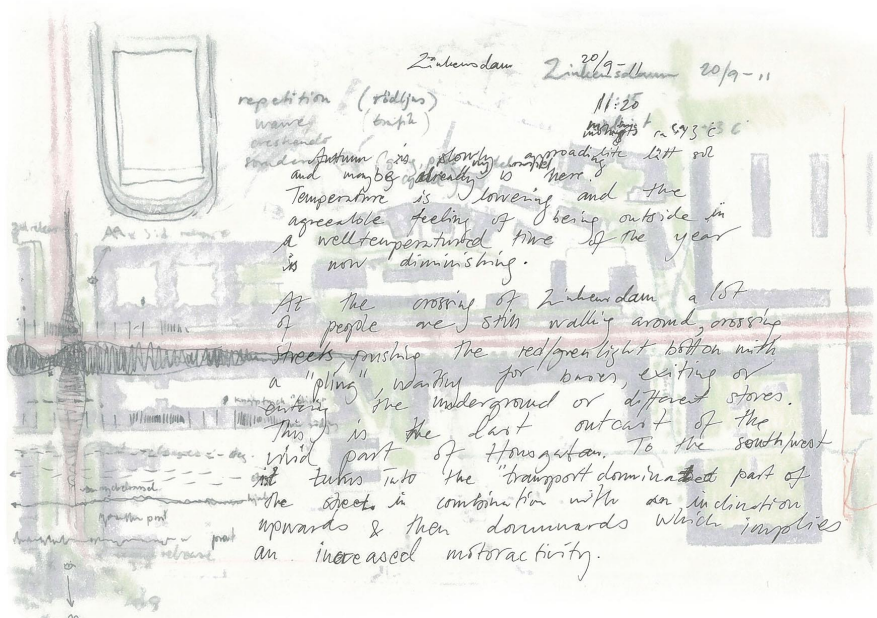




3. THE CASE OF HORNSGATAN:

METHODS FOR QUALITATIVE SOUND ANALYSIS





Layers of spatio-sonic information. City map. Ink and colored pencil on paper and transparent paper. Sept. 2011.

3.1 Introduction to the case study

The case study chapter begins with a brief **introduction** to the historical, locational and functional context of the street that explains the reasons for choosing Hornsgatan as my case study. The midpart of the chapter is devoted to a survey of the **tools and techniques** identified, explored and implemented in this study. Recorded sound files and other digital media such as video documentations are an important part of the inventoried material. Sonic and digital media appearing in the case study presentation are part of a digital online version of the thesis which can be found in the Research Catalogue (RC) connected to the Society for Artistic Research (SAR).⁹³

References are intentionally excluded in the next chapter to preserve the timeline and to highlight the creative “thread” and show the development process in a linear fashion.

The main part of the case study concerns the **implementation phase**, in which the case is divided into three sections corresponding to clearly identified segments of Hornsgatan that span between two or more nodes like junctions, crossings, parks etc. I have chosen to call the three segments of the street **sections**. Each of these sections contains between eight and ten case studies (25 in total), that have been investigated during weekdays/daytime through a plentitude of qualitative facets of observation and description. This information is superimposed and organized through mapping strategies in various constellations, but also with the intent of making it easier to obtain enhanced understanding and communication of crucial factors affecting the quality of public urban sonic space.

The final part of the chapter consists of implementing chosen aspects of the gathered information into a coherent and visible whole.

A possible synthesis is proposed through the compilation of spatio-sonic data, which may provide the reader with a comprehensible and condensed picture of the differences or similarities; problems or possibilities; and the advantages or disadvantages of various sonic qualities identified at Hornsgatan. These consolidated representations, illustrations and textual analyses are denoted **spatio-sonic drawings** and contain a qualitative sound analysis of each site. The spatio-sonic drawings function as the basic foundation for making an analysis of the entire street together with an adjoining final critical reflection.

3.1.1 Why Hornsgatan?

The reason for choosing Hornsgatan as the major case study is primarily because of its variegated spatial character, urban morphology and combination of different uses and functions along its full extension. Simultaneously, it is one of the most noise and air polluted urban streets in Stockholm, which makes it even more interesting to investigate. When reading media accounts about the street or if you look at the noise map, you could be led to believe that Hornsgatan is all about problems, but obviously, there are nuances here as the various sections of the street differ widely with regard to usage, appearance, quality and in tone, compared to the black spots of the noise map. Locating and describing these parts of Hornsgatan that have positive aspect alongside those that don't, and understanding *how* these function and possibly interact, is essential to this study. It is central to this process-based research to perform a qualitative spatio-sonic inventory to explore useful means and methods, both well-established and more experimental, in order to describe and represent every nuance and the factors that affect them. My strategy has been to experience the street with all my senses while focusing on the aural dimension, and to describe, represent, visualize and understand these variations. through the use of different media.

The entire length of Hornsgatan is in this study denoted *the case* or *the case study* although several *case studies* are actually involved. I have elected to regard the street as one single spatial entity (the case) that consists of several smaller spatial entities (the case studies), sections and sites, each with its own unique characteristics, and distinguished by time, space and usage/activities. However, the sections and sites are all spatially connected and can therefore never be considered as being totally separate and they are also studied both as an entity and as unique parts. By utilizing a range of different tools, techniques and strategies for describing, representing and analyzing various facets of sound, architectural space, and experience, the assumption is that extended knowledge can be achieved by bringing this information together in new forms and constellations, to allow another kind of assessment. It must be emphasized that the methods presented here cannot be regarded as general or universal in the sense that it is possible to transfer and apply them directly in the practice-based work by people who are interested in working with qualitative sound analysis and the planning of dense urban environments. The tools and techniques described on the following pages and the implementation phase of the method development as well represent *one single* example of how it is possible to

⁹³ <https://www.researchcatalogue.net/view/264750/264751>

approach these questions from a broadened and integrative perspective. It is not a matter of proposing a one-size-fits-all solution, just showing instead that infinite ways of working with urban sonic space exist and this is one of them. The results obtained by this study provide an explorative model that corresponds to the challenges of the research project as well as to the personal abilities and strengths I bring along. My background as an architect with artistic and musical training affects the outcome, which is only natural.

As a result of these specific conditions, I present a model for studying and analyzing the qualitative dimension of urban sonic space that is propositional and intended to be extended, elaborated and further adjusted and then proven in dialogue with other professional disciplines engaged in this particular, or a related, field of research and practice.

3.1.2 Historical background, location and function

Hornsgatan is a land-bound connection between the two separated bodies of water, Mälaren and Saltsjön, and it is also situated between the two urban nodes Slussen and Hornstull. From an altitude of 14.7 meters on the northeast side of the island of Södermalm, Hornsgatan overlooks Saltsjön, a part of the salty Baltic Sea that ultimately is connected to the Atlantic Ocean. On the southwest side of the island, the street runs almost up to the shore of Lake Mälaren, the third-largest sweet water inland lake in the country, which also is a drinking-water reserve for the capital of Sweden.

Today, Hornsgatan functions as an important artery in terms of traffic and communication with thousands of people passing by everyday by foot, bicycle or public transportation. The intersecting streets funnel their traffic into Hornsgatan's buzzing stream of vehicles, a swell that increases and decreases in intensity several times an hour as well as over the span of one day. In its role as a well-used traffic route where some 10,000 to 23,000 vehicles pass every day depending on the site selected (average year value)⁹⁴, the street has turned it into a highly problematic spot in Stockholm with regard to air-pollution (nitric oxide), and high sound-pressure levels have exceeded accepted threshold values for quite some time now, a fact that has forced the municipality to take action.⁹⁵

⁹⁴ Data acquired from Trafikkontoret (Stockholm Traffic Administration), Nov 2016.

⁹⁵ For example in 2010, a prohibition against the use of studded tires was introduced on Hornsgatan to diminish the exceedingly high levels of hazardous particles in the air. The same year, actions were taken by the municipality to make the street safer for pedestrians and bicyclists through spatial and traffic related adjustments and improvements.

These levels vary, however, as the inflow and outflow of vehicles at certain spots affects the total amount of traffic at certain sections of the street.⁹⁶

Since I started with the inventory of Hornsgatan's sonic character and quality, the street has undergone some esthetic changes and convenience improvements. Trees have been planted alongside the sidewalks, bicycle-lanes have been added on both sides, and the walking space has been made wider as well. These improvements began in 2009 and were completed in 2015, resulting in positive changes for this neighborhood and for those passing through Hornsgatan on a daily basis. As my investigation of Hornsgatan was conducted before the completion of these physical changes, I do not explicitly include these as part of my research. They do, however, appear in descriptions and documentations as ongoing construction work, and certain sections of Hornsgatan are integrated in the site-specific documentation and observations in some instances.

Apart from being well used as a route of transportation for land-bound traffic, the street is a popular scene for everyday urban life. It hosts a broad variety of inhabitants, small-scale businesses and trade, along with other activities. This has been the case as long as the street has existed. Though the neighborhood close to the street was once poor and slum-like, in particular up on the hilly northern crest of Mariaberget, this blend of people, trade, and activities has historically always been present at Hornsgatan – it has apparently been an urban spot from past to present. Nowadays, the area is one of the more popular spots on the island of Södermalm, with escalating real estate values, gentrification and heavy traffic on centrally positioned streets as a consequence of this popularity.

37,000 inhabitants live in the neighborhood surrounding Hornsgatan. Between 25 and 30% of the inhabitants are under 18 or above 65 years old, which implies that between 9,250 and 11,000 persons are likely to be more firmly anchored to their immediate surroundings, compared to the more mobile age-groups of 18-65.⁹⁷ "Quality" is therefore an important concept when talking about urban outdoor space. In particular, it is important to consider what quality involves when acting physically in dense urban public spaces. The ability to have access to different urban spaces containing various visual, spatial and sonic qualities

⁹⁶ The outflow of the tunnel of Söderleden for example as well as the in/outflow at Ringvägen and Rosenlundsgatan as well as Hornstull.

⁹⁷ Statistics from Stockholms Stad concerning the number of inhabitants in the districts of Mariatorget, mid and north Högalid (2013). www.statistikstockholm.se.

is important. It is, however, often hard to talk about, and to safeguard quality as a concept when other more prominent features like costs or sustainable densification strategies are being discussed by governmental or municipal authorities. Being able to make a case for these less-evident and even evasive and non-visible qualities found in livable, socially sustainable and high-quality environments requires that anyone in the position of making important decisions has sufficient training and is equipped with a relevant and useful kit of tools and strategies.

The street has a history that reaches several hundred years back in time. The oldest part is the northeast section near the passage to The Old Town district, known as Slussen, which dates back to the 1600s. It has changed its appearance over time and reached its current length and outline in the 20th century as the masterplan from 1866 (Lindhagenplanen) was completed. The relationship between Slussen and the south-west end of Hornsgatan known as Hornstull, a lively industrial area as far back as in the 17th century, had been strong even before Hornsgatan was orthogonally outstretched, with the slight difference that one had to take a detour or two due to the hilly profile of the street at that time. Towards the end of the 19th century, the massive granite rock that gave this side of Södermalm its characteristic silhouette known as Mullvadsberget and Mariaberget, was blasted down to a more convenient level using dynamite, which was a new invention at the time, in order to facilitate transportation. This makeover forever changed the physical appearance of the street and improved the conditions for traveling in this area.⁹⁸

Lindhagen's masterplan for this part of Södermalm was finally fulfilled in the 1970s, when cost-inefficient low-rise residential buildings, barracks, and intermediate yards of the semi-industrial area of Lignaområdet on the western portion of the street were torn down and replaced with the residential blocks of Plankan and Drakensberg (1966-1970). This physical change led to a division of the street with one section characterized by a building stock dating up to 400 years old, alongside a newer section with a stock built between the beginning of the 20th century and our own time that is characterized by post-modern urban planning ideals.⁹⁹

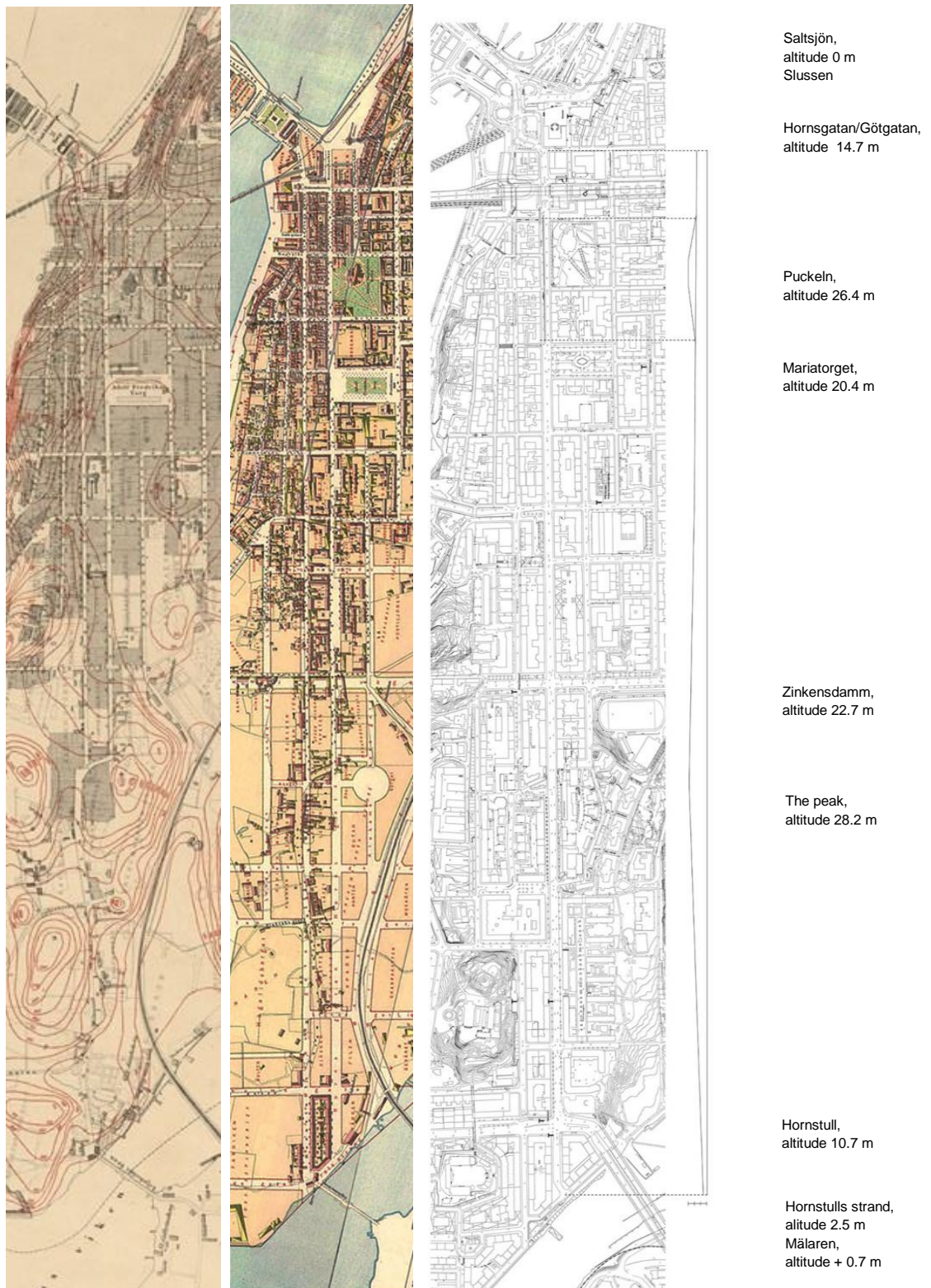
⁹⁸ Between 1891-1901 major demolition works were carried out to break the massive rock of Mullvadsberget and straighten the street west of Zinkensdamm. 1901-1904 Hornsgatan was lowered about 7 meters opposite the Maria Magdalena Churchyard and broadened some 10 meters. (Liljeberg, E. I., Carlsson, K. (1989), *Från Slussen till Hornstull*).

⁹⁹ For example the block of Plankan is currently questioned for their low Floor Space Index (FSI) values, which means that they occupy far less land than they according to the masterplan of Stockholm potentially could occupy. Built at a time when modern

When the street was flat enough to be energy efficient for all kinds of vehicles to navigate Hornsgatan from shore to shore, its function as a highly important transportation artery through Södermalm was sealed. Though flattened, Hornsgatan is not entirely flat, however. It is straight, but not flat. Between Hornstull and Zinkendamm the street rises towards a peak, a point that distinctly tilts in two directions.

Even though the street now was lined by high-rise buildings of six or seven stories, instead of having the mid-western section dominated by barracks and workshops of industrial character, this part of the street came to have a distinctly different character than the eastern portion, known for its busy and vivid urban street life. The mid-western part is not as frequented by people on the go, and it features heavier traffic that escalates by the peak of Hornsgatan as it moves towards the junctions of Hornstull and Zinkensdamm. It is important to be aware of that this two-sided character of Hornsgatan is not only due to the esthetics of buildings erected during a certain era in architectural history, but that it has just as much to do with to the topographic context, the quality of outdoor life and the fact that Hornsgatan is an important traffic route in the city.

planning ideals of light, space, and traffic separation were strong, the appearance and structure of these buildings affects the spatial and sonic character of this section of Hornsgatan.



1. Map from 1870 before the demolition of Mullvadsberget (author: R. Brodin, C.E. Dahlman, General Stabens Litografiska Anstalt, source: Stockholms stadsarkiv).
2. Map from 1885 of how Hornsgatan was projected to appear after the demolition of Mullvadsberget (author: A.R. Lundgren. Source: Stockholms stadsarkiv).
3. Map from 2009 with added section through the street showing the height above sea level. (Source: Lantmäteriet).

3.2 A survey of applied tools, techniques and strategies

The chapter begins with a survey of tools and techniques for mapping aspects of urban sonic space identified and utilized during the first inventory phase of the case study. The next section of the chapter presents examples of how it is possible to make use of the information acquired at phase one through various strategies that combine the acquired information of space, sound and experience. The last phase of this investigative work and of this chapter proposes an example of how to implement chosen facets of spatio-sonic information and suggests a proposal for qualitative sound analysis.

