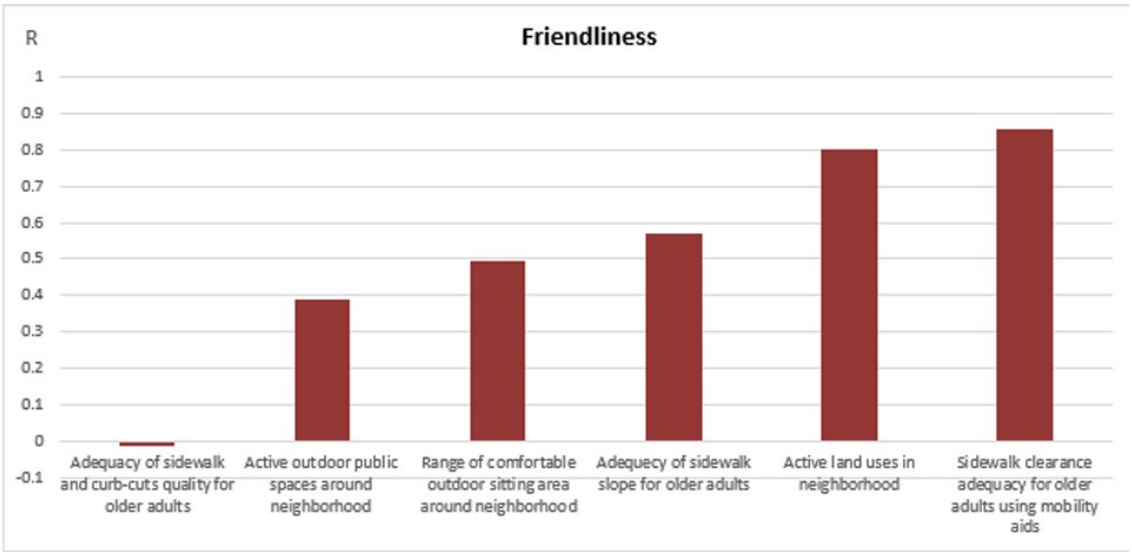


Figure 52: [Friendliness Correlation Coefficient to Urban Physical Features], Al Asmar 2018

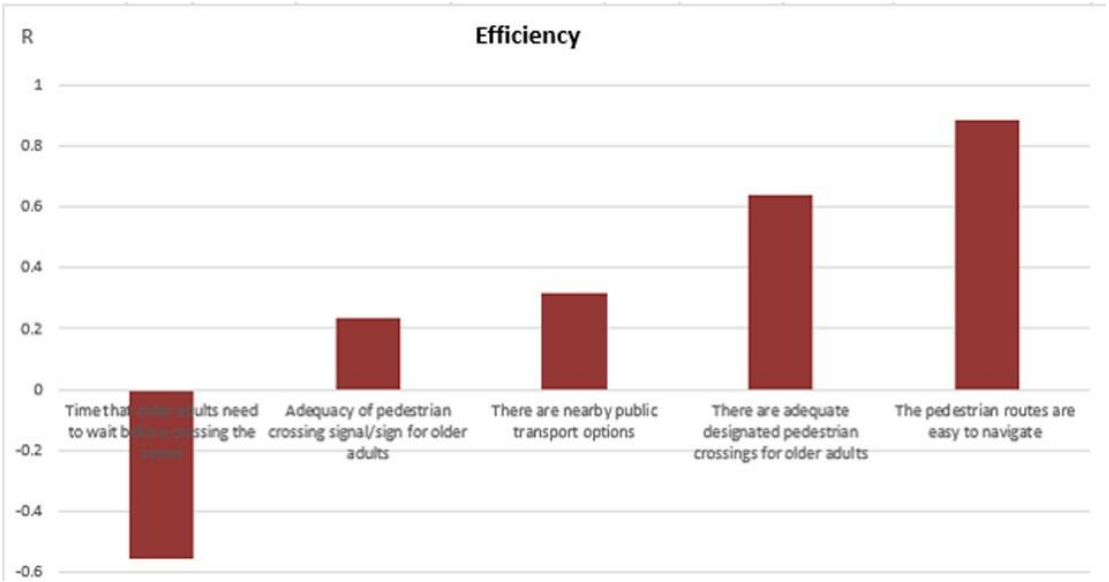


Figure 53: [Efficiency Correlation Coefficient to Urban Physical Features], Al Asmar 2018

5. 3. Conclusions from SAFE Assessment

Overall, the study findings validate my hypothesis by showing that the "Ras El Nabaa" neighborhood characteristics have a low invitation quality that could discourage older adults from accessing and performing activities in the outdoor public space. This fact threatens their autonomy and community inclusion hence worsening their quality of life. In addition, the findings revealed that the neighborhood safety, attractiveness, friendliness, and efficiency measures have significant correlations with the neighborhood IQ. Furthermore, the study determined that the existing outdoor physical features directly affect the SAFE measures in the neighborhood streets. We can then conclude that a direct relationship exists between the quality of urban physical features and the neighborhood IQ for older adults. Consequently, modifying the studied neighborhood characteristics as per the needs of older adults improves the neighborhood invitation quality and therefore encourage access to the urban fabric and the performing of community activities. As a result, older adults are more likely to remain autonomous, maintain their community connections, and age actively.

Accordingly, Hodge (2008) argued that modifying certain physical aspects of the urban environment encourages the performing of activities in the urban fabric and thus may generate a sense of place (Hodge, 2018; Gehl, 2010; etc...). As per Knox and Pinch (2010), urban design can modify neighborhood physical features. Furthermore, Gehl (2010) argues that urban designers can collaborate in creating an interdisciplinary urban composition made up of both designed physical features and social qualities. They can thus address socio-spatial relationships and bring them up to a higher quality of activities to provide greater public well-being and enable a neighborhood into a community (Gehl, 2010; Knox & Pinch, 2010).

In consequence, the thesis conceptualizes the aging-friendly characteristics into a design solution to create aging-friendly communities. It transforms the conceptual framework into a practical design solution. In order to do so, the proposal focuses on re-designing the assessed outdoor physical features as per the SAFE criteria. The design focuses on the attractiveness and friendliness measures which proved to have the strongest impact on the neighborhood IQ. As such, the main highlighted outdoor physical features which are enhanced, introduced, or removed in chapter 7 are the ones with the highest impact on the IQ as listed in table one. These features are building frontage, landmarks, adequacy of the pedestrian network, traffic congestion, outdoor public spaces, seating areas, landscape buffer, signals and crossings, public transportation, and cleanliness. (Table 1) As such, the interventions tackle the neighborhood mentioned neighborhood constraints reducing the invitation quality; while also decreasing the effects of the infrastructure break. Therefore, the features are improved to increase the neighborhood invitation quality; hence encouraging older adults to access the urban fabric and perform communal activities.

Variables	Safety	Attractiveness	Friendliness	Efficiency
Targeted Measures	**Level of Passive Surveillance from Low Vehicular Traffic Speed**	**Building Transparency around the Neighborhood**	**Adequacy of Sidewalks and Curb-Cuts for Older Adults Using Mobility Aids**	**Existence of Pedestrian Signs or Patterns for Easy Access to Destinations**
	Adequacy of Sidewalks and Curb-Cuts for Older Adults Using Mobility Aids	**Presence of Remarkable/Visible Landmarks around the Neighborhood**	**Adequacy of Sidewalk Clearance for Older Adults with Mobility Aids**	**Existence of Adequate Designated Pedestrian Crossings for Older Adults**
	Adequacy of Landscape Buffer	**Cleanliness of Streetscape around Neighborhood**	**Active Outdoor Public Spaces around the Neighborhood**	**Adequacy of Pedestrian Crossing Signal/Sign for Older Adults**
	Adequacy of Traffic Flow around the Neighborhood	**Presence of Inviting Landscape**	**Range of Comfortable Outdoor Sitting Areas around the Neighborhood**	**Existence of Nearby Public Transport Options**

Table 1: [Targeted Neighborhood Features Determined Through the SAFE Assessment], Al Asmar 2018

CHAPTER 6

DESIGN INSPIRATION

6.1. "Liaison Douce" Between "Horsh Beirut" and Downtown Beirut Project Proposal

The first project analyzed for this thesis is an environmental design proposal called "Liason Douce", located at a close link and proximity to the "Ras El Nabaa" neighborhood (Figure 54). The proposal was conceived by planning consultancies URBI and SITRAM in collaboration with its financers the municipality of Beirut and the Ile de France region. It focuses on ensuring better transportation and soft mobility between "Horsh Beirut" and the CBD while passing through Damascus Street (the old demarcation line). In addition, it focuses on well-designed recreational public space, improved quality of urban landscapes, and the appropriation of the city by its citizens. (Kreidy, 2013)

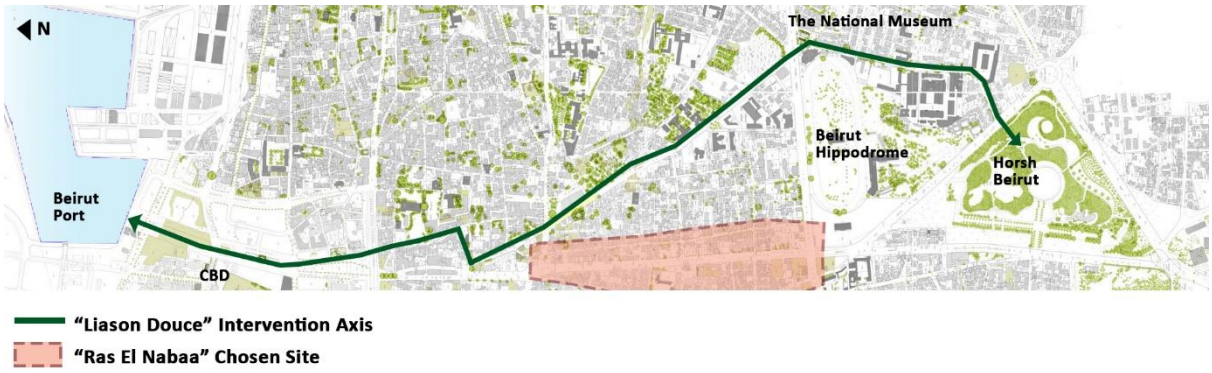


Figure 54: ["Liason Douce" Intervention Location in Relation to the "Ras El Nabaa" Neighborhood], Al Asmar 2018

Four main character zones were determined along the main axis, a park character, a campus character, a residential character, and a commercial character

(Figure 55). These types of land-use determined the types of users for the public space. It was thus determined that a variety in social groups such as older adults, university students, and children all access and utilize the public space. (Kreidy, 2013)

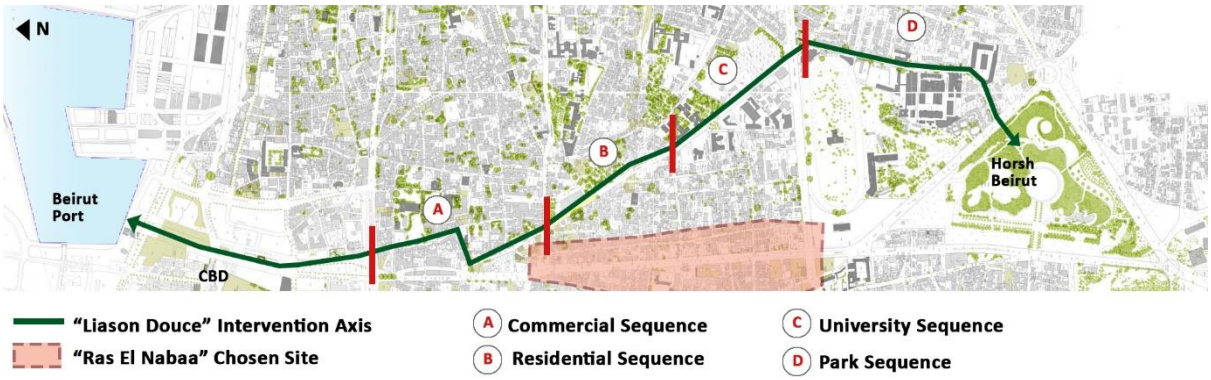


Figure 55: [Sequences: 4 Neighborhoods, Characters and Users], Al Asmar 2018

As such, the main objectives and strategies were deduced. The main goals were to give more space to pedestrians and cyclists, landscape the public space, equip and animate the public space to meet the residents' needs, and preserve the memory of the place. In order to achieve the mentioned objectives, changes had to be made in the urban fabric's main road network. To improve the neighborhood's traffic congestion issue, the two lanes were reduced to one and made unidirectional along the Damascus Road while diverging the remaining traffic to nearby main vehicular roads such as "Bechara El Khoury" highway. This causes the traffic along "Bechara El Khoury" highway to increase (Figure 56). Furthermore, some parking spots along Damascus Street were eliminated and transferred to potential parking areas on private land. Therefore, more space was being used for pedestrians and cyclists instead of vehicles (Figure 57). (Kreidy, 2013)

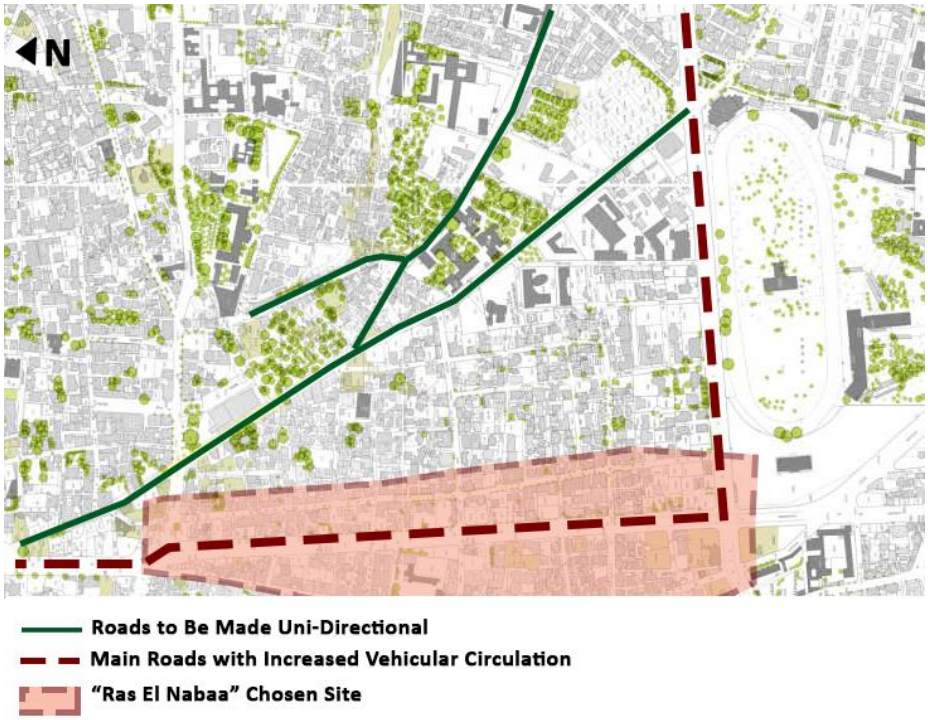


Figure 56: ["Liaison Douce" Road Traffic Divergence], Al Asmar 2018

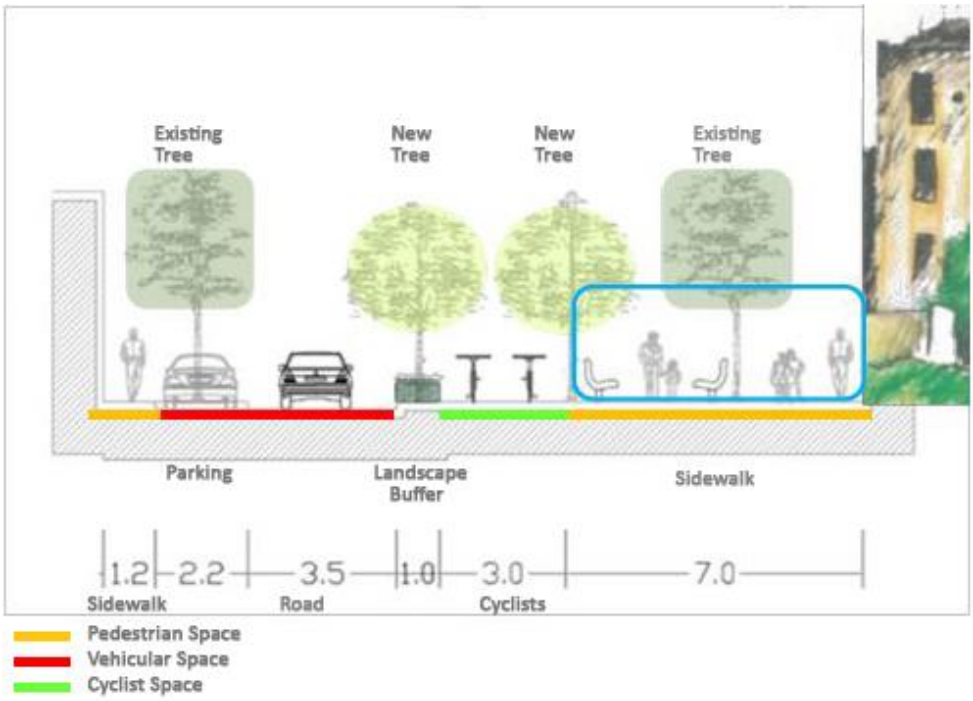


Figure 57: [Street Section of the Proposal Along Damascus Street], Debs

The next design step was linking the landscapes at the urban level. Small piazzas were created at the entrance of the important institutions in order to accentuate them.

