

Traffic planning and sustainable mobility in small and medium sized port cities of Greece

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Abstract

Port-city development requires a strong level of complementary relationships among the focal urban operations and port activities. This paper attempts to evaluate and discuss traffic and urban planning policies as implemented in the Greek territory, while proposing alternative approaches to enhance mobility in port-driven spatial entities. More specifically, four small to medium sized cities are analyzed in terms of their traffic characteristics, street geometrical attributes, accessibility and urban forms. All four port cities had been designed to provide ultimate vehicle accessibility from the city to the port, creating a 'street embankment' to the waterfront. The proposed interventions for these four research schemes deal with the enhancement of accessibility to port service areas combined with protective measures for the nearby cities regarding integrated traffic solutions, parking arrangements and radical sustainable mobility policies.

Keywords

Port City, Greece, Urban Waterfront, Sustainable Mobility

1. Introduction

Historically, cities and their adjacent ports have evolved at similar periods developing strong links in economic, social and cultural terms. In numerous cases worldwide, the identity of a city was shaped by its proximity to the port and this association played a crucial role in development priorities. Active dockside communities thrived, as sea trade was emerging and the transfer of goods influenced social and economic hierarchies.

As port and city relationships were strengthened, conflicts were raised related to the port-city interface, the transition area which accommodates both port and urban functions. These conflicts arose due to the lack of information exchange and contact, inadequate synergistic processes, land use overlapping, traffic congestion, physical separation of operations, aesthetic downgrade of the waterfront, which particularly restrict port and city's complementarity.

Scientific literature on port cities -and their conflicts with urbanity- has been constantly growing in the last four decades as sea trade remains the main form of exchanging goods,

globalization calls for upgraded infrastructure and intensification of production is highly emerging.

But, according to Ducruet (2011), most of the analyses of port-city interactions traditionally focused on the area where spatial, cultural, and functional changes were most visible: the waterfront. Similarly in Greece, issues of theoretical and spatial cohesion among water and urban elements have been explored, but in quite scattered approaches.

Given the important influence of cargo and passenger ports on the street network of the host cities, this paper attempts to suggest redevelopment plans that aim at the harmonic coexistence of both and enhance urban and waterfront qualities.

This study briefly presents combined urban and traffic planning intervention projects for 4 small and medium sized port cities in the surroundings of Attica prefecture, aiming at radical alterations in traffic policies and the implementation of sustainable urban mobility principles. Research started around 2004 for the first two cities and a parallel research was conducted later around 2007 in the other two study areas. Plans were officially delivered from 2007 to 2013, while some complementary works are still ongoing for all four port cities.

The suggested plans do not reallocate traffic in common terms but rather impose a whole new approach on hierarchy and the priorities of vulnerable users.

2. Aims and Methodology

This paper is concerned with the analysis of traffic and urban planning characteristics and has applied policies in four small and medium sized port cities-Lavrio, Elefsina, Oropos and Eretria- in the close vicinity of Athens. Issues of accessibility and congestion are explored in order to identify viable solutions for the cities' enhancement.

Firstly, the paper reviews the port and city relations referring to their planning principles, urban patterns, benefits and deficiencies. It describes the current situation of the cities while it highlights common strategies and approaches in order to effectively address the upcoming conflicts at the port-city interface. Limitations are also presented related to decision making and incompatibility in the responsibilities of stakeholders.

Secondly, the analysis is centered on the suggested intervention attributes of our research by describing case specific elements in all four studied cities. Maps and graphs depict detailed solutions and the concept of the proposals, as well as their expected outcomes are explored thoroughly.

Lastly, conclusions are drawn by summarizing the positive elements of the study as well as highlighting the potential research expansion and diffusion. Proposals for collaboration between city and port authorities for the mutual benefit of both are also mentioned.

The proposals incorporated in this paper derive from the research programs completed by the Sustainable Mobility Unit of the National Technical University of Athens and individual studies regarding the implementation of combined urban and traffic planning policies in the cities of Elefsina, Lavrio, Oropos and Eretria.

3. Overview of Port- City Relations: Planning Principles, Patterns, Benefits and Deficiencies in the Studied Cases

3.1. Port-City Relationship

According to Ducruet (2011), there is a theoretical lack in defining the concept of a single port city. After studying various researchers, such as Morvan, Brocard, Burghardt, Bird, Pearson and others, he argues that "the simplest definitions converge in defining the port city simply as a city exerting port and maritime activities" (Ducruet, 2011).