Here, it is important to emphasize that the proposed tools, techniques and strategies described in the following section represent *one* way of approaching and working with the challenge of communicating urban sonic space. As the possibilities of approaching this topic of inquiry are infinite - and should also continue to be open-ended and non-fixed in the future, the ways to represent and communicate this subtle, transgressing, temporal and ephemeral subject matter are also infinite.

As mentioned earlier in the thesis, the intention is not to understand the changing sound qualities of an urban site from every possible angle - subjective as well as objective - but to test the viability of the explored tools, techniques and strategies of representation and communication and to analyze the coexisting sound qualities of an outstretched exterior urban site.

3.2.1 On and off-site studies

In the search for communicative and usable tools to complement the common use of noise-maps, quantitative measurements and calculations of sound pressure levels, it has been necessary to accommodate the real-life context as well. Exploring the complexity of the sonic environment along Hornsgatan, in all its everyday glory, has been necessary in order to grasp what kind of on-site sonic events are present at any given location at a certain point in time and to recognize the spatial features and active physical and temporal agents that condition the specific sound qualities of this urban context. A basic strategy for the method development of this work is to acknowledge what is going on at each instant and to be attentive to the circumstances of specific situations taking place at a specific time by combining on- and off-site observations, documentations and analyses. Shifting between these approaches, the on and off-site studies of various sonic spaces along Hornsgatan, is a consistently feature of most of the tools, techniques, and strategies presented in this chapter. The assumption is that the co-reading of disparate, but complementary, spatio-sonic information may generate deeper understanding as to how to represent and communicate the qualitative aspects of urban sonic space from a practice-based and design-oriented perspective. Transposing visual, textual and sonic representations of urban sonic space onto an off-site context is essential, in my opinion, in order to share information that enhances interdisciplinary communication and understanding. To meet and share opinions and knowledge about a phenomenon that is invisible and always is on the move, and that also is made up of hundreds of interacting factors - physical, temporal, experiential - without having something physical or visible to grasp hold of, is difficult. Questions of representation and communication have therefore been important to consider and relate to at every stage of this work.

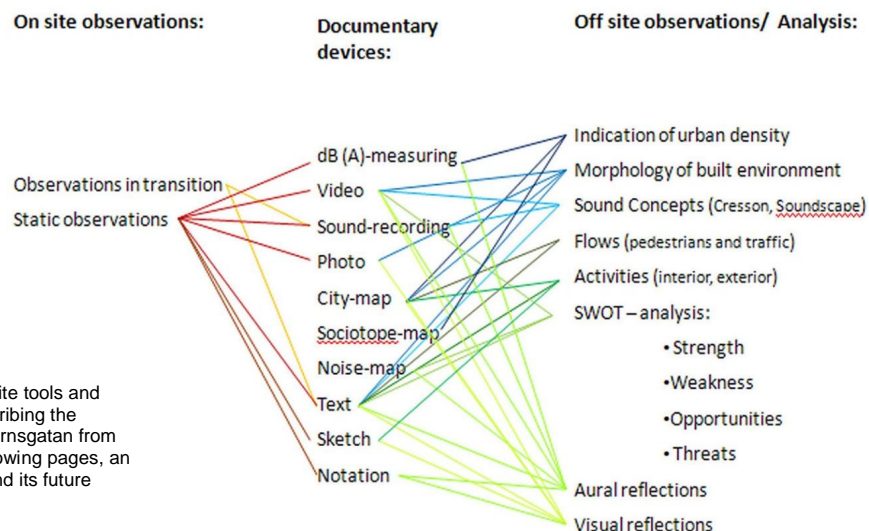
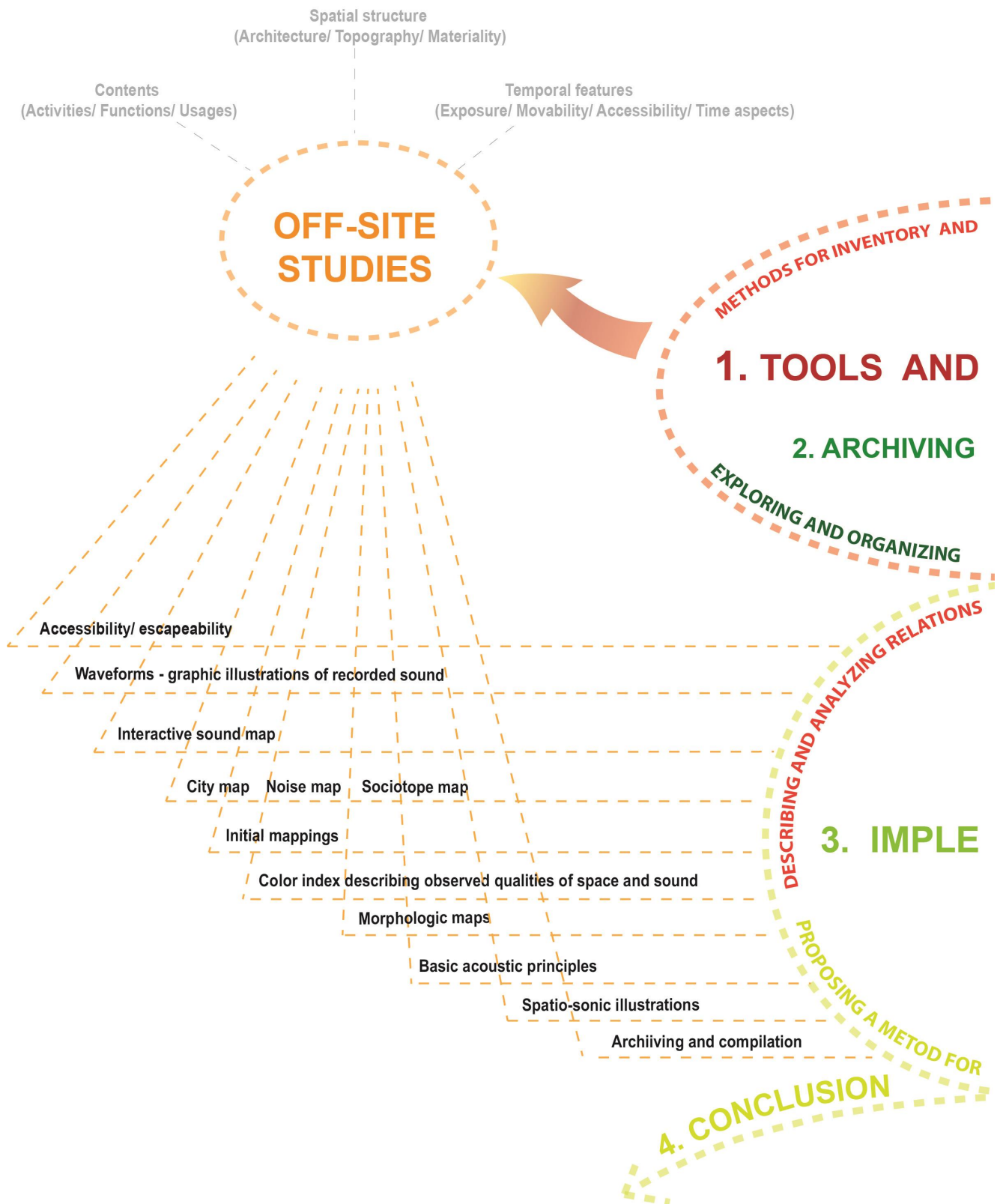


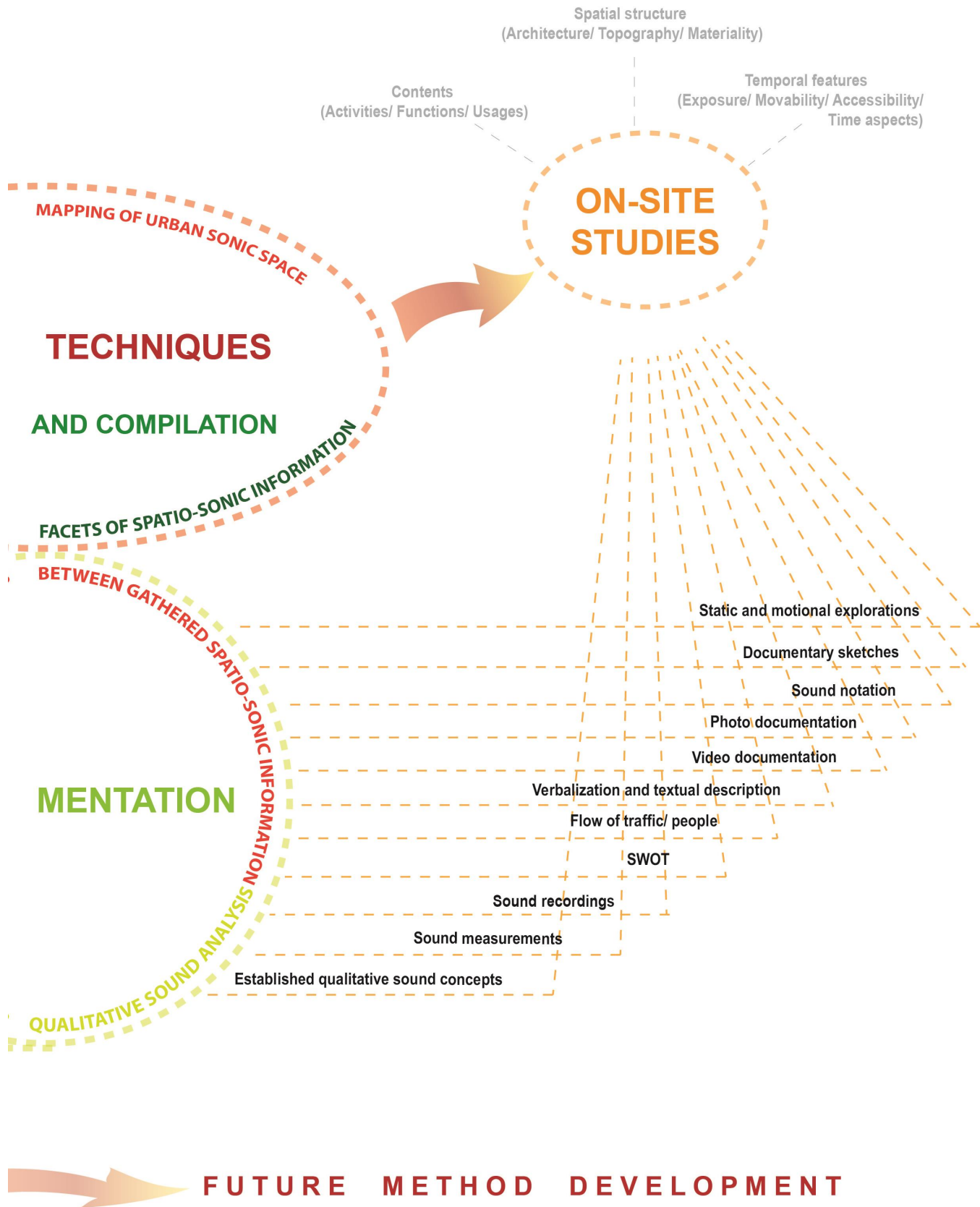
Chart of initially applied on- and off-site tools and techniques for inventorying and describing the character of urban sonic space at Hornsgatan from several divergent angles. On the following pages, an overall survey of the work process and its future continuation is presented.

3.2.2 SURVEY OF CASE STUDY CHRONOLOGY



TEST PHASE: APPLICATION AND EVALUATION

AND METHOD DEVELOPMENT PROCESS



3.2.3 Static and motional explorations

It is through the act of movement that we connect the experience of various urban spaces into a single coherent whole and create our own individual impressions and sonic experiences of complex and different architectural spaces. At every moment, we are emerged in, contribute to, and are confronted by the sonic dimension of everyday spaces. Our brains process these impressions and our minds and corporal system react. We have a choice to either stay immobile and experience the course of events at a certain individual point, or to move away from that point. The experiences we have in either case will be very different, as they are directly dependent on the physical structure of the environment and the kind of sound sources being active there at that very moment. Therefore, architecture and the temporal aspect of sonic propagation in relation to the sound events themselves, as well as the temporal aspect in relation to the physical positioning of a perceptive body, should not be neglected in a study on sound in complex architectural environments.

As the site of investigation is a well-frequented traffic artery in Stockholm, a great deal of attention is focused on trying to describe and understand the variations of sound intensity and sound quality in the area. These derive both from large quantities of traffic and from less-dominant sound sources such as activities connected to pedestrians: social, commercial, leisure events, and service-related activities as well as sound deriving from animals and nature. By moving along and actively documenting the impressions from these spatial or temporal changes, a sense of understanding for the dynamic interplay between sound, space and activities emerged. This was an important step in raising a personal awareness for these matters and to further define what other tools and techniques might be useful to promote the research process.



Photos from static and motional inventories at Mariaberget/Hornsgatan. June 2010

3.2.4 Documentary sketches

Instead of using photography as the only documenting device to create a record of a site - the most commonly used documentary method today - I made quick sketches serving the same purpose. A sketch can function as an efficient tool for narrowing the focus of the moment and for catching some of the features that define that particular space at that particular moment in time, such as architecture, the spatial relation between buildings, greenery, any change of ground level, irregularities, actions on site, etc. Sketches convey moods and atmospheres that can be of value in retrospect. In architectural practices, the sketching process holds a prominent place in the development of an idea, the documentation of a site, or the communication of a vision to a colleague, a client or an audience. Sometimes the sketch is made by hand and sometimes it is made through a

physical model, or by way of a computer-aided feature. All methods serve the same purpose: They communicate an idea, a vision, a situation, a relationship, or some other feature. In this case, the sketches serve as a tool for documentation and thinking. By taking the time to stop, to pick up a sketchbook and a pen, and to capture a given context at a certain moment, is actually a highly efficient and rewarding way to closely familiarize yourself with the urban sonic environment at a specific moment.

The sketch keeps to the essentialities, and functions as a personal archive for site-specific spatio-sonic memories. In this study, they also functioned as a means to communicate certain qualities at Hornsgatan relating to space, function, ongoing activities, materiality, and the position of the observer (i.e. me).



Sketch from Hornsgatan, Puckeln, 110622.
Ink on paper.

3.2.5 Sound notation

Another method that employs sketching techniques is creating documentary sound notations on site. The mode of expression has been free and explorative with the intention of visually capturing sonic impressions over a specific amount of time. This tool has been very helpful. It enables me to go back in time and space to the site of inquiry later on; so I can recall what took place there at that moment.

Most of the notations were made on transparent paper with an underlying map to help localize sound events in space in relation to a notated listening position (the cross). During this inventory described on page 63-66, several layers of information were gathered, such as sound recordings, textual descriptions, and flow notations of traffic and people.

The sound notations may seem subtle and fractional at first glance, but they have been helpful in the process of recalling the memory of certain sound environments, and in order to visualize that impression through a graphic notation of the experienced events.



Notation of sound events and impressions outside Folkoperan, Hornsgatan. 101110, 13:45, dB (A) 69.6. Ink on paper.

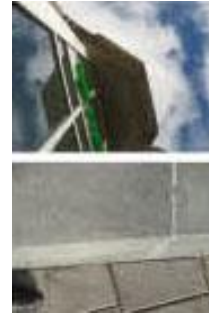


Notation of sound events and impressions at Hornstull, transparent paper and underlying map. 110923, 12:00. Ink on paper.

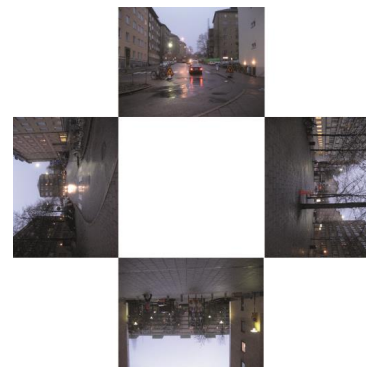
3.2.6 Photo documentation

My way of using photographic documentation as one of the tools of visually describing the sites varied over the course of the study, and spanned a spectrum ranging from random snapshots to more planned strategies of documentation.

For example, one strategy was to shoot two 180-degree photos at each location, one of the grounds and one towards the sky to give an account of the material ground and what kind of space I found myself in (open, closed, green, built, etc). However, I was unsure how to best integrate the use of these 180-degree photos and the information they carried in, and wondered if they were useful at all. I began to add turn around-photos (360 degrees) consisting of four shots in four directions, that would describe a 360-degree overview of the site in question. During the researching process, the photos were both useful and efficient as they provided a visual description of the spatial characteristics on site and as an aid to memory when off-site.



180-degree photos of ground and sky, Hornstull.



