A Tangible Understanding of Liveability

Making Liveability Operational

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Master Thesis in Urban Planning and Management

Aalborg University, June 2016

BREAKING NEW GROUND

AALBORG UNIVERSITY

Frontpage photo: Sønder Boulevard at Vesterbro, Copenhagen (Als 2014)

Thank you!

I would like to thank the participants from Aarhus Municipality for providing me with their time and knowledge. Also a big thank you to my supervisor who has been at call whenever needed, and motivating me at times when I hit the wall. Lastly, thank you to my family, friends and my girlfriend for their strong support throughout the process, and to Henrik for reviewing. And to KF84 and Stuen.

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ABSTRACT

This study examines how liveability can be facilitated into a tangible tool, in the context of urban planning. Liveability is a hyped term, though practitioners are having trouble making it operational. Many cities transform old social housing areas, but also old abandoned industry and harbour areas are being seen as potential hot spots.

This study creates a definition of liveability, as there are no common understanding of the term. This definition is then formed into a liveability concept with ease of use in made, and can be operated by e.g.. municipal urban planners. The study has not focused on which indicators should be used, though it concluded maximum 25 should be used, to not make it too complex. The study of indicators has to be done in further studies, though the concept and framework are in place.

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1. Introduction

Transformation of cities remain a former, current and future challenge for city planners. Planners strive to find the best solutions to their current problems, and when solved, attention falls to new arised problems. In the industrialisation period the challenge was to build new infrastructure and accommodate people moving from the city centers to the suburbs. Later, the focus on climate change resulted in more sustainable solutions when constructing new buildings and more public transportation, as well as better bicycle infrastructure. Today liveability has taken the scene as the new vision for what cities strive to be. It is being used in many media to express what is wanted from the city, but it also gets some critique. In Denmark one article says that it is just a buzzword for the political agenda that leaves room for everything that seems to be a benefit for the citizen (Nielsen 1999). Though in later years there has actually been a political shift in Denmark towards liveability. In the capital, Copenhagen, street gardens are now allowed, to strengthen the greenery of the streets (Ravndal 2016). In Odense the third largest city in Denmark, a massive budget for improving the city in the coming years, has been planned, including a new light rail (Halskov 2016). In Aarhus, the second largest city, there are several plans to transform the city, especially the harbour front, where a lot of the industry has been moved further away, leaving the old areas to be developed (Lund 2016). Aalborg, the fourth largest city in Denmark, has been mentioned in both national and international media, since the European Commission rated it as the happiest city in EU (Martin 2016). Amongst other things, this is due to the transformed harbour front, with a music hall, university buildings and student housing for the cities many university students. Also worth mentioning is that Copenhagen came in at second place. This indicates that Denmark has a high quality

of life and continues to improve. The Office of National Statistics[1] now has a plan to do its own comparison of cities on the same indicators as used by the European Commission (Etwill 2016). European cities are, like the cities in Denmark, seeing a transformation, but the best solution is not necessarily the same for every city (Guardian.com 2016). In London the privatisation of public space is seen as an issue towards the use of the space, where citizens will be more policed by the property owners than usual (Garrett 2015). This can also be true for other cities as well. The issues of urban planning is becoming more complex, as the focus of quality of life is more present than ever. A shift away from the rigid planning approaches may be the way forward. The concepts of planning has to be rethinked (Flint 2015).

In Aarhus Municipality they have the ambition to create a new concept on its own. In the corporate plan 2015-2017 of Engineering & Environmental Management of Aarhus Municipality, had in the original version a vision to create a concept for how to work with liveability within the year 2015 (Appendix 12). However, in the revised version of this year, the plan is pushed to 2016, and liveability is joint with a concept for sustainability (Aarhus Municipality 2016).

Planners are having trouble finding these new ways of working with liveability and though quality of life is the aim, what is it in the context of planning? But how dœs one describe what liveability is? Can a basis of a definition be found, to be able to discuss it? With a range of challenges in mind a research question was formed.

[1] Danmarks Statistik

Research question

How is liveability defined in the context of urban planning

and how can it be facilitated into a tangible concept?

Work questions

1. How can a general comprehension of liveability be made?
    1.1. What are the aspects of liveability?
2. How can the definition be made operational?
    2.1. How should indicators be found and measured?
    2.2. What is the target group, and in what situations is it aimed for?
    2.3. What results will come from using a liveability concept?

The two work questions are effectively the research question split into two parts, first answering what the definition of liveability is and then using the definition to structure an operational concept. The first work question are answered in *2.1 Towards defining liveability (O&R)* and the second work question in *2.2 Facilitating liveability concept (FAC)*. The findings are discussed in *2.3 Discussion of findings* that makes the foundation for answering the research question in *3.1 Conclusion*.

1.1 Theoretical considerations

The subject of this study is to study liveability in the context of urban planning. It is a theoretical study, posing hypothesis in how to define liveability and how to use it in praxis. One of the reasons for conducting this study is that there is a lack in knowledge about this subject, and therefore not much theory on the subject. For the theoretical considerations has an approach, in which the perspective of urban planning is considered, been used.

1.1.1 Perspective on liveability

For choosing theory it is a criteria that it has to be as new as possible, possibly with the last ten years. This is due to the fact that cities are constant transforming, often changing for the better, and new discoveries and insights should therefore be of the newest date. "Quality of life" and "liveability" in the context of urban planning are used as search criteria. The *Report on the United Nations conference on sustainable development* (UN 2002) covers the basic needs for life, which holds true to liveability, as these must be adhered to before quality of life can be improved. Veenhoven (1999) address the quality of life of citizens in different nations, and covers all indicators associated with quality of life, also utilising the basic needs from UN. The study is comprehensive and is not focused particularly on quality of life in a perspective of urban planning, but rather covers all perspectives. In architecture, especially in Denmark, Jan Gehl (1972, 2010, Gehl and Svarre 2013) is often referred to, as he as a practicing architect has studied the tendencies in how people experience architecture, and use urban spaces. Though he is a praised architect, his works mostly inspires for methods of observing life, and uses that data when planning. No exact theories are posed he is not ideal to use as theory.

In the perspective of urban geography Pacione (2001) poses five approaches on liveability where especially the human ecology approach has an urban planning

perspective. In this same field dœs van Dorst (2012) write about liveability and also uses the ecology approach. van Dorst also incorporates a focus on the basic needs (UN 2002) and borrows from Veenhoven (1999) to create an understanding of the criteria from an urban planning point of view.
Pacione will be used to introduce the theory on liveability in the perspective of human ecology, and van Dorst will be the main source.

