

Université de Montréal

The Mobility of Elderly Women of Puebla, Mexico:  
Effects of Walkability on Daily Trips in Three Neighbourhoods

by Karine Picard

École d'urbanisme et d'architecture du paysage, Faculté de l'aménagement

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## **Résumé**

Le vieillissement de la population pose plusieurs défis au Mexique, particulièrement chez les femmes. Le climat de violence envers les femmes et une absence d'espaces publics adaptés aux besoins des aînés rend les femmes âgées vulnérables quant à leur mobilité quotidienne. Dans la ville de Puebla, les femmes occupent une plus grande part de la population de 60 ans et plus, mais on n'en sait très peu sur leur mobilité quotidienne. Ce mémoire présente une étude de cas sur la mobilité quotidienne de femmes âgées dans trois quartiers de cette ville : Gabriel-Pastor, La Hacienda et El Refugio. Des entretiens semi-dirigés et un audit environnemental ont permis de dresser un portrait des habitudes de mobilité de ces femmes, ainsi que voir l'état de leur quartier. L'analyse des entretiens a révélé que pour ces femmes, la perception de leur environnement et de leur capacité de l'approprier affectait leur volonté de sortir de chez elles au quotidien. Cette perception, mise en relation avec la marchabilité des quartiers, explique l'importance d'un environnement attractif, où l'on se sent en sécurité.

### **Mots-clés :**

Mobilité quotidienne, Vieillissement, Aînés, Genre, Femmes, Marchabilité, Mexique

## **Summary**

As life expectancy increases in developing countries, many elderly people are faced with challenges concerning their mobility. In Mexico, where women see their mobility affected by gender violence in public spaces, elderly women find themselves vulnerable on two fronts: because of their age and their gender. In the city of Puebla, women make up a larger proportion of the elderly, but very little research has been done on their mobility habits. This Master's thesis presents a case study on the daily mobility of elderly women living in three different neighbourhoods in Puebla. The data was collected through semi-structured interviews with elderly women, as well as an environmental audit evaluating the walkability in these neighbourhoods. The interviews revealed that walking was not a preferred mode of travel, especially not in their own neighbourhoods. Their perception of the environment and their ability to appropriate it affected their capacity and willingness to leave their home. This combined with the walkability evaluation of the audit reveals the importance of having an environment that is perceived as welcoming, attractive and safe.

## **Keywords :**

Daily mobility, aging, elderly, gender, women, walkability, Mexico

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## List of Abbreviations

INEGI: Instituto nacional de Estadística y Geografía

IMSS : Instituto Mexicano del Seguro Social

ONU: Organización de las Naciones Unidas

RUTA: Red Urbana de Transporte Articulada

WATS: Walkability Assessment Tool for Seniors



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## Introduction

Age expectancy is growing at a rapid rate, as much in the developing world, as in the developed world. Rapid economic development, growth and substantial improvements in living conditions have significantly increased the lifespan of men and women in many developing countries. In Mexico, the average life expectancy for men and women has risen from 57 years in 1960 to 76 in 2015 (INEGI, 2015). Women, who tend to live longer in general, have especially have seen their life expectancy rise, up to 76 years of age, compared to 74 for men.

Daily mobility is an important component of overall well-being and quality of life, and is often affected by the aging process. It allows us to participate in society, be employed, socialize, and be active in our community. However, it is dependent on many variables, that are as much environmental (having an accessible neighbourhood), social (having family and friends), as they are personal (being in good health or having financial means). Mobility in old age is an important component of healthy aging and maintaining autonomy. In order to be an active member of society, the ability to leave the home and participate in their community is extremely important. It allows social connections to be maintained, and for an aging person to feel independent and in control of their life. Each individual is affected by the aging process differently. Personal factors, such as health issues, can change an individual's mobility, as making daily trips becomes more strenuous. The state of the environment can also pose a challenge, if it is not adapted to the abilities of the individual, especially when it comes to travel on foot. Walking is an important form of travel and exercise for the elderly, contributing to well-being and longevity. However, elements of the urban environment (such as damaged sidewalks and traffic) often make walking difficult for an aging pedestrian (Clarke et al. 2008, Borst et al, 2009). Ability and willingness to leave the home may

diminish, making social interactions less common, and the ability to perform ordinary tasks more difficult. This may result in feelings of isolation and helplessness.

Elderly women have a different relationship with their environment due to feelings of insecurity as women in public spaces, in addition to the challenges related to aging. This is even more true in the Latin American context where travelling through public spaces as a woman is often a risk in and of itself, due to high rates of gender violence and harassment. Much has been written on the effect of gender violence on the mobility of women (Dunckel-Graglia, 2013; Fenster, 2005; Hanson, 2010; Law, 1999; Sweet *et al.*, 2015; Uteng, 2012), but few studies have taken into consideration the additional vulnerability of old age. Faced with a much longer life expectancy, how do these women perceive their environment and how does this affect their mobility?

The main objective of this research is to relate the two conditions of old age and gender, to see how these two elements play incidence on the daily mobility of elderly women living in Puebla, Mexico. We interviewed elderly women and conducted environmental audits in three neighbourhoods: Gabriel-Pastor (a middle-class neighbourhood with participants living in a retirement home), La Hacienda (a suburban neighbourhood located in a river valley), and El Refugio (a lower-middle class neighbourhood near the historic city centre). This thesis aimed to understand the relationship between the environment and daily mobility. Faced with these, we wish to answer the following questions: how do these women travel on a daily basis? What barriers do they encounter that may inhibit their mobility, and what strategies do they employ to overcome these barriers? This research is divided into four chapters, with the first presenting the context, the problematic and the previous findings on the subject. The second describes the methodology used for the collection of data and the analysis of the results. The third chapter presents results and heir

analysis. The fourth chapter discusses the findings, relating them with the theoretical framework and previous studies, as well as noting the limitations of the study.

# Chapter 1: Daily mobility and the challenges of gender and age

## 1.1 Mobility and capabilities in old age

The capabilities framework was developed in the 1980s as an economic model which served to evaluate the effects of poverty and inequality on well-being. Developed by Amartya Sen in response to the limitations of the welfare approach to economics, “the capability approach to a person’s advantage is concerned with evaluating it in terms of his or her actual ability to achieve various valuable functionings as a part of living” (Sen, 1993, p. 30). This approach takes into consideration the conditions that determine an individual’s access to opportunities. As noted by Robeyns (2005, p. 94) “the core characteristic of the capability approach is its focus on what people are effectively able to do and to be, that is on their capabilities”. Applying this model to the evaluation of mobility (based on opportunities, barriers, and strategies employed to overcome these barriers) relates mobility to well-being. It is particularly useful for the evaluation of socioeconomic inequality, as mobility is an important signifier of access to opportunities, be they social connections or employment.

This is demonstrated by Nordebakke in her study on the mobility of elderly women in Oslo, Norway. In this case study, mobility capabilities depended on individual resources as well as spatial and temporal attributes (such as the time of day of activities). The most important capabilities she identifies are physical function (the state of the body endurance), knowledge (the ability to navigate and use public transportation, for example), and finally, access to and the ability to drive a car (Nordbakke, 2013). This is done by equating mobility as a set of potential opportunities, or *functionings*. Functionings are not equally distributed, and vary according to a person’s age, health, gender, education or income. They are also dependent on contextual realities,

such as social connections, spatial location, and the temporal context (Nordbakke, 2013). They differ in importance, as every functioning bears an unequal weight between individuals. A functioning that is very valuable and precious to one person may be entirely unimportant to another. Capabilities are made up of a combination of these functionings.

Kauffman developed a similar idea with the concept of ‘*motility*’, or potential mobility. He presents motility as a form of capital, on equal grounds with financial and social capital, echoing the role of capabilities in Sen’s model. He breaks down motility into three components offered to a person: accessibility, skills, and appropriation. Accessibility refers to the conditions in which an offer is available (for example in terms of affordability or proximity.) Each individual also has their own set of skills, which plays a part in their ability to take advantage of an offer. Finally, the combination of these two elements translates to whether or not an offer is appropriated or accepted. This appropriation is often a reflection of individual values and perceptions, but also echoes personal intentions, goals, and projects (Kaufmann & Jemelin, 2018). In this case the barriers inhibiting mobility are considered the lack or absence of a capability, while an individual’s options and strategies are capabilities.

## **1.2 Aging and mobility**

### 1.2.1: Importance of daily mobility in old age

The definition of mobility is the ability to move oneself within an environment, whether it be within the home (Webber *et al.*, 2010), neighbourhood (Gardner, 2014) or city (Lynott *et al.*, 2009). Maintaining a certain scope of mobility and access to resources in old age allows to preserve independence, autonomy, and social interactions, which are all beneficial for physical,

psychological and social health (Gardner, 2014). The relationship to the environment follows the aging process, often reflecting the physical and psychological changes experienced by an individual, which is studied from various disciplinary points of view in the study of environmental gerontology. Peel et al. (2005) note that “lifespace”, the physical space that is frequented by a person on a daily basis, tends to shrink as a person ages, spanning from the city to the bedroom. This constricting space and diminishing potential mobility have an influence on a person’s well-being, as it affects their self-confidence, autonomy and independence. The ability to participate in activities outside the home may diminish, affecting social relations and reducing the opportunities to socialize. Finally, maintained mobility in old age, particularly active mobility, has been shown to be beneficial to health and a contributor to longevity (Rosso *et al.*, 2011).

Mobility (and potential mobility) are important factors of well-being for aging adults, particularly with regards to their sense of autonomy. The ability to perform daily activities, such as going to the grocery store or the doctors’ office, gives an individual a sense of accomplishment and independence (Stalvey et al., 1999). Diminished mobility can often result in a sense of helplessness and the need to depend on others. In their study on the relationship between mobility and well-being for the elderly, Siren and Hakamies-Blomqvist note that this relationship between mobility and well-being is closely tied to identity. Through discussion groups with Finnish seniors from the University of the Third Age in Helsinki and a veterans’ association, they addressed the changes that occur with aging, such as increased sensitivity to the environment. The analysis revealed that there is a close association between mobility, and maintaining a lifestyle coherent with one’s identity (Siren & Hakamies-Blomqvist, 2009). The three elements that arose from this study were the importance of physical ability, the close relationship between mobility, lifestyle

and identity, and finally how adaptations in behavior were used to maintain “the sense of self and continuity, and manifesting one’s own identity” (Siren & Hakamies-Blomqvist, 2009, p. 7).

Maintained mobility in old age is also vital for socializing and being in contact with friends, family and other acquaintances. The ability to leave the home and participate in activities with other people, as well as visit friends and family is a great contributor to mental health in the elderly. Social relations help give life meaning, a sense of belonging and a purpose, as well as a reason to leave the house. Social isolation in old age has been shown to negatively affect well-being in old age, and inversely, maintained mobility has a positive effect. Movement in space provides the opportunity to see people, not only acquaintances, by participating in civic life and feeling included in community. Changes in health that accompany aging can reduce contact with friends, family and the community, “which may cause or aggravate isolation, loneliness, or depression” (Ziegler & Schwanen, 2011). Ziegler and Schwanen also identify social relationships as a substantial component of well-being, contributing to a person’s attitude to their mobility and willingness to be mobile.

Maintained mobility has a significant influence on physical health in old age. As previously mentioned, mobility, identity and social relations contribute to well-being, particularly psychological well-being. When it comes to physical health, the regular participation of activities outside the home requires certain physical capacities. With aging, if a physical capacity is lost, it becomes increasingly difficult to gain it back. For an elderly person to retain their autonomy, it is important to maintain mobility habits as much as possible. In the field of gerontology, the concept of lifespace is defined as the “area a person moved in a given time period (e.g. within a day), providing an estimate of the magnitude of the space in which a person habitually lived” (Stalvey et al., 1999). This space is elastic and will grow and shrink throughout the lifetime. In old age, it



will generally get smaller and smaller. As demonstrated in a study by Xue et al., diminished daily mobility and constricted ‘lifespace’ can result and accelerate frailty, ultimately ending in people being homebound (Xue *et al.*, 2007). Having a larger lifespace and sphere of activity helps maintain physical capacities, but is also a component of healthy aging. The scope of an individual’s lifespace changes according to elements that limit or enable their ability to move throughout the space.

### 1.2.2: Facilitators and barriers

Much like the *functionings* or potential opportunities of the capabilities framework, mobility is not distributed equally among individuals, but varies according to certain determinants. Many components of mobility have been studied in detail, but very few frameworks focus on the larger picture. Webber et al. critiqued the studies done as being “focused on specific components of mobility (e.g., life-spaces relevant to older adults and environmental factors that influence physical aspects of mobility) but have not defined mobility in a broad or inclusive way (e.g., incorporating movement on foot and in vehicle; recognizing biographical, psychosocial, cognitive, and financial influences)” (Webber et al., 2010, p. 444). Additionally, Webber et al. note that mobility is determined by a variety of abilities from five categories: cognitive, psychosocial, physical, environmental and financial. Cognitive abilities such as memory can affect a person’s ability to get from their home to the store because they need to remember how to get to their destination. These are similar to the concept of “skills” proposed by Flamm and Kauffmann, which are a combination of the knowledge and organizational ability needed to plan a trajectory (Flamm & Kaufmann, 2006). Psychosocial determinants refer to motivations and the mental skills needed to be mobile. For example, a depressed person has more difficulty leaving their home to visit

friends or practice leisure activities outside of the home. Physical determinants such as a disability or an injury can affect a person's capacity to move. Environmental barriers refer to of the built environment that pose a challenge to an elderly person, such as inadequate, maladapted, or damaged pedestrian infrastructure (Rantakokko *et al.*, 2012). As people age, the scope of their mobility can become restrained due to certain barriers that will be related to aging. These barriers are as much personal and individual (such as physical disabilities or limited income), as they are present in the environment that is frequented by all (like a limited offer of public transportation or a lack of safe places to walk).

Most of these determinants will have an influence on facilitators of mobility as well as on barriers that inhibit mobility (Webber *et al.*, 2010). For example, financial determinants such as income can facilitate access to transportation (personal vehicle or the ability to pay for a taxi). Psychosocial determinants such as the loss of friends or family can negatively affect motivation and confidence to be mobile. The severity of barriers is therefore closely tied to these determinants.

### *Personal Barriers*

Aging can develop or exacerbate individual realities which affect personal mobility. These realities will therefore create barriers or obstacles to a person's mobility. They are not only physical, but also financial, psychological, and social.

Lavery *et al.* (1996) identify personal physical barriers to be the loss of certain senses that are essential for travel or a weakening of the body. For example, loss of vision, hearing, limb mobility, or balance can severely limit an older person's ability and willingness to leave their home autonomously. These conditions may limit the opportunities to go out in public, in terms of the length of trips that can be taken, as well as the modes of transportation that can be used. The act

of walking for prolonged distances can be uncomfortable, if not impossible (Lavery *et al.*, 1996). For many individuals, aging often means diminished physical capacities such as strength, balance and agility, making what used to be easy a much more arduous task. Rosso *et al.* (Rosso, Auchinchloss & Michael, 2011) identified this as the “disablement pathway” whereby the aging process limits the body’s ability to heal or return to its full function after disease or injury, or causes impairments or dysfunctions. These disabilities make an aging adult more susceptible to challenges in their environment.

In addition to the mobility of the elderly being vulnerable due to their diminishing physical capacities, it may be further affected by their socioeconomic status. Poverty results in a lack of flexibility and options, limiting their range of mobility. If a person can only afford to take the bus, they can only go where the bus takes them, compared to someone who can pay for a taxi, or can afford their own vehicle. This in turn affects the number of destinations that they will frequent on a regular basis. Older adults who are often socioeconomically disadvantaged (such as women and minorities) are more likely to see their situation and well-being deteriorate, as they often depend on many more social services, these become less accessible if they are unable to navigate the urban environment (Clarke & Gallagher, 2013).

The experience of aging also produces several changes psychologically, particularly with regards to one’s own body and physical capabilities. Many elderly people see their mobility reduced due to a fear of falling outside the home (Clarke *et al.*, 2008), and also perceive outside environments as potentially dangerous, due to unknowns in the environment. Unexpected elements such as blocked sidewalks, insurmountable obstacles and dangerous traffic can cause uneasiness leading to a diminished sense of mastery of the environment. Confidence in one’s abilities to navigate outdoors diminishes greatly, affecting the number of trips taken and the overall

willingness to go outside the home. A study by Rantakokko et al. (2012) demonstrates that the perception of barriers to mobility in the outdoor environment can arise before the actual physical inability to navigate this environment. While aging affects mobility due to diminishing physical capacities, it also contributes to a person's perceived mobility on a psychological level (Rantakokko et al., 2012). Discomfort or inability to travel easily within the public sphere can result in lowered confidence in one's capacities, further lowering the interest in appropriating public spaces and travelling on a daily basis. This results in a gradual shrinking of the sphere and scope of daily activities, lowering an individual's capabilities. Being confined to the immediate environment, such as the neighbourhood, can lead to feelings of anxiety and depression, as shown by (Vallée *et al.*, 2011). In their study, they related the access to services and important neighbourhood features with the activity space of 3000 elderly residents in Paris, France. They found that those limited to their neighbourhood had a higher risk of depression compared to residents whose sphere of activity went beyond the limits of the neighbourhood

### *Environmental Barriers*

As mentioned earlier, the perception of these barriers often comes before the actual physical inability to surmount the barrier (Rantakokko et al., 2012). However, the fact remains that many elements of the outdoor environment are difficult for the elderly to navigate, which can negatively affect their capacity and willingness to make daily trips, or to leave the house altogether (Lavery et al., 1996). Clarke and Gallagher document the importance of physical health as one of the determinants of the mobility of the elderly. Their study addressed the outdoor mobility of the elderly in Detroit, Michigan, faced with a decaying urban environment. It also identifies the main obstacles that affect this population, including degradation or an unmaintained public area, uneven

and cracked sidewalks, too much automobile traffic, and an absence of adequate lighting (Clarke & Gallagher, 2013). Lockett et al. explored the walkability of seniors in several neighbourhoods in Ottawa, Canada, arguing that in order to encourage the elderly to walk (and reap the health and longevity benefits), they needed to have an enticing and safe place to do so. Through the use of photovoice and discussion groups, they identified that the presence of environmental hazards (such as holes, cracks, or obstacles blocking the sidewalk) can discourage walking as trajectories must be changed, and often lengthened, in order to avoid them (Lockett, Willis, & Edwards, 2005).

According to Rosso et al., transportation systems, land use patterns and urban design also affect mobility (Rosso et al., 2011). Transportation systems refer to roadway infrastructure, street systems, and generally “influence how easy it is to travel through a neighborhood and get to places a person wants to go” (Rosso et al., 2011, p. 2). Land use patterns reflect the distribution of residential, commercial and industrial activities on the territory. This affects the distances between destinations, particularly with regards to density and mixing of uses. Dense, mixed-use areas have shorter distances between destinations (such as between the home and the shopping area), compared to areas that are not mixed and require much more distance to be travelled in order to reach them. Finally, urban design addresses the elements of public space that make it appealing and comfortable for pedestrians, by adding things such as trees, benches, and aesthetic elements.

### 1.2.3. Aging and the automobile

As studied by Lynott and his colleagues, travel patterns and choice in preferred forms of transportation is often indicative of an individual’s relationship with their environment. Lynott et al. (2009) note that urban forms that are more walkable and offer access to public transportation can improve the mobility of seniors, increasing their travel options and opportunities. They are

more likely to leave the home and take frequent weekly trips, compared to those who must drive or be driven. However, as more and more people prefer aging in place, or aging in their own home, driving and maintaining mobility through the use of a vehicle is increasingly popular. This mode of transportation is flexible and convenient, particularly in environments that are difficult to navigate on foot or with insufficient public transit. For many it becomes a dependence, with very few perceivable or viable alternatives, especially for those living in suburban or rural areas. The growing popularity of the personal automobile as a form of transportation is also reflected in the aging population, where many developed a dependence on the automobile in pre-retirement life. This becomes problematic as more and more seniors are interested in aging in place, and want to maintain the use of their automobile (Lord *et al.*, 2011). The reluctance of seniors to abandon the car and adopt another form of transit is therefore understandable.

#### 1.2.4. Walking as a Mode of Transportation

Walking and living in a walkable environment, where scale, design, and features make an environment appealing to pedestrians, has proven beneficial for longevity and healthy aging. Seniors should walk, for their well-being, but can be easily discouraged by the poor quality of the environment. As they age, they are increasingly sensitive to obstacles. In their review of studies examining the relationship between neighbourhood environment and its effect on the health of seniors, Yen *et al.* found that elderly individuals with health problems were much more affected by the quality of their neighbourhood, compared to the less vulnerable (Yen *et al.*, 2009). Lockett *et al.* (2005) also note the importance of walking for seniors. They demonstrated that a person's choice to be active must be supported by an amenable environment. In their study on the different influence on street characteristics on the walking route choices of the elderly, Borst *et al.* (2009)

found a significant relationship between the state of the environment, and certain environmental realities and their influence on the walking route choices of the elderly.

The state of the outdoor environment plays a significant role in the mobility of the elderly, as it can determine how, when, and how frequently they walk. As previously noted, the features of the environment play an important role in how appealing an environment is to walking, whether it be to go for a leisurely walk or to run an errand. This relationship is particularly important for the elderly, for whom walking is not only significant for their health, but also a major factor in their ability to navigate the outdoor environment. The concept of ‘walkability’, or the amenability of the environment for a person travelling on foot has been defined and redefined in the last few decades. Forsyth (Forsyth, 2015) breaks down the concept into several themes, stating that a walkable environment is necessarily *traversable, compact, physically enticing, and safe*.

The first determinant of walkability is the distance between destinations within the environment. In order to be functionally walkable, the environment must be *traversable*, meaning the area must be easily accessible on foot, without any major obstacles or elements that could inhibit walking. This is particularly important for the elderly, as demonstrated in the study of walking habits of seniors by Borst et al. They found, for example, the flatness of the terrain will make one particular route more appealing, because of the distance travelled. If less effort is required, taking on the task of going for a walk or walking to a destination seems less daunting (Borst et al., 2009). This also considers the importance of the state of pedestrian infrastructure, such as the state of sidewalks, presence of stairs, ramps or obstacles that may pose a considerable challenge to an elderly person. Deterioration, cracks or holes in the sidewalk make the task of walking much more exerting for an elderly person. This was particularly significant by Lockett et

al., where participants in their study identified these as ‘falls hazards’, making walking difficult and risky, especially for those who used aids such as canes or walkers.

The second determinant identified by Forsyth (2009), is *compactness*, meaning that a walkable environment must be scaled to accommodate a person. A compact environment is one in which the distances between destinations and points of interest are short, and therefore easily navigable on mostly on foot. A compact environment, as understood by Forsyth, also implies that infrastructure is at human scale. For example, sidewalks are wider and traffic lanes narrower, signage is sized to be read by pedestrians, cyclists, as well as drivers. Borst’s results explain that this is far from being the one and only reality that will incite the elderly to walk. His results demonstrate that the elderly will frequently prefer longer, but more attractive routes (Borst et al., 2009).

The **attractiveness** of an environment on the pedestrian scale is one of the most important, yet most overlooked aspects when it comes the walkability of an environment. Forsyth notes the importance of having a “physically enticing” environment, which offering physical infrastructure especially for walking, such as sidewalks, lighting and benches. This component includes visually interesting aspects such as architecture, gardens, shop windows, pleasant views, and interesting landscapes. It is argued that these characteristics make people want to walk through it, making walking more about the experience and the journey than about arriving at a destination. Adkins et al. (2012) demonstrated that urban design plays a role in the attractiveness of an area, positively influencing its walkability appeal. This is particularly important for the elderly, as many will practice walking not only as a mode of transport but for well-being and exercise. When the environment itself is inviting to exercise, it becomes more about enjoyment and leisure than exercise, and also a generalized appropriation of public space.



Finally, the feeling and perception of **safety** is an important part of the walkability of an environment. This refers to both crime and traffic safety. The presence or perception of crime will obviously deter interest in walking along streets or through public spaces. Traffic safety is also a significant component of safety for pedestrians, particularly with the form and planning of traffic, but also where and how people drive. The speed of traffic and the amount of space dedicated to vehicles, as well as the presence of zebra crossings and other pedestrian-oriented infrastructure help contribute to the feeling of safety for pedestrians.

### **1.3 Gendered public spaces, fear, and mobility**

As seen in the previous section, a person's mobility is affected by a variety of conditions (both personal and environmental). Just as age influences one's relationship with the environment and the ability to navigate it, gender also plays a role. The term gender refers to "the associations, stereotypes and social patterns that a culture constructs on the basis of actual or perceived differences between men and women" (Fainstein & Servon, 2005, p. 3). These differences and power relations are very context specific, varying amongst cultures, and are closely linked to the social assignment given to each gender. For example, in cultures where women take care of the children and home, all tasks and travel related to the household are their responsibility. However, gender roles are not fixed, they often change from one generation to the next, reflecting social and cultural norms. Gender norms prevalent in one generation might not be in the next. These norms are performed in manners "which are historically, geographically, culturally and politically different but dynamic" (Uteng, 2012, p. 18).

In Western culture, the gender binary is prevalent to the point where objects, actions, and concepts will be coded along gendered norms. This also applies to the appropriation of public

spaces, where gendered socialization affects how a person perceives and appropriates their environment. For example, a park with a group of men playing a game amongst each other can be coded as a 'masculine' space. It can be perceived as hostile, especially if a woman is alone and vulnerable to harassment. The gendered discrepancies in mobility can be attributed to inequalities that women face, such as less representation in positions of power, reduced access to resources (financial or otherwise), and limited transportation options (Loukaitou-Sideris, 2014), but is also greatly affected by their limited access to public space.

### 1.3.1: Gendered access to public space

Public spaces are often unwelcoming or hostile environments for women for many reasons. The relationship that women have with public spaces is often indicative of the state of gender relations in their specific sociocultural context. In her paper on the the appropriation of public spaces by Bedouin women, Fenster (1999) compares the concepts of spaces as "forbidden and permitted" to the "private and public", particularly noting that this conceptualization occurs in many cultures but is rarely taken into consideration during the planning process. She argues that this culturally insensitive approach will often leave women, in this case of the Bedouin culture, with a very restrained perimeter of travel, in order to avoid conflicting spaces. Fenster further discusses this point in another of her texts, where she deconstructs Lefebvre's 'right to the city' notion. She argues that it is too simplistic and disregards "patriarchal power relations" that play a significant part in womens' access to public spaces and the city (Fenster, 2005, p. 219).

