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## PLANNING ACCESSIBILITY IN THE OLD CITY OF JERUSALEM

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### 16.1 Introduction

The Old City of Jerusalem has been settled continuously for more than 3,000 years. The current structure including the Old City walls and location of its gates exist since the early medieval era (Prawer, 1972; Rubin, 1999). The Old City contains a mixture of old and new construction, archeology, history, people of many different religions, holy sites. Each of the main monotheist religions and their denominations has their own holy sites within the Old City walls. The area is characterized by very dense population, about 35,000 residents (Jerusalem Statistical Yearbook, 2005) and in addition there are about 10 million visitors per year. This chapter discusses the tools and planning processes of accessibility in the unique and complicated nature of the Old City of Jerusalem, a model for other historic cities (see Figure 16.1).

### 16.2 Structure and topography

The Old City extends for 871 square meters (Jerusalem Statistical Yearbook, 2005), and is built on two hills separated by a valley. The Old City was built in a Medieval Mediterranean scheme, based on a former Roman city, not necessarily in accordance with the topography. Two main streets, the north-south Cardo Maximus and the east-west Decumanus Maximus, divide the Old City into four quarters, each containing residential block areas, schools, prayer places, etc. (Bahat & Rubinshtein, 1990).

The present design resembles other eastern cities. It is based on residential enclosures, connected by major streets allowing for free passage among the different parts of the Old City. Dead end streets and alleys lead to the residences. The main streets have the main trade markets, which overflow to the nearby streets, as well as most of the municipal and religious public buildings. Many of the residential homes are located on top of the commercial areas.

They can be reached only by staircases, starting from internal dead end alleys. Therefore, there are no direct passages among residential areas.

Because the streets are hundreds of years old and surrounded by very high density construction, their width in general is at its maximum 3 m, and often the space available for pedestrians does not exceed 1.50 m.



**Figure 16.1.** Muristan square, located next to the church of the Holy Sepulcher. The accessible gate to the Muristan Square, a busy shopping and restaurant enclosure, where merchandise is displayed on the street outside the shops as everywhere else in the Old City.

**Long Description:** This photo shows a semicircular triple-arched gate built of masonry in a neoclassic style. The threshold is lifted from the street lime stone pavement by a 12 cm step (made to block out vehicle). The entrance was modified to accommodate wheelchair users by insertion of a concrete ramp. Beyond the gate, there is a commercial street, about 8 m wide, where a significant amount of merchandize is displayed outdoors. The shops are tourist-oriented, offering ethnic clothing hanging down from shop-marquees, baskets, and artisan work displayed on the street pavement, and local restaurants with outdoor seating.

Some of the streets are sloped very steeply due to the natural topography. Many of the sloped streets were built with stairs to accommodate the pedestrians, while minimizing the slope between the staircases. The buildings were built along the streets, therefore the level of the entrances to the shops or houses correlates to the slope and subdivisions created by the steps.

The seven well-preserved city gates are the only way to connect this area to the New City, outside of the Old City walls. A green area around the walls helps isolate the Old City from the new construction outside of the walls. The decision to have this separation was made in the 19th century, and it is maintained to this day.

### 16.3 Mobility infrastructures

Three mobility systems are currently interconnected.

- The most common is for pedestrians who can use all streets, as long as their physical fitness permits them to use the stairs (see Figure 16.2).
- Carts and cars, built specially to suit the crowded streets, are used for transporting merchandise. For that purpose, narrow stone ramps were added to enable pushing them. These ramps are fitted to meet the distance between cart wheels (see Figure 16.3).



**FIGURE 16.2.** Residential stairway street in the Moslem Quarter. Narrow municipal service wagon, specially adapted for the narrow stairway streets, are an effective way to provide the Old City with routine municipal sanitation and maintenance services.