Fences were treated in order to ensure visual continuity of landscape spaces. For instance, the height of the fences was lowered, solid concrete fences were replaced by see-through metallic ones, and night lights were provided. Finally, each public space was equipped with the requirements of the institution. For example, terraced benches and ground seating patches were provided for young adults in front of university campuses (Figure 58). (Kreidy, 2013)

Figure 58: [Faculty of Medicine and the Campus of Human Sciences Plaza], Debs

In conclusion, the planned proposal provided a contextualized solution in order to improve urban connectivity and mobility along a main axis in Beirut. It provided more space for pedestrians and cyclists, a landscape buffer, and better quality public

spaces as per the residents' needs. However, it increased vehicular circulation along "Bechara El Khoury" highway. As such, my design proposal works in accordance with "Liaison Douce". It is a complementary intervention that works on reducing the impact of the increased traffic intensity in the "Ras El Nabaa" neighborhood.

6.1.1. Key Principles to Be Implemented in My Ensuing Design

My urban design proposal for the "Ras El Nabaa" neighborhood is complementary to that of "Liason Douce", taking into consideration the predicted increased traffic congestion along "Bechara El Khoury" highway. It introduces traffic moderation strategies to reduce any future traffic in the neighborhood. In addition, some of the design features of "Liason Douce" are valuable in re-designing a neighborhood and improving its connectivity, accessibility, and invitation. These features include:

- Strategies to decrease vehicular traffic by reducing traffic lanes and adding chicanes and speed bumps.
- Designed plazas with urban furniture complimentary to the surrounding land-use
- Appropriately treated fences to ensure landscape continuity by replacing concrete fences with metallic ones
- Increased sidewalk width to provide improved urban features such as bicycle lanes, dining facilities, seating areas, lighting, wider pedestrian clearance, and continuous landscape buffer

6.2. Chapultepec Avenue in Downtown Mexico

The second project discussed for this thesis is the Chapultepec Avenue in Downtown Mexico (Figure 59). The avenue divides the city in two. Its ten-lane uninviting vehicular road makes it difficult for pedestrians to cross the street and cyclists to ride their bike. In addition, the sidewalks are in a filthy, dilapidated condition and are blocked by commercial food stalls and garage ramps. As such, the municipality has decided to re-design it as a park (Rosenfield, 2015; Fernando Romero Enterprise, 2015).

Figure 59: [The Chapultepec Avenue in Downtown Mexico], Skyscrapercity.com 2015

The park design stretches along 1.3 km and proposes a pedestrian-centric master plan whose concept is to transform the congested highway into an efficient, multimodal roadway (Figure 60). It contains an elevated promenade lined with cultural and commercial programs that are connected by lush landscaping. Accordingly, the design flips the street priority from 90% of the space being vehicular to only 30% and the rest becoming an area for pedestrians. At street level, most lanes were closed off to cars and

replaced by a wide green promenade with new lanes for pedestrians and people with bicycles, wheelchairs, and strollers. In addition, pedestrian crossings were used to create shortcuts to nearby bus lines and subways. As for the upper level, a new platform was designed on top of the road to extend the park and provide shade for the people below and to offer retail services (Rosenfield, 2015; Fernando Romero Enterprise, 2015). Additionally, the promenade featured public open spaces designed to cater to both the commercial and cultural needs of the people. These designs ranged from plazas to restaurant extensions, to terraced open amphitheaters (Figure 61).

In addition, the avenue formed a barrier between the two neighborhoods on the opposite sides of the highway. The promenade would connect the two neighborhoods by establishing secure and appealing crossovers. Likewise, the designed connections would make it more likely for people to access public transportation lines in order to reach different parts of the city (Figure 62) (Rosenfield, 2015; Fernando Romero Enterprise, 2015).

Figure 60: [The Chapultepec Avenue Plan Design], Fernando Romero Enterprise 2015

Figure 61: [The Chapultepec Redesigned Terraced Seating], Fernando Romero Enterprise 2015

Figure 62: [The Chapultepec Redesigned Promenade], Fernando Romero Enterprise 2015

6.2.1. Key Principles to Be Implemented in My Ensuing Design

In conclusion, the design answered to the need for reducing the impact of an infrastructural break inside the city. This need is common in both the Chapultepec redesigned promenade and the "Ras El Nabaa" neighborhood. As such key strategies and design principles are adopted from the Chapultepec promenade and used in my design:

- Substitution of the vehicular dominance along the street with a pedestrian one. (30% vehicular and 70% pedestrianized)
- Improved pedestrian network by providing attractive pedestrian connections and crossings from one side of the avenue to the other
- Attractive promenade and a series of outdoor public plazas and spaces complementary to the land-use
- Improved access and connection to public transportation

As such, these mentioned elements were used in my design proposal in order to reduce the impact of the infrastructural break and are utilized in my design proposal in "Ras El Nabaa".

6. 3. Downtown Belleville: Creating Successful Open Spaces

The third project discussed for this thesis is an adapted framework to improve, develop, and connect city downtown of Belleville, Canada. This framework was developed by the office of urbanism and adopted by the municipality of Belleville in 2006. Among its goals is developing a network of public spaces, which accommodates different types of pedestrian activity and attracts different social

groups, essential for the vitality of the downtown (Figure 63). This study analyzes the developed master plan design.

Figure 63: [Open Space Framework for Downtown Belleville], Belleville Municipality 2006

The network is comprised mainly of public land such as streets, sidewalks, and parks, designed as community parks, green spaces, squares, and plazas (Belleville Municipality, 2006) (Figure 64):

- Community Parks: The network's predominant open spaces are community parks which serve a broad community and have different scales. In addition, they include a variety of activities such as playgrounds and exercise spaces. These parks ensure accessibility and security through their location and design. For instance, they have at least one side bordered by a road frontage and clear of any visual obstructions.
- Green Spaces: Located in residential neighborhoods, these spaces are passive green focus areas. They contain pavilion, gateways, memorials, and public art.
- Squares: Squares are located in diverse locations, serving as focus areas for neighborhoods and districts. They contain, in addition to gateways, memorials, and public art, concession stands and dining facilities where there is heavy pedestrian traffic.
- Plazas: Plazas are generally located in front of civic and commercial uses. They hold pedestrian priority over the vehicular one. These spaces are seldom closed off and used for events. (Belleville Municipality, 2006)

Figure 64: [The Belleville Downtown Network of Public Places], Belleville Municipality 2006

In addition to the mentioned spaces, the pedestrian network is thoroughly designed to allow safety, accessibility, and inclusion in the downtown. This is due to the fact that the success of the downtown is mainly caused by how well it can accommodate and enhance the pedestrian experience. Among the designed elements are special streetscapes and promenades, mid-block connections, crosswalks, and recreational trails and bicycle paths (Figure 65). (Belleville Municipality, 2006) Those elements provide the basic demand needed for pedestrians to navigate the streets as well as the invitation quality needed to invite them into the neighborhood.

- Streetscapes and Promenades: Streetscapes are considered of main significance in linking the area's open spaces, districts, and neighborhoods. They are designed to serve as main pedestrian routes, designated to unify the urban environment and create appealing landscaped spaces. Streetscapes are enhanced by street trees and landscaping, feature paving treatment, comfortable seating, distinctive street signs, and lights. As for the promenades, their design is that of are wide sidewalk occupying one side of the roadway. They are designed as special streetscapes but with double row trees, which serve to highlight important connections and pedestrian paths.
- Mid-Block Connectors: Having the same purpose and design as streetscapes, these connectors are located between blocks to minimize walking distance.
- Crosswalks: Crosswalks serve two functions: a clear demarcation of a safe passage where a pedestrian can cross; and a traffic calming measure. Every key four-way intersection has a crosswalk in order to ensure reduced traffic speed and enable cautious driving, therefore leading to a sense of comfort and safety

for pedestrians. In addition, major crosswalks have feature paving embedded into asphalt.

- Recreational Trails and On-Street Bicycle Trails: Recreational trails and on-street bicycle trails are equipped with the proper lighting and clear sight lines in order to connect the downtown district with a wider network of city trails. (Belleville Municipality, 2006)

Figure 65: [The Belleville Downtown Pedestrian Network], Belleville Municipality 2006

6.3.1. Key Principles to Be Implemented in My Ensuing Design

In conclusion, the proposed network of public open spaces serves to promote accessibility and attraction to the urban fabric from different demographic and social

groups. It aims at creating an accessible, safe, and attractive urban environment using both neighborhood and street scale design elements. These elements include active outdoor public spaces to encourage people to access the urban fabric and an improved pedestrian network to allow them to do so. As such, my "Ras El Nabaa" neighborhood design adopts some of its key features in order to provide access, safety, and attractive features into the aging-friendly design. These features include:

- Community gardens and diverse outdoor activities such as playgrounds and exercise space as a means to invite different demographic groups into the neighborhood
- Streetscapes containing proper street trees and landscaping, feature paving treatment, comfortable seating, distinctive street signs, and lights as a way to unify the urban environment and create appealing landscaped spaces
- Crosswalk embedded in asphalt in order to ensure reduced traffic speed, enable cautious driving and allow safe pedestrian crossing

6.4. Las Ramblas Street Design

The third project discussed for this thesis is the Las Ramblas pedestrian boulevard in Barcelona's Gothic quarter (Figure 66). The wide Boulevard connects the city's main square with a city monument and stretches along 1.12 km. It consists of five main pedestrian-oriented streets, forming one continuous strip. The strip consists of a 10 to 24-meter wide pedestrian promenade at its center surrounded by a one-way car lane and parking lane from each side. The sidewalks at its edges are usually less than 3 meters wide which encourages walking at its central pedestrian strip. Due to its central location and pedestrian-oriented design, a boulevard is a

meeting place for different social classes and tourists. This reserves the center of the street for pedestrian usage and the side lanes for vehicular traffic, reversing the usual street division between pedestrians and vehicles. (Gimenez & Guo, 2002) (Figure 67)

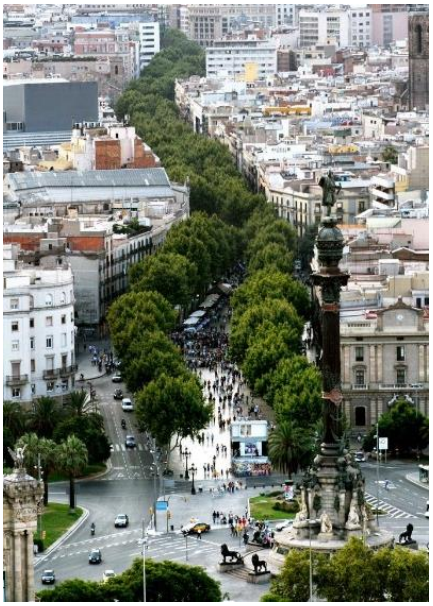


Figure 66: [Las Ramblas Boulevard], Urbaning 100 2018

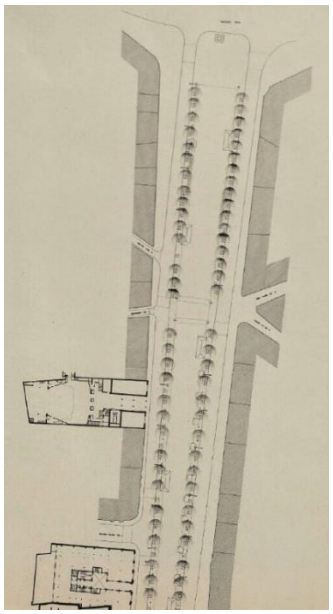


Figure 67: [Las Ramblas Boulevard Plan], Urbaning 100 2018

The street dimensions, building heights and frontages, and landscaping create a pedestrian-friendly environment. For instance, the street is lined with seven-story buildings having almost transparent facades on the ground floor level; therefore, extending the pedestrian view to the interior and creating a sense of safety. As for the landscaping, large trees spaced 6 meters apart, create an interweaving canopy. The canopy filters sunlight during the summer and provides protection from the one-way vehicular traffic. (Figure 68)

Figure 68: [Las Ramblas Boulevard Pedestrian Strip], Projects for Public Spaces Website (PPS.com) 2015

Additionally, the central promenade is rich in activities such as retail pushcarts, sales kiosks, and arts and crafts exhibitions (Figure 69). These activities are complemented with urban furniture such as benches and dining furniture; (Figure 70) hence providing comfortable sitting areas and enabling diverse activities. Moreover, some pavements are decorated with urban art patterns which provide community landmarks and an attractive sight (Figure 71). As for the surrounding building land-use, the ground floor is mainly commercial with the exception to some cultural destinations such as the Plaza Reial museums and a theater. Additionally, the street provides its own programs and events such as artistic performances by local artists. (Gimenez & Guo, 2002)

Figure 69: [Las Ramblas Boulevard Kiosques], Projects for Public Spaces Website (PPS.com) 2015

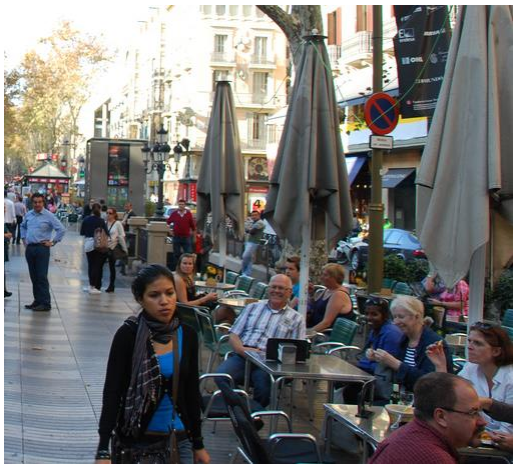


Figure 70: [Las Ramblas Dining Urban Furniture], Projects for Public Spaces Website (PPS.com) 2015

