7. IKONOMIDI STREET

7.1. Case Study Area and Character Sections

Case Study Area

Ikonomidi case study street is located at the northwest part of Kalamaria. Until 1995, Ikonomidi was a two-direction collector street, with low traffic volumes. Due to traffic capacity problems of the adjacent Sofouli street, the Traffic Plan of 1989 [7] proposed one-way operation, Ikonomidi being the second street of the pair of one-way streets. Therefore, in September 1995, Ikonomidi and Sofouli streets were turned to one-way operation. After the implementation of the scheme, Ikonomidi became an arterial, passing through a purely residential area. Its traffic flow was increased significantly and two bus routes were moved to it. In order to eliminate traffic and safety impacts, several measures were taken. Firstly, the street width was reduced from 10.5 m to 8.0 m, and parking bays were constructed along the sidewalks. In addition, the carriageway pavement was changed in front of the school complex in Section 2, and a pedestrian-actuated traffic signal was installed. Traffic signals were also installed at two major junctions, and road humps were constructed at every priority junction at the approaches of the vertical local streets. Warning and control traffic signs, as well as pavement marking were applied, including marking of warning signs on the pavement. Finally, the sidewalks were reconstructed with new materials and design, new lighting poles were installed, and the sidewalks planting was reformed and organized in a better way. Therefore, both the operational and geometric characteristics of the street were changed.

Ikonomidi Street Study Area has a length of 1,100 m. The average daily traffic volume is 8,000-10,000 vehicles, including 2 public transport (bus) routes. The carriageway width is 8.0m. Buildings at Ikonomidi street study area have 4 floors in average, mainly with residential use.
Character Sections

Ikonomidi Street Study Area is divided into two Character Sections. The first one runs from Rousidou Street to Kerasountos (840 m); and the second from Kerasountos to Papagou Street (226 m).

Character Section 2 is a two way street while the whole Section 1 is one-way street.
7.2. **Street Attribute Descriptors**

### 7.2.1 Built Form

#### Buildings

**Building Height:**
Most buildings in Ikonomidi street have 4 floors. The average height of roofline is 14m. The number of floors varies, as there are few old buildings with 1 or 2 floors, as well as several new apartment buildings with up to 6 or 7 floors.

**Change Before/After reconstruction**
The raise in the building height during the years is not related to the street reconstruction.

#### Spacing of Buildings:

- **Northwest side of street**
  - Length of frontages: 503
  - Distance of space between frontages: 367
  - Ratio of frontage to space between frontages: 1.37

- **Southeast side of street**
  - Length of frontages: 539
  - Distance of space between frontages: 205
  - Ratio of frontage to space between frontages: 2.63

**Cross sections**
Inactive Frontages:
- Northwest side of street
  - Number of inactive frontages: 7
  - Length of inactive frontages: 107
- Southeast side of street
  - Number of inactive frontages: 8
  - Length of inactive frontages: 116

Doorways:
- Northwest side of street
  - Number of doorways opened onto the public realm: 31
  - Number of doorways per 100m is 2.8
- Southeast side of street
  - Number of doorways opened onto the public realm: 47
  - Number of doorways per 100m is 4.3

Historically important buildings:
There are no historically important buildings or other significant structures in Ikonomidi street case study area.

Quality of Built Fabric:
Most buildings are newly constructed, with modern style and materials. Both character sections present a nice image in terms of the quality of built fabric: reinforced concrete and masonry are the basic materials used, due to strict Greek building regulations and seismic code. The street reconstruction did no change the quality of built fabric.

Space Between Buildings
Primary Descriptors
Street Width:
The distance between building lines is 29 m in both sections. The average width of public space between buildings is 10m shorter than the distance between opposing building lines, that is 5m in each side of the street. The 5m wide area in front of buildings belongs to the neighbour properties. In some cases it is enclosed by a fence and used as a private garden, but in many cases it is embodied to the public side space.
<table>
<thead>
<tr>
<th>Side Space Width</th>
<th>Width of side space on Southeast side of street (m)</th>
<th>Width of side space on Northwest side of street (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average: 4.9 (5.9-Section 1 2.9-Section 2)</td>
<td>Average: 5.1 (5.6-Section 1 3.2-Section 2)</td>
</tr>
<tr>
<td></td>
<td>Narrowest: 2.8 (5.4-Section 1 2.8-Section 2)</td>
<td>Narrowest: 3.0 (4.7-Section 1 3.0-Section 2)</td>
</tr>
<tr>
<td></td>
<td>Widest: 6.3 (6.3-Section 1 2.9-Section 2)</td>
<td>Widest: 6.4 (6.4-Section 1 3.4-Section 2)</td>
</tr>
</tbody>
</table>

The following photos are taken in successive points, walking from Section 1 to Section 2:

Section 1

Section 2

Median Strip:
Ikonomidi Street has a median strip in Section 2 where traffic operates two-way. The type of median is 'kerbed', that is elevated by kerb compared to traffic lanes.

