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Urban sound design – can we talk about it?

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Abstract

This article intends to critically discuss noise-mapping as the predominant method for evaluation, communication and maintenance of urban acoustic space, as performed in a majority of urban spatial practices today. Discussing the common strategy for handling environmental sounds raises specific questions: How is it possible to extend the current way of managing urban acoustic space, and why should we do that? How can the integration of quantitative and qualitative methods for analysing urban acoustic space act as a complement to existing methods? Interdisciplinary strategies are required which directly focus upon the perspective and needs of design practitioners in architecture and urban planning. The article will also present an example of such an explorative strategy within the scope of the PhD project Urban Sound Design – methods for qualitative sound analysis, a practice-based project within the field of artistic research.

Introduction: a designer's reflection

There is no such thing as an empty space or an empty time. There is always something to see, something to hear. (Cage, 1961, p. 8)

Today we are facing the consequences of about 150 years of urbanisation, confronting questions about quality of life in relation to efficiency and economic benefits. Hard facts based on quantitative measurements are considered to be more reliable than soft values, describing qualities instead of numbers. Sound can be described as a soft value. The dense urban fabric implies a complex mix of buildings, inhabitants, services and communications that are difficult to separate and analyse objectively. Sound appears everywhere without cease and is at the same time extremely difficult to capture and encase. Unfortunately urban designers and architects are not sufficiently aware of the interaction between the propagation and experience of sound and the built outcomes of their work. Designing houses, relations between houses, connections between places, entire neighbourhoods and cities is a serious task, affecting many different aspects of life. This reality is what surrounds the urban inhabitant for an entire lifetime, whether one is aware of it or not. If we continue to neglect the interconnected relation between space, activity and sound, we will most certainly fail to create sustainable urban development where the sonic environment is included as an important and self-evident aspect of the human experience. What words, instruments and tools do we need to develop further to enhance discussions of the difference between a 'noisy environment' and 'a living and vibrating environment'? Can we obtain a more full understanding of the parameters that create and affect the palette of urban acoustic qualities, while also taking into account the practitioners' perspective?

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An interesting and rare example of a study of these aspects is the work of the French urban sound researcher Blaise Arlaud, who proposes a method for mapping out the qualities of urban sounds through the making and use of multiple maps. Arlaud's work criticises the current ways of handling urban acoustic space, proposing a theoretical and practice-based strategy that involves the view and needs of spatial practitioners.

Dealing with urban sounds from a creative design perspective demands a certain awareness of the above-mentioned questions, especially from the parties who are involved in decision-making processes and who are active in the creation of public and outdoor urban spaces, in order to generate built outcomes (Axelsson, 2010). To reach increased awareness and make a difference in future design processes we need to deepen our understanding of the *existing* urban environment and its adjoining acoustic qualities. We also need concrete 'how to' examples, preferably built ones, which embrace larger areas and not only single spots in the city, such as green spaces or parks, to obtain a broad understanding of how various places in the ordinary urban mesh relate to each other and how we relate to them. Unfortunately we see little of this among practitioners today. Why?

The educational situation in Sweden is an illustrative example of the above query. Today, matters of spatial and acoustic relations are not naturally included in the curriculum of the Swedish Schools of Architecture, where students only get a general introduction to room acoustics at the beginning of the ninth semester of study. This implies that specific focus on and possible knowledge transference of a general sonic awareness is more or less dependent upon the personal commitment and interest of single teachers, if any. This situation underscores a somewhat uncertain transference of sound knowledge in relation to space. Instead, students spend a lot of time working with other qualitative aspects that are necessary for the understanding and design of indoor or outdoor spaces like, for example, form, function, tactility, visuality, sociability and sustainability. These are indeed very important concepts to explore and learn to master. But still, the sonic aspect of understanding the built and perceived reality is absent in the classrooms. This is particularly problematic as these students later on in their careers will be in charge of complex design processes. Increased attention to what is going on both inside and outside and around buildings in terms of qualitative sonic experiences needs to be put on the agenda. The wobbly balance between visual, spatial and sonic awareness requires stabilisation in order to generate built outcomes on a larger urban scale.