Figure 71: [Las Ramblas Pavement Art], Barcelonaturisme.com 2018

6.4.1. Key Principles to Be Implemented in My Ensuing Design

Las Ramblas street succeeds in creating an accessible, comfortable, multi-use, and vibrant urban public commercial pedestrian space. Its design features encourage people to access it and engage in diverse activities. As such, it is considered to be highly accessible and inviting. Accordingly, my ensuing design in the "Ras El Nabaa" neighborhood adapts its key concepts and features. These features include:

- Pedestrian-prioritizing street providing harmony between street width and landscaping
- Diverse designed spaces, enabling socio-spatial activities, complementary to different land-use functions
- Pedestrian promenade with sitting areas
- Access to public transportation
- Well-connected pedestrian network to surrounding areas

6.5. The Bus Rapid Transit System (BRT) Between Tabarja and Beirut and Feeders Buses Services

The Lebanese Council for Development and Reconstruction (CDR) has developed a BRT system between the coastal town of Tabarja and the Lebanese capital Beirut and feeder bus services. The mentioned project aims to ameliorate transport mobility and connectivity along the coastal corridor, North of Beirut. The project is the first of three parts to improve traffic circulation and mobility along the three main entrances to Beirut. The mentioned part developed that of the Northern entrance, while the rest of the entrances will be developed in the future. It works on multiple strategies such as constructing a new BRT System between Tabarja and Beirut and within Beirut, establishing feeder buses to the main BRT line, and establishing appropriate institutional arrangements for the system's upkeep. (CRD, 2018)

The project is hence the development and implementation of a BRT system which continues into the city of Beirut in an outer ring and inner ring. (Figure 72) It has multiple characteristics:

- Aligned central division in relation to the road with physical separation of the dedicated bus lane from mixed traffic
- Presence of stations with an off-board fare collection system
- Station platforms level aligned with the bus floor and multiple bus doors options for entry to ease access
- Priority for buses at intersections (Figure 73)

(CDR, 2018)

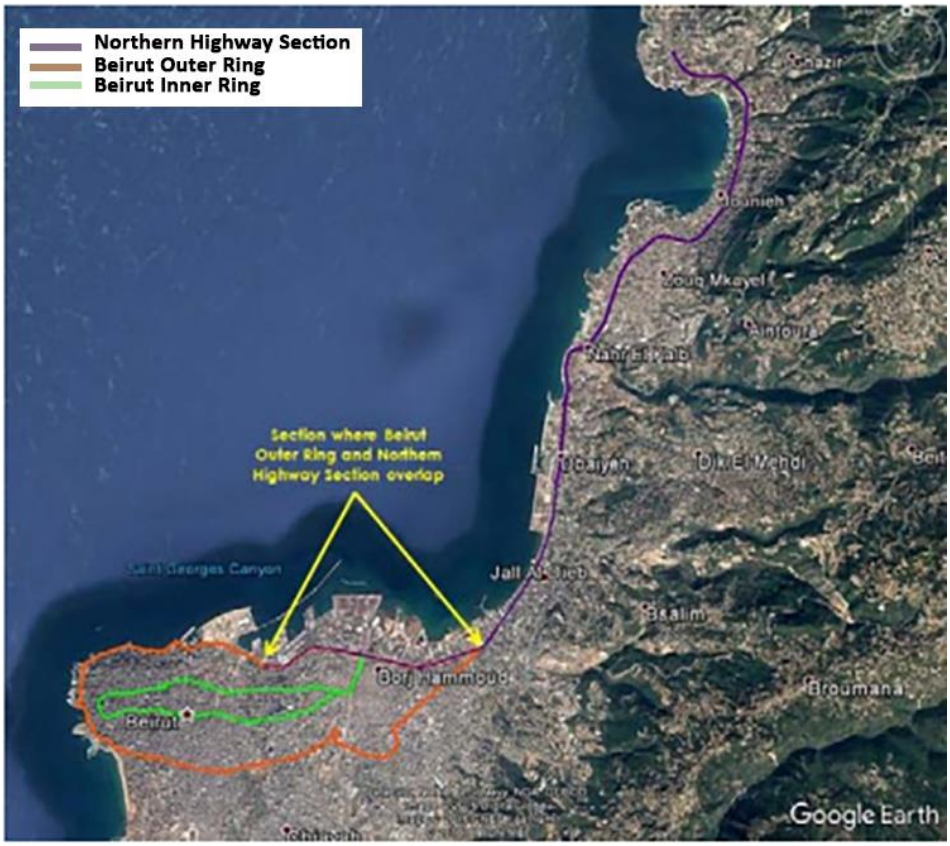


Figure 72: [Proposed BRT Line], CDR 2018

Figure 73: [Proposed BRT Line Perspective], CDR 2018

These characteristics are intended to ease access and connectivity to Beirut while encouraging the use of the BRT; therefore reducing the existing high-level of traffic intensity. In addition, the bus feeder lines pass directly through the “Ras El

Nabaa" neighborhood which provides more access to public transportation and reduces traffic congestion in the neighborhood when implemented. (Figure 74) As such, my ensuing design proposes that the BRT system is used as a traffic solution in the neighborhood along with the rest if Beirut. (CDR, 2018)

Figure 74: [Proposed BRT Line in Relation to "Ras El Nabaa"], Al Asmar 201

6.6. Summary

In conclusion, five design projects are analyzed in order to acquire the needed key concepts and design features for the "Ras El Nabaa" neighborhood design. Even though these projects have different geographic locations, concepts, objectives, and designs, they all show a similar strategy or approach. For instance, in order to make an urban space more accessible and vibrant for pedestrians, all projects insist on prioritizing the streets for pedestrian usage and improving the pedestrian network. A such, all the projects mention enhancing the pedestrian network as to allow a wide sidewalk clearance, safe crossings, landscape buffer, lighting, and seating areas while providing a connection to the surrounding districts and public transportation hubs. In

addition, creating spaces with diverse activities to target all social groups is also mentioned in all the analyzed projects. As such, those key approaches are utilized in my ensuing urban design proposal for the “Ras El Nabaa” neighborhood.

CHAPTER 7

“RAS EL NABAA” AGING-FRIENDLY URBAN DESIGN PROPOSAL

As previously mentioned, the aim of this thesis is to develop a contextualized aging-friendly neighborhood design for the “Ras El Nabaa” neighborhood in Beirut. As such, the following proposed design is my thesis design proposal and potential intervention in the neighborhood. The design is based on the research findings from SAFE assessment, spatial and regression analysis, site data collection, interviews, and design inspirations from similar cases. It aims at proposing a contextualized major street layout intervention, which alters the outdoor urban physical characteristics in “Ras El Nabaa” into an aging-friendly design to accommodate older adults. Accordingly, this design concept tackles the two major issues determined through the study, the “Bechara El Khoury” highway infra-structure break and the neighborhood’s low invitation quality based on the SAFE assessment. The proposed solution targets each SAFE measure through a specific design feature (Tables 2, 3, 4, & 5). This improves the neighborhood invitation quality. Then, by doing so, it might enable communal socio-spatial practices and encourage the establishment of a community.

Attractiveness Measures	Design Features	
	Neighborhood Scale	Street Scale
Building Transparency around the Neighborhood		Metal Fences to Replace Concrete Ones
Presence of Remarkable/Visible Landmarks around the Neighborhood	Outdoor Public Spaces	
	Trees with Distinctive Type	
Cleanliness of Streetscape around Neighborhood		Garbage Bins
Presence of Inviting Landscape	Public Garden	Street trees, planter boxes

Table 2: [Proposed Features in Relation to the Neighborhood Attractiveness], Al Asmar 2018

Safety Measures	Proposed Design Features	
	Neighborhood Scale	Street Scale
Level of Passive Surveillance from Low Vehicular Traffic Speed	Decreased Car Lanes on the Highway	Speed Bumps
Adequacy of Sidewalks and Curb-Cuts for Older Adults Using Mobility Aids	Increased Sidewalk Width	Re-designed Sidewalk Curb to Prevent Sidewalk Parking (Figure 78)
	Parking Relocation to Remove Sidewalk Parking	Pedestrian Elevated Crossings and Pedestrian Edge Crossings
Adequacy of Landscape Buffer		Street Trees, Bushes, and Planter Boxes
Adequacy of Traffic Flow around the Neighborhood	Decreased Car Lanes on the Highway GF level	

Table 3: [Proposed Features in Relation to the Neighborhood Safety], Al Asmar 2018

Friendliness Measures	Design Features	
	Neighborhood Scale	**Street Scale**
Adequacy of Sidewalks and Curb-Cuts for Older Adults Using Mobility Aids	Increased Sidewalk Width	Re-designed Sidewalk Curb to Prevent Sidewalk Parking (Figure 78)
	Parking Relocation to Remove Sidewalk Parking	Pedestrian Elevated Crossings and Pedestrian Edge Crossings
Adequacy of Sidewalk Clearance for Older Adults with Mobility Aids	Increased Sidewalk Width	
Active Outdoor Public Spaces around the Neighborhood	Designed Street Nodes with Furniture	Exercise Spaces
		Dining Spaces
		Garden
Range of Comfortable Outdoor Sitting Areas around the Neighborhood		Benches

Table 4: [Proposed Features in Relation to the Neighborhood Friendliness], Al Asmar 2018

Efficiency Measures	Design Features	
	Neighborhood Scale	**Street Scale**
Existence of Pedestrian Signs or Patterns for Easy Access to Destinations	Signage for Significant Locations	Visual, audible, and Tactile Pedestrian Crossing Signals
Existence of Adequate Designated Pedestrian Crossings for Older Adults		Pedestrian Elevated Crossings and Pedestrian Edge Crossings
Adequacy of Pedestrian Crossing Signal/Sign for Older Adults		Visual, audible, and Tactile Pedestrian Crossing Signals
Existence of Nearby Public Transport Options	Shuttle Service	Bus Stops

Table 5: [Proposed Features in Relation to the Neighborhood Efficiency], Al Asmar 2018

7.1. Vehicular Network Design Proposal in Relation to the Neighborhood Safety, Friendliness, and Efficiency

One of the major issues in the neighborhood, as determined through the SAFE assessment and interviews with older adults, is the traffic congestion and the lack of parking spaces which often cause cars to block the sidewalks. In addition, the "Liaison Douce" project that will be implemented at its proximity, predicts a major increase in traffic congestion along "Bechara El Khoury". Therefore, I developed a traffic and parking moderation strategy for the neighborhood (Figure 75).

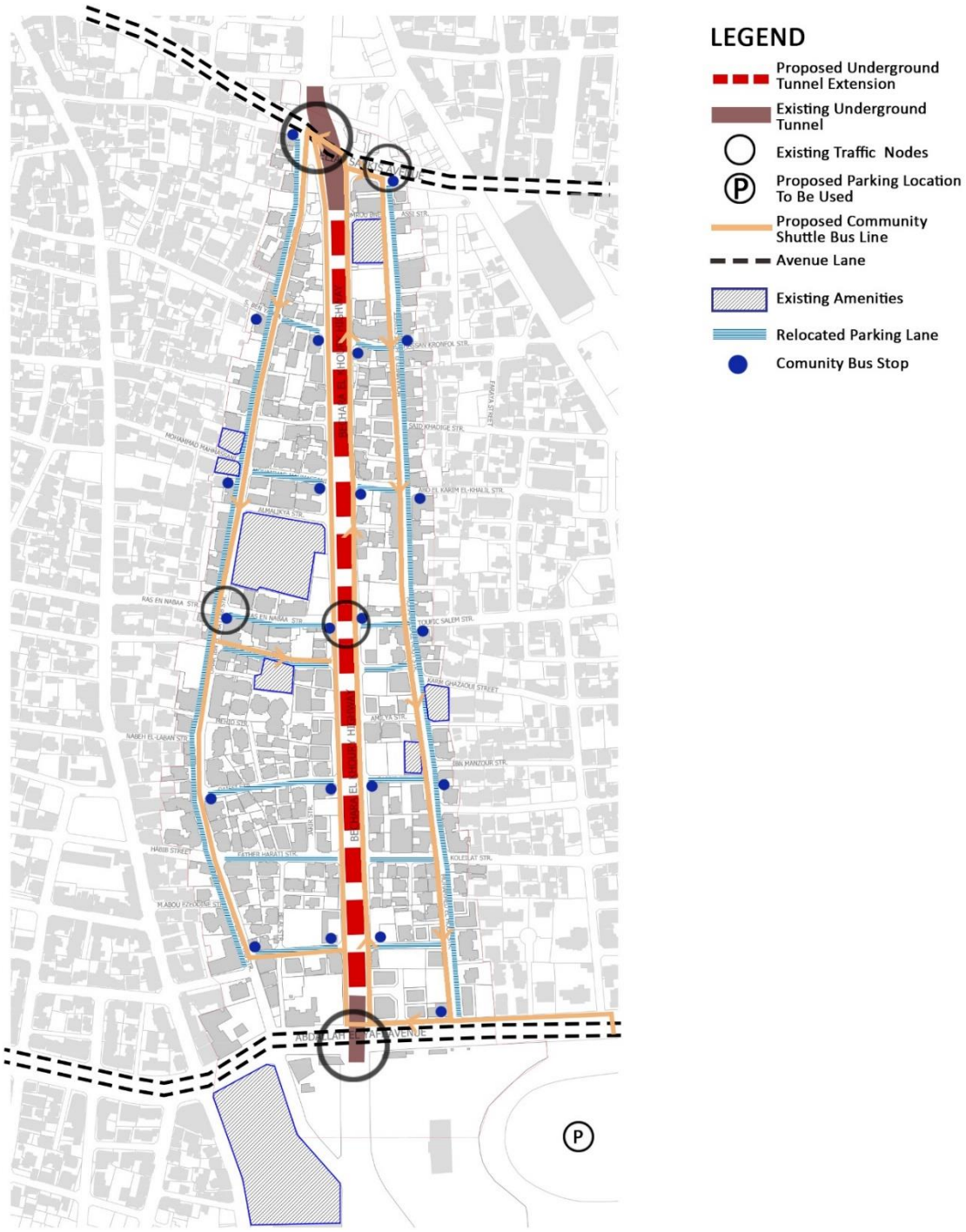


Figure 75: [Traffic and Mobility Strategy], Al Asmar 2018

7.1.1. "Bechara El Khoury" Highway Tunnel

The strategy attempts to propose a solution for the existing high traffic intensity and its projected increase along the "Bechara El Khoury" Highway. This intensity, as discovered through the SAFE assessment and conducted interviews, is discouraging people - mainly older adults - from crossing the highway and is hence creating a physical barrier between the two sides. In addition, the unappealing smells and sounds, caused by the traffic intensity, discourage older adults from accessing the street. As such, the proposal divides vehicular traffic along "Bechara El Khoury" into two levels. The first level is a slow secondary road on the ground-floor level and the second is a fast underground primary road.

The proposed strategy intervenes on both the ground floor and the underground levels. It connects the two existing tunnels on the peripheries of "Bechara El Khoury" and creates an underground tunnel passageway. Then, it relocates two out of three existing lanes along the highway to the underground level and preserves only one lane on the ground floor level. Therefore, traffic is divided into two parts: First of all, there is a slow ground-floor secondary road for cars accessing the neighborhood, and then there is an underground tunnel for cars passing through the neighborhood. As such, it reduces two-thirds of the ground-floor vehicular lanes and transfers that space for pedestrian use, which results in 30% of the space becoming for vehicles and 70% for pedestrians (Figure 76). Hence, like the Chapultepec redesigned promenade, it flips the existing dominance of the vehicular traffic and gives it to pedestrians.

