1. Case Study Area and Character Sections

Case Study Area
The case study street is located in city of Girona, about 100 km north of Barcelona. Girona is the capital of the province also named Girona. The street belongs to 3 districts: Eixample, Casernes and Palau Zone. See figure 1 below.

Figure 1: Barcelona Street. Situation in Girona sections division

The zone by where the Barcelona street extends is of cuartenario material, gravel, sands, the slime and clays, pertaining to the pluvial terraces of river Ter. By these materials, the zone before the urbanization of century XX, was very apt for the cultivation and the pottery industry, taking advantage of the ground
Initially, Barcelona Street was going to be longer, but the continuation was never executed. The street forms an important via of communication between Girona and the surrounding towns.

Regarding the name, Barcelona Street was always known by this name; although it wasn’t until 1876 when it was officially named so.

It is during the period from 1850-1855 that street takes an urban character and it loses its primitive character of rural way. But it wasn’t the decades 1880-1890 when the city crosses the limit of the walls and extends toward the West. During this period many constructions are being made in Barcelona Street, especially in the North section – near Marques de Camps Square and the railway station.

During many years the street grew without order. But with the time, specific actions were done to give the street it a homogeneous width. In 1928 the first alignment is being made, and in the Spanish postwar period different street works are being done in order to improve the conditions of circulation.

In the years 1958, 1963, 1974, 1975 and 1982 public works were being made to improve the lighting system. The last time—in 1982—a total renewal of the lighting system was made with sodium lights. The total cost of this works was about five million pesetas (around 30050 €). Also, Barcelona Street also experienced several projects in order to renovate and improve the pavement, the sidewalks and the drain system; concretely in 1916, 1927, 1958, 1963, 1966 (lighting system new) and 1983. However, the two most important actions in Barcelona Street have been the enlargement from six to twelve meters, and the urbanization of the land sector yielded by the railroad company in 1954.

The history of Barcelona Street is linked to the evolution of the railway transport in the city of Girona. The present Maquina Square was the train station since the arrival of the first train in 1862. This way, an important impact for the street was the installation of the repair factory of machines of the railroad company, the year 1913.

Barcelona Street has several important buildings; many of them belonging to the modernism period.

Nowadays, Barcelona Street is a continuos of shops in the ground floor by all kind of commerce. In the Southern section construction companies, metallurgy, cars companies and large warehouses. The tendency of these companies to settle in this zone is because of the proximity of entrance and exit of the freeway.
The street is, without doubt, the longest and most dynamics street in Girona, with a heavy traffic load.

The High Speed Train from the French border to Barcelona (and then further on to Madrid) will pass through the town of Girona in about 3 years. The new railway will pass the centre of Girona in tunnel and not at street level as today.
This will leave a corridor open parallel to the demonstration street, and can totally change the traffic and environmental situation in the centre: less noise, more traffic going to the station (cars and/or public transport), necessity of long time parking, more room for pedestrians and cyclists, etc. etc.

At the same time, and because the toll highway can now be used around Girona as a free ring road, the demonstration street has changed from being a state through road to become a municipal street. The Ministry of Public works has given some financial support to the Municipality of Girona in order to help financing the change from high capacity road to urban street.

**Character Sections**

Barcelona Street is 2310 metres long and runs from Marques de Camps Square to the Mas Gri Roundabout.

The Conceptual Study Area is divided into three Character Section: Section 1 (705 m), Section 2 (662 m) and Section 3 (943 m).
The most northerly Section (section 1) starts in Marques de Camps Square. Section 1 is the section of Barcelona street with most residential character, this section has greater density of population than the other two. In addition there is a greater vision of closing of the space.

The Section 2 starts at the junction with Emili Grahit Street. This section have more space between constructions, mainly in the part next to section 3, and the buildings are less homogeneous than in section 1. In addition, in this section there is an inactivate frontage corresponding to a building in construction.

The South Section (section 3) starts at the junction with Sant Isidre Street and it finish at Mas Gri Roundabout.

Section 3 has an aspect more differentiated from the rest of street. In this section small industries are found. In addition, it is the most poorly urbanised zone. In this section sidewalks are not paved, and illegal parking is habitual. Finally, it is the less dense populated zone.