Port cities vary significantly in type and scale. However, they share some common characteristics. Firstly, they are located on the seaside or riverside and accommodate harbor activities in the close vicinity of their urban environment. The port and its host city develop a strong dipole, which allows for intense bonds and tight operational relationships, regarding

mostly trade and maritime transportation.

Port cities in urban studies form a special type of city, regarding their culture, topography, interdependency relationships, dynamics, spatial arrangements and commonalities in historical evolution. The two parts (the city and its port) influence each other and for years (especially during the industrial era) ports were the regulators of the cities' economic resources.

Regarding port-city relations Ducruet (2011) reflects, by combining the various theories, on the debate "...about whether port-city relations are based on a reciprocal breed (Vigarié, 1979), two independent dynamics (Boyer and Vigarié, 1982), a concomitant but indirect mutual enhancement (Vallega, 1983), or a spontaneous interaction (Goss, 1990)."

In the 20th century, when deindustrialization, globalization, change in production means and economy, city networking, expansion of tourism and many more occurred, issues of dominance and separation arose in port and city relations, leading to the need for port's transformation and redevelopment. Common renewal efforts, as Montanary (1988) states, deal with waterfront revitalization on various scales aiming at re-establishing the port and city relationship, through recreational facilities, tourist zones, seaside parks and walkways and other cultural and public facilities.

In broad terms we could assume that port-city relations are characterized by economic, institutional and spatial issues, while they are highly influenced by the allocation of new transportation linkages (both road and rail networks), the potential for intermodalism, the emergence of new centralities, the relationships between port and city authorities, maritime traffic et cetera.

3.2. General and Traffic Impacts from the Port Presence in the Urban Environment

Cities and their adjacent ports develop strong relationships as mentioned above, greatly affecting each other in various ways. The described "bond" can benefit the city in socio-economical terms by facilitating trade activities and innovation, increasing employment, enhancing the values of exports and imports as well as the cities' healthy competitiveness.

On the other hand, the presence of a port in the close vicinity of a city can lead to various negative impacts, such as the dominance of port functions against the urban character, the emergence of new unregulated centralities leading to sprawl phenomena, social disruption, environmental downgrade, land use overlapping, aesthetic/ visual downgrade and traffic congestion.

Focusing on the latter, the negative impacts of the ports' presence on traffic, which is the key issue studied in the current paper; originates from the congestion caused by hinterland traffic to and from the port area mainly from trucks and lorries transporting goods.

As highlighted in the OECD synthesis report "congestion in urban areas attributable to port activity and traffic heightens the negative economic and environmental impacts of the global shipping trade on metropolitan regions hosting port

facilities” (OECD,2013).

Not only does port-related traffic immediately affect the neighboring street network, but also the rest of the city’s road system does not remain intact as well, especially in cases where the whole alignment prioritizes port activities, as in numerous Greek cases. Profoundly, delays in traffic flows are increased, according to Chioma (2011) who argues that “inadequate port services and cargo handling equipment, availability of storage space, excessive turn-around times and unloading time can all contribute to delays in urban traffic flows”. This excess in traffic volumes and flows results in an increase of accident as, “due to their large cargoes, they contribute disproportionately to traffic accidents” (Giuliano and O’ Brien, 2008). Next, we will present the reasons why the street network of the studied port- cities in Greece is highly insufficient and why the proposed interventions are necessary in order to mitigate traffic burden.

Lastly, an issue that is considered crucial in terms of traffic organization and the compatibility of applied policies, and has a direct impact on previous and future development schemes is the overlapping of managing authorities at the port hinterland, which complicates responsibilities and decision making procedures.

This derives from the fact that, although Greek port areas are public, they are not managed by their adjacent local municipality authority but instead belong to specific corporations (société anonyme- S.A.) which refer to the Ministry of Shipping, Maritime Affairs & the Aegean. These port corporations own and manage not only the specific port areas, but also a large zone in their immediate surroundings, often expanding within the city limits, including streets, public spaces and a number of urban blocks. Consequently, there are numerous cases where the local authorities conflict with planning decisions made by the port authority and vice versa, developing a complicated field of discussion and agreement.