1.1.2 The ecology approach

Pacione (2001) offers five perspectives on liveability, *1) The Human Ecological Approach, 2), The Subcultural Approach, 3) The Environmental Load Approach, 4) The Behavioral Constraint Approach,* and *5) The Behavior-Setting Approach*.

The human ecology approach describes that an individual's behaviour is associated with the environment (Wirth 1938 in Pacione 2001). The city has few advantages and is characterised by stress, anonymity, alienation and personal and social disorganization (Wirth 1938 in Pacione 2001). This interpretation has been critiqued for its negative view on the city, and keeping in mind that cities have evolved since 1938, when Wirth did this study, a more positive view is appropriate.

van Dorst (2012) has a newer interpretation of human ecology, which is more up to date with the cities today, in which the interaction between human and environment are analysed. van Dorst (2012) clarifies two research differences, the first being the distinction between research on human beings and research on humanity. *"The environment of humans include our artefacts, whereas the environment of humanity is limited to our habitat."* (van Dorst 2012, 224). In this study the human beings including artefacts are studied. The second distinction is between sustainability and liveability, where liveability focuses on the here and now are small scale projects, and sustainability focuses on and larger scale including larger groups of people or populations (van Dorst 2012).

1.2 Methodological considerations

"Planning is not just concerned with understanding the world, but also, and fundamentally, with changing it. Academic research in planning should reflect this fact, which sets it apart from research in most natural and social sciences." (Straatemeier et al. 2010, 578)

1.2.1 From action research to experiential approach

The method of this study will be based on the experiential approach by Straatemeier et al. (2010). The method is a refined design of the underlying method; action research.

Action research

Action research originated after World War II when the research arena of the social sciences had changed (Lewin 1951 in Baskerville and Wood-Harper 1996). It was first used in medicine, but was developed into other fields of research as well. Action research was new in the way that it *"merges research and praxis thus producing exceedingly relevant research findings."* (Baskerville and Wood-Harper 1996). It is described as being *"the paragon of post-positivist research methods"* (Baskerville and Wood-Harper 1996), recognising that the researcher plays a part in his own studies, and may influence the researched person. However, a researcher should always strive to be objective, but acknowledge when bias can occur.

On figure 1.0 the latest derivation of the original method for action research is shown, and coloured with how the method ended in the four steps that it uses in the experiential approach. The initial method used six steps in 1951, then was refined into five steps in 1978, and lastly four steps in 2012 with the experiential ap-

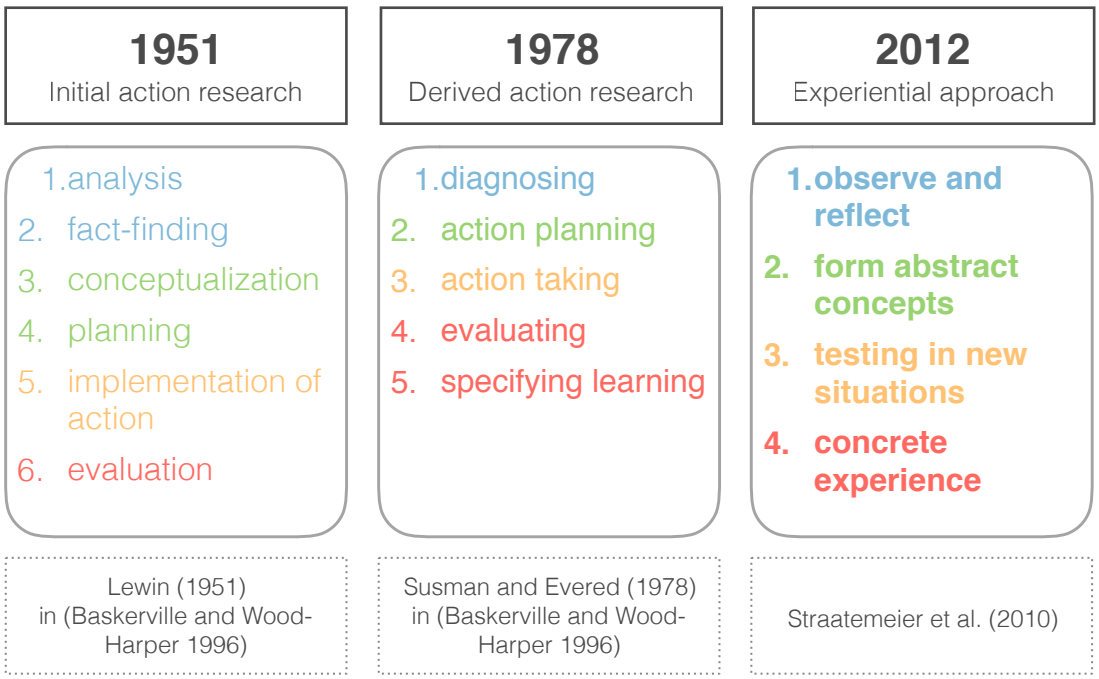

FIGURE 1.0 - DERIVATION OF ACTION RESEARCH TO EXPERIENTIAL APPROACH

proach. The steps of the action research will not be detailed here, as they are very similar to the steps in the experiential approach. The first two methods of action research has their core use in medicine, though they can be used as a method in other fields of science too. The experiential approach has a form, so that it can be used in many fields, whereas it is chosen for this study.

The experiential approach

Liveability is a weaved term and to understand its definition today, a look into how it originated and how it has developed until today is needed. For a point of departure is chosen the early 1960s when Jane Jacobs published *The death and life of great American cities*. For this study the focus is to understand what the term is, and how it can be used in planning. A new concept of how to approach the planning problems with liveability in mind is needed, to change the planning process. The common way to conduct planning research is "explanatory science" where a problem is analysed and then solved, using a widespread field of research (Straatemeier et al. 2010). This method is best used for analysing existing problems,

such as an existing planning approach. Then it will be analysed and evaluated, and improvements may be suggested. For investigating a new planning concept, Straatemeier et al. (2010) has developed an experiential method called "design science" to analyse and test new planning methods. This change-oriented approach is focused on *"what"* and *"why"* something works, rather than *"how"*. The product of the concept is prescriptions which are *"tested in practice and grounded in scientific knowledge"* (Straatemeier et al. 2010, 579). The aim is to engage both practitioners and researchers to test the new concept in practice and then reflect on its performance, make improvements, and then test in new situations (Straatemeier et al. 2010). Design science derives from "action research" which also engages the practitioners and planners, though design sciences have the focus to test the concepts in new situations multiple times, to ensure that the concept can be used in more situations than just the one researched originally. It also helps ensure that the practitioners get a result they can actually use in practice, rather than a scientific report which can be too abstract to translate into planning practice.