Noise or quality of urban sound?

When it comes to the current knowledge exchange and action plans among executive professionals, discussions to a great extent revolve around sound pressure levels,

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also known as decibel (dB levels). This position is problematic, because it points to a one-dimensional understanding and handling of complex sonic realities in this particular group of professionals. The lack of use of existing interdisciplinary concepts for describing urban acoustic space implies that constructive and vigorous changes in the urban tissue remain difficult to obtain. We cannot know what to do, if we cannot talk about what we want to do, when a shared terminology is absent in discussions. Architecture and urban planning practitioners are, for example, well acquainted with the concept of 'noise', but they are not fully aware of the meaning of the more elaborative concept of 'sound quality'. Does it mean 'quiet', 'harmonious' or maybe 'musical'? Opinions may diverge at this point, but the concept of sound quality is far more interesting to develop further and make use of in an urban design context than the concept of noise, which is both dualistic and reductive. As the urban sound researcher and designer Björn Hellström asserts, 'Treating noise as unwanted (sound) implies the denial of all its immanent qualities' (Hellström, 2004, p. 13).

Noise is above all a concept that includes a variety of sonic qualities, wanted as well as less wanted. Is it realistic then to divide the urban sonic environment into only two categories: good = quiet and bad = noisy? No, of course not, but unintentionally this is exactly how it works today, as the commonly shared platform for conversation departs from a dichotomous understanding of how to handle environmental sound as consolidated and communicated through noise legislations. Professionals in the architecture and urban planning sectors are tied to these legislations, both concerning indoor and outdoor environments, and as a result they primarily deal with quantitative aspects of environmental sound, rather than the qualitative dimensions. A common view is that sound is something we need to handle with offensive strategies: a misunderstanding that implies restricted possibilities in terms of urban design and a defensive attitude towards urban sounds in general.

One way to get away from this impasse is to pay attention to and understand the grayscale of the urban fabric and its qualitative and transient values, not only the extremes. This thought is in itself not a new one; it is actually a research field that has existed for the last four decades, initiated and manifested through the work and research of R. Murray Schafer and others connected to the World Soundscape Project (WSP) and the important urban research and specific terminology developed at the interdisciplinary Institute Cresson (Research Center on Sonic Space and the Urban Environment) in Grenoble, France.

These two approaches to environmental sound research can be understood as two complementary ways of handling urban sonic space. The WSP approach (later also the World Forum for Acoustic Ecology, WFAE) is grounded in a clear set of values, based on the idea of 'acoustic ecology', where small and discreet sounds in the environment should be protected from the high and dominating ones: often traffic or technically generated sounds (Schafer, 1977). This focus, or value system,

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simultaneously places urban sounds in a hierarchical system where a natural urban setting (i.e. any ordinary urban environment) implicates restrictions rather than possibilities in terms of urban sound design.

Another approach to environmental sound research is applied at Institute Cresson, where emphasis is placed on the *constitution* of sound, its propagation in space, paired with questions of what kind of *effect* different urban sonic situations/spaces may have on us, the city dwellers. A range of interdisciplinary concepts describing and depicting some of these various situations are developed in order to increase understanding and communication (Augoyard & Torgue, 2006; Hellström, 2004).

Trying to describe urban acoustic space from a perspective that does not judge the basics of the urban situation itself is crucial, if one aims to extend the creative strategies for urban sound design.

Noise maps – a predominant tool

Another reason why architects and planners still linger in ignorance of how to deal with urban acoustic space from a creative point of view is the prevailing division of sound studies into separate and sharply defined disciplines, such as physical acoustics and phsyco-acoustics. This division implies that some perspectives on urban acoustic space and its management historically have proved to be more prominent than others. Depending on what influence and recognition these disciplines represent and whether their strategies are quantitative, technically or medically grounded, legislations are affected by their recommendations. There is nothing wrong with the procedure as such. The problem is that it is often the *only* perspective at hand, when professionals later on wish to discuss and manage urban acoustic space, manifested in the recurrent making and use of noise maps.[1]