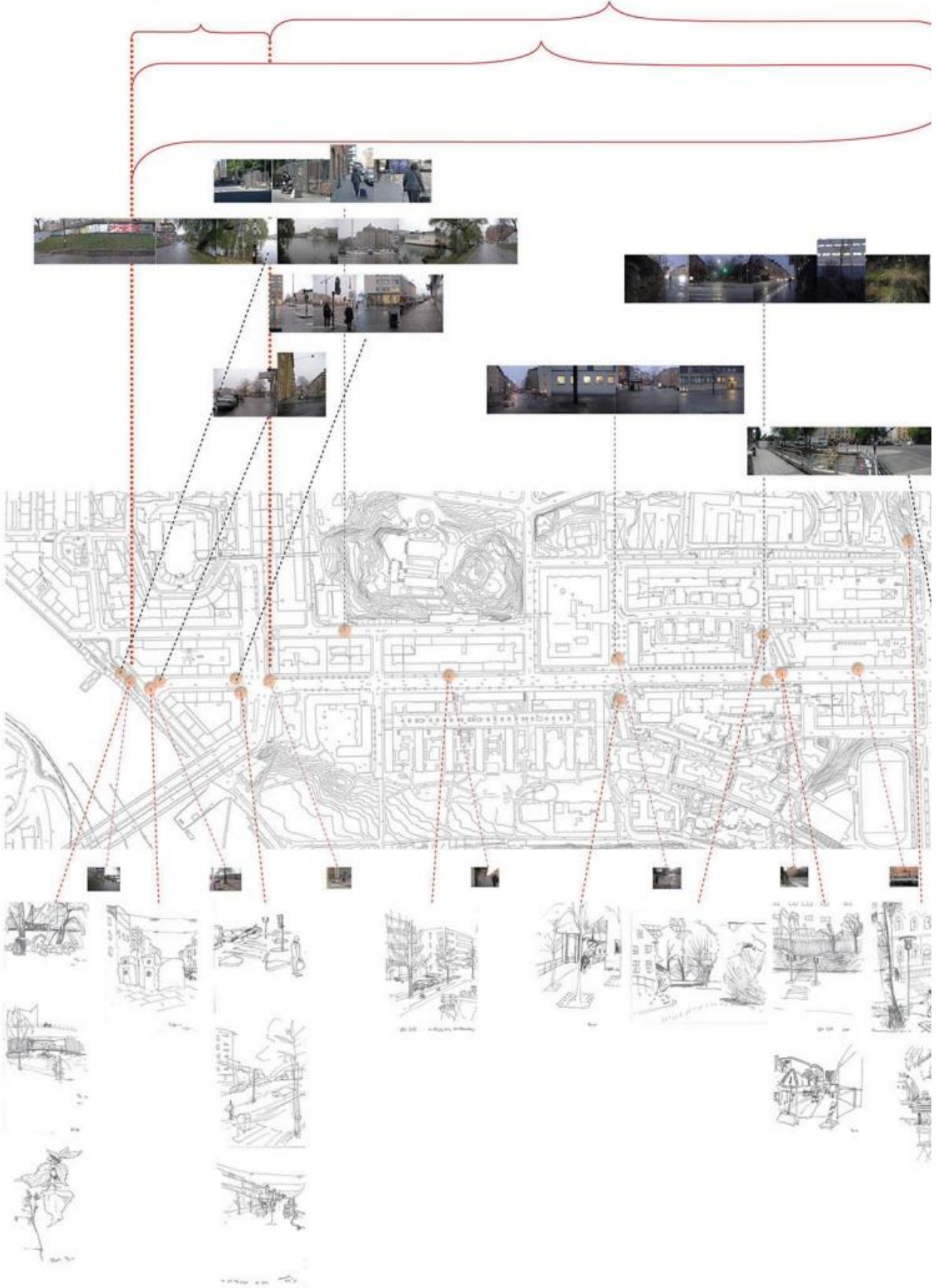
Circular montage of 360-degree photos, Kristinehovsgatan.



Photograph montages 360 degrees, Kristinehovsgatan, the peak of Hornsgatan and Strand.

Hornstulls
Strand

Hornstull



Zinkensdamm

Mariatorget

Slussen



Mapping of identified sections, rows of photos, videos, and sketches of Hornsgatan (2013).

3.2.7 Video documentation

Video recordings have been sparsely utilized in this project. They have mainly been a way to prove the usefulness of video recording for this kind of qualitative site-specific documentation, and thus function as one of several methods of description.

The recording strategy consisted of turning the camera around 360 degrees, and by doing so, catching essential aspects of architecture, activities, sounds, materials, etc.

To some extent, the video recordings were very helpful as a memory aid when off-site, and also as a descriptive complement to other spatio-sonic information, such as during presentations in front of an audience in a situation

when time is limited, and a quick review of the situation being discussed is required. However, when working in a 2D environment with flat presentational material like this book format or large-size posters, the video format is not suitable.

The video turn-arounds were finally integrated in the spatio-sonic drawings (see page 96) functioning in digital formats of the presentation and the web.



Map of locations for 360-degree video recordings. 101111-101116

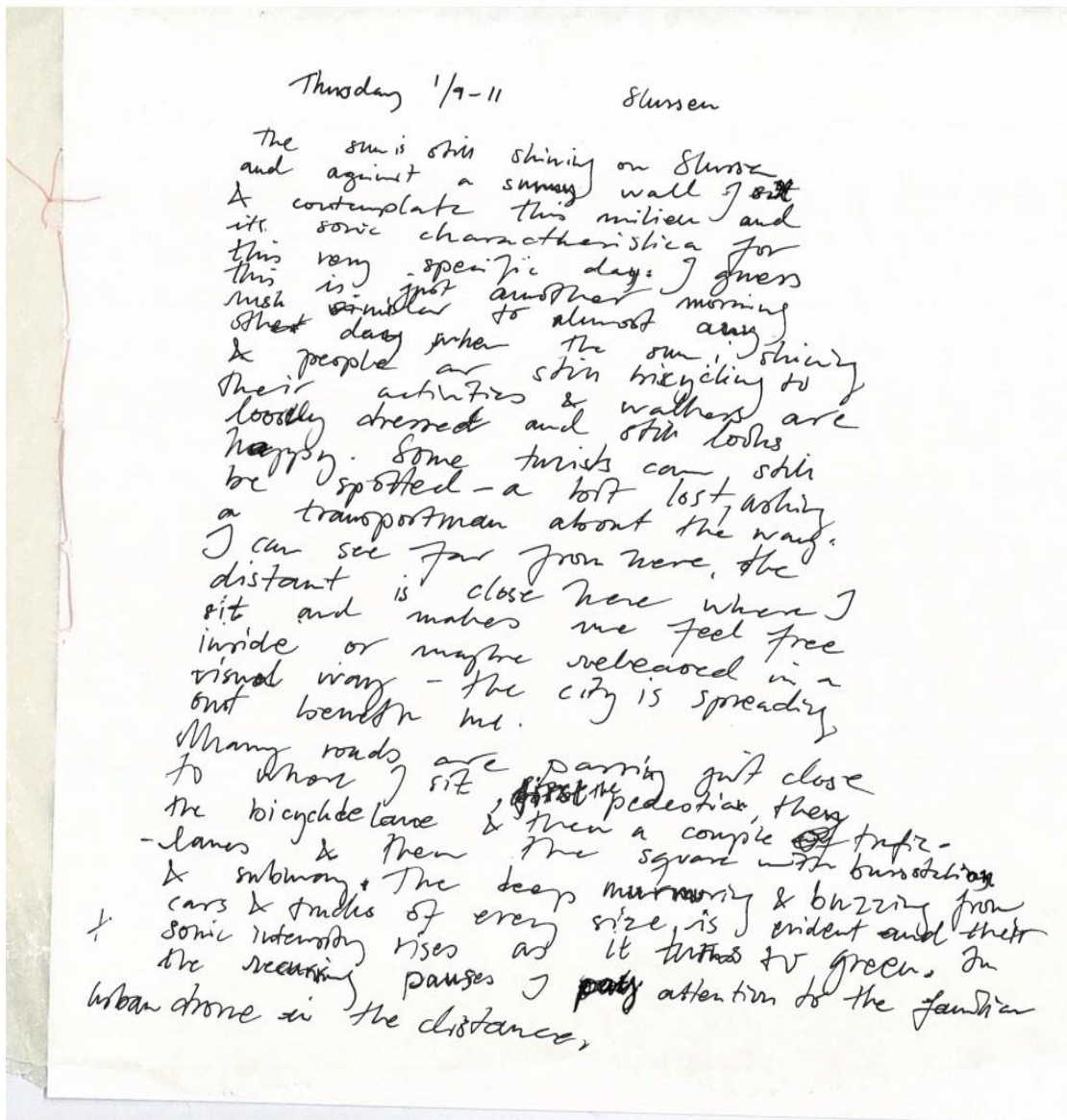
3.2.8 Verbalization and textual description

Textual representation is a tool for sharpening focus on aspects such as the impressions of an experienced urban situation while embracing the challenge of transforming that experience into words.

The question posed by this study was what words and concepts to use and how to describe something that has a certain sonic character, but lacks a visual form conveyed through letters. I have used various modes of text in this work - often short and descriptive, often under the headings of aural and visual reflections, but not always. Sometimes the tone is dry and simple, while other times the tone is

more personal and subjective. I have also integrated established concepts (see page 71) in the narrative text, and by so doing I test the viability of these concepts and connect their meaning to a real-life context on Hornsgatan.

Most of the texts were produced as part of a collective inventory of various places along Hornsgatan, and are intended to be read in parallel with other practiced tools of description such as sketches, sound recordings, sound notations, and observations of the flow of traffic and people.



Textual reflection on sound, space and experience at Slussen, 110901, 10:30.

3.2.9 SWOT

SWOT is an acronym for Strengths, Weaknesses, Opportunities and Threats and is a method for identifying qualities of the subject or a situation that may otherwise be difficult to grasp. Originally the SWOT-analysis was developed for the marketing and economic analysis of new, not yet launched, products. The method has since then spread to many divergent fields due to its effectiveness in capturing some of the essentialities of a subject under study.

I have used SWOT in a condensed manner with the purpose of describing specific urban sonic situations from

four oppositional and complementary angles, in order to encompass essential qualities. It has been an efficient method to separate and distinguish information and helps you to focus on one aspect at the time. The basic reference in this case is the user perspective, the inhabitants and visitors at a site that inhabit, use and move in public urban outdoor environments. The SWOT inventory was consistently performed once on each site (Nov. 2011) but acquired information and the principle of the method has been integrated in the qualitative sound analysis of the spatio-sonic drawings.



Place: *Hornstull (Långholmsg. / Hornsgatan)*
 Date: *11/11-10*
 Time: *12:00*
 dB (A): *70,9*
 Recording: *207*

Built environment: *Väghorsning. Stora, massiva huskroppar. Öppet mot söder & Långholmsbron. Sölen ligger på. Fri sikt. Nybyggd fastighet sluter sig.*

Sound Effects: *Wave, Fade in, Fade out, (Drone) konstiga yttre ljud. Wall - enstaka sound events (passerande, röster, talar)*

Flows: *Kraftig trafikflöden, människoflöden - dock underordnade trafik & ljudslöjen. 4 olika siktningssynligheter (3 olika siktningar till staket)*

Activities: *Trafik. Männingar på lunch. Butiker verksamhet. Ålderhem (servicehus). Kommunala kontor (buss + t-bana)*

Strength: *Koncentration av rörelse & kombinationer. Fri sikt mot söder (mkt. sol)*

Weakness: *Dominerande trafik + hög ljudslöjen. Ständig påfyllning = avstannar ex: Tydliga barriärer.*

Opportunities: *Minskade trafikflöden + ökade, möjliga barriäreffekt. allmänhet & svårbeskrivna.*

Threats: *Barriär, slöjen, trafik*

Aural reflections: *"Wall", hög ljuddensitet. Human actions är underordnade.*

Visual reflections: *Fri sikt + sdgata är en visuell kvalitet.*

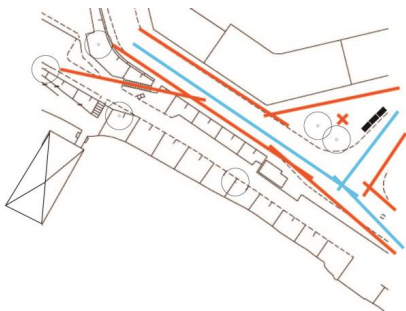
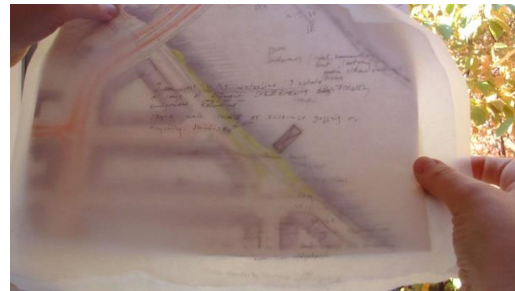
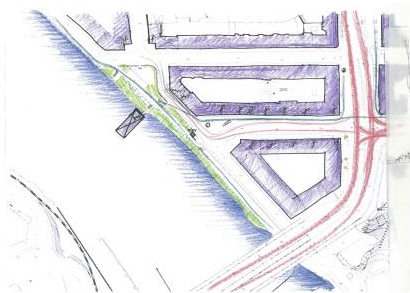
Formula/ chart of experienced observed and identified spatio-sonic qualities at the crossing of Hornsgatan/Långholmsgatan. The SWOT analysis is integrated in the formula (filled in in Swedish by the author). 101111.

3.2.10 Flow of traffic and people

Accessibility and escapeability

Flow in this context is describing the movement/mobility of motor vehicles and pedestrians at a publicly accessible outdoor urban site. The sketches/mappings are to promote understanding of where these sounds often appear and how their intensities seem to intermingle/interact on site. The relationship between mechanical and technical sounds deriving from traffic generated by combustion engines and contact between tires/ground in relation to sounds produced by other kind of site-specific human/nature/animal activities, are vital aspects to describe and to reflect upon. In the inventory charted below, the mapping of flows of traffic and pedestrians are based on qualitative observations made on site. By illuminating the dynamic interplay between various interacting agents, a relational understanding of crucial coexistent factors that determine the time and site-specific sound quality of a physical site, can take place.

Accessibility in this context concerns the ability to move to or from a specific spot. We can also call it *escapeability* or *exit* indicating the opposite possibility of leaving a site. These mappings are based on on-site observations showing the possible point of entry or exit to the site in question. These options are then separated in two categories, one for pedestrians and one for traffic. The investigation provides a visual and quantifiable clue to what extent someone is spatially or temporally “stuck” in an urban situation with a certain sound quality and heaving little access to alternatives. In short, it is a matter of to what extent a person is forced to be **exposed** to a given context. The mapping may indicate whether an urban site is considered highly problematic or well-functioning from a public urban life point of view, when weighing in features such as the functions, uses, and intentions of a certain location.



Sketch/mapping of possible flows of pedestrians and traffic at Hornstull and Bergsundsstrand, 110923, 12:00, and mapping of accessibility/ escapeability at Bergsundsstrand.

Gathered information from two inventories made at 21sites. The techniques used here are described on page 56, 63-66. Original format 4 x A1.



1

Formula



18 **Flow of traffic**

Flow of traffic is a key factor in the design of a building and its surrounding environment. It is important to consider the flow of traffic when designing a building and its surrounding environment. The flow of traffic can be influenced by the design of the building and its surrounding environment. The flow of traffic can be influenced by the design of the building and its surrounding environment.



21 **Flow of traffic**

Flow of traffic is a key factor in the design of a building and its surrounding environment. It is important to consider the flow of traffic when designing a building and its surrounding environment. The flow of traffic can be influenced by the design of the building and its surrounding environment. The flow of traffic can be influenced by the design of the building and its surrounding environment.



22 **Flow of traffic**

Flow of traffic is a key factor in the design of a building and its surrounding environment. It is important to consider the flow of traffic when designing a building and its surrounding environment. The flow of traffic can be influenced by the design of the building and its surrounding environment. The flow of traffic can be influenced by the design of the building and its surrounding environment.

Flows of traffic, pedestrians, and general morphology of buildings and green spaces



Textual reflection on site

Handwritten notes reflecting on the site, discussing the flow of traffic and the morphology of buildings and green spaces.

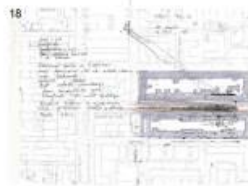
Handwritten notes reflecting on the site, discussing the flow of traffic and the morphology of buildings and green spaces.

Handwritten notes reflecting on the site, discussing the flow of traffic and the morphology of buildings and green spaces.

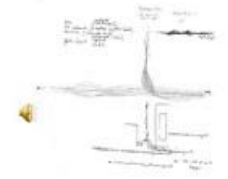
Handwritten notes reflecting on the site, discussing the flow of traffic and the morphology of buildings and green spaces.

Handwritten notes reflecting on the site, discussing the flow of traffic and the morphology of buildings and green spaces.

Underlying map and sketches of the sonic environment

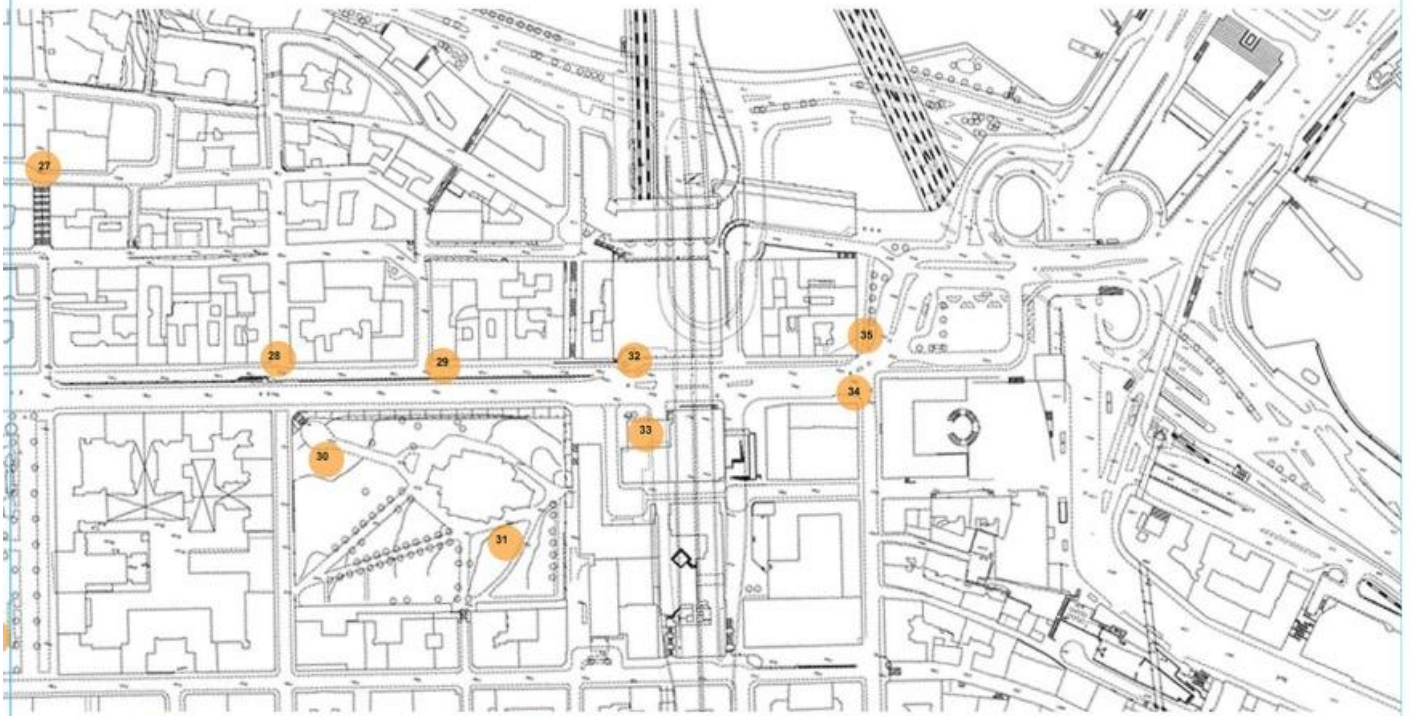


Drawings of the sonic environment and sound-recording (only available online: JARR Journal of Acoustic Research)



Observations superimposed





1

25 *Handwritten notes and a small diagram.*

28 *Handwritten notes and a small diagram.*

32 *Handwritten notes and a small diagram.*

34 *Handwritten notes and a small diagram.*



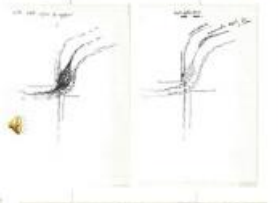
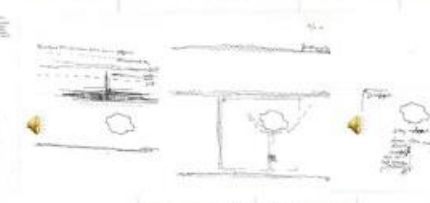
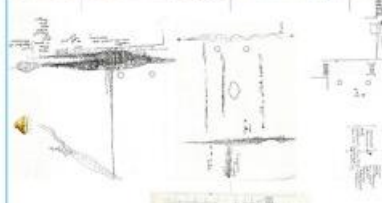
Handwritten notes for section 25.