**Long Description:** This photo shows a residential stairway street climbing up the hill. Most of the rises are up to 14 cm, while the treads differ from 30 cm to 60 cm. The stairs are grouped by two to three steps, with landing of about 180 cm in-between. The average width of the street is about 3 m and is paved with lime-stone tiles. On the rear, the street is blocked by a residential building, allowing the public an arched path of 180 cm wide and 270 cm high. The photo shows a narrow (100 cm or less) municipal service wagon which is pulled by a modified small tractor, driving on the stairway with a man passing by the side of the vehicle.

- Cars and narrow tractors are relatively new to the Old City. These can be used only in a limited number of streets. There is no room for a side walk in these streets, which are more or less suitable for the use of cars (see Figure 16.4).

#### 16.4 The problem of planning upgrading

For many years there were no significant renovations done in the Old City. With the urgent need to improve the quality of life and upgrade the infrastructure for the increasing number of residents and tourists, a major comprehensive planning project was needed. This project was designed to address general concerns, with particular attention to accessibility. A multidisciplinary team was set up for this purpose and was coordinated by the Jerusalem Development Authority. The team was composed of representatives of the following concerns, services and entities: architecture, civil engineering, electricity, sewage, water, tourism, archeology, preservation, heritage, emergency services, religions, community organizations, and accessibility. Priorities were proposed for each street. Integration of proposals was the responsibility of the coordinator. The accessibility planning team was faced with two major dilemmas:

- How to implement the official national guidelines for accessibility in the complex context of the Old City.
- Where to start, since no criteria to prioritize the overall accessibility needs were available.

There are many cases in which enforcement of the guidelines is problematic. As a result, there are buildings and environments that do not comply with the requirements.

It is important to note that many countries, including Israel, have laws, regulations, and guidelines for barrier-free design exist in many places. These guidelines, although often similar in nature, vary from country to country. In many countries, including Israel (The Standards Institution of Israel, 1998; Guidelines for Accessibility in Open Spaces, The State of Israel, 2008) and the U.S. (ADAAG, 2002), the standards refer to minimum requirements.



**Figure 16.3.** Semi commercial street, Christian Quarter. A Street constructed as a stairway is paved by limestone tiles with a handrail mounted on the left façade wall. Narrow stone ramps are anchored into the stairway for scooter and wheelchair users as well as pushers of carts and wagons.

**Long Description:** This photo shows a street that is approximately three m wide, with shops on the right hand and a continuous stone wall on the left. Typical to the Old City of Jerusalem, the street is paved with limestone tiles and is made as a stairway, which is constructed of wide treads (60 to 100 cm) with short rises (10 to 14 cm). Larger treads allow entrances to shops. Steep and narrow stone ramps are anchored into the stairway on a line. These ramps serve wheelchair or scooter users as well as carts or wagons. A handrail fixed to the wall assists the pedestrians who prefer to use the stairway beside the ramps.

In Israel, as in the United States., full compliance with the standards is required only for construction of new buildings, as well as alteration of existing buildings. Structural barriers must be removed from the latter on the condition that this can be easily accomplished. If complying with the Standards is not readily achievable, modification that does not fully comply may be approved on the condition that it poses no health or safety risk. The regulations do not define what changes would be accomplished easily, and what expense is required for a facility to meet its obligation to remove barriers. The judgment is made on a

case-by-case basis by the planner, architect, or engineer of the facility (Adaptive Environments, 1995).

Old cities throughout the world are the ultimate environments for facing difficulties with enforcement of the guidelines. Adaptation of environments and facilities must be undertaken in accordance with standards required by law, as well as with the goal of meeting the needs of the consumer. At the same time, access needs and universal design must also relate to: heritage; historic and archaeology needs; preservation as opposed to modernization and progress; tourism; and local citizens' welfare, different religions' needs, etc.

There are guidelines, but no official audit tools to assess compliance. The first step in addressing the demand to provide accessibility is to share consistent, reliable and objective access information.