These led to the development of 'geography of fear', where women's tendency to perceive certain spaces as 'scary' and adjusting their behaviour according to this fear, is a spatial representation of gender dynamics. Valentine developed this branch of geography, starting with

the study of women's fear of violent crimes, originally studied in criminology. By spatializing this fear, Valentine argued that women would associate a certain fear to public places, resulting in a "spatial production of patriarchy" (Valentine, 1989). Rachel Pain (1997) explores this concept, and notes how this fear and the assignation of fear on certain public spaces restricts the free use of urban spaces by women on two levels: behavioural adaptations made on a daily basis, and more deep-seated psychological effects (Pain, 1997). In the study done by Pain, women noted that isolated, empty places in the city generally triggered a sense of fear and possibility of attack. This sense of fear has a debilitating effect on women's freedom and capacities to do as they please in the public sphere. This is due to a cultural assignation of certain spaces, particularly those of the public sphere, as spaces reserved for men, reiterating the public-private, mobile-immobile, male-female binary model mentioned by Cresswell (2006). The non-belonging of women in certain public areas renders them vulnerable to violence (Cresswell, 2006; Pain, 1997; Valentine, 1989).

Women have a greater fear of crime than men in general, but are even more wary because of the constant threat of sexual violence, which is present as much in public as in private spaces (Whitzman, 2007). This in turn affects women's ways of life, behavior, and mobility, as "women develop mental maps of places where they fear assault as a product of their past experience of space and secondary information" (Valentine, 1989, p. 386). Girls are socialized with a more limited use of public space and see their spatial range and activities controlled to a greater extent than their male peers, therefore instilling a gendered self-restraint habit when it comes to navigating and travelling in the public sphere. This habit persists throughout the life course of women.

This is further developed by Whitzman, following a literature review of gender, public spaces and a fear of crime. She argues that the feelings of fear and danger in public spaces are not isolated, but are in fact an extension of gender violence behind closed doors (Whitzman, 2007). This is particularly relevant in Latin America, where a gender violence and inequality is prevalent, and is often manifested in public spaces. Zúñiga Elizalde (2014) explores this in the context of Mexican cities, where women are increasingly looking to be independent and autonomous but must face the constant threat and fear of violence.

One of the main differences in experience between men and women in the public sphere is the wariness for violence and unsafe spaces. This plays an important role in understanding the motivations and justifications of certain travel decisions taken by women, and how they are often formed by manifestations of fear of certain spaces. As a consequence, women will adapt their behavior, and take certain precautionary measures. These measures, such as avoiding certain areas or changing their trajectory, limit their mobility but also maintain the absence of women in certain settings “reinforcing the sense of fear and risk for women who do find themselves in these settings” (Law, 1999, p. 570).

### 1.3.2. Gender Roles and Mobility Patterns

Mobility and gender have an interdependent relationship that has been studied in many ways, but rarely in a comprehensive manner. The focus was less on the gendered aspect of mobility and more on transport, using statistical information and large data sets to shed light on significant trends and the general differences between men and women’s daily travel. Several different schools of thought have contributed to this knowledge base, with several sub-disciplines of geography, urban planning and sociology contributing various epistemological approaches. A

growing interest in gendered experience led to studies of gender differences in urban contexts, including presence in the public sphere, transport, and mobility. Mobility, the public sphere, and employment are often coded as masculine, and associated with men, while immobility, the private sphere, and the home are coded as feminine (Law, 1999). This affects how women perceive themselves and their sense of belonging in public spaces. The safer they feel, the greater their numbers, and the more women there are in public spaces and in the street, the greater the feeling of safety.

The study of mobility and gender is well elaborated in Susan Hanson's text 'Gender, Place and Culture'. Here she makes the claim that mobility and gender are "bound together, to the point of almost being inseparable" (Hanson, 2010, p. 6), and questions 1) how *mobility* affects gender and 2) how *gender* affects mobility. Mobility affects gender as an empowering vector. The more mobile a woman is, the more opportunities are accessible to her, as it allows her to travel further, easier, or simply allows her to leave the family home. A presence alone in the public domain can act as an empowering factor. However, the inverse is also true, as gender can determine mobility, but in this case, usually in an inhibiting manner for women. In this case the "denial of mobility is used to keep women in a subordinate position and to sustain traditional gender roles" (Hanson, 2010, p. 10). These trends arise from studies done in large metropolitan areas, and don't necessarily take into consideration other significant social factors such as ethnicity and sociocultural context. In other words, social and cultural contexts will affect gender roles, and therefore affect travel motives and travel patterns. Hanson concludes that in order to understand how gender affects mobility, it is important to understand an individual as being "imbedded in household, neighborhood, region and larger society" (Hanson, 2010, p. 13).

Fenster (1999) reaffirms this in her article concerning the cultural construction of space as allowed or forbidden to women of a Bedouin society in southern Israel. Although the study was concerned with a very specific cultural context where women's access to public space is culturally limited, it gives an interesting analysis of the relationship between space, gender, and permission. It particularly conveys how a woman attempting to appropriate a space where she is not allowed or welcome, that has not been coded as a 'woman's space', can put her safety at risk. The severity and extent of this cultural construction of space and assignation of gender is dependent on the sociocultural context, but is prevalent in many societies and urban areas, where the public sphere can be a hostile place for a woman (Fenster, 1999). This consideration and coding of public space therefore affects women's mobility and behavior, limiting their access to the public space, but also limiting their opportunities outside of their travel range.

A woman's daily mobility is therefore closely tied to her perception and feeling of safety and belonging in her neighbourhood and city. Hanson identifies mobility as a form of power, which is unequally distributed between the genders, whereby women travel differently, such as making multi-stop trips, using public transportation, and engaging in non-work related travel. She particularly notes the shortcomings of the study of 'women and transport' as not taking into consideration other contextual factors such as individuals' place within their family and community and realities of the built environment. This is also addressed in Crane's study, which considered the implications of gender with regards to commute, noting that women seem to travel shorter distances than their spouses, but often practice trip-chaining. This includes running errands for the household or childminding, reflecting the domestic gender role assigned to women (Crane, 2007). Crane's study also demonstrated that commuting behaviour often varies by not only by gender, but also vary according to age, family structure and race.

Another critique of past studies of women and transport was made by Law (1999), she argues that reframing the subject as ‘gender and daily mobility’ takes into consideration certain social and cultural realities that come into play. Levy (2013) further criticises the work already done, particularly the repeated comparisons of travel-to-work patterns of men and women, because this does not take into consideration the numerous non-work trips, which compose a large part of womens’ trips (Levy, 2013). She addresses the importance of understanding the relationship between the place of women in the public sphere and their mobility, rising from the study of the geography of women’s fear. Leveille et al. also describe the relationship between the public versus private binary as not taken into consideration in transport planning, consequently negatively affecting the experience of women in transport. They identify a link between mobility, transport and a right to appropriation, a right which is often violated due to a gendered fear of violence in public spaces (Leveille *et al.*, 2000). This gendered fear of violence causes a restriction in the potential mobility of women, in comparison to men, causing an unequal access to opportunities, particularly employment opportunities.

### 1.3.3. Gender roles and mobility in an unsafe environment: The case of Puebla

Although most of the research on gender and mobility has been conducted in the developed world, many of the related issues also occur, often more severely, in developing countries (Uteng, 2012). Uteng notes that gendered travel behaviour in the developing world is often very similar to that of the developed world, but income and social class have greater influence. As a consequence, wealthier women are more mobile and have access to more opportunities and social connections. This rift exists because sexual assault and violence are very prevalent in public spaces and public transit. Even if a woman has never been a victim of this type of violence, the knowledge that these

events happen frequently reinforces the fear. This makes lower-income women more susceptible and sensitive to the risk of assault and sexual violence. Older women in particular tend to feel even more vulnerable, often having lived most of their life in fear of sexual violence in both private and public spaces, but also because of their smaller size and strength, and often their financial vulnerability (Barnett et al., 2007). For example, middle and upper-class women can afford private vehicles and taxis, have greater mobility and can travel greater distances, not only because these forms of transportation are more flexible, but also because they are safer. Modes of transportation other than a private car often pose a risk for women, as sexual harassment is common in public transit, such as buses, metros and trains. Sexual harassment and gendered violence on public transportation deters from potential opportunities located further away from home (Uteng, 2012, p. 15).

This is further demonstrated in Rozas and Arredondo's work; they note the lack of consideration of gender in the planning of public transportation projects in various Latin American cities, whereby gender, gender-related violence, and sexual harassment are not considered or addressed in the planning process (Rozas & Arredondo, 2015). Bearing in mind the combined vulnerabilities of age and gender, this study aims to look into the daily mobility of elderly women in Puebla, Mexico.

The city of Puebla, Mexico is the capital of the state of Puebla (see Map 1), and has a population of 1.6 million people, making it the fourth largest city in Mexico. Much like the rest of Mexico, the median age in the city of Puebla, is quite young, at 28 years old for women and 26 years old for men (INEGI, 2015). However, economic development and increasing quality of life in the past few decades has resulted in a rapid rise in life expectancy, going from 70.8 years in 1990 to 76.7 years in 2015 (WHO, 2015). As in many other countries, there is a slight feminization



of aging in the city of Puebla, with women over 60 years of age making up an increasingly important part of the population. Women over 60 made up 4.9% of the population of the city in 2010, but grew to make up 6.4% of the population in 2015 (INEGI, 2015). Considering their increasing demographic weight, it is important to consider how elderly women travel on a daily basis, so as to include their needs and desires into planning future interventions.

In Puebla, as is the reality in many Mexican cities, rates of violence against women are very high, with many women attacked, kidnapped, or killed on a daily basis (Dunckel-Graglia, 2013). This climate of fear and risk plays a considerable role when it comes to the mobility of women, as many of these incidences happen in public places (such as in the city streets), on public



Map 1: Geographical location of the state of Puebla  
Source: taxomita.com

transit, or in taxis. For most women, leaving their home to take a bus to work or school involves putting their life in danger. For example, according to a study done by ONU Mujeres, 7 on 10 women have been victim to some form of sexual assault on public transportation in Mexico City (ONU Mujeres, 2017). While Puebla is a smaller city, the rates of violence and absence of security on public transit are very high, with 72% of the population feeling generally unsafe in public transportation (Vega, 2018). As there have been few studies on safety, crime rates, and violence against women in public spaces in Puebla, most of the knowledge about risk is passed through word of mouth. This issue of security applies to women of all ages, but plays particular incident for elderly women, who have lived with a certain fear of navigating the city for most of their lives.

These women may also be wary of travelling as aging affects capacities needed to travel safely, such as physical weakening due to illness or injury. This study sheds light on the need for more research, to quantify the danger and risk, to intervene accordingly. Taking these concerns into consideration, we decided to explore these issues in the context of the city of Puebla. The next chapter will present the methodological aspects of our research.

## Chapter 2: Methodology

The goal of this research is to explore the relationship between gender, age and daily mobility, in the context of Puebla, Mexico. In order to do so, these three research questions were formulated:

*1) How do the elderly women of Puebla travel on a daily basis?*

In order to properly understand how gender and aging can affect mobility, it is important to know the mobility habits of elderly women in this city, particularly the variations between neighbourhoods, socioeconomic status and living situation.

*2) What obstacles or barriers to mobility do they encounter?*

This question refers to the various components that can inhibit elderly women's mobility, whether it be security issues related to gender or changes linked to aging. For example, the feelings and perceptions of safety and potential gender-related violence and how they deter or encourage certain mobility habits. Environmental mastery and confidence can be affected by the aging process, changing their mobility habits and the scope of their travel.

*3) What strategies do they adopt to overcome these barriers?*

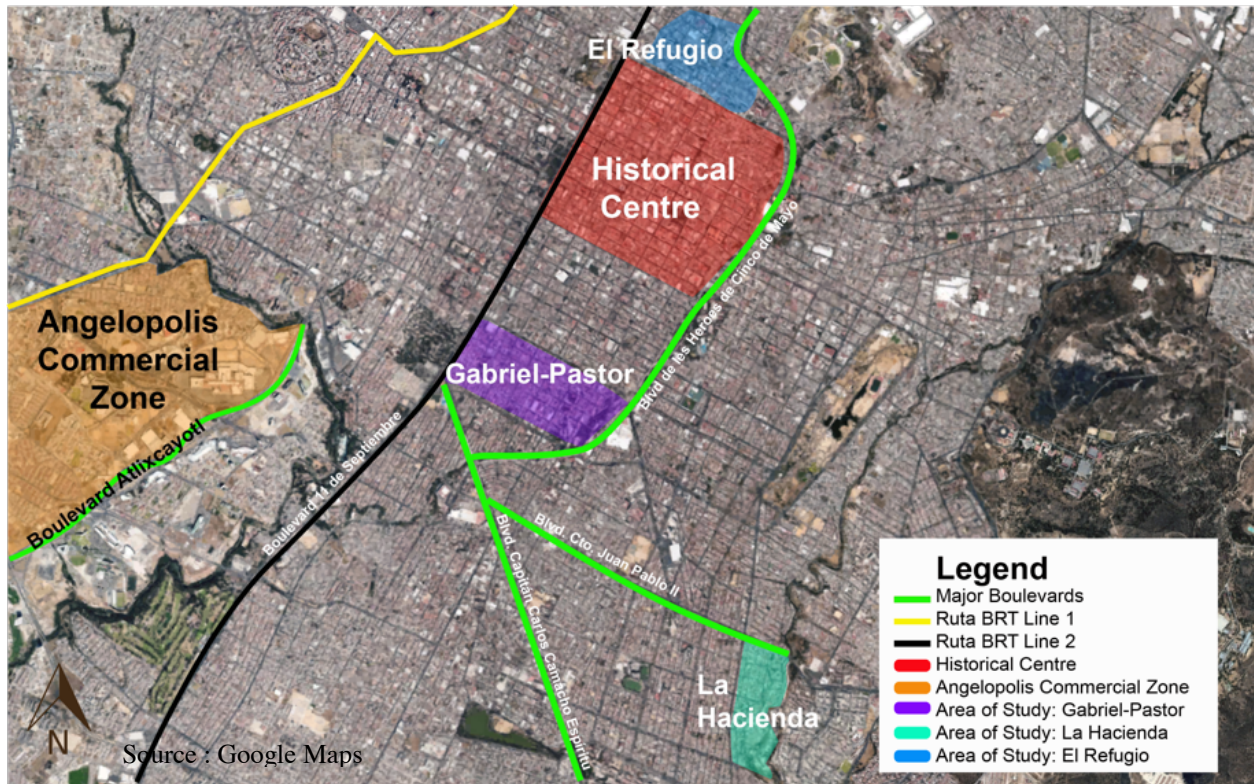
Faced with these barriers and obstacles, elderly women will develop and use certain strategies and habits in order to maintain their mobility and autonomy. For security-related obstacles, these may be strategies of carefulness and precautions, such as avoiding isolated areas or being accompanied. There is often overlap between these strategies, such as being accompanied. However, as a person ages, their relation to the environment changes, where certain attributes of the environment suddenly become more difficult and challenging.

In order to answer these questions, this study examined three neighbourhoods in Puebla in order to understand how their daily mobility, and see if different urban forms affect their mobility

as they age. This study uses qualitative data in the form of semi-structured interviews, to learn more about the mobility patterns of elderly women in Puebla. In addition, we conducted an environmental audit to analyze the walkability of streets along trajectories linking their homes and main destinations in their respective neighbourhood. The following sections present the methodology in greater detail.

## **2.1. Research Territory: Puebla and the chosen neighbourhoods**

Puebla consists of many different kinds of neighbourhoods (see figure 1), ranging from a colonial downtown core, residential neighbourhoods, and several commercial shopping districts (such as Angelópolis). In 2010, seniors (age 60 and above) represented 9% of the total population of 1.5 million. The colonial historic centre is built around the central square (or zocalo) and cathedral, with several smaller squares and parks. It is walkable, with services within walking distance. Residential neighbourhoods around the historical centre maintain the grid of the streets, while those further away are often affected by the topography, with a less rigid grid



Map 2: Main districts and neighbourhoods of Puebla  
 Source: Google Maps, Data Treatment: Karine Picard

The commercial shopping districts, such as the Zona Angelópolis, to the west, are located along major highways or boulevards, such as the Atlixcayotl Boulevard (see Figure 1), and are mostly accessible by car. The prevalence of the automobile is felt throughout many of the areas of the city, with large multi-lane boulevards and highways. Privately managed buses, camiones and combis that operates throughout the city, along with two



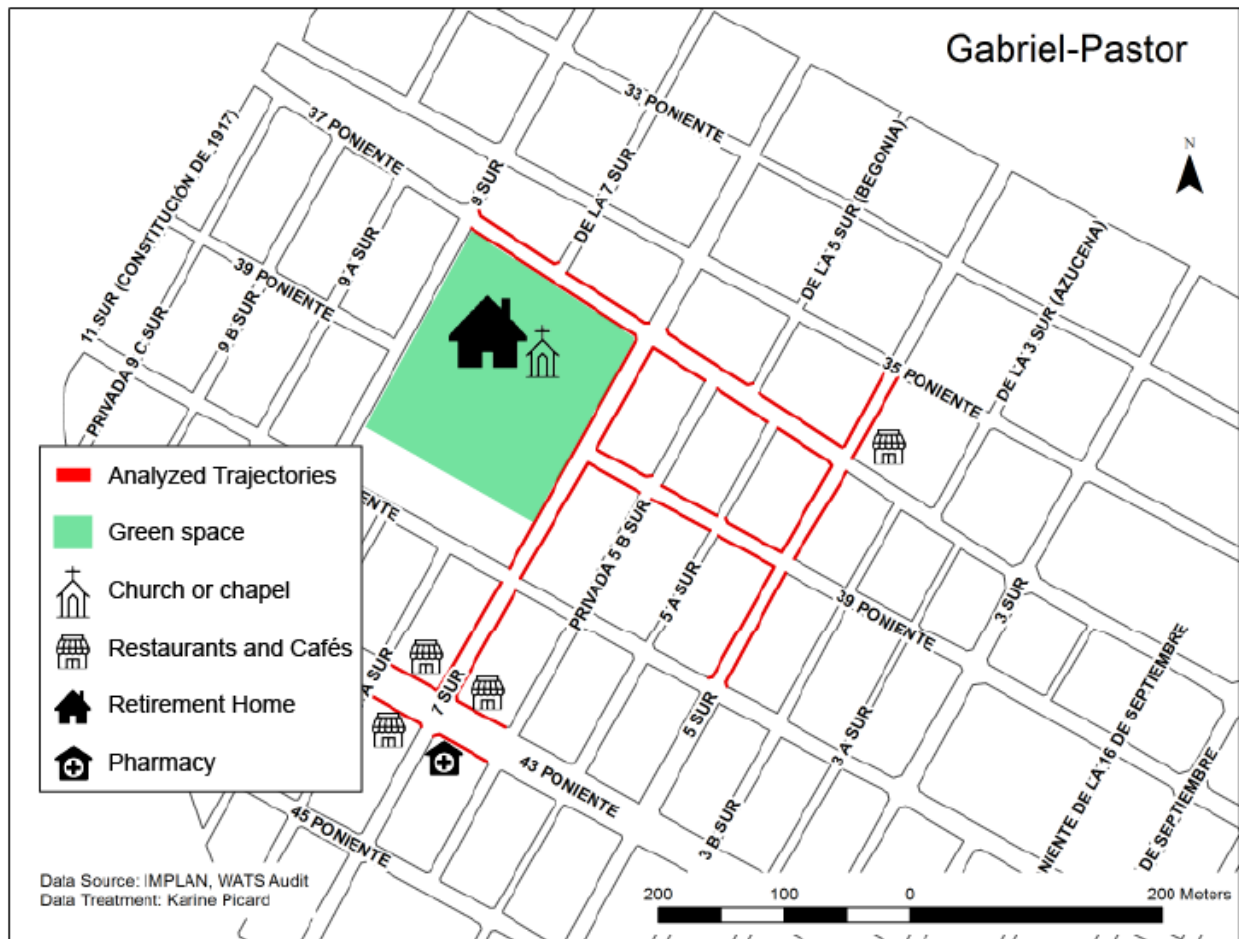
Figure 1: Atlixcayotl Boulevard



Figure 2: RUTA Rapid Bus Transit Station

lines of a bus rapid transit line called the RUTA, open since 2013 (see figure 2). However, aside from the RUTA with its security guards and cameras, bus lines are known to be unreliable and often dangerous, and deemed unsafe by the citizens of the city (Vega, 2018).

The neighbourhoods studied were built in different periods, have different urban forms, variations in topography, and are in varying states of degradation. This diversity is important as it represents the various urban forms in the city of Puebla, which result in variations in daily mobility. These variations can play a role in the perception of an urban environment for elderly women.



Map 3: Neighbourhood map of Gabriel-Pastor



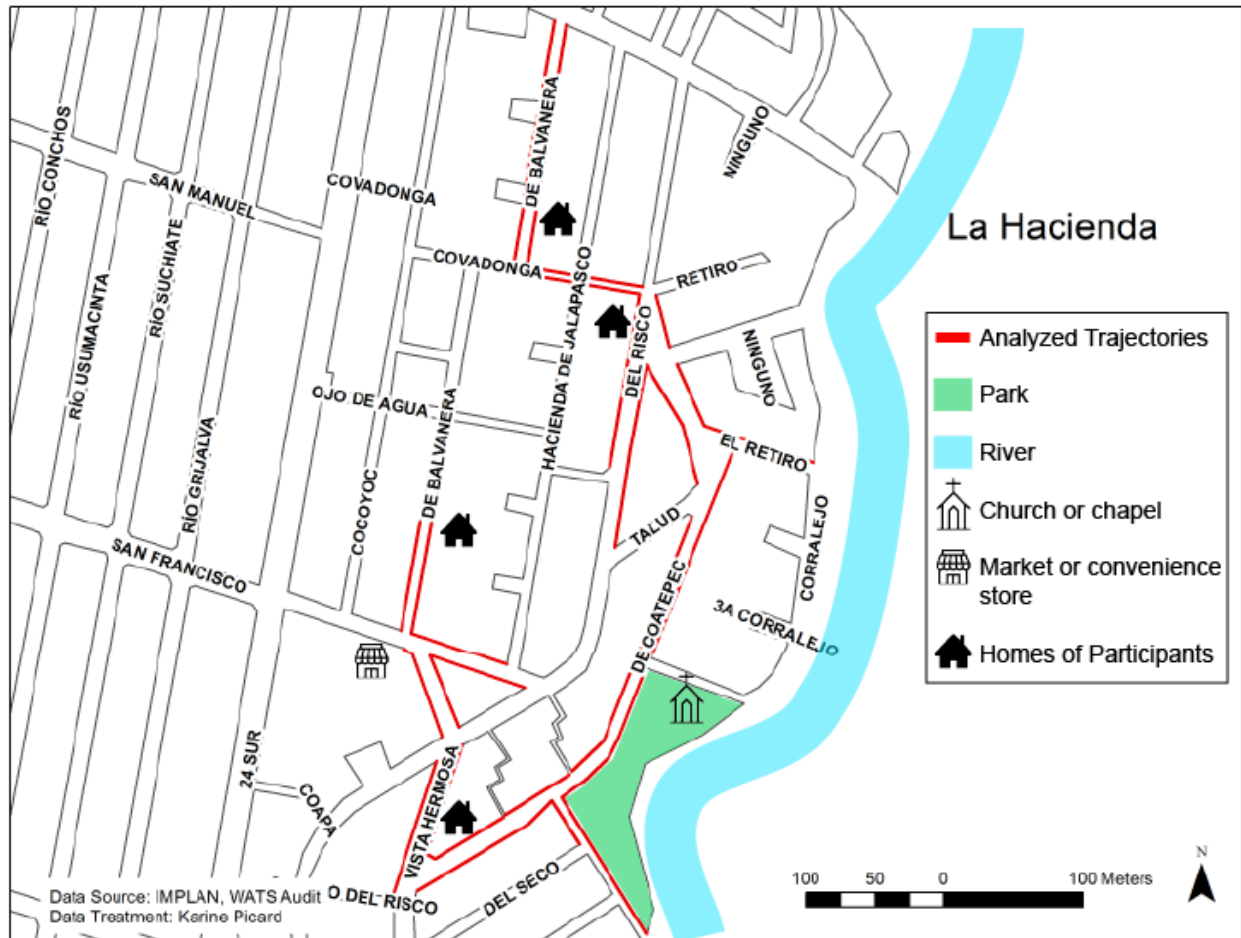
*Figure 4: A new apartment block being built next to an older house*  
*Source: Google Streetview*



*Figure 3: Fundación Gabriel-Pastor, a retirement home*

The neighbourhood of **Gabriel-Pastor** is located to the south of the historic centre of Puebla. The population of the neighbourhood is 5310 people, with 17% of this population are elderly residents (over 65 years of age). The streets are arranged in a grid with several commercial streets, such as the Avenida 43 Poniente and 16 de Noviembre, which have more traffic. The average block is 50 meters wide and 100 meters long. The other streets are mostly residential. The neighbourhood is mostly composed of large homes built in the 1970s and 1980s.

This neighbourhood is densifying as several of these older houses are being demolished in order to build multi-storey apartment and condo buildings (see Figure 3). There are many services and shops along the main streets, with several convenience stores and bakeries. These services are generally accessible on foot in terms of distance. The point of interest for this study in the neighbourhood is the Asilo Gabriel-Pastor, a retirement home with grounds that take up two city blocks (see figure 4).