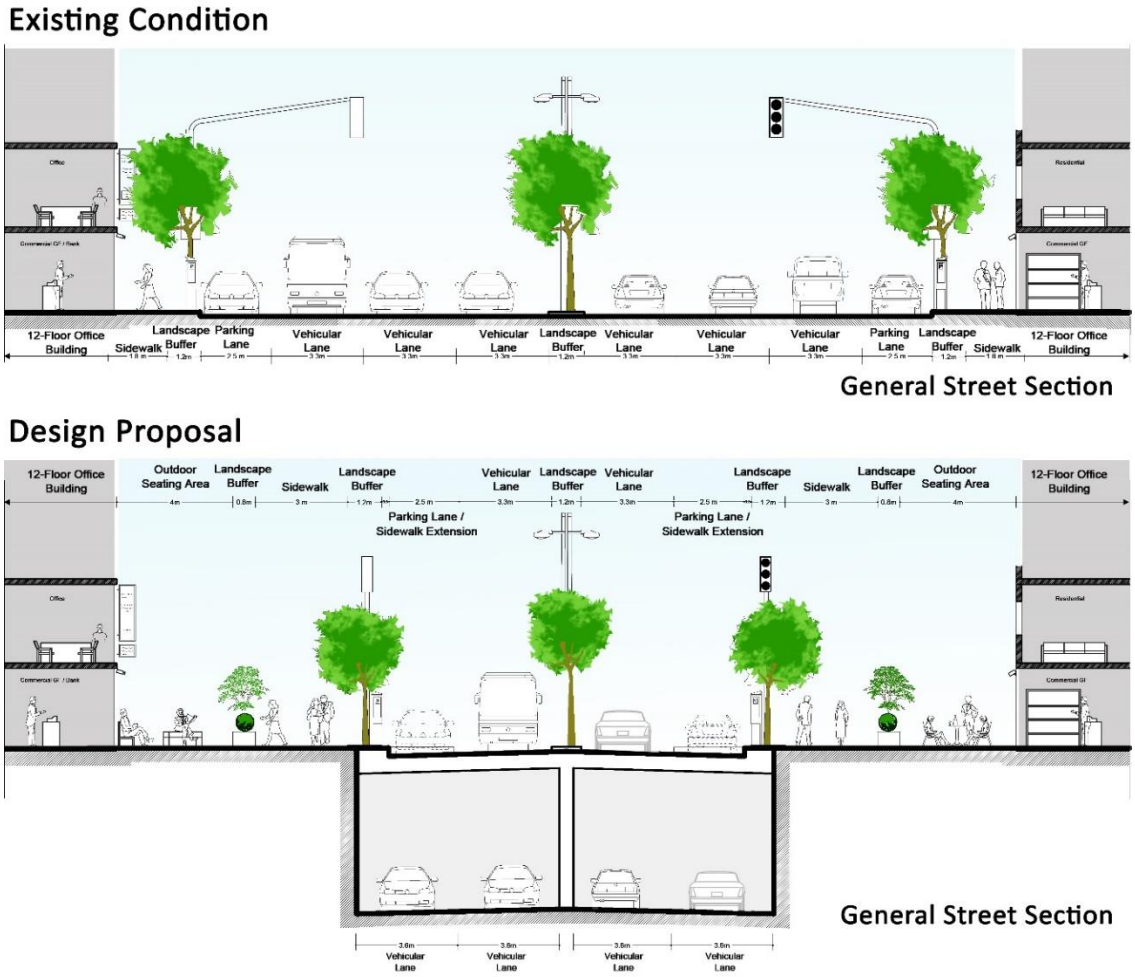


Figure 76: [“Bechara El Khoury” Existing and Proposed Street Sections], Al Asmar 2018

As a result, the traffic speed and vehicular traffic in the neighborhood decrease; therefore, affecting the level of passive surveillance and vehicular safety for older adults. In addition, this makes room for the sidewalk width and clearance to be increased. As a result, the overall level of neighborhood safety is improved for older adults.

7.1.2. Parking and Shuttle Buses

As previously determined, the neighborhood has multiple attraction locations such as schools, mosques, hospitals, and commercial arteries. These attraction points increase its vehicular traffic intensity and create a need for parking spaces. However, as determined by the interviews and the collected data, the need for parking spaces exceeds the provided parking spots available in the neighborhood. For example, cars usually park on vehicular road lanes and on sidewalks (Figure 77). This problem increases traffic congestion and causes the sidewalks to be blocked, therefore reducing their accessibility by older adults. Thus, my proposal works on reducing the traffic intensity of cars accessing the neighborhood through relocating some existing parking spaces to the nearby hippodrome (Table 2) and providing shuttle buses to transfer people from the hippodrome parking to and from the neighborhood. In addition, I propose to incentivize the private sector through public-private partnerships encouraging the establishment of parking structures in existing parking lots, vacant land, and new buildings. In return, the municipality reduces taxes bestowed upon the private sector.

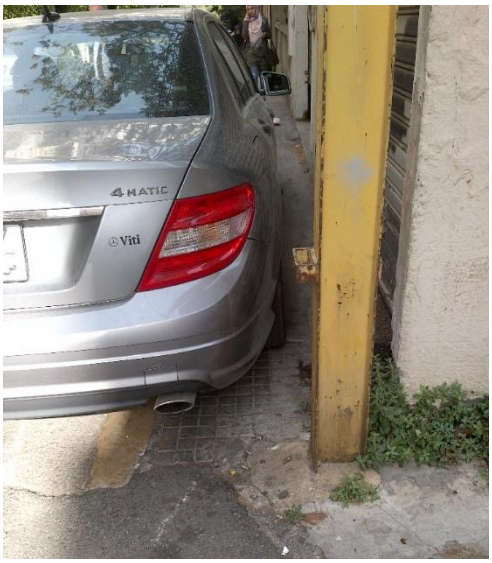


Figure 77: [Car Parking on the Sidewalk in “Ras El Nabaa”], Al Asmar 2018

	Omar Ibn El Khattab	Mohamed El Hout	Secondary and Tertiary Streets	Bechara El Khoury	Total
Total Parking Spaces	290	260	100	260	650
Parking Spaces to Be Relocated	130	130	100	100	460

New Proposed Parking Space	
Parking Capacity	1000
Parking Spaces Relocated from the Neighborhood	460
Parking Spaces Available for Visitors	540

Table 6: [Parking Relocation Figures], Al Asmar 2018

A total of 460 parking spots are relocated from the neighborhood to the publicly owned hippodrome parking lot, which has a capacity of over 1000 cars. Since horse races occur there only on Sundays, it is empty during week days when schools, mosques, and shops are active. As such, it is ideal for relocating parking spots. In addition, a community shuttle service transports people from the Hippodrome parking lot to and from the neighborhood, thereby encouraging car owners to park their cars outside of the neighborhood and consequently reducing vehicular influx and traffic congestion. These shuttle buses are suitable for older adults, therefore providing appropriate seating, handles, and access ramps and are compliant with the ADA regulations (Figure 78).

Figure 78: [Example of a Community Shuttle Bus Compliant with ADA Regulations], Al Asmar 2018

Additionally, parking structures are designed within the neighborhood on vacant land, existing parking lots, and new buildings as part of a public-private partnership. This reduces the need for any future parking spaces and provides close-distance parking spaces within the neighborhood boundary. Consequently, the parking relocation and shuttle bus services reduce the existing sidewalk obstructions and provide more public transportation options for older adults, therefore affecting the levels of safety, friendliness, and efficiency. Hence, they improve the overall neighborhood IQ.

7.2. Pedestrian Network and Design Features in Relation to SAFE Measures

The next step of the design proposal is modifying and improving the outdoor physical features of the neighborhood in order to ameliorate both its demand quality and invitation quality. Accordingly, it targets the pedestrian network, creates places of socialization for older adults, and provides an appealing environment. In order to do so, the design first improves the pedestrian connection between the neighborhood, the

Beirut pine forest, and the CBD. Next, it re-designs the “Bechara El Khoury” Highway and main connecting streets to become pedestrian dominated while providing bus stops to encourage the use of public transportation. In addition to the pedestrian networks, the design introduces places for socializing such as comfortable seating areas across street intersections. It also enforces existing socio-spatial practices through placemaking. These places encourage different types of activities complementary to the surrounding land-use and provide way-finding elements for older adults. More so, the design works on improving the landscape continuity by modifying the physical features of existing unappealing concrete fences (Figure 79). As a result, the design targets physical features related to the levels of safety, attractiveness, friendliness, and efficiency.

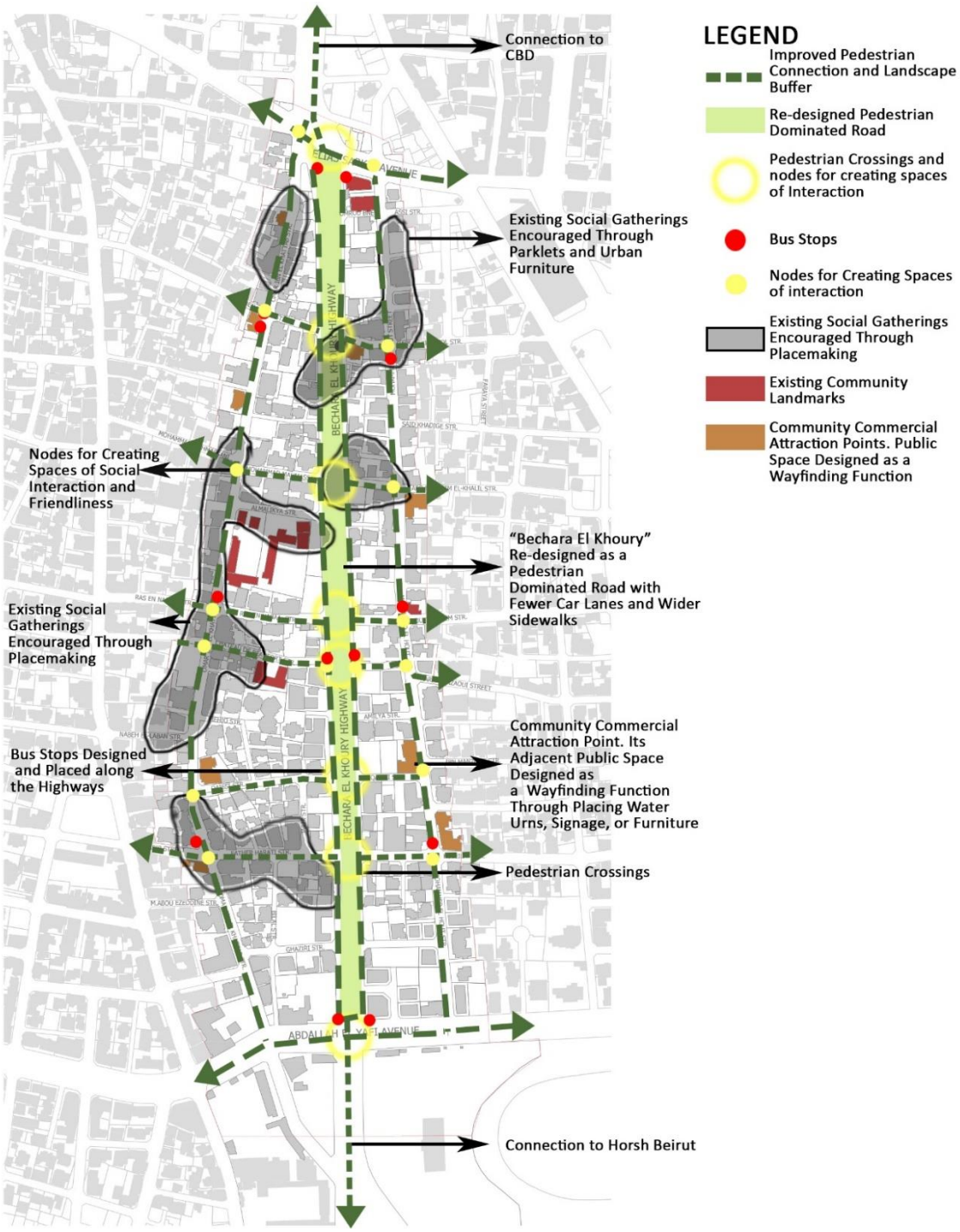


Figure 79: ["Ras El Nabaa" Design Concept Map], Al Asmar 2018

7.2.1. Demand Quality Features for Older Adults

The proposed design improves the pedestrian network throughout the entire neighborhood in order to provide no less than the minimum demand quality needed as per the ADA regulations (Figure 80). For example, after reducing the number of vehicular lanes, the proposed design increases the width of the sidewalks to no less than 1.5 meters and adds adequate pedestrian crossings. More so, the sidewalk edges are re-designed to prevent cars from parking along their edges. (Figure 81) This increases the sidewalk clearance and reduces sidewalk obstructions and disconnections. In addition, the added pedestrian crossings create easy, safe, and inviting connections for older adults (Figure 82). Additionally, bus stops that are used for both public transportation and community shuttle services are added in front of main attraction points such as schools and mosques and at the peripheries of the neighborhood. Consequently, the design provides an easily accessible neighborhood environment for older adults to have access to their basic needs and services, and therefore preserving their autonomy.

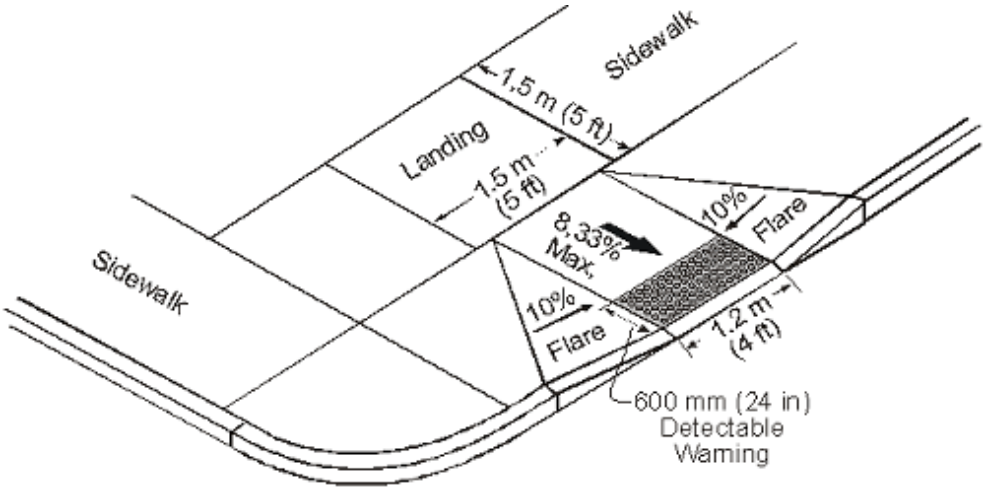


Figure 80: [ADA Required Curb Ramp and Sidewalk Width], Al Asmar 2018

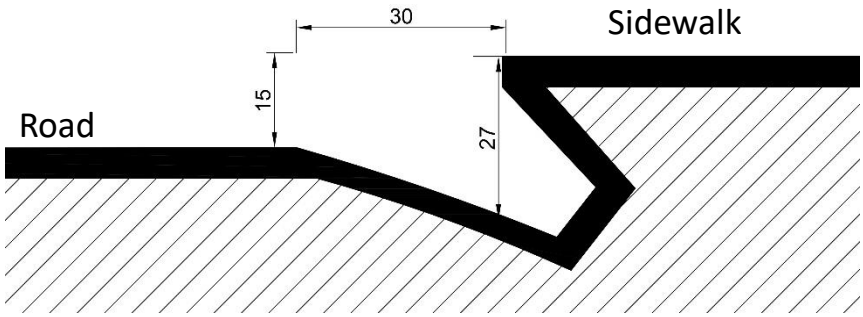


Figure 81: [Sidewalk Design Type], Al Asmar 2018

As a result, the sidewalk clearance increases and the sidewalk obstructions decrease; therefore, improving the adequacy of sidewalks and curb-cuts for older adults using mobility aids. This improves the levels of safety and friendliness in the neighborhood. In addition, the implemented crossings provide adequate designated pedestrian crossings for older adults and adequate signals. Accordingly, this improves the level of neighborhood efficiency.

