3. ADRIANOUPOLEOS STREET

3.1. Case Study Area and Character Sections

Case Study Area

Adrianoupoleos street is one of the main arterials of Greater Thessaloniki Area. It connects the centre of Thessaloniki to the airport and the nearby resort areas of the eastern coast of Thermaikos Gulf. It crosses Kalamaria with a N to SE direction and carries very high traffic volumes, with high percentage of through and heavy traffic. Its one-way operation was implemented in the late 70s, in order to increase capacity and improve vehicle mobility.

The total length of the street, within the Municipality of Kalamaria area, is approximately 1,400m.

This arterial, which has been selected as the demo case for Kalamaria, has a carriageway width of 4 standard traffic lanes. The main land use along the street is residence, with commercial uses at the ground floor (banks, car sales, home furniture and equipment), and some office space on the other floors. The commercial character of the street, the high density of residences, the schools as well as the bus services along the street generate high pedestrian volumes walking at the sidewalks or crossing the street.

The main problems of the arterial include high vehicle speeds, high accident rates, high noise level, illegal kerbside parking, as well as the segregation of urban space.

Kalamaria & Case study area

Bus route map of Kalamaria
Character Sections

For the purpose of the project, Adrianoupoleos Street was divided into three Character Sections. The first one (Character Section 1) begins at Kidonion Street, which is the border line between Thessaloniki and Kalamaria Municipalities, and ends at Egeou street. This section is 420m long and it is not very densely built. It is characterized by a sharp curve, which is rather dangerous when vehicles speed up. Even if there are many warning signs and speed limit signs, many cars go fast and run out of road accidents frequently occur. A high school is located at the beginning of the section. Most of the vertical streets are pedestrianised.

Character Section 2 begins at Egeou street and ends at M. Alexandrou street. Its length is 660m. The building density and pedestrian volumes are higher than in Section 1, because Section 2 has the character of a city centre. A school complex is situated in the middle of the section.

Finally, character Section 3, between M. Alexandrou and Erithrou Stavrou street, has a length of 300m, and is again not very densely built. Residence is the predominant land use. Commercial uses are limited. Special land uses of the section are a parish church and a military camp.
3.2. Street Attribute Descriptors

3.2.1 Built Form

**Buildings**

- **Building Height:** Average height of roofline is 16m, 15m, and 14m at the three sections respectively.

- **Spacing of Buildings:** Ratio of frontage to space between frontages is 1.24 for Section 1, 3.55 for Section 2 and 0.43 for Section 3. The buildings’ density of is much higher in Section 2 than in Sections 1 and 3.

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**Cross sections**

[Diagram of cross sections showing the case study area and character section edges]
Inactive Frontages: Percentage of inactive to active building line is 7% for the whole area, 8% for Section 1, 6% for Section 2 and 7% for Section 3.

Buildings facades to Adrianoupoleos street are almost all active.

Doorways: The number of doorways opening onto the public realm is 21 for Section 1, 64 for Section 2 and 2 for Section 3.

Number of doorways per 100m is 6.5 for the whole street, 5.7 for Section 1, 8.0 for Section 2 and 2.0 for Section 3.

Apart from the residential doorways, almost all the rest are stores or office buildings. Most of the stores sale home furniture and equipment.

![Doorways and inactive frontages](image)

<table>
<thead>
<tr>
<th>Historically important buildings:</th>
<th>There are no historically important buildings along Adrianoupoleos street. All the buildings are newly structured, with modern style and materials.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of Built Fabric:</td>
<td>All three character sections present a nice picture in terms of the quality of built fabric: reinforced concrete and bricks are the basic materials used, due to strict greek building regulations and seismic code. In addition, iron and glass are the usual materials used in modern structures. Decoration elements in the new residential buildings are the balconies, the windows, as well as coloured metallic parts.</td>
</tr>
</tbody>
</table>
### Space Between Buildings

#### Primary Descriptors

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street Width</td>
<td>The average distance between opposing buildings is 33m in Section 1, 29m in Section 2 and 25m in Section 3.</td>
</tr>
<tr>
<td>Side Space Width</td>
<td>Average width of side space is 5.3m in Section 1, 3.5m in Section 2 and 3.0 m in Section 3.</td>
</tr>
</tbody>
</table>

The following photos are taken in successive points, walking from Section 1 to Section 3.
Median Strip: Adrianoupoleos street does not have a median strip.

Width Between Side Space: The width between side space is 14m all along Adrianoupoleos street.