Colour as a descriptor of complex acoustic spaces

The intention with noise maps is to indicate measured and calculated sound pressure levels of outdoor spaces in order to enable comparisons and noise-abating strategies.[2] Analysed areas are coloured, using different colours that correspond to certain intervals of the dB scale. Parameters that are taken into account include, for example, the amount of road, train and airborne traffic at different times of the day in relation to the dimensions and distances between built structures. This strategy is efficient in many ways; we can instantly localise problematic neighbourhoods in terms of sound levels or potentially quiet areas. The maps can be used as basic data for making noise-abating moves at certain problematic spots and also, more and more often, they function as a guide indicating real estate values in urban areas (Kreutzfeldt, 2011, pp. 67-79). But trying to use these documents as descrip-

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tors of complex urban sonic spaces, these 'tools' immediately prove to be too rough and general in their performance to function as the only basic data. Urban spaces and their interrelations are too complex to be easily encircled. This fact has been explored by many researchers over the years.[3] Studying colourful noise maps is not enough to produce satisfying answers or even to propose the right questions regarding how to understand and design urban acoustic spaces. We are in need of other, complementary tools to describe the grayscale of urban environments and their sonic qualities and thus learn how to work creatively and consciously with this complex material.

Image 1: Examples of alternative forms of documentation and analysis adjoining the noise map to the right

What information can we soak up from the brightly coloured noise map? The instant impression might be that what we observe is a general acoustic situation, describing loudness and quietness, respectively, in relation to the built structures of the place. Transposing the visual input of the map to an idea of what is actually happening at a certain place in terms of real sonic propagation is difficult if one is not acquainted with the area in advance. It is, of course, also possible to claim that we do not hear much at all. What we do get, though, is a general apprehension for where on the scale of 'good = quiet and bad = noisy' a specific place in the city may be inscribed. Noise is a dualistic concept that fits well with the reduced acoustic comprehension adjoining noise maps. But if we are interested in other and complementary information to the notions of 'quiet' or 'noisy', we realise that these maps communicate a severe lack of important components, components that could possibly describe what *kind* of acoustic space a certain place communicates to a visitor, an inhabitant or someone working in the neighbourhood.

Layers of qualitative information – the necessity of adding new perspectives

What are the acoustic and other sensuous qualities inscribed in the experience of a specific urban place? How is the ground – soft, hard, grassy, pebbly? How is the space *constituted* – narrow, open, sloping, elevated, empty, filled? What are the moving elements in a particular place – traffic, people, water, trees, animals, technology? How are different spaces *connected* and how do they *affect* each other on a broader urban scale? What kind of *effect* does the experience of going from a calm

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yard to a busy street, reaching an open space from a narrow path, or the change of heights evoke in someone who is moving through the cityscape? These and other aspects are not present in the outline of a noise map, but are qualities that are constantly present in our experience of the city. It is therefore necessary to add more layers of information to the traditional usage of noise maps. This procedure could create a deeper understanding of the acoustic quality and possibly encourage relevant and fruitful discussions of the constitution, importance and legitimacy of different urban spaces.

Variation and contrasts – the act of moving

Through the act of moving around an area by feet, one place distinguishes itself from another through the appearance and experience of major or minor changes and contrasts in the surrounding environment. Human ears, eyes and the entire body are experts in distinguishing and identifying these distinctions and changes, which give us important information and stimuli in our daily lives. As researcher on urban ambiances, J.P. Thibaud, at Cresson describes it, 'Sound and ambiance enable us to emphasize the "in-between" and the "in the-middle", and through them a relational thought can develop' (Thibaud, 2011). Presume that we distinguish none or very little variation in the spatial and acoustic experience of an ordinary promenade. This would probably not be a problematic scenario if one was an occasional visitor, but if it was a matter of a daily and repeated route to work, school or the supermarket, then the promenade would contain a shortage of qualitative experience.

Moving around an environment in situ involves a sense of variation through the very act of transition. It is therefore not sufficient to only use measured and calculated sound pressure levels as guidance for offensive strategies for the design of urban environments. Extended strategies are required to embrace these questions from a new angle, where new approaches for description, analysis and operation are unified.