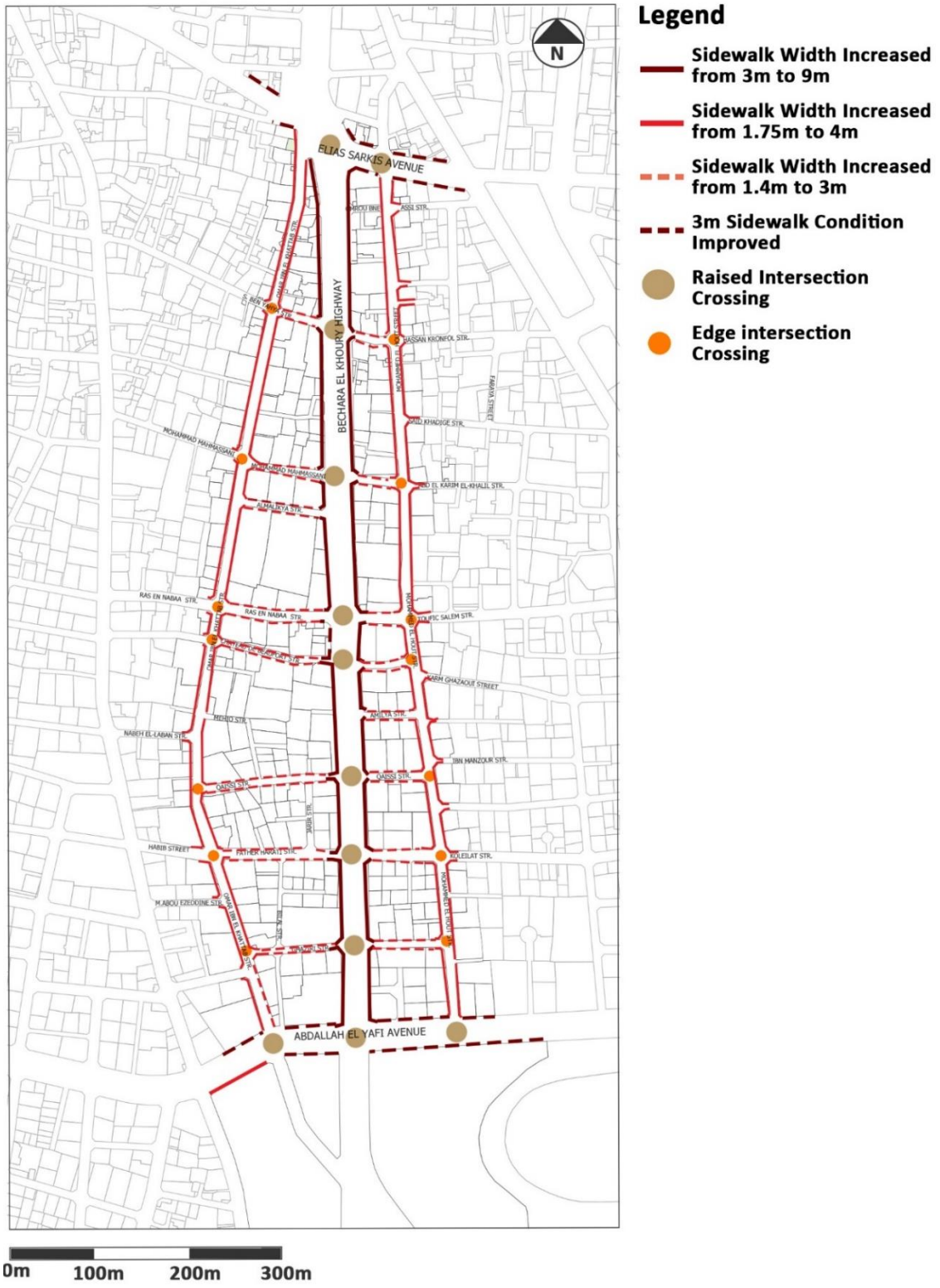


Figure 82: [“Ras El Nabaa” Sidewalk and Intersections Concept Map], Al Asmar 2018

7.2.2. Invitation Quality Features for Older Adults

The proposal targets the improvement of the neighborhood invitation quality features by providing older adults with a pleasant environment for social interaction and activities. In order to do so, it tackles different layers in the urban fabric in relation to Safety, Attractiveness, and Friendliness

- Landscape Buffer in Relation to the Neighborhood Safety and Attractiveness: The design proposes aligned street trees to act as landscape buffer while providing shade and clean air in the neighborhood. The main common street tree type used as landscape buffer is the "Ficus Nitida", which can be found along many streets in Beirut. In addition, some of the street trees have a distinctive type such as the "Delonix Regia", the "Robinia Pseudoacacia", and the "Sakura", which act as way-finding tools for older adults (Figure 83). All the mentioned trees can be found in public spaces around Beirut (Figure 84). This intervention provides adequate landscape buffer and inviting landscape; therefore, increasing the neighborhood safety and attractiveness levels.

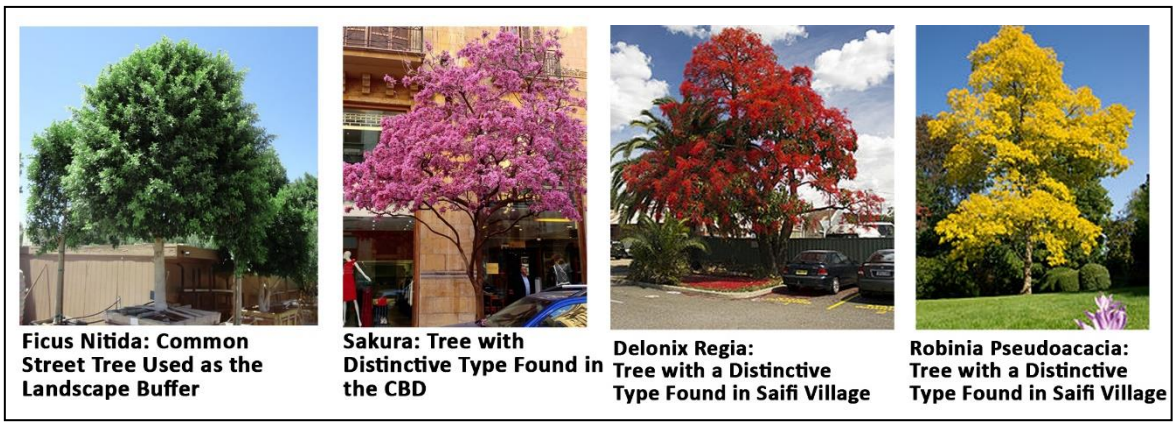


Figure 83: [Proposed Street Tree Types], Al Asmar 2018

Figure 84: [“Ras El Nabaa” Landscape Buffer Concept Map], Al Asmar 2018

- Landscape Visual Continuity in Relation to the Neighborhood Attractiveness: The design intervenes on the level of landscape visual continuity by modifying existing unappealing concrete fences. It replaces unappealing concrete fences by see-through metallic ones, where the interior view is not guarded in locations such as schools and parking lots. This increases the building frontage transparency and, as a result, improves the level of attractiveness. Additionally, it redesigns concrete fences into vertical landscape infrastructure, where the interior is either guarded or unappealing such as secured military areas and industrial zones (Figure 85). The proposed design as per figure 82 covers the concrete fences in industrial zones in a permanent vertical landscape infrastructure; while it covers concrete blocks around military secured areas with temporary vegetative walls. This renders the streetscape more attractive for older adults. These interventions increase the building transparency and install inviting landscape around the neighborhood; therefore, increasing the level of neighborhood attractiveness. (Figure 86)

Figure 85: [Examples of Vertical Landscape Infrastructure for Permanent and Temporary Usage], Al Asmar 2018

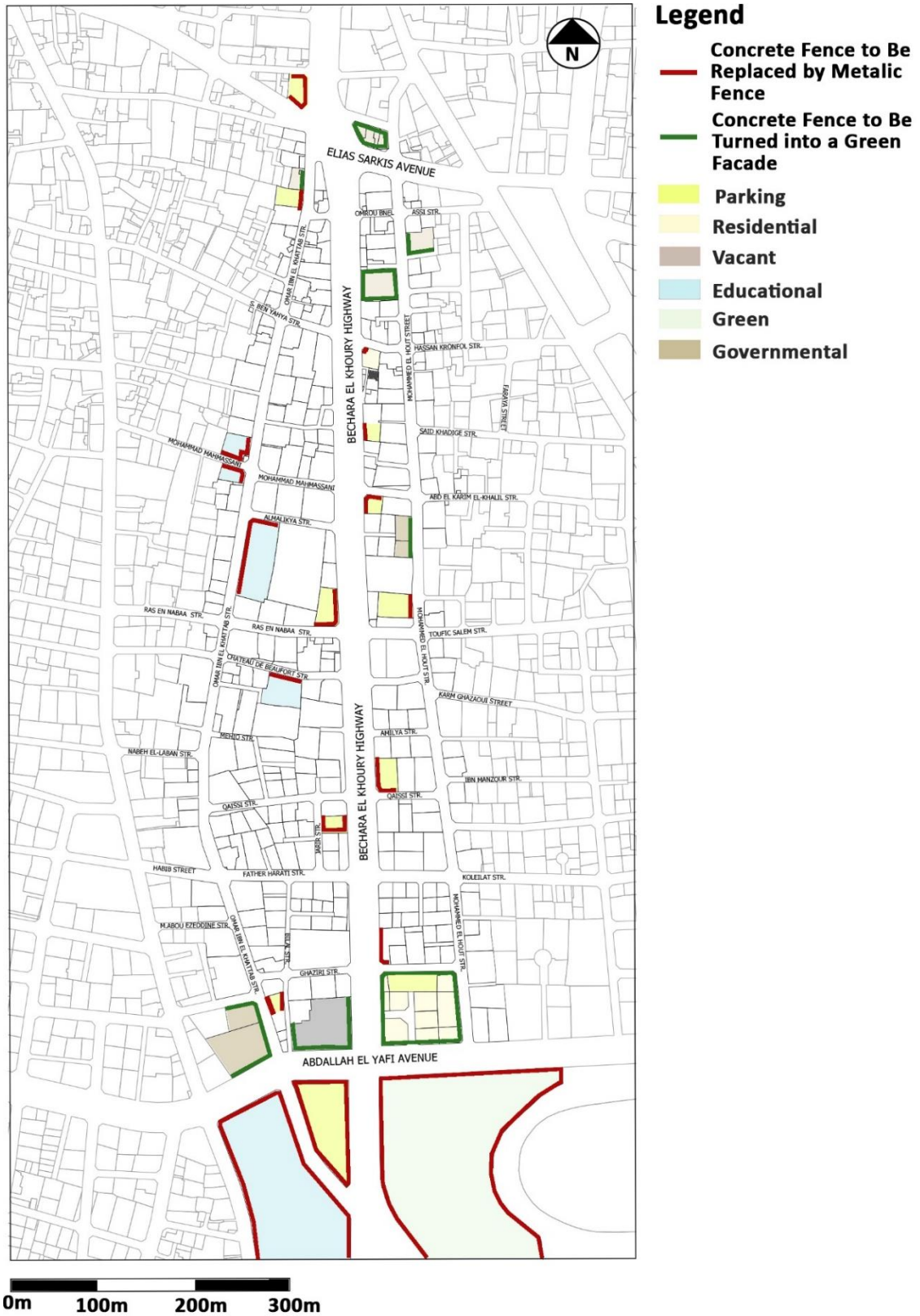


Figure 86: [“Ras El Nabaa” Frontage Treatment Concept Map], Al Asmar 2018

- Urban Furniture in Relation to the Neighborhood Attractiveness and Friendliness: The design installs urban furniture in front of street intersections to encourage socialization. This furniture is inspired by existing furniture around the neighborhood such as chairs, tables, game tables (chess, checkers, etc…), drinking fountains, and benches (Figure 87). In addition, it designs parklets in order to encourage existing socio-spatial practices. Furthermore, recycling bins are installed to improve the streetscape cleanliness (Figure 88). Accordingly, a range of comfortable outdoor sitting area around neighborhood are created for older adults, and the neighborhood cleanliness is improved; therefore, improving the neighborhood attractiveness and friendliness levels.

Figure 87: [Street Furniture Types], Al Asmar 2018

Figure 88: [“Ras El Nabaa” Placemaking Concept Map], Al Asmar 2018

- Outdoor Public Open Places in Relation to the Neighborhood Friendliness: The design proposes a variety of public places with distinct activities and social interaction along the streetscape. These activities are complementary to their adjacent land-use characters. For example, child playgrounds are designed next to educational hubs, dining furniture next to restaurants (Figure 89), gardens next to mosques, and outdoor exercise spaces next to health hubs (Figure 90). Consequently, a diverse sequence of outdoor public places, directly related to the existing land-use, is created which increases the neighborhood friendliness (Figure 91).

