

PERSPECTIVE ON SOUNDSCAPE PRACTICES – PUBLIC AND OCCUPATIONAL HEALTH BENEFITS

Tin Oberman¹, Francesco Aletta¹, Jian Kang¹

¹*Institute for Environmental Design and Engineering, University College London
14 Upper Woburn Place, Central House, WC1H 0NN, London, United Kingdom*

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Abstract

Soundscape approaches, as formalized in the ISO 12913 series, have introduced perceptual dimensions into environmental acoustics, complementing traditional noise metrics. Recent developments, including the Soundscape Perception Index (SPI) from the ERC-funded Soundscape Indices (SSID) project, provide quantitative tools for describing and comparing sound environments. However, their uptake in professional practice remains limited. This perspective paper argues that current methodological and data-related advances enable a transition towards implementation. A strategy is proposed to support the integration of soundscape indices into existing design, engineering, and policy processes. The approach focuses on identifying feasible entry points within current workflows and evaluating application scenarios through simulated and case-informed studies. Particular attention is given to public and occupational health contexts, where soundscape considerations can complement existing noise management practices. The proposed framework seeks to accelerate the uptake of soundscape practices by producing transferable workflows, practical recommendations, and an open-access multimedia evidence base. Ultimately, this work contributes to bridging the gap between research and application, supporting the integration of soundscape thinking into mainstream environmental design and policy.

Keywords: soundscape, public health, occupational health, noise management

1. Introduction

In recent years, soundscape research has become a growing interdisciplinary field, attracting interest from academics and increasing attention from practitioners.

One of the key challenges in applying the soundscape framework to practice has been the difficulty of quantifying the perceptual quality of a soundscape in a way that enables meaningful comparisons, mapping, and planning. The European Research Council (ERC)-funded Soundscape Indices (SSID) project has addressed this by developing the Soundscape Perception Index (SPI) and a corresponding framework to bridge these gaps [1]. However, limited awareness across the industry and policy, as well as limited interest from clients and demonstrable case studies are hindering its adoption. On the other hand, building robust evidence to advance the policy happens in small steps which take a lot of time.

Building on the momentum of the Soundscape Indices project, we believe it is possible to develop a strategy to improve chances of soundscape implementation in practice, as proposed in this perspective paper. The strategy would be based on engaging experts from fields of architecture, planning, acoustics and health to: 1) identify and map the opportunities in the current policy and industry mechanisms where implementing soundscape indices is most feasible, within the existing workflows; and 2) contribute to speculative soundscape implementation exercises in a range of simulated workflow scenarios “hijacked” from real-life (and live) projects. This would in turn help: 1) build evidence on the efficiency of soundscape indices implemented in the specific use-case scenarios via speculative immersive laboratory simulations; 2) deliver recommendations for practical soundscape applications, and finally 3) create an open access database of multimedia material highlighting the benefits of implementing soundscape indices, such as the SPI, in practice.

We hope to translate soundscape research into practical applications, lay foundation for the application of soundscape tools and instrumentation, and advance its full integration into real-world design, engineering, planning and decision-making.

Corresponding author: t.oberman@ucl.ac.uk

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2. Overcoming Barriers

There are two most common dilemmas that one comes across when discussing soundscape concepts with acoustics consultants and policy makers:

- 1) Why would a client commission an additional soundscape assessment and design project?
- 2) How should the benefits of soundscape approach be implemented by policy makers, pushing towards soundscape assessments (and design)?

The research trying to uncover the barriers standing in the way of practical soundscape implementation is often recommending an elaborate process of promoting cross-disciplinary collaboration, increasing the body of evidence and creating practical tools to quantify societal and economic impact of soundscape enhancements [2], [3]. These research outputs help the policy makers but the effect on the industry is indirect and uncertain.

For years, a large barrier was the lack of common language within the soundscape community, including the lack of indices that would allow quantifying and comparing key soundscape features of a place [4]. The ISO 12913 series (Parts 1-3) helped to establish a standardised way of conducting soundscape appraisals and the Part 4 working group is working on the delivery of the soundscape design framework [5]. These milestones brought everyone on the same page and established a common platform for communication but most of the impact that the ISO has brought forward was limited to the academic and research communities and then pushing for implementation in practice through living lab projects and stakeholder engagement [6]. Even with the growing evidence base of health and well-being benefits of the soundscape approach [7], [8], [9], [10], recommendations to include soundscape in the early planning and design stages as their integral parts [6], [11], [12], [13], [14], [15] and the effort regarding the understanding of cost benefits of soundscape appraisals [16], industry, clients and policy remain unengaged at large.