1.2.2 Research design

This study uses empirical research to base the found conclusions on the data used (Yin 2011, 21). The goal is to create new knowledge and find new ways to use liveability. The approach described in *1.2.1 From action research to experiential approach* is inductive and follows a "bottom-up" scheme that drives the research onwards. *"Inductive approaches tend to let the data lead to the emergence of concepts"* (Yin 2011, 94).

The research design aims to create logic between research questions, the data collected, and the strategies for analysing data (Yin 2011, 76). In qualitative studies the researcher can choose a specific design before the study begins, or keep an open mind, and do it during the study. If the design had been altered during the

study, the researcher could be compromised by influencing the findings (Yin 2011, 77). However, this specific problem is not relevant to this study as the preferred design was found early in the process, favoring its advantages when conducting research in new fields.

This study is build on the research design called “design science” which uses the experiential approach (Straatemeier et al. 2010). The design uses an iterative process in which cycles are run through several times. This study uses the design to steer the analysis in the direction of forming a liveability concept, though it dœs not complete the full cycle. The focus is one the first phases of the cycle where a definition (for liveability) is build, thus leaving room for further analysis.

The experiential approach contains four phases which are used at each testing cycle, and then is repeated for each new testing situation (see figure 2.0). The phases of the experiential research design are: O&R - observation and reflection, FAC - forming abstract concepts, TNS - testing in new situations, CE - concrete experience.

The first phase - O&R - is where the researcher has the knowledge and time to observe a problem and reflect upon how it can be solved. The next phase - FAC - is where a draft to a possible solution is written, and a concept is created. The third phase - TNS - is where the concept is tested in a new situation. Depending on the problem the situation, where the concept is tested, can be a place, an organisation, a municipality or something else. This is to ensure that the final concept can be used as a general concept, and not only for one situation in collaboration with practitioners. It is here the researcher has interaction with practitioners to learn from their experience from when the concept is applied to a hypothetical or real case in their field of expertise. The fourth phase - CE - is where the practitioners give their verdict and comments on the concept, and from that the cycle starts over again, where the researcher observes how the concept was used and where it can be improved and so forth (Straatemeier et al. 2010).

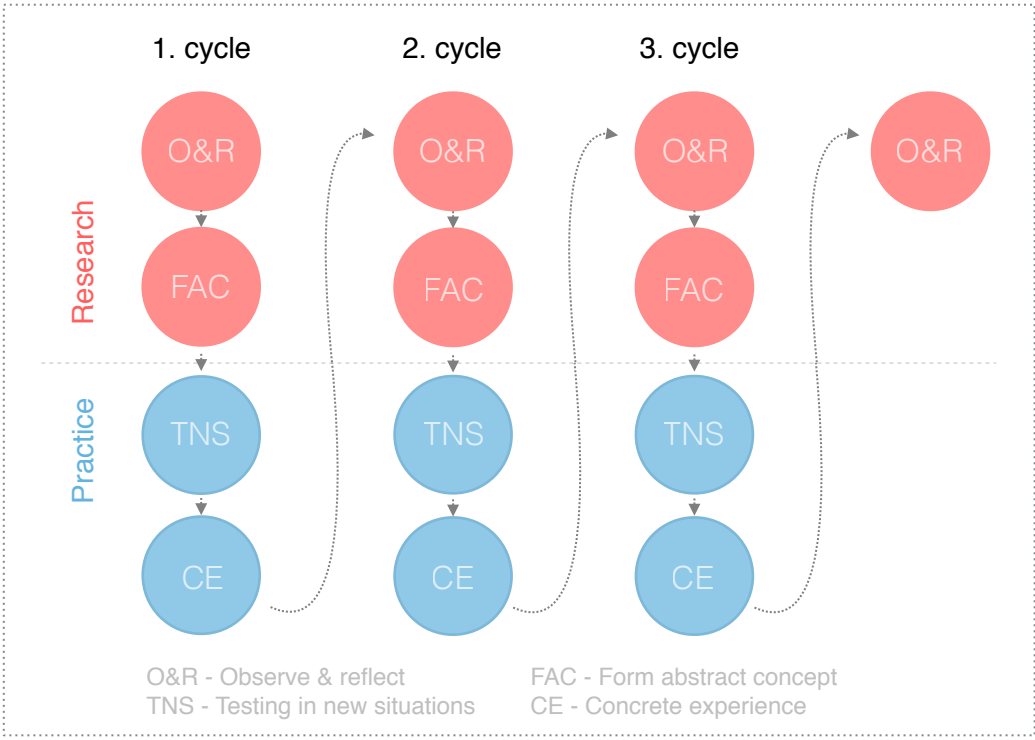

FIGURE 2.0 - THE EXPERIENTIAL APPROACH (STRAATEMEIER ET AL. 2010, 582)

This study forms the analysis from this approach, thus first observing and reflecting on the subject of liveability, finding a definition and then linking it with mobility. Then definition will be used to create a concept for which planners can use, and will then be tested with planners. Lastly their experience is used to refine the concept, and the process can start over. During this study the need for a thorough and in depth definition of liveability became apparent, meaning that the initial ambition of testing the concept it will not be included. However this study will found the base for further studies that can continue with the same approach.

1.2.3 Data Collection

To have a trustworthy and valid research process, a thorough methodology is needed (Yin 2011). In the previous sections in this chapter the approach, research design and perspective on liveability has been detailed, and in this section the ty-

pes of data used will we explained. It is important to be self-reflexive and the researcher need:

> *"to demonstrate that the data and interpretations are accurate from some point of view, which leads in particular to a sensitivity about the need to report, in a self-reflexive manner, the presumed interplay between the researcher's positioning (as a research instrument) and the events and participants in the field." (Yin 2011, 20)*

One way to ensure validity in a study is to use triangulation when collecting data (Yin 2011, 81). This means that the study should build on at least three sources but also preferably three different types of data (Yin 2011, 81). This study uses three types of data, qualitative interviews, focus group meeting and a literature review. In both the interviews and literature review, multiple sources are used.

Qualitative interviews

As part of a previous study, conducted by the same author as this one, four qualitative interviews were conducted with high profile employees and one politician Aarhus Municipality that all have worked with liveability within the city. The interviews were conducted one by one, but following the same interview guide (Appendix 1). All the interviews were recorded with sound, and took between 30 to 50 minutes. They were conducted in November and December 2015. Some of the questions were regarding liveability in general and is usable for this study as well. Other questions had focus on Aarhus, whereas these is not of use. Among other things, they were asked what their relation to liveability is, and if they see a need for the creation of a simple concept that can be of benefit for planners.