Figure 89: [Sidewalk Dining Furniture], Greaterplaces.com 2018

Figure 90: [Outdoor Exercise Spaces], lappset.com 2018

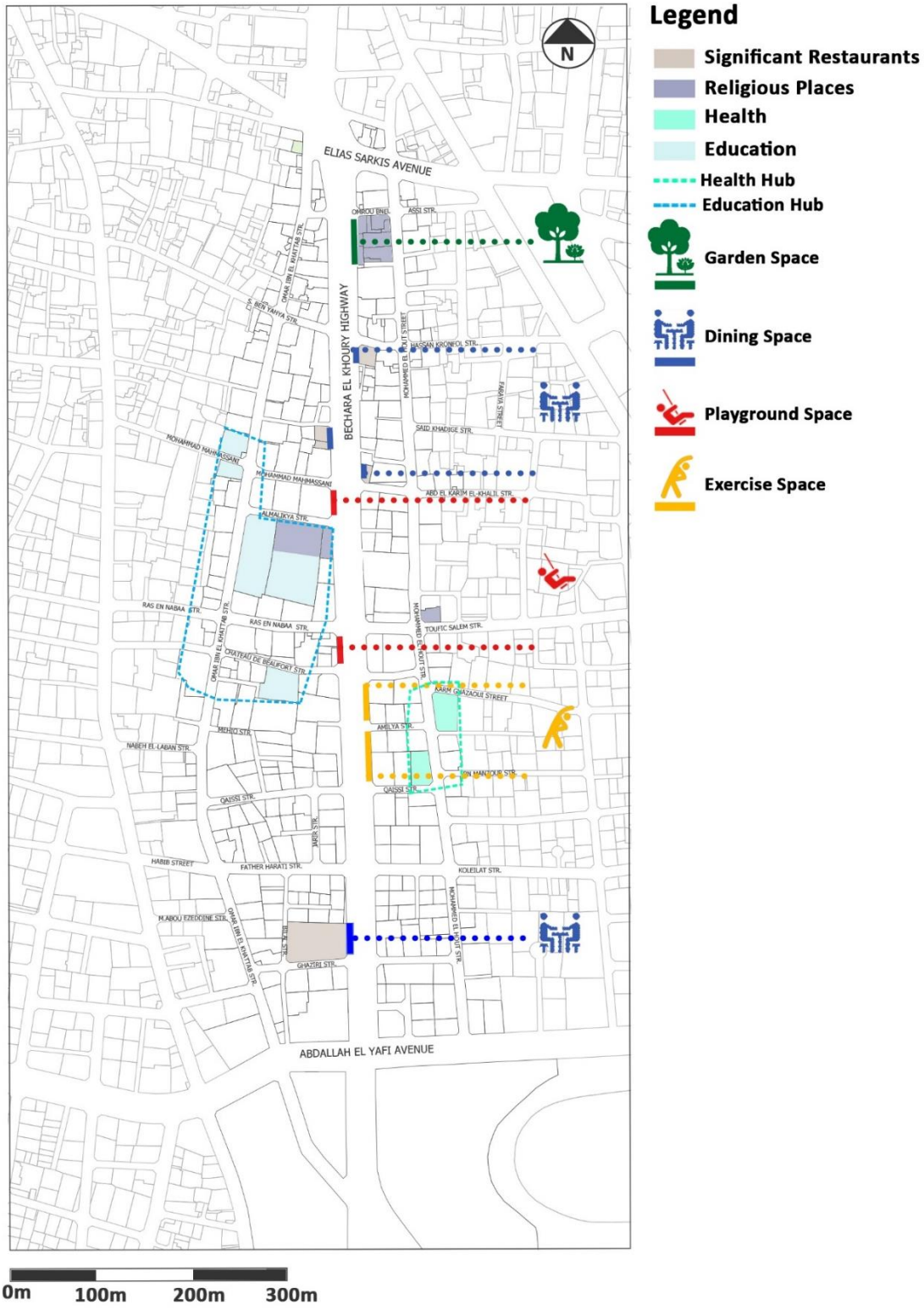


Figure 91: [“Ras El Nabaa” Open Space Concept Map], Al Asmar 2018

7.3. Detailed Design

For this thesis, two detailed design locations are developed. The first is the "Bechara El Khoury" Highway strip and the second is the "S. Ben Yehya- Hassan Kronfol" Street connection. These two locations are chosen to show the diverse types of spaces and interventions around the neighborhood (Figure 92).

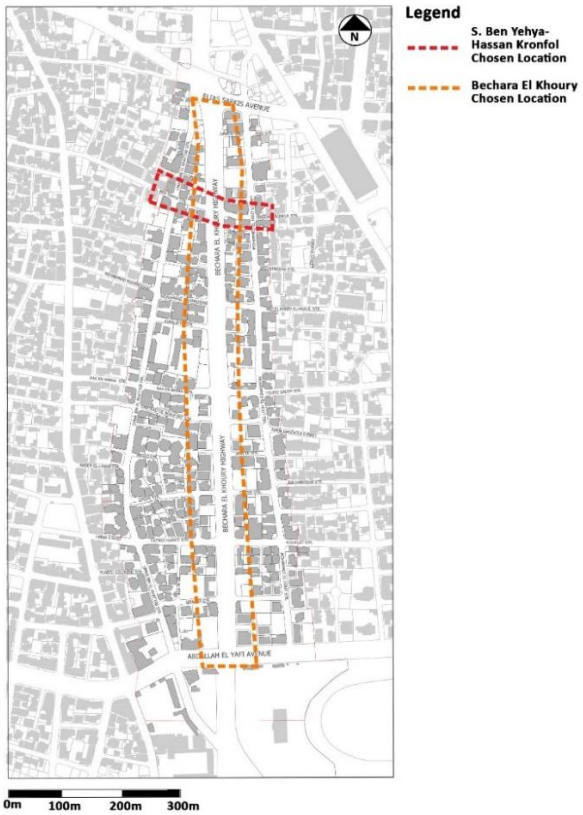


Figure 92: ["Ras El Nabaa" Chosen Location for Detailed Design Development], Al Asmar 2018

7.3.1. "Bechara El Khoury" Street Design

The design along the "Bechara El Khoury" Highway enables an aging-friendly community through providing both the demand quality needed for older adults to access the urban fabric and the invitation quality needed to invite them. First, the highway is

redesigned as a pedestrian-dominated strip with 9-meter-wide sidewalks, containing landscape buffer and seating areas. Pedestrian crossings with bus stops and comfortable seating areas are designed on main street intersections to encourage older adults to cross the street, therefore decreasing the barrier created by the highway. As a result, the necessary sidewalk clearance and pedestrian crossings, as per the ADA, are achieved; this provides the basic demand quality needed for older adults. In addition, way-finding elements, outdoor spaces with activities, and landscape continuity are provided to invite older adults them to the neighborhood. For instance, a tree with a distinctive character is planted on every main crossing as a way-finding tool. Outdoor spaces, exercise spaces, playgrounds, dining spaces, and gardens are designed along the strip in order to invite older adults to access the urban fabric and socialize; all of these enable the development of a community. Furthermore, concrete fences are replaced by metallic ones or redesigned as green walls in order to preserve the landscape continuity (Figure 93 & 94). As such, the proposed design achieves the following objectives:

- It decreases the gap between both sides of “Bechara El Khoury” and encourages older adults to access and cross the highway; therefore, it decreases the effects of the infrastructure break inside the neighborhood.
- It provides the demand quality needed for older adults to access the urban environment in relation to SAFE measures and helps them maintain their autonomy.
- It improves the invitation quality of the street in relation to SAFE measures and provides places to socialize with diverse activities; hence, it enables the establishment of a community.

Figure 93: [“Bechara El Khoury” Detailed Design Development], Al Asmar 2018

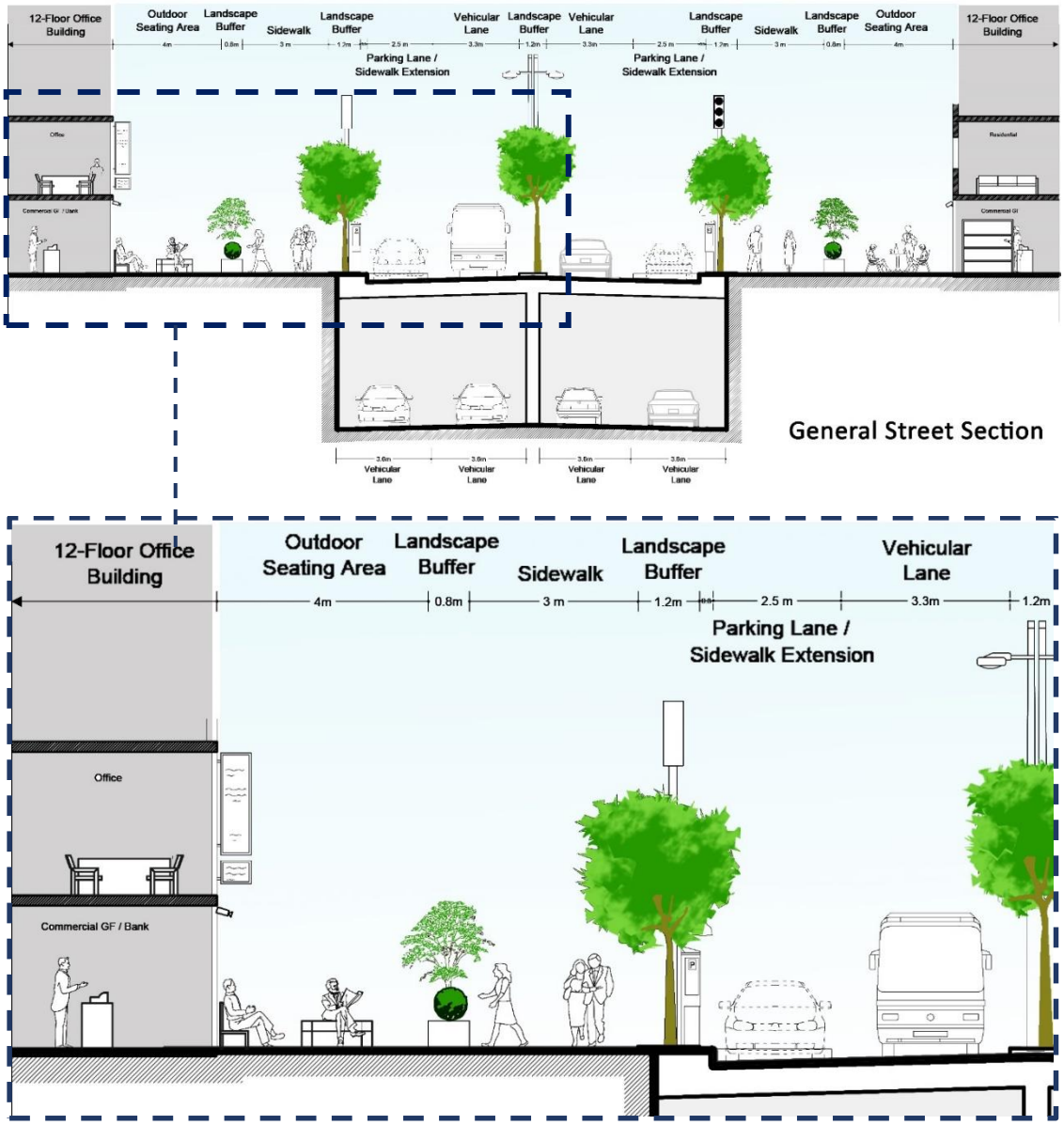


Figure 94: [“Bechara El Khoury” Typical Sidewalk Section and Division], Al Asmar 2018

In addition to the mentioned interventions, the design takes into consideration the technical aspects of implementing an underground tunnel and its effect on the pedestrian network. For safety and service purposes, two tunnel service exit lanes have to be installed in order for the tunnel design to be functional. These exit lanes are placed in the middle of the neighborhood, stretch along 60 meters, and link the tunnel with the

ground floor road. As such, a specific sidewalk design has to be done for the space they occupy on the ground floor level. (Figure 95) First, the parking lanes along the exit tunnels are removed in order to make room for the service lanes. Then, landscape buffer planter zones are installed between the tunnels and the sidewalks to provide a buffer zone for safety purposes and to provide a space for the ventilation exhaust exits, servicing the tunnel. (Figure 96)

Figure 95: [“Bechara El Khoury” Tunnel Exit Plan], Al Asmar 2018

Figure 96: [“Bechara El Khoury” Tunnel Exit Section], Al Asmar 2018

7.3.2. “Bechara El Khoury” Activity Open Space Detailed Design

The open spaces containing a design which promotes socio-spatial communal activities were developed.

- Outdoor Dining Spaces: The first open spaces to be developed are the outdoor dining areas in front of significant restaurants and cafes. Those facilities include but are not limited to “Saker Juice”, “Zein Chicken”, and “Agha”, which form community attraction points. In those spaces, 5.5 meters of the sidewalk width is being used to install tables and chairs as restaurant extensions, in addition to providing landscape buffer between the seating area and the sidewalk clearance.

More so, the design introduces designated pedestrian signage, leading to those spaces, in order to ease the street navigation for older adults. As a result, this design introduces a range of outdoor comfortable sitting areas and an active outdoor public space, which improves the neighborhood friendliness. Additionally, it provides inviting landscape and a remarkable space in the neighborhood, which improves the neighborhood attractiveness. Overall, the design serves in creating an inviting semi-public space to be used by restaurant customers and encourage older adults to access the neighborhood and the mentioned commercial facilities (Figures 97 & 98).

Figure 97: [“Bechara El Khoury” Detailed Plan for Dining Spaces], Al Asmar 2018

Figure 98: [Dining Space], Al Asmar 2018

- Playground and Exercise Spaces: The second open spaces to be developed are the outdoor playgrounds and exercise spaces. Along those spaces, the parking slots are removed to make room for a sidewalk extension. These two types of spaces occupy a similar sidewalk division space of 5 meters in width and allow a 2-meter vacancy consisting of landscape buffer and sidewalk clearance between them and the surrounding buildings (Figures 99 & 100). In addition, the flooring consists of rubber sidewalks to prevent and reduce injuries. However, the only difference is the urban furniture they require. The playgrounds consist of equipment targeting young children such as slides, jungle gyms, sandboxes, swings, etc…. while the exercise spaces consist of low impact fitness equipment targeting teens, adults, and older adults such as outdoor cycling machines, arm stretches, ladders, and steppers. These exercise and playground spaces invite people of all ages to access the neighborhood while improving both the physical and mental health of not only

older adults but also the community as a whole (Figures 101 & 102). Accordingly, the design adds inviting landscape and active outdoor public spaces; therefore, improving the neighborhoods' attractiveness and friendliness.