3.3. Presentation of the Four Studied Port Cities. Analysis, Urban Morphology, Street Patterns and Potential Qualities

The research was focused on the study of four small to medium sized cities-Elefsina, Lavrio, Oropos and Eretria-located in the outskirts of the Districts of Attica and Central Greece. (fig.1).

Elefsina is a seaside city with almost 30.000 people, famous for the archaeological site of the Eleusinian Mysteries. It is a major industrial center with oil refineries located in the west part of Attica Prefecture, 18km from Athens. It attracts numerous tourists during the summer period and workers throughout the whole year. In the last ten years, it has become a supra-local center of waterfront recreational activities for residents in the west part of Attica (Mandra, Magoula, Aspropyrgos). Elefsina is very well connected to the regional and national street network as it is linked to AttikiOdos, New National Road links (between Athens and Korinthos) and the Old National Road link (between Athens and Korinthos) as well as to the rail link between Pireaus and Patras (fig.2). It also has a military airport and the port under study.

Furthermore, Elefsina is connected to Athens and the neighboring municipalities through bus links.



Fig. 1. Location of the study areas



Fig. 2. Elefsina location and network links

The port of Elefsina is a cargo port of national importance as it transports more than 2 million tones in freight goods and serves more than 5.000 ships on an annual basis. Moreover, it is one of the oldest ports in Europe (since 500 B.C.) and expands over an area of 200 acres including the berth for mooring vessels.

According to the Strategic Plan for Athens 2021, Elefsina will become a major urban center, the port will be relocated in the nearby vicinity and the former rail link between Megara and Agioi Anargyroi will be reused to serve supra-local connectivity.

Elefsina currently, attracts mainly low to medium income families and is characterized by low quality of life (QOL) attributes, due to inadequacies in urban environment and the lack of public facilities. The co-existence and immediate vicinity of the abandoned stone quarry facilities and the 3rd most important archaeological site in Athens, further downgrade the urban environment qualities.

The urban morphology of Elefsina is characterized by its

street grid system, which forms large urban blocks and a wide street network, while it has considerable open and green spaces (fig.3).

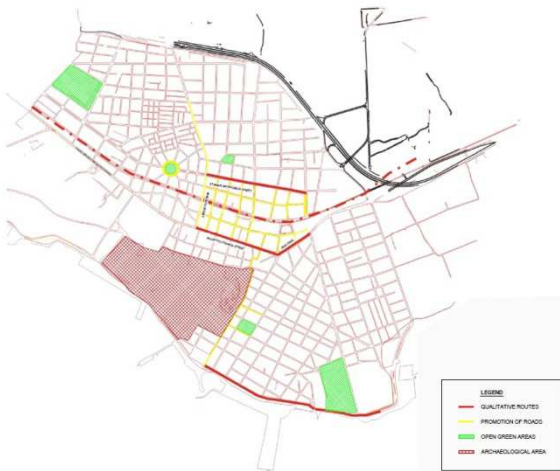


Fig. 3. Eleusinian urban morphology and quality routes

During the analysis step of the study, we identified the major problems of the area - low QOL, traffic anarchy and limited emergence of the archaeological site. Following, we explored the evolution of the place in depth in terms of urban sprawl and increase in traffic congestion and focused on historical and valuable routes as well as the waterfront and the rail corridor (fig. 3). The main urban planning aims of the intervention were reported as: the development of traffic calmed neighborhoods, the re- arrangement of street hierarchy, the enhancement of the old National road (as well as Antistaseos Str.), the waterfront regeneration, the reuse of the old rail link and the upgrade of valuable urban and seafront routes.

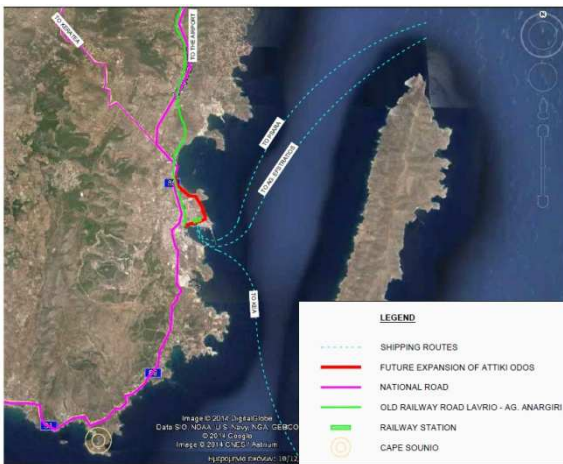


Fig. 4. Lavrio location and network links

Lavrio is a small seaside town with a population of approximately 10.000 people, well-known from the classical period of Ancient Greece for its silver mining activities and its proximity to Sounio archaeological site. In the past, Lavrio was a purely industrial city with numerous factories and active