Map 4: Neighbourhood Plan of La Hacienda

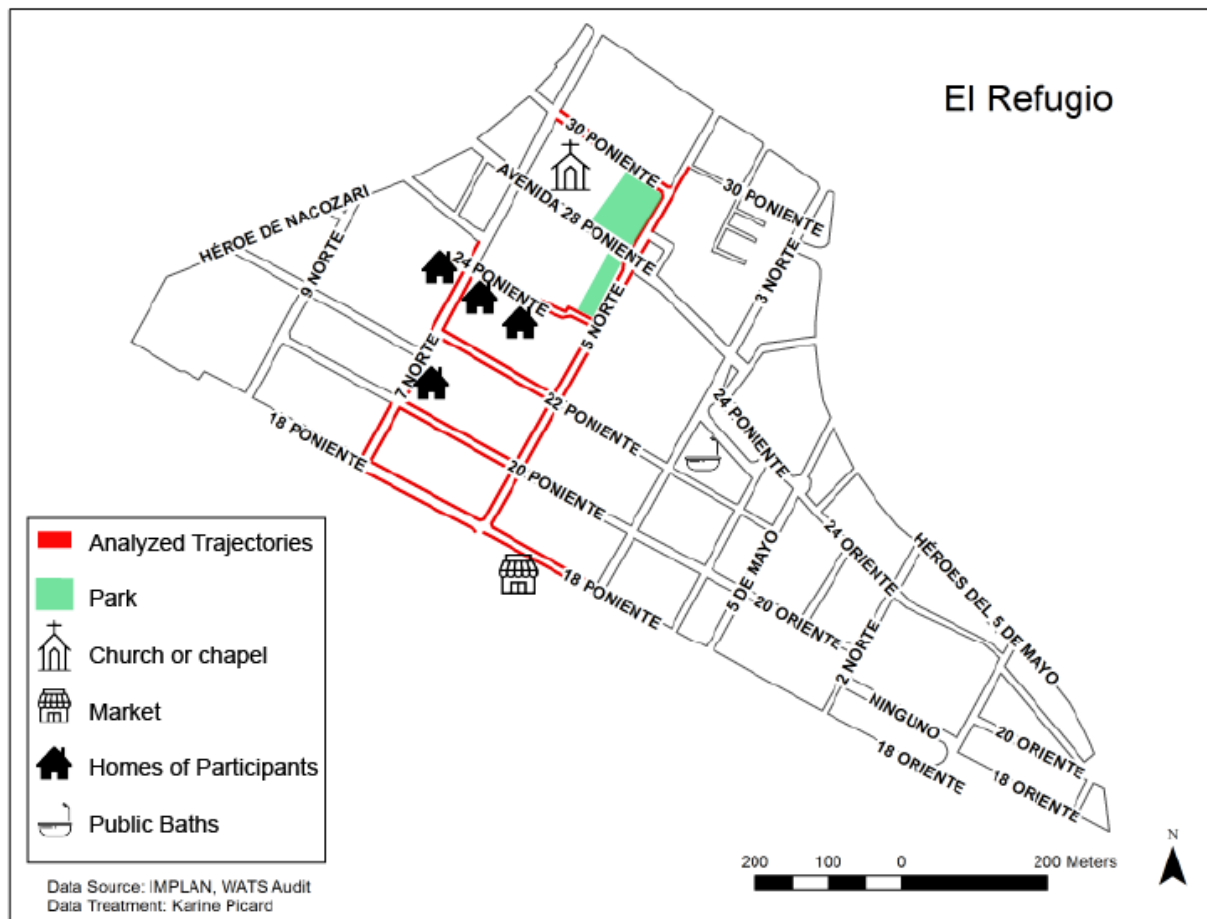
The second neighbourhood, **La Hacienda**, is located to the south-west of the city centre, close to the Benemérita Universidad Autónoma de Puebla (BUAP), the state’s main public university. The population of the neighbourhood is 19079 people. 18% of this population are elderly residents. It is mostly composed of middle-class homes built in the 1970s. It is located in the valley of the Atoyac River, a major river that passes through the city.



The presence of the river makes this neighbourhood particularly vulnerable to flooding, while the topography of the valley and the steep hills make the neighbourhood difficult to navigate on foot (see Figure 5). The buildings and homes in this neighbourhood are in good shape, with very few signs of neglect or vandalism.



*Figure 5: A steep hill in La Hacienda*



Map 5: Neighbourhood Plan of El Refugio

The neighbourhood of **El Refugio** is located a few blocks from the historic centre of Puebla. The population of the neighbourhood is 5816 people. 8% of this population are elderly residents (over 65 years of age). While the historic centre has gone through significant renovations and renewal projects in order to attract more tourism, El Refugio has not benefitted from this plan. The area is mostly composed of old houses, small shops (convenience stores) at street level and *vecindades* (see Figure 6). *Vecindades* are a type of housing where families will rent rooms that give to a central courtyard, often with shared kitchen or bathroom facilities.



*Figure 7: Example of a vecindad*  
*Source: flickr.com/fiveminder*



*Figure 6: Degradation and vandalism in El Refugio*

One of the essential services in this neighbourhood are the public baths, as not all households have access to running water. It is a poor neighbourhood with significant neglect and degradation (see Figure 7). The public market Cinco de Mayo is located in this neighbourhood, as well as several convenience stores and other services. The central point of the neighbourhood is the church and a small park.

## **2.2. Methods Used**

In order to answer the research questions mentioned at the beginning of this chapter, we chose two methods to gather data: semi-structured interviews and an environmental audit. The interviews allowed us get a thorough understanding of elderly women's daily mobility habits, their key destinations, their perception of their environment, and how their habits have evolved. Twelve participants were recruited for this study. Four women from each of the three neighbourhoods were interviewed. Starting from the key destinations identified in the interviews, we devised

hypothetical trajectories in their neighbourhood, starting from their homes to these destinations following the shortest route on foot according to Google Maps. These segments (around 30 per neighbourhood) were then evaluated with the use of the MAPPA-WATS environmental audit (Negron-Poblete et al., 2014), in order to rate the safety and attractiveness of these trajectories for an elderly pedestrian.

### 2.2.1 Semi-structured Interviews

The semi-structured interview was chosen in order to have a thorough understanding of the participants' daily mobility and their perceptions of their environment. The semi-structured interview is a qualitative research interview that takes the form of a conversation, rather than just an exchange of questions and answers (Lewis-Beck et al., 2004). While the interviewer does have a list of open-ended questions pertaining to the research topics, they have the freedom to ask other questions to deepen discussion or provide additional details. This flexibility ensures that the interviewer can ask for clarifications, or pursue a topic of conversation the interviewee feels comfortable discussing, enhancing trust between the interviewee and interviewer. This is particularly important when discussing sensitive topics like personal security. In addition, the conversation can allow for unexpected sub-themes to emerge, different from those in the initial questionnaire. Semi-structured interviews are well suited to studies about mobility, as mobility is integrated into many other facets of life (Goins et al., 2015).

We wrote an interview guide, exploring the different research questions and topics. This guide had a few open-ended questions, allowing for participants to speak freely about their lives, daily and weekly activities, social interactions, all of which play a part on their mobility. The interview was organized around three themes, based on the research questions. The interview guide

that was used can be found in Annex #3, in both English and Spanish. The first theme is an introduction, where the participant states how long they've lived in their neighbourhood, and what they like best about it. The second theme is daily mobility. Favourite and frequent destinations are addressed, as well as asking about social activities in the neighbourhood, as well as how much they appreciate taking walks or travelling on foot through their neighbourhood. The third theme addresses perceptions and feelings of safety. These questions address the potential vulnerability of an elderly woman in public spaces, and how they perceive their safety. The fourth and last theme addresses strategies and precautions taken when travelling on a daily basis, particularly with regard to changes in habits and strategies that have been adopted over time.

### *Recruitment of Participants*

The targeted population of this study is the elderly women of the three neighbourhoods of Gabriel-Pastor, La Hacienda and El Refugio. It was difficult to find elderly women who were willing to participate and speak openly about this topic. Recruitment was a challenge as safety issues make people very distrustful and wary of strangers, especially women. For this reason, it was necessary to have someone already working in the community in order to find women willing to take part in this study. We did a total of 12 in-depth interviews. The criteria for participation was that these women were over 60 years of age, the age at which they are entitled to old-age benefits from the federal government in Mexico.

These participants were recruited with the help of contacts from the Benemérita Universidad Autónoma de Puebla (BUAP) already working in each of the neighbourhoods. Snowball sampling allowed us to get in contact with four participants in each neighbourhood. These interviews were accepted by the Comité plurifacultaire d'éthique de la recherche of the

Université de Montréal. Every participant signed a document approved by the CPÉR, located in Annex #4. In Gabriel-Pastor, four women living in the retirement home of the Asilo Gabriel-Pastor were interviewed. These participants had moved here from other neighbourhoods in the city. They were aged between 80 and 94 years old. They were recruited with the help of the professor Lourdes Flores Lucero of the BUAP, and the director of the Asilo Gabriel-Pastor, who referred us to women who were active and left the home on a regular basis.

In the neighbourhood of El Refugio, the participants were recruited with the help of another professor from the BUAP, Adriana Hernandez, who works in the neighbourhood through the organization Re Genera Espacio, an urban renewal organization working in several low-income and severely degraded neighbourhoods. The four women were interviewed in their homes, apart from one, who was interviewed in a hair salon. They were aged between 60 and 74 years old.

The participants from the neighbourhood of La Hacienda were recruited with the help of Stephanie Salgado, a doctoral student at the BUAP, who had previously conducted research in the neighbourhood and is active in a participatory neighbourhood organization. They were aged between 65 and 72 years old.

These interviews were transcribed and coded using MAXQDA12, a qualitative analysis software. Five main parent codes were defined, tied to the research questions. The first parent code is 'Positive environmental attributes.' This parent code refers to the various attributes of the environment that the participants identify as something positive and appreciated. These attributes make their neighbourhoods and public spaces more appealing and interesting, as well as easier to navigate. Several studies have been done with the elderly to know which elements of their urban environment they appreciate most (Adkins et al., 2012; Lockett et al., 2005).

The parent code ‘Negative environmental attributes’ refers to elements of public spaces and their neighbourhoods that the participants identify and perceive as negative, or a deterrent to their mobility. There are several components to the environment, as identified by (Rosso et al., 2011) that have an effect on the mobility of the elderly.

‘Travel habits’ is a parent code referring to all mentions of daily travel by the participant. It is used to identify various components of the participants’ daily mobility, in order to grasp a better sense of how, why and where they travel on a daily basis. This is a component of the “life-space” framework proposed by (Webber et al., 2010) to study the mobility of the elderly.

“Barriers” is a parent code that refers to the various barriers and obstacles that can affect the mobility of the elderly identified by the participants. These can be personal, social, or environmental. These barriers are also described as “limitations” in the literature, being elements of reality that inhibit mobility on several fronts (Rosso et al., 2011).

In order to overcome these barriers, the participants also identified “strategies.” This parent code refers to the options and habits adopted by the elderly specifically to overcome the barriers that affect their mobility. These options include changing behaviour, habits or adopting new tools available to them (Nordbakke, 2013).

### 2.2.2. Environmental Audit using the Walkability Assessment Tool for Seniors (WATS)

The Walkability Assessment Tool for Seniors was developed by Negron-Poblete & Lord (2014). Its goal is to analyze the walkability and amenability of the urban environment for the specific needs of the elderly.

As the WATS was initially developed for application in the Montreal region, it needed to be adapted to the Mexican context. This consisted of adding elements that were common in the city of Puebla that were not already in the questionnaire. These details of the audit are expanded in Annex #1. Some examples are the presence of large holes in the sidewalks, numerous street vendors, car ramps and exits (which cause the sidewalk to be uneven), and façades of buildings (which usually consisted of large doors or gates, without windows and not allowing to see the front door of houses).

This audit tool was used to evaluate the safety, comfort, and overall walkability for the elderly of different street segments in the three neighbourhoods. It takes into consideration the safety and overall attractiveness of street segments, which are combined to determine its overall walkability and appeal to the elderly. It also includes the following elements of the urban environment: characteristics of the street and its intersections, buffer zones (the area between the roadway and the sidewalk), sidewalks, land use, public spaces, and the overall maintenance of the area. The audit was conducted one street segment at a time, using a tablet to fill out a questionnaire and take photos. The street segments consist of the elements between each intersection, on either side of the street (see Figure 8). The results of this questionnaire were tabulated and the data was



arranged with the geospatial data of the neighbourhoods (according to street segments), using ArcGIS Desktop 10.5.1.

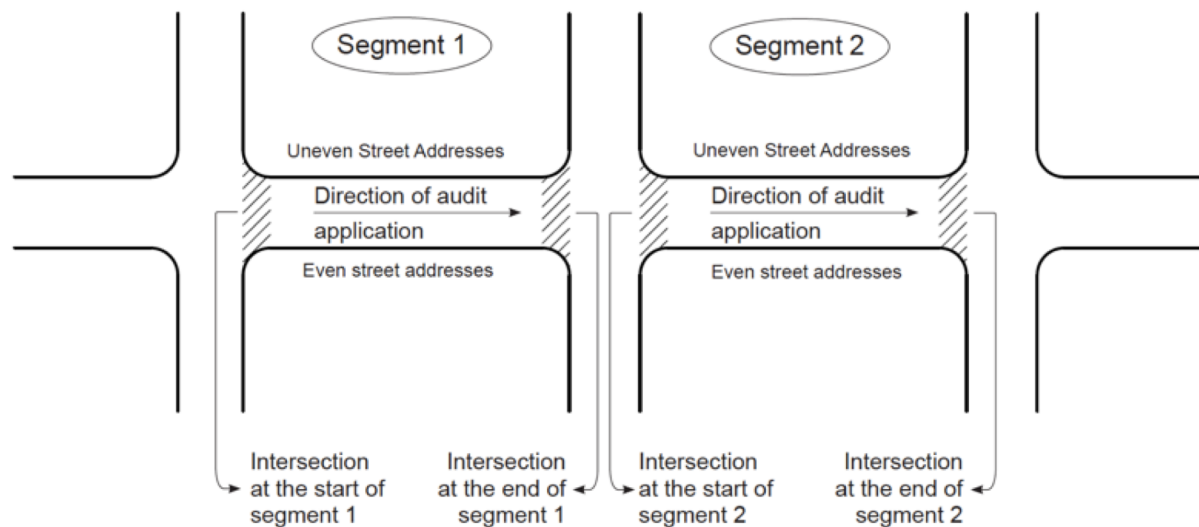


Figure 8: Evaluation of street segments using WATS audit  
Source: WATS Walkability Audit (2014)

The answers of the questionnaire were assigned a positive or negative notation with regard to the two variables of safety and attractiveness. *Safety* refers to elements of the urban environment that affect the physical and mental well-being of an aging pedestrian, either insuring their well-being or posing a risk. *Attractiveness* refers to the elements of the urban environment that contribute to its appeal for walking. It is as much aesthetic (architecture, maintenance, cleanliness) as to do with comfort (presence of benches, shade, greenery). The components of the questionnaire and their relative variables are included in Annex #2.

If an answer contributes positively to the safety or attractiveness of a segment, positive points are given, such as a sidewalk free of obstacles (considered to be “ideal.”) An answer that does not improve or worsen the safety or attractiveness of the segment is awarded zero points. An example of this is a sidewalk being repaired. While the construction may be a hindrance to the walkability of the segment, it is temporary and will ultimately be an improvement. An answer that

negatively impacts the safety or attractiveness of the segment is given negative points, such as the presence of industrial buildings, auto repair shops or cars parked on the sidewalk. The sum of these points gives each street segment a grade for its safety and its attractiveness. The following tables demonstrate the grade distribution for safety and attractiveness. Following the tally of points, this score represents the level reached, ranging from **Very Good** (50-60 points) to **Poor** (15 points or fewer) for the safety score. The Attractiveness score will range from **Very Good** (between 35 and 45 points) to **Poor** (5 points or fewer).

	Safety	Attractiveness
Very Good	60	
	55	
	50	
Good	45	45
	40	40
	35	35
Moderate	30	30
	25	25
	20	20
Poor	15	15
	10	10
	5	5
	0	0
	-5	-5
	-10	-10
	-15	

Table 1: Safety and Attractiveness Grade according to Score

Once each segment has been assigned a grade for attractiveness and safety, the combination of these two will dictate the segment’s overall walkability score, using the following matrix:

<i>Walkability</i>	<b>Safety</b>			
<b>Attractiveness</b>	Very Good	Good	Moderate	Poor
Very Good	Ideal	Appealing	Fairly attractive	Unappealing
Good	Appealing	Appealing	Fairly attractive	Unappealing
Moderate	Fairly safe	Fairly safe	Tolerable	Bad
Poor	Unappealing	Unappealing	Bad	Poor

*Table 2: Walkability Score Matrix*

For example, if a segment has a safety grade of “Good,” but an attractiveness score of “Poor,” the segment is therefore deemed as “Unappealing.” Every segment is then assigned an overall walkability score. These scores were then joined to each street segment using the software ArcGIS to represent the scores spatially. A total of 85 street segments were audited: 30 from Gabriel-Pastor, 25 from La Hacienda, and 29 in El Refugio. This data was collected during the months of May to July 2017.

## Chapter 3: Results and Analysis

The results and analysis of the interviews and walkability audits offer a detailed insight on the mobility habits and neighbourhood environments of elderly women living in the neighbourhoods of Gabriel-Pastor, La Hacienda and El Refugio, in Puebla, Mexico. The results and analysis of the walkability audits draw a picture of the urban environment these women must interact with on a regular basis. It reveals the presence and frequency of barriers in their neighbourhood.

### **3.1 Daily mobility: Learned habits and evolving challenges**

The first section will present the results and analysis of the interviews. It will address the daily mobility of the participants, the barriers and strategies they encountered (particularly on foot), how they perceived their neighbourhood and as well as their ideal environment. The coding of the interviews shed light on these women's perception of their mobility and environment and how they travelled regularly. While they lived in different types of housing and access to different forms of transportation, similarities arose in their relationship with the environment. Three main commonalities emerged: they kept their daily travels to a minimum (especially on foot), they didn't view their neighbourhood as a welcoming place for walking, and they simply did not feel safe walking in their respective neighbourhood.

#### 3.1.1. Different Environments, Different Routines

The participants within neighbourhoods often had similar mobility patterns and scopes of travel, but significant distinctions arose *between* the neighbourhoods. These variations reflect not

only the differences in urban form between the neighbourhoods, but also the differences in lifestyle (especially with regard to age, level of activity and socioeconomic standing).

In the neighbourhood of Gabriel-Pastor, the women were older (85 to 95 years old) and lived in a retirement home. Most trips were done by taxi, in the company of a family member or aide. Very few would go for walks in the immediate neighbourhood outside the home, as the estate itself had extensive gardens. The participants from El Refugio were more active on foot with the dense nature of the neighbourhood making daily destinations, such as the public market, easily accessible. The participants from La Hacienda were very active in their community and city, with busy schedules. However, the majority (if not all) of their trips were by private car. Most drove their own vehicle, or were driven by their spouse. They stated that the use of the car was a necessity not only for convenience, but also for their own safety.

Private cars are seen as the safest option as they are a controlled environment. There is less risk of violence, harassment or theft. It is also the most comfortable and convenient, allowing transit from door to door: *“I use the car for the speed. In reality, I used to walk. More than anything now, because it’s faster.”*<sup>1</sup> (LH3). The use of the car also reduces perceived risk of injury, as the individual does not risk their safety by interacting with the environment. However, this particular mode of transportation is not available to all. All the participants from Gabriel-Pastor mentioned using taxis to visit friends and family, or for religious outings. They have the same convenience as private cars, but come at a higher cost. For one woman, the cost of taxis was an obstacle, and she could only use when someone else would pay.

Five participants (from the neighbourhoods of El Refugio and Gabriel-Pastor) used public transit, either the small *combis* or the RUTA bus rapid transit system. However, they found it

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<sup>1</sup> “Por rapidez en coche, pero en realidad, yo caminaba. Mas que nada a esa hora, por la rapidez.”

uncomfortable because of the high speeds, making it difficult to stand: *“It’s terrible because it’s like this [snaps fingers]. Quick quick quick. A young woman would show me a seat. It’s like this.”*<sup>2</sup> (GP3). In addition, public transit is not considered safe, as many robberies and assaults happen in *combis* or buses. While public transit is sometimes available to reach destinations, for safety reasons it isn’t an option: *“When I studied computing, at the Seguro, I went with my computer in a bag, I went by bus, not by car because of the parking. I went by bus and when I got there, my classmates told me NOT to take a bus. I’m lucky that nothing happened.”*<sup>3</sup> (LH2)

### 3.1.2 Walking: an activity or an obligation?

Eight of the twelve participants mentioned walking for both trips to specific activities and leisure, including all four women from the neighbourhood of El Refugio. For all of the participants from El Refugio, walking was the main form of travel. However, it depended on the number of activities located in this neighbourhood. Several preferred walking in other parts of the city (such as the Centro) rather than in El Refugio, especially for leisure activities. They generally walked because they had very few alternatives, but also because their daily destinations were accessible on foot. Walking in the neighbourhood was mainly for utilitarian reasons, and not a leisurely activity. In La Hacienda, walking in the neighbourhood was not considered as safe or interesting, as mentioned by all four of the participants. Rumours of violence and robberies, and feelings of isolation discouraged walking. One woman stated that the neighbourhood was *“very abandoned [by the authorities], in poor shape, [...] especially with broken sidewalks and steps.”*<sup>4</sup> (LH4)

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<sup>2</sup> “El metrobus, es, este, terrible porque, es asi asi. De veloz de veloz, de veloz. Subia y cualquiera de las muchachas muy rapido y me decian aca un asiento. Y es asi. Si.”

<sup>3</sup> “Si, yo, este, estaba estudiando computacion, aqui en el Seguro, me iba yo con mi computadora en una bolsa, y me iba en camion, no iba en coche por la estacionada. Yo iba en camion y mis companeros de clase me dijeron NO venirme en camion. Tengo suerte que nunca me he pasado nada.”

<sup>4</sup> “muy abandonada [by the authorities], porque lo que decía ahorita de las banquetas.”

### 3.1.3 Reasons for Travel: Family, Friends and Religious Activities

The daily trips undertaken by these women were motivated by the need to reach important destinations. It may be to participate in religious activities, run errands for the home, participate in leisurely or recreative activities, health services, as well as social activities. These activities and destinations structure a person's mobility, and are closely tied to their values and identity.

Almost all of the participants cited that they left the house for religious activities, be it going to the chapel for Mass, bible study or to perform religious acts in their community. Religion played an important part of the daily life of the participants from La Hacienda, as these women participated in Bible study at their neighbourhood chapel. It was through this network that they were recruited for the study. They also had the role of ministers, performing sacraments for homebound and sick people in their neighbourhood, as well as neighbouring communities. This role kept them very busy and composed the majority of their daily trips. In El Refugio, religious activities were part of their weekly routine, but was considered less important. In Gabriel-Pastor, the women did not need to leave home if they wanted to go to Mass, as there was a chapel within the retirement home, but several appreciated visiting different churches in the city with friends and family. For several of the women, some of their trips were related to household tasks, such as going to the market or the supermarket, but these errands were often integrated into their other outings, such as seeing friends, taking classes or participating in religious activities.

Half the participants mentioned travelling for leisure activities, such as physical activity or going to the theatre or the cinema. Several women would frequent the parks in La Hacienda and El Refugio to accompany grandchildren or to use the exercise equipment. For reasons of safety, several mentioned preferring parks outside the neighbourhood, such as the Parque Ecologico<sup>5</sup>, as

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<sup>5</sup> The *Parque Ecologico* is a large municipal park located near the historical centre of Puebla. Within this 58-acre park, there are bike paths, pedestrian trails, athletic fields, a botanical garden, an aviary, and a small lake.

it is a more controlled environment, with different paths for bicycles and pedestrians, as well as a security presence. However, while neighbourhood parks could be accessed on foot, the Parque Ecologico was reached by car. For this reason, visits to the Parque Ecologico were less frequent. An important destination for several cultural activities was the city historical centre, where a cinema and theatre are located, as well as several museums.

Essential services, such as health services were important for several of the participants, but not the majority. Those living in the retirement home in Gabriel-Pastor had access to health services and a pharmacy in the retirement home, but for other services, such as the bank, or the *Seguro social* (public health services), they needed to go out. The participants from El Refugio living in a vecindad would regularly go to the local steam bath, as they did not have baths or showers in their home. Most women had to leave their neighbourhood to visit their doctor or get health and social services from the IMSS (Instituto Mexicano del Seguro Social), the federal governmental social insurance organization, which offers health services and pensions. These services were used on a weekly or monthly basis.

Restaurants and friends' and family's homes were frequented regularly, as social activities were a great motivator of travel. While some had visitors in their home, these women mentioned going places and doing activities with their friends and family. Social relations were an important source of entertainment, but also contribute to a sense of meaning and belonging. The participants from La Hacienda, who were ministers at their chapel, often spent time with each other, doing their duties, but also socializing: *"I really enjoy going to the chapel. I really do. Because we're several women, sometimes we go have breakfast. If it's someone's birthday, we all get together and get breakfast."*<sup>6</sup> (LH2) Their duties with the Church doubled as their social group.

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<sup>6</sup> Me gusta muchisimo ir a la capilla. Me gusta ir, claro que si. Y ahi, como hay algunas senoras, a veces vamos a desayunar."



The overall daily mobility of these women reflects the characteristics of the environment, the availability of safe and comfortable transportation, but also the motivations behind their daily trips. For the women of La Hacienda, who were younger, their automobility allows them to travel run many errands and keep performing their duties as ministers in their community. While they travel daily, walking does not take an important role in their daily life, especially not in their own neighbourhood.

In Gabriel-Pastor, the women have the majority of their essential needs (such as meals, activities, and medical care) met in the retirement home, and don't often have to leave. The home itself has extensive grounds and



*Figure 9: Gardens of Asilo Gabriel-Pastor*

gardens, offering a controlled and familiar environment for walking (see figure 9). The nearby presence of aides, as well as the thorough knowledge of the space ensures the feeling of safety while walking, should a misfortune occur. In this particular space, there are no or very few unknown elements, ensuring a sense of mastery. When they would leave the home, it is with friends who would pick them up in their car or by taxi, never alone. A few took public transit with their friends, or used the shuttle occasionally offered by the retirement home. These sorts of outings were occasional, and depended on the availability of transportation and accompaniment. In El Refugio, women walk because they don't have many other options, but also because their daily destinations are easily accessible.