Handwritten notes for section 28.

Handwritten notes for section 34.



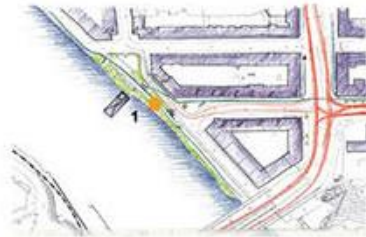
2



Formula



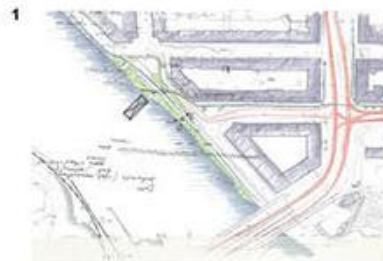
Flows of traffic, pedestrians, and schematic morphology of built and green spaces



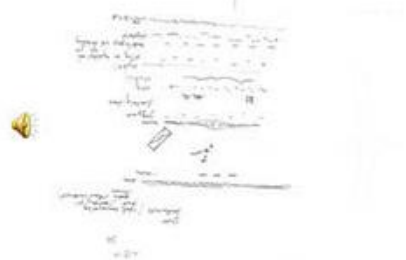
Textual reflection on site



Underlying map and sketches of the sonic environment



Drawings of the sonic environment and sound-recording
(only available online in JAR Journal of Artistic Research)



Superimposed observations



3.2.11 Sound recordings

From the start, sound recordings have been part of the inventory of tools and strategies. However, the relevancy of sound recordings in a study like this one has not been as self-evident as one may believe. Questions such as *why* the recording is made, by whom, and what purpose it is meant to serve in the study, as well as figuring out how to make use of the material *after* the recording is made, in an off-site context, are all very pertinent. In this case, the answers were not clear from the start, which is also why I decided to integrate the technique of recording the sonic environment in the inventory process to test its relevancy and to learn how to make use of the registered sonic material, if it has pertinent information.

I have mainly used two methods for documenting the sound environment (three, if I count the video-format as a sort of sound recording). The first employs binaural ear-microphones hooked up to a recording device that registers sonic events as humans would perceive them, i.e. having different sonic input via either side of the head. In this case, the sound quality is often high as the recording corresponds well to the experienced sonic reality, especially when re-played through a sound system of good quality and while listening with headphones. In the second method, recordings of Hornsgatan were made with the inbuilt microphone of an iPhone as an integrated part of a particular walking session conducted in Sept. 2011, where several layers of sketches and reflections of the observed and perceived sonic qualities were made on site (see page 63-66). In this inventory, the sonic recordings made with the iPhone function as one of the sketch strategies accomplished on site.

The aim of the sound recordings has been to capture ongoing events at the sites under study, and they include both the street in its entirety and all of the individual case study sites, for the sake of documentation and as a memory aid later on. In the final spatio-sonic drawings, both a sound excerpt registered during daytime on a weekday, as well as a video turnabout, is integrated into the other documentary techniques.

3.2.12 Waveforms – graphic illustrations of recorded sound

A waveform is a graphic picture that describes the intensity of recorded sound events over a certain time period. The sonic illustration shows how the amplitudes of sound intensities change over time or if the listening position is altered.

Here, transforming sound recordings into the visual format of a waveform in greyscale was a method I used at the beginning of the project, in particular, to find a way to use these recordings in a manner that would be beneficial for the project. As the waveform provides a visual image of changes in the urban sonic environment, it can potentially serve as generic basic data in discussions of, say, the relationship between sound intensities, spatial configuration, sonic experience, and accessibility. In this case, the graphic representation of sound recordings made in June 2010, while walking the total length of both Hornsgatan and its parallel streets, as well as crossing the street at various points or standing still at single sites of interest, was a method to approach the subject from a visual standpoint and propose a communicative strategy along with other qualitative techniques for describing and representing the spatio-sonic qualities of Hornsgatan. Working with the recorded material from a frequency-analysis perspective has not been topical in this inventory, as I have not given priority to an analysis of sound frequencies at that detail level, at least not at this stage of the project.



Waveform from a binaural sound recording made while walking from Slussen to Hornstulls Strand at Hornsgatan. Nov. 2010.

Hornsgatan
Part 1: sonic and visual analysis

2010-06-16
Nina Hällgren
PhD project: Urban Sound Design - methods for spatial sound analysis

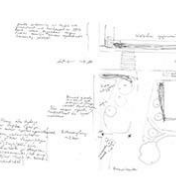
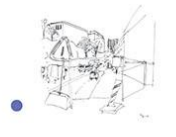
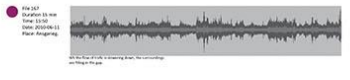
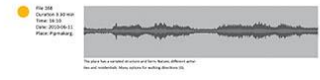
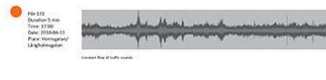
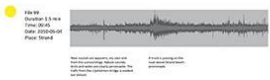


Fig 103
Duration 1:30 min
Date: 2010-06-16
From: Hornsgatan 10
Place: Hornsgatan
The recording was supported with sound lines and color markers along the course.

Fig 104
Duration 1:30 min
Date: 2010-06-16
From: Hornsgatan 10
Place: Hornsgatan
The recording was supported with sound lines and color markers along the course.

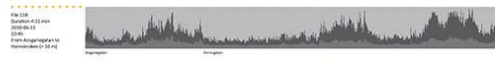


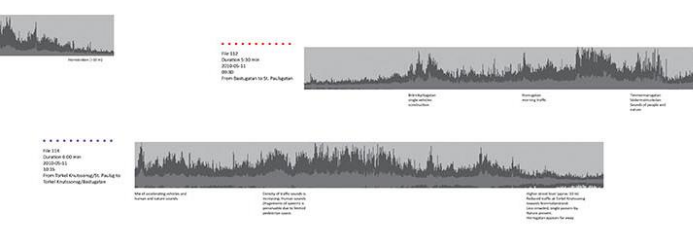
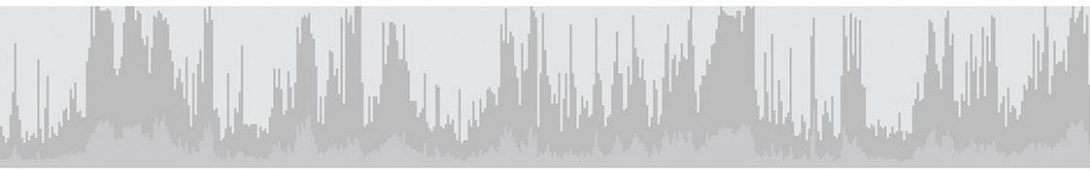
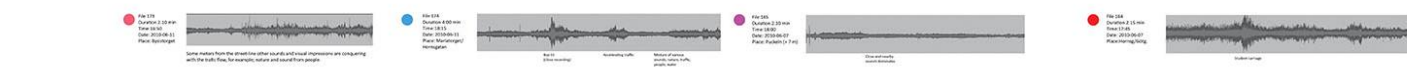
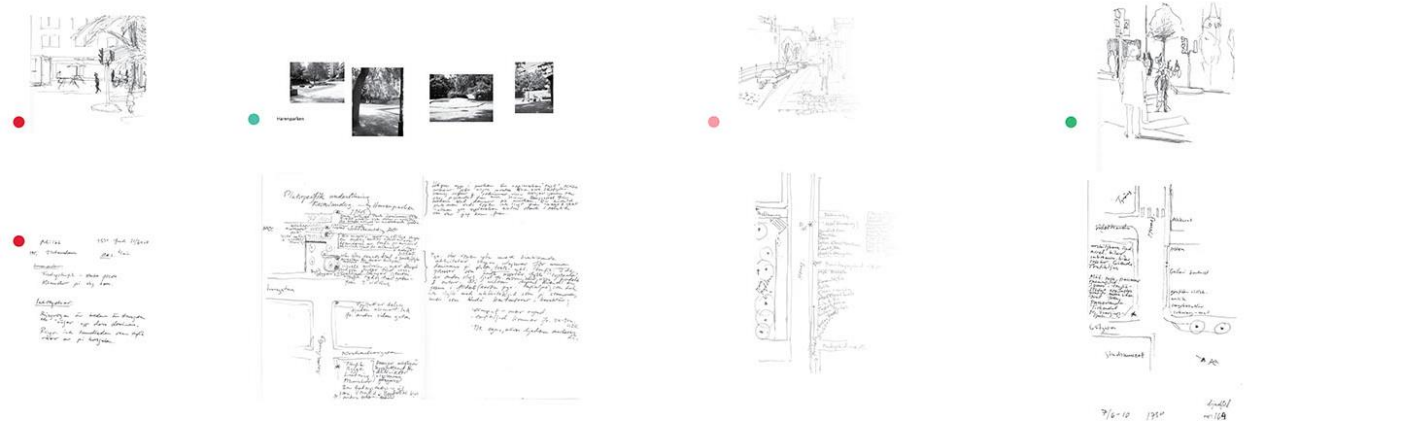
Sound Hornsgatan The peak of Hornsgatan



Fig 105
Duration: 4:00 min
Date: 2010-06-16
From: Hornsgatan 10
Place: Hornsgatan 10
The recording was supported with sound lines and color markers along the course.

Hornsgatan Hornsgatan Hornsgatan Hornsgatan Hornsgatan





Large size poster of waveforms from recordings together with sketches and reflections made at Hornsgatan May 2010. Original size A1.

3.2.13 Sound measurements

Sound measurements have been carried out during some of the inventories made at Hornsgatan. The function of sound measurements in this project has been two-fold; educational and referential.

The act of measuring urban situations has had an educational aspect on my own behalf. For example, I learned more about how certain threshold values used in applied legislation documents such as the official noise directive of Sweden actually sound like in reality. I also gained a greater understanding of what kind of real-life sonic situations the bright colors of a noise map could be, and what kind of sound events that normally generate these spots in an urban location such as Hornsgatan. Secondly, making sound measurements along Hornsgatan additionally created referential points that allowed the proving of, and comparison between, calculated decibel values of a noise map and the values I measured on site. The measurements have been carried out in two separate ways: The first way was tested at the start of the project and consisted of making measurements with a professional SPL-meter for time-lapses of approx. 10 min. The second way consisted of making decibel measurements with an app downloaded to my iPhone. It provided accurate values, though not as precise as the first measuring method, but it was possible to extract sufficient information for the inventory process, which was also the intent.

One of the useful outcomes of this method of quantitative description was that indications of the calculated average daytime sound pressure levels, as described in the noise map of Hornsgatan, corresponded fairly well to my own measurements on site. The noise maps can be regarded as fairly reliable for general descriptions of sound intensities deriving from traffic, and in this sense are useful. However, no calculations in the world can transmit information of specific sound qualities of the non-calculated sound pressure levels deriving from all the other kinds of activities taking place at a specific location at a certain time due to common events in our surroundings.

3.2.14 Interactive sound map

As a pilot, an interactive sound map of Hornsgatan was constructed, based upon recordings made at 21 different locations on, around and near the street during the multi-tactic inventory described on page 63-67. The test model project was initiated and carried out in cooperation with the sound artist Gerhard Eckel, who also is a professor at the School of Computer science and Communication at The Royal Institute of Technology. A special software program developed by Eckel made it possible to allow sound recordings of Hornsgatan registered with the iPhone to play simultaneously as they were connected to the map at the site where they had been recorded (Sept. 2011). The sound files were looped, increasing and decreasing in intensity as the listening-position changed location, tuning in and out of the recorded sonic environments at Hornsgatan, now translocated in time and space. By using the interactive sound map, you are immediately aurally submerged into specific but virtual urban sites and easily get a sonic picture of one place in relation to other places that are either close or far apart. With the co-reading of the visually exposed city map, a sense of the different spatial characteristics and qualities of those sites are transposed to the listener. The ability to compare the sound quality of a specific site at a specific time (when the recordings were made) with other sites - being able to virtually travel over a wide geographic area - was eye-opening (and "ear-opening") to me. The map functioned as an educational communicative tool, as it connected a visual overview of the site with an aural understanding of the same. It is, however, important to note in this context that the interactive computer model over Hornsgatan was the result of a short, time-limited and co-operative project that only had the chance to pass the first stage of development. It has therefore not been extensively explored, developed and refined in line with the research intentions, and it has not been tried out on a wider audience. Its potential or usability as a tool for further research and/or practice therefore remains unproven.



The interactive sound map. Mars 2012

3.2.15 Established qualitative sound concepts

Existing concepts developed by the transdisciplinary research team at Cresson and the International Ambiances Network and practice/research-strains connected to the World Soundscape Project and World Forum for Acoustic Ecology WFAE, have been utilized in this study as a tool to capture and describe the sonic qualities of Hornsgatan. The assumption is that these methods for describing what is going on sonic-wise in an urban situation could presumably help to conceptualize, and sort out, the sonic impressions directly on-site and also be useful as a memory aid.

The concepts listed below are those I considered most relevant for this study, with the intent to evaluate and test their validity and usability as communicational tools for the description, explanation, and understanding of sound space and experiences in a complex urban environment. One of the questions posed in the implementation phase of the method development process was whether the listed concepts should be integrated in the final stages of the work or not. The cons were that the chosen qualitative and descriptive sound concepts were either too infiltrated by either ideology (Murray Schafer et al) or too bound up to a thorough theoretical system (Cresson-team et al) to be integrated in the final version of this work. However, I ultimately came to the conclusion that these concepts have been relevant, useful, and were consistently used throughout, since they acted as an efficient and clarifying tool for thinking and reflection, and in that sense were of value in the learning process and its outcome, and therefore also should be present in the final presentations.

Soundscape concepts of relevance for this thesis defined and utilized by M. Schafer et al.

For Murray Schafer and his fellow colleagues, the notion of the *sound event* is crucial, as it presupposes that sounds always are naturally bound to the event that generated their existence and that these sound events occur in "...a certain place during a certain amount of time. This suggests that the sound event is not abstractable from the time-space continuum."¹⁰⁰ The understanding of the sound event as the smallest and most important constitutional part of a soundscape lies at the basic core of Schafer's thinking about sound in spatial contexts, a description which provides a certain important basic understanding of how

our surrounding sonic world functions. The concept of *sound event* has been useful in this work, as it embraces the existence of events/activities that produce sound at an intermediate descriptive level.

Schafer also writes about, and coins the concepts of, *hi-fi* (high fidelity) *environments* and *lo-fi* (low fidelity) *environments*. The hi-fi environment is one where small and subtle sounds are perceivable, as opposed to the lo-fi environment, which is characterized by the opposite, i.e. a low degree of opportunity when it comes to perceiving naturally evoked sounds connected to animal, human or nature activities in, say, an urban situation. This means that lo-fi environments are to be found in situations where low-volume and diminutive sounds are likely to be drowned out and masked by sonic environments characterized by a more dominating and heavy character in terms of sound intensity, such as the noise of a highway, a rumbling fan or other loud activities or devices.

In this project, identifying and communicating different sound events in relation to their spatial context is highly important to the method development, which is why I employed these concepts in my case study as one of the explored techniques/tactics of representation and communication. This does not induce a given adherence to the more ideologically colored parts of the ideas and knowledge development initiated by Schafer et al., but are a way to learn more about the sonic environment, a strategy to enhance reflection upon its complexity while simultaneously testing the viability of these concepts.

For reasons of clarity, I have chosen to label the sound typologies and concepts defined and used by M. Schafer et al. applied in this work as *Soundscape concepts*, even though no such term exists outside this thesis.

Hi-fi: "...favorable signal-to-noise ratio. (...) Applied to soundscape studies, a hi-fi environment is one in which sounds may be heard clearly without crowding or masking."

Lo-fi: "...unfavorable signal-to-noise ratio. (...) Applied to soundscape studies a lo-fi environment is one in which signals are overcrowded, resulting in masking or lack of clarity."

Sound event: "The sound event (...) is defined by the human ear as the smallest self-contained particle of a soundscape."

¹⁰⁰ Schafer, R.M. (1994, 1977), *The Soundscape – Our sonic environment and the tuning of the world*, p. 274.