The three persons interviewed are:

1. Erik Jespersen - Director of the Engineering & Environmental Management[2]
2. Kristian Würtz - Councilman of the Engineering & Environmental Management[3]
3. Stephen Willacy - City Architect of Aarhus[4]

The interviews are used to show the need for this study. As director, Jespersen has in depth knowledge of liveability as he has travelled the world to see examples of good liveability, as well as having a partnership with the Danish consulting engineering firm Rambøll, to analyse the liveability of an area in Aarhus. Würtz is a politician and the current councilman on the area of engineering and environment. He dœs not have the same in depth knowledge as Jespersen, but as a politician he is the one to decide that liveability is on the agenda for Aarhus. Willacy is the current city architect of Aarhus, and is the most visionary of the three of interviewees. He has the most in depth knowledge on liveability of the three, as he is a former practicing architect, and is excited to bring more liveability to Aarhus.

Focus group meeting

It is presumed that the amount of liveability for an area, has a high correlation with how the urban environment and streetscape is layed out, and therefore a point of departure for the analysis i taken in the correlation between mobility and liveability.

The focus group meeting were held with two planners from Aarhus Municipality that have both worked with a liveability project within the municipality. On a daily basis they work with smart mobility in the city. They are Gustav Friis (Engineer) and Charlotte Kjær Petersen (Architect). The reason for the meeting is that they should

2 Danish: Direktør for Magistraten for Teknik og Miljø

3 Danish: Rådmand for Magistraten for Teknik og Miljø

4 Danish: Stadsarkitekt i Aarhus

help test an example of what a liveability concept should include and how it could work, according to the experiential approach described in *1.2.2 Research Design*.

From earlier experience, a log was kept from every meeting, to be able to recover how they moved along.

On March 29th 2016 we met for the first time, were the study was introduced and it was discussed how they would help. It was agreed that Friis would think of possible indicators relating to liveability and mobility, as well as a possible case within Aarhus City. Meanwhile the concept would take shape, and the planners' inputs would be added to the final draft.

Our second meeting was on April 19th 2016, where they presented three indicators they recommended as being relevant to study.

After some work on the draft and discussion with the supervisor, it was agreed that the project was on a too early stage to be producing a product of a concept. Though the intended use of the meeting is not met, the meetings is helpful in directing the project course into the field of liveability linked with mobility.

Literature review

This study aims to make liveability operational and thus do precedence for a concept of how planning in practice can incorporate liveability into a project on a broad scale.

> *"If a new study is claimed to be entirely unique, a good literature review also can demonstrate a researcher's mastery over the literature as well as presenting the argument for the lacuna[5]. Thus, conducting some type of literature review seems to be desirable." (Yin 2011, 62)*

[5] A blank gap or missing part (http://www.whatisabc.com/lacuna)

Yin (2011) continues to emphasise that the researcher needs to define the niche of the study, and justify how it is situated in the array of other studies. The niche must be defined *"substantively"* which is a core element of this study.

To find the literature relevant to this study, a comprehensive review was done at the beginning of the project (Yin 2011, 63). The search criteria was "liveability", "quality of life", "urban planning" and subjects and synonyms relating to this. This helped find publications that focuses on operational liveability, which is quite few. Thus, the study will rely on a selective review with these publications, that discusses how liveability can be used in praxis. Through the process of this study, Gehl and Svarre (2013) was thought to be of use, but in the end it was used only a few times as the focus of the book is more on the methods for how to analyse indicators.

Gehl and Svarre (2013) argues how architecture has developed for the past 50 years, from when the building was the most important piece in architecture and a small attention was payed to the life between the buildings, till today where there is a larger focus on the urban life. Although not directly mentioned in the book, liveability is also how urban life is lived, as the book offers methods how to study. This study will focus on how liveability can be used in planning as a concept, and therefore not offer a conclusion of how to design an urban space. Although this is the case, the methods of Gehl and Svarre (2013) can be of help to understand the problems seen in urban spaces, to emphasise why a need for a liveability concept is present. The methods to measure urban life also acts as an indicator of how an urban space should be designed, and this can be used as a planning objective. For a further study of indicators this might be of use.

The literature used in the literature review are:

- Appleyard and Lintell 1972 - The Environmental Quality of City Streets: The Residents' Viewpoint

- Bosselmann, Macdonald and Kronemeyer 1999 - Livable streets revisited
- Pacione 2001 - Urban Livability in Urban Geography
- van Dorst 2012 - Liveability in Sustainable Urban Environments

Appleyard and Lintell (1972) has studied the influence of the indicator *traffic* on three streets of different sizes. They use 5 criteria that poses as their understanding of liveability and examines traffic according to these. This is useful when linking mobility and liveability in *2.1.2 Mobility and liveability* as well as in *2.1.3 The basic needs for liveability*.

Bosselmann, Macdonald and Kronemeyer (1999) has revisited the findings of Appleyard and Lintell (1972) and by using the same methods they examine three groups of streets, nine in total. Two groups are in Brooklyn, New York City and one in the suburban town of Chico, California. What they did differently from Appleyard and Lintell, is that they looked at boulevards as the street with heavy traffic, instead of a conventional street. Their findings therefore expresses an understanding of how the street design influences how the liveability is perceived.

Pacione (2001) is writing about liveability in the viewpoint of geography. He poses five perspectives on liveability, that has some similarities with the perspective from van Dorst (2012). Together with van Dorst (2012) these perspectives will form the base when defining liveability in *2.1.3 The basic needs for liveability*.

van Dorst (2012) is a Dutch researcher who have refined an operational perspective on liveability. Though the publication is on the same subject as this study, this study will look at liveability in a Danish point of view and link liveability and mobility, to form the basis of a new definition that can further develop into a final concept.

2. Creating and testing a concept for liveability

In this chapter the knowledge of how to operationalise liveability will be exercised using the experiential approach. A link between mobility and liveability will be examined and the findings will be used as point of departure in defining liveability. Thereafter the definition is ready to be formed into a tangible tool for practitioners.