How can we communicate spatial/sonic complexities?

Nevertheless, the existing and presumably useful concepts for describing urban sonic space, developed by researchers connected to the WSP and the Institute Cresson, have obvious problems reaching out to professionals engaged in everyday practice. Here I am not referring to the professionals engaged in advanced research networks or communities where one is both already well-aware of relevant terminology and involved in direct knowledge development,[4] but to the professionals working in the front row of everyday practice, at the innumerable architecture and planning offices all over the world. There seem to be some missing links between

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theoreticians and practitioners in the chain of knowledge transference, which indicates that this is a question of communication. My point is that for understanding the resonating subtleties of complex urban spaces, the development of useful and relevant *communicational tools* is required, verbal and technical, descriptive and operative, to bridge this gap and reach out to the hands and minds of everyday practitioners: tools that are able to bring together qualitative and quantitative information and transfer knowledge and understanding of urban acoustic space to new contexts where these aspects can be discussed and comprehended by non-researchers. Theory alone will not do; practice alone will not do. I believe this is of the greatest importance, especially when the intention is to approach visually and spatially oriented disciplines.

So, what *will* do? One way of approaching this issue is through the act of making everyday situations in the city visible and audible on a basic and comprehensive level, where matters of *representation* and *communication* are the guiding stars. Improving the visual and verbal communicational language among researchers could open up for much broader knowledge transference. Then professionals from other fields could more fully understand and more actively elaborate on the transient subtleties of urban sonic space that are continuously present in our lives, but rarely thought about and verbalised in general.

Urban sound quality?

As has been stated in the previous section of this article, working with the concept of noise is not sufficient if we want to understand the acoustic qualities of urban spaces. Talking about qualitative aspects instead of problems opens up the field for new elaborative approaches; it is therefore worth taking a deeper look at the notion of 'urban sound quality'.

Sounds emanating from activities that take place *around* us and are generated *by* us, as well as the plethora of changes in the urban sonic structure we experience while moving *between* locations, are crucial to consider when we want to understand how sound and space interact, behave and constantly produce themselves, i.e. when we want to understand the formation of an *ambiance* or an *atmosphere*. 'When we try to understand the way an atmosphere is generated, we have to consider the interaction between the built environment and the social practices it enables and relies on' (Thibaud, 2011). The symbiosis of these parameters – an experiencing subject, the surrounding environment and all the sounds emanating from activities (human, natural, animal, technological) at specific location(s) – also constitute a basis for understanding the meaning of urban sound quality. Urban sound quality is not a fixed term, but a flexible one, enabling discussions of how these three parameters interact and relate to one another at a specific place, at a specific time. Instead of

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describing the sonic character of a place as 'good/bad' or 'preferable/less preferable', one could for example ask: *How* is the sound quality of this particular place compared to that of another particular place? The notion of quality holds the potential of acting on a communicational level, unifying aspects of description and operation. It has the capability of focusing on different nuances of information that can be useful and relevant in the description of an urban environment, bringing forth aspects of tactility, spatiality, visuality, orientation or changes in the perception of space for example. When talking about acoustic or sonic quality, the emphasis is of course on the resounding aspect of the experienced reality, and talking about urban sound quality we arrive at the integration of complex, spatial and structural aspects in correspondence with a perceiving subject. Maybe it is also possible to propose that the diversity of these more or less evident and transient qualities of urban sounds correspond to the invisible grayscale of the brightly coloured noise map?

Methods for qualitative sound analysis – an example

As a mediating space, the sidewalk draws out an acoustical flux of so many occurrences and events. It teems with energy, frictions and noises to form a sonorous fabric signaling the ongoing flow of life. [...] In the city, the sidewalk seems to overwhelm or disregard the dichotomy of silence and noise with a general hubbub rising and falling through the day and night. Pockets of intensity, zones of volume, shifting gradations of acoustical flow that makes the sidewalk a sort of sound membrane contoured by the noise of the street on one side and the buildings on the other. (Labelle, 2010, p. 92)

I will finally give a short account of how I have dealt with the challenge of working with urban acoustic space in an extensive central site in Stockholm, Sweden. Through explorative modes of observation, representation and analysis, the intention was to gain new insights and practically grounded knowledge and understanding. The underlying scope of this project was, as has already been mentioned, to try to bridge the existing gap between theory and practice by focusing on strategies that might induce practical and pragmatic hands-on knowledge.