labour. It was built around its port following a clear grid-iron planning system, with large urban blocks and a wide street network. Located in the southeastern part of Attica, 60km from Athens and very close to Cape Sounio (fig.4), it is very well connected to transportation links with strong potential for expansion. According to the Strategic Plan for Athens 2021, Lavrio will be reached by the extension of the suburban railway network as well as a complementary section of Attiki Odos.

The port of Lavrio is a passenger port (city harbor) located in a strategic position, serving cabotage, numerous yachts, cruise ships, fishing and commercial ships. It is a developing port which is emerging as the “east port entrance” to Attica, playing a complementary role to Piraeus port. By 2021, it is predicted to serve more than 60% of the passenger traffic, previously served by Piraeus port, to and from the Aegean islands and the Dodecanese islands. Lavrio port and its hinterland area, have been under serious redevelopment plans and modernization since 2004.

Regarding its urban planning environment, Lavrio has a clear and readable morphology based on the grid system, with large urban blocks and various open and communal spaces which however remain scattered due to the lack of planning cohesion. It has large former industrial plots, which were left underused due to the economic decline of the deindustrialization period after the 90s.



Fig. 5. The urban morphology of Lavrio and identification of quality routes and open spaces.

Lavrio is expected to play a vital role in Attica's urban center network, as it is constantly becoming a recreational zone and its proximity to the Airport and connection to the suburban railway will allow for further development.

During the analysis step of the study, we identified the major inconsistencies in Lavrio’s urban environment, which were mostly related to the lack of cohesion among its open spaces and the predominant traffic anarchy in its road network. One of the main planning aims which drove our study was the transformation of Lavrio city, from a typical transition port city to a destination point. Quality routes and valuable spaces were pointed out (fig.5), setting the intervention character of

the research. The waterfront, the public spaces network and the developing commercial center were explored in depth together with the linkages to Cape Sounio and its archeological site as well as the science park of Lavrio.

The main urban and traffic planning aims of the intervention were reported as: the unification of large open spaces in the city, the enhancement of the city's identity, the operational and aesthetic redevelopment of the waterfront, the re-organization of traffic and the deterioration of trucks movement through the city's quality places, the increase of the accessibility to the city center and the implementation of sustainable mobility policies.

Its street network, especially the streets leading to the port, is characterized by remarkably wide streets, which are poorly organized (lack of clear traffic lanes and parking spaces) allowing for the redevelopment of high speed and U-turns at many points.

Oropos is a city with a population of approximately 31.000 people, known for its ancient theatre (Amphiareion) and for being a previous affluent agriculture center and a leisure destination for Athenians. Located in northeastern Attica, it is 54 km away from the city of Athens and is connected to the transportation links of the capital through the National Road link (between Athens and Lamia-Thessaloniki) as well as the core national rail link (between Athens and Thessaloniki).

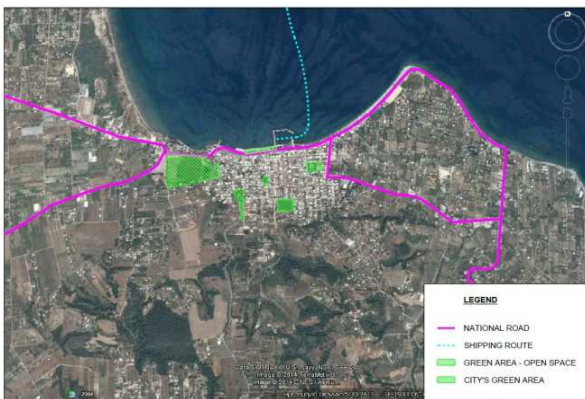


Fig. 6. Oropos location and network links



Fig. 7. Oropos to Eretria ferry link

Oropos has a small harbor close to the main urban settlement Skala Oropou, which serves solely the ferry route to Eretria (fig.7) as well as a marine for yachts and boats.