Regarding public spaces, Barcelona Street has six public spaces. Most important, by its great extension, is the Migdia Park located in section 2. In addition in this section one more public zone is located. In section 1 there are 4 public zones but much smaller than the previous ones in section 2.
2. Street indicators

Theme 1. Built Form

1. Buildings

Along each of the Character Sections, there is a general consistency of building height. The most homogenous zone is in Section 1.
<table>
<thead>
<tr>
<th>Primary Descriptors</th>
<th>Measurement and or Comment</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.1 Building Height</td>
<td>Average height of roofline is 16.5 m in section 1; 9 m in section 2 and 7 m in section 3.</td>
<td>Around 1970 Barcelona street had similar building height, such as photo below showns.</td>
</tr>
<tr>
<td>1.1.2 Spacing of Buildings</td>
<td>Ratio of frontage to space between frontages is 34.3; 15.3; 55.5 for each character section.</td>
<td></td>
</tr>
<tr>
<td>1.1.3 Inactive Frontages</td>
<td>Ratio of length of inactive frontage to active frontage is 29 for section 1; 22 for section 2 and 19 for section 3. See next page</td>
<td></td>
</tr>
</tbody>
</table>
Inactive frontage. Section 1

Inactive frontage. Section 2
1.1.4 Doorways

Number of doorways per 100 m opening onto the public realm is for section 1 7, 5 doorways for section 2, and 4 doorways for section 3.

See next page
Doorways in section 1

Doorways in section 2

Doorways in section 3
1.1.5 Historically important buildings or significant structures

There are 5 historically important buildings in Barcelona Street. In Section 1 there are 4 important buildings:

Colomer House, in number 7, was built in 1927-28 by Rafael Masó I Valentí. It is a building created in “noucentisme” period, with vertical and symmetrical lines.

Caixa de Pensions’ House was built in 1955 by Bartomeu Llonguera i Galí; Juan Gordillo Nieto.

Ensesa House in number 68 was built by Rafael Masó in 1913-15. The original remodelling by the architect survives in the main frontatge and interior stairway. The rest of the building has suffered important modification. Ensesa house exhibits the fully developed language of its creator through its "noucentista" features, related to central European architecture of the period. The outside gate and the side storeroom were built in 1932.

Forné Garage is at the corner of Barcelona Street and Bisbe de Lorenzaba Street. It was built in 1957, in the postwar period by Joan Mª de Ribot i de Batlle. The garage is organized around a spiral permitting access to its different levels. Especially interesting are the two side frontages, carefully composed (introducing to Girona the solution of the light frontage or "curtain wall") and with a very studied handling of all its materials.

Soler Factory of sausage is number 146 of Barcelona Street and it was built by Josep Claret i Rovira in 1933; in the Rationalism Period.
1.1.6 Quality of Built Fabric

Regarding quality of built fabric, each character section have different qualities. In section 1 and section 2 quality is good and in section 3 is poor, such as photo 1 showns. Buildings in section 1 shows a continuous state of repair. Maybe, in section 3, where almost all buildings are industries, the state of repair is found not so important.

Around year 1970, quality of built fabric was similar because buildings are the same.


### Theme 1.2  Space Between Buildings

<table>
<thead>
<tr>
<th><strong>Primary Descriptors</strong></th>
<th><strong>Measurement and or Comment</strong></th>
<th><strong>Trend (Increasing/decreasing etc)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.1 Street Width</td>
<td>Distance between opposing building lines is 18.44 m; 17.33 m and 23.67 metres in each character sections.</td>
<td>Around 1970 street width in barcelona street was the same that now.</td>
</tr>
<tr>
<td>1.2.2 Side Space Width</td>
<td>Width of side space in section 1 is 3.20 m and 3.20 m. In section 2 6 m and 3.5 m and in section 3 6 m and 3 m. Side space with widest width of side space is section 2 where the Migdia Park gives a side width of 30,5 m (photo 1)</td>
<td>Barcelona Street had a similar side space width in 1970.</td>
</tr>
<tr>
<td>1.2.3 Median Strip</td>
<td>Barcelona Street has no median street</td>
<td>It never had median strip.</td>
</tr>
<tr>
<td>1.2.4 Width Between Side Space</td>
<td>12 m in each character section.</td>
<td>Around 1970 width between side space was the same that now.</td>
</tr>
<tr>
<td>1.2.5 Trees and Other Greenery</td>
<td>- Green shapes the street space and is an important formative element, unmistakable of the street</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Green has an influence on the street space / Green outweighs over technical installations.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Green does not shape the street space / Green and other installations cancel each other</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Green has no influence on the street space / Green sporadic exist</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- There is no Green</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In section 1 green is found in several places along the</td>
<td></td>
</tr>
</tbody>
</table>
street; it has no influence. In the same way, section 3 has a poor green influence with some trees. In section 2, there are trees on the side space and the Migdia Park such as shown in photos below.
Trees and other green elements in section 2; in front of Migdia Park.