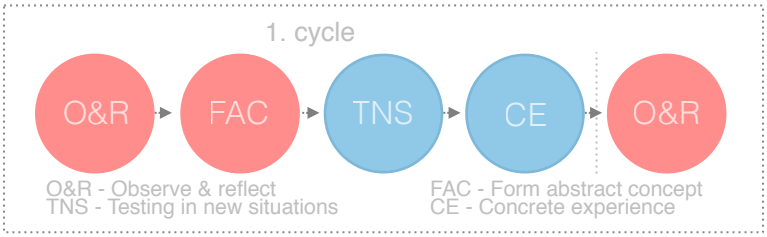

FIGURE 3.0 - COMPROMISED VERSION OF FIGURE 1.0

On figure 3.0, the full cycle of the experiential approach (explained in *1.2 Methodological considerations*) is shown. This study will only utilise the first two phases, being within the research area. The study was planned to be tested on a few indicators recommended by the practitioners participating in the focus group meeting, though as the proposed solutions, being the result of the concept, will be based on several indicators, unwound not be a valid test. All indicators must intended for the concept must be found first before a test can start. The input from the practitioners is still of use to confine the indicators needed.

The aim for this study is not to describe the vast amount of indicators and decide which are more relevant than others.

2.1 Towards defining liveability (O&R)

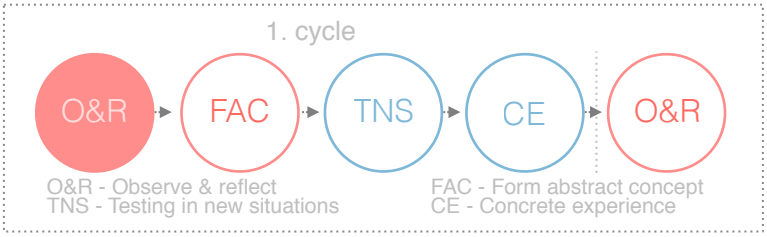

FIGURE 3.1 - STEP 1: OBSERVE & REFLECT

Liveability is not a new concept, though its popularity has sparked in recent years and still dœs today. The study of public life came into focus in the 1960's after rational functionalist planning had been the primary way of planning for several years (Gehl and Svarre 2011). Jane Jacobs (1961) publish her book *The Death and Life of Great American Cities* in 1961 that takes departure in her own neighbourhood of Green Village, New York, that faced demolition due to a new highway. This sparked her resistance of bad planning, and she helped getting the public life onto the agenda. Ten years later Jan Gehl publishes his first book *Life between buildings* (Gehl 1971) that studies several cities around the world, with examples of good and bad planning. He also includes directions of how to build within the human scale. In 1972 Appleyard and Lintell (1972) publishes *The environmental quality of city streets: The residents viewpoint* which studies three streets in San Francisco with a low, medium and high amount of traffic. They study the quality of life through observation of traffic, interviews with residents and surveys. They conclude that there is a connection between low traffic and higher perceived liveability. After this study the concept of liveability ("livability" in American) was broadly adopted in urban planning practices (Bosselmann, Macdonald and Kronemeyer 1999). In 1981 Donald Appleyard publishes *Liveable streets* (Appleyard 1981) which is a later book about the very same studies conducted in 1972. Gehl and Svarre (2011) explains that the period between 1960 and 1985 saw the most publications about public life, and after that period cities and planners began to adopt the new findings. Appleyard and Lintell (1972) did a small scale study, which in their conclusion resulted in several hypotheses that they found wore worth of further study. In 1999 their findings were reexamined in *Liveable streets*

revisited (Bosselmann, Macdonald and Kronemeyer 1999) which replicated the study in New York City, and included the effects of density on higher renter occupancy and on liveability. The definition of liveability made by Appleyard and Lintell (1972) is widely accepted, though it is meant for research purposes. The definition made by van Dorst (2012) is focused on making liveability operational, and he includes a wider spectrum of indicators other than mobility, and therefore the hypothesis is that it is more useful today. Another hypothesis is the liveability has moved from being concentrated on mobility issues of cars versus quality of life, to being "everything" versus quality of life.

This chapter will discuss the connection between mobility and liveability as being a fundamental issue, and then define liveability in a danish context, for a more overall use of the term.

2.1.1 Three forms of liveability

> *"The quality of the match between people and their living environment is known as liveability." (van Dorst 2012, 223)*

In a broad sense, humans - as any other species - thrive in an ecosystem, where all the needs for living a meaningful healthy life must be in place to be able to A) survive and B) be happy (van Dorst 2012). Some basic needs are safety, health, utilities and such that must be present to be able to live in a neighbourhood. To live a happy life, more complex needs should be present within short distance of the residence. The list of indicators is long, but not all indicators are applicable in every situation, and to focus too much on some indicators might restrain you from achieving a certain goal for the neighbourhood or city. A look will be cast on indicators when forming a concept for liveability in *2.2 Facilitating liveability concept*.

van Dorst (2012) describes liveability in three aspects:

The perceived liveability is *"the individual's appreciation of his or her environment"* (van Dorst 2012, 225). The method used, is to conduct a survey and ask the citizens what they appreciate in their neighbourhood.

This would be a useful method to find the indicators most important to liveability in the local environment.

The apparent liveability is *"a good match between the organism (person) and the environment, which can subsequently be evaluated in terms of the number of happy years of life"* (Veenhoven 2000 in van Dorst 2012, 225). The apparent liveability is the optimal habitat for an organism. This can be determined for plants and animals, but for humans it is not that clear. Humans can adopt to different environments, and therefore the apparent liveability can only be defined by the number of happy years in ones life, and therefore at the end of life (van Dorst 2012).

This is what is strived for when planning liveable environments, and it will change over time and always be unreachable. It is essentially the perfect balance between perceived liveability and presumed liveability.

The presumed liveability is *"the degree to which the living environment meets the presumed conditions for liveability"* (van Dorst 2012, 226). This describes a set of indicators that are presumed to meet the requirements of liveability, but has no proof of its effectiveness. *"The following factors of the presumed liveability are related to the perceived liveability: the maintenance of the area, spatial quality, presence of nature, absence of noise, absence of nuisance, common ground in lifestyles (and cultural backgrounds)."* (van Dorst 2012, 227). Even if these requirements are met, there is no guarantee of a liveable neighbourhood. Non-spatial indicators dœs also influence the liveability, but dœs not affect the design.

For liveability to be an effective operational concept, the environment needs to be defined in type and scale (van Dorst 2012).

2.1.2 Mobility and liveability

The amount of liveability for an area, has a high correlation with how the urban environment and streetscape is layed out. With the introduction of the car as a common mode of transport in 1950s and 1960s, a new planning layout was adopted (Bosselmann, Macdonald and Kronemeyer 1999). For the existing streets to be able to handle the amount of traffic that was generated by cars, other things in the streets had to yield, such as sidewalks, squares, trees and benches. This proves to still be a relevant topic, as car ownership has been rising ever since it became mass produced. In April 2016 Denmark saw a record high of new sales at 18.900 vehicles, as seen on figure 4.0 (Dalbro and Moric 2016).