As observed, Oropos is a sparsely built town around the waterfront with some smaller settlements in the mainland. The urban morphology in the concise small town of Skala Oropou is characterized by a gridiron system, oriented similarly to the port alignment (fig. 6). During the analysis step of the study, we identified the major inconsistencies in planning which derive from the intense building of cottages, the scattered commercial activities and the seasonal traffic congestion in the city center of Skala Oropou due to the increase in port activity.

The main urban and traffic planning aims of the intervention in Oropos were reported as: the improvement of the city's identity and the enhancement of the quality routes and green open spaces, the aesthetic and operational redevelopment of the waterfront, the transformation of the traffic environment into a clear and friendly network to its inhabitants and visitors et cetera.

The last studied port city was Eretria, which is a small seaside city with a population of approximately 13.000 people, known for its Ancient city (Acropolis) since the 9th century BC. Nowadays, Eretria is a beachside resort with various bars and restaurants located in Euboea Island to the Northeast of Attica. It can be reached either by ferry from Oropos port or by car through the regional highway routes.

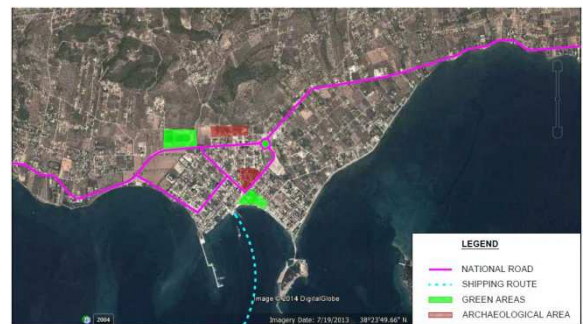


Fig. 8. Eretria location and network links



Fig. 9. Eretria historical plan by Kleanthis and Schaubert, 1834

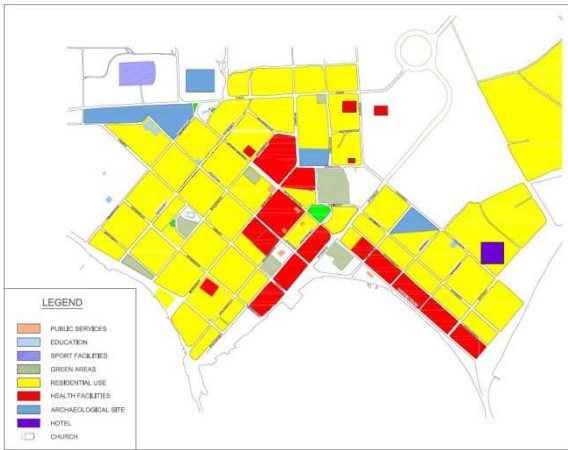


Fig. 10. Eretria; the existing urban morphology and land uses

The harbor of Eretria serves trips by ferries to and from Oropos port and also has a marine for yachts and boats. Its role is complementary to Oropos port and almost 600.000 people are transported through it annually.

While analyzing the urban morphology of Eretria, we came across a historical urban plan of 1834 by famous Kleantes and Schaubert (fig.9). As observed, this plan was indeed followed, but with many modifications and alterations (fig.10).

Urban blocks and main streets are oriented to connect the Eretrian Acropolis and the waterfront, although they present inconsistencies due to scattered approaches in linking open spaces and public facilities. The coexistence of large archaeological sites, open public spaces, green protected zones and intense leisure activities by the waterfront would require a well-organized urban and traffic environment to prioritize vulnerable users, and facilitate trips to and from the harbor without burdening the city’s traffic routes. Following the above principles, we developed alternative proposals to upgrade the cooperation between the port and the city as well as enhance the city’s identity in terms of route readability and landmarks determination.

All four studied port cities share some key common characteristics, which allowed for a unified approach in developing the intervention attributes for a combined urban and traffic planning study, such as:

- the perception of the area as a transition zone and not as a destination point,
- the presence of important archaeological sites,
- the presence of large, open, public spaces in the close vicinity of the harbors,
- the presence of small marines for yachts close to the main ports,
- the downgraded waterfront environment,
- the traffic congestion attributes both in port hinterland areas and in the main street network of the cities,
- the convergence of the main street arteries to the waterfront,
- the lack of concise parking strategies etc.