## 3.2 Walking in a hostile environment: Barriers, strategies and potential for improvement

During these interviews, the participants identified elements of their neighbourhood that they appreciated, as well as those that they perceived as negative. Several also discussed hypothetical elements of an environment ideal for walking, or things that would make them more interested in walking in their own neighbourhood. This revealed that significant improvements were needed to change the perception of safety in these neighbourhoods, as they were generally not seen as safe places to walk. In addition to being made safe, they mentioned elements which make environments *appealing* and *attractive* for walking, for their needs as elderly women. There seemed to be an interest and a desire to walk in their neighbourhood if improvements were made.

### 3.2.1 Barriers to Mobility: Evolving Personal Capacities and an Unsafe Environment

Several barriers arose during the interviews. Health issues, such as an injury or illness, can affect the participant's capacity to travel on a daily basis, making it more physically exerting to travel. It particularly has an effect on confidence, with many citing an increased fear of falling and further injuring themselves. *"I like to walk. But because of my feet, because of the problem I have with my feet, I can't walk much. There is tremendous pain."*<sup>7</sup> (LH2) Several had pain following illness or developed health problems that made walking longer distances difficult. It becomes more physically taxing to travel, but also affects confidence, with many citing an increased fear of falling and further injuring themselves: *"Since then I developed vertigo. This is what scares me the most [about walking]."*<sup>8</sup> (GP4)

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<sup>7</sup> "Si me gusta caminar. Pero, por mis pies, por el problema que tengo, no puedo caminar mucho. Porque de veras es un dolor tremendo."

<sup>8</sup> "Ya después me vino fuerte el vertigo. Es por eso que me da mucho miedo [de caminar]."

One participant from Gabriel-Pastor specifically identified financial reasons as a barrier to mobility, such as the inability to pay for a taxi or bus fare on a regular basis. She was therefore constrained to destinations accessible on foot, or dependent on friends and acquaintances for rides. The other participants from this neighbourhood used taxis frequently, or had friends and family who could pick them up. She was the only one who specifically cited financial difficulty as a hindrance to her mobility. In El Refugio, where participants were of lower socioeconomic status, they travelled on foot or by public transit, as personal vehicles and taxis were unaffordable.

Personal experiences or rumours from friends and family contributed to a feeling of danger or unease in the public space for several participants. These may have affected their habits in such a way that their daily mobility changed, limited more often than not. These refer to experiences such as street harassment, violence, negative rumours, or having experienced a fall. The participants have specifically identified that they do not feel safe in their neighbourhoods, which affects their mobility within their neighbourhood.

In El Refugio, safety was a big concern, particularly in certain areas. The residents of this neighbourhood were wary of particular streets, such as the Avenida 22 (see Figure 10), where they had heard rumours of violence or simply reported feeling unsafe. They stated



Figure 10: Avenida 22 is rumoured to be unsafe

feeling isolated and alone in this particular street, because of these rumours. One woman from La Hacienda stated that the neighbourhood was not safe because she'd "*heard of many robberies, at*

*different hours of the day.*”<sup>9</sup> (LH1) Another stated while *“I’ve never had safety problems, but I have heard that several people have experienced things.”*<sup>10</sup> (LH3)

The feeling of safety is related to the presence and perception of danger, be it from accidents, crime or violence. It is often a result of the activities happening in a space, such as a park: *“It is safer. There are specific paths for walking. There is a path for cyclists and a path for walking, everything is protected.”*<sup>11</sup> (LH1). For this participant from La Hacienda, this was the main reason she preferred the Parque Ecologico for walking. The absence of cars and the separation of paths between pedestrians and cyclists ensures that the risk of being struck by a cyclist or a vehicle was eliminated, or at least greatly reduced. Vehicular traffic was cited by several participants as making them feel unsafe, as cars often drove at high speeds, or would sometimes go onto the sidewalks.

Feeling safe from crime was an important variable to consider for several of these women when walking in their neighbourhood. In El Refugio, for example, the participants acknowledged that while their neighbourhood was not safe, they themselves did not feel in danger: *“For me, it isn’t dangerous. For me. For me, my neighbourhood is not dangerous. [...] Why? Because I know everyone and I grew up here, I suppose. I grew up here and it’s been a long time.”*<sup>12</sup> (ER3) The danger and risk in their neighbourhood bothered them, even if they did not feel necessarily targeted. However, in La Hacienda, the rumours of muggings and violence in the streets are seen as a deterrent for frequenting public spaces like the streets and parks, creating a hostile climate of fear that discourages people to appropriate these spaces. Reinforced by an absence of others in the

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<sup>9</sup> “he sabido de mucho robos a distintas horas del dia.”

<sup>10</sup> Yo no he tenido problemas de seguridad, pero he sabido de algunas personas que han pasado cosas”

<sup>11</sup> “Hay mas seguridad, hay este vias especificas para caminar. Hay circuito para bicicletas y circuito para que camines. Esta protegido todo eso.”

<sup>12</sup> “Para mi, mi barrio no es peligroso. [...] Porque yo conozco a todos, o sea, aqui creci yo puedo decir. Aqui creci, y son muchos muchos años.”

street: *“As much as I appreciate how peaceful it is, you always have to be careful not to get accosted. Because the streets are so empty, it’s always frightening.”*<sup>13</sup> (LH4)

Gender issues were discussed during the interviews, but were addressed through the lens of safety. Did they feel more at risk or vulnerable because they were women? The majority felt quite respected as elderly women in public and did not have any bad experiences to speak of. However, certain gendered behaviours were adopted when it came to precautions and wariness. These women remarked on the importance of being responsible for your own safety by taking precautions regarding their appearance, such as dressing soberly, not wearing flashy or expensive jewelry or clothes that draw attention. Only one participant explicitly mentioned that men in the street were less considerate than women, as they would take up all the space on the sidewalk. They would not apologize if they bumped into her, but acted like they expected her to go around them.

The participants identified that certain characteristics of the environment has affected their capacity and willingness to move through their neighbourhood on a daily basis. These characteristics are generally physical components of the environment, such as steep hills, damaged sidewalks, or the presence of obstacles such as poles, trash, and cars. In addition, the presence of activities in the streets, such as large crowds and public consumption of alcohol and drugs, is often a deterrent to elderly women as it makes them feel unsafe. Consequently, they would adapt their trajectory so as to avoid these situations, or it would discourage them from leaving the house at all. However, during the interviews, sidewalks and the emptiness of the streets were the greatest preoccupations as they contributed to this feeling of danger.

Interaction and proximity with potentially dangerous elements can be seen as a risk or threat to well-being and health, especially if they can be cause for accidents. Degraded and damaged

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<sup>13</sup> “La tranquilidad, a la tranquilidad pero siempre cuidandose no vaya a sufrir a un atraco. Como estan tan solitas las calles, siempre da temor.”

infrastructure can be cause for injury. For example, a crumbling sidewalk or cracks could cause tripping or a fall. Uneven sidewalks are uncomfortable and make walking more difficult and exerting. The safest environment for walking described during the interviews is composed of large clean sidewalks without cracks, holes, car ramps, or uneven slabs. They are wide and flat, allowing everyone to walk without bumping into each other, and with well-lit open spaces, free of dark corners. The presence of open spaces and good lighting reduces the risk of being cornered or isolated from others. The absence of cars reinforces this sense of safety, diminishing the risk of being hit by a vehicle. By removing an element of risk from an environment, it can be navigated in confidence.

### 3.2.2 Overcoming Barriers: Adopting New Behaviours and Taking Necessary Precautions

In order to overcome these barriers and maintain as much of their mobility as possible, the participants in this study have adopted strategies to overcome these barriers. Several codes were pre-established, but some also emerged during the coding of the interviews. These strategies consisted of adjustments to behaviour (such as changes in habits and conduct), while others are precautions taken before taking a trip.

Behavioural strategies refer to practices adopted by the participants whereby they can overcome or avoid barriers through a change in behaviour, both before and during the trip. This includes things such as alertness, minimizing travel, and time of travel. For example, one participant adopts extreme caution and alertness when walking and navigating through the public space. She states that when she leaves the house, she does everything she runs all of her errands so she won't have to leave again. She kept her trips to a minimum in terms of frequency, and also in terms of length. Three of the participants mentioned taking the time of day into consideration

when planning their trips. For example, they will avoid going out when it is dark, or when the sun is directly overhead in the afternoon (due to the heat). One participant mentioned walking in the roadway alongside traffic, as opposed to on the sidewalk, to avoid the obstacles and unevenness of car ramps. She may have changed her trajectory or avoids certain streets for safety reasons. For leisurely walks, another participant stated preferring neighbourhoods other than her own as they were safer, more interesting and more attractive.

Precautionary strategies are actions taken in anticipation of unfortunate situations, as well as a response to changes caused by aging. Apart from “being accompanied,” “alertness” was mentioned, or being particularly cautious when travelling so as to avoid an incident or accident. *“Because when I go alone... I don’t. Because sometimes car entrances that are very high and I can’t see well. I’m afraid of falling. I’m always accompanied if I want to walk.”*<sup>14</sup> This extreme caution implies that they do not feel entirely comfortable with their environment, as they must always put considerable energy into their safety. Most of the participants living in La Hacienda and El Refugio mentioned the importance of not drawing attention to oneself while walking in public spaces, and being as nondescript as possible. This is in order to avoid being a target for violence or robbery. 6 of the 12 participants stated they would wear only small or barely visible jewelry, avoid carrying a lot of money or have an expensive cell phone. Six participants cited that they rarely, if ever, go out alone. They prefer the company of another person, should they need assistance, but also for a sense of security. Two participants noted that they always wear flat shoes to avoid potential injuries from higher heels. The last precaution would be the use of a tool such as a cane, walker or wheelchair to ensure her safety while she walks. This can also help with endurance, making longer walks possible.

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<sup>14</sup> “Porque cuando voy solita, este no, porque hay veces que hay entradas de carro que, esta muy alta la entrada, y a veces como no veo muy bien. Tengo miedo me caer. Siempre voy acompañada si quiero caminar.”

### 3.2.3 The Importance of Maintenance and Appeal for a Neighbourhood's Attractiveness

While the ability to navigate a neighbourhood safely is important, points of interest or elements the environment are essential (Borst et al., 2009; Forsyth, 2015). During the interviews, these women described multiple negative environmental aspects of their neighbourhood that affected their safety, but also elements that addressed comfort, aesthetics, and important destination. The presence of interesting architecture, nice homes and buildings make the experience of walking more appealing, while the presence of trees and vegetation makes it much more comfortable. *“Well, it’s the open air, and what fascinates me the most is trees. Trees for me. I really enjoy it when there are trees.”*<sup>15</sup> One participant mentioned that trees were her favourite part of being outside and walking, particularly seeing the different types of trees and flowers that people would plant. Vegetation creates shade from the sun, and also cools the pavement, making walking much more comfortable.

Neglect, either from residents or from municipal or governmental bodies, reduced the appeal and attractiveness of an environment for walking. A negative perception of the environment and neglect makes an area more difficult to appreciate, which consequently, can exacerbate the neglect. This was seen as a



Figure 11: Degradation and vandalism in El Refugio

significant problem in La Hacienda and El Refugio, with four participants mentioning that the neighbourhood had been in a much better condition in the past. Trash is a potential obstacle for a pedestrian, but is also seen as a lack of respect for the neighbourhood and public space. Neglect of

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<sup>15</sup> “Pues el aire libre, y lo que me fascina y me encanta, es los arboles. Los arboles a mi, que hayan arboles me gusta mucho.”



buildings, such as peeling paint, crumbling walls, overgrown plants, and vandalism are seen as a negative appreciation of the environment, making it unwelcome and hostile (see figure 11).

Points of interest, such as health services, shops or recreational areas and activities are beneficial to the attractiveness of an area for taking walks, providing a reason to frequent this area. Parks are also of interest, especially for the women who go with their grandchildren. Not only are there playgrounds for the children, but the trees, benches and the occasional outdoor gym are all appreciated (see Figure 12).



*Figure 12: Park in La Hacienda*

There is a close tie between the elements that contribute to a perception of safety and attractiveness of the environment and an individual's desire and willingness to walk it. This is especially true if walking is a leisure activity and they have no need to travel on foot, or if other forms of safer and more comfortable are available.

Through the interviews the participants of this study expressed a certain dissatisfaction with the state of their neighbourhoods. In order to understand how welcoming and safe these neighbourhoods are to elderly pedestrians, the interviews were followed by the application of the WATS environmental audit along paths to reach main activities visited by these elderly women. The audit was applied to paths to reach important neighbourhood destinations and activities. The next section will examine the reality of the three neighbourhoods where these women live, through the results of this audit.

### 3.3 Analyzing Walkability: Moderately attractive, safety not guaranteed

The walkability of these neighbourhoods was analyzed using the WATS environmental audit, a walkability audit that considers the particular needs and preferences of elderly pedestrians. As mentioned in the section 2.2.2 of Chapter 2, important neighbourhood destinations were identified by the participants during the interviews. From these, we established hypothetical paths in order to analyze the walkability of segments between the participants' homes and places in their neighbourhood they might frequent. The segments were analyzed according to their safety and attractiveness. The combined grade of these two evaluations gave them a rating of walkability. The results are presented in a table, demonstrating the distribution of the scores of the segments. The following section will explain the main characteristics of the audited segments according to safety and attractiveness, followed by a more detailed evaluation of the walkability of each neighbourhood.

The three territories audited in this study had several things in common, but also issues and problems specific to each neighbourhood. Elements contributing to the safety and attractiveness of these areas play a large part in the walkability of each.

	Safety				
	Very good	Good	Moderate	Poor	Total (N)
Gabriel Pastor	0%	0%	70% (21)	30% (9)	100% (30)
La Hacienda	0%	0%	0%	100% (25)	100% (25)
El Refugio	0%	0%	38 (11)	62% (18)	100% (29)

Table 3: Distribution of Safety Scores

The three neighbourhoods received scores of moderate or poor for safety (see Table 3). The most significant elements that determined these scores were the absence of pedestrian safety infrastructure, blind walls and opaque doors, absence of windows directly on the street, the state of the sidewalks, and finally the absence or limited presence of traffic-calming infrastructure. Despite not being generally widespread in all three neighbourhoods, the inconsistent presence of pedestrian safety infrastructure was significant enough to lower their safety grade. They were present on 27% of segments in Gabriel-Pastor, 4% of segments in La Hacienda, and 38% of segments in El Refugio. For example, the absence of infrastructure such as curb ramps, markings indicating a crosswalk, and traffic lights for pedestrians did not award the segment any points, while their presence contributed positively to the final grade. Additional points were awarded according to the type of infrastructure, as some provide a greater feeling of safety than others (such traffic lights for pedestrians and marked crosswalks).

Blank walls were present in all three neighbourhoods, creating a distinct separation between the public space of the sidewalk and the private spaces of homes (see Figure 13). This creates a distinct separation from the public space of the sidewalk and the private space of the home. This can often create a sentiment of isolation for a pedestrian, as there is no engagement or point of contact between the residents in the houses and the passersby on the street.



*Figure 13: Blank walls in La Hacienda*

The sidewalks evaluated showed lack of maintenance, which negatively affected the safety score of all the neighbourhoods. 24% of the sidewalks in Gabriel-Pastor were given a score of

“Poor,” while 100% of the sidewalks in La Hacienda and 62% in El Refugio received this score. Although it was to varying degrees, damage and degradation were prevalent, often acting as an obstacle between residential areas and commercial areas. Holes and sidewalk slabs lifted by tree roots were present in all three neighbourhoods. Crumbling and cracked concrete or slabs lifted by tree roots often created a difficult surface to walk on, as it is uneven, and sometimes even unstable. Concrete in good condition is ideal as it creates a smooth flat surface that is easy and comfortable to walk on. Other materials, such as bricks and tile can be more hazardous for several reasons. They can be uneven, with the space between the bricks becoming a tripping hazard for a person who has difficulty walking or uses an aide to walk (such as a cane or walker). 38% of the segments in Gabriel-Pastor, 25% in La Hacienda, and 38% in El Refugio had sidewalks made from a variety of materials.

In addition to being smooth, an ideal sidewalk must be flat. 65% of segments in Gabriel-Pastor, 100% in La Hacienda and 67% of segments in El Refugio did not have a continuously flat sidewalk. Along these segments, car ramps and exits, steps, and severely damaged sidewalks posed a risk for tripping.

The three neighbourhoods fared better with regard to their levels of attractiveness, receiving grades of good or moderate (see Table 4). The attractiveness grade reflects the presence and abundance of elements that contribute positively to the aesthetic, comfort and interest of an area for walking. Some of these elements are the presence of vegetation, destinations of interest, public spaces such as parks, and urban furnishings. All three neighbourhoods had a presence of elements contributing to their attractiveness, but some more than others. Greenery and vegetation

were present in all three, offering visual interest and comfort by providing shade. These neighbourhoods were mostly residential, with only a few destinations of interest accessible on foot.

	Attractiveness				
	Very good	Good	Moderate	Poor	Total
Gabriel Pastor	0%	83% (23)	17% (7)	0%	100% (30)
La Hacienda	0%	80% (20)	20% (5)	0%	100% (25)
El Refugio	0%	14% (4)	83% (24)	3% (1)	100% (29)

*Table 4: Distribution of Attractiveness Grades*

In order to find the walkability grade, the safety and attractiveness grade were combined using the matrix presented in Table 2 (p. 49), which gives the same weight to safety and attractiveness. Using this rubric reveals which element of the segment needs more work in order to improve its walkability.

Moderate or low safety scores affect the walkability scores of these neighbourhoods negatively. Despite faring better in the evaluation of attractiveness, the presence of interesting and aesthetically pleasing elements does not sufficiently compensate for the risk and danger of injury. “Moderate” means that the segment got a grade of more than 15 points in the evaluation of the audit results, while “Poor” refers to a segment that got fewer than 15 points. The next sections will explain the results of the audit in each neighbourhood, illustrating in greater detail the particularities of each neighbourhood.

The following sections will break down these results by neighbourhood, explaining the principal elements that contributed to the scores and grades.

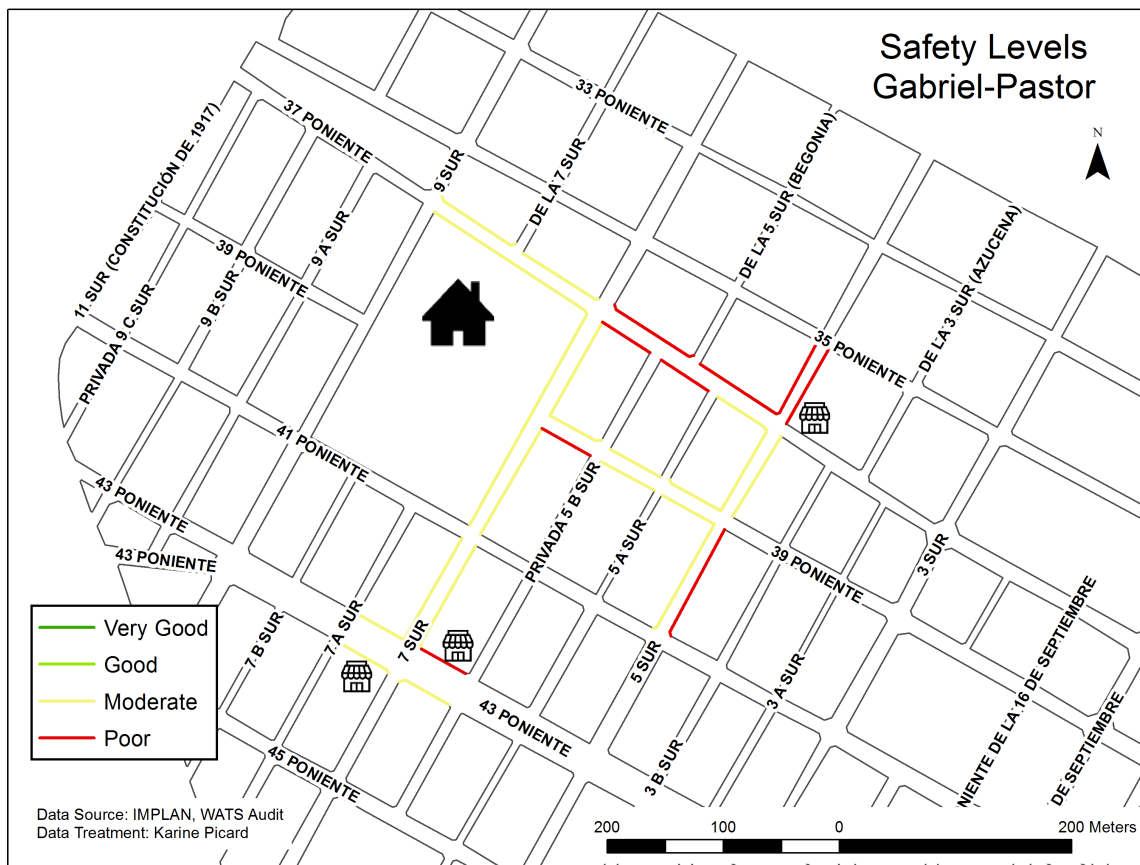
<i>Final Walkability Grade</i>	<b>Gabriel Pastor</b>	<b>La Hacienda</b>	<b>El Refugio</b>
<b>Ideal</b>	0%	0%	0%
<b>Good</b>	0%	0%	0%
<b>Fairly Attractive</b>	57% (17)	0%	3% (1)
<b>Fairly Safe</b>	0%	0%	0%
<b>Appealing</b>	0%	0%	0%
<b>Moderate</b>	13% (4)	0%	0%
<b>Unappealing</b>	27% (8)	80% (20)	59% (17)
<b>Bad</b>	3% (1)	20% (5)	0%
<b>Poor</b>	0%	0%	3% (1)
Total (N)	100% (30)	100% (25)	100% (29)

*Table 5: Distribution of Walkability Grades*

### 3.2.1 Gabriel-Pastor: Attractive, but not consistently safe

As the participants from this neighbourhood lived in the retirement home of Asilo Gabriel-Pastor, this is the central point and the departure point for all of the hypothetical routes from the home to a destination of interest. The neighbourhood of Gabriel-Pastor had several cafés, restaurants and shops along the Avenida 43 Poniente, as well as on the Calle 5 Sur, each located a few blocks from the entrance to the retirement home.

#### *Gabriel-Pastor: Interrupted Safety*



Map 6: Safety Scores in Gabriel-Pastor

The streets and sidewalks of Gabriel-Pastor were moderately safe, for the most part. 70% (21 on 30) of the street segments audited in this neighbourhood managed to get a grade of “Moderate” safety, while 30% (9 on 30) did not, and were “poor.”

Pedestrian safety infrastructure (such as crosswalks, pedestrian lights and curb ramps) at an intersection was present only on 67% of the street segments. For street crossings, zebra crossings accounted for 90% of pedestrian infrastructure while two parallel lines at the intersection accounted for the other 10%.

At intersections and at street corners, 67% of the segments did not have any pedestrian infrastructure (see Figure 14); and only 5 of the 30 corners had a high step going from the sidewalk to the street. This complicates the process of crossing the street, compromising the safety and comfort of the pedestrian.



*Figure 14: Small wall at an intersection*

Only three segments had curb ramps, allowing to go from the sidewalk level onto the roadway easily. Another three of the segments had small walls (see Figure 15). This obstacle is to protect pedestrians and businesses from vehicles,



*Figure 15: Cut corner and absence of pedestrian infrastructure*



*Figure 16: Intersection after improvements*



but in the process blocks the pedestrian's trajectory. This has since been improved, following an intervention from the city. A pedestrian ramp and bollards were installed on one side of the street (see Figure 16). However, the high curb remains on the other side of the intersection.

The atmosphere along the sidewalk plays a significant part on how safe a person will feel while walking. The presence of buffer zones creates a physical barrier between the pedestrian and vehicular traffic, reinforcing a sense of safety. In Gabriel-Pastor, 80% of the street segments audited had a narrow buffer zone, most made of trees or vegetation (such as grass or bushes). 10% of the segments had buffer zones made of concrete, but having signage, poles and streetlights in the buffer zone reduced the number of obstacles on the sidewalk. Homes were very closed off from pedestrians on the sidewalk, as 67% of the segments had blind walls and opaque doors (see Figure 16).



*Figure 17: Blank walls and closed doors*

The state of the sidewalk affects the pedestrian's experience. In Gabriel-Pastor, all the segments audited had sidewalks, with 62% of the street segments have sidewalks made entirely of concrete. The rest of the segments audited use multiple materials. These elements make walking not only more dangerous and demanding for users, but also less comfortable and appealing.

While the sidewalk in front of some houses may be concrete, there were some homes where the sidewalk was made of stone tiles, bricks or another material of their choice. In Gabriel-Pastor, about 66% of the segments audited had uneven sidewalks due to the presence of car exits or ramps, making the surface of the sidewalk uneven (see Figure 17). The sidewalks in this neighbourhood were generally in good condition, but 28% of the segments had damage from tree roots and 24% had significant holes, creating tripping hazards (see Figure 18).

The street segments that received a poor grade are those along the Avenida 37 Poniente, which is a residential street. The entrance to the retirement home is located on this street, and it leads to a small convenience store, other shops and a few public transit routes on the Calle 5 Sur (see Figure 19). Therefore, several seniors will have to walk down this street in order to access these businesses. The trajectory going from the retirement home to this main commercial street was moderately safe, with few elements ensuring the safety and comfort of elderly pedestrians.