¹⁰¹ Ibid. pp. 271-275. Definition of Soundscape concepts.

Sound effects – concepts of relevance for this thesis defined and utilized by researchers at Institute Cresson et al.

A continuation of the classification-system initiated by Pierre Schaeffer (see page 39) in the 1950s was further developed at Institute Cresson through explorative work initiated and performed by their interdisciplinary team of researchers decades later. An extensive bank of names and concepts stems from that classification system through transdisciplinary development and cooperative evaluation and refinement. Over the years, new concepts have continuously emerged while old ones have disappeared and some have remained more or less constant. These are labeled “*sonic effects*” and function as descriptive, operative tools for understanding acoustic, social, physiological, architectural, cultural, artistic and musical aspects of the sonic environment. The sonic effects integrated in this work are those that relate to a spatial context and therefore are relevant from an architectural and urban planning perspective in relation to urban sound quality. The sonic effects included in the thesis are: *cut out, crescendo, decrescendo, crossfade, fade in/fade out, drone, mask, release, wave, wall and niche*.¹⁰² The niche effect, the way it is defined here, has not explicitly been present in the inventories of this work. The reason for this is the risk of confusion with regard to definition and intelligibility in terms of clearness and its usefulness for the development of a qualitative sound analysis strategy. Though it is possible to claim that the sonic phenomenon this sound effect emphasizes is nevertheless highly present in this work, this would be in a non-articulated manner even though I have not worked explicitly with the notion as such during explorations on site. The identification and existence of “niches” in the urban sonic mesh is, as a matter of fact, the basic foundation of this research as the existence and spread of variegated sonic spaces in a dense urban context allows for diverse human actions to emerge, take place, and be experienced and hence, as described at the beginning of the thesis, they attach democratic and health-related issues to the qualitative aspects of urban sonic space. The principle of the niche effect, accompanied by the sonic effects described below, has its given place in the inventory process, and in that sense constitutes one of the facets of description utilized in this work.

¹⁰² Augoyard, J.F./Torgue, H. (2009), *Sonic Experience – A Guide to Everyday Sounds*.

Cut out: “...refers to a sudden drop in intensity associated with an abrupt change in the spectral envelope of a sound or a modification of reverberation (moving from reverberant to dull spaces, for instance).”

Crescendo: “An effect produced by a progressive increase in intensity of a sound. (...) can be found in the most diverse contexts: in the approach of a sound source, the acceleration of a vehicle, the start-up of a machine, the rise of a murmur, etc.”

Crossfade: “...is an acoustic effect that describes the residual duration of a sound, from its cessation until silence or background noise.”

Decrescendo: “An effect produced by a progressive diminution of sound intensity.”

Drone: “...refers to the presence of a constant layer of stable pitch in a sound ensemble with no noticeable variation in intensity.”

Fade: “Disappearance of a sound through a progressive decrease in intensity.”

Mask: “...refers to the presence of sound that partially or completely masks another sound because of its intensity or the distribution of its frequencies.”

Niche: “...An occurrence of a sound emission at the moment that is the most favorable and that offers a particularly well-adapted place for its expression.”

Release: “...is an acoustic effect that describes the residual duration of a sound, from its cessation until silence or background noise.”

Repetition: “...the reappearance of similar sound occurrences.”

Wall: “...a composite effect in which a continuous high intensity sound gives the listener an impression of facing an ensemble of sound materialized in the shape of a wall.”

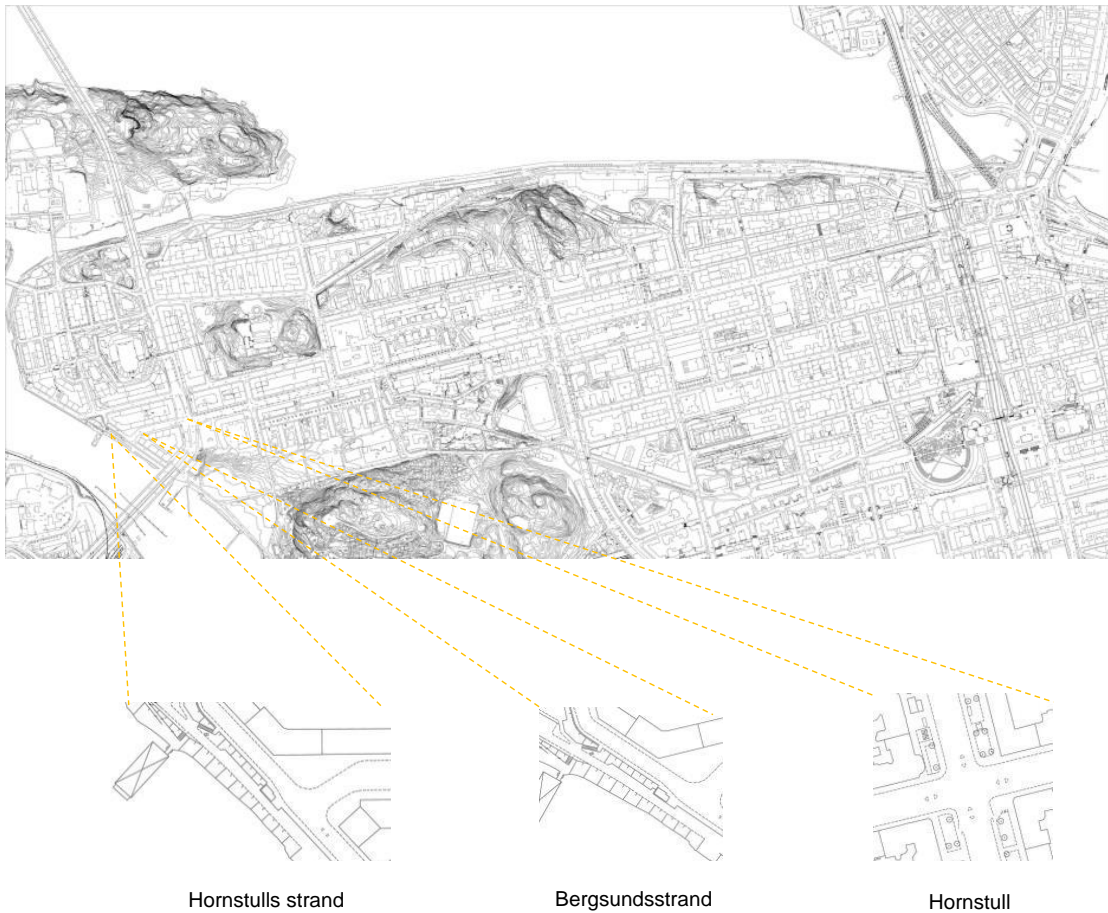
¹⁰³ Ibid. p.p. 21-152. Definition of Sound effects.

Place	Drone	Cut out	Crescendo	Decrescendo	Fade in/ou	Mask	Release	Repetition	Sound events	Wave	Wall
Slussen	x		x	x	x	x		x	x	x	x
Tyröntorget			x	x	x	x		x	x	x	x
Maria Magdalena k:a	x	x					x				
Puckeln	x		x	x			x	x	x		
Blecktornstrappan					x		x				
Mariatorget A			x	x	x					x	x
Mariatorget B						x	x		x		
Folkoperan									x		x
Bysistorget					x		x		x		x
Bysisparken	x							x			
Bysis		x	x	x	x	x	x		x		
Frälsis			x	x	x	x	x		x		x
Zinkensdamm			x	x	x	x		x		x	x
Mellan Zink och topp			x	x	x	x				x	x
Hornskroken	x						x				
Toppen			x	x	x		x	x	x	x	x
Ansgariegatan							x				
Kristinehamnsgatan C							x		x		
Kristinehamnsgatan B							x		x		
Plankan		x					x		x		
Kristinehamnsgatan A			x	x	x				x	x	
"-"-trappan			x	x	x		x				
Drakensberg			x	x	x	x			x	x	x
Hornstull			x	x	x	x	x	x	x	x	x
Bergsundsstrand	x								x		
Strand	x								x		x

Inventory and matrix of perceived and identified Sound effects and Soundscape concepts along Hornsgatan.

3.2.16 The city map

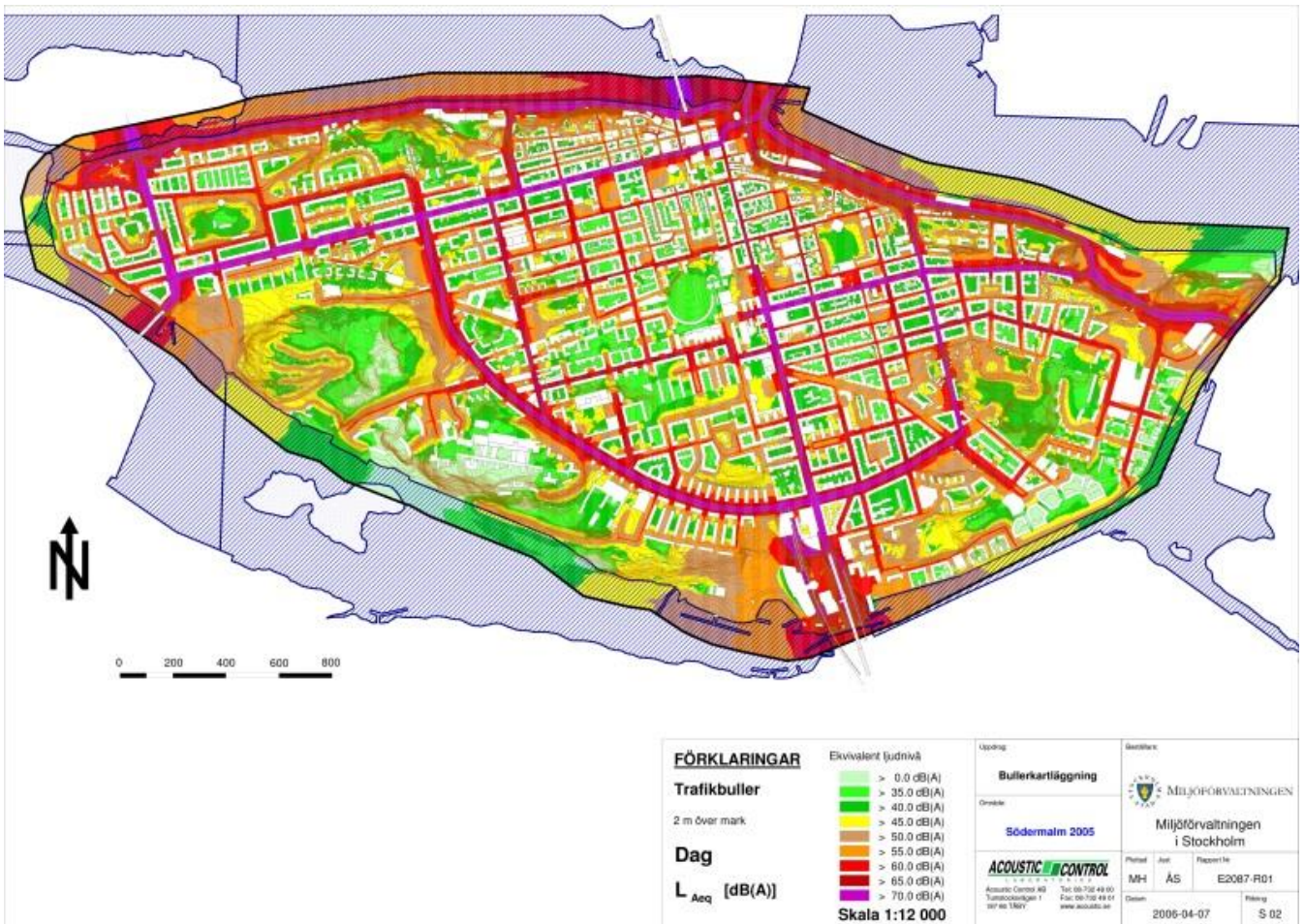
The city map showing the topography, street-system and building structures of the case study site has a basic and central position in the mapping of Hornsgatan. The plain city map constitutes a reference point to which other tools and techniques for describing experienced qualities of urban sonic space are spatially and visually connected. Working with the city map as an underlying “board” for pinning up facets of spatio-sonic information has been a strategy to keep track of the inventories made and placing these in their geographic context. The ability to co-read disparate but interconnected information as well as the ability to zoom in and out of scale is an important feature for the use of the city map in this work. The map is used by kind permission by the Swedish land surveying service (Lantmäteriet).



3.2.17 The noise map

As has been stated previously in the thesis, the making of noise maps is currently the dominating strategy for managing and describing sound in urban contexts. It is an internationally used and commonly accepted tool for working with sound in urban environments, which has been more widely spread throughout Europe since the European Union launched its Environmental Noise Directive in 2002: the Directive 2002/49/EC (in use in Sweden since 2004), which prescribes the compulsory mapping of measured and calculated sound-pressure levels for every European city and region with more than 250,000 inhabitants. The noise map of Södermalm/ Hornsgatan is interesting in this study for two reasons. First of all, it is the most common way of understanding and discussing sound and sound quality today, which makes it important as a point of

reference. Secondly, I wanted to explore the trustworthiness and usefulness of the noise map to see in what way, and to what extent, the traditional manner of working with sound in terms of how much energy it contains (short description of sound pressure levels, (dB) see page 42), could serve my purposes by functioning as *one* layer of description and understanding in this study, and also, in what way I could add meaningful information to its colorful noise-level intervals. The noise map showed below and used in this work was calculated and constructed in 2004 and 2005 and displays the average sound-levels from road traffic over 24 hours. The map is used by kind permission by the Environment Department of Stockholm (Miljöförvaltningen).



3.2.18 Sociotope map



The sociotope map is a document used as basic data for planning and designing built environment in Sweden, as the map charts social, cultural and environmental values of public open spaces. It also employs four different colors to chart to what extent the environment is dense in terms of built structures and open space, such as the space surrounding different kinds of residential blocks. The construction of the document is based upon interviews with inhabitants of the area of interest, and the integration and analysis of acquired qualitative and quantitative data such as observations and spatial analysis. As the sociotope map indicates and maps out identified social and cultural values of this urban space, the map is initially used in this project as a reference point for spatial and qualitative information and also to test its relevancy in this case.

The conclusion of the usability of the sociotope map for purposes of this project is that it is far too general and imprecise to be relevant for the chosen scale of this study. However, it cannot be excluded that it may be useful at a more strategic level when studying, say, the potential accessibility to environments containing certain urban sonic qualities or for pin-pointing urban outdoor spaces of various quality such as streets, squares, pocket-parks, urban glades, etc. in a certain area.

Below is one section of the sociotope map of Södermalm launched in 2003 by the urban planning office of Stockholm (Stockholms stadsbyggnadskontor).



VÄRDEFULLA FRIYTOR

-  **Friytor med sociala och kulturella värden**
Friytor större än 0,5 hektar som upplevs som särskilt värdefulla för utvistelse och fritidsliv. Värdena har bedömts utifrån omfattande observationer och flera enkät- och intervjuundersökningar. Ytor motsvarar i princip den offentliga grönstrukturen.
-  **Värdefulla friytor i andra stadsdelsområden och kommuner**
-  **Vattenområde**
Dessa friytor har generellt mycket stora sociala och kulturella värden i Stockholm.

GLESA BEBYGGELSE




-  **>75% av området är värdefulla friytor**
-  **50 - 75% av området är värdefulla friytor**
Den glesa bebyggelsen utgör många gånger en viktig del av Stockholms gröna karaktär, och bidrar ofta till grönstrukturens sociala och kulturella värden med lokala gröna oaser, lekplatser och möjligheter att sitta i solen.

TÅT BEBYGGELSE

-  **25 - 50% av området är värdefulla friytor**
-  **< 25% av området är värdefulla friytor**
Den tätta bebyggelsen kan utgöra bra utemiljöer om de är bra planerade, men här ingår också industri- och parkeringsområden. Brist på sociala och kulturella värden kompletteras med offentliga grönytor.



SOCIALA OCH KULTURELLA VÄRDEN

Sociala värden redovisas så som medborgarna ser dem. Värdena har bedömts utifrån omfattande observationer och flera enkät- och intervjuundersökningar. De kulturella värdena har bedömts av park- och kulturhistoriskt sakkunniga.

-  **Riksintresse för kulturminnesvärden** - Miljö av särskilt betydelse för Sveriges park- och stadsbyggnadshist. Utpekas av Riksantikvarieämbetet.
-  **Annan kulturmiljö** - Miljö av särskilt betydelse för Stockholms park- och stadsbyggnadshistoria. Utpekas av Stockholms stadsmuseum.
-  **Landform** - Friyta av betydelse för upplevelsen av Stockholms landskapsbild och naturkaraktär, t ex förkastnings-branter, bergsryggar, dalgångar och stränder. Samtliga vattenområden är landformer. Utpekas av Stockholms byggnadsordning.
- Ba** **Bad** - bada och simma
- Bl** **Blomprakt** - rik blomning, trädgårdsodling, koloniområden, botaniska trädgårdar
- Bo** **Bollspel** - lek med boll på större plana ytor, lagfotboll, rugby, brännboll, cricket
- E** **Evenemang** - plats för teater- musik- och motionsevenemang eller festivaler
- F** **Folkliv** - ofta många människor och myllrande folkliv
- G** **Grön oas** - rum med grönskande golv och väggar, årstidsväxlingar
- Lp** **Lekplats** - barns redskapslek, gräva, hoppa, klättra, springa på gräs eller grus
- L** **Naturlek** - barns möjlighet till naturlek, att klättra i träd, på berg, krypa i buskage
- P** **Picknick** - samvaro i mindre sällskap, oftast i samband med solbad, även utflykter
- R** **Ro** - möjligheten till avkoppling, avskildhet och tystnad, att vara i fred
- S** **Skogskänsla** - upplevelsen av stor tyst skog, plocka bär, stor rymlighet
- U** **Utsikt** - överblick över landskapet samt känslan av stor rymd
- N** **Vild natur** - upplevelsen av naturens orörda skönhet, vildhet och artrikedom

Fler värden i tabellen

- Bollek** - lek med boll på mindre ytor (inkl. 25X40), fotboll, landbandy, basket
- Backåkning** - åka pulka, utförsskidor, snowboard, mountainbike
- Båtliv** - aktivt båt- och kajliv, småbåtshamnar, båtuppläggningsplatser, bryggor
- Djurhållning** - aktivt lantbruk och djurhållning, 4H, stadsbondgård
- Friidrott** - plats för hopp, kast och löpning
- Löpträning** - förekomst av ett iordningställt och belyst motionsspår
- Odling** - odla i koloniträdgårdar eller fritidsträdgårdar
- Parklek** - förekomst av en bemannad lekplats
- Golf** - möjligheten att spela golf på små och stora banor
- Promenader** - flanerande, strövande, hundrastning, jogging, cykling
- Ridning** - möjligheten att rida, ridstigar, ridbanor, ridstall
- Skateåkning** - möjligheten att åka skateboard
- Skridsko** - möjligheten att åka skridskor
- Torghandel** - förekomsten av torgstånd med försäljnings av blommor och grönsaker
- Uteservering** - förekomst av café eller kiosk med uteservering
- Vattenkontakt** - kontakt med större vattenyta
- Vattenlek** - lek i och vid vatten, plaskdammar och säkra stränder

-  **Plats med regionalt värde.** Plats som har ett eller flera värden av regional karaktär. Ett regionalt värde innebär en kvalitet som ofta är attraktiv för kommuninvånarna i stort, till skillnad från det lokala värdet som närmast rör stadsdelen.
-  **Gångstråk** av stor betydelse för möjligheten att använda och uppleva stadens friytor och grönstruktur. Skall betraktas som stadens stomnät för gångtrafik och promenader.