It has an average width of 4m and is all green with trees, bushes and grass. Pedestrians do not use the median strip in order to cross the street because of the vegetation.

Section 2 – median strip

Width Between Side Space:
The width between side spaces is 7m in Section 1 and 14m (including the median strip) in Section 2.

In Section 1, where Ikonomidi street operates one way, the carriageway is used only for circulation. In Section 2, where Ikonomidi street works two-way, the effective carriageway is 10m, as the median strip has a width of 4m.
Trees and Other Greenery:
Green has a significant influence on Ikonomidi street space, especially after the reconstruction, when the planting was reformed and organized. There are a lot of flowerbeds on the sidewalks planted with bushes and small palm trees, as well as other domestic trees. In addition, there are a significant number of private gardens all along the street, between buildings and public side space. In particular, greenery is dominant in Section 2, basically because of the median strip that is all green.

Street surfaces, furniture and other design elements:
Ikonomidi street is paved with asphalt all. After the reconstruction, the sidewalks were covered by decorative coloured concrete slabs. The carriageway pavement is in good condition, as it has been rebuilt recently (summer 2002).
Pedestrian zebra crossings are provided at all signalized intersections. The zebra stripes in some of them are coloured yellow and red, in order to be more visible by the drivers. The maintenance of the pavement’s markings is very good.
Other important elements of street furniture on Ikonomidi street are parking and refuse bin bays all along Section 1. Lowered kerbs and ramps are provided at all pedestrian crossings, as well as in front of private parking spaces (on the ground floor of buildings).
Close to the school, in Section 1, there are warning and speed limit signs.
There are no elements of street furniture in Section 2.

Guard Railing:
Guard railing is placed only in front of the school in Section 2, to protect children and lead them to the pedestrian crossings. Bollards are used sporadically, in order to prevent cars from parking on sidewalks.
People
Spaces:

Ikonomidi Street has 2 places for people to congregate, both of them in on Section 1.
The first one includes a park and a playground and is located by a pedestrian street. A small number of trees and bushes are planted in the park, but its overall image is not very well attended.

The second space for people to congregate is a playground close to the school. It is located 50m away from Plastira street at the corner of Argiropoulou and Papadimitriou str.

Lighting:

Ikonomidi street has two rows of street lighting in Section 1 and a single row in Section 2, located on the Northwest side.
The average distance between two successive lighting poles (of the same row) is 30m in Section 1 and space out to 54m in Section 2. Section 2 is not illuminated properly.

Secondary Descriptors

1A Definition (Two Dimensional Scale):

Ratio of street width to building height
2.2 in both sections

Type of green
‘influence’ = green has an important influence on the street space

1B Definition (Enclosure):

Average width between side spaces in Section 1 is 7m, while in Section 2 is 14m.
Total average side space is 11m in Section 1 and 6m in Section 2.
The enclosure effect is insignificant.
1C Transparency :

**Inactive building line**
49% (45%-section1 65%-section2 )

**Number of doorways per 100 metres of building line**
4.8 (5.4-section1 2.5-section2 )

**Illuminated building line**
There are no heavily illuminated large windows at the ground floor level on both sides of Ikonomidi street.

---

**Change Before/After reconstruction**

After reconstruction, new lighting poles were installed in Section 1; therefore the illumination of the street was improved. Other than that, there are no changes of these descriptors before and after the street reconstruction.
7.2.2 Function, Management And Regulation

Primary Descriptors

One-Way or Two-Way Operation:

Section 1 of Ikonomidi street study area operates in one-way, while Section 2 has a two-ways operation.

The first major parallel to Ikonomidi street is Sofouli street, which works two-way between Papagou and Kerasountos street and has a one-way operation, reverse to Ikonomidi street’s direction, at the remained segment.