The common aim was the transformation of the traffic

environment, deriving from the port related trips, in order to enhance the relationship between the urban environment and waterfront. In the following section, the proposed traffic interventions attempt to promote the existing urban qualities, by sustaining the economic viability of port activities and preventing further “embankments” to the cities’ waterfronts.

4. Combined Urban Planning and Traffic Management Plan in the 4 Studied Port-Cities

4.1. The Case Study of Elefsina

As described above, Elefsina is a developing modern city in Attica which faces important issues of urban and environmental downgrade due to the high presence of former industrial facilities and the vicinity to the afore mentioned cargo port. In the last 10 years, transportation links to and from Elefsina have been improved and the presence of numerous underused public or semi-public plot lands present an opportunity for the aesthetic and operational enhancement of its infrastructure.

Aiming at the redevelopment of the existing mobility patterns and the enforcement of urban qualities (fig. 11), we developed a comprehensive plan which includes specific measures and actions, as well as policies and principles.



Fig. 11. Elefsina’s current quality nodes and centralities

The issues that needed to be tackled were related to the traffic congestion in specific street sections (I.Polytechniou str., Venizelou str., Old National Road and coastal avenue) and the wider traffic impact due to the inevitable increase in private car circulation. Moreover, we considered the enhancement of the city’s microclimate, the protection of the neighborhoods and city centre from truck circulation and the upgrade of the previous Eleusian heritage. In terms of sustainable mobility principles, the plans attempt to promote and improve the attractiveness of public transport, walking and cycling through particular interventions in order to reduce car dependency for trips for both inside and outside the city. Two of the most important opportunities which were identified and utilized properly were the downgrade of the Old National Road link and the interruption of the old railway

service of OSE (National Railways) which connected Elefsina with the center of Athens.

After studying the current land use allocation in the city center (fig.12) and the street hierarchy (fig.13), we proposed detailed traffic alterations which will improve the accessibility of all focal parts in the wider area (fig.14).



Fig. 12. Current land uses in the city center of Elefsina



Fig. 13. Existing street hierarchy in Elefsina

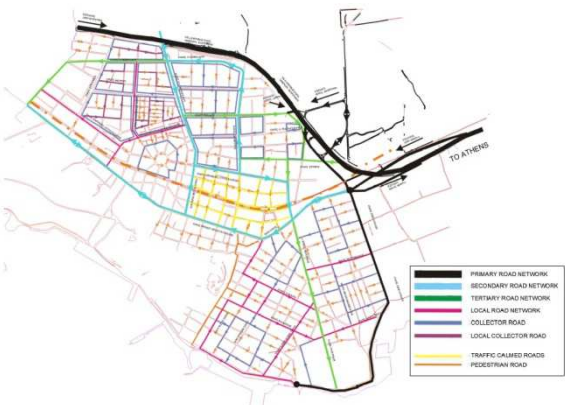


Fig. 14. Proposed street hierarchy and traffic plan in Elefsina

A large number of streets are becoming one-way streets and the methodology of converging and diverging traffic flows is applied through the implementation of small ring roads. Accordingly, vehicles are restricted from crossing urban neighborhoods and forced to follow the suggested traffic loops. Specific infrastructure works (fig.15) are proposed in major intersections and a new cycling network is designed to link quality inner city routes to the waterfront (fig.16).

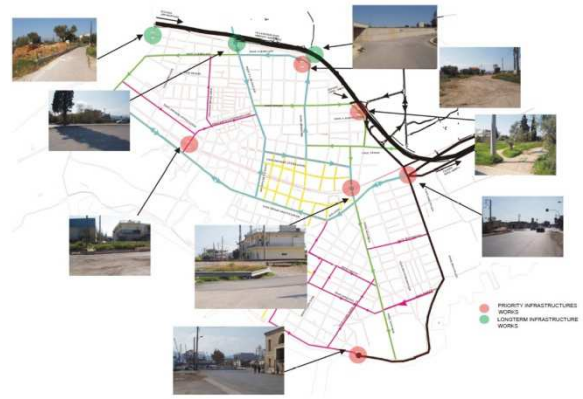


Fig. 15. Proposed infrastructure interventions in Elefsina



Fig. 16. Proposed bicycle network in Elefsina

Through the above transformations, port traffic (high truck volumes and their cargoes) is diverted from the coastal avenue to the motorway, bypassing the city street network.