3.2.19 Initial mappings

As a means to understand the visual, aural, spatial and social qualities of Hornsgatan early in the project, sketch-like mappings were acquired off site that were based on observations made on site. These mappings constituted part of a strategy to zoom out and begin to connect and overlay certain kinds of information identified as crucial, information that might have importance for the continuation of the method development process. An ordinary city map is used as underlying data visually describing spatial relations on site. On the city map, various layers of information were added, information acquired while walking the length of Hornsgatan back and forth and traversing it at several points.

These sketch-like mappings of *areas of limited visual and aural variation*; areas of visual and aural variation; *public accessible spaces*; *dominating and contrasting sonic*

qualities; *active areas*; *time-related sonic contrasts depending on traffic flow*; *hi-fi, lo-fi, and the in-between*; *space-related sonic contrasts*; *locations of the cut-out effect*; *locations of the crossfade effect*; and *variation of terrain* have been rewarding when it comes to understanding some of the interacting agents affecting the quality of urban sonic space and when reflecting upon these on a wider geographical scale. This investigation propelled both further thinking and acting in regard to the exploration of relevant means and methods in the project and also pointed at the necessity of having a relational approach to the subject of concern by emphasizing a focus on both the site-specific situation and its context.

Areas of limited visual variation
Describes the density of:

- actions (actions of traffic not included)
- distance/perspective
- built environment
- lights
- nature
- texture



Areas of limited aural variation
Describes the density of:

- actions
- distance/perspective
- subjective/close sounds
- built environment
- lights
- nature
- texture

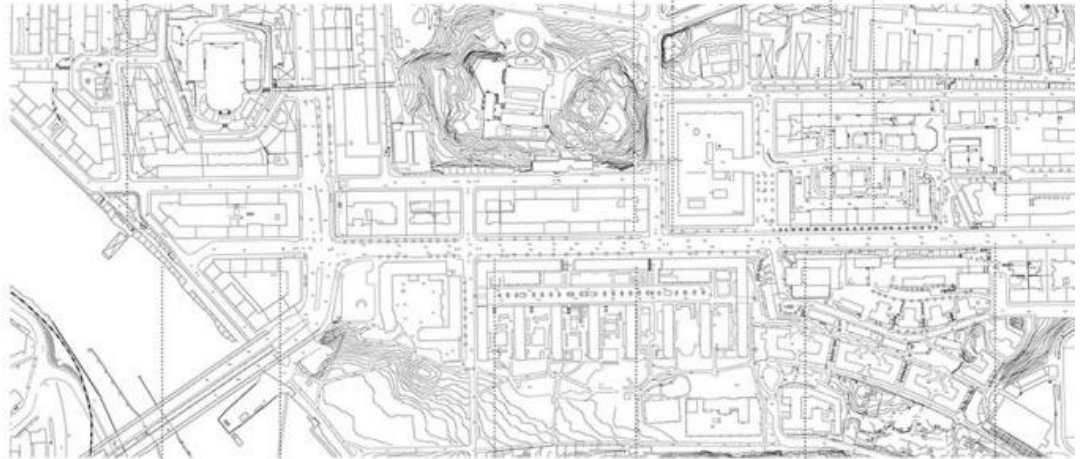
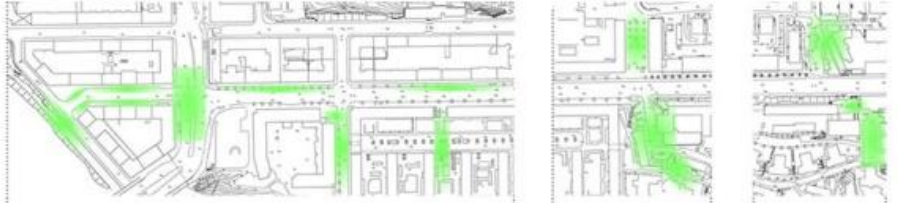




Describes the limited prevalence of various observed actions (traffic not included); view/perspective; distance/perspective; subjective/close sounds; built environment; heights; nature; texture. Original presented on an A1-poster, June 2010.

Areas of visual variation
Describes the density of:

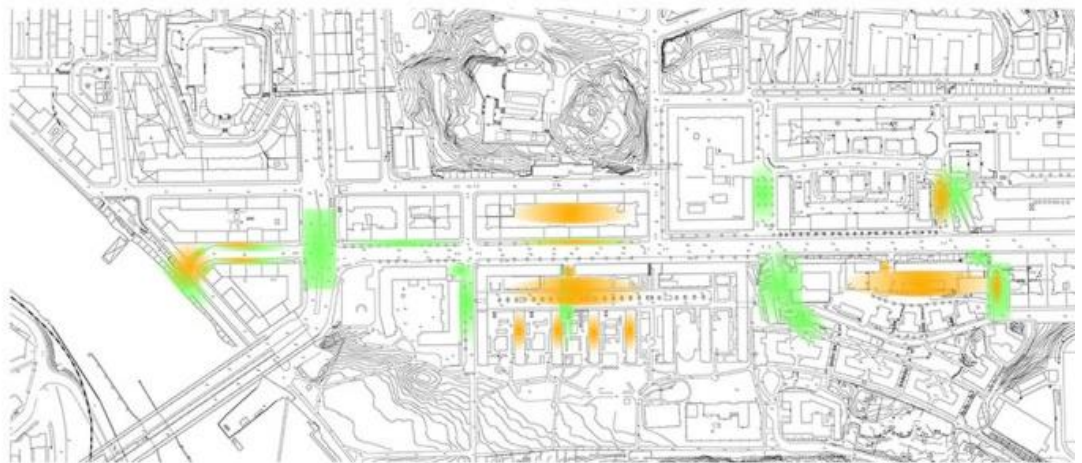
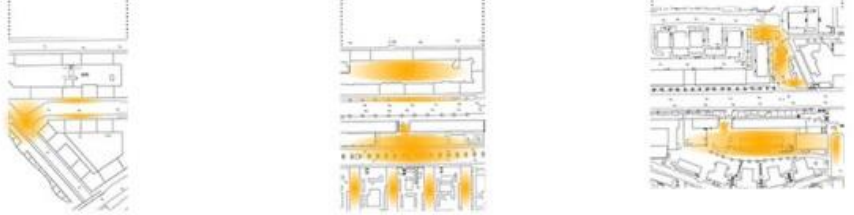
- actions
- views/perspective
- built environment
- heights
- nature
- texture



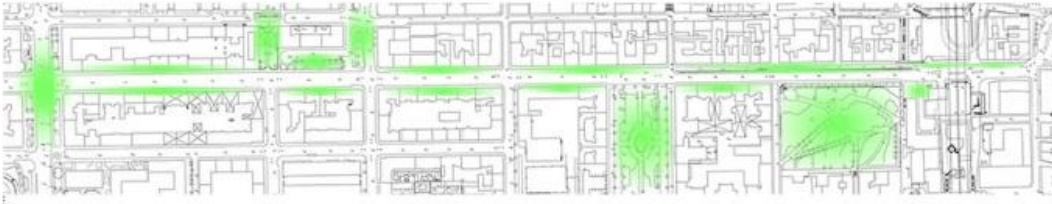
Areas of aural variation

Describes the density of:

- actions
- distance/perspective
- subjective/close sounds
- built environment
- heights
- nature
- texture



Overlaying of visual and aural variation



"Areas of visual (green) and aural (orange) variation". Describes the prevalence of actions (traffic not included); view/perspective; distance/perspective; subjective/close sounds; built environment; heights, nature and texture. Original presented on an A1-poster, June 2010

Public accessible spaces

This map points out where public outdoor accessible space around Hornsgatan (yellow) and topographic barriers such as a steep rock, raised areas, a wall of any kind (stone, brick, rock for example), are located and where we can find publicly accessible spaces. Only the public outdoor environment is covered, not private inner courtyards etc.



Dominating and contrasting sonic spaces

Mapping of dominating sonic spaces in regard to observed sound intensities. In this case, traffic is the main sound source and it cancels out minor sonic events in terms of sound intensity. Contrasting or different sonic spaces (compared to the dominating sonic environment i.e. the traffic) are observed and located.



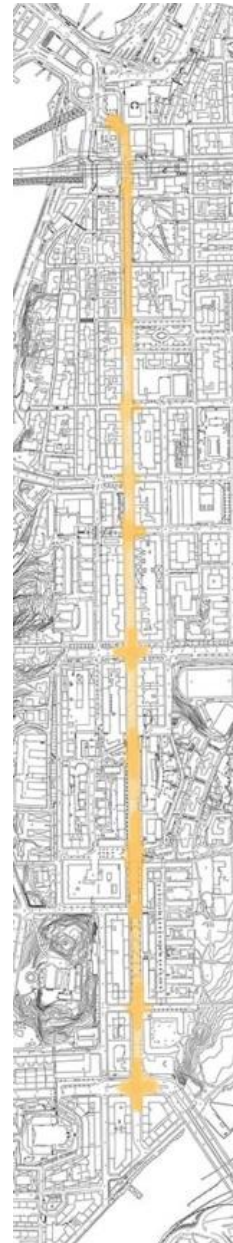
Activities at ground level and animated outdoor space

Observed and experienced prevalence of *life, liveliness, activities, movement* (walking, sitting, moving, shopping, relaxing etc.) generated by people on site. This mapping gives us a hint of how Hornsgatan is used by the population.



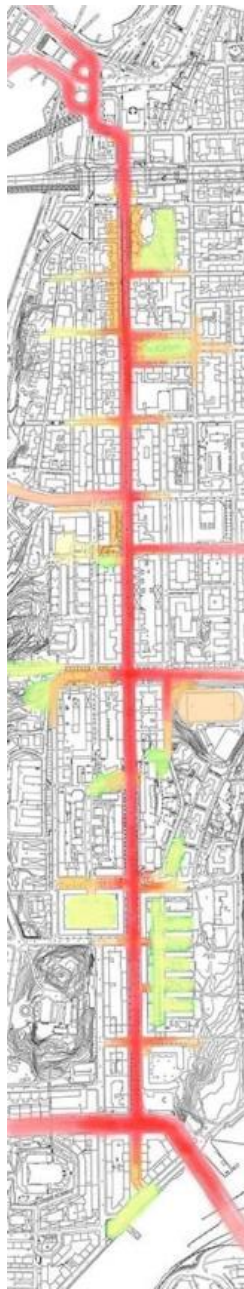
Time-related sonic contrasts

This map show us where observed sound intensities at Hornsgatan (this mapping only concerns time-related sonic contrasts in regard to the traffic flow) fluctuates depending on the amount of traffic and the existence of crossings and traffic-lights directing the flows. This time-regulated dynamic flow going from high to low sound intensity and back again exists all along the street extension and is directly dependent on the spatial organization and localization of crossings and traffic lights. The mapping implies that loud sound intensities caused by traffic is not a constant state, and that intervals of a more low-intensity character also exist.



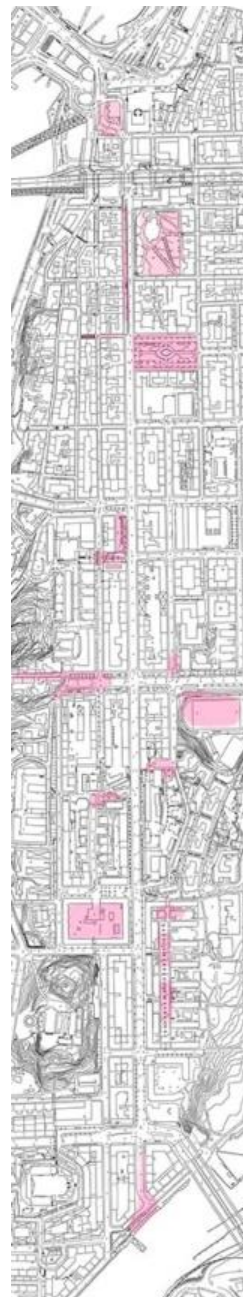
Hi-fi, lo-fi and the “in-between”

Areas/sections characterized by high fidelity (hi-fi) towards indiscriminate sounds are marked in yellow and areas/sections characterized by low fidelity towards indiscriminate sounds are marked in red. The transitional space inbetween these polarities is marked in orange. Hi-fi and Lo-fi are well-established concepts within certain strains of sound studies (see page 71) and are here tested to prove the concept’s relevancy and usefulness in this project.



Space-related sonic contrasts

Much like how the fluctuation of sound intensities on Hornsgatan depend on the intensity or flow of traffic, other parameters such as distance, spatiality, various activities, heights, materiality, spatial dimensions etc also have an effect. In this map, sonically contrasting spaces at Hornsgatan affected by the above-mentioned factors are marked out. The point of reference is here the dominating sonic space, i.e. flow of traffic along Hornsgatan.



Location of the “cut-out effect”

The distinction between two clearly different sonic environments indicates a change of the surrounding conditions affecting the sound quality on site. We can distinguish this change or variation by the act of physical translocation in the built environment by, for example, turning a corner or entering a yard from a street. The notion of the *cut-out effect* is frequently used by certain strains of sound studies (see page 72) and is used here to mark out where abrupt and publically accessible changes in the qualitative character of urban sonic space information appear.



Location of the crossfade-effect

The transitional change from an urban sonic situation characterized by dense sound intensities into another urban situation displaying a lower degree of intensity, can evoke a sense of sonic release for anyone having this experience. This sonic effect is known as “crossfade” by certain strains of sound studies (see page 72) and is here used to test its usefulness in the project. Having Horngatan’s sonic intensity as the base point of reference, it is easy to experience a sonic release just by walking away from the edge of the street at a 90-degree angle. Depending of the morphologic structure of the built environment, topography, accessibility to courtyards etc., the identification of the crossfade effect appears at different positions. The phenomenon is interesting, as it describes a change between sonic states.



Variation of terrain

This map points out the variation of terrain in conjunction with Hornsgatan and is divided into two aspects: constructed variation of terrain and topographical variation of terrain. In the former, the material ground and morphologic structure is planned and constructed and often involves hard material such as asphalt, concrete or other building materials, but also includes soft and porous materials such as grass or gravel in parks: Zinkensdamm's sports arena or the churchyard of Maria Magdalena, the courtyards of the residential blocks of Drakensberg and Plankan, Bysistorget, the open square of Mariatorget. In the latter aspect, the variation of terrain is generated by topography, i.e. how geological conditions affect the physical constitution of urban space, such as the change of heights. Here, the level of Hornsgatan is the basic point of reference.

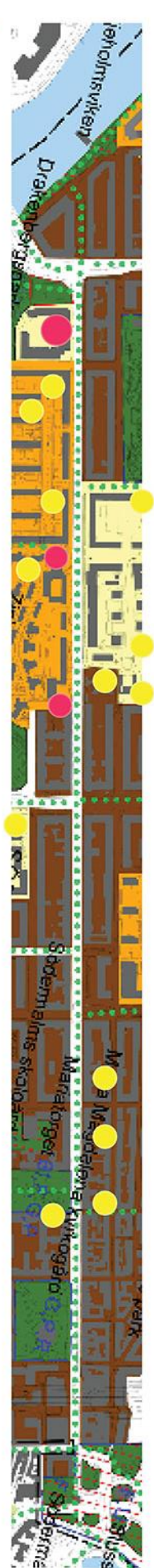


3.2.20 Location of indoor activities at ground level, Location of child and elderly care

The mappings of *Locations of indoor activities at ground level* and *Locations of child and elderly care* onto strips of the sociotope map was an attempt to visualize the spatial relationship between the built environment, observed activities at ground level, and certain functions/services. Indoor activities at ground level along the public sidewalks of Hornsgatan holds the capacity to animate the shared public space of Hornsgatan to a certain degree, the intent was to monitor this relationship through a simple mapping of the huge variation of on-going activities that I could identify while walking along the full extension of the street. The other map shows the location of elderly-care and child-care centers in 2010 in order to highlight two vulnerable groups of citizens that I considered as highly crucial in relation to the question of accessibility and exposure to a differentiated urban sonic environment (the information was retrieved from the official site of Stockholm www.stockholm.se in May 2010).