Through this site specific, or to be more accurate, area specific fieldwork in Stockholm I have dealt with a twofold agenda, embracing questions of how to understand and handle the qualitative aspects of urban sounds from a practitioner's point of view, and how to communicate that kind of information internally within the project, but also externally to a professional and design-driven audience outside the research community. This point of departure implies a strategy that at the same time is experimental in character, but also strives towards simplicity and clearness regarding the performance and transfer of research material.

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Image 2: Hornsgatan, the fieldwork area, at the elevated part called 'Puckeln'. Documented in photo and ink.
Sound file 'Puckeln'. At 1 p.m. on 28 October 2010. About 7 metres above the main traffic flow on Hornsgatan.

Trained as a visually, aesthetically and functionally oriented architect with a personal interest in sound, I began to study the 2.3 kilometres long street Hornsgatan in the district of Sodermalm. The street is interesting due to its topography, different usages and variations in aesthetic appearance, and it was constructed over three centuries which also mirrors the various architectural expressions clearly represented in different sections. Some areas contain a greater amount of iconographic value, while other parts are less used. It is also one of northern Europe's most air polluted streets because of the dense traffic flow, as it functions as a main passage into the central parts of Stockholm. Hornsgatan is regarded as a problematic street due to these circumstances, but at the same time several parts of the street are well-used and appreciated by both inhabitants and visitors. Attempting to encircle these different states of Hornsgatan through all its visual and transient qualities, it is easy to see that the study of a noise map alone would not be enough.

By comparing diverse but complementary forms of information, the idea of reaching a deeper and broader understanding of urban spatial and sonic relations has been explored. Utilising the for architects well-known method of site specific observations through sketching, studying maps, taking photos etc., I began to thoroughly study the area while also integrating the sonic perspective. Traditional observational methods were thus extended to also include audio documentations, video surveys together with text-based reflections of the sonic environment. One important layer in this approach was to try out and assess some of the notions and concepts I considered useful for my main queries, concepts coined by leading urban sound researchers (R.M. Schafer and the research team at Cresson for example), such as the commonly used soundscape concepts *hi-fi/lo-fi* and the sound effects concepts *cut out* and *release*.[5]

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Integrated in this article is a selection of images and a sound file, presenting some of the observations, representations and analyses used in the study, such as sound pressure levels, textual reflections, morphology of space, activities, mapping of pedestrian and traffic flows, an interactive digital sound map, to name a few. Without going into specifics, I would like to share the general conclusion of this work in order to give an account of how an explorative study like this one could potentially act on a mediating level, extending the strategies for practical knowledge-building concerning urban sound design.

As a result of this elaborative approach and through the integration of different perspectives on studying space and sound, a possibility for obtaining a broader understanding of sonic propagation and experience in relation to spatial and temporal aspects of an extensive geographical area has emerged.

Hornsgatan is, as already stated, a problematic street in terms of air and noise pollution. Several prevention strategies have been undertaken by responsible authorities in an attempt to change this course of events. At the same time, the urban planners have far-reaching densification plans for the area. The proposed method for qualitative sound analysis can at this point provide important complementary information to a decision-making process of this kind.

The case of Hornsgatan has showed that by comparing and surveying complex information of a large geographical area, new insights can be drawn from visual and sonic material. These insights could have an effect on decision-making processes, as the proposed strategy is able to bring to light previously unattended relations. An example hereof is the existing proposal to build new housing in the middle of a public yard of a semi-closed block from the 1970s, next to the most troubled part of Hornsgatan.[6] This is, according to some of the observations, analyses and conclusions in my research, a highly counterproductive proposal, as it would destroy important qualitative values in the neighbourhood and additionally hinder the development of a sustainable urban acoustic environment in this area. A more rewarding strategy in this case would be to focus on strengthening the existing qualities of this public yard, as it is an open, contrasting space next to the dense traffic buzz of Hornsgatan. Such a move would not directly generate profits in the short term, but it would increase the quality of life of numerous citizens for years to come in terms of sonic experience.