4.2. The Case Study of Lavrio

Transformations in Lavrio considered the aforementioned characteristics and the official proposals for transportation improvements, such as the suburban railway expansion and the extension of AttikiOdos. Moreover, the proposal has taken account of the increased role that Lavrio is expected to play in the southeastern coast of Attica, according to the Strategic Plan of Athens- 2021 as well as the suggested upgrade in the port facilities.

Prior to the combined urban and traffic planning proposal, we identified the specific qualities of space (large open spaces, emerging commercial center, old rail link, Sounio archaeological site, waterfront etc.) and analyzed land uses, street hierarchies, cargo traffic freedom and many more. Following the previously mentioned aims, we re-organized open spaces and restored cohesion issues (fig.17) as well as suggested 5 alternative routes for trips to and from the port, which are incorporated in 4 alternative scenarios (fig.18).

Specific solutions were also provided for walking and cycling networks within the city and in the port hinterland area. Moreover, an integrated parking system was provided utilizing existing vacant plots for short- and long-term parking.

Similarly to the case study of Elefsina, port traffic is diverted to the neighboring motorways bypassing the vulnerable urban environment.



Fig. 17. Unification of green open spaces between Lavrio city center and port area



Fig. 18. Alternative scenario routes to and from Lavrio port area

4.3. The Case Study of Oropos

Oropos faces the common difficulties of small, seaside, sparsely built Greek cities especially during the spring and summer period. The lack of a concise planning scheme has led to the disorganized concentration of leisure and commercial activities in close vicinity to the waterfront, which attract residents from the periphery even for everyday needs. The street network is ultimately oriented to car traffic and develops congestions both around the port and in the areas adjacent to the wider waterfront. Pedestrians, cyclists and other vulnerable road users have been excluded from the urban environment and illegal parking is observed throughout the whole area. Oropos, compared to Elefsina and Lavrio, does not have cargo traffic. Consequently the proposed measures focus on milder traffic arrangements and small scale urban intervention characteristics. Urban regeneration zones (fig. 19 & 20) are suggested in the city center and the waterfront in

order to enhance quality routes and improve the connectivity of landmarks.

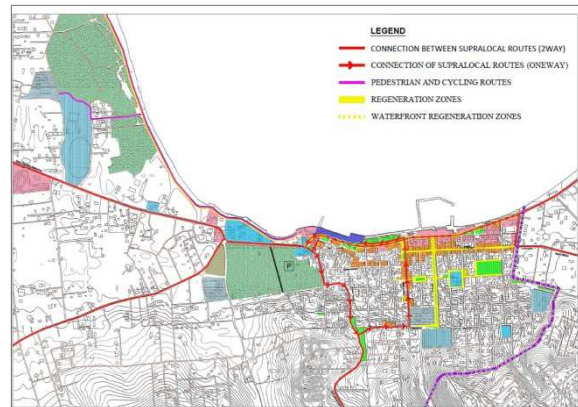


Fig. 19. First Scenario- Urban and traffic planning proposal in Oropos

Moreover, two alternative scenarios were developed for the traffic organization of the area. The first (fig. 19) concerns the transformation of the coastal avenue from a dual carriageway to a one-way street as well as a smaller one-way ring road close to the archaeological site. In the second scenario (fig. 20), the coastal avenue remains a two-way street, yet with changes in geometrical characteristics and sidewalks (i.e. road diet policies). In both cases the inner city network is protected through complex smaller ring roads, pedestrian and cycling routes, urban boulevards as well as a local bus network.

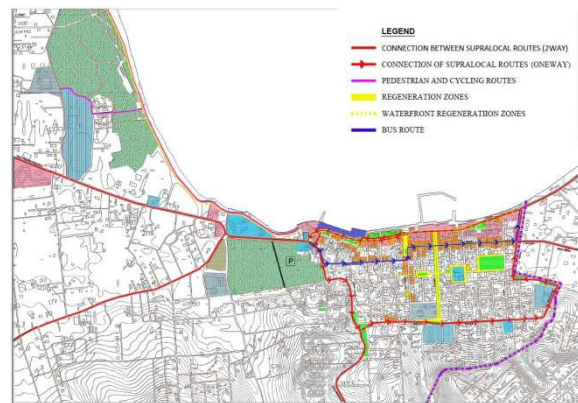


Fig. 20. Second scenario - Urban and traffic planning proposal in Oropos.