*Figure 18: Uneven car ramp*

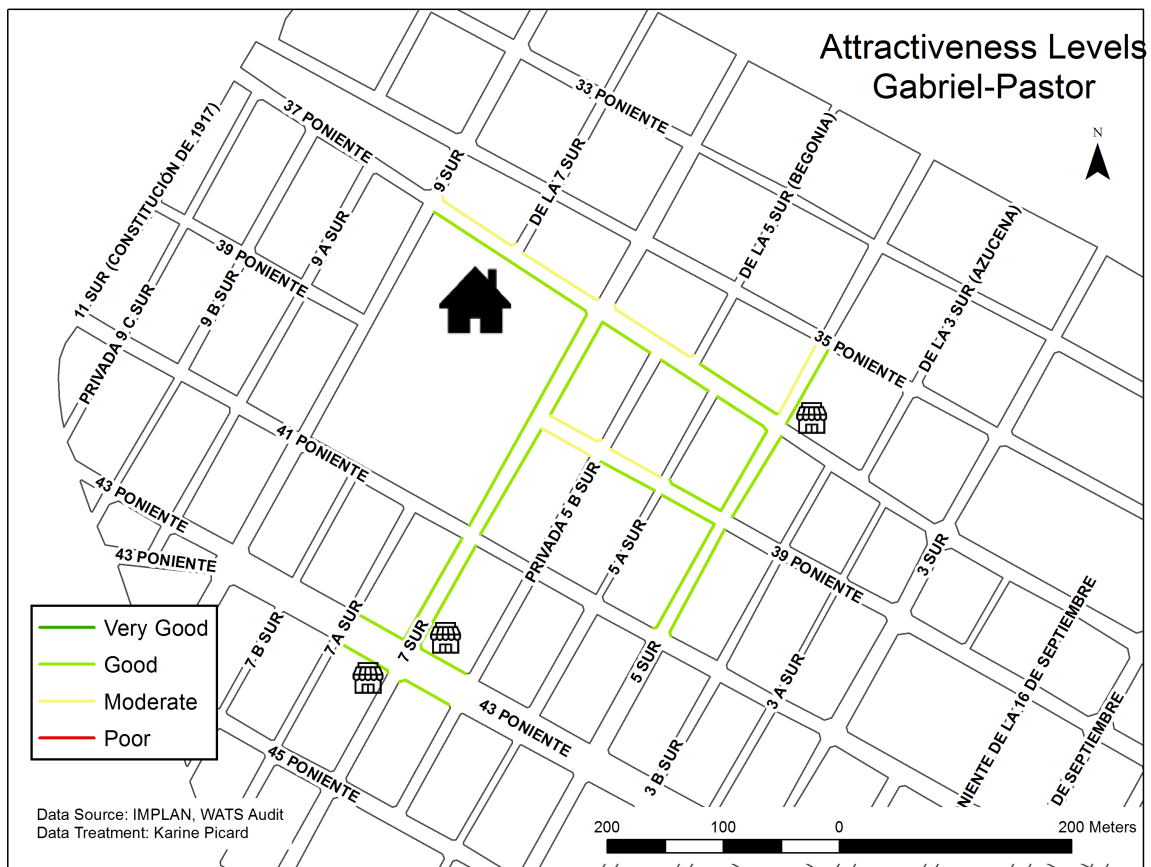


*Figure 19: Hole in sidewalk and detritus*



*Figure 20: Bus stop infrastructure*  
*Source: Google Streetview*

*Gabriel-Pastor: Appealing elements for an aging population*



Map 7: Attractiveness Scores in Gabriel-Pastor

Despite the lower safety levels, Gabriel-Pastor’s streets had many elements that make them attractive and appealing to elderly pedestrians. 23 of the 30 segments audited received a grade of “Good” in terms of attractiveness, meaning that they reached between 20 and 30 points out of a possible 45.

As mentioned previously, 80% of the segments audited had a buffer zone, a space that creates a physical barrier between the pedestrian and the roadway. While buffer zones are important for safety, they can also improve the pedestrian environment, through the presence of

vegetation (trees, plants and flowers). Elements of urban design, such as interesting paving or urban furniture also contribute to attractiveness. 88% of the segments with buffer zones had grass, bushes or shrubs (see Figure 20). Greenery not only contributes aesthetically, but also makes the environment cooler and more comfortable, as it counters the effects of heat islands caused by concrete and other elements of the built environment that capture heat. 67% of the segments audited had shade coming from trees. In Gabriel-Pastor, urban furniture was only present on 10% of the segments.



*Figure 21: Buffer zone with trees providing shade*

Half of the street segments audited had a residential land use, with high walls and closed doors between the streets and the homes (see figure 21). There was very little contact between the residents and pedestrians in the street. Businesses and services were concentrated along several commercial streets, particularly the Avenida 43, and Calle 5 Sur. These segments also served as a point of interest for users of public transit, as several *microbus* lines run along

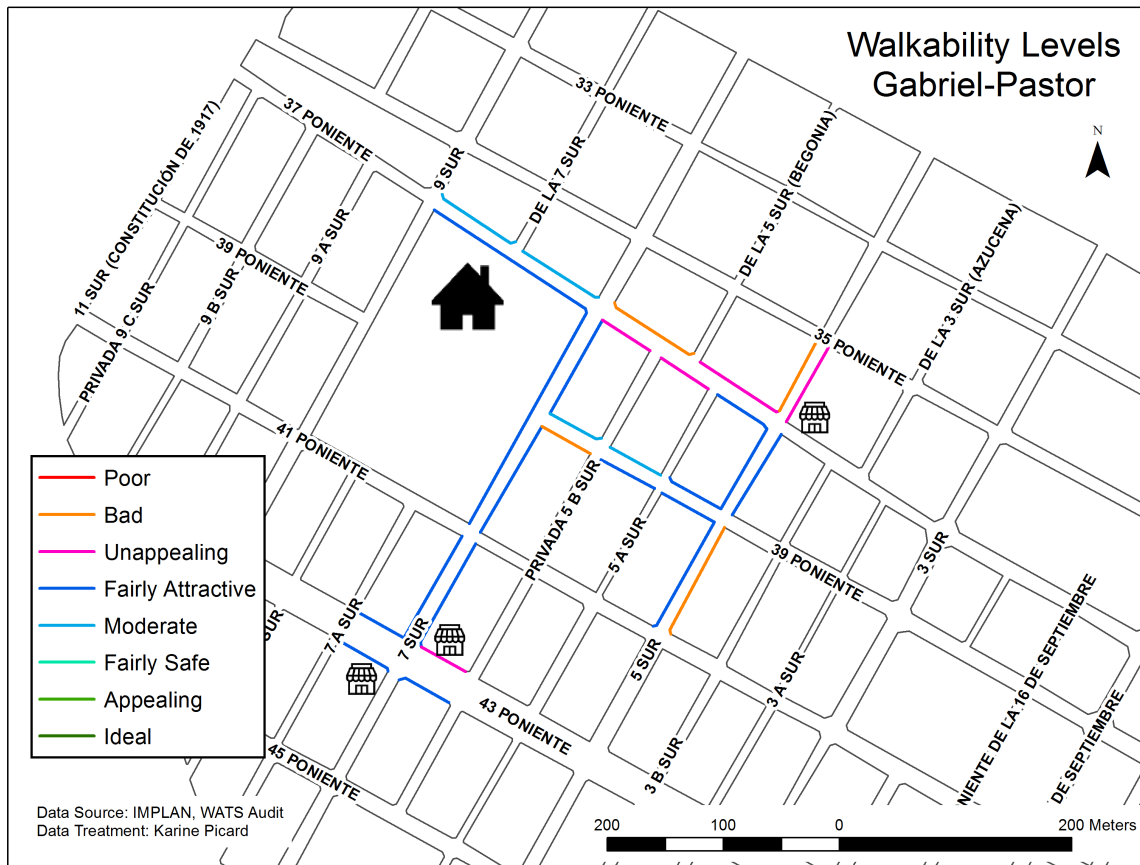


*Figure 22: Closed doors, little contact between homes and sidewalks*

these streets, as seen in Figure 20 on page 74. On three of the segments, unappealing activities such as car garages, created noisy and dirty environments, and sometimes even blocked the

sidewalk. More than half of the segments had shopfronts on the street. These contribute to the attractiveness of an area as they serve as visual interest for pedestrians. Graffiti, major lack of maintenance and peeled pain were present, only on three to four segments.

*Walkability in Gabriel-Pastor: Interruptions and inconsistencies*



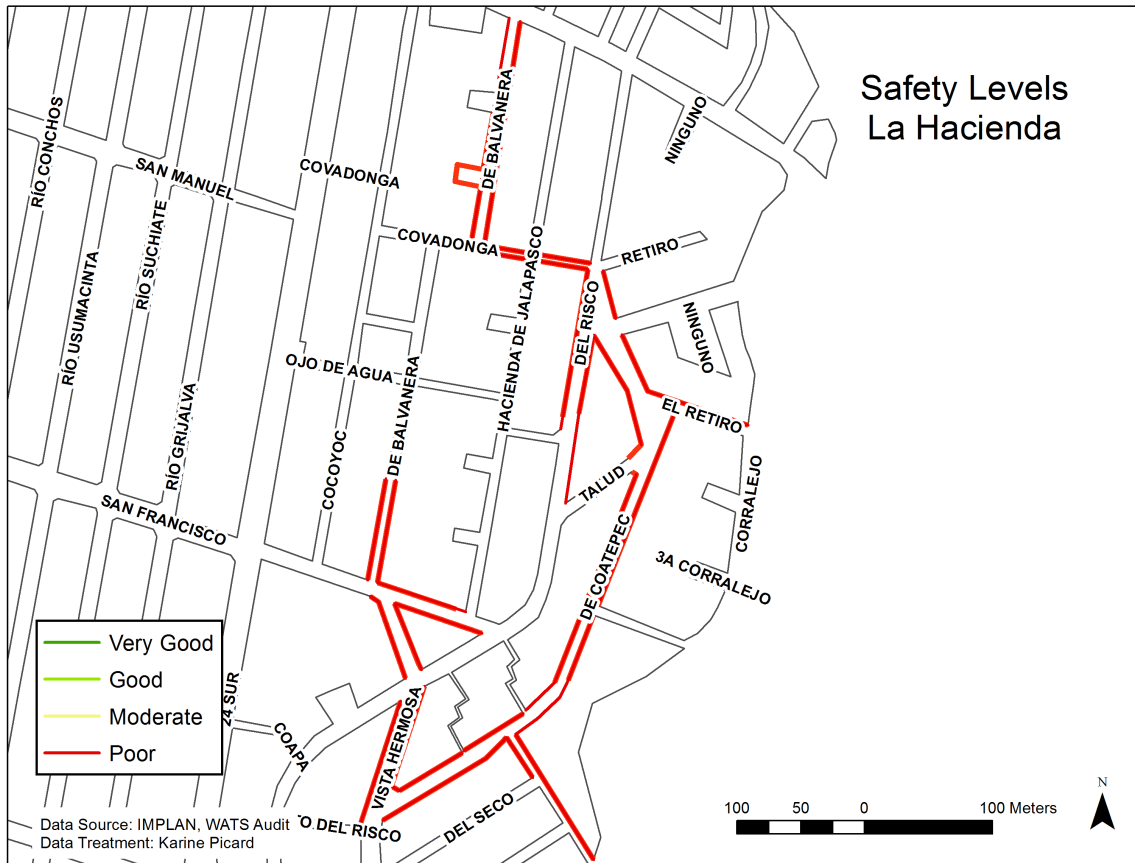
*Map 8: Walkability Scores in Gabriel-Pastor*

The most common walkability grade in Gabriel-Pastor was “fairly attractive,” with 57% of the segments receiving this grade. The spatial distribution of the different levels of attractiveness closely followed the safety grades. The most significant factor for these areas was that the segments that were more decrepit and had fewer safety elements or more damage were generally less attractive. The major factor that dictated whether or not an area was walkable and accessible

seemed to be the maintenance. If a street segment was not well maintained, it stood out from the rest, as the neighbourhood was generally adequate. However, this inconsistency of safety and attractiveness plays a large part in the walkability of an area for an elderly person, because an unsafe street segment can interrupt a trajectory. It requires a change of trajectory, and may even make a destination unreachable on foot altogether. In Gabriel-Pastor, most destinations are safely accessible and offer an attractive walk. The walk from the retirement home to the Avenida 43 is moderately safe and has a good level of attractiveness.

### 3.2.2 La Hacienda: Entirely unsafe, despite attractive elements

In La Hacienda, the entirety of the segments audited received a safety grade of “Poor,” meaning that they failed to get more than 15 points during the evaluation. In terms of attractiveness, many elements, such as vegetation and well-maintained homes make this neighbourhood moderately attractive. However, public and shared spaces, such as sidewalks and parks, show signs of neglect. Deterioration and the absence of pedestrian infrastructure resulted in an environment that was unsafe to walk, despite being aesthetically attractive.



Map 9: Safety Grades in La Hacienda

*Safety: Absent or inadequate infrastructure*

Pedestrian safety in La Hacienda is lacking. Only one intersection audited among 25 had a zebra crossing. The rest had no infrastructure at all to ensure the safety of pedestrians at intersections (see Figure 22). Not only were there no curb ramps, but 38% of the segments audited had very high curbs and cut corners, which allows cars to go around corners very fast, or being used as parking.



Figure 23: Absence of pedestrian infrastructure at an intersection

While almost all of the segments evaluated had sidewalks (24 of the 25), these sidewalks had several problems. 62% of these sidewalks had buffer zones, most consisting of small trees or electrical poles and street signs. Obstacles were present on 22 of these segments, making the sidewalks feel smaller, especially considering that 58% of the sidewalks between 4 and 6 feet, and another 25% being narrower than 4 feet. For example, one segment with a narrow sidewalk had several structural obstacles, blocking the entirety of the sidewalk. An individual would have to walk in the roadway to go around it (see Figure 23). Residents would occasionally put trash or park their cars on sidewalks. Obstacles such as streetlights and power line poles were often in the middle of the sidewalk (see Figure 24). These kinds of obstacles were the most prevalent (on 98% of sidewalks). Vegetation also obstructed several sidewalks, with large trees and tree stumps overtaking or damaging the sidewalks (see Figure 23).



*Figure 24: Sidewalk obstructed by pole and tree stumps*



*Figure 25: Narrow sidewalk obstructed by utilities pole*

The majority of the sidewalks were concrete, but 25% of the segments had sidewalks made of a variety of materials (often a mix of concrete, brick, tile, or stone). In addition, a considerable number of sidewalks (58%) had varying amounts of damage, such as holes, cracks, crumbling, or damaged by tree roots.



However, the unevenness of the sidewalks due to car ramps and car exits is also a major obstacle for a pedestrian. These ramps raised the sidewalk, and put them at an angle to allow the car to exit. This makes it very difficult to continue straight path on the sidewalk. None of the sidewalks audited had a continuously level sidewalk, as ramps were present on 63% of the sidewalks, and car exits present on the other 37%.

La Hacienda is located in a river valley, on a steep hill. One part of the neighbourhood is at the top of the hill on a relatively flat plane. The other part of the neighbourhood is at the bottom of a steep hill, closer to the river. The topography makes it difficult for an elderly person to navigate on foot as it is too physically

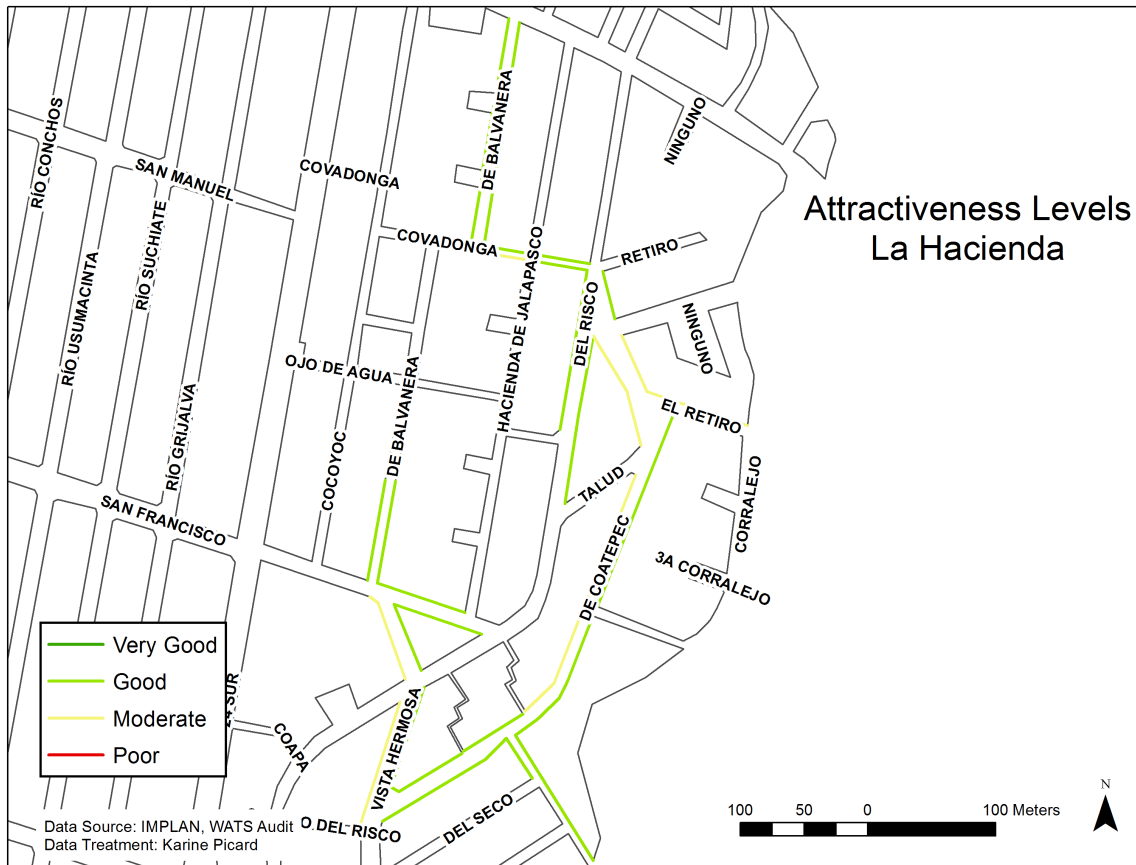


*Figure 26: Hill with a steep grade*

*Source: Google Streetview*

strenuous to go up and down this hill (see Figure 25). All of the roadways of the audited segments have two lanes of traffic, going in both directions, and are generally very large. In order to slow traffic, several traffic calming devices are in place. 40% of the streets audited had speed bumps, while 24% have curb extensions. As the entirety of these segments have the lowest safety grade, there are no spatial trends or areas that appear to be safer than others.

*Attractiveness: Greenery and Good Maintenance*



*Map 10: Attractiveness Grades in La Hacienda*

Although La Hacienda did not score high for safety, certain elements do make it inviting and interesting for walking. 5 of the 25 segments audited were “moderately attractive,” while 20 segments were “good.”

The area audited was primarily residential, with a few small businesses throughout. 64% of the segments were solely residential, with a few convenience stores and bakeries. There were two drug stores, a hair salon, and a church in the area audited. While there were services, they were sparse and did not offer much in terms of variety. There was a public space in the form of a park, with playground equipment for children, several benches to sit, as well as outdoor exercise

equipment. There were no vacant buildings or lots in this neighbourhood, contributing to the sense of safety and security.

Sidewalks in this neighbourhood were generally neglected. As mentioned earlier, the sidewalks were quite narrow, and made narrower when buffer zones were between the sidewalk and the roadway. However, these buffer zones often had vegetation, in the form of grass (28%), bushes (48%) or flower boxes (20%), contributing to the visual appeal and

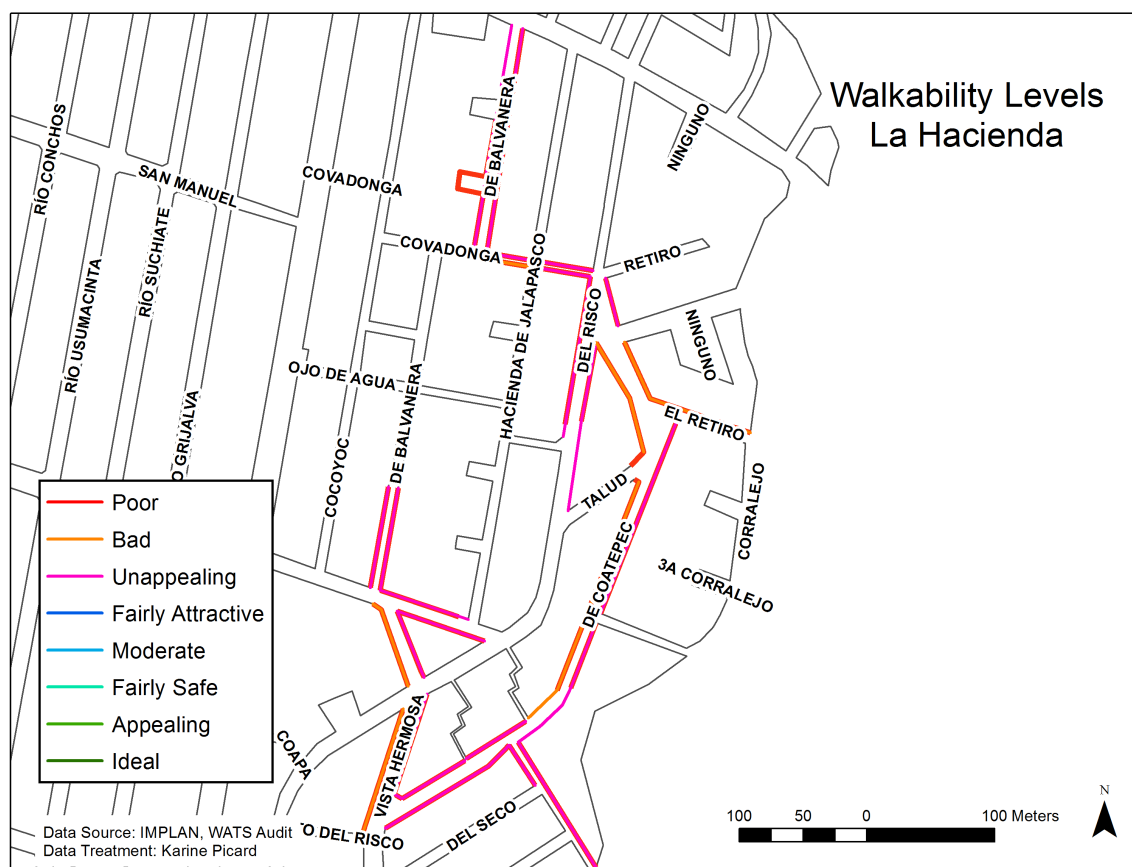


*Figure 27: Green elements on the buffer zone*

comfort of a street (see Figure 26). However, only a few of the segments evaluated (28%) had trees and vegetation large enough to provide shade for pedestrians. There was no urban furniture in any of these buffer zones, but the three segments that bordered the park near the river had benches.

Other than the degradation of pedestrian infrastructure, there was little evidence of decay on private homes exteriors. 96% of the segments showed no signs of degradation on buildings, and 4% had vandalized buildings. There was little trash on the sidewalks, with small detritus only present on 12% of the segments.

*Walkability in La Hacienda: Uncomfortable, unsafe and unappealing*



Map 11: Walkability Scores in La Hacienda

Despite the attractive elements and relative comfort of La Hacienda, the lack of safe infrastructure for pedestrians, like well-maintained and comfortable sidewalks, makes this neighbourhood ultimately uninviting for elderly pedestrians. Little maintenance was done on the sidewalks to make them comfortable or interesting for travel on foot. As a result, destinations within the neighbourhood and close to home are not favoured. Damaged, cramped sidewalks, car ramps and



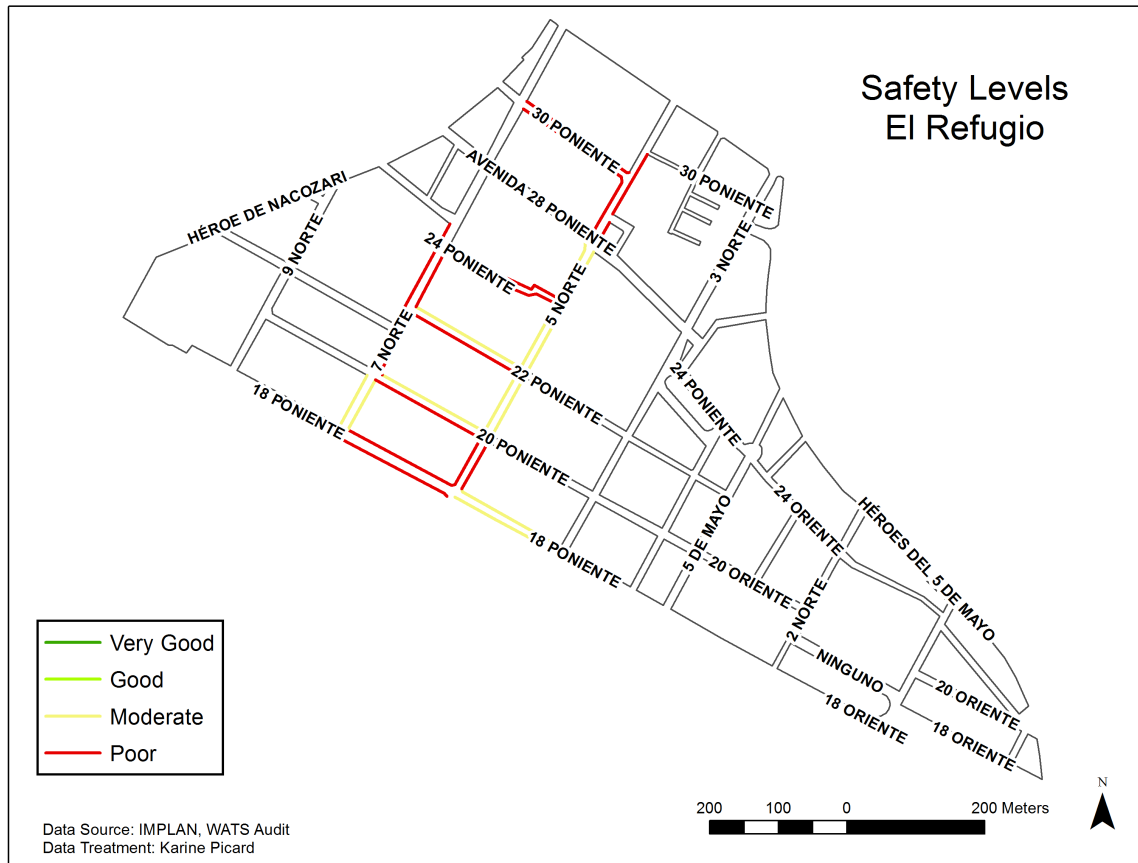
Figure 28: Empty public spaces

vehicular traffic make the neighbourhood unappealing, creating a feeling of isolation for those walking along empty streets, especially when alone. This image of hostility, isolation, and non-belonging discourage residents from appropriating public spaces in their neighbourhood (see Figure 27) and rather encourage everyone to stay behind closed doors.

