



From environmental noise abatement to soundscape creation through strategic noise mapping in medium urban agglomerations in South Europe



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HIGHLIGHTS

- The Strategic Noise Mapping is a tool for the rehabilitation of the urban soundscape.
- South Europe's mid size urban agglomerations need to introduce this approach.
- Different urban typologies and sound perception issues are identified.
- Residential population's qualitative surveys aim to analyze the sound perception.
- A cross-analysis explains sound qualities identifying each distinct neighborhood.

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ABSTRACT

In the framework of the European Directive 2002–49–EU, the medium sized cities of Volos and Larissa in central Greece recently completed (2012) their strategic noise maps and relevant action plans that define the main strategies to reduce noise exposure of residents and introduce and preserve “quite zones”. For the first time in this framework, it has been decided to introduce, as well, a general study for five specific urban districts covering not only the measurement and modeling of environmental noise levels but also qualitative surveys on the sound perception by the residents and several analyses of the urban and architectural tissue. The districts (respectively four in Volos and one in Larissa with the two of them in the center of both agglomerations) were chosen as representatives of urban situations due to their proximity to transportation infrastructures (main road network, industrial harbor facilities and both regional and intercity train network) and also because they represent different urban typologies (residential district, downtown area with or without shops, more or less densely populated neighborhood, etc...). Sociological surveys on sound and noise perception have been implemented on some 15% of the residents per district using opened questionnaires. Soundscape analysis was also conducted through qualitative criteria. A cross-analysis of these data explains in detail the physical reasons for the existence of sound qualities that contribute to the identity of each distinct neighborhood. This paper, in a strategic plan level, has introduced valuable recommendations in order not only to preserve the sound quality on the existing sites but also to authorize developers and decision makers (mayors, architects, town planners) to evolve them positively over time.

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1. Introduction

In the framework of the [European Directive, 2002/49/EC \(END\)](#), the cities of Volos and Larissa in central Greece recently completed (2012) their strategic noise maps. These maps come with strategic noise action plans that usually define the main strategies to reduce noise exposure of residents and introduce and preserve “quite zones”. For the first time in

this framework, it has been decided to introduce, as well, a general study for five specific urban districts covering not only the measurement and modeling of environmental noise levels, but also qualitative surveys on the sound perception by the residents and several analyses of the urban and architectural tissue. The districts (respectively four in Volos and one in Larissa with the two of them in the center of both agglomerations) were chosen as representatives of urban situations due to their proximity to transportation infrastructures (main road network, industrial harbor facilities and both regional and intercity train network) and also because they represent different urban typologies

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Fig. 1. SNM of Larissa urban area: Indices (a) L_{den} and (b) L_{night} .

(residential district, downtown area with or without shops, more or less densely populated neighborhood, etc...). In this way, in the frame of the action plan, the aim was to provide for a guideline to preserve and manage those sound qualities for the future.

In the following figures, the relevant Strategic Noise Maps for both Larissa and Volos cities (software CadnaA) for both indices L_{den} and L_{night} are presented (combination of road/rail noise). According to the END provisions, the noise contours of 55 and 65 dB (A) are presented in the maps below together with geographical configuration of the municipalities within the noise contours. For whatever regard the

population exposure in every residential building, it was assumed that all the recorded population for every building, was exposed to its most noisy side (façade) of the building and thus ensure adverse scenario conditions for noise reporting and evaluation (Figs. 1 and 2).

2. From noise abatement to soundscape creation

For this work, main research results were used from the research that has been developed the last 30 years by several researchers in CRESSON (Centre de Recherche sur l'Espace Sonore et l'Environnement

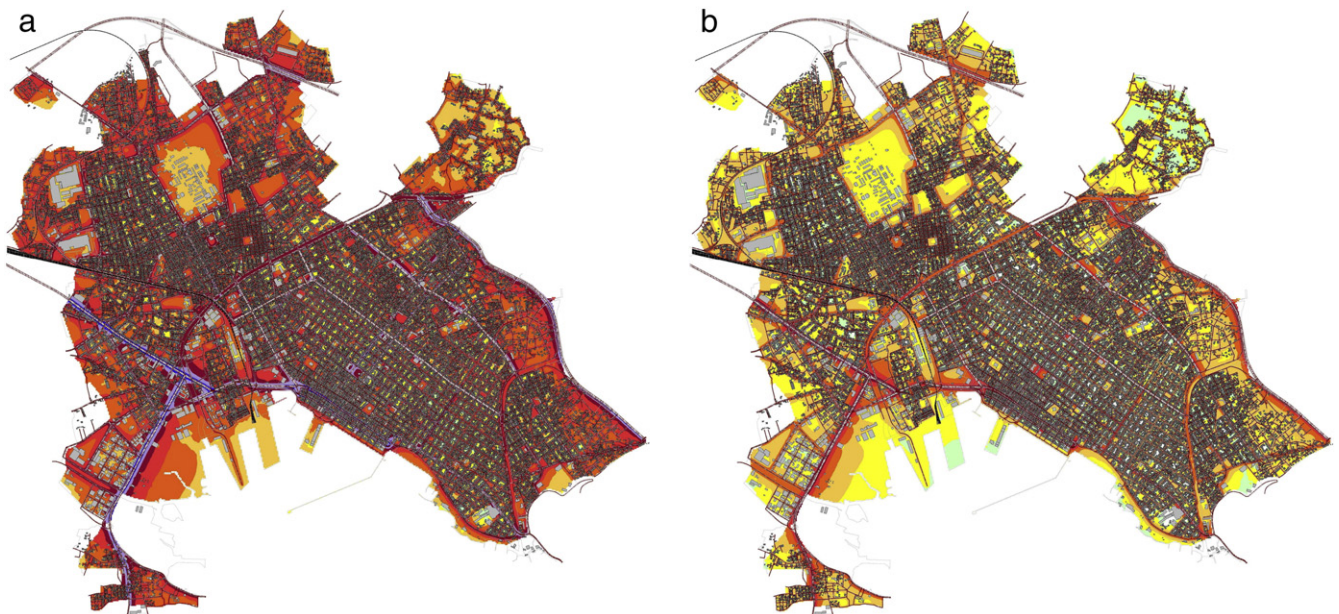


Fig. 2. SNM of Volos urban area: Indices (a) L_{den} and (b) L_{night} .

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