**Figure 16.4.** New Gate Streets, Christian Quarter. A street leading to the "New Gate", one of very few where private cars can enter within the walls of the Old City. Cars are parked very close to the building walls, between low stone car barriers.

**Long Description:** This photo shows a level street, about 500 cm wide, paved with lime stone tiles. The left façade is occupied by small shops, and the right façade is a mixture of buildings and a wall of a public yard. Low stone car barriers define a one way dual-purpose driving and walking route, of 320 cm wide. The distance from one barrier to the next is not constant. In front of shop entrances the barriers are grouped to block car parking, while next to blank walls the distance between the stone barriers accommodates car parking.

To provide such information, there is need for a valid and reliable accessibility evaluation tool (Dijkers, 2003).

The existing data collection tools are not official audit tools to assess compliance, and are not supported by data analysis tools. Several authors focused on identifying instruments that measure the built environment. For example, The Enabler (Steinfeld & Danford, 1997) assesses private homes. The basic premise of the work is that accessibility problems arise in the relationship between the individual and the environment. Scoring is dependent on judgments and, therefore, training in administering the tool is recommended to ensure inter-rater reliability (The Enabler, 2005).

Other tools attempt to assess hazards that persons with physical or cognitive deficits face in their homes, with the ultimate purpose of predicting and preventing falls and other injuries. Most of these tools develop a set of items that each of which constitutes a risk—e.g., loose rugs, dangling power cords, lack of grab bars, etc.—assign points for presence or absence, and add up to obtain a residence hazard score (Clemson, Fitzgerald, Heard & Cumming, 1999). A decision support system tool for evaluating accessibility of various facilities was created in Israel using mathematical equations based on the specifications of the official guideline requirements (Bendel, 2006).

Accessibility checklists are most commonly used to assess the degree to which both existing and new buildings satisfy legal criteria for access. The purpose of the Americans with Disabilities Act (ADA) checklist for Readily Achievable Barrier Removal (*ADA Compliance Materials*, 1995), e.g., is to “help you identify accessibility problems and solutions in existing facilities, in order to meet your obligations under the ADA” (*ADA Compliance Materials*, 1995, p. 2). This tool checks for compliance with the *ADA Accessibility Guidelines* (2002) and has been widely used in the U.S. since the passage of the ADA.

Most of the evaluations or audits were done regarding accessibility in existing buildings, public transportation, or tourist sites. Emerson (2008) in Ottawa and tourist sites in Chicago (Open Doors Organization, 2010) are examples. As for old cities, work was done on renovation and upgrading, for example, Athens, Greece and Ávila, Spain. A *Management Guide of Historic Cities* was published by the Organization of World Heritage Cities (1991), but accessibility was not addressed intensively. Specifically, not much work was reported on audit tools and criteria to evaluate old cities.

In regard to accessibility in the Old City of Jerusalem, the planning unit was required to make decisions and prioritize the required work. The work in planning accessibility resulted in an attempt to create such an evaluation tool, as well as a model for decision making. The pilot decision support system focused on the interplay between people and the built city environment. The results of the audit highlighted items in the Old City, that required adaptation or upgrading to better meet users' needs, and it prioritized items for implementation.

## 16.5 Decision support and evaluation system

The decision support and evaluation system is a unique and bias-free tool. Criteria were defined to grade accessibility of specific elements and spaces separately, e.g., route width, slope, etc. At this stage, weighted criteria were defined specifically for people with mobility impairments, including persons using wheelchairs, crutches, or other assistive devices.

Since the official guidelines do not take into consideration the unique situation in old cities, the criteria were defined with the official standards in mind. Deviations from these standards were allowed for reasonable accessibility within the complex layout of the Old City. Grades were given on a scale from 1-5, as follows:

- 1= inaccessible, no simple solution is apparent;
- 2= requires major renovations;
- 3= requires some renovations;
- 4= requires some superficial improvements of surfaces;
- 5= accessible according to national standards, no renovations required.