FIGURE 4.0 - GROWTH OF NEW CARS 2009-2016 (DALBRO AND MORIC 2016)

Planning with a focus on liveability, should leave room for every mode of transport, but in context also favourise the mode of transport most needed. For example public transport cannot gather the same service, as it has in larger cities, in low rise residential neighbourhoods due to urban sprawl. The density of people is simply too low for a bus to have a high enough frequency and have a bus stop close enough to every home, that they can amount a real challenge for the car. For the

urbanist who lives in the city, and makes most of his/her travels within the city, public transportation or a bicycle may be a favourite of transport, as congestion and lack of parking spaces makes the car less favoured.

In this section of the analysis first inputs from , the two studies of liveable streets by Appleyard and Lintell (1972 and Bosselmann, Macdonald and Kronemeyer (1999) will be examined.

Liveable streets

Appleyard and Lintell (1972) has analysed the perceived liveability (van Dorst 2012) to determine the effects of traffic on liveability. They analysed three streets in San Francisco in 1969 with a low (2.000 cars daily), moderate (8.700 cars daily) and high (15.750 cars daily) amount of traffic. To be able to compare the three streets, the streets needed to be as similar as possible, regarding buildings sizes and facades. By that they assumed that all other interference on the amount of liveability would come from the street scape, thereby the amount of traffic, and the type of dwelling (renter or owner). They observed the traffic flow, with numbers of cars on an average day and made interviews introduced as surveys with the residents as well. The residents were not told that they primarily were interested in effect of traffic (Appleyard and Lintell 1972).

In their survey they presented a design which they used in earlier studies, combining environmental criteria and transportation system design. The questions were bound to these five criteria:

> *"**Traffic hazard:** concerns for safety in the street associated with traffic activity.*
>
> ***Stress, noise, and pollution:** dissatisfaction with noise, vibration, fumes, dust, and feelings of anxiety concerning traffic.*
>
> ***Social interaction:** the degree to which residents had friends and acquaintances on the block, and the degree to which the street was a community.*

> ***Privacy and home territory:*** *the residents' responses to intrusion from outside their homes, and the extent of their sensed personal territory or turf.*
> ***Environmental awareness:*** *the degree to which the respondents were aware of their physical surroundings and were concerned for the external appearance of the buildings and the street." (Appleyard and Lintell 1972, 86)*

The answers were given as ratings on a 1-5 scale as "environmental quality", which resembles the level of liveability, and each question were discussed before a considered answer were given. The researchers remained as objective as possible, and did not try to influence the answers (Appleyard and Lintell 1972). To make the findings more understandable, Appleyard and Lintel made cartoons of the findings, one for each criteria (see appendix 2-6).

In the first criteria, *Traffic hazard* (Appendix 2) the heavy traffic street, which had three lanes with one-way traffic driving at 55-65 km/h (35-40 mph), the residents fear crossing the street, and getting out on the lane from their driveway (Appleyard and Lintell 1972). The moderate traffic street with two lanes and two-way traffic at 40 km/h (25 mph), also had a lot of traffic, but concern was more focused on people driving carelessly and frequent accidents (Appleyard and Lintell 1972). On the light traffic street with two lanes and two-way traffic at 25-30 km/h (15-20 mph) the hazard is not that frequent, and the occasional truck or motorcycle is the most noticeable. One resident says that street is easy to cross on foot (Appleyard and Lintell 1972).

The finding shows the relation between safety and the amount of traffic as the streets ability to facilitate a good liveable environment. The heavier traffic, the less safety.

BOX 1 - FINDINGS ON TRAFFIC

In the second criteria, *Stress, noise, and pollution* (Appendix 3) they find that the residents on the heavy traffic street find the noise almost unbearable, spending

their time at home in rooms facing the courtyard. On the moderate traffic street noise is also of concern, but air pollution seems to be a bigger issue here. On the light traffic street the occasional truck might make som noise, but otherwise it is not too bad, and they feel that the street is clean and safe (Appleyard and Lintell 1972).

This finding shows that, as well as with the traffic hazard, that more and faster traffic creates an unpleasant atmosphere, makes noise and air pollution, which makes residents try to escape from the stress. On streets without this stress there is not a similar concern, and it is almost taken for granted that noise and pollution are low and liveability high.

BOX 2 - FINDINGS ON STRESS, NOISE AND POLLUTION

The third criteria, *Social interaction* (Appendix 4) shows how many friends and acquaintances the residents have on the street. The heavy traffic street sees the fewest friends, and they mostly live on the same side of the road. Residents describe the street as not being friendly, and no one offers help. On the moderate traffic street they have a few more friends, and more of them live across the street. The residents answers unevenly in their views on this street, and people who lived here for a long time remembers the good old days with less traffic. Some think it is a friendly street, some think it used to be. The light traffic street sees residents having the most friends, and many of them living across the street. Here the residents are more consistent in their answers, and they see it as a very friendly street, where you converse with your neighbours (Appleyard and Lintell 1972).

This shows that when a street allows for people to use it, they meet each other, make new connections and strengthen the community, and are generally more welcoming. This also helps making a sense of home and belonging.

BOX 3 - FINDINGS ON SOCIAL INTERACTION

In the fourth criteria, *Privacy and home territory* (Appendix 5) residents were asked to draw what they saw as their home territory. On the heavy traffic street residents sees only their apartment, and some sees the building they live in as their home territory. The noise from the street intrudes, and there is an absence of personality and identity on the street. On the moderate street answers are inconsistent, as some residents feel as on the heavy street, seeing only their apartment or building as home, where others see some or all of the street as their home territory as well. On the light traffic street most residents see the whole street as their home territory, and they feel responsible for keeping it clean and friendly.

It is clear that heavy traffic repel people from using the streets, and thereby from meeting their neighbours. On the moderate traffic street, different issues can be a cause for the inconsistency and different views on th street. Some residents have lived there for a long time, and has seen the traffic increase and make the place worse. Newer residents may come from a street with worse traffic and therefor see the moderate street as good. In any case the tendency is that the light traffic street create the best feel of home, with a hight level of liveability.