- Grill
- Clothing
- Restaurant
- Bike-shop
- Clothing
- Kiosk
- Fishing store
- Office
- Hair dresser
- Restaurant
- Gym
- Construction site
- Residential block
- Hair-dresser
- Bathrooms-shop
- Photo
- Fishing-store
- Estate agent
- Hair dresser
- Flower
- Gym
- Businesses
- Globala gymnasiet
- Photo
- Threat
- Bike store
- Photo
- African-store
- Bridge-club
- Orient-travel
- Restaurant
- Restaurant
- Marriage-shop
- Hair dresser
- Restaurant
- Bar
- Restaurant
- El-store
- Laundry
- Drumline
- South
- Second hand
- Escrow
- Dance-palace
- Second hand
- Video
- Cosman
- Skin care
- Flower
- Dance shop
- Hardware shop
- Restaurant
- Bakery
- Clothes
- Clothes
- Cafe
- Shoes
- Bakery
- Shops
- China shop
- New-age-shop
- Boutique
- Hair
- Kiosk
- Shops
- Shoes
- Laundry
- Hair dresser
- Cafe
- Shoes
- Trousers
- Photo
- Clothes
- Bank
- El shop
- Carpets
- Interior
- Tattoo
- Hair dresser
- Computer
- Cafe
- Health shop
- Jewellery
- Flowers
- Clothes
- Clothes
- Shoes
- Bakery
- Cheese
- Shoes
- 7-eleven
- Estate agent
- Cafe
- Restau/bar
- Restau/bar
- Estate agent
- Restau
- Clothes
- Mobiles
- Bakery
- Marinatorget (surrounded by 27 activities in total)
- 7-eleven
- Bar
- Clothes
- Boutique
- Boutique
- Stones
- Boutique
- Boutique
- Clothes
- Hair dresser
- Cafe
- Skin-care
- Interior
- Church
- Tyrbis
- Offices
- Offices
- Interior

- Dogcare
- Restaurant
- Second hand
- Second hand
- Knitting bout.
- Business office
- Restaurant
- Furniture
- Baby-store
- Pharmacy
- Clothing
- Restaurant
- Health-shop
- Estate agent
- Hair dresser
- Tattoo
- Boutique
- Cafe
- Undertaker
- Flower
- Gym
- Bike-store
- Kiosk
- Bargain-shop
- Clothing
- Gift
- Pizza
- Underground
- ICA
- Sushi
- Clothing
- Restaurant
- Cafe
- Tailor
- Kiosk
- Bank
- Ice/Post
- Restaurant
- Sportbar
- Apartment agent
- Kiosk
- Grill
- Marriage-shop
- Stockholmshem
- Restaurant
- Hair dresser
- Komoux
- Travel
- Nail-care
- Doctor
- Antique-shop
- Hair dresser
- Tailor
- Second hand
- Travel
- Fishing-store
- Foot-care
- Kiosk
- Tailor
- Sport-shop
- Bakery
- BAV
- Eggsam
- Paint
- Hair dresser
- Football store
- Interior
- Second hand
- Person
- Sushi
- Structure
- Theater
- Shops
- Restaurant
- Photo
- Restaurant
- Printer
- Optician
- McDonalds
- Baby-shop
- Bargain shop
- Restaurant
- Restaurant
- Art shop
- Restaurant
- Books
- Record label
- Sushi
- Cafe
- Record studio
- Bed store
- Restaurant
- Henklopp
- Jewellery
- Bar/Opera
- Cafe
- Skin care
- Boutique
- Boutique
- Restaurant
- Hotel
- Bags
- Thai shop
- Shoes
- Clothes
- African interior
- Electrical shop
- Carpets
- Optician
- Assembly room
- Shops
- Clothes
- Clothes
- Alfons
- Second-hand
- Bank
- Cafe
- Red cross
- Knitting
- Komoun
- Hair dresser
- Book
- Boutique
- Restau/bar
- Pottery
- Boutique
- Estate agent
- Underwear
- Children clothes
- Toys
- The shop
- Art gallery
- Art gallery
- Jewellery
- Jewellery
- Art gallery
- Hair dresser
- Glass gallery
- Map workshop
- Clothes
- Gallery
- Gallery
- Gallery
- Atelier
- Cafe
- Offices
- Restau/bar
- Conferees
- Photo gallery
- Art gallery
- Antiques
- Jewellery
- Fast food



Locations of indoor activities at ground level and Locations of child and elderly care onto an excerpt of the sociotope map. June 2010. Original size A1.

3.2.21 Color index describing observed qualities of space and sound

What I have chosen to call *color index describing observed qualities of space* (ground materiality) *and sound* (intensity and exposure from surrounding sound sources of which traffic is a self-evident agent) began as a strategy to quickly localize myself in the first versions of the compilations containing facets of spatio-sonic information. At first, the dots of localization were neutral markers of the geographic point itself, but after the initial phase the “dots” underwent a gradual transformation as they were adjusted to accommodate the possibilities and needs of the project. Information pertaining to ground materiality and the sound intensity of the site was integrated into the dots and distinguished as a gradient change of color. The intent was to quickly survey and position observed data on sound quality and materiality, along with other valuable information on the built environment, when being in an off-site situation.

The idea was that the dots could bring instant knowledge to a reader/ analyst with regard to important features of space sound and materiality at a given point. As the interaction between sound, spatial and material character affects how the sound environment at Hornsgatan is experienced and used, an attempt was made to merge at least two of these three aspects into a gradient color scheme.

The colors correspond to observed sound intensities on site and the existence of hardness/softness of the materiality in the immediate surrounding context. This implies that the colors provide a rough indication of degrees of exposure from the dominating surrounding sound sources. Co-reading this information with the information on the architectural and spatial constitution of space gives us a quick hint as to what kind of space we are dealing with. In this format, however, further information is required to be able to determine anything of importance at a deeper level. For example, there is a huge difference in regard to the emergence and behavior of sound if the surrounding surfaces are hard and close to the listener, or if they are soft and porous and more spread out. As the nature of sound and activity always fluctuate and contain a temporal dimension, the “color index” contains a time aspect when integrated in the spatio-sonic illustrations (see page 90-91) that shows two typical states, one with traffic rolling and one without, to provide a better understanding of what kind of sonic situation is at stake at the site of inquiry, generally speaking. In the inventory mappings though, only one state is present - the most commonly observed one.

	Low intense sonic situation: mineral and solid materials, low grade of exposure from surrounding sound sources.
	Medium intense sonic situation: mineral and solid materials, medium grade of exposure from surrounding sound sources.
	Intense sonic situation: mineral and solid materials, high grade of exposure from surrounding sound sources.
	Very intense sonic situation: mineral and solid materials, high and persistent grade of exposure from surrounding sound sources.
	Very intense sonic situation: green and porous materials, high and persistent grade of exposure from surrounding sound sources.
	Intense sonic situation: green and porous materials, high grade of exposure from surrounding sound sources.
	Medium intense sonic situation: green and porous materials, medium grade of sound exposure from surrounding sound sources.
	Low intense sonic situation: green and porous materials, low grade of exposure from surrounding sound sources.

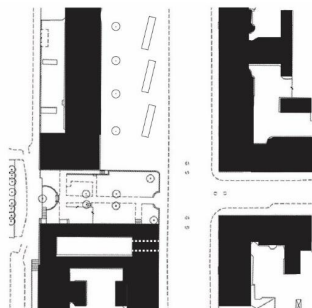
Key to the color index



Application of the color index onto the map

3.2.22 Morphologic maps

Morphology is originally a biological term describing the study of structure and form of organisms. Today the term is applied to a vast number of fields and can generally be described as the study of forms and structures. In architecture, morphology deals with the form and structure of buildings, emphasizing the relation between physical masses and the space between them. The morphology of built structures is essential to the behavior of sound, a sound signal appearing in an outdoor urban situation is directly affected by the environment in which it has emerged and is thereby colored by factors such as the distance to the closest obstacle, like a wall. It is relevant to be aware of physical acoustics and the behavior of vibrational energy generated through all kinds of actions and understand this interaction at a basic level. However, what is important to emphasize in this context is that physical acoustics alone have never been a point of departure for any of the inventories and mappings made. Instead, these basic principles have gradually crept into the project as a natural result of other practice-based and design-oriented investigations and proven methods of representation and communication used in this research project.



Plan and section of Bysistorget

3.2.23 Basic acoustic principles

This study more or less implicitly deals with several acoustical laws, of which one of the most prominent in this case is the **inversed square law**. The acoustic principle is equivalent to a reduction of 3 dB for a line source or 6 dB for a point source for each doubling of distance from the sound source. In this case, it means that when moving away from the dominant sound source of traffic along Hornsgatan, sound intensity is sequentially reduced and thereby leaves the air and space free for other sound events to be perceivable and other actions to take place (compare the *crossfade effect* page 72).

Another basic acoustic principle is connected to the existence of a screen or barrier, implying that sound waves bounce against any sufficiently sized obstacle they may encounter and are thereby impaired in their journey. Depending on such physical aspects as height, thickness and materiality, the impairing effect on the spreading of soundwaves differs (compare the *wall effect*, page 72).

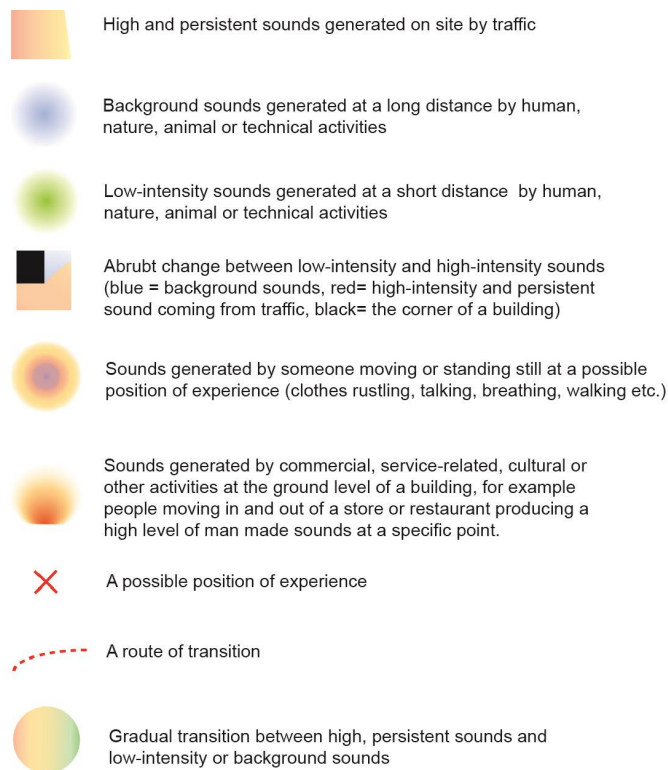
Reflection, absorption and diffraction are other important acoustic phenomena affecting the physical behavior of sound. Reflection is the notion for vibrational energy that continues to bounce against all kinds of surfaces until it fades out or gets absorbed by the material it is confronted with. The structure and tactility of materials directly affects the behavior of sound waves and thereby the quality of the sonic space regardless of whether it concerns an outdoor or an indoor environment. One clear difference, however, is that in an interior situation, sound is much easier to control, as its movement can be exactly calculated and adjusted according to needs or requirements. In an exterior context, calculations are much less precise, and interventions are occasionally difficult to control, as there are innumerable factors affecting how the sound waves move. For example, soft materials that either cover the ground, or facades or roof tops that attenuate the spreading of sound waves by way of the principle of diffusion, and **absorption**, which directly affects how the environment is experienced in terms of sound quality (compare *fade in/out* and *release effect*, page 72).

Diffraction concerns the bending of soundwaves as they encounter the edge of an obstacle such as like a sharp corner of a building. The changed direction of sound waves due to physical obstacles affects and influences the total sonic experience of sound quality at or around an urban site, influenced by any variations of functions and usages in the area, either by their existence or their non-existence, that create distinguishable acoustic shadows. An example of this is the abrupt change of sound quality when turning a corner, or upon leaving a busy road for a semi-open yard (compare the *cut out effect*, page 72).

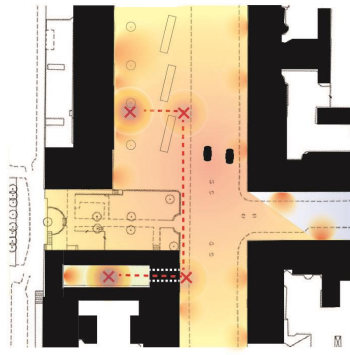
3.2.24 Spatio-sonic illustrations

In this thesis, a spatio-sonic illustration refers to a drawing that shows the properties and qualities of space, sound and a possible sonic experience during a fraction of a generally described moment. I decided to call these drawings **spatio-sonic illustrations** since they are inexact and sketch-like and they aim to describe and communicate a situation that is far more complex than a picture can ever transmit and thereby can only be regarded as material for discussion as opposed to an absolute truth. The visual image of this frozen moment in time is based on experiences and inventories made on site and basic acoustic principles interpreted in a sketch-like, inexact, manner. These illustrations are both specific and general in their approach, as they describe a specific location at a general level by lifting forth two typical urban states, one with the traffic rolling, and one without. The illustration aims to be a condensed and simplified synthesis of a complex situation.

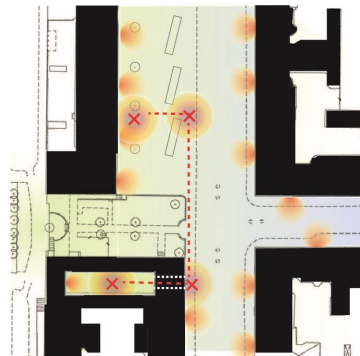
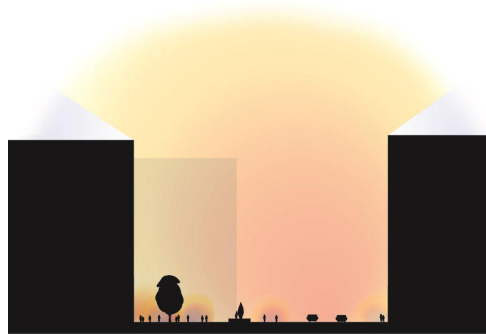
The information it contains stems from several site-specific explorations made at Hornsgatan along with information acquired off-site (such as how the morphology of the built environment affects the propagation of soundwaves coming from various events on site). It is important to note that the illustrations in this sense are reduced in comparison to the real-life event, but that this is also the point of producing them, they are a means of bringing some crucial aspects to the fore so they may be taken into account when, say, discussing a given site over disciplinary borders. The spatio-sonic illustrations become a visual document that enables a comparative and relational discussion around important issues relating to space, sound and experience. Together with the architectural morphology marked on the plan and section of each site, the following aspects of space, sound and temporal variables are highlighted in the spatio-sonic illustrations, each of them corresponding to certain specific sound effects as well as soundscape terms investigated in this study and to the idea of moving through these various sonic spaces.



Key to spatio-sonic illustrations



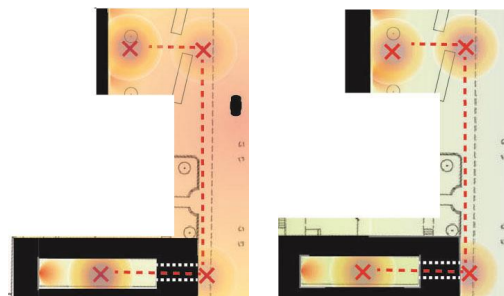
Spatio-sonic illustration, plan and section with traffic



Spatio-sonic illustration, plan and section without traffic



A route of transition with and without traffic



3.3 Archiving

The spatial organization of gathered research material on space, sound and experience that merges facets of spatio-sonic information has been a crucial part of the method development process, and it is an active strategy for thinking and reacting to inventoried and compiled material that propels the project forward. Organizing and surveying a vast amount of disparate material is, in this case, obviously also a matter of archiving or keeping track of gathered information, which makes comparison and further strategic moves easier. Mapping is another word for describing the strategy applied here.

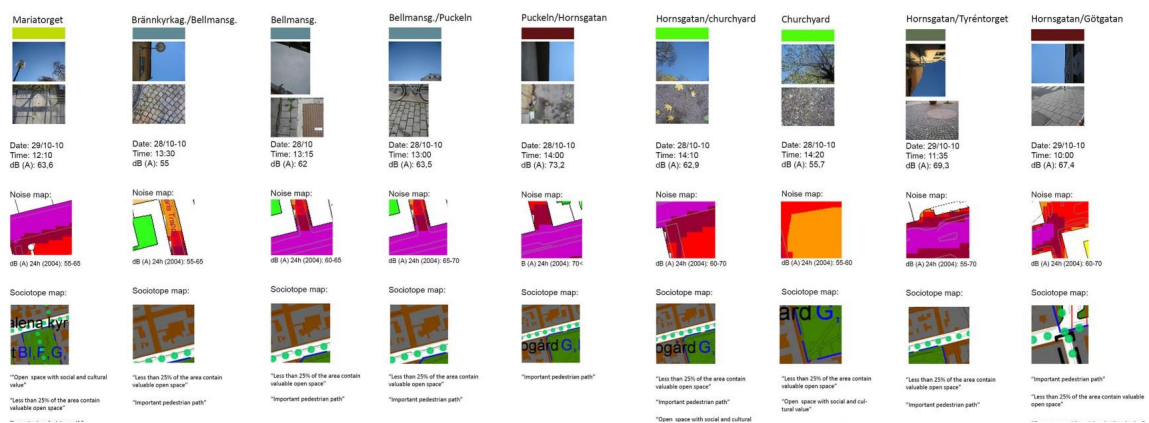
The city map is used as a node of orientation to geographically position gathered facets of spatio-sonic information in conjunction with their specific sites of belonging. The act of bringing together sketches, photos, notations, different map-formats and other informational excerpts that describe various aspects of the urban sonic environment is, as mentioned above, central to the method development process. It is a strategy that tries to expose, isolate and sort out crucial aspects that affect the quality of urban sonic space and describe how it is possible to encounter this quality (the user perspective) by separating crucial basic factors connected to spatial quality, content and temporal features.¹⁰⁴

Traditionally, architects, urban planners and designers use different mapping strategies to organize, represent and understand complex spatial, structural, aesthetical and social connections between multitudes of situations

factors that need to be discussed or taken into account in such as the planning and creation of new buildings and environments. In this case, converging information on space, sound and experience on a flat and spatially limited surface (A1 or 3 x A1 international paper size) has been a challenge. In addition, integrating sonic elements such as sound and video recordings is another important feature and finding good ways to communicate via digital media was a nut to crack that resulted in parallel presentations of the thesis, one in a physical format and one for a digital online environment. Content-wise, these versions are the same, though the digital online version contains audio and motion picture clips and relies on an architectural structure that not is bound to the two-dimensional format of a thesis.