## 16.6 Audit of accessibility in the Old City

The audit of accessibility in the Old City was the first step taken in order to study and highlight the problems to be addressed in the planning process.

### **Methodology**

Information was collected regarding the streets' suitability for individuals using wheelchairs, crutches or walkers, or individuals with walking difficulties without aid devices.

The audit took place in all streets and alleys of the Old City, regardless of the size, popularity or population. The audit included public open spaces only. No buildings were evaluated.

The topics studied were:

- *Width*: When the width of the streets was not uniform along its entire length, an approximate average width of the street was established.
- *Height*: Some streets were covered, and the ceilings low. In others there were other obstacles, such as, old logs sticking out of the walls and protruding into pedestrian paths.
- *Slope*: Besides the steepness of slopes, the availability and standard of handrails was evaluated.
- *Stairs*: Size, height, surface, distance between steps and groups of steps were measured. Here again the availability and standard of handrails was assessed.
- *Surface*: Roughness of the surface, bumps, holes, missing, and uneven or broken tiles were noted.
- *Obstacles*: In addition to surface problems, poles, road blocks, electricity, telephone, other distribution boxes, and other permanent obstacles to travel were noted.
- *Signage*: For the purpose of general orientation, the location and design of signage were studied, the accessibility of signage according to the guidelines was not addressed.

Two sets of criteria were defined to analyze the data. The criteria were defined by a multidisciplinary team of experts (rehabilitation and accessibility experts, and an architect).

The first set of criteria consisted of each specific elements audited, such as, slope. In other words, if the specific element in the street complied with all requirements for mobility impaired users according to the defined standards and behaviors (as defined in the questionnaire), the element received a score of 5. However, elements received a score of 4 if some of the components did not fully comply with the standard but enabled some access. For example, the slope received a score of 4 if all components complied with the standards except, for example, the width of the slope being less than required. This approach considered the interaction between the individual and the environment, as well as possible combinations and variations between the different elements of the design.

The second set of criteria defined the overall accessibility of the street. The overall weighted grade was computed based on all the different elements, using the grades of each element determined by the first set of criteria. The relative importance of each element and the connection between elements was considered in the definition of the criteria. If all the elements at the street complied with all defined requirements, the street received a score of 5.

However, if most the relevant elements received a score of 5 or 4, but one element scored 3, then the total score was 3. As such, the system is flexible, and the criteria can be further developed and refined.

## Results

Once the two sets of criteria were defined, all streets and alleys of the Old City of Jerusalem were graded accordingly. A decision was taken to start work on the streets which graded at least 3 on the surface criterion (see Figure 16.5).

Yet, in addition to decisions based on the use of the grading system, some other components had to be considered and dealt with before any recommendations or upgrading could be implemented, such as public vs. private land ownership. The assumption is incorrect that all public areas, such as, streets alleys and squares, are public properties and everything beyond the entrance gate or door is private property in the Old City of Jerusalem. Inner dead end alleys are semi-private property, welcoming only local community members. In other cases, streets are owned by the church (see Figure 16.6).

Among the 10 million visitors per year there are people who attend the Old City on a daily basis for work, trade or school. These people can be considered residents, even if they do not live in the Old City physically. However, a great number of visitors are tourists. Therefore, to some extent, the 35,000 residents can be imagined as living in an open museum. This can create tension for the residents who wish to live a quiet and peaceful life, and who view curious tourists as intruders.

The main decision to be taken was whether to give higher priority to the residents' needs, or to those of the visitors, as these two do not always coincide. The main reasons to give priority to the residents' needs were to:

- Improve quality of life
- Advance social justice
- Involve residents in planning and implementation
- Influence on political standpoints and enhance dialogue between hostile parties.

Favoring the visitors, on the other hand:

- Increases the possibility for people from all religions to visit the holy sites
- Increases income and encourages the residents to develop new tourism-related businesses
- Improves the image of the Old City and public relations in the world.