BOX 4 - FINDINGS ON PRIVACY AND HOME TERRITORY

The fifth and last criteria, *Environmental awareness* (Appendix 6) features a composite illustration of how residents drew their streets from memory. More lines indicate that a feature has been drawn more times. For the heavy traffic streets, there are very few details, and residents describes the streets as monotous. Many cars are pictured. On the moderate traffic street more details appear, with corners and buildings taking shape. On the light traffic street many details appear, such as streets, distinct building shapes and driveways. Residents know each other and likes the variety of people and age. They find it cheerful to see or engage in conversation on the street.

This finding shows, that the more people reside on the streets, the better they remember the details of it. The criteria for choosing these three streets were that they were similar in the building structures, so it is interesting to find the different views that people have towards the look and feel. This shows the overwhelming effect of traffic on the quality of life.

BOX 5 - FINDINGS ON ENVIRONMENTAL AWARENESS

From all five criteria there is a tendency that the light traffic street is the one with the best quality of life, and thereby has a high level of liveability. The findings are summarised in figure 5.0, where the answers on the 1-5 point scale are shown. It is clear that the light street has the most satisfaction in all criteria, and that traffic influence the quality of life on the moderate and heavy traffic street.

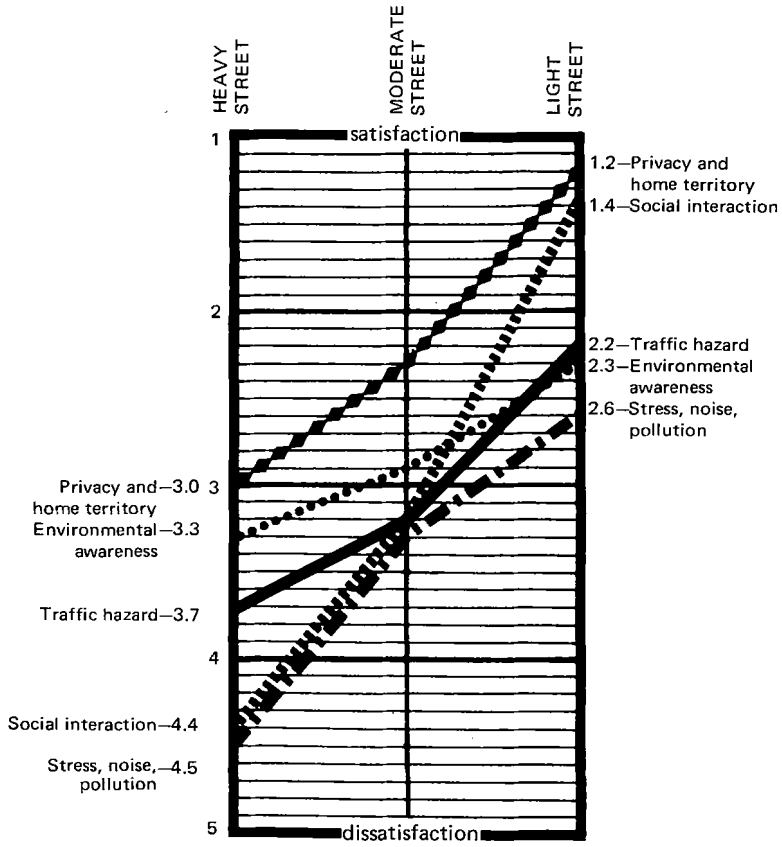

FIGURE 5.0 - ENVIRONMENTAL QUALITY FINDINGS (APPLEYARD AND LINTELL 1972)

Bosselmann, Macdonald and Kronemeyer (1999) adopted the same methods as the study of Appleyard and Lintell (1972) and they summarised the previous findings into a definition of liveability:

1. *"Traffic is an intrusion in a neighborhood and disruptive to the quality of life there.*
2. *A livable street has a balance of owners and renters, and accommodates various sized households.*
3. *It is a place where many people know each other because they spend time out-of-doors on sidewalks, on stoops, or in front yards, thus creating a sense of community and belonging.*
4. *A livable street is also a place that residents know very well, take care of, and identify with as a part of their personal territory" (Bosselmann, Macdonald and Kronemeyer 1999)*

Liveable streets revisited

In 1988 a group of students tested the very same study as Appleyard and Lintell on the same streets (Bosselmann, Macdonald and Kronemeyer 1999). They discovered similar trends, but what they found was that the density of dwellings were higher on the heavy street, than the two others. 27 years after the original study by Appleyard and Lintell (1972) was published, another group of scientists tested the study on a larger scale and decided to include the variable of density (Bosselmann, Macdonald and Kronemeyer 1999). They studied two boulevards in Brooklyn, New York City, and one in Chico, California, with each a moderate and light traffic street nearby. The boulevard street design is different from the original study, thus it has high speed traffic in the center, then a row of trees and then a slow lane for traffic going to the residents, and lastly a side walk, pictured on figure 6.0 (Bosselmann, Macdonald and Kronemeyer 1999).

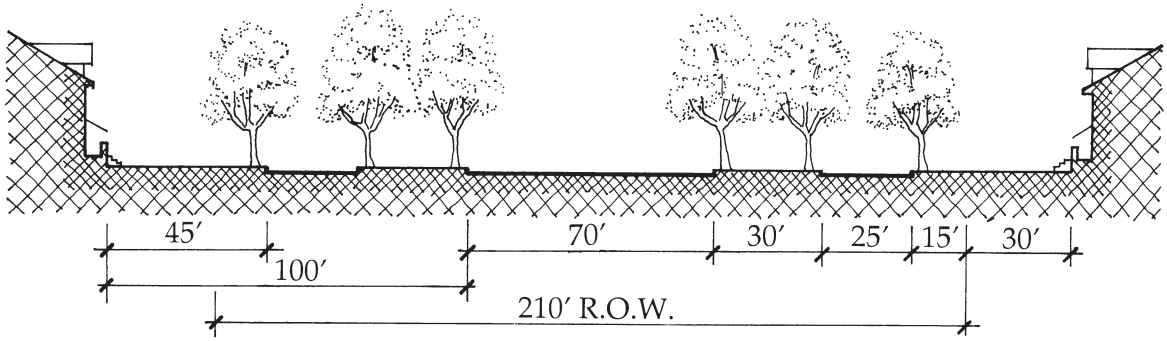

FIGURE 6.0 - ONE OF THE BOULEVARD STREETS IN CROSS SECTION VIEW (BOSSELMANN, MACDONALD AND KRONEMEYER 1999)

As with the original study, they measured the *traffic volumes, speed, and noise* (Bosselmann, Macdonald and Kronemeyer 1999). Their findings was similar to the Appleyard and Lintell (1971), though in two of the three cases, the moderate street had the highest noise level. This might be due to the street design of the boulevard, where both trees and longer distance from houses to the high speed lanes reduce the noise level, though the reason is not included.