The plausible question, *where* exactly in this part of the city should we concentrate our strategies for urban sound design? requires motivated answers. I believe that through the visual communication of complex invisible qualities, answers could be reached more easily and a consensual understanding made possible in dialogue with others.

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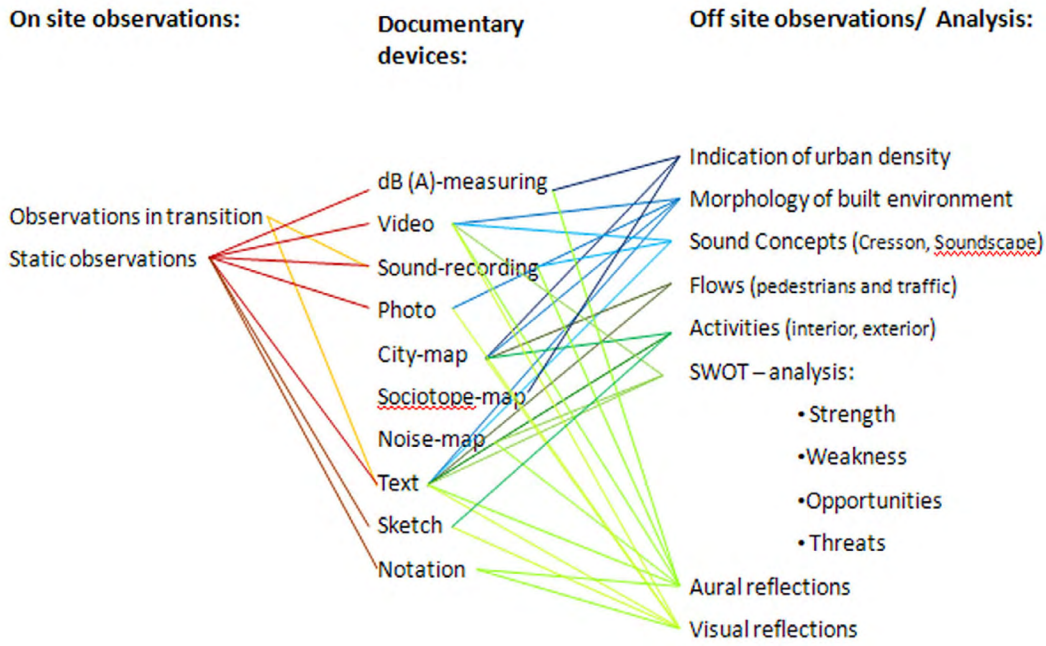

Image 3: Chart mapping the strategies in use in the initial phase of the research study