The reason for organizing small excerpts of information in this way is because it provides the ability to survey and make comparisons of certain selected aspects of spatio-sonic information in order to identify important relations between different, but interconnected, sites. The intention is also to reflect upon and analyze urban sonic space from an extended site-specific but zoomed-out perspective where matters of spatial quality (architecture, topography and materiality), content (activities, function), and temporal features (sound quality, mobility, accessibility) are taken into account.

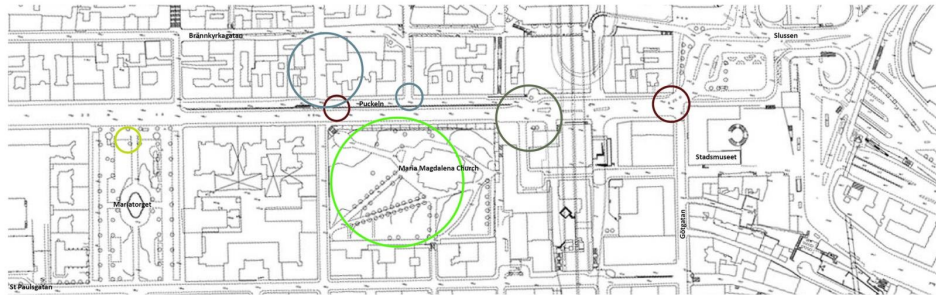
The compilations are presented in order of appearance as they represent different phases of the development process each one different from the other in terms of complexity and contained facets of information.



Phase one: The first compilation of gathered facets of spatio-sonic information (phase one) containing the primary attempt for utilizing a *color index of observed qualities of ground materiality and sound intensity*, photos 180°, sound measurements, noise map, sociotope map highlighting the social values represented on these map-excerpts.

¹⁰⁴ See a condensed description of the basic active conditional agents affecting urban sonic space at page 35.

Phase two:



Indication of geometry and stone structures:	Mariatorget	Bränhyttsgatan/Bellmanng.	Bellmanng.	Bellmanng./Puckeln	Puckeln/Hornsgatan	Hornsgatan/Churchyard	Churchyard	Hornsgatan/Tyrénorget	Hornsgatan/Gårsgatan
Photo 180° vertically:									
Video 360°:									
Date:	Date: 28/10-10 Time: 13:02 dB (A): 63.6	Date: 28/10-10 Time: 13:02 dB (A): 55	Date: 28/10-10 Time: 13:02 dB (A): 62	Date: 28/10-10 Time: 13:02 dB (A): 63.5	Date: 28/10-10 Time: 13:02 dB (A): 70.2	Date: 28/10-10 Time: 13:02 dB (A): 62.9	Date: 28/10-10 Time: 13:02 dB (A): 58.7	Date: 28/10-10 Time: 13:02 dB (A): 62.3	Date: 28/10-10 Time: 13:02 dB (A): 67.4
Noise map:									
Sociotope map:	 "Open space with social and cultural value" "See how 20% of the area contains suitable open space" "Workable pedestrian path" "Private, active open space"			 "See how 20% of the area contains suitable open space" "Workable pedestrian path"	 "Workable pedestrian path"	 "See how 20% of the area contains suitable open space" "Workable pedestrian path" "Private, active open space"	 "See how 20% of the area contains suitable open space" "Workable pedestrian path" "Private, active open space"	 "See how 20% of the area contains suitable open space" "Workable pedestrian path"	 "See how 20% of the area contains suitable open space"
Sound Effects:	Sound Effects:	Sound Effects:	Sound Effects:	Sound Effects:	Sound Effects:	Sound Effects:	Sound Effects:	Sound Effects:	Sound Effects:
Soundscape concepts:	Soundscape concepts:	Soundscape concepts:	Soundscape concepts:	Soundscape concepts:	Soundscape concepts:	Soundscape concepts:	Soundscape concepts:	Soundscape concepts:	Soundscape concepts:
Sound notation:									
Access/escapability:									
Public accessibility:									
Variation of terrain:									
Dominating and contrasting sonic spaces:									
Socially active spaces:									
Variation of topographic heights:									
Location of release effect:									
Space related sonic contrasts:									
Time related sonic contrasts:									
Sketches:									

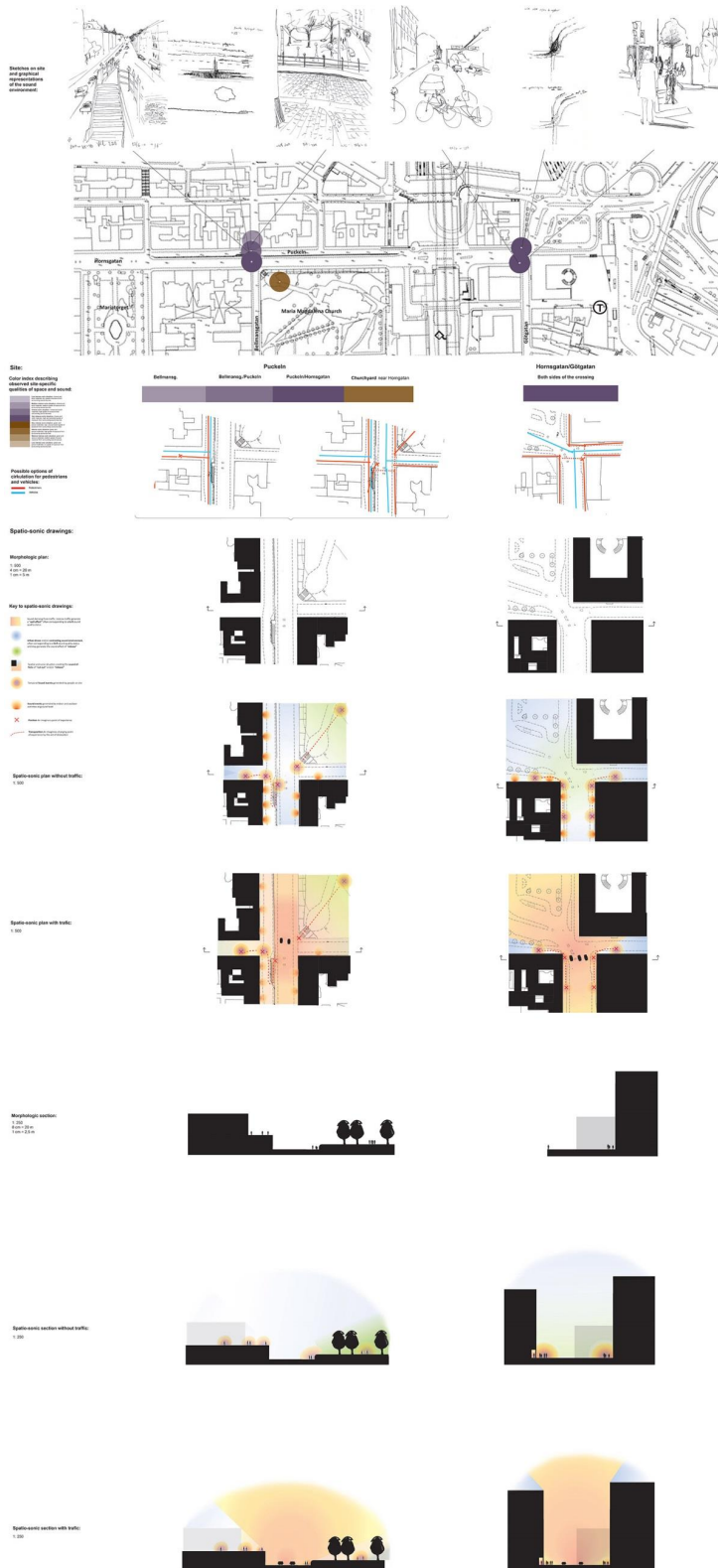
The second compilation of gathered facets of spatio-sonic information (phase two). It contains the secondary version for utilizing a color index of observed qualities of ground materiality and sound intensity by marking out the site (s) under study as a wider circle covering a larger area of land, photos 180°, sound measurements, noise map, sociotope map, sound concepts, sound notation, accessibility/escape-ability, excerpts from initial mappings, location of indoor activities at ground level and sketches.

Phase three:



The third compilation of gathered facets of spatio-sonic information. It contains the third and final version of *color index of observed qualities of ground materiality and sound intensity* by marking out the site(s) under study as a one single dot, noise map, sociotope map, location of indoor activities at ground level, accessibility/escapeability sound concepts, sound notation, excerpts from initial mappings, photos 180°, sketches, documentary photos and textual reflections.

Phase four:

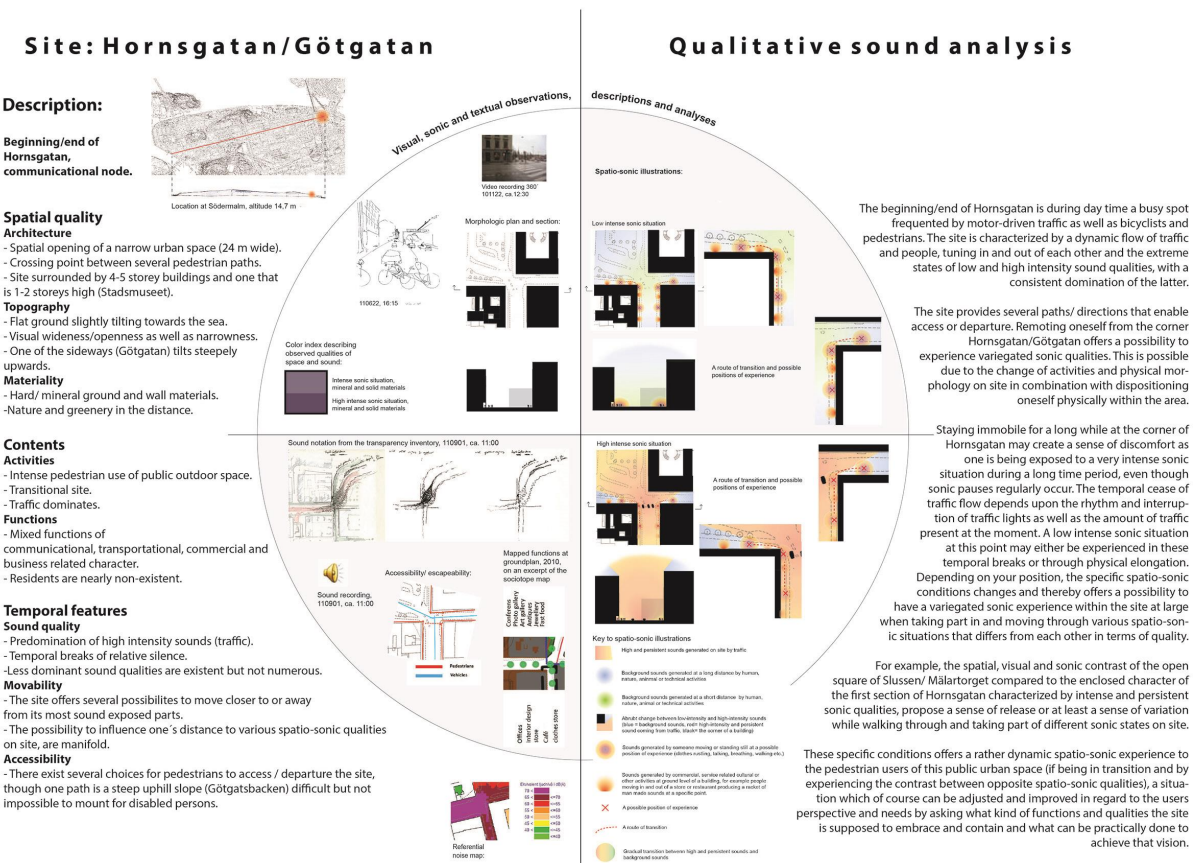


The fourth compilation of gathered facets of spatio-sonic information. It contains the final version of color index of observed qualities of ground materiality and sound intensity, sketches, accessibility/escapeability and spatio-sonic illustrations.

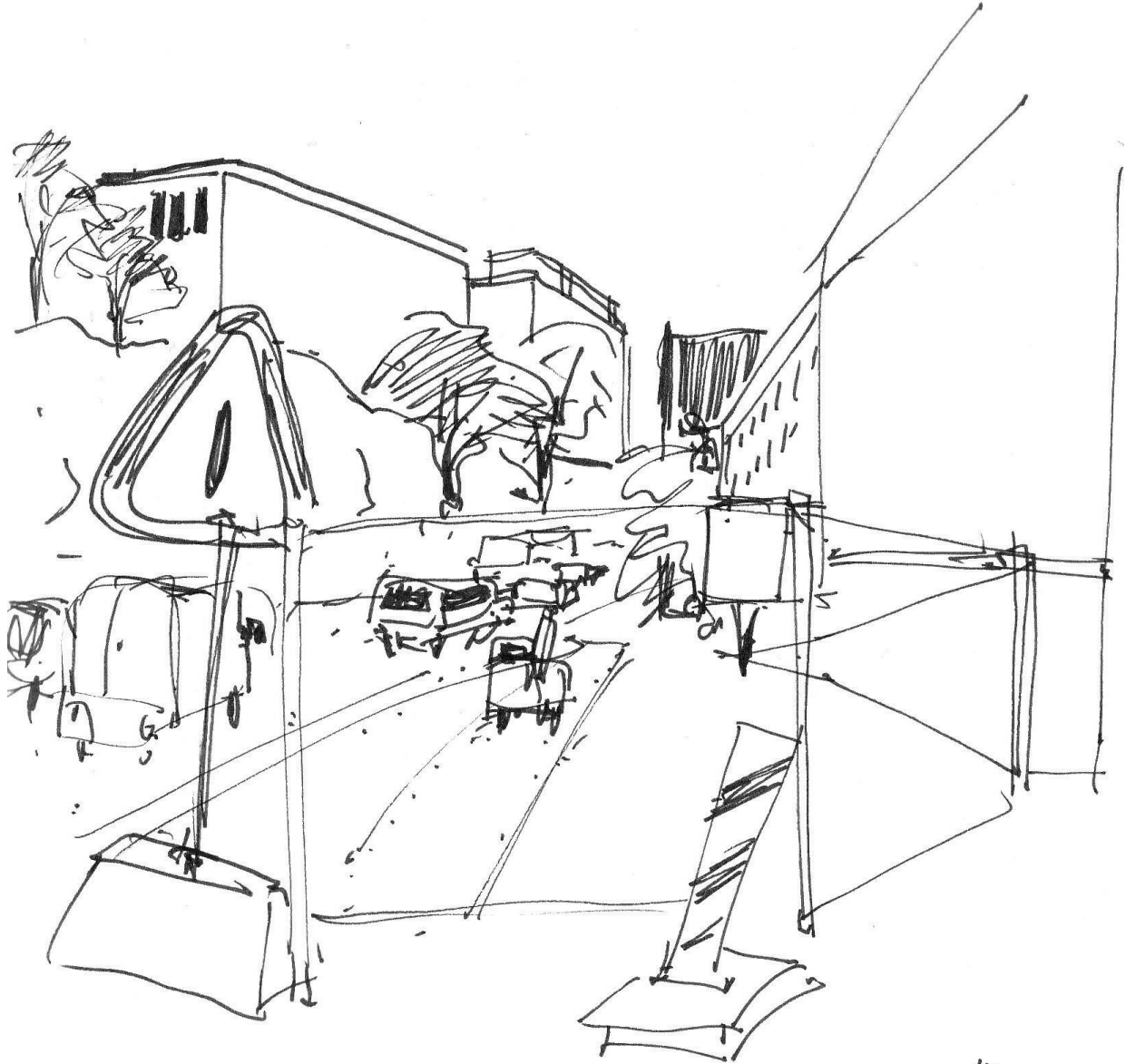
Phase five: Spatio-sonic drawings

The strategies of archiving and compiling resulted in a proposal for a qualitative sound analysis of the built environment, merging and consolidating chosen facets of information on space, sound and experience into a disparate and hopefully coherent and graspable whole, here denoted as **spatio-sonic drawings**. The proposal brings together these facets into a site-specific sound analysis of thirteen sites along Hornsgatan, thoroughly scrutinized in the implementation section of the Licentiate study. As one of the challenges of this method development process is to gather and reflect upon a vast amount of information of the qualitative dimension of urban sonic space, consistent efforts have been made to identify what can be regarded as the most important basic information to bring into that analysis, and what to exclude. These efforts have resulted in a choice of integrating visual, aural and textual material of description, representation and analysis that lifts forth and/or explains site-specific aspects of **spatial quality** (architecture, topography, materiality), **content** (activities, functions), **temporal features** (sound quality, mobility, accessibility) that communicate information on the three identified crucial parameters, in the thesis denoted **active conditional agents**, affecting the quality of urban sonic space (see p. 35).

The drawings consist of several layers of spatio-sonic information organized and visually divided into two parts. The left side is devoted to **visual, aural and textual descriptions** of observations and experiences made on and off-site that indicate the physical and functional characteristics and experiential qualities of the site under study using a combination of text and images as well as audio and video clips (in digital or web-based formats). The right side is devoted to **analysis and reflection** of the site through a combination of textual analysis and descriptive illustrations (spatio-sonic illustrations). In the summarizing textual reflection/analysis, all of the previously performed inventories made at and around Hornsgatan are taken into account, such as mappings of topography and dominant and less-dominant sound sources, variation of terrain, and so on, as described in this chapter. The noise map is integrated as a referential anchor for comparison and discussion. The drawing is an attempt to gather relevant information on space, sound and experience functioning both as an educational tool for explanation and internal knowledge development and as a generator of a possible method for the qualitative sound analysis of the built environment.



4. Implementation



11/6-10