All crossing streets operate in two directions

Change before/after reconstruction

The major change after reconstruction was the implementation of one-way operation in character Section 2. The initial Traffic Plan of Kalamaria, aiming to increase the street capacity, proposed this scheme. In the meantime, several traffic control measures were taken in order to increase traffic safety along the street.

Speed limit:

The speed limit is 50km/h. In Section 1, close to the school, the speed limit is lowered to 40 km/h.

Change before/after reconstruction

The reduction of speed limit and the relevant traffic signs and pavement markings were part of the reconstruction scheme applications.
Traffic Calming Measures:

Traffic calming measures in Section 1, close to the school, include:

- Warning and guide traffic signs and pavement markings, which indicate the school site and impose the speed limit
- Pavement texture and color changes
- A pedestrian-actuated traffic light installation in front of the school, providing a pedestrian crossing

**Change before/after reconstruction**

In addition, speed humps were constructed at the approaches of local streets at all priority junctions.

Number of Marked Traffic Lanes:

There are 2 marked traffic lanes at Ikonomidi street study area. In Section 1, that operates one-way, on-street parking is provided in special parking bays and there are 2 effective traffic lanes. In Section 2, that operates two-way, there is 1 effective lane in each direction.

Lane Width:

The lane width is 3.5m along Section 1, and 4m in Section 2.

Visual Width:

One of the measures taken after reconstruction was the application of pavement markings that created visual reduction of the carriageway width. The markings were maintained for a period of 2 or 3 years after reconstruction. Today there are no special markings for visual reduction of the carriageway width.

**Segregation of carriageway**

- **bus**
  - separate
  - in mix

- **bicycles**
  - separate
  - in mix

- **pedestrians**
  - separate
  - in mix

- **HOV / taxis etc**
  - separate
  - in mix

Pedestrians use the sidewalks. Bicycles are not specially cared for and they use either the carriageway or the sidewalks.

Pedestrian Crossings:

All pedestrian crossings are signalized and have lowered kerbs and ramps. Some of them are marked with yellow and red stripes. There are 6 signalized pedestrian crossings along the study area. All of them are at junctions, except the one in front of the school, which is pedestrian-actuated.

There are no pedestrian over / underpasses neither built pedestrian crossings.
Signal Junctions: There are 4 signalized junctions along Ikonomidi street study area. There are no special phases provided for cyclists or buses.

Roundabout Junctions: Ikonomidi Street has no roundabout junctions.

Other Junctions: Ikonomidi Street has 13 non-signalized (priority) junctions.

On-Street Parking: On-street parking is permitted along Ikonomidi Street. 132 on-street parking places have been constructed in special parking bays in Section 1. There are no restrictions or special reserved parking places.

Apparently there are few illegally parked cars on the sidewalks, most of them owned by the residents who for various reasons do not enter the private parking place inside their property.

In Section 2 on-street parking is not allowed.

Change before/after reconstruction
Before reconstruction, traffic volume was too low, that on-street parking was permitted, at both sides of the street.

Cycle “Lanes”: Cyclists are not pecially cared for. There are no special facilities for them, but the lowered kerbs and ramps for pedestrians and handicaps are used by the cyclist as well.

Cycle Parking: There are two (2) bus stops along Ikonomidi Street study area, both in Section 1. The average distance between successive bus stops is 500 m.

Bus stops are clearly indicated by a special sign and provide a shelter with a bench and a map showing the bus routes within Kalamaria. Parking in front of bus stops, to a length of 25m, is prohibited by Greek traffic regulations.
7.2.3 Patterns Of Use

Traffic Primary Descriptors

Average Vehicle Flow:

Average Daily traffic flow (24 hour AADT) by vehicle type:

- Cars/vans
  - 8,100 in Section 1
  - 2,350 in Section 2
- Vans/trucks >3.5T
  - 90 in Section 1
  - 25 in Section 2
- Buses
  - 360 in Section 1
  - 75 in Section 2
- Motorcycles/mopeds
  - 540 in Section 1
  - 75 in Section 2

There is one major crossing street with significant traffic volume, Kerasountos str: 6,500pcus (AADT)

Change before/after reconstruction

After reconstruction there has been a significant increase in the traffic volume of the street. A high percentage of the traffic volume is through traffic.