### 3.2.3 El Refugio: Mostly unsafe, moderately attractive

El Refugio is an older neighbourhood with a variety of essential services and points of interest accessible on foot. However, it is a poorer neighbourhood that seems to have been neglected by the municipality and its residents. The built environment shows signs of degradation that have a significant effect on the safety of pedestrians and the walking appeal of the neighbourhood. Not only is it unsafe and poses a risk for injury, but it lacks in elements that make it visually interesting and comfortable.

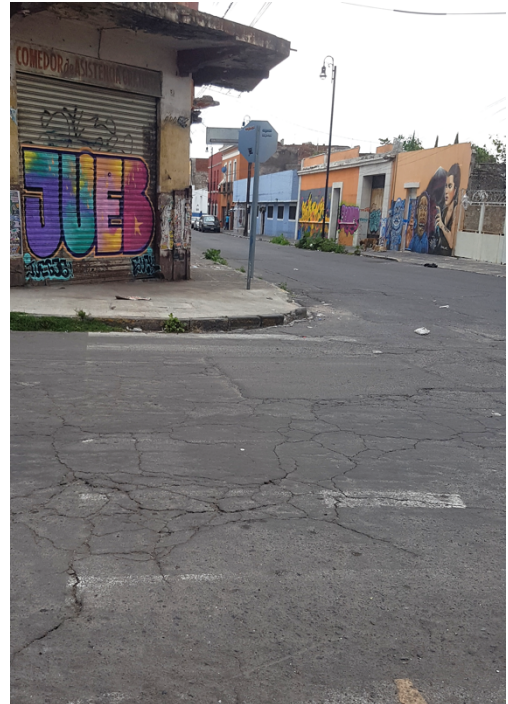
*Safety: Inconsistent infrastructure and lack of maintenance*



*Map 12: Safety Grades in El Refugio*

More than half of the segments audited (62%) in El Refugio were deemed unsafe, having a “Poor” safety rating. The other 38% were moderately safe. The safety of pedestrians is compromised in this neighbourhood due to sporadic and deteriorating pedestrian infrastructure. Safety on the sidewalk is negatively impacted by the lack of buffer zones and the closed-off nature of the homes in the area. The area has most of its destinations accessible on foot, but damage and obstacles make the sidewalks uncomfortable and potentially dangerous. Streets in El Refugio are generally two lanes of traffic (79%). 86% are one directional, and speed bumps are present on 6% of the segments, to slow traffic.

The pedestrian infrastructure is present on most of the segments, but degradation and a marked lack of maintenance makes many of these segments unsafe. While 45% of the segments had zebra crossings at intersections, they were not well maintained (see Figure 28). 24% of the crossings have no infrastructure for pedestrians at all, while 62% have curb ramps. Curb ramps allow a comfortable descent into the roadway when crossing the street, creating less resistance for the pedestrian. Only 6% of the segments had the negative elements of high curbs and cut corners.



*Figure 29: Damaged zebra crossing and graffiti*

However, the sidewalks in this neighbourhood have no buffer zones, which does not contribute to feelings of safety from street traffic, but rather increases feelings of vulnerability. Almost all of the segments audited in this neighbourhood had sidewalks, but 19% of those were suddenly interrupted. This forces the pedestrian into the roadway or across the street the other sidewalk to continue their trajectory.

About half of the segments audited had sidewalks made of concrete, and 38% had mixed materials. These can pose a risk for safety, as not all materials are equally suited for sidewalks. For example, stone sidewalks, are not always smooth, with differences in levels between stones, and they can also be slippery when wet. Additionally, 58% of sidewalks are in a poor state, 39% had significant holes and damage, which are a tripping hazard and 6% of the segments had the sidewalk damaged by tree roots, causing raising concrete slabs.

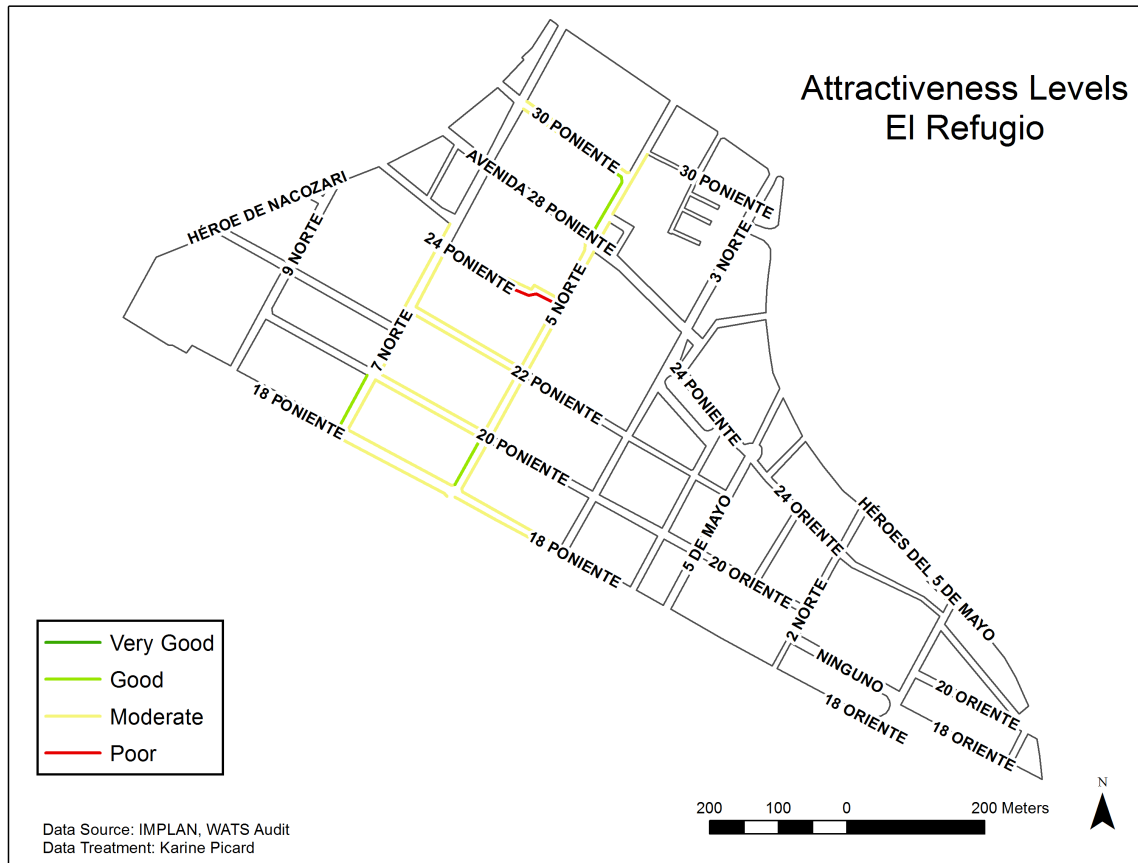


*Figure 30: Cars often park on the sidewalk*

Additionally, they were also uneven due to car ramps and car exits, which are often difficult to walk on. Only 23% of the segments had the same level for the entirety of the segment. Minor obstacles such as poles and streetlights obstructed 92% of the segments audited, while major obstructions, such as cars (see Figure 29), were present on 15% of the segments. The main safety issue in El Refugio is a lack of maintenance of pedestrian infrastructure, which compromises the security, confidence and well-being of elderly pedestrians in this neighbourhood.



*Attractiveness: Degradation and neglect, with accessible destinations*



Map 13: Attractiveness Grades in El Refugio

El Refugio fared better in its evaluation of attractiveness than safety. 14% of the segments achieved a grade of “good,” 83% of the segments were “moderately attractive,” and 3% were “Poor.” The visual components of this neighbourhood did not contribute many points to its attractiveness. The absence of buffer zones reduced opportunities for green spaces and aesthetically interesting components. Neglect and lack of maintenance of buildings and public spaces contributed to the lower score. Only 17% of the segments showed no sign of degradation.

69% had graffiti, some in the form of public art (see Figure 30) but most was vandalism. 41% of the segments had homes and buildings with extensive peeling paint, and 24% of segments showed major neglect. Broken windows were present on 4% of the segments.



Figure 31: Street art on Avenida 30 Poniente

There were also signs of a lack of respect for public spaces with trash (small detritus, such as bottles, bags and wrappers) present on over half of the segments (52%), 4% had large waste items on the sidewalk, which were both signs of neglect, but also considerable obstacles. There were few elements providing visual interest for pedestrians as they walked through this neighbourhood. Blind walls were present on 7 of the 29 of the segments. Vacant shops and fenced-in vacant lots were present on two segments. Industrial buildings and garages were present on 28% of the segments audited. These usually contribute to noise and air pollution of an area, and do not contribute anything positive on an aesthetic front.

While being visually interesting is important for the attractiveness of an area, it is also crucial that pedestrians feel comfortable while walking through this neighbourhood. This feeling of comfort reinforces the willingness and appeal of navigating the environment on foot, allowing people to enjoy and appreciate it.



Figure 32: Benches and graffiti in the park in El Refugio

Very few elements of comfort were present in El Refugio. The absence of buffer zones meant that very few areas had urban furniture or places to sit. The only benches in the area were located in the small park close next to the church. These benches had back and arm rests, but were vandalized. This small park was the only green space in the area evaluated. It had trees, benches, and a small playground for children, but much of the infrastructure was in disrepair or vandalized (See Figure 31).

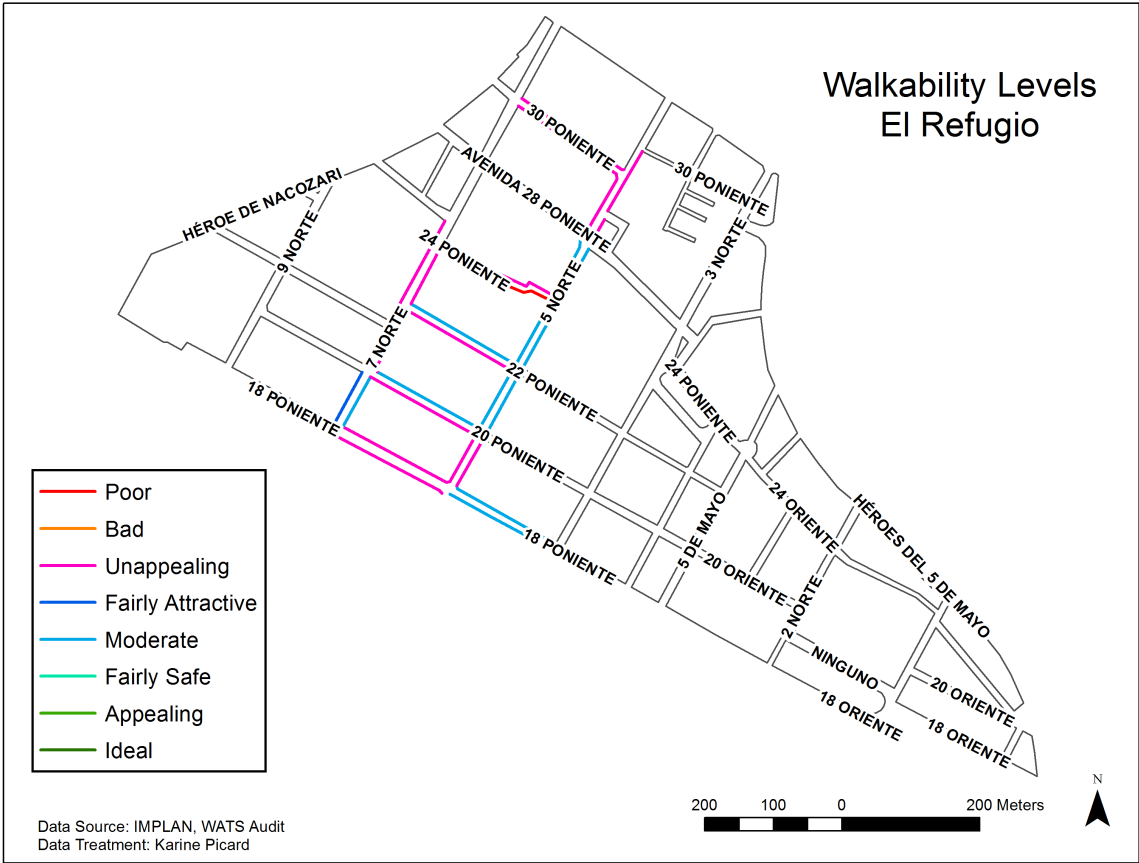
El Refugio's attractiveness stemmed from the number of services and points of interest accessible on foot. Only 14% of the segments were exclusively residential, meaning that other businesses, services and destinations were present in a majority of segments audited. Many small businesses were located throughout



Figure 33: Street vendors near Cinco de Mayo Market

the area audited. Convenience stores, pharmacies, hairdressers were all located in the area audited. The large public market Cinco de Mayo was also accessible for the participants (see Figure 32). 72% of the segments had *microbus* stops, as several lines of public transportation passed through the neighbourhood on the bigger boulevards.

*Walkability: A human-scale neighbourhood, but safety not guaranteed*



Map 14: Walkability Scores in El Refugio

The majority of El Refugio’s streets received the grades “tolerable” (35%) and “unappealing” (59%) as walkability level. One segment achieved the grade of “fairly attractive” and one was “poor.” For a neighbourhood that has many people walking on foot, the state of degradation and neglect of the environment negatively affects both the safety and the attractiveness of the area. A few streets did have one side of the road that was “tolerable,” while the other side is “unappealing,” allowing people to continue their trajectory. However, they must cross the street in order to walk in an environment they feel comfortable. The destinations were therefore generally accessible for the most part, but it came at a risk of getting hurt and was uncomfortable. As many people walk in this neighbourhood because regular destinations are nearby, reinforcing the safety

infrastructure and taking into consideration the travel needs of all population groups can make the streets safer and more inviting.

The results of the audits and the interviews demonstrate that the perceived state of the environment and its actual state greatly play into the opportunities for mobility available to the participants of this study. This is supported by the analysis of the audit results, which revealed that safety is an issue in all of these neighbourhoods, making each trip on foot a real risk. This feeling of risk was present in all three neighbourhoods, as infrastructure was ill-maintained or entirely absent. While certain elements made these neighbourhoods attractive for walking in the three neighbourhoods, many negative elements arose in both the interviews and in the results of the audits. The next chapter will discuss how the state of the environment, as revealed through the audit confirms the perception of these neighbourhoods by the participants of this study, and in turn, how this affects the opportunities to mobility that are available to them.

## Chapter 4: Discussion

Many variables come into play with regard to the daily mobility of an individual, but trends and similarities tend to emerge among people of similar socio-demographic groups. In this study, we examined the daily mobility of individuals faced with the two vulnerabilities of age and gender, living in urban environments not well adapted to their abilities, and where violence against women is a noteworthy issue. The analysis of this study shed light the importance of confidence and perception when it came to appropriating public spaces, and how this has an effect on daily mobility habits. This chapter relates the functionings (both personal and environmental realities) that play a role in the potential mobility, or motility, of these women on a daily basis. Personal functionings include things such as physical capabilities, gender and psychosocial skills, while environmental functionings are the opportunities and limitations imposed by the physical environment. The second section of this chapter focuses more specifically on capabilities relating to the environment, and especially how these realities affect walking and walkability.

### **4.1 Capabilities and Mobility: Navigating Difficult Environments with Evolving Skills**

The results of this case study revealed the importance of the relationship with the environment when it comes to daily mobility, particularly daily mobility on foot. This perception is formed by individual personal experiences, and the environment we live in.

Mobility as a capability is a collection of functionings, or circumstances and abilities allowing a person to travel. Functionings reflect personal circumstances and skills, as well as environmental realities. Variations in these functionings affect a person's scope of mobility and consequently, the opportunities that are offered to them (Nordbakke, 2013). Every person has an individual set of functionings that vary according to their physical, psychological and social state.

These functionings combined become their capabilities. Trips that were once easy and done on a regular basis become more demanding in terms of energy and effort, becoming less frequent or abandoned altogether (Lord *et al.*, 2011).

This occurred with four (33%) of the participants, who noted that changes in their physical health had affected their mobility habits. Their injuries, illness, and consequent pain made travelling, specifically walking, more difficult as it became too painful or physically strenuous, changing and limiting their mobility habits. The diminishing of physical functionings therefore affects an individual's overall potential to travel, or motility, which is then reflected in their daily activities and mobility habits (Kaufmann *et al.*, 2018).

These changes had an influence in their physical abilities of these participants, affecting their daily trips. The actual and perceived diminishing of seniors' skills is reflected in the perception of their environment. As their individual skills diminish, the environment becomes less accessible, and interacting with this environment puts them further at risk of injury. In the neighbourhood of Gabriel-Pastor, the environment is relatively safe according to the evaluation of our audit, but has too many elements of risk for the participants of this study. While they did consider the neighbourhood safe, the many unknowns outside of the retirement home make it unsafe to walk alone. This is consistent with the findings in Rantakokko's study, where aging has the greatest effect on a person's confidence in themselves and they become more aware and fearful of risk for injury. As these mobility functionings seem to weaken, individuals see themselves as less capable of travelling and moving as they used to, and often underestimate their actual capabilities and skills (Rantakokko *et al.*, 2012).

The confidence and absence of perceived risk are an important functioning when it comes to travelling on foot. An individual must not only confidence in one's own abilities, but must also

feel that they are safe from danger. Insecurity was often a barrier and limitation to the daily mobility of these women. Despite the known danger for women walking and being in public spaces, it was more often due to their age than with issues of gender. Gender was not directly recognized as affecting their mobility explicitly, but it still played a role.

#### **4.2 Gender and Safety: A Feeling of Belonging in Public Spaces**

In order for an area to be walkable and attractive to elderly women, safety is a very important factor. Safety in public spaces in their neighbourhoods was a major preoccupation for the participants in this study. As an individual's relationship to the environment is formed early in life, women often learn through socialization and personal experience that they are more vulnerable to violence, particularly sexual violence (Whitzman, 2007). This vulnerability is represented spatially through a fear and a sense of non-belonging in certain public spaces, which in response limits potential and actual mobility.

The gendered fear of violence in public spaces, along with the sentiment of non-belonging, learned in early life carries into old age (Pain, 1997). The participants of this study did not recognize a gendered component to their fear of crime in public spaces, but gave examples of taking precautions that are often seen as gendered. For example, several mentioned that they wore plain clothes and avoided attracting attention, and did not go out at night.

The fear and perception of risk was also reinforced by the emptiness of the streets. The feeling of isolation while walking in their neighbourhood was mentioned by several women as an element that made their neighbourhood unattractive and unappealing for walking. They ultimately did not perceive it as safe.



### **4.3 Putting capabilities to the test: overcoming obstacles in a difficult environment**

During this study, we saw two types of daily trips. The first were necessary trips, such as going to the doctor or the market. The second type was non-essential trips, such as seeing friends or leisurely walks, which came from a desire to travel. As the maintenance of autonomy and social relations is important for the aging process, the ability to travel on a daily basis affects it greatly. In this study, the ability to travel within the public space of the city depended on two factors: an individual's sociocultural perceptions of the environment, and the physical constraints this environment imposed on them. These two conditions shape an individual's ability and willingness to travel through the urban space.

Faced with these constraints and obstacles, the individual is either immobilized and becomes contained to the home, or adopts strategies to adapt to the challenges they face. In the latter case, they maintain some mobility, but it stays conditional to their willingness and ability to adapt. As a result, they are faced with the choice of either becoming immobile, or adapting to the challenges in front of them. Their mobility is therefore changed, due to the effort that must be put into these strategies. However, as capabilities are unequal and dependent on individual realities, those who do not have the necessary conditions to adapt to these constraints find themselves immobile, greatly reducing their quality of life (see figure 33).

## Motivation to travel, potential mobility, and actual mobility

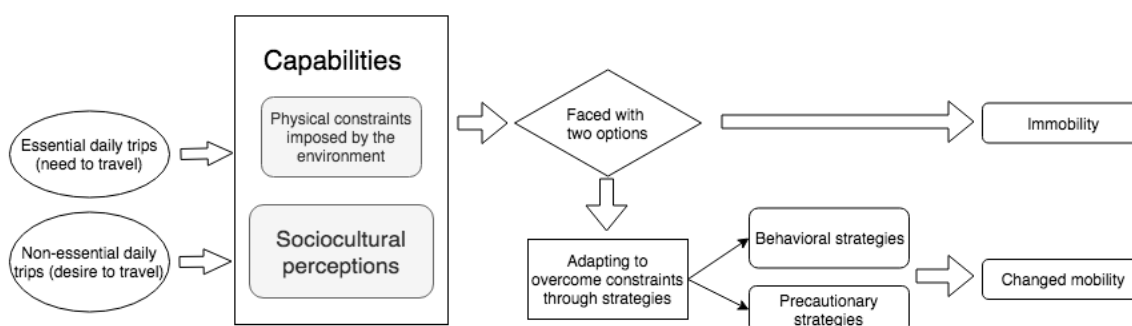


Diagram by Karine Picard

Figure 34: Motivation to travel, potential mobility and actual mobility

Personal factors form an individual's functionings and their ability to be mobile, but the state of the environment they must navigate also plays a part in an individual's potential mobility. An important obstacle and barrier in the daily mobility of the participants in this study was the hostility of their neighbourhoods. It weighed significantly in their travel choices and mobility habits. Those who did walk regularly did it mostly out of necessity, and the others chose alternative forms of travel, such as driving. Their environments were perceived as unsafe because they were degraded, neglected and generally uncomfortable. However, the degraded state of the pedestrian infrastructure put them at risk of injury. These environments are therefore not adapted, amenable or interesting to an aging population, for whom a walkable and accessible environment is crucial for longevity and health in old age.

Walking as a form of transportation is important for the elderly as it is beneficial to their physical and mental well-being, but the ability and willingness to walk depend on both personal and environmental factors (Adkins *et al.*, 2012; Borst *et al.*, 2009; Gallagher *et al.*, 2012; Lavery *et al.*, 1996; Lockett *et al.*, 2005; Rantakokko *et al.*, 2012). However, these women's

neighbourhoods were not appealing for walking, and travel on foot was done generally out of sheer necessity, and as a last resort. For the women who had access to cars, walking was not so much an option as a form of transportation, but more of a leisurely activity enjoyed in certain areas (such as the historical city centre or in parks). The environment imposes several elements that serve as capabilities, either encouraging walking or impeding it. The presence and state of pedestrian infrastructure, which significantly contribute to the walkability of an environment. They serve to ensure the actual and perceived safety of pedestrians, by keeping them out of harm's way of vehicles. According to the literature, these plays a large part in the appropriation of public spaces by the elderly, as it is a major component in ensuring their actual and perceived safety (Clarke *et al.*, 2013; Lavery *et al.*, 1996; Lockett *et al.*, 2005; Rantakokko *et al.*, 2012; Rosso *et al.*, 2011).

The participants of this study saw the state of the environment as a preoccupation and a barrier to their mobility. This preoccupation was reinforced by the environmental audit, which revealed the shortcomings of these neighbourhoods in terms of pedestrian safety, in particular. The lack or decrepit state of pedestrian infrastructure posed a risk for elderly pedestrians, making walking more demanding, as well as putting them at risk of injury, either from falling, tripping, or proximity to vehicles. All three neighbourhoods in this study had significant drawbacks when it came to pedestrian safety. In both La Hacienda and El Refugio, safety was greatly compromised by the absence or inadequacy of pedestrian infrastructure, with significant damage present on more than half of the segments audited. This greatly discouraged walking to nearby destinations, or just simply walking for leisure, as it involved putting oneself at risk. In Gabriel-Pastor, while most segments did have the necessary elements to ensure safety and security of elderly pedestrians, its absence on several key street segments became an obstacle, ultimately interrupting a potential trajectory. This either causes the person to have to deviate their trajectory, making it longer and

more tiring, or ultimately discourages them from making the trip altogether. This is consistent with Borst's findings on the walking habits of elderly pedestrians, who would often take longer, but less demanding trajectories, as compared to more physically exerting or potentially dangerous trajectories (Borst *et al.*, 2009). These realities therefore diminish their potential mobility, as they must consider the obstacles present in their environment, as well as their personal ability to overcome them.

#### **4.4 Attractiveness as a Capability**

A capability can also be seen as something that encourages and facilitates the completion of an action. The environment imposes several elements that serve as capabilities, either encouraging walking or impeding it. In this case, the attractiveness of an environment is a capability. As mentioned by Forsyth (2015), the attractiveness of an environment on a pedestrian scale is a significant part of its walkability. This was reflected in the environmental audit, whereby the proximity of destinations of interest for the elderly contributed positively to the attractiveness of an area, such as in El Refugio and Gabriel-Pastor, where restaurants, shops and services were accessible on foot. La Hacienda had a few destinations of interest within the neighbourhood, but the division of these destinations as above and below a large hill play a part in their accessibility.

The accessibility of important destinations (such as services and activities) is a significant functioning that contributes to this capability. The greater the number of accessible destinations, the greater the functioning. If destinations are absent or few, far away or inaccessible due to obstacles and barriers in the environment, it diminishes the capability of attractiveness. This is reflected in the urban morphology and land use of the neighbourhood. Higher density and mixed use neighbourhoods tend to have higher walkability scores, as services and destinations are

accessible on foot (Adkins *et al.*, 2012; Borst *et al.*, 2009; Gallagher *et al.*, 2012; Lockett *et al.*, 2005).

In addition to interesting destinations, having a comfortable environment and visually interesting elements that make walking a comfortable and positive experience, act as important functionings for the attractiveness of an environment. Elements of attractiveness such as vegetation and trees were mentioned in the interviews as an encouraging factor for walking, and negative elements such as neglect, vandalism and trash in the streets were not appreciated. Trees and vegetation are important for shade and are aesthetically pleasing (Borst *et al.*, 2009; Clarke *et al.*, 2013; Lavery *et al.*, 1996).