**Figure 16.5.** Via Dolorosa, with original Roman pavement in situ. A section of the Via Dolorosa is paved with original large Roman stone tiles and is combined with much smaller stone tiles of the twentieth century. Pedestrians, carts, and wagons use the pavement intensively on a daily basis.

**Long Description:** This photo shows pedestrians walking in a market street, about 300 cm wide.. The street is paved with large original Roman lime stone tiles, uneven but smooth. The impressive original Roman pavement (measured as 300/200 cm) serves as an integral part of the 20<sup>th</sup> century lime stone pavement. This section of the market street is challenging for pedestrians with mobility disabilities, who find it hard to cope with uneven surface. On the right, dresses hang for sale in front of a shop, with an open kiosk with two customers seated at an outdoor table. On the left a cart is pushed.

After much struggle with the problem, the planning team, with the input of policy makers, concluded that each priority area has some balance between the needs of the residents and those of the tourists, with emphasis placed on residents' welfare. Priorities were based on:

- Access leading to schools, especially special education schools
- Access leading to local public services
- Access leading to meaningful Islamic, Christian, and Judaic religious sites

This decision created momentum for resident participation, despite density, distrust, costs, and other factors.



**Figure 16.6.** Semiprivate residential dead-end alley. A typical inner residential alley demonstrates different styles, sizes, angles and directions of staircases in one street, all serving private residential compounds

**Long Description:** This photo shows a dead-end residential alley, meandering up the hill. In front, the alley is evenly paved by stone tiles. From that point onward, a main wide, curved staircase leads the way. A secondary, much steeper staircase attached to the left façade, constructed of 12 steps with a handrail on one side, leads to the door of a residence. A secondary staircase of 5 steps with no handrail leads to another door in the same facade. On the right façade, a door opens to the alley. The semipublic stairway ends with an arched entrance to a private residence.

## 16.7 Implementation

A feasibility study for the upgrading of the old city, including the accessibility for people with mobility impairments, was the next step. Four different areas meeting the aforementioned criteria were chosen for the pilot phase of the project. At present, the actual implementation is being planned by the designers.

The first step will be improving the existing amenities for pedestrians, in the streets within the chosen areas, which scored at least 3 on the surface item. This includes repairing stairs, adding handrails, adding signage, and providing resting places. The goal was to make a strong impact with as little disruption to residents' daily lives as possible (see Figure 16.7).



**Figure 16.7.** Renovated, noncommercial public street. One of the accessible streets transitions into a modified stair. Most accessible streets are not connected to each other in an accessible way.

**Long Description:** This photo shows a clean, recently renovated noncommercial street. In the photo the street is level, 240 cm wide, paved with limestone tiles. The left façade combines old stone walls with a newer ones, behind which is a monastery. The right stone façade belongs to a private community compound. The street is divided in two parts by a neoclassical arch. Behind the arch, the street ends with stairs going down the hill. This street is very usable, but is isolated due to the stair at the end.

## 16.8 Public Transportation

As an element of upgrading mobility, public transportation was also considered. As of 1931 there was only one minibus line, which enters the Old City and runs on a relatively short route along the southern wall of the Old City. The goal was to develop effective public transportation, which connects to the main attractions. That way, transportation can increase the accessibility of the Old City for all, including users of personal mobility devices. While other transportation ideas were suggested, feasibility of internal public transportation has yet to be examined.

## 16.9 Conclusions and recommendations

This chapter clarified the need for an audit tool and data analysis criteria to provide consistent, reliable, and objective information when planning according to universal design principles in old cities and heritage sites. The criteria used to assess accessibility were defined based on the interaction between disability and environment, as well as on possible variations of accessible design. The data analysis tool provided reliable, unbiased results.

The described pilot decision support system is based on universal values. It is expected that the tool can be adapted to audit old cities anywhere, in preparation for upgrading accessibility. Research is recommended to test the system's usefulness in countries other than Israel, and to refine the criteria used for purposes of future evaluations.

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