Peak Vehicle Flow:

Peak Hour traffic flow by vehicle type:

- Cars/vans
  - 630 in Section 1
  - 200 in Section 2
- Vans/trucks >3.5T
  - 20 in Section 1
  - 5 in Section 2
- Buses
  - 15 in Section 1
  - 10 in Section 2
- Motorcycles/mopeds
  - 35 in Section 1
  - 10 in Section 2

Change before/after reconstruction

See previous paragraph.
Bus Reliability: Average bus delay is 1 minute. Although the calculated average delay is too low, it has a significant deviation from average, that affects bus reliability.

### Activities

**Primary Descriptors**

#### Street Activities and Behaviour:

As Ikonomidi street area is purely residential, there is a number of pedestrian street activities. During the morning hours, the residential uses generating every-day pedestrian trips, home to work, school, shops etc.

#### Pedestrians Along the Street:

Pedestrian flows along the road sections of the study area were not available from Municipal or other sources. These flows vary significantly with time of day, season and exact location, and therefore flow counts in one period and at one point only are not indicative of the real situation and representative of the pedestrians’ level of service. Nevertheless limited pedestrian flow counts were conducted according to the ARTISTS, suggested instructions in November 2002. These counts were taken during afternoon peak period (around 13:00) and resulted in the following figures:

- 84 pedestrians / h in Section 1
- 48 pedestrians / h in Section 2

(in both street sides at the busiest point)

It is worth mentioning that although there are several obstacles on the sidewalks, such as illegally parked cars, flower beds, kiosks, bus stops, trees and poles (lighting, electricity, telecommunication, traffic signals, advertisement etc.), the effective walkway width is quite wide and the number of people in the street is quite low thus, pedestrian mobility is not obstructed and is free.

#### Pedestrians Across the Street:

In a similar manner, observations of pedestrian flows at peak hour (afternoon around 13:00) were conducted and resulted in the following figures:

- 72 pedestrians/ h Section 1
- 48 pedestrians/ h Section 2

(in both directions at the busiest point in winter)
Most buildings within the study area have residential use while very few of them have mixed residential and retail use (small neighborhood shops at the ground floor). Section 2 has a stronger residential use than Section 1.

<table>
<thead>
<tr>
<th></th>
<th>Total str</th>
<th>Section 1</th>
<th>Section 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business</td>
<td>6</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Industrial</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Retail</td>
<td>58</td>
<td>53</td>
<td>5</td>
</tr>
<tr>
<td>Public service</td>
<td>7</td>
<td>7</td>
<td>0</td>
</tr>
</tbody>
</table>

Number of workplaces on ground floor:

<table>
<thead>
<tr>
<th></th>
<th>Total str</th>
<th>Section 1</th>
<th>Section 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business</td>
<td>30</td>
<td>27</td>
<td>3</td>
</tr>
<tr>
<td>Industrial</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Retail</td>
<td>30</td>
<td>26</td>
<td>4</td>
</tr>
<tr>
<td>Public service</td>
<td>12</td>
<td>12</td>
<td>0</td>
</tr>
</tbody>
</table>

The use of upper floors is primarily residential. There are no special office buildings in the area.

<table>
<thead>
<tr>
<th></th>
<th>Total str</th>
<th>Section 1</th>
<th>Section 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business</td>
<td>1040</td>
<td>50</td>
<td>990</td>
</tr>
<tr>
<td>Industrial</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Retail</td>
<td>2771</td>
<td>446</td>
<td>2325</td>
</tr>
<tr>
<td>Public service</td>
<td>873</td>
<td>0</td>
<td>873</td>
</tr>
</tbody>
</table>

Off-Street Parking:

There are 214 off-street parking spaces in the study area, 174 of them in Section 1 and 40 in Section 2. All of them are private parking spaces at the ground floor of buildings. During the reconstruction of the street, lowered kerbs and ramps were constructed on the sidewalks assisting cars to enter these spaces.
7.3. Performance Indicators

7.3.1 Street Safety

Traffic deaths and injuries:

**Existing Situation**

The numbers of accidents presented hereby are referred to the period 1999-2001.

- Total number of road deaths = 1
- Killed pedestrians = 1
- Seriously injured pedestrians = 0
- Slightly injured pedestrians = 2
- Seriously injured two-wheelers = 0
- Slightly injured two-wheelers = 3
- Seriously injured in motorised vehicles = 0
- Slightly injured in motorised vehicles = 6

The following total numbers are given separately for the total length of the street case, as well as for the two character sections.