Trees and Other Greenery: Green has an influence on Adrianoupoleos street space. Along the sidewalks of Adrianoupoleos and the crossing roads trees are planted in rows. Pedestrian streets have many trees and flowerbeds. The park in Section 2 is not very well organized and planted.

Street surfaces, furniture and other design elements: Adrianoupoleos street is paved with asphalt. The sidewalks are covered by slabs. The pavement is in good condition. Pavement marking even if it is often repainted, it is not always in good condition. Pedestrian crossings are provided at all signalised intersections.

Guard Railing: Guard railing or bollards are placed only in front of the schools to protect children and lead them to the pedestrian crossings. Occasionally, bollards are used to prevent parking on the sidewalk.

People Spaces: Along Adrianoupoleos street there are not many places for people to congregate. Moreover, they are not green. Land uses that generate people congregation are the school complexes, the church and the pedestrian streets in Section 1, between the residential buildings. The commercial land uses along the street attract people, but most of them arrive by car.
Lighting:

Adrianoupoleos street has two rows of street lighting in all three sections. They illuminate both the street and the sidewalks. The average distance between successive lighting poles (of the same row) is 44m all along the street.

Lighting at most of the crossing local streets is satisfactory, while the footpaths are very well illuminated.

Secondary Descriptors

1A Definition (Two Dimensional Scale):

The average ratio of street width to building height is 1.93 (2.36 in Section 1, 1.81 in Section 2 and 1.79 in Section 3).

Although the ratio is low in Section 3, the impact is not significant as there are a few unbuilt sides.

1B Definition (Enclosure):

The average width between side spaces is 14m. The total average side space is approximately 8m.

The enclosure effect varies in different points of the street but in general is observed in a low scale as the space between opposing building lines is quite wide comparing to the building height.

1C Transparency:

Section 1 has a percentage of inactive frontages of 49%, Section 2 has 29% and Section 3 has 73%.

All building frontages with shopdoors on the ground floor (see map “doorways and inactive frontages”) of Adrianoupoleos street are heavily illuminated.
### 3.2.2 Function, Management and Regulation

<table>
<thead>
<tr>
<th>Primary Descriptors</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-Way or Two-Way operation</td>
<td>Adrianoupoleos is a one-way street. Most of the adjacent streets (crossing or parallel to Adrianoupoleos) are one-way streets, and operate as pairs of opposite direction, as shown in the map.</td>
</tr>
<tr>
<td>Speed limit</td>
<td>Speed limit is 50 km/h. This is posted by traffic signs.</td>
</tr>
<tr>
<td>Traffic Calming Measures</td>
<td>No traffic calming measures have been implemented at Adrianoupoleos street (except for traffic signs).</td>
</tr>
<tr>
<td>Number of Marked Traffic Lanes</td>
<td>Adrianoupoleos street has 4 traffic lanes. Traffic is restricted by on-street illegally parked vehicles in both sides of the street. Most often only three traffic lanes are effective.</td>
</tr>
<tr>
<td>Lane Width</td>
<td>The lanes' width is 3.5 m along the street.</td>
</tr>
<tr>
<td>Visual Width</td>
<td>There is no visual reduction of carriageway width.</td>
</tr>
</tbody>
</table>

![Flow direction of streets in Case Study Area](image)
Segregation of carriageway

<table>
<thead>
<tr>
<th>Allocation of Carriageway Space</th>
<th>bus</th>
<th>pedestrians</th>
<th>bicycles</th>
<th>HOV / taxis etc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space</td>
<td></td>
<td>separate</td>
<td>separate</td>
<td>separate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in mix</td>
<td>in mix</td>
<td>in mix</td>
</tr>
</tbody>
</table>

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

Illegal on-street parking occupies 2m of the carriageway width at each side of the street space, thus limiting traffic volumes to 3 lanes 3.30m wide.

There is no tram line at Adrianoupoleos street.

Pedestrian Crossings:

The high vehicles’ speeds do not allow pedestrians to cross the street anywhere else but at pedestrian crossings. All of them are protected by traffic signals and have zebra markings. At the entrance of the school at Section 1, a pedestrian actuated traffic signal has been installed, in order to help students to cross the street safely.

There are 7 signalised pedestrian crossings along the study area, every 200m in average.

There are no pedestrian over/underpasses, neither built pedestrians crossings.

Observations have indicated few non-protected pedestrian crossing points along the Adrianoupoleos street. These points are located mainly at the non-protected sides of Passalidi intersection and Egeou Intersection, which are both signalized.