These neighbourhoods fared better in the audits for their scores of attractiveness than safety, with more than half of the segments audited receiving the score of “good.” La Hacienda scored well due to the presence of vegetation and well-maintained facades. Gabriel-Pastor scored well due to the number of interesting destinations in the neighbourhood, the presence of vegetation and buffer zones, and the high degree of maintenance of homes and buildings. El Refugio had the lowest scores for attractiveness, mainly due to the lack of maintenance, vandalism and the presence of trash in the streets.

#### **4.5 Daily Mobility: Guided by Capabilities, Actual and Perceived**

The daily mobility and the motility of these women are a reflection both of their own personal functionings and capabilities, but is also greatly affected by their neighbourhood. In addition to personal realities, the different environments affect the options and opportunities these women have to leave their home and make daily trips.

The variations in living environments between neighbourhoods play a part in the necessity, ability and desire to navigate their neighbourhoods. In Gabriel-Pastor, many needs are met within the retirement home, special permission is often needed to leave. The surrounding environment, although attractive, is not seen as safe for the women to walk through it on their own. The participants from La Hacienda rarely walk in their neighbourhood, and do most of their daily travel by car to destinations outside of their neighbourhood. Walking as a leisure activity was something practised elsewhere, but not in the neighbourhood. In El Refugio, the participants did most of their daily trips on foot, as destinations are within walking distance. However, the state of the pedestrian infrastructure and the degradation in the environment make walking a risky and unpleasant experience, only done by sheer necessity. Here, it was a form of transportation, and not a leisurely activity.

The women from these three neighbourhoods therefore saw a part of their mobility limited by the capabilities imposed by the environment, in addition to their own capabilities. This resulted in a preference for staying at home and only leaving when entirely necessary, limiting their daily travel to essential trips.

While the state of the physical environment was important in the mobility of the women in this study, it was ultimately their perception of their neighbourhoods that played a greater part. Their status as elderly people and as women shaped their relationship to their environment. In El Refugio, despite the danger and rumours of crime and delinquency, they generally felt safe from crime, as everyone knew them. They were aware of crime and violence, but did not necessarily feel targeted.

Lastly, an important aspect of this case study that cannot be overlooked is the social and cultural perceptions of public spaces in Puebla, and in Mexico. As a developing country with

significant socioeconomic inequality between the classes, the climate of fear and distrust of crime and violence increases the public/private divide. While this study did not address the issues of socioeconomic realities and their effect on access to public spaces, varying between the neighbourhoods. These variations contributed to individual perceptions of public spaces and the relative sense of belonging and safety. For example, a few women said they did not feel safe walking in their own neighbourhood. However, they felt safer in areas like the historical centre or in large public parks, because of the number of people as well as increased security. The feeling of insecurity and fear of crime and violence in their own neighbourhood reinforces the necessity to stay within the private space of their home, which leads to deserted public spaces. This feeds into the feeling of non-belonging in public spaces and the fear of isolation and vulnerability, felt not only by elderly women but by all demographics. While crime and violence cannot be solved through planning and the treatment of public spaces, making them more accessible and inviting to all populations can help reinforce the feeling of safety and belonging for all.

## Conclusion:

In Mexico, where generalized violence against women in some cities and a lack of public spaces adapted to the needs and particularities of the elderly, elderly women are often in a position of vulnerability with regard to their daily mobility. This very real risk, combined with the challenges brought on by aging, plays a large part in their daily mobility, especially with regard to walking, a very important form of activity for the elderly.

This research explored the daily mobility of elderly women living in the city of Puebla, Mexico, and aimed to see the various barriers they faced, with a particular focus on walking in their own neighbourhoods. The present study examined the daily mobility of elderly women living in an urban context where they were vulnerable as women, due to gender violence, and as a senior. This research revealed how elderly women appropriate and travel through the public space varies greatly among neighbourhoods and urban environments, creating different experiences of aging in place.

The interviews revealed that these women were generally active on a daily basis. The personal automobile was preferred as a transport mode for those with access to it, due to its convenience and time-saving. It was seen as safer than walking or taking public transportation, due to a perception of danger and isolation in the streets. The degraded state of walking infrastructure also discourages travel on foot, with most citing a fear of falling and injuring themselves. The WATS (MAPPA) audit analysis revealed distinct challenges for each neighbourhood. Despite its human scale, El Refugio presented several degraded elements making walking very difficult and dangerous, such as run-down sidewalks and holes in the ground. Gabriel-Pastor was moderately walkable, with several activities at walking distance and an overall



pleasing environment. Finally, walkability in La Hacienda was lowest, despite its attractiveness, due to the inadequate pedestrian infrastructure and the topography.

The analysis of these results revealed that the main element that stood as a barrier to these women's mobility was safety in public spaces from crime and violence. While most did not feel to be a target specifically because they were women, they did have habits that were the result of a gendered socialization of appropriation of public spaces. They were more preoccupied with their safety as an aging person than as a woman, necessarily. The participants' perception of their own abilities, combined with their perception of their neighbourhood as an unsafe and hostile environment, discouraged their willingness to travel on foot. Those who had access to cars and taxis preferred this to walking, and those who walked for leisure would do so outside of their neighbourhood.

The hostility of the neighbourhoods to walking made it not only unsafe for these women, but were mostly uninteresting to begin with. The absence or neglect of pedestrian infrastructure made walking uncomfortable and dangerous, as these could put an elderly person at risk of injury or an accident involving a vehicle. In order for an environment to be walkable, the pedestrian needs to feel safe and confident within their own abilities. They must feel confident that their own abilities are sufficient for them to navigate an environment safely, without being at risk of injury. The fear of injury is particularly important with the elderly, as the body is less resilient as it ages. In order for them to consider walking in their neighbourhood, these women needed their environment to guarantee their safety, rather than challenge it.

The findings of this study were consistent with the claims made in the literature, meaning that their mobility and potential mobility reflected the form and state of their environment. This ended up being more important than their own personal realities. For almost all of the participants,

despite their different neighbourhoods and mobility habits, staying home was the preferred option. They would go out when necessary, but were reluctant to do so because it meant facing a hostile environment, even in the neighbourhoods that received better scores for safety and attractiveness.

Addressing first the reduction of risk of injury in their neighbourhoods can improve the daily mobility of elderly women, particularly their trip done on foot. Accessible, well maintained, and appropriate pedestrian infrastructure for an elderly pedestrian ensures their feeling of safety and confidence as they walk. Removing obstacles and tripping hazards, such as trash, holes in the sidewalk and sidewalk vendors, ensures that they can reach their destination without being at risk of a fall. Keeping sidewalks flat and putting in comfortable curb ramps can increase the comfort and ease of an elderly person as they walk.

Secondly, addressing the attractiveness of a neighbourhood can encourage people to appropriate public spaces in their neighbourhoods. Introducing interesting and desirable destinations within walking distance of their home gives elderly women a reason to leave their home and walk. It offers them somewhere to go in their immediate surroundings, rather than visit destinations outside of it. Also, addressing issues of aesthetics and maintenance makes the pedestrian experience much more pleasant.

Several aspects of this study could have been improved, namely the number of participants. At only 12 participants, with 4 per neighbourhood, the interview sample size was limited by the difficulty of recruiting participants of this particular demographic, as they are reluctant to speak to strangers. In order to recruit participants, certain social groups were contacted. The participants from each neighbourhood were generally in the same social circle and had similar lifestyles, such as the residents of the retirement home in Gabriel-Pastor and the bible study group from La

Hacienda. This study therefore gave a glimpse of several cases of mobility, but was not widespread enough to reveal major trends among this population group.

In addition, the choice of the three neighbourhoods was made according to the ability to find participants. While there were differences between them, expanding this type of study to more neighbourhoods, in different areas of the city, would show the variations in mobility between varying urban tissues, sociodemographic groups. In addition, we were not able to audit the entirety of the neighbourhoods for lack of time and for safety reasons, as we needed to be accompanied in certain neighbourhoods (La Hacienda and El Refugio). For this reason, we opted to audit hypothetical trajectories between the homes and important destinations in each neighbourhood, in order to see where the women would most likely be walking.

As one of the very few, if only, studies done in Puebla on the mobility of elderly women, there is potential to do further research on the urban experiences of an increasingly significant demographic. Not only does this study shed light on the particular needs and desires of this population, but puts forward the importance of the relationship with the environment, and particularly an individual's feeling of safety and belonging in this environment. This study could be done with a variety of other vulnerable population groups, such as younger women and girls has particular needs and desires when it comes to their daily mobility in their neighbourhoods. However, in order to address the feeling of safety, belonging and identity in an urban space, it takes much more than just intervening on an infrastructural level. In order to create a safe environment, the residents need to be engaged and encouraged to interact and coexist in public spaces create a sense of community, identity and belonging.

As a vulnerable part of the population, including the voices and needs of elderly women in the planning process could improve the quality of the environment, by addressing the particular

needs of a vulnerable population. This would not only help these women and other individuals who see their mobility challenged, but could improve the interest, attractiveness, and sense of belonging in these neighbourhoods. A community in which elderly women feel sufficiently safe to walk is one where the majority of the population will feel safe. If all feel safe, feelings of pride and identity tied to the neighbourhood tend to further reinforce the willingness to improve and maintain it, and above all, to take a walk.

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Annex



## ANNEX 1: WATS 3.3.6 Puebla

1

**IDENTIFICATION - Name of researcher**

Answer 1: Karine

Answer 2: Paula

Answer 3: Autre

2

**IDENTIFICATION - Related to identification of the segment**

Answer 1 (ex.): La Hacienda

→ Skips to question 15

Answer 2 (ex.): El Refugio

→ Skips to question 3

Answer 3 (ex.): Gabriel Pastor

→ Skips to question 4

Etc.

3 (exemple)

**IDENTIFICATION - Related to identification of the segment**

Answer 1: Aberdeen

→ Skips to question 20

Answer 2: Aime

→ Skips to question 20

Answer 3: Amherst

→ Skips to question 20

Etc.

4 (exemple)

**IDENTIFICATION - Related to identification of the segment**

Answer 1: Bleau

→ Skips to question 20

Answer 2: Breault

→ Skips to question 20

Answer 3: Claudette

→ Skips to question 20

Etc.

6

**IDENTIFICATION - Related to identification of the segment**

Max Characters: 3

## ANNEX 1: WATS 3.3.6 Puebla

**7**

**Has this segment already been evaluated?**

Answer 1: Yes

→ Skips to question 27

Answer 2: No

→ Skips to question 22

**8**

**INTERSECTION AT BEGINNING OF SEGMENT - Présence of pedestrian aide at beginning of segment?**

Answer 1: Yes

→ Skips to question 23

Answer 2: No

→ Skips to question 26

**9**

**INTERSECTION AT BEGINNING OF SEGMENT - What type of pedestrian aide at the beginning of the segment?**

Minimum responses: 1

Maximum responses: N/A

Answer 1: Stop sign

Answer 2: Yield for pedestrians

Answer 3: Painted crosswalk (two lines)

Answer 4: Paved crosswalk

Answer 5: Zebra crossing

Answer 6: Pedestrian countdown

Answer 7: Stoplight for cars

Answer 8: Stoplight for pedestrians

Answer 9: Curb extension

**10**

**INTERSECTION AT BEGINNING OF SEGMENT - Deterioration or obstacle in the crossing zone?**

Answer 1: Yes

Answer 2: No

**11**

**INTERSECTION AT BEGINNING OF SEGMENT - State of the corner at beginning of segment?**

Minimum responses: 1

Maximum responses: N/A

Answer 1: Curb ramp

Answer 2: High sidewalk curb

Answer 3: Corner blocked (walls, bollards)

Answer 4: Cut corner

Answer 5: No object

## ANNEX 1: WATS 3.3.6 Puebla

12

### **BUFFER ZONES - Presence of buffer zone between street and sidewalk?**

Answer 1: Yes

→ Skips to question 30

Answer 2: No

→ Skips to question 31

13

### **BUFFER ZONES - Characteristics of buffer zone?**

Minimum responses: N/A

Maximum responses: N/A

Answer 1: Trees

Answer 2: Grass

Answer 3: Bushes

Answer 4: Flower boxes

Answer 5: Paving stones

Answer 6: Concrete/asphalt

Answer 7: Poles / Signposts / Streetlights

Answer 8: Bollards

Answer 9: Urban furniture

14

### **BUFFER ZONES - Limit between private lots and sidewalk**

Answer 1: Fencing allowing visibility

Answer 2: Doors not permitting visibility

Answer 3: Fences and doors combined

Answer 4: Other (photo)

15

### **SIDEWALKS - Presence of sidewalks on segment?**

Answer 1: Yes

→ Skips to question 36

Answer 2: No

→ Skips to question 42

16

### **SIDEWALKS - Sidewalks interrupted along segment?**

Answer 1: Yes

Answer 2: No

17

### **SIDEWALKS - Level of sidewalks along segment?**

## ANNEX 1: WATS 3.3.6 Puebla

Answer 1: Continuous level

Answer 2: Car ramps along sidewalk

Answer 3: Car exit (no ramp)

**18**

### **SIDEWALKS - Width of sidewalk along segment?**

Answer 1: Less than 4 feet (1,20m)

Answer 2: Between 4 and 6 feet (1,20 et 1,80m)

Answer 3: More than 6 feet (1,80m)

**19**

### **SIDEWALKS - What material are sidewalks made of?**

Answer 1: Concrete

Answer 2: Asphalt

Answer 3: Paving stones

Answer 4: Stones

Answer 5: Several materials

**20**

### **SIDEWALKS - Types of obstacles on the sidewalk?**

Minimum responses: 1

Maximum responses: N/A

Answer 1: None

Answer 2: Poles

Answer 3: Urban furniture

Answer 4: Fire hydrants/parking meters

Answer 5: Tables / Chairs

Answer 6: Trees/Vegetation

Answer 7: Gutter

Answer 8: Parked bicycles

Answer 9: Parked cars

Answer 10: Trashcans/recycle bins

Answer 11: Newspaper kiosque

Answer 12: Street vendors

**21**

### **SIDEWALKS - Overall state of the sidewalks along the segment?**

Answer 1: Poor

Answer 2: Several different materials

Answer 3: Good

Answer 4: Sidewalk being repaired

Answer 5: Holes in the sidewalk

Answer 6: Sidewalk slabs lifted by tree roots

**22**

### **LAND USE/BUILDINGS - Activities affecting walking**

## ANNEX 1: WATS 3.3.6 Puebla

Minimum responses: 1

Maximum responses: N/A

Answer 1: Blind walls

Answer 2: Exclusively residential

Answer 3: Industrial / Mechanic shops

Answer 4: Restaurant / Café / Bar / Patios

Answer 5: Street vendors

Answer 6: Bank

Answer 7: Hairdresser/laundromat

Answer 8: Grocery/Bakery/Tortilleria

Answer 9: Convenience store

Answer 10: Pharmacy/Clinic/Health services

Answer 11: Church/Site of worship

Answer 12: Cultural/community centre/public pool

Answer 13: Shopping centre

Answer 14: Green space

Answer 15: Clothing shop

Answer 16: No interesting activity

**23**

**LAND USE/BUILDINGS - Presence of several vacant premises?**

Answer 1: Yes

Answer 2: No

**24**

**LAND USE/BUILDINGS - Presence of businesses with shop windows?**

Answer 1: Yes

→ Skips to question 45

Answer 2: No

→ Skips to question 47

**25**

**LAND USE/BUILDINGS - Presence of steps to access shops??**

Answer 1: Yes

Answer 2: No

**26**

**LAND USE/BUILDING - Presence of construction work?**

Answer 1: Yes

Answer 2: No

**27**

**LAND USE/BUILDING - Presence of vacant lots?**

Answer 1: Oui - Bardés

Answer 2: Oui - Non bardés

## ANNEX 1: WATS 3.3.6 Puebla

Answer 3: Non

**28**

**LAND USE/BUILDING - Presence of off-street parking?**

Answer 1: Yes

Answer 2: No

**29**

**LAND USE/BUILDING - Average height of buildings along segment?**

Answer 1: Does not apply

Answer 2: 1level

Answer 3: 2 levels

Answer 4: 3 levels

Answer 5: 4-5 levels

Answer 6: 6+ levels

**30**

**PUBLIC SPACES - Are there public spaces along the segment?**

Minimum responses: 1

Maximum responses: N/A

Answer 1: None

Answer 2: Relaxation park

Answer 3: Park for children (with playground)

Answer 4: Square

Answer 5: Community garden

Answer 6: Small public space

**31**

**PUBLIC SPACES - Presence of public transit access along the segment?**

Minimum responses: 1

Maximum responses: N/A

Answer 1: None

Answer 2: Microbus with bus shelter

Answer 3: Microbus with signage

**32**

**PUBLIC SPACES - Type of urban furniture**

Minimum responses: 1

Maximum responses: N/A

Answer 1: None

Answer 2: Trash can

Answer 3: Mailbox

Answer 4: Bench

Answer 5: Phone booth

## ANNEX 1: WATS 3.3.6 Puebla

Answer 6: Space to sit (see photo)

**33**

**PUBLIC SPACE - Characteristics of benches along the segment?**

Minimum responses: 1

Maximum responses: N/A

Answer 1: Does not apply

Answer 2: Bench with back rest

Answer 3: Armrest

Answer 4: Damaged

Answer 5: Vandalized

**34**

**PUBLIC SPACE - Presence of shade from vegetation?**

Answer 1: Yes

Answer 2: No

**35**

**PUBLIC SPACE - Presence of street lighting?**

Answer 1: Yes, general

Answer 2: Yes, for pedestrians

Answer 3: No

**36**

**MAINTENANCE - Presence of degradation on buildings?**

Minimum responses: 1

Maximum responses: N/A

Answer 1: None

Answer 2: Graffiti

Answer 3: Major maintenance issues

Answer 4: Broken windows

Answer 5: Excessively peeled paint

**37**

**MAINTENANCE - Presence of trash along the segment?**

Answer 1: Yes - small detritus

Answer 2: Yes - large detritus

Answer 3: No

**38**

**IDENTIFICATION - Has this segment already been evaluated?**

Answer 1: Yes

→ Skips to question 73

Answer 2: No

→ Skips to question 68

## ANNEX 1: WATS 3.3.6 Puebla

39

**PUBLIC SPACE - Visible powerlines along the segment?**

Answer 1: Yes

Answer 2: No

40

**STREET CHARACTERISTICS - Presence of construction work?**

Answer 1: Yes

Answer 2: No

41

**STREET CHARACTERISTICS - Slope of the segment?**

Answer 1: Flat or slight

Answer 2: Moderate

Answer 3: Strong

42

**STREET CHARACTERISTICS - Number of lanes of traffic (both sides)**

Max Characters: 1

43

**STREET CHARACTERISTICS - Is street parking allowed?**

Answer 1: Yes

Answer 2: No

44

**STREET CHARACTERISTICS - Direction of traffic?**

Answer 1: One-way

Answer 2: Two-way

45

**STREET CHARACTERISTICS - Presence of central median?**

Answer 1: Yes

Answer 2: No

46

**STREET CHARACTERISTICS - Presence of traffic-calming devices?**

Minimum responses: 1

Maximum responses: N/A

Answer 1: None

Answer 2: Speed-bump

Answer 3: Pedestrian crossing (clearly marked)

Answer 4: Curb extensions (outside of intersection)

Answer 5: Pedestrian signage (30km/h zone)



## ANNEX 1: WATS 3.3.6 Puebla

Answer 6: School zone signage

**47**

**INTERSECTION AT THE END OF THE SEGMENT- Presence of pedestrian aide at the end of the segment?**

Answer 1: Yes

→ Skips to question 69

Answer 2: No

→ Skips to question 72

**48**

**INTERSECTION AT THE END OF THE SEGMENT -What type of pedestrian aide at the end of the segment?**

Minimum responses: 1

Maximum responses: N/A

Answer 1: Stop sign

Answer 2: Yield for pedestrians

Answer 3: Crosswalk with two lines

Answer 4: Crosswalk with paving stones

Answer 5: Zebra crossing

Answer 6: Pedestrian countdown

Answer 7: Stoplight for cars

Answer 8: Stoplight for pedestrians

Answer 9: Curb extension

**49**

**INTERSECTION AT THE END OF THE SEGMENT - Deterioration or obstacles on the crosswalk?**

Answer 1: Yes

Answer 2: No

**50**

**INTERSECTION AT THE END OF THE SEGMENT - State of the street corner at the end of the segment?**

Minimum responses: 1

Maximum responses: N/A

Answer 1: Curb ramp

Answer 2: Curb too high

Answer 3: Corner blocked (small wall/bollards)

Answer 4: Cut corner

Answer 5: No object

**51**

**OVERALL APPRECIATION? - What is the overall level of attractiveness for this segment?**

Answer 1: Poor

Answer 2: Moderate

Answer 3: High

## ANNEX 2: WATS ANALYSIS LEGEND

### WATS ANALYSIS LEGEND

#### QUESTIONS AND ANSWERS CONTRIBUTING TO ATTRACTIVENESS

#### QUESTIONS AND ANSWERS CONTRIBUTING TO SAFETY

8	POINTS	
<b>INTERSECTION AT BEGINNING OF SEGMENT - Presence of pedestrian aide ?</b>		<b>Q1_AideDeb</b>
Answer 1: Yes	1	Ideal
Answer 2: No	-1	Bad
<b>9</b>		
<b>INTERSECTION AT BEGINNING OF SEGMENT - - What type of pedestrian aide?</b>		<b>Aucun</b>
Minimum responses: 1		
Maximum responses: N/A		
Answer 1: Stop sign	1	Minimal
Answer 2: Yield for pedestrians	1	Minimal
Answer 3: Crosswalk with two painted lines	2	Average
Answer 4: Crosswalk with paving stones	2	Average
Answer 5: Zebra crossing	2	Average
Answer 6: Countdown for pedestrians	3	Ideal
Answer 7: Stoplights for cars	2	Average
Answer 8: Stoplights for pedestrians	3	Ideal
Answer 9: Curb extension	3	Ideal
<b>10</b>		
<b>INTERSECTION AT BEGINNING OF SEGMENT - Deterioration or obstacle in crosswalk?</b>		<b>Q3_ChTrvAb</b>
Answer 1: Yes	-1	Bad
Answer 2: No	1	Ideal
<b>11</b>		
<b>INTERSECTION AT BEGINNING OF SEGMENT - State of the corner at the beginning of the segment?</b>		
Minimum responses: 1		
Maximum responses: N/A		
Answer 1: Curb ramp	3	Ideal
Answer 2: Sidewalk too high	-1	Bad
Answer 3: Corner blocked (small wall, bollards)	-1	Bad
Answer 4: Cut corner	2	Average
Answer 5: No object	0	Not bad, nor good
<b>12</b>		

ANNEX 2: WATS ANALYSIS LEGEND

<b>13</b>	<b>BUFFER ZONE - Presence of buffer zone between sidewalk and street?</b>	<b>Q6_ZTampon</b>		
	Answer 1: Yes		1	Ideal
	Answer 2: No		0	Not bad, nor good
<b>13</b>	<b>BUFFER ZONE - Characteristics of the buffer zone?</b>	<b>Aucun</b>		
	Minimum responses: N/A			
	Maximum responses: N/A			
	Answer 1: Trees	<b>Q7_ZTamp1</b>	4	Ideal
	Answer 2: Grass	<b>Q7_ZTamp2</b>	2	Average
	Answer 3: Bushes	<b>Q7_ZTamp3</b>	3	Good
	Answer 4: Flowerboxes	<b>Q7_ZTamp4</b>	3	Good
	Answer 5: Paving stones	<b>Q7_ZTamp5</b>	2	Average
	Answer 6: Concrete/asphalt	<b>Q7_ZTamp6</b>	1	Average
	Answer 7: Poles/signposts/streetlights	<b>Q7_ZTamp7</b>	1	Average
	Answer 8: Bollards	<b>Q7_ZTamp8</b>	1	Moyen
	Answer 9: Urban furniture	<b>Q7_ZTamp9</b>	3	Good
<b>14</b>	<b>BUFFER ZONES - Limitation between private lots and sidewalk</b>	<b>Q8_Limite</b>		
	Answer 1: Fencing allowing visibility	<b>Q8_Limite1</b>	2	Ideal
	Answer 2: Doors not permitting visibility	<b>Q8_Limite2</b>	-1	Bad
	Answer 3: Fences and doors combined	<b>Q8_Limite3</b>	1	Average
	Answer 4: Other (photo)	<b>Q8_Limite4</b>		
<b>15</b>	<b>SIDEWALKS - Presence of sidewalks on segment?</b>	<b>Q11_Trottoi</b>		
	Answer 1: Yes		2	Ideal
	Answer 2: No		-1	Bad
<b>16</b>	<b>SIDEWALKS - Sidewalks interrupted along segment?</b>	<b>Q12_TroInt</b>		
	Answer 1: Yes		-1	Bad
	Answer 2: No		2	Ideal
<b>17</b>	<b>SIDEWALKS - Level of sidewalks along segment?</b>			
	Answer 1: Continuous level	<b>Q13_TrNiv1</b>	2	Ideal
	Answer 2: Car ramps along sidewalk	<b>Q13_TrNiv2</b>	-1	Bad
	Answer 3: Car exit (no ramp)	<b>Q13_TrNiv3</b>	1	Average
<b>18</b>				