- Serious road injuries = 0 (Section 1: 0 Section 2: 0)
- Slight road injuries = 11 (Section 1: 8 Section 2: 3)
- Killed and injured = 12 (Section 1: 9 Section 2: 3)
- Accidents = 3 (Section 1: 8 Section 2: 1)

All accidents in Ikonomidi street occur at intersections. There is a significant concentration of incidents in Section 1 that operates one-way; particularly in the signalized junctions of Trapezountos str., Kapetan Goni str. and Kerasountos str. Also at the priority junctions of Argonauton str. with a pedestrian fatality and Kolhidos str.

**Changes before/after reconstruction**

There has been a significant increase in road accidents during the past years and especially after the reconstruction of Ikonomidi street. The increase in vehicles’ speed, after the one-way operation, is the main reason for the traffic safety problems, despite all the preventing measures.

<table>
<thead>
<tr>
<th>Year</th>
<th>Road Deaths</th>
<th>Serious Road Injuries</th>
<th>Slight Road Injuries</th>
<th>Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999-2001</td>
<td>1</td>
<td>0</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>1995-1997</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>1987-1989</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Number of casualties

- Fatalities - 1
- Heavy injuries - 0
- Light injuries - 11
- Two or more vehicles - 4

**Distribution of accidents by participants**

- Pedestrian
- Two-wheeler
- Other

**Accidents during 1999-2001**
Vehicle Speed: Average speed of motorized vehicles in km/h (free flow conditions)

53-Total str 53-Section 1 50-Section 2

V85 of motorized vehicles in km/h

59-Total str 59-Section 1 50-Section 2

In free flow conditions drivers violate the speed limit in both sections.

Changes before/after reconstruction
After the implementation of one-way operation in Section 1, vehicle speeds have been increased.

7.3.2 Economy

Viability: Homes (Apartments): The average rent of a 80m² flat for one year is € 5,650 (estimated for 2002).

Homes (Apartments): The purchase price per owner-occupied flat is € 2,950 per m² (estimated for 2002).

Kalamaria, and the particular neighbourhood, is a place of high-income households. Many of the apartment buildings are constructed within the last fifteen years and they are of very good quality. Therefore, the cost of renting or buying a house is rather high comparing to other districts of Thessaloniki.

Retail: Average rent price per year is € 71 per m² (estimated for 2002).

Office: Average rent price per year is € 71 per m² (estimated for 2002).

The above mentioned rental price of retail shops is considered low for Kalamaria. The office rental price is similar to the average for Kalamaria.

Residential Population: The total population of the Study area is 4950, which is equally divided between the two sections. The population density of the area is medium (33 m² of space per inhabitant).

7.3.3 Noise

The noise level due to traffic along Ikonomidi street varies from 65 to 68 dB (Leq). These values are close to the limit imposed by the Greek and European legislation for residential areas (67 dBA). Noise levels are higher in Section 1 than in Section 2.
7.4. Decision-Making and Design Processes

Before the scheme's implementation, this street was a collector/distributor. The traffic volumes were rather low and the street was a purely residential area.

The reconstruction took place in 1995, in conjunction to Sofouli street, to operate as a pair of one-way arterials.

The legal procedures for the implementation of the new traffic control measures were taken as described above for Sofouli Street (city council's decisions, public announcements, public presentation of the project etc.).

Because of the upgrade of the street from collector to arterial, all the necessary measures were taken, mainly to ensure an acceptable traffic safety level. The project contained the following traffic control and safety measures:

- Installation of traffic signs to identify the new traffic control measures
- Installation of traffic signals at almost all major intersections, in order to control traffic
- Modification of public transport routes (two bus routes were transferred from Sofouli street to Ikonomidi street)
- Construction of traffic calming measures at all local streets' junctions, including road humps
- Special care was taken in front of a primary school, including the installation of a pedestrian activated traffic light, special pavement markings for visual street width reduction, pavement's surface and colour change etc.
- Reconstruction of the street pavement surface and redesign and reconstruction of the sidewalks surface
- Installation of new street and sidewalks lighting
- Construction of special on-street parking spaces.

The project was designed and implemented by the Technical Department of the Municipality.