### 1.2.6 Street surfaces, furniture and other design elements

What materials are used –
- [x] asphalt
- [x] paving stone
- [ ] concrete
- [ ] cobblestone pavement
- [ ] _______________________?

Barcelona Street has homogeneous paving stone in side spaces and asphalt on the carriageway.

Around 1970 street surfaces was asphalt for carriage space and paving stone for side spaces.

In a small section in character section 1 a different paving stone (with an older look) is used in front of an important building such as photo 2 shows. Section 2 has a reasonable mantenement.

In section 3 the mantenement is poor, it has some zones without paving stone, such as picture 3 shows.
1.2.7 Guard Railing

Guard Railing are used where there are schools, in some corner as protection for pedestrians and along the street to prevent parking car on side spaces.

1.2.8 “People Spaces”

Are they green?
☑ yes
☐ no

Poeta Marquina in section 1
España Square in section 1
Migdia Park in section 2.
Salvador Dali Square in the end of section 2.
1.2.9 Lighting

☐ the places are very well light, illumination is part of design of the place
☒ places are light
☐ no light (the places are places of fear)
☐ the footpaths are well lit
☒ the footpaths are poorly lit
☐ only one side lit
☐ the lighting is at the median
☐ no lighting of the footpaths
colour of light
.....aesthetically pleasing?
☒ yes ☐ no

Now Barcelona street has two street lines with an average of 18 metres between them.

Around 1970 Barcelona street had a similar lighting system, two lines between footway and carriageway, near the kerb. See photo.

Secondary Descriptors

1A Definition (Two Dimensional Scale) Ratio street width to building height are 1.12, 1.93 and 3.38 for each character sections.

Around 1970 ratio street was the same that now.
Section 3

1B Definition (Enclosure)

Average width between side spaces are 12.04, 7.83 and 14.67 for each section.
Section with a greater enclosure effect is section 1. In section 2 the degree of enclosure is smaller.

Barcelona Street had a similar effects 30 years ago such as the photo below shows.

Girona Council. CRDI (unknown author).
Section 1 in 1969.
Section 1 has a larger percentage of inactive frontatge with 29% and more doorways per 100 metre building line (7.1 doorways). Section 2 has a larger percentage of illuminated building line.

### Theme 2. Function, Management and Regulation

<table>
<thead>
<tr>
<th>Primary Descriptors</th>
<th>Measurement and or Comment</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3.1 One-Way or Two-Way Working</td>
<td>All the street works two way.</td>
<td>The street always worked two way.</td>
</tr>
<tr>
<td>2.3.2 Speed limit</td>
<td>Speed limit is 50 km/h along all the street, as photo shows.</td>
<td>In mid 70’s speed limit was 60 km/h.</td>
</tr>
</tbody>
</table>

Section 2.


Section 1
### 2.3.3 Traffic Calming Measures

<table>
<thead>
<tr>
<th>Is traffic “calmed”?</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ yes</td>
</tr>
<tr>
<td>x no</td>
</tr>
</tbody>
</table>

Barcelona street never had traffic calming measures.

### 2.3.4 Number of Marked Traffic Lanes

The number of lanes per carriageway is 4 (2 en each direction).

Around 1970 Barcelona Street was same number of marked traffic lanes: 2+2 for each direction.

### 2.3.5 Lane Width

Width of lanes is 3 m.

Street had 3 m of width of lanes in 1970.

### 2.3.6 Visual Width

There is not visual reduction of carriage width.

Around 1970, Barcelona street had no visual reduction of carriage width.

### 2.3.7 Division/Allocation of Carriageway Space

**Describe segregation of carriageway**

<table>
<thead>
<tr>
<th>bus / tram</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ separate</td>
</tr>
<tr>
<td>x in mix</td>
</tr>
<tr>
<td>width:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>bicycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ separate</td>
</tr>
<tr>
<td>x in mix</td>
</tr>
<tr>
<td>width:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>pedestrians</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ separate</td>
</tr>
<tr>
<td>□ in mix</td>
</tr>
</tbody>
</table>

Around 1970 division of carriage space was same that now.
Division of side space:
- pedestrians: 3.20 metres in section 1; 5 m and 3.50 m in section 2; finally 6 m and 2 m in section 3.
- bicycles: _____m
- green: __1___m
- parking: _____m
- bus/tram: _____m
- waiting places: _____m

Where side space is divided (section 2 and 3), it is in green space (1 metre for trees) and the rest for pedestrian movements. In section 1 all side space is for pedestrians. In section 3 there is on-street parking on side space.