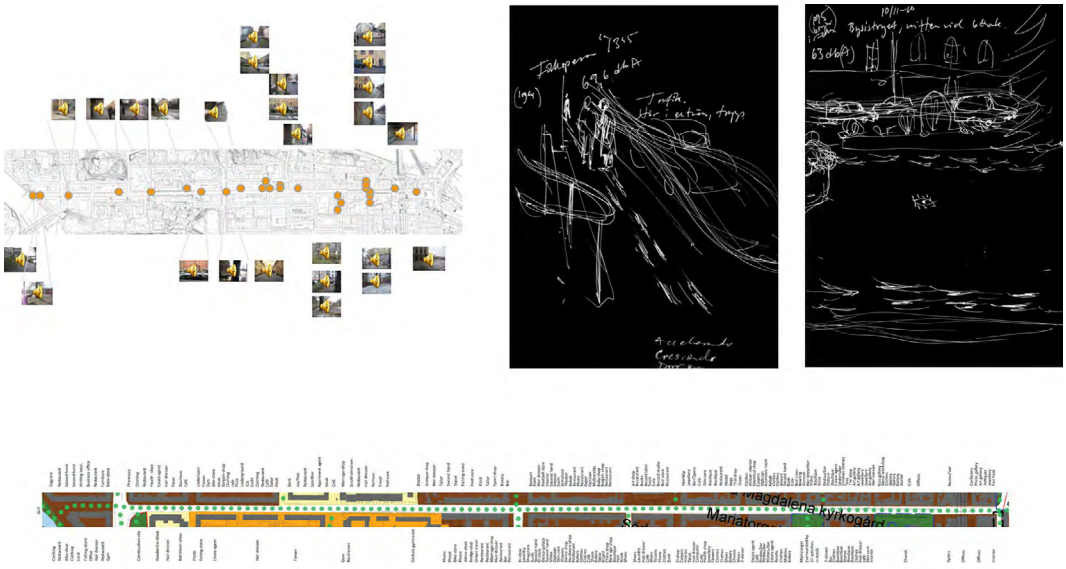

Image 4: a) assemblage of video documentation and sound recordings on a city map, b) sketches of site specific sonic observations, c) inventory of business/activities along Hornsgatan marked onto excerpt of the sociotope map.[7]

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Conclusion

The main idea of this article has been to describe, question and challenge existing strategies for managing urban sonic space by proposing an extended method for qualitative sound analysis that focuses on the perspective of design practitioners. The point of departure is the idea that by identifying different types of spaces and specific urban situations as well as their relational meaning and effect on us, it is possible to learn more about how these spaces function and how they could be improved and designed in the future. Through more empirical spatial/sonic research it is possible to make the knowledge area understandable to professionals outside the research community. Such a scenario would increase the chances of implementing important findings and discussions in everyday practice and affect the planning and construction of public urban spaces in terms of acoustic quality.

Sonic qualities of urban environments relate directly to the situations in which they appear, and their diversities and subtleties can best be understood through our ears and minds, through the attentive experience and critical thinking of inhabitants, users and creators. At the same time, the sonic reality tends to slip away from all kinds of simplifying understanding. But one thing remains clear; built outcomes are produced every second in all corners of the world, regardless of whether the practitioners possess a spatial/sonic awareness or not. *Now* is the right time to develop and use urban acoustic quality as a design element in the emergence and reconstruction of our shared environments. What we still need is a broader and more practically grounded understanding of what urban acoustic quality is and how we can work dynamically and creatively with the grayscale of everyday urban sounds.

If we could design our shared everyday outdoor spaces while simultaneously considering the sonic aspects in congruence with functional, formal, visual and tactile aspects, we would emphasise progress towards acoustically sustainable environments where attention is paid to the sensuous experiences and quality of life of urban inhabitants.

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Notes

1 For example, illustrated by the EU-initiated Environmental Noise Directive, which has been in use in Sweden since 2004 (Direktiv/2002/49/EG); here EU legislation prescribes compulsory mapping of measured and calculated sound-pressure levels for every European region with more than 250,000 inhabitants (www.naturvardsverket.se).

2 See report: On the implementation of the Environmental Noise Directive 2002/49/EC from the European Commission (2012).

3 An example hereof is the Swedish interdisciplinary research programme MISTRA – Soundscape Support to Health (finished 2007). Qualitative and quantitative research methods were here merged, which was a strategy that both generated new knowledge and concrete design proposals regarding urban planning (www.mistra.org).

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4 Like for example the EU-initiated and highly urgent Soundscape COST action programme: **COST Action** TD 0804, '**Soundscape** of European Cities and Landscapes' (www.soundscape-cost.org).

5 For definitions of the concepts of hi-fi and lo-fi as well as cut out and release, see Schafer (1977) and Augoyard and Torque (2006).

6 Read more about the block called 'Plankan', a semi-closed housing project from the 1970s at: http://www.bygg.stockholm.se/-/Alla-projekt/Sodermalm-Plankan/ (in Swedish).

7 The sociotope map of Stockholm is developed at the Swedish town and planning office. It indicates social and cultural values of all free outdoor spaces in the city, together with indications of morphologic density and biotopes. The map is used as a guide when planning projects and can be downloaded from: http://www.stockholm.se/TrafikStadsplanering/Stadsutveckling/Stadsplanering/Gronstrukturplanering/Sociotopkarta/

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