Chapter 1

Urban Sound Planning:  
An Essential Component in Urbanism and Landscape Architecture

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ABSTRACT

In this chapter, examples of the application of urbanism approaches are described not only to reduce unwanted noise but also to improve the quality of the sonic environment. By considering different architectonic elements existent in the urban environment, it is possible to highly reduce traffic noise levels. The shape of the buildings, the street configurations, or the urban furniture are effective for urban sound-friendly architecture. Additionally, it has been proven that human perception is multisensorial; thus, the visual elements are also influential to the perception of urban sound environments. The way visual elements can support the sonic coherence of a space and its relation to the urban functionality is discussed. Finally, Virtual Reality Technology is proposed as a tool for the design and appraisal of future urban development where both visual and audio can be simultaneously assessed. The implementation within a smart city is also considered.

URBAN SOUND PLANNING: THE FUTURE OF SOUND PLANNING

Sounds are an essential part of the world. Through sound, organisms from all walks of life can communicate. An example of communication through sound is by music. Music has the capacity to elevate people’s moods and minds, which is why the Italian composer Ferruccio Busoni defined music as the “Sonorus Air” (Habron, 2015); but also through quietness people restore mentally in a world that can sometimes be so overloaded with noise (unwanted sound). A complete sense of tranquility is achieved...
with a combination of landscape and soundscape elements (Pheasant, Horoshenkov, Watts & Barrett, 2008; Pheasant, Watts & Horoshenkov, 2009), thus when considering the way sounds affect people in urban environments, researchers and planners are naturally concerned. Eliminating the negative effects of sound is considered a high priority in urban planning because of the impact noise can have to human’s health and in general to urban biosystems (Warren, Katti, Ermann & Brazel, 2006; Francis & Chadwick, 2013). The health effects of prolonged exposure to noise (road, railway, aircraft, recreation, etc.) at home have been proven to cause sleep disturbance, annoyance, and can increase the risk for cardiovascular diseases. (WHO, 2009; WHO, 2011) In particular, the cacophony of urban life may cause cognitive impairment, particularly in children. According to the recent Environment European Agency (EAA) briefing (EEA, 2017), noise pollution remains as one of the major forms of pollution as at least 100 million people are still exposed to levels of traffic noise that exceed indicators of noise annoyance and sleep disturbance (55 dB Lden and 50 dB Lnight) (EAA Report No 10/2014, 2014; WHO, 2009). Worldwide, cities are expanding at an unprecedented rate, resulting in new housing and infrastructure demands. In 2050 the number of Mega (more than 10 million inhabitants) and Meta cities (more than 20 million inhabitants) is expected to grow and 66 per cent of the World population will be living in urbanised area (Siemens, 2013; United Nations, 2014). The expansion of the infrastructure network (road, rail and air) to support the growth in mobility demand will result in inevitable impacts in terms of air and noise pollution, which will consequently decrease the health and quality of life of the inhabitants. In Europe, for example, efforts to alleviate this tendency and support cities (politicians, public sectors and other agencies) in implementing strategies to address the growing health and sustainability demands, are developed by networks such as the WHO European Healthy Cities (Who European Healthy Cities Network, 2009). According to this network, a healthy city offers “a physical and built environment that supports health, recreation and well-being, safety, social interaction, easy mobility, a sense of pride and cultural identity and, which is accessible to the needs of all its citizens”; therefore, advocating healthy urban planning, and integrating health considerations in the urban planning processes. A well-designed sonic environment can support and enhance most of these services: it can stimulate mental restoration and physical activity thereby improving urban public health; it can increase the feeling of subjective safety and stimulate social interactions; and above all, it can enhance the cultural experience and provide identity-forming sound marks.

The Environmental Noise Directive (Directive 2002/49/EC, 2002) is one of the main legislative instruments in Europe to control noise pollution in the most urbanised areas. But despite all efforts made in the last few decades at both the European and national levels, the slow progression of beneficially standard noise policies fails to reach the needed outcomes.

Myriam Weber in her PhD thesis (Weber, 2013) refers three cross cutting-factors to explain the unsatisfactory results of classical environmental noise policies:

- **Problem Framing**: Although there is enough scientific evidence to support the health effects of noise, due to the fact that its effects are not obvious and also because it is expressed in a difficult to understand unit of measure (the decibel scale is logarithmic), in practice environmental acoustic pollution is often considered as a nuisance rather than a health problem.
- **Agenda Setting**: A transversal problem at the academic, societal and political fields.
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