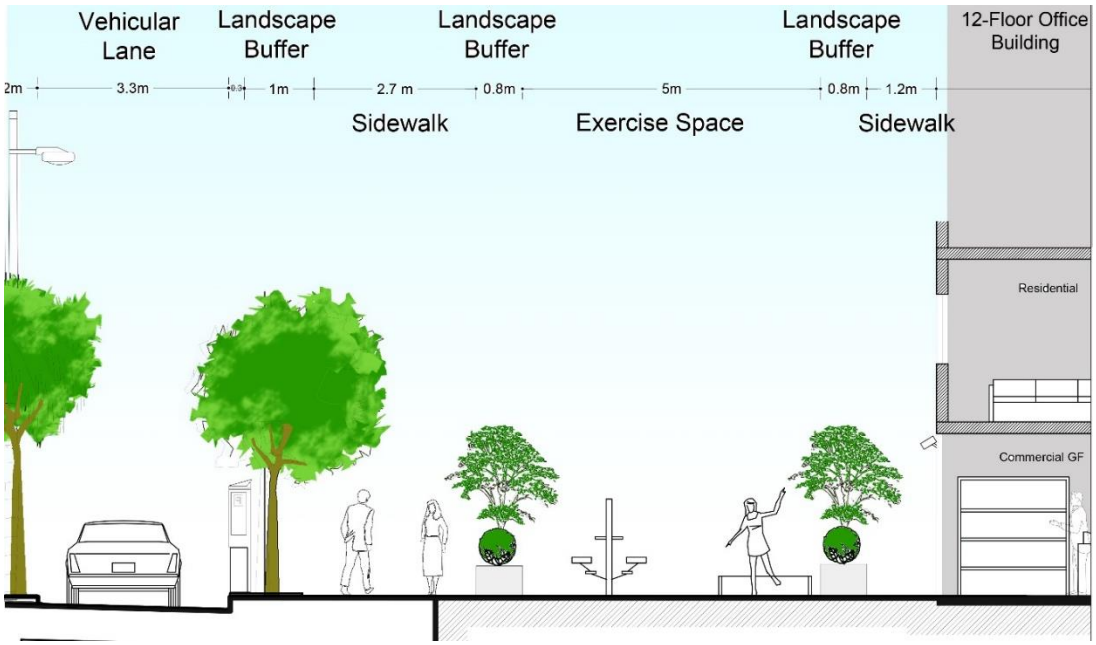


Figure 99: ["Bechara El Khoury" Section for Exercise Spaces], Al Asmar 2018

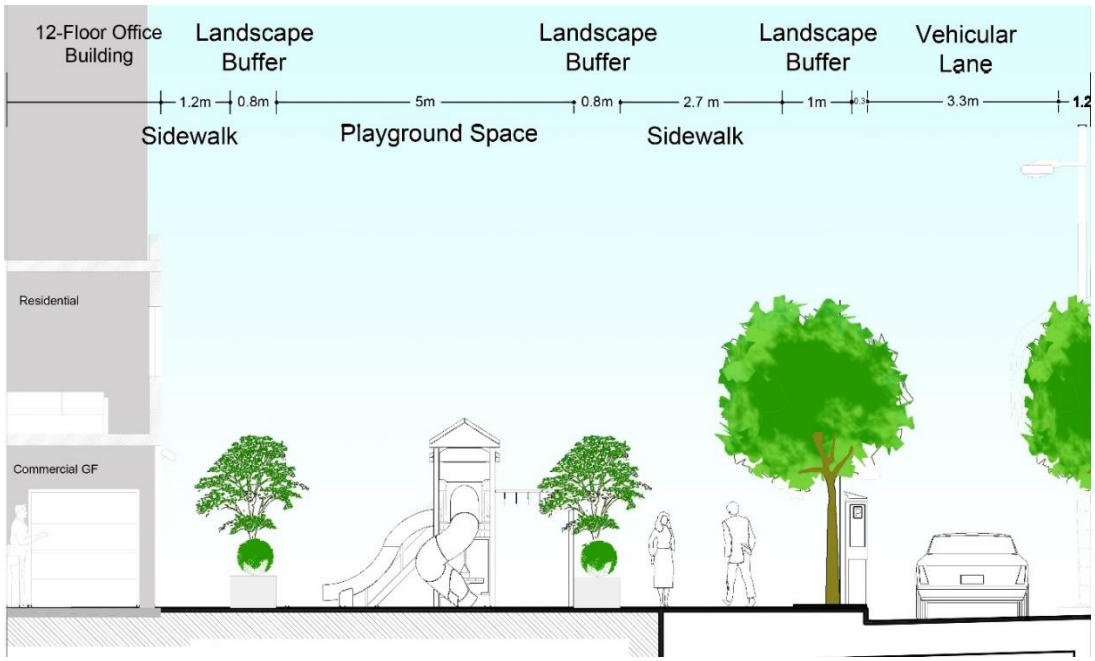


Figure 100: ["Bechara El Khoury" Section for Playground Spaces], Al Asmar 2018

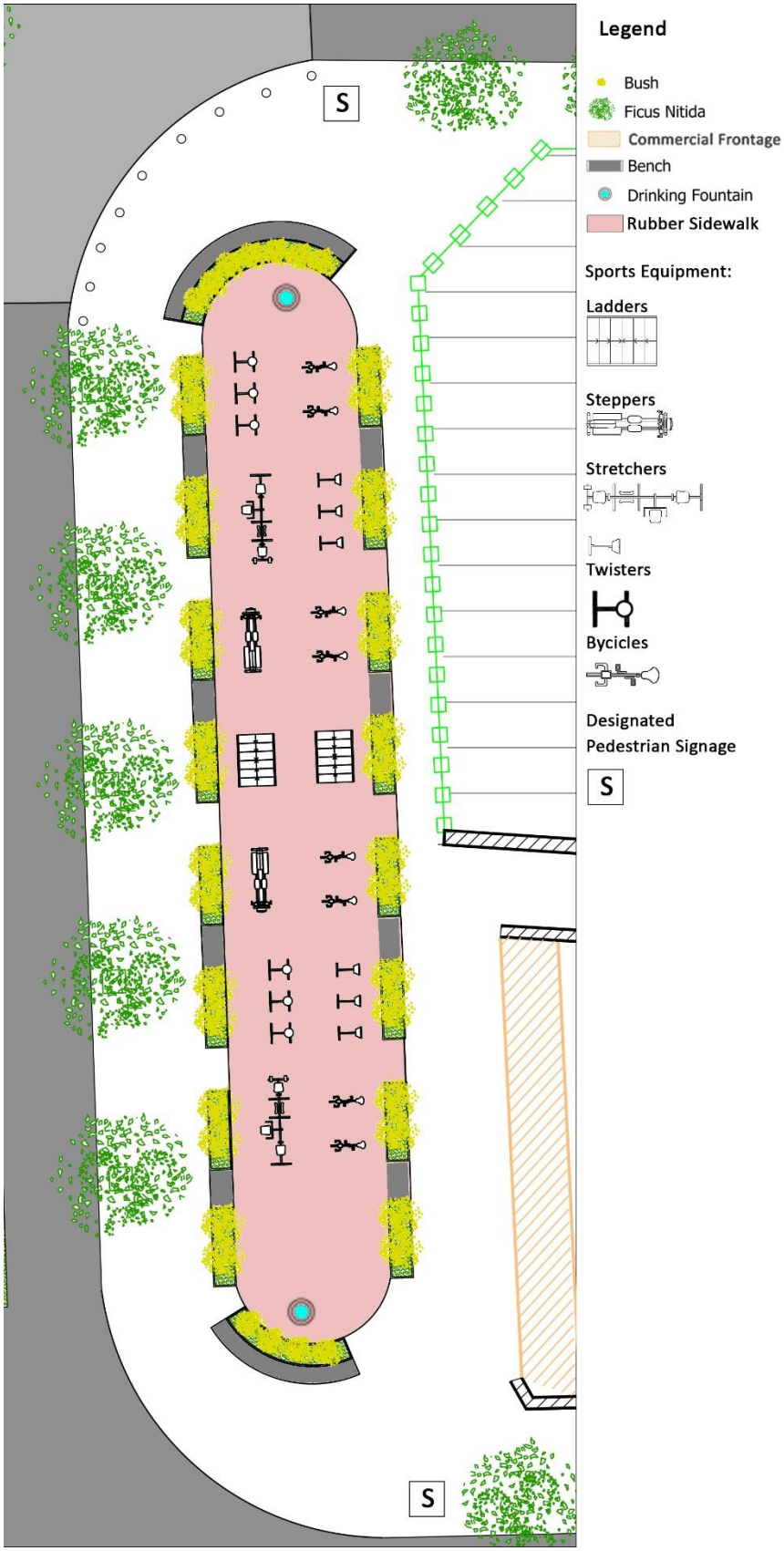


Figure 101: [“Bechara El Khoury” Plan for Exercise Space], Al Asmar 2018

Figure 102: [Exercise Space], Al Asmar 2018

- The Garden: The third open space to be developed is the garden in front of the "Zo Al Nourayn" Mosque. The mosque already has a plaza along with some trees overlooking the highway though it is separated from the sidewalk by a metal fence. As such, my design proposes a garden strip on the sidewalk in front of the existing private one to provide landscape continuity and to encourage people to access it. In addition, the sidewalk division is modified along that strip rendering the sidewalk clearance centered to the garden space. This creates the green promenade effect while engaging the garden space and encouraging access to it (Figure 103). As a result, inviting landscape and an

active outdoor public space is added; therefore, improving the neighborhoods' attractiveness and friendliness.

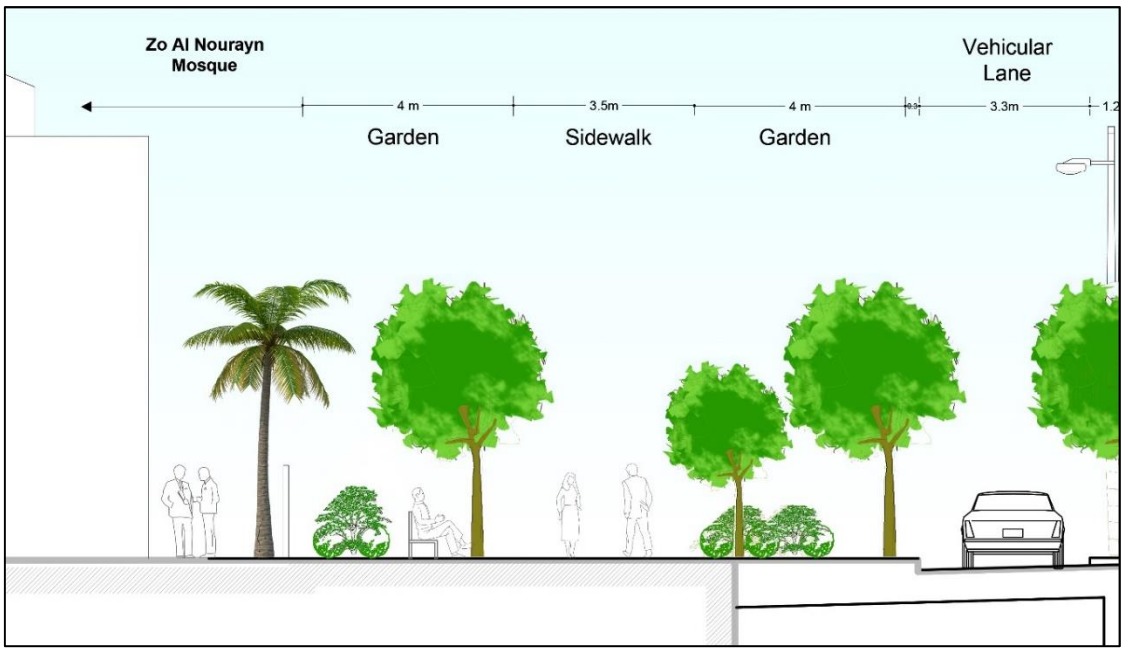


Figure 103: ["Bechara El Khoury" Garden Space Section], Al Asmar 2018

7.3.3. "Bechara El Khoury" Street Intersections Design

The street intersections along "Bechara El Khoury" are treated as zones of social interaction. Small covered seating locations along with greenery, drinking fountains and bus stops are designed at sidewalk corners. In addition, raised crossings with pavement texture, preceded by speed bumps, are designed at the main intersections in order to ease crossing for older adults as well as reduce the traffic speed; this provides safe and efficient access from one side of the street to the other. These crossings even have designated traffic crossing signals. Furthermore, a tree with a significant character is placed at the center of the street in order to provide a way-finding tool for older adults

and to embellishing the streetscape. As such, both the street's invitation quality and demand quality are improved through the design (Figure 104& 105).

Figure 104: ["Bechara El Khoury" Intersection], Al Asmar 2018

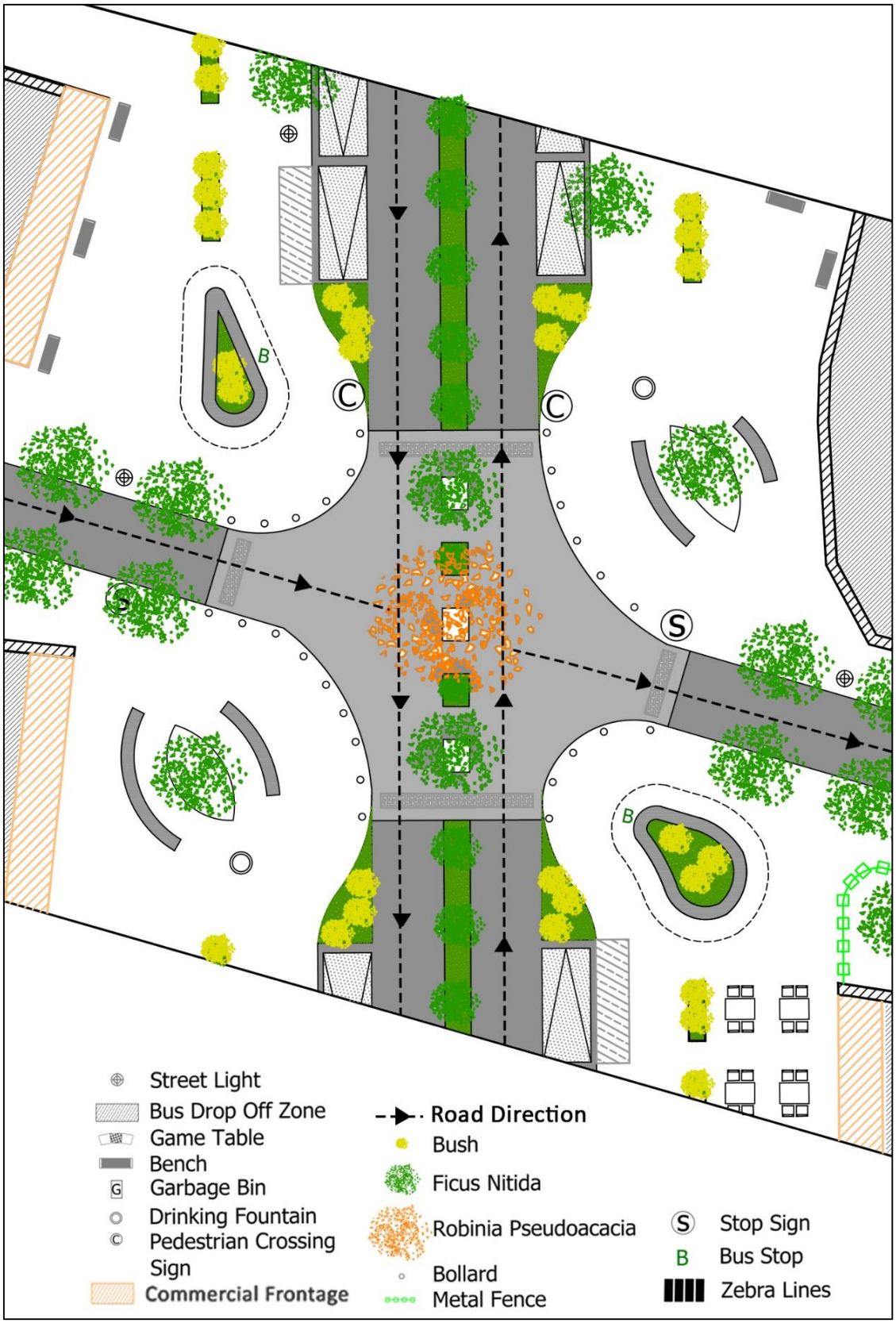


Figure 105: [“Bechara El Khoury” Intersection Design], Al Asmar 2018

7.3.4. "S. Ben Yehya - Hassan Kronfol" Street Design

The "S. Ben Yehya - Hassan Kronfol" horizontal connection articulates the typical proposed design for all the similar horizontal secondary streets in the neighborhood. Like all similar secondary streets one-way streets, it contains multiple physical features which are reducing its invitation quality. For instance, the current 1.4m sidewalk clearance is blocked multiple times by different barrier types such as trees, bollards, and cars. In addition, no pedestrian crossings exist along the streets. In addition, no pedestrian crossings exist along the streets. Moreover, multiple concrete fences surrounding residential units are present along the street and are blocking the landscape visual continuity while at the same time creating an unpleasant atmosphere. However, the streets harbor multiple socio-spatial practices, for people have set up tables and chairs on parking lanes, and a shop owner has set up a drinking fountain in front his shop for passersby (Figure 106).

As such, the detailed design proposal aims at improving the invitation quality through rectifying, modifying and deleting the existing physical features (Figure 107). First of all, the parking lanes were reduced along the "S. Ben Yehya", "Hassan Kronflol', and "Bechara El Khoury" streets which allowed me to increase the sidewalk widths to 3 meters, 3 meters, and 9 meters respectively. This increase in sidewalk width allowed me to install landscape buffer and urban furniture while maintaining a minimum of 1.8-meter clearance for pedestrians. In addition, the sidewalk bollards were replaced by a sidewalk curb design which blocks cars without taking up part of the sidewalk width (Figure 108). Similarly, pedestrian crossings (zebra crossings) and elevated crossings are designed on the edges of the streets in order to allow safe, easy, and short crossings for older adults. While at the same time reducing traffic speed. In

addition, bus stops for shuttle services are placed on main intersections, and concrete fences are replaced by metallic ones.