Signal Junctions:

Adrianoupoleos street has 6 signalised junctions, with the following characteristics:

- Pedestrian phase provided?
  - ☒ no
  - ☑ yes

- “All green” pedestrian phase?
  - ☒ no
  - ☑ yes

Diagonal crossing provided?

- ☑ no
- ☒ yes

Cyclists catered for?

- ☒ no
- ☑ yes

Roundabout Junctions:

Adrianoupoleos street has no roundabout junctions.

Other Junctions:

Adrianoupoleos street has 12 non-signalised (priority) junctions.
On-Street Parking:

On-street parking is not allowed along Adrianoupoloeos street. Nevertheless, many vehicles park illegally, mostly during shop and office working hours.

- **Section 1**
  - Illegal on-street parking and on the sidewalk

- **Section 2**
  - Illegal on-street parking (two rows of parked cars)

Cycle “Lanes” & Cycle Parking:

There are no special facilities for cyclists (cycle lane or cycle parking) along Adrianoupoloeos street.

Bus Stops and Stands:

There are 6 bus stops in total along the study area. The average distance between successive bus stops is approximately 230m.

- **Section 1**
  - Bus stop with shelter and bench

  - Marked spaces? yes × no
  - Parking prohibited? yes – by law. This regulation is often violated, due to lack of enforcement. no
  - Shelter provided? yes × no
3.2.3 Patterns of Use

### Traffic Primary Descriptors

<table>
<thead>
<tr>
<th>Average Vehicle Flow</th>
<th>Average Daily Traffic Flow (24-hour AADT) by vehicle type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cars/vans</td>
<td>Section 1: 33,800, Section 2: 28,200, Section 3: 25,750</td>
</tr>
<tr>
<td>Vans/trucks &gt;3.5T</td>
<td>Section 1: 730, Section 2: 620, Section 3: 850</td>
</tr>
<tr>
<td>Buses</td>
<td>Section 1: 750, Section 2: 850, Section 3: 550</td>
</tr>
</tbody>
</table>

There are five major crossing streets with significant traffic flows: Kidonion (26,000 pcus/day), Egeou (16,000 pcus/day), Perikleous (12,000 pcus/day), M. Alexandrou and Ethnikis Antistasis (50,000 pcus/day).

### Peak Vehicle Flow (along the street):

- **Cars/vans**
  - Section 1: 2,650
  - Section 2: 2,300
  - Section 3: 2,000

- **Vans/trucks >3.5T**
  - Section 1: 60
  - Section 2: 50
  - Section 3: 65

- **Buses**
  - Section 1: 65
  - Section 2: 70
  - Section 3: 45

The average car occupancy is 1.4. The average bus occupancy for the total study area is 40 passengers per bus. The bus occupancy is higher in Section 1 than in sections 2 and 3, because the closer to the centre of Thessaloniki, the higher the bus occupancy.

- 50 persons per bus in Section 1
- 40 persons per bus in Section 2
- 30 persons per bus in Section 3

**Bus Reliability:**

Average bus delay is 2 minutes. Although the calculated average delay is too low, there is a significant deviation from average, which affects bus reliability.
Activities

Primary Descriptors

Street Activities and Behaviours:
There are various pedestrian street activities along Adrianoupolous street. During the morning hours, the residential uses generate every-day pedestrian trips, home to work, school, shops etc. The peak of pedestrian trips occurs during the morning and afternoon hours, that is during the working hours of shops, schools and offices.

Pedestrians Along the Street:
Observations of pedestrian flow at peak hour (Saturday morning around 11:30 – 12:00) along the street have shown:

- 156 pedestrians / h in Section 1
- 342 pedestrians / h in Section 2
- 12 pedestrians / h in Section 3

(for both street sides at the busiest point in winter 2002)

The fact that the free space of the sidewalks is quite wide, results in a rather low density in pedestrian flows.

Many objects are placed on the sidewalks (kiosks, bus stops, trees, lighting poles, traffic signs and signals, advertisements). Nevertheless they do not obstruct the walkway and do not reduce the pedestrian mobility, because the free space for the pedestrians is still wide.

Pedestrians Across the Street:
Observations of pedestrian flow at peak hour (Saturday morning around 11:30 – 12:00) across the street have shown:

- 144 pedestrians /h in Section 1
- 216 pedestrians /h in Section 2
- 12 pedestrians /h in Section 3

(in both directions at the busiest point in winter 2002)

Very few pedestrians cross the street at non-protected points, because the vehicles' speeds do not allow them to do it safely. These non-protected pedestrian crossing points are mostly observed close to Passalidi intersection and Egeou Intersection.