ANNEX 2: WATS ANALYSIS LEGEND

<b>18</b>	<b>SIDEWALKS - Width of sidewalk along segment?</b>	<b>Q14_LargTr</b>		
	Answer 1: Less than 4 feet (1,20m)		-1	Bad
	Answer 2: Between 4 and 6 feet (1,20 et 1,80m)		1	Average
	Answer 3: More than 6 feet (1,80m)		2	Ideal
<b>19</b>	<b>SIDEWALKS - What material are sidewalks made of?</b>	<b>Q15_MatTro</b>		
	Answer 1: Concrete		3	Ideal
	Answer 2: Asphalt		2	Good
	Answer 3: Paving stones		1	Average
	Answer 4: Stones		1	Average
	Answer 5: Several materials		1	Average
<b>20</b>	<b>SIDEWALKS - Types of obstacles on the sidewalk?</b>	<b>Aucun</b>	1	Ideal
	Minimum responses: 1			
	Maximum responses: N/A			
	Answer 1: None	<b>Q16_ObTAuc</b>	2	Ideal
	Answer 2: Poles	<b>Q16_ObTy1</b>	-1	Average
	Answer 3: Urban furniture	<b>Q16_ObTy2</b>	-1	Average
	Answer 4: Fire hydrants/parking meters	<b>Q16_ObTy3</b>	-1	Average
	Answer 5: Tables / Chairs	<b>Q16_ObTy4</b>	-1	Average
	Answer 6: Trees/Vegetation	<b>Q16_ObTy5</b>	-1	Average
	Answer 7: Gutter	<b>Q16_ObTy6</b>	-1	Average
	Answer 8: Parked bicycles	<b>Q16_ObTy7</b>	-1	Average
	Answer 9: Parked cars	<b>Q16_ObTy8</b>	-2	Bad
	Answer 10: Trashcans/recycle bins	<b>Q16_ObTy9</b>	-1	Average
	Answer 11: Newspaper kiosque	<b>Q16_ObTy10</b>	-1	Average
	Answer 12: Street vendors	<b>Q16_ObTy11</b>	-2	Bad
<b>21</b>	<b>SIDEWALKS - Overall state of the sidewalks along the segment?</b>	<b>Q17_EtatTr</b>		
	Answer 1: Poor	<b>Q17_EtatT1</b>	-1	Bad
	Answer 2: Several different materials	<b>Q17_EtatT2</b>	1	Average
	Answer 3: Good	<b>Q17_EtatT3</b>	3	Good
	Answer 4: Sidewalk being repaired	<b>Q17_EtatT4</b>	0	Not bad, nor good
	Answer 5: Holes in the sidewalk	<b>Q17_EtatT5</b>	-1	Bad
	Answer 6: Sidewalk slabs lifted by tree roots	<b>Q17_EtatT6</b>	-1	Bad
<b>22</b>	<b>LAND USE/BUILDINGS - Activities affecting walking</b>	<b>Aucun</b>		

## ANNEX 2: WATS ANALYSIS LEGEND

Answer 1: Blind walls	Q18_OcTy1	-1	Bad
Answer 2: Exclusively residential	Q18_OcTy2	2	Average
Answer 3: Industrial / Mechanic shops	Q18_OcTy3	-2	Very bad
Answer 4: Restaurant / Café / Bar / Patios	Q18_OcTy4	3	Good
Answer 5: Street vendors	Q18_OcTy5	2	Average
Answer 6: Bank	Q18_OcTy6	3	Good
Answer 7: Hairdresser/laundromat	Q18_OcTy7	3	Good
Answer 8: Grocery/Bakery/Tortilleria	Q18_OcTy8	4	Ideal
Answer 9: Convenience store	Q18_OcTy9	3	Good
Answer 10: Pharmacy/Clinic/Health services	Q18_OcTy10	4	Ideal
Answer 11: Church/Site of worship	Q18_OcTy11	4	Ideal
Answer 12: Cultural/community centre/public pool	Q18_OcTy12	3	Good
Answer 13: Shopping centre	Q18_OcTy13	4	Ideal
Answer 14: Green space	Q18_OcTy14	4	Ideal
Answer 15: Clothing shop	Q18_OcTy15	3	Good
Answer 16: No interesting activity	Q18_OcTy16	-1	Bad
<b>23</b>			
<b>LAND USE/BUILDINGS - Presence of several vacant premises?</b>	<b>Q19_LocVac</b>		
Answer 1: Yes		-1 ou 0	Bad
Answer 2: No		2	Ideal
<b>24</b>			
<b>LAND USE/BUILDINGS - Presence of businesses with shop windows?</b>	<b>Q20_Vitrine</b>		
Answer 1: Yes		2	Ideal
Answer 2: No		0	Average
<b>25</b>			
<b>LAND USE/BUILDINGS - Presence of steps to access shops??</b>	<b>Q22_Marche</b>		
Answer 1: Yes		-1	Bad
Answer 2: No		2	Ideal
<b>26</b>			
<b>LAND USE/BUILDING - Presence of construction work?</b>	<b>Q23_Constr</b>		
Answer 1: Yes		-1	Bad
Answer 2: No		2	Ideal
<b>27</b>			
<b>LAND USE/BUILDING - Presence of vacant lots?</b>	<b>Q24_TerVac</b>		
Answer 1: Oui - Bardés		0	Average
Answer 2: Oui - Non bardés		-1	Bad
Answer 3: Non		2	Ideal

ANNEX 2: WATS ANALYSIS LEGEND

<b>28</b>	<b>LAND USE/BUILDING - Presence of off-street parking?</b>	<b>Q25_Statio</b>		
Answer 1: Yes			-1	Bad
Answer 2: No			0	Average
<b>29</b>	<b>LAND USE/BUILDING - Average height of buildings alongs segment?</b>	<b>Q26_HtBati</b>		
Answer 1: Does not apply			0	Does not apply
Answer 2: 1level			2	Good
Answer 3: 2 levels			3	Ideal
Answer 4: 3 levels			3	Ideal
Answer 5: 4-5 levels			1	Average
Answer 6: 6+ levels			-1	Bad
<b>30</b>	<b>PUBLIC SPACES - Are there public spaces along the segment?</b>			
Minimum responses: 1				
Maximum responses: N/A				
Answer 1: None		<b>Q27_EPubAu</b>	0	Does not apply
Answer 2: Relaxation park		<b>Q27_EPTyp1</b>	4	Ideal
Answer 3: Park for children (with playground)		<b>Q27_EPTyp2</b>	2	Average
Answer 4: Square		<b>Q27_EPTyp3</b>	3	Good
Answer 5: Community garden		<b>Q27_EPTyp4</b>	2	Average
Answer 6: Small public space		<b>Q27_EPTyp5</b>	3	Good
<b>31</b>	<b>PUBLIC SPACES - Presence of public transit access along the segment?</b>			
Minimum responses: 1				
Maximum responses: N/A				
Answer 1: None		<b>Q28_ArBus1</b>	0	Does not apply
Answer 2: Microbus with bus shelter		<b>Q28_ArBus2</b>	2	Ideal
Answer 3: Microbus with signage		<b>Q28_ArBus3</b>	1	Average
<b>32</b>				

ANNEX 2: WATS ANALYSIS LEGEND

<b>PUBLIC SPACES - Type of urban furniture</b>				
Minimum responses: 1				
Maximum responses: N/A				
Answer 1: None		Q30_MobAuc	0	Does not apply
Answer 2: Trash can		Q30_MobTy1	1	Average
Answer 3: Mailbox		Q30_MobTy2	1	Average
Answer 4: Bench		Q30_MobTy3	2	Ideal
Answer 5: Phone booth		Q30_MobTy4	1	Average
Answer 6: Space to sit (see photo)		Q30_MobTy5	2	Ideal
<b>33</b>				
<b>PUBLIC SPACE - Characteristics of benches along the segment?</b>		<i>Aucun</i>		
Minimum responses: 1				
Maximum responses: N/A				
Answer 1: Does not apply		Q31_BancNA	0	Does not apply
Answer 2: Bench with back rest		Q31_Banc1	2	Ideal
Answer 3: Armrest		Q31_Banc2	1	Average
Answer 4: Damaged		Q31_Banc3	-1	Bad
Answer 5: Vandalized		Q31_Banc4	-2	Very bad
<b>34</b>				
<b>PUBLIC SPACE - Presence of shade from vegetation?</b>		Q32_Ombre		
Answer 1: Yes			2	Good
Answer 2: No			0	No influence
<b>35</b>				
<b>PUBLIC SPACE - Presence of street lighting?</b>				
Answer 1: Yes, general		Q40_Ecl1	1	Good
Answer 2: Yes, for pedestrians		Q40_Ecl2	2	Ideal
Answer 3: No		Q40_Ecl3	-1	Bad
<b>36</b>				
<b>MAINTENANCE - Presence of degradation on buildings?</b>				
Minimum responses: 1				
Maximum responses: N/A				
Answer 1: None		Q39_Degr1	2	Good
Answer 2: Graffiti		Q39_Degr2	-1	Bad
Answer 3: Major maintenance issues		Q39_Degr3	-2	Very bad
Answer 4: Broken windows		Q39_Degr4	-1	Bad
Answer 5: Excessively peeled paint		Q39_Degr5	-1	Bad
<b>37</b>				

## ANNEX 2: WATS ANALYSIS LEGEND

<b>MAINTENANCE - Presence of trash along the segment?</b>		<b>Q41_Dechet</b>		
Answer 1: Yes - small detritus			0	Average
Answer 2: Yes - large detritus			-2	Very bad
Answer 3: No			2	Good
<b>38</b>				
<b>IDENTIFICATION - Ce segment a-t-il déjà fait l'objet d'une évaluation?</b>				<b>EvalF_2e</b>
Answer 1: Yes				
→ Skips to question 73				
Answer 2: No				
→ Skips to question 68				
<b>39</b>				
<b>PUBLIC SPACE - Visible powerlines along the segment?</b>		<b>Q41_Fils</b>		
Answer 1: Yes			0	Not bad, nor good
Answer 2: No			1	Ideal
<b>40</b>				
<b>STREET CHARACTERISTICS - Presence of construction work?</b>		<b>Q33_Travau</b>		
Answer 1: Yes			-1	Bad
Answer 2: No			2	Ideal
<b>41</b>				
<b>STREET CHARACTERISTICS - Slope of the segment?</b>		<b>Q34_Pente</b>		
Answer 1: Flat or slight			3	Ideal
Answer 2: Moderate			2	Average
Answer 3: Strong			-1	Bad
<b>42</b>				
<b>STREET CHARACTERISTICS - Number of lanes of traffic (both sides)</b>		<b>Q35_NbCirc</b>		
Max Characters: 1			3	Ideal (1 lane)
			2	Average (2 lanes)
			-1	Bad (+3 lanes)
<b>43</b>				
<b>STREET CHARACTERISTICS - Is street parking allowed?</b>		<b>Q35_Stat</b>		
Answer 1: Yes			1	Average
Answer 2: No			2	Ideal
<b>44</b>				
<b>STREET CHARACTERISTICS - Direction of traffic?</b>		<b>Q36_Sens</b>		
Answer 1: One-way			2	Ideal
Answer 2: Two-way			0	Average



ANNEX 2: WATS ANALYSIS LEGEND

<b>45</b>	<b>STREET CHARACTERISTICS - Presence of central median?</b>	<b>Q37_TerreP</b>		
Answer 1: Yes			0	Average
Answer 2: No			2	Ideal
<b>46</b>	<b>STREET CHARACTERISTICS - Presence of traffic-calming devices?</b>			
Minimum responses: 1				
Maximum responses: N/A				
Answer 1: None		<b>Q38_Redua</b>	0	None
Answer 2: Speed-bump		<b>Q38_Redua1</b>	3	Ideal
Answer 3: Pedestrian crossing (clearly marked)		<b>Q38_Redua2</b>	2	Good
Answer 4: Curb extensions (outside of intersection)		<b>Q38_Redua3</b>	3	Ideal
Answer 5: Pedestrian signage (30km/h zone)		<b>Q38_Redua4</b>	2	Good
Answer 6: School zone signage		<b>Q38_Redua5</b>	1	Average
<b>47</b>	<b>INTERSECTION AT THE END OF THE SEGMENT- Presence of pedestrian aide at the end of the segment?</b>	<b>Q42_AidFin</b>		
Answer 1: Yes			1	Ideal
→ Skips to question 69				
Answer 2: No			-1	Bad
→ Skips to question 72				
<b>48</b>	<b>INTERSECTION AT THE END OF THE SEGMENT -What type of pedestrian aide at the end of the segment?</b>			
Minimum responses: 1				
Maximum responses: N/A				
Answer 1: Stop sign		<b>Q42_AidF1</b>	1	Minimal
Answer 2: Yield for pedestrians		<b>Q42_AidF2</b>	1	Minimal
Answer 3: Crosswalk with two lines		<b>Q42_AidF3</b>	2	Average
Answer 4: Crosswalk with paving stones		<b>Q42_AidF4</b>	2	Average
Answer 5: Zebra crossing		<b>Q42_AidF5</b>	2	Average
Answer 6: Pedestrian countdown		<b>Q42_AidF6</b>	3	Ideal
Answer 7: Stoplight for cars		<b>Q42_AidF7</b>	2	Average
Answer 8: Stoplight for pedestrians		<b>Q42_AidF8</b>	3	Ideal
Answer 9: Curb extension		<b>Q42_AidF9</b>	3	Ideal
<b>49</b>	<b>INTERSECTION AT THE END OF THE SEGMENT - Deterioration or obstacles on the crosswalk?</b>	<b>Q44_ChTrAb</b>		
Answer 1: Yes			-1	Bad
Answer 2: No			1	Ideal

ANNEX 2: WATS ANALYSIS LEGEND

**50**  
**INTERSECTION AT THE END OF THE SEGMENT - State of the street corner at the end of the segment?**

Minimum responses: 1  
 Maximum responses: N/A  
 Answer 1: Curb ramp  
 Answer 2: Curb too high  
 Answer 3: Corner blocked (small wall/bollards)  
 Answer 4: Cut corner  
 Answer 5: No object

Q4_CoinF1	2	Ideal
Q4_CoinF2	-1	Bad
Q4_CoinF3	-1	Bad
Q4_CoinF4	1	Average
Q4_CoinF5	0	None

**51**  
**OVERALL APPRECIATION? - What is the overall level of attractiveness for this segment?**

Answer 1: Poor  
 Answer 2: Moderate  
 Answer 3: High

Q47_Attrac
------------

**52**  
**NOTE AND COMMENTS ABOUT SEGMENT - 255 characters max**

Max Characters: 255

Safety	
Highest possible score*	56
Lowest possible score	-13

Attractiveness	
Highest possible score*	45
Lowest possible score	-9

\*Points according to "ideal" or highest points for each question

	Safety	Attractiveness
Very Good	60	
	55	
	50	
Good	45	45
	40	40
	35	35

ANNEX 2: WATS ANALYSIS LEGEND

Moderate

30

30

25

25

20

20

Poor

15

15

10

10

5

5

0

0

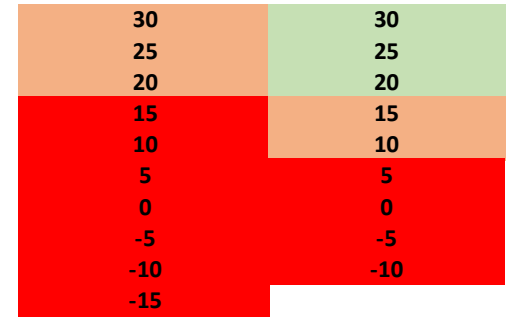
-5

-5

-10

-10

-15



## Annex 3:

### Interview Guide

Age, gender and mobility:

The daily mobility of elderly women in Puebla, Mexico

Hello, my name is Karine Picard. I am a student from l'Université de Montréal, in Canada. I am doing a Masters' degree in Urban planning. Thank you for agreeing to participate in this research project.

I'd like to remind you that you do not run any risk by participating in this study. Everything that is said during this interview is completely confidential and it will not be possible to identify you directly.

During the interview, I will ask a series of questions, but if any question makes you uncomfortable, you are not obligated to answer it.

With your permission, I would like to record the interview. This will facilitate the note taking process. All of the information gathered here is entirely confidential and for academic purposes.

#### *Theme and Questions*

##### **Theme 1: Introduction**

- 1. How long have you lived in this house and this neighbourhood?**
- 2. What do you like about your neighbourhood?**
  - *What don't you like about it?*

##### **Theme 2: Overall Mobility**

- 3. Tell me about the trips you take on a daily basis? Where do you go?**
  - Shopping
  - Leisure/activities
  - Pharmacy
  - Social (friends/family)
  - *How do you get to these places?*
    - On foot
    - By car (accompanied or driving)
    - Public transit
    - Taxi
    - Are they in the neighbourhood or further out?
  - *Are there certain places in the neighbourhood that you enjoy visiting on a regular basis? Which?*
- 4. Do you take part in social activities in the neighbourhood?**
- 5. What do you like about walking in your neighbourhood?**
  - *What don't you like about walking in your neighbourhood?*

**Theme 3: Perception of Safety**

6. If I say « *(Gabriel-Pastor/La Hacienda/El Refugio)* is a safe neighbourhood. » Do you agree? Why or why not?
7. When you walk down the street in the neighbourhood, do you feel safe and respected as a woman?
- *Are there things that bother you in the street, as a woman?*
8. Do you feel safe and respected as an elderly person?
- *Are there things that bother you, as an elderly person?*
9. Are there areas that you avoid for safety reasons? Which ones? Why?

**Theme 4: Experiences and strategies**

10. Have your daily mobility habits changed in the past few years?
- Time of outings
  - Destinations
  - Frequency of trips
11. Do you take any precautions when you leave the house? Which ones?
- Being accompanied
  - Dress, type of shoes
  - Use of cane
  - Time of outings
12. Have you or anyone you know experienced an event which has caused you to change your mobility habits? (ex: a fall, a mugging, injury)

\*\*\*\*

This concludes the interview. Do you have any questions for me, or anything to add?

## Guía de entrevista

Movilidad, edad y género:

La movilidad cotidiana de mujeres mayores en tres barrios y colonias de Puebla, México

Buenos días, mi nombre es Karine Picard, soy estudiante de la Universidad de Montreal, en Canadá, en la maestría en urbanismo. Le agradezco que haya aceptado participar en este proyecto de investigación.

Le recuerdo que usted no corre ningún riesgo si participa en este proyecto. Todo lo que se diga durante esta entrevista será totalmente confidencial y no será posible identificarla a usted directamente.

Durante la entrevista, le voy a hacer una serie de preguntas, si alguna pregunta le incomoda, siéntase libre de no contestarla.

Con su permiso, quisiera grabar nuestra conversación. Esto me facilitará la toma de apuntes. La información será totalmente confidencial y para fines académicos.

<p><b>Tema 1: Introducción</b></p> <p><b>1. Desde hace cuánto tiempo vive usted en este lugar? En esta colonia?</b></p> <p><b>2. Qué cosas le agradan de su colonia?</b></p> <ul style="list-style-type: none"><li>• Qué cosas le agradan menos?</li></ul>
<p><b>Tema 2: Movilidad en general</b></p> <p><b>3. Platíqueme de los lugares a donde va usualmente durante una semana.</b></p> <ul style="list-style-type: none"><li>• Compras</li><li>• Diversión</li><li>• Farmacia</li><li>• Social (amigos / familia)</li><li>• Visita al médico, a una clínica</li><li>• Otros</li></ul> <p>• <b><i>Cómo se va usted a esos lugares?</i></b></p> <ul style="list-style-type: none"><li>• Camina</li><li>• Va en coche (acompañada)</li><li>• En transporte público</li><li>• En taxi</li><li>• Destinos en la colonia o fuera de la colonia?</li></ul> <p>• <b><i>Hay algunos lugares a los que le gusta ir más que a otros? Cuáles?</i></b></p> <p><b>4. Le gusta caminar en su colonia? Porqué?</b></p> <ul style="list-style-type: none"><li>• Si camina: Qué es <u>lo que más</u> le gusta cuando camina en la colonia?</li><li>• Si camina: Qué es <u>lo que le menos</u> le gusta cuando camina en la colonia?</li></ul>

	<p><b>5. Hay otros lugares en donde a usted le gusta caminar?</b></p> <ul style="list-style-type: none"> <li>• Porque le gusta ir ahí?</li> </ul>
	<p><b>Tema 3: Relaciones sociales</b></p> <p><b>6. Qué tipo de relaciones mantiene usted con sus vecinos? (ej. de amistad, cordiales)</b></p> <p><b>7. Participa usted en actividades sociales en la colonia? (ej. juntas de vecinos, fiestas religiosas)</b></p>
	<p><b>Tema 4: Percepción de seguridad</b></p> <p><b>8. Si le digo: la colonia <i>Gabriel Pastor</i> es segura. Está usted de acuerdo? Por qué?</b></p> <p><b>9. Cuando usted camina en la calle, se siente segura y respetada como mujer?</b></p> <ul style="list-style-type: none"> <li>• <i>Hay cosas que le molestan?</i></li> </ul> <p><b>10. Se siente usted en seguridad y respetada como adulto mayor?</b></p> <ul style="list-style-type: none"> <li>• <i>Hay cosas que le molestan?</i></li> </ul> <p><b>11. Hay lugares a los cuales usted no le gusta ir por cuestiones de seguridad? Cuáles? Por qué?</b></p>
	<p><b>Tema 5: Experiencias y estrategias</b></p> <p><b>12. Ha usted cambiado su manera de desplazarse en la colonia en los últimos años?</b></p> <ul style="list-style-type: none"> <li>• Horas de salida</li> <li>• Destinos, rutas</li> <li>• Frecuencia</li> </ul> <p><b>13. Toma usted algunas precauciones cuando camina en la calle? Cuáles son?</b></p> <ul style="list-style-type: none"> <li>• Caminar acompañada</li> <li>• Vestimenta, tipo de zapatos</li> <li>• Uso de bastón</li> </ul> <p><b>14. Ha sido usted, o alguien que conoce, víctima reciente de algún incidente (robo, caída, intimidación), después del cual decidió usted cambiar sus hábitos de movilidad?</b></p> <p><b>15. Finalmente, le pediré si me puede proporcionar los siguientes datos, son únicamente para fines de clasificación</b></p> <ul style="list-style-type: none"> <li>• Año de nacimiento (o edad)</li> <li>• Vive usted sola, con sus hijos, con su esposo, con otro familiar?</li> <li>• Tiene familiares que vivan en esta colonia?</li> <li>• En la ciudad de Puebla?</li> </ul> <p>****</p> <p>Con esto terminamos la entrevista, le agradezco mucho su colaboración. Desea usted hacerme alguna pregunta?</p>

Madame Karine Picard  
Candidate à la maîtrise  
Urbanisme et architecture du paysage - Faculté de l'aménagement

**OBJET: Approbation éthique**

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Mme Karine Picard,

Le *Comité plurifacultaire d'éthique de la recherche (CPER)* a étudié le projet de recherche intitulé « Mobilité, âge, et genre: la mobilité quotidienne des femmes âgées dans trois quartiers de Puebla, Mexique » et a délivré le certificat d'éthique demandé suite à la satisfaction des exigences précédemment émises.

Notez qu'il y apparaît une mention relative à un suivi annuel et que le certificat comporte une date de fin de validité. En effet, afin de répondre aux exigences éthiques en vigueur au Canada et à l'Université de Montréal, nous devons exercer un suivi annuel auprès des chercheurs et étudiants-chercheurs.

De manière à rendre ce processus le plus simple possible et afin d'en tirer pour tous le plus grand profit, nous avons élaboré un court questionnaire qui vous permettra à la fois de satisfaire aux exigences du suivi et de nous faire part de vos commentaires et de vos besoins en matière d'éthique en cours de recherche. Ce questionnaire de suivi devra être rempli annuellement jusqu'à la fin du projet et pourra nous être retourné par courriel. La validité de l'approbation éthique est conditionnelle à ce suivi. Sur réception du dernier rapport de suivi en fin de projet, votre dossier sera clos.

Il est entendu que cela ne modifie en rien l'obligation pour le chercheur, tel qu'indiqué sur le certificat d'éthique, de signaler au CPER tout incident grave dès qu'il survient ou de lui faire part de tout changement anticipé au protocole de recherche.

Nous vous prions d'agréer, Madame, l'expression de nos sentiments les meilleurs,



Jean Poupart, Président  
*Comité plurifacultaire d'éthique de la recherche (CPER)*  
Université de Montréal

JP/RS/rs

c.c. Gestion des certificats, BRDV

Paula Negron-Poblete, professeure agrégée, Urbanisme et architecture de paysage - Faculté de l'aménagement

Lourdes Flores Lucero,

Sylvie Beaudoin

p.j. Certificat CPER-17-028-D

adresse postale

3744 Jean-Brillant, B-430-8

C.P. 6128, succ. Centre-ville

Montréal QC H3C 3J7

[www.cper.umontreal.ca](http://www.cper.umontreal.ca)

Téléphone : 514-343-6111 poste 1896

[cper@umontreal.ca](mailto:cper@umontreal.ca)



## CERTIFICAT D'APPROBATION ÉTHIQUE

Le Comité plurifacultaire d'éthique de la recherche (CPEP), selon les procédures en vigueur, en vertu des documents qui lui ont été fournis, a examiné le projet de recherche suivant et conclu qu'il respecte les règles d'éthique énoncées dans la Politique sur la recherche avec des êtres humains de l'Université de Montréal.

Projet	
Titre du projet	Mobilité, âge, et genre: la mobilité quotidienne des femmes âgées dans trois quartiers de Puebla, Mexique
Étudiante requérant	Karine Picard (██████████) Candidate à la maîtrise, Urbanisme et architecture du paysage - Faculté de l'aménagement, Université de Montréal
Financement	
Organisme	FRQSC/INRS
Programme	Bourse de 2e cycle
Titre de l'octroi si différent	Mobilité, âge, et genre: la mobilité quotidienne des femmes âgées à Puebla, Mexique
Numéro d'octroi	--
Chercheur principal	--
No de compte	--
Approbation reconnue	
Approbation émise par	non
Certificat:	s.o.

### MODALITÉS D'APPLICATION

Tout changement anticipé au protocole de recherche doit être communiqué au CPEP qui en évaluera l'impact au chapitre de l'éthique.

Toute interruption prématurée du projet ou tout incident grave doit être immédiatement signalé au CPEP.

Selon les règles universitaires en vigueur, un suivi annuel est minimalement exigé pour maintenir la validité de la présente approbation éthique, et ce, jusqu'à la fin du projet. Le questionnaire de suivi est disponible sur la page web du CPEP.

██████████  
Jean Poupart, Président  
Comité plurifacultaire d'éthique de la recherche  
Université de Montréal

9 mai 2017  
Date de délivrance

1 juin 2018  
Date de fin de validité