In both scenarios parking solutions are provided regarding the duration of the desired stop (short and long-term parking facilities) and the proximity to urban operations.

4.4. The Case Study of Eretria

Similarly to Oropos, Eretria's port serves solely ferry links and thus it does not suffer from cargo traffic. Nevertheless, seasonal traffic congestions derive from the concentration of leisure activities by the waterfront and the trips to and from the port area.

The redevelopment proposal includes the pedestrianization of several streets (fig.21) in the city centre and the regeneration of public squares in order to revive the historical

allocation of space and enhance urban cohesion. Moreover, street hierarchy is re-arranged so as to protect the urban area from through traffic. The methodology of converging and diverging traffic flows is also applied here, through the implementation of small ring roads and one-way streets.

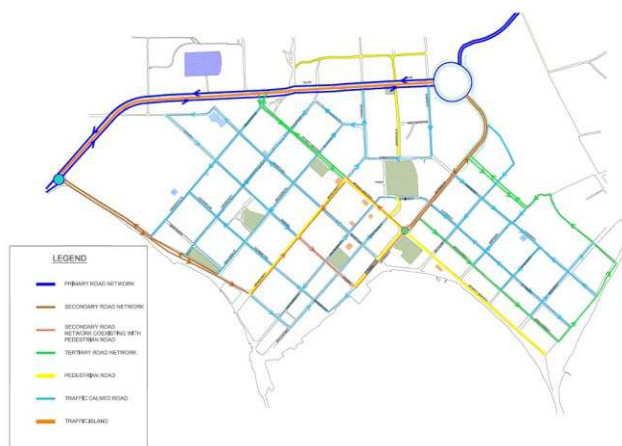


Fig. 21. Eretria's plan for pedestrianizations and alterations in the street hierarchy

Lastly, specific interventions were decided in focal intersections (i.e. roundabouts-fig. 21) in order to regulate entrance to and exit from the city and the port.

5. Conclusions

As described in the beginning of the paper, ports have always influenced their host cities and vice versa. Optimal port cities and their adjacent ports complement each other and benefit from their co-existence and growth.

This paper examined port city relations and their common planning principles, benefits and deficiencies. Urban and traffic planning characteristics in four small and medium sized port cities in Greece were studied in depth, aiming to solve the problems arising by the vicinity to port facilities and the traffic generated by trips to and from the port areas. Moreover, an attempt was made to enhance the urban environment of the studied cities and transform them from transition areas to terminal destinations- places with identity and qualities.

The proposed interventions were based on simple principles of reorganization of priorities and implementation of sustainable mobility techniques. Special attention was given to the enhancement of the waterfront environment and the restrain of cargo traffic from entering the city. Walking and cycling routes, green interventions, pedestrianizations, integrated parking solutions et cetera contributed to the achievement of the initial goals of the study. The benefits of the suggested proposals vary from the city's enhancement to improvement in accessibility, noise and environmental upgrade, reduction in car dependency rates etc.

A significant number of scholars (academics, engineers, planners etc.) is dealing with the traffic attributes of inner port arrangements as well as port entrance and exit intersections from the pure transport engineering perspective. Nevertheless

there is little combined research integrating urban and traffic planning characteristics.

The limitations which occurred during the study of the four port cities were mostly related to the lack of detailed quantitative data in cargo traffic, fluctuation in flows and maritime traffic, as well as detailed predictions for the future development of each port and host city (i.e. demographic prediction, evolution in services etc.). Moreover, a common obstacle faced in all cases was the overlapping of the authorities and stakeholders involved in decision making, funding and monitoring of the interventions. The fact that port hinterland areas belong to port authority companies, and are managed independently by local municipalities, complicates the processes of any urban and traffic transformation.

While writing of this paper, the policies and infrastructure works had not been fully developed yet due to complex procedures of permission granting and audit. Completed projects in Elefsina include the pedestrianization of the links to the archaeological site, the regeneration of the eastern street route to the cargo port, the development of two cycling routes and the construction of two roundabouts. Lavrio has redeveloped part of its waterfront, its main public square and some green routes from the city centre to the port facilities. Oropos has only applied some of the traffic calming policies and Eretria is working on applying several traffic measures and pedestrianization schemes.

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