Of course, the average distance between successive pedestrian crossings could be reduced, in order to reduce the average walking distance.
Upper Floors Land Use: 38% of the buildings within the study area have a mixed use (commercial ground floor and residential upper floors land use). This figure is even higher for buildings with frontages on Adrianoupolias street. Nevertheless, buildings with frontages at the parallel street have mainly residential use.

Ground Floor Use:

Number of business workplaces *

<table>
<thead>
<tr>
<th>Total str.</th>
<th>sect. 1</th>
<th>sect. 2</th>
<th>sect. 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business</td>
<td>6</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Retail</td>
<td>114</td>
<td>26</td>
<td>82</td>
</tr>
<tr>
<td>Public service</td>
<td>8</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

*1995

The upper floors’ use is primarily residential. However, in several cases floor apartments are used for office space, since there are very few special office buildings in the area.

The ground floor of buildings in front of Adrianoupolias street has retail stores, mainly sales of home furniture and equipment.

There are 114 businesses at the ground floors of buildings in Adrianoupolias street study area (year 2002)

Off-Street Parking:

There are two off-street parking lots at the study area. The first one is located close to Kidorion junction at Section 1. The second is located close to Passalidi junction at Section 2.

Both are open-air public parking lots with no restrictions (time or charge). None of them is properly organized and designed.
3.3. Performance Indicators

3.3.1 Street Safety

Traffic deaths and injuries:

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

- Total number of road deaths = 0
- Seriously injured pedestrians = 0
- Slightly injured pedestrians = 4
- Seriously injured two-wheelers = 3
- Slightly injured two-wheelers = 4
- Seriously injured in motorised vehicles = 3
- Slightly injured in motorised vehicles = 12
- Total number of serious road injuries = 5
- Total number of slight road injuries = 20
- Total number of killed and injured = 25
- Total number of accidents = 13

From the above is concluded that there is a significant number of serious accidents along Adrianoupoleos street. Most of the accidents with injuries, involve two or more vehicles and two-wheelers.

A high concentration of accidents occurs at the junctions with major streets, such as Papagou, Egeou and Passalidi streets.
Vehicle Speed: Average speed of motorised vehicles in km/h, along the whole street and along the three sections respectively (free flow conditions): 

76 67 70 87

V85 of motorised vehicles in km/h, along the whole street and along the three sections respectively:

86 79 79 102

3.3.2 Economy

Viability: Home (Apartments): The average rent of a flat of 80 m² for one year is €4,250.

Home (Apartments): Purchase price per owner-occupied flat is 2,050 euros per m².

As Adrianoupoleos street has a dominant retail character, rent and purchase price for retail shops is very high compared to other districts of Kalamaria or Greater Thessaloniki area.

Retail: Average rent price per year is €212 per m² (estimated for 2002).

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

This very high rental price of retail shops in Adrianoupoleos is due to the commercial character of the street. The office rental price is similar to the average for Kalamaria.

Residential Population: The total population of the Study area is 4,953. The population density of the area is medium to low, (47 m² of space per inhabitant). The population density is lower in Section 3 (79 m² of space per inhabitant), which is closer to the end of the city.

3.3.3 Noise

The noise level due to traffic along Adrianoupoleos street varies from 72 to 74 dB (Leq). This value exceeds the limit imposed by the Greek and European legislation for residential areas (67 dBA).
It is worth mentioning that in Adrianoupoleos street there are numerous advertisement signs, almost overwhelming other installations such as traffic signs.

Those very large advertisement banners located mainly in Section 1 and Section 2 has a significant impact on the arterial street environment.

They cause a degradation of the general visual appearance of the street, which is disturbing for pedestrians and residents. It is also possible that the drivers’ view is obstructed, or their attention is caught, and therefore these banners have an impact on the street safety. Moreover, they disturb pedestrian flow since their footing eliminates the effective walkway width on the sidespace.

### 3.4. Long-Term Change

Until 1980 there were no signalized junctions in Plastira street. In 1980 traffic signals of 70sec cycle time and fixed program were installed in the major intersections of the street. Recently, in 2002, the program changed to a new cycle time of 90 sec to conform with the rest of the signals of the Greater Thessaloniki Area, which have changed at the same time.

Although Plastira street has always been a zone of recreation, during the last couple of decades a lot of new service shops (restaurants, bars, cafes and street cafes with open air seats) have appeared while the old ones has been renovated. The recreational character of the zone has been enhanced and respectively the mobility in the street has been raised significantly.

Alongside, the demand for parking spaces was rising and in 1980 the first public open-air parking was founded. Later on, in 1990, a second public open air parking space was added.