Pedestrian crossing points:
- everywhere possible to cross
- to cross the street only at some points possible
- no possibility to cross

Number/location of signal lights at pedestrian crossings:
- 18 in section 1; 13 in section 2 and 14 in section 3; including the junctions.

Number of marked pedestrian crossings (e.g. zebra crossing): 1 in

Barcelona Street has no tram neither has HOV.
In section 1 there are special pedestrian crossings to improve crossing for people with limited mobility (lowered kerb and change in pavement (photo))

2.3.10 Signal Junctions

<table>
<thead>
<tr>
<th>Question</th>
<th>Section 1</th>
<th>Section 2</th>
<th>Section 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrian phase provided?</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>“all green” pedestrian phase provided?</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Diagonal crossing provided?</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Cyclists catered for?</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Priority/timing for pedestrians relative to vehicles:</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
</tbody>
</table>

There are 34 signal junctions, 12 in section 1, 10 in section 2 and 12 in section 3.

Around 1970 Barcelona Street had the same number of signal junctions that now.
section 3.
Pedestrians has no priority relative to vehicles along all the street.

### 2.3.11 Roundabout Junctions
Barcelona Street has no roundabout junctions.
Barcelona Street had no roundabout junctions.

### 2.3.12 Other Junctions
Barcelona Street has no other type of junctions.
Barcelona Street had no other junctions around 1970.

### 2.3.13 On-Street Parking
Barcelona Street has 290 possible legal parking places.
In section 1 there are 4 on-street parking places at the corner reserved for delivery vans (photo 1). In addition, section 1 has a public parking on street with a capacity for 180 cars (photo 2).

In section 2 there are no on-street legal parking places.

In section 3 there are 106 on-street parking places. The places are located on the side space. (photo 3)

### 2.3.14 Cycle “Lanes”
For each side of street describe the type of cycle provision e.g. –
- none
- path/lane for both directions
- on road bicycle lane
- bicycle path on the sidewalk
- bicycle path in the side

Around 1970 there was not cycle “lanes” provision in Barcelona Street
2.3.15 Cycle Parking

What is the number of formal cycle parking places? Zero.

Around 1970 there were no cycle parking places.

2.3.16 Bus Stops and Stands

In Barcelona Street there are 6 bus stops: 1 in section 1, 3 in section 2 and 2 in section 3.

Marked spaces? ☒ yes ☐ no
Parking prohibited? ☒ yes ☐ no
Shelter provided? ☒ yes ☐ no

Section 1
Theme 3  Patterns of Use

Theme 3.1  Traffic

<table>
<thead>
<tr>
<th>Primary Descriptors</th>
<th>Measurement and or Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1.1 Average Vehicle Flow</td>
<td>Annual Average Daily Traffic (24 hour AADT) is 19693 cars and vans under 3.5 tones; 543 vans over 3.5 tones and 51 motorcycles.</td>
</tr>
<tr>
<td>3.1.2 Peak Vehicle Flow</td>
<td>In general, peak vehicle flow in Barcelona street is 630 vehicles/hour.</td>
</tr>
<tr>
<td>3.1.4 Vehicle Occupancy</td>
<td>Vehicle occupancy is 1.7 for cars, vans or trucks and 7 persons by bus.</td>
</tr>
<tr>
<td>3.1.5 Bus/Tram Reliability</td>
<td>Average delay in minutes of bus is 5 minutes. Barcelona Street has no tram.</td>
</tr>
</tbody>
</table>

Theme 3.2  Activities

3.2.1 Street Activities and Behaviours

See next page
3.2.2 Pedestrians Along the Street
Peak hour pedestrian flow along the Character Section is in picture below.

3.2.3 Pedestrians Across the Street
The number in the figures below indicated the number of pedestrians. Ex. Route 1 – 2 – means 2 persons following route 1.
Different routes in section 1.
ROUTE 2 by pedestrians in section 1 (Barcelona Street with Bailen Street). During 20 minutes in peak hour (9:39 a.m).
ROUTE 3 by pedestrians in section 1 (Barcelona Street with Bailen Street) During 20 minutes in peak hour (13:40 h).

