

## 5. URBAN AND SOCIOECONOMIC CHARACTERISTICS OF CHICAGO AND BARCELONA

The first step to understand and analyze a city's public transportation needs is to study its social, historical, and economical characteristics. These facts about a city provide us with the necessary background in order to detect possible deficiencies in the transportation services offered, as well as propose some improvements.

In this chapter, the cities of Chicago and Barcelona are described in terms of geomorphologic characteristics such as the street layout or natural boundaries. The social use of the cities' lands is then exposed, followed by a summary of the cities' transportation patterns. With this information, a general picture of the cities' traits is given and the subsequent process of analyzing and evaluating their bus network design and operability can be properly done.

### 5.1 General information about Chicago and Barcelona

Chicago is located in the U.S. State of Illinois, on the western shore of Lake Michigan. Only 175 years old, Chicago is the third largest city in the United States, with an official population of 2.896.016, as of the 2000 census. The city itself covers 590 square kilometers but when combined with its suburbs the metropolitan area, known as Chicagoland, encompasses eight counties and almost 13.000 square kilometers with a population nearing 10 million.

The streets of Chicago primarily follow the grid system which was established by the City Council in 1908 and implemented on September, 1st 1909. The whole city follows this square grid layout, simplifying the implementation of methodical and organized indication systems as well as service networks, such as public transit.

For instance, the street numbering system is an evident example of the advantages that the city's layout provides. The baseline from which all streets and houses in Chicago are numbered are State Street, which runs North and South, and Madison Street, which runs East and West (see *Figure 2*).

The City of Chicago is divided into one mile sections (1,609 km) which contain 8 blocks to the mile. Every average block is assigned a new series of 100 numbers. Therefore, every 800 in numbers is approximately one mile.

South of Madison Street many of the streets are simply numbered. These streets run East and West and the number of the street indicates its location and distance.

While all north-south streets in Chicago are named, rather than numbered, many of the smaller streets are named in groups all starting with the same letter; thus, when traveling westward on a Chicago road, starting just past Pulaski Rd. (4000 West), one will encounter a mile-long block of cross-streets most of which have names starting with the letter "K". A mile later, just past Cicero (4800 West), the starting letter changes to "L", and so on all the way up to the letter "P".

As a curiosity, it can be mentioned that there were thirteen streets named Washington at the turn of the 20th century and that, on the first day of implementing the modern street numbering system, 75% of the mail was incorrectly addressed.

There are 77 districts that compose the City of Chicago, and one of the most distinctive is the downtown area, known as the 'Loop'. This is where the baselines of Chicago's streets start, since it is the city's business district.



Figure 2. Detail of the Loop and the baseline streets.  
Source: Regional Transportation Authority, 2000.

The City of Chicago offers a clear and logic layout, mainly because of its natural situation. It is located in a flatland area with no significant land features, which facilitates the implementation of straight streets. This particular characteristic allowed a continuous growth of the city towards its suburbs, maintaining the square grid layout and the street numbering system on most of them (see *Figure 3*).



Figure 3. Chicago and its suburbs.  
Source: Hawthorne, 2005.



The design considered the edification of buildings in only two or three sides of the blocks, and the remaining space was kept for gardens and open spaces. The reason for this was to provide sun lighting and ventilation even to the interior side of the buildings.

Different sorts of facilities were also planned ahead: there were supposed to be schools, churches, markets, parks and hospitals throughout the *Eixample* so that every single person could have easy access to them.

The grid pattern remains as a hallmark of Barcelona, but many of his other provisions were unfortunately ignored. When the design was approved, the land owners claimed that the amount of open spaces was excessive and that it made the design less profitable economically. Therefore, several changes to the design were introduced when the *Eixample* was finally built: the four sides of the blocks and the inner space were built instead of the planned two or three sides around a garden; the streets were narrower; only one of the two diagonal avenues were realized; the inhabitants were of a higher class than the mixed composition dreamed of by Cerdà, and many of the facilities were rejected as well.



Figure 5. *Eixample* street layout.  
Source: Euroave, 2005.

## 5.2 Land use

Chicago's structure follows the American pattern for cities, with a central downtown that is the center for business and commerce surrounded by a big extension of suburbs mostly dedicated to housing. However, the city of Chicago itself shows this model in a lower grade.

Barcelona is an example of European city with different historical neighborhoods that follow different layouts. The industrial and businesses of the city are merged with the housing areas, not showing a defined and clear center for them.

*Table 4* shows some of the demographical characteristics for both cities, and an overview of the space reserved for housing and businesses as well. The sources for the information found in *Table 4* thru *Table 7* are listed in the references.

*Table 4. Demographical characteristics and land use.*

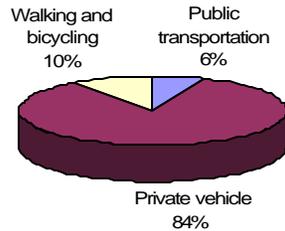
	<b>Chicago</b>	<b>Barcelona</b>
<b>Population</b>	2.869.121 city only 9.650.137 city and suburbs	1.583.000 city only 5.267.000 metropolitan area
<b>Area</b>	590 km <sup>2</sup> city only 13.000 km <sup>2</sup> city and suburbs	100,4 km <sup>2</sup> city only 7.600 km <sup>2</sup> metropolitan area
<b>Population density</b>	4.923 /km <sup>2</sup>	15.764 /km <sup>2</sup>
<b>Housing</b>	1.158.142 units	75.932 units
<b>Industrial market and offices</b>	310.842.295 square feet	10.812 units

Sources: American Community Survey, US Census Bureau, 2002; Chicago Department of Planning and Development, 2004; Institut d'Estadística de Catalunya.

### 5.3 Transit and circulation

The average daily trips expected in the Chicago area are about 24.600.000. From these trips, the 84% are expected to be done by private vehicles, whereas only the 6% is expected to be done by public transportation. Walking and bicycling trips account for the 10% of the total trips (see *Figure 6*).

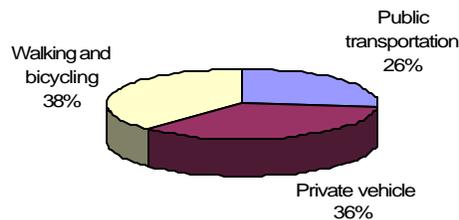
**Chicago's transit distribution**



*Figure 6. Chicago's transit distribution.*  
Source: Illinois Department of Transportation, 2004

In Barcelona, on the other hand, the walking trips are the most significant, being the 38% of the total trips. The private vehicle is the second most important transportation mode, with 36% of the trips, or 3.960.000 trips every day. Public transportation represents the 26% of the total trips in the metropolitan area of Barcelona, with a daily average of 2.860.000 trips (see *Figure 7*).

**Barcelona's transit distribution**



*Figure 7. Barcelona's transit distribution.*  
Source: TransMet, ATM 2004.

It is interesting to notice the homogeneous distribution of the daily trips in the metropolitan area of Barcelona, whereas the Chicago area is clearly dominated by private vehicle trips. *Table 5* shows the data for the daily trips in both cities.

*Table 5. Daily trips.*

	<b>Chicago</b>	<b>Barcelona</b>
<b>Total Trips</b>	24.600.000	11.000.000
<b>Public transportation</b>	1.500.000 6%	2.860.000 26%
<b>Private vehicle</b>	20.640.000 84%	3.960.000 36%
<b>Walking and bicycling</b>	2.460.000 10%	4.180.000 38%

Sources: Illinois Department of Transportation, 2004; TransMet, ATM, 2004.