Bosselmann, Macdonald and Kronemeyer (1999) used the same survey method as Appleyard and Lintell (1972), though their interviews lasted an average of 20 minutes versus one hour for Appleyard and Lintell (1972). Their sample size is approximately the same as Applyard and Lintell, having 99 responses in total averaging 33 per street group (of three streets), whereas Appleyard and Lintell had a total of 36 for their streets. Their surveys where constructed with less open-ended questions than Appleyard and Lintell, giving the respondents more multiple choice questions. This might be the reason that their interviews were much shorter than of the original study, plus he fact that they needed to conduct almost three times more interviews over the course of a weekend. This means that they have used 33 hours to collect the 99 interviews lasting 20 minutes each, instead of using 99 hours if they had lasted 1 hour each. As a reference Appleyard and Lintel used 36 hours on 36 interviews. This variation might be due to that surveys with multiple

choice questions generally takes less time to answer, though they do not give a reason to why this is.

When the *social interaction* was studied Bosselmann, Macdonald and Kronemeyer (1999) did not find the same results as Appleyard and Lintel (1972). In the first street group the highest number of friends was found on the moderate traffic street, with the lower number on the heat traffic street. In the second group the light traffic streets had the most friends and the moderate the lowest. On the third street the heavy street had the most friends and the moderate the lowest. The result thus are inconsistent and do not correlate with the study of Appleyard and Lintel (1972). Appleyard and Lintel (1972) distinguish between friends and acquaintances and present both numbers, whereas Bosselmann, Macdonald and Kronemeyer (1999) present the two different variables as a total. On the boulevards in Brooklyn, the number of friends were higher or almost as high as on the light traffic streets. In both streets groups the moderate traffic street had the lowest number of friends. The first street group in Chico, California, is a suburban town, and though they studied it to see if the same effects would be present in a suburban environment as in the city, it seems that this is not the case. The high number of friends on the boulevards in Brooklyn, might be due to the significant street design of a boulevard, that the other streets dœs not have. If the increase in friends on these two boulevards are assumed to be because of the different street design, and only the moderate and light trade street are looked at, then the two street groups in Brooklyn dœs follow the same results as Appleyard and Lintel (1972) found. They indicate that a reason for the high number of fiends on the boulevards of Brooklyn, might also be due to the landscaped malls[1]. As in the study of Appleyard and Lintel (1972) they have asked respondents to draw where their friends live on the street (Appendix 10). It is noticeable that on the boulevard, nobody has drawn friends across the road, though they have many friends on the one side of the street. One resident

1 An outdoor mall, often with more greenery than a usual mall.

compliments the scenery of the boulevard, which looks nicer than on ordinary streets (Bosselmann, Macdonald and Kronemeyer 1999).

Regarding *awareness and care* the three boulevards ranked higher or as high as the light traffic streets, when residents where sked about specific details of the environment (Bosselmann, Macdonald and Kronemeyer 1999). A map of residents drawing of specific features, are not included in the study of Bosselmann, Macdonald and Kronemeyer (1999).

The residents though where asked to draw the boundary of their *home territory*, and looking at the boulevards, the territory dœs not extend to the other side of the road, but included the whole one side of the street (Appendix 11).

Two hypotheses can be extracted from this study:

1. The street design of the boulevards, with trees, and distance to the high speed traffic, reduces not only noise, but also invites residents to use the streets and meet one another.
2. The street design of the boulevard, with a low speed lane closest to the houses, and trees blocking the view of the fast center lanes, makes each side of the boulevard be the home territory and thus more similar to a light traffic road, than a normal heavy traffic street.

Summary of the two studies on liveable streets

The study of Bosselmann, Macdonald and Kronemeyer (1999) revisited the methods of Appleyard and Lintell (1972), though the cases where not entirely identical. They have proven that boulevard design, can increase the level if liveability, to be as high or near as high as the generally high level seen on the light traffic streets. Taking point of departure in the definition of liveability found by Appleyard and Lintell (Bosselmann, Macdonald and Kronemeyer 1999), a revamped definition can be made. Only item one needs a revamp, as the others are true for the study of Bosselmann, Macdonald and Kronemeyer (1999).

The findings from these studies are a point of departure in finding a general definition of liveability (Box 6).

2.1.3 The basic needs for liveability

A definition of liveability is much needed, to be able to discuss indicators and measures to improve the apparent liveability.

For an earlier study on liveability, three interviews were made with high-ranking employees from Aarhus Municipality, Denmarks second largest city. When asked what challenges working with liveability pose, Jespersen (2015) responds that there is a problem when discussing liveability in cases, because there is no common perception of the term. How is it dealt with? Willacy (2015) responds that it should be the core of the city, and not just used as a buzzword. Würtz (2015) responds in the same ways as Willacy, and includes that the city should get better while it grows. Both Jespersen (2015) and Willacy (2015) responds that a further study of the term is needed.

Finding a common understanding of liveability

An understanding of liveability should represent the core aspects that are present in every case and every indicator should be measures according to this. The indicators are therefore irrelevant to the definition, though they are important in making liveability operational.

In 1975 a study of inter-urban quality of life measured 132 indicators related to:

1. economic conditions
2. political conditions
3. environmental conditions
4. health conditions
5. education conditions

6. social conditions (Liu 1975 in Pacione 2001).

The criteria found in *2.1.2 Mobility and liveability* by Appleyard and Lintell (1972), had 5 criteria they used to measure the environmental quality of the indicator *traffic*. These are:

1. Traffic hazard
2. Stress, noise and pollution
3. Social interaction
4. Privacy and home territory
5. Environmental awareness

The criteria found by Liu is more general, as they relate to 132 indicators, whereas Appleyard and Lintell's only relate to *traffic*. There is some overlap, but even though Liu's criteria seem more general, it is difficult to see where *traffic hazard* and *Stress, noise and pollution* would fit in Liu's criteria. There is a similarity between Liu's criteria and the three themes in sustainability, being economic, environmental and social sustainability. In the study by Liu, urban cities were studied and ranked, whereas the study by Appleyard and Lintell compared three well-defined streets. It seems that there are different values for different levels of boundary.

For a more general understanding of liveability, van Dorst (2012) has examined the sustainable liveability that emphasise the basic needs for people in an international context, in relation to the physical environment.

"Within a sustainable liveability, we have to address those needs that are essential for the present generation but also for future generations." (van Dorst 2012, 229).

The basic needs are:

1. Health and security (or safety)
2. Material prosperity, income inequality, inequality happiness