3.2.4 Upper Floors Land Use
Barcelona Street has 55 business workplaces, 64 public services and 1534 homes.

3.2.5 Ground Floor Use
Barcelona Street has 9 business workplaces, 16 industrial workplaces, 108 retail workplaces and 10 public services in ground floor.

3.2.6 Off-Street Parking
Number of places is 341, distributes as follows: in section 1 285 off-street parking places, 30 in section 2 and 26 in section 3. Regarding type of off-street parking, in section 1 and 2 most are residential, but also some for offices and other businesses.

Off-street residential parking in section 1
and other businesses.
In section 3 most off-street parking are business type.

### Secondary Descriptors

<table>
<thead>
<tr>
<th>3A Ratio of normal to peak traffic</th>
<th>If normal traffic is from 8 to 22 hours, ratio of normal to peak traffic is 6,26 : 7,59 =0,82 &lt;br&gt; If normal traffic is 24 hours, ratio of normal to peak traffic is 4,17 : 7,59 = 0,55. &lt;br&gt; So, regarding ratio of normal to peak traffic by TOPP (Germany) Barcelona Street is medium or totally bad.</th>
<th>Ratio of normal traffic to peak traffic ≤ 0,4 very good &lt;br&gt; ≤ 0,5 good &lt;br&gt; ≤ 0,6 medium &lt;br&gt; ≤ 0,7 bad &lt;br&gt; &gt; 0,7 totally bad &lt;br&gt;(source: TOPP, kompensatorischer Ansatz, Germany)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3B Percentage of HGVs Outside Peak</td>
<td>Percentage of heavy good vehicles is 20%, 4% motorcycles and 76% cars. &lt;br&gt; So, regarding percentage of HGV by TOPP (Germany), the Barcelona street is totally bad.</td>
<td>% of trucks (&gt;3,5t) ≤ 3 % very good &lt;br&gt; ≤ 6 % good &lt;br&gt; ≤ 9 % medium &lt;br&gt; ≤ 12 % bad &lt;br&gt; &gt; 12 % totally bad &lt;br&gt;(source: TOPP, kompensatorischer Ansatz, Germany)</td>
</tr>
</tbody>
</table>
3. Performance indicators

1. Vehicle ownership

Regarding vehicle ownership, in Barcelona Street there are a total of 1005 vehicles.

- Number of two-wheelers: 214
- Number of private cars, pick-ups, vans: 752
- Number of heavy vehicles like lorries, buses etc.: 8
- Total number of vehicles: 1005

2. Residential population

Barcelona Street has 1251 persons distributed as follows:

- 0–14 years of age: 174
- 14–64 years of age: 848
- 65 years and older: 229

3. Working population

There are 323 jobs in Barcelona Street.

4. Traffic deaths and traffic injuries

In 2002 in Barcelona Street there was 1 pedestrian killed and 1 two-wheelers killed.
There was 24 traffic accidents in 2002.

5. Vehicle speed

Average speed of motorised vehicles in Barcelona Street is 55.5 km/h.

6. Reported crime

Regarding reported crime, in 2002:

- Number of sex and violence crimes: 34
- Number of vehicle thefts: 18
- Number of Arson, burglary, other thefts, robbery...: 157
- Total number of penal and criminal offences: 2143
7. Homes: Number of homes

Barcelona Street has 1535 homes.

8. Air pollutant concentrations

In Girona city:

- Pb (yearly average): 0.26 ng/m³
- CO (max hour): 0.0043 ng/m³
- CO (yearly average): 0.0008 ng/m³
- Ozone (max hour): 178 ng/m³
- Ozone (yearly average): 44 ng/m³

9. Noise

Outdoor daytime noise level is 74.51 dB.

10. Recent statements

No recent statements have been found. The Municipality want to use the ARTISTS project to indicate the public discussion about the future of the Barcelona street.

11. Case Summary

The street is the longest and most dynamics street in Girona, with a heavy traffic load.

The High Speed Train from the French border to Barcelona (and then further on to Madrid) will pass through the town of Girona in about 3 years. The new railway will pass the centre of Girona in tunnel and not at street level as today.

This will leave a corridor open parallel to the demonstration street, and can totally change the traffic and environmental situation in the centre: less noise, more traffic going to the station (cars and/or public transport), necessity of long time parking, more room for pedestrians and cyclists, etc. etc.

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to the Municipality of Girona in order to help financing the change from high capacity road to urban street.

The Technical Department of the Municipality of Girona has elaborated a first proposal about the future design of the street: enlarging the sidewalks and reducing traffic space. Public involvement has not started yet. Performance indicators are not being elaborated so far.