3. Soundscape Readiness

In terms of soundscape readiness, recently, United Nations Environment Programme (UNEP) has recognised noise as an emerging environmental issue, together with wildfires [17]. Welsh Government has implemented soundscape, understood as in the ISO 12913 series, in their environmental legislation [18]. The tools developed within Soundscape Indices (SSID) project, based of the ISO 12913 series and psychoacoustic tools [19], [20], now allow for predicting and comparing soundscapes of a place and setting the design targets via the Soundscape Perception Index (SPI) [1]. The Acoustics Group at the UCL Institute for Environmental Design and Engineering has conducted large scale soundscape data collection and modelling studies, contributing to several databases of urban, natural and indoor soundscapes, containing immersive audio-visual footage, acoustic measurements and perceptual data from more than a hundred

campaigns taking place over the world [21], [22], [23], [24]. Together with the data available from the Urban Soundscapes of the World project [25], these offer a starting point for evidence-based simulations of soundscape practice use-case scenarios and cover the potential scenarios relevant for health and well-being driven projects - widely recognised as the key areas where soundscape approach to acoustics is needed [3], [7]. Other studies offered recommendations to optimise stakeholder engagement [6] and provided a vocabulary for working with planning and design professionals [15]. At the present moment, the above provides key tools and a framework, to pragmatically push forward and fast track the practical implementation, in parallel with the ongoing standardisation and increasing the base of scientific evidence.

4. Agenda Setting

Two general areas where such “hijacking” is expected to have the highest impact are: public health and occupational health. In the past research, perhaps more attention might have been given to soundscape and public health, than to occupational health. While in the policy documents they are treated separately [26], [27], it is argued that soundscape is equally relevant to both. To achieve such a goal, following steps are possible: 1) identifying opportunities for the implementation of the ISO 12913 soundscape approach in current design and engineering workflows, 2) utilising speculative approaches to design soundscape implementation workflows, 3) evaluating evidence on the efficiency of various soundscape implementation approaches, 4) defining new strategies for practical soundscape application.

4.1 Public Health Opportunities

We trust that it is essential to address the public health opportunities in both urban and ex-urban settings, in line with this distinction applied in the technical reports on quiet areas [28], [29]. Application of soundscape framework in public health – driven projects is possible where there is evidence that public is already sensitised to soundscape issues so the potential for impact is high: 1) Pedestrianization of streets in London, where soundscape data is available from research projects such as SSID, and 2) Overtourism management in National Parks, where soundscape data is available from research initiative such as *Silenzi in Quota*. Such an approach considers both urban and ex-urban settings where the expectations from soundscape are very high.

Further, the urban areas opportunities relate to the healthy city trends in urban planning and the increasing number of pedestrianization and ultra-low emission projects as case study sites. Here soundscape approach allows for improved planning of both tranquil and lively pedestrian areas in a city.

In regards to ex-urban settings, observing the increased concerns over the global overtourism phenomenon in natural (protected) areas allows for a demonstration of the soundscape approach to be used to manage our activities and experience in the outdoors [23], [30], [31].



4.2 Occupational Health Opportunities

Sound in the occupational health policies in the UK is almost exclusively managed via documents such as The Health & Safety Executive [27], focused on noise, missing the opportunity to address the positive effects sounds can have on health and wellbeing in a workplace setting. Some building standards address this gap, but mostly in an exclusive and competitive way, such as WELL v2, for instance. A recent study on soundscape for truck drivers [32] demonstrates an approach to include adaptive technological systems to improve perceived comfort in workplaces that traditionally suffer from high noise levels.

4.3 Identifying opportunities for the implementation of the ISO 12913 soundscape approach in current design and engineering workflows

Key processes where the *Soundscape Perception Index* (SPI) framework can be effectively applied in practice, across industry and policy, would be identified, related to: 1) noise-driven projects (noise action plans and everyday environmental noise projects for the opportunities in public health, and noise at work for occupational health); but also 2) everyday design and engineering projects. These would be produced through interviews and workshops with the industry stakeholders, focused on mapping their everyday workflows using tools such as swimlane diagrams [33].

4.4 Utilising speculative approaches to design soundscape implementation workflows

The whole process from commissioning a project to its completion would be explored, from viewpoints of the clients, professionals and end users. Speculative design [34] and immersive digital tools (such as immersive virtual reality) could then allow to bridge the existing gaps (i.e. the lack of an actual client or legislation) along the way and simulate the key scenarios by following the “what if”-type of ideas gathered from the before mentioned interviews. The applicability of soundscape assessments, design process and interventions would be explored while working together with the stakeholders. In this way the existing workflows would be “hijacked to serve the soundscape agenda.”

4.5 Evaluating evidence on the efficiency of various soundscape implementation approaches

Immersive and interactive approaches are expected to be most effective, while *in situ* tools are usually the most valuable for participants [6] but more difficult to reproduce. Various workflows identified in the engineering and design practices will be compared and assessed while working with the stakeholders. This would produce evidence on the challenges and facilitators of implementing soundscape approach, including the SPI.

4.6 Defining new strategies for practical soundscape application.

By tweaking the existing industry workflows to include soundscape framework, recommendations would be made for new cost-effective, easy-to-implement processes that bring high gain and clear co-benefits in design and engineering workflows beyond noise control.

5. Concluding Remarks

This perspective paper builds on the ISO 12913 series aiming to contribute to its implementation in practice, focused on the areas of public and occupational health. We argue that progress can be accelerated not only by expanding the evidence base, but by strategically embedding soundscape approaches into ongoing industry workflows. The proposed use of speculative methods offers a method for testing implementation scenarios, engaging stakeholders, and demonstrating clear benefits.

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