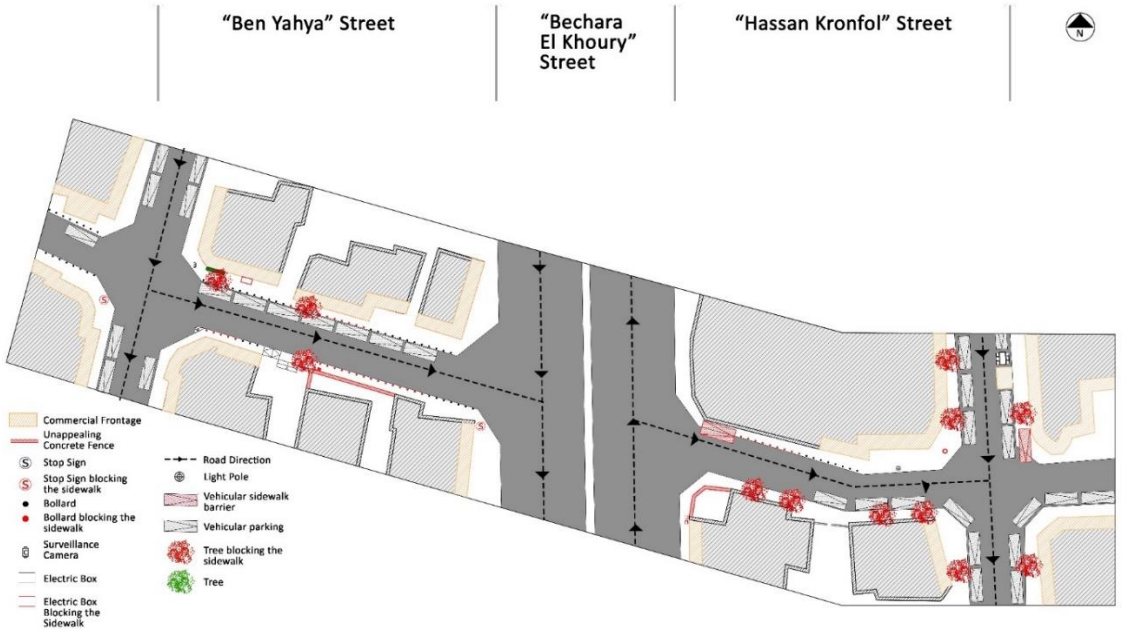


Figure 106: ["S. Ben Yehya- Hassan Kronfol" Current Condition], Al Asmar 2018 (See below for enlarged image)

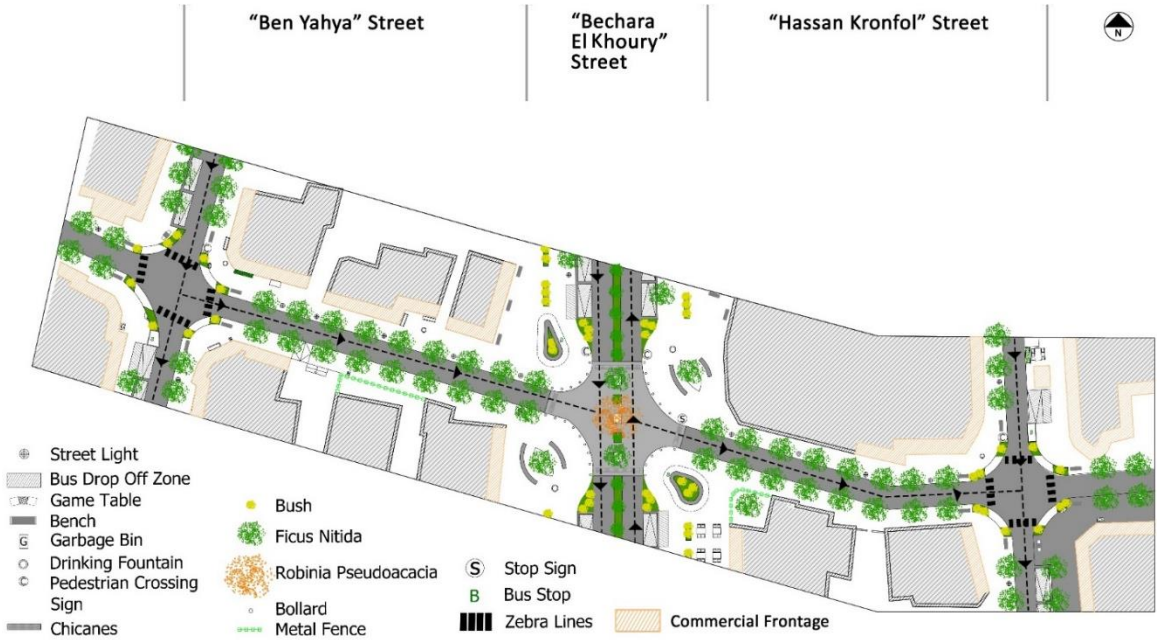


Figure 107: ["S. Ben Yehya- Hassan Kronfol" Proposed Design], Al Asmar 2018 (See below for enlarged image)

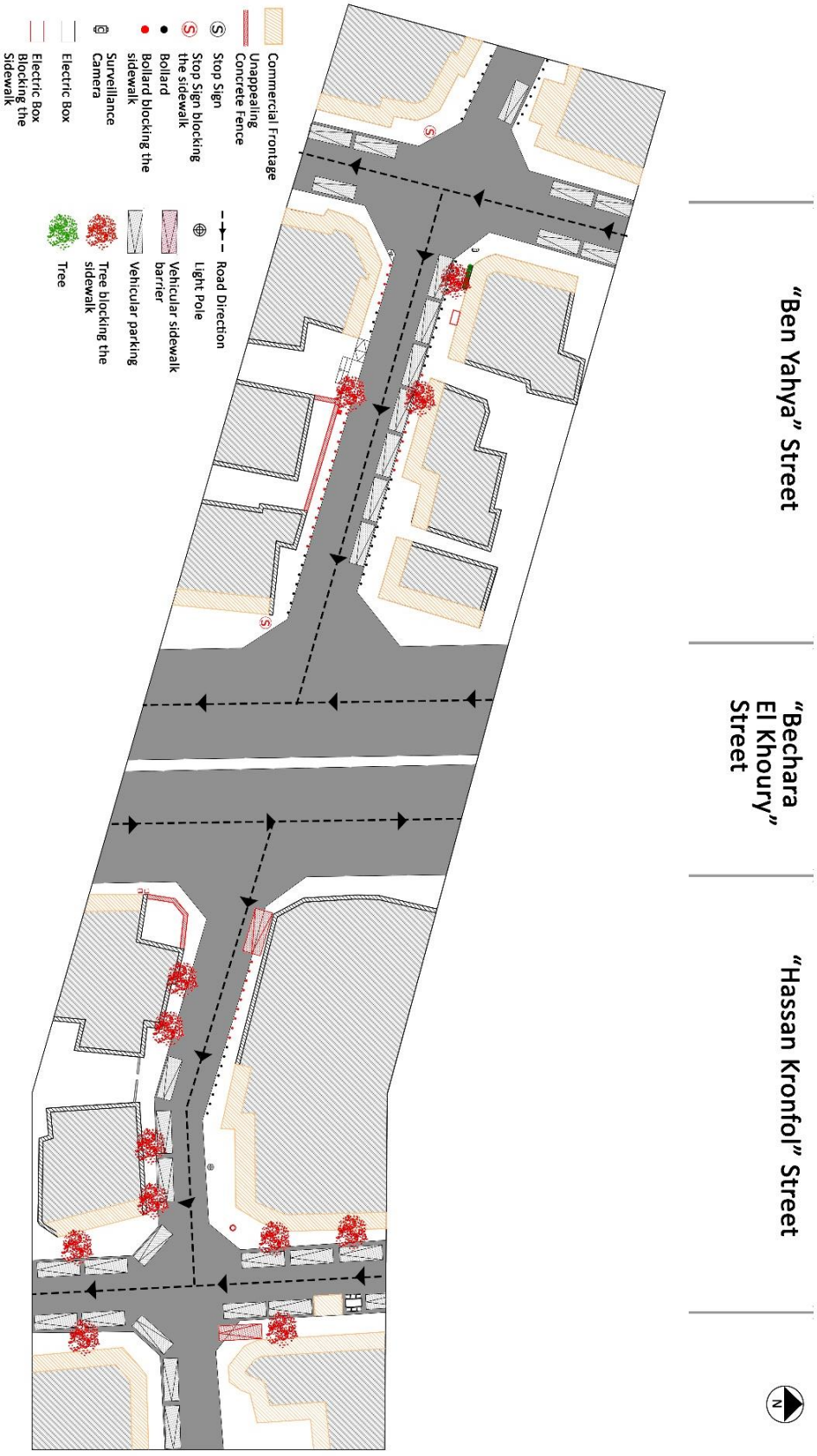


Figure 106: ["S. Ben Yehya- Hassan Kronfol" Current Condition], Al Asmar 2018

Figure 107: ["S. Ben Yehya- Hassan Kronfol" Proposed Design], Al Asmar 2018

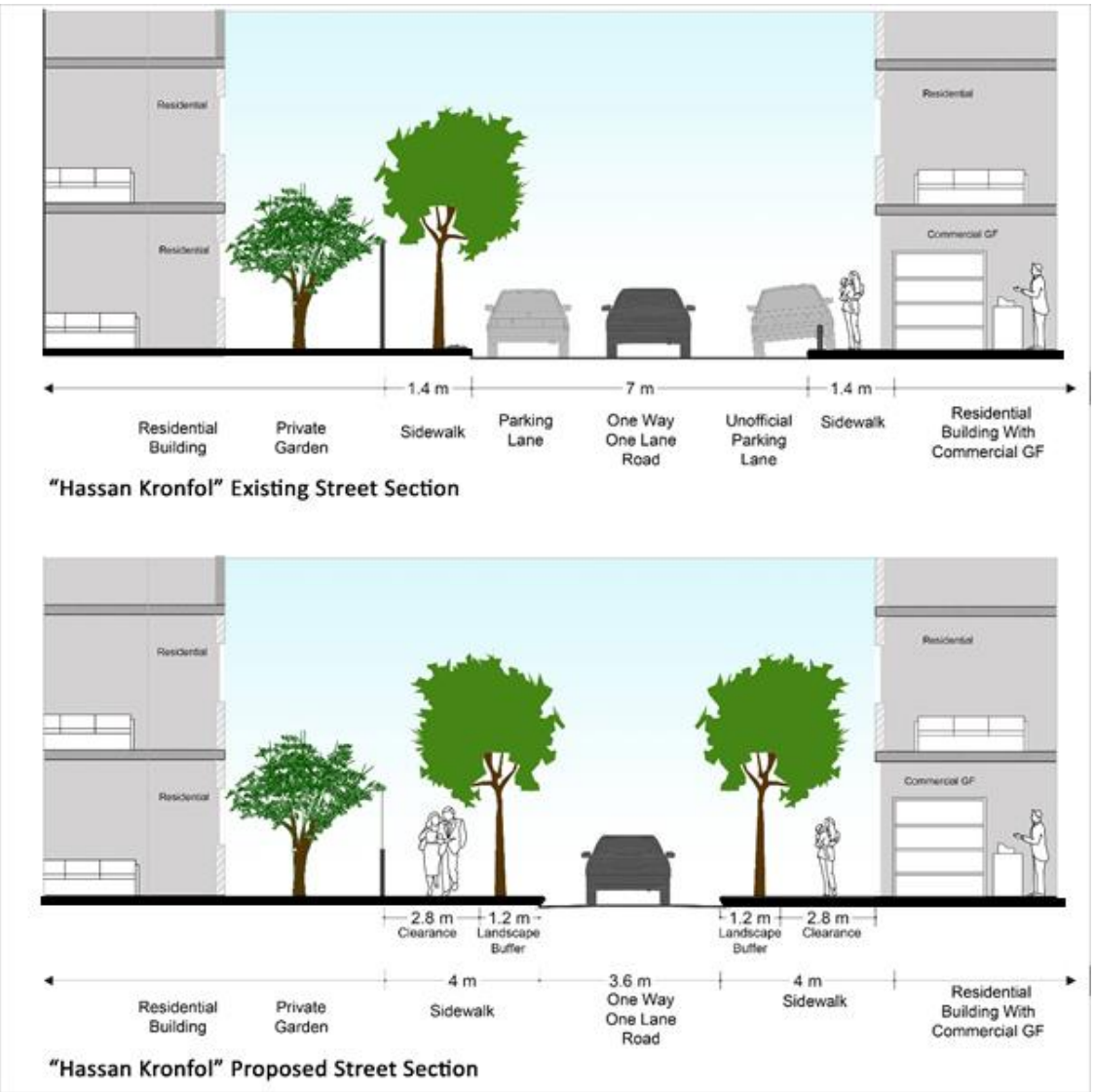


Figure 108: [“Hassan Kronfol” Street Sections - Current and Proposed], Al Asmar 2018

CHAPTER 8

CONCLUSION

This thesis has critically explored the emerging concept of aging-friendly communities in relation to cross-disciplinary research between gerontology, public health, and urban design. It has articulated design strategies that embrace the complexity and uniqueness of the “Ras El Nabaa” neighborhood in order to enable an aging-friendly community.

The outcomes of this thesis are a contextualized urban design solution to the existing body of knowledge as a new design strategy for aging-friendly communities and take as a case study, the “Ras El Nabaa” neighborhood in Beirut. As such, it investigates specific urban design elements’ influence on the invitation quality of the neighborhood and then modifies, removes, or adds these elements to the urban fabric through a contextualized design. Furthermore, it studies the role of certain urban design elements in enabling the development of a community.

Accordingly, the significance of this thesis is through the dual gaps it answers to. It first explores interdisciplinary pioneering research between various disciplines, resulting in an approach to public health through urban design elements. More so, it answers to a contextualized gap in policymaking through applying urban design aging-friendly elements to a case study, the “Ras El Nabaa” neighborhood, while dealing with an infrastructure break. However, this thesis leaves room to explore different dimensions to aging-friendly communities in “Ras El Nabaa” such as housing, community participation, and health services - the latter being currently studied at the

AUB Department of Public Health. In addition, it leaves further opportunities to replicate the methodology in different neighborhoods around Beirut as well as in other cities.

Lastly, this thesis concludes with inception to a potential strategy which entails collaboration between various stakeholders. As concluded from different case studies from Beirut and various cities, this strategy cannot be put into action without engaging the public sector, community agencies, and associations responsible for implementing urban design interventions at the scale of both cities and local neighborhoods.

The collaboration with the public sector-mainly the Beirut Municipality, the Directorate General of Urbanism, the CDR, and the Ministry of Public Work and Transportation - is of utmost importance to put this aging-friendly community design into effect. This is due to the fact that the interventions occurring are mainly on public space and have a city-scale transportation impact. In addition, the concept of aging-friendly communities holds interest with the WHO, which plans on creating a network for an aging-friendly world and as such has to be taken into consideration as a main stakeholder. Furthermore, non-governmental organizations working on palliative care elderly support, such as the center for studies on aging and universities such as AUB and its Neighborhood Initiative, are to be considered as main stakeholders and partners. Furthermore, local neighborhood organizations such as religious ones like Makassed, and existing mosques, and trader's family associations should be mobilized for the implementation.

The strategy mentioned above is only a foreshadowing to the implementation strategy which requires further development and research. In addition, it lacks further

stakeholder analysis necessary for the proposed vision itself as well as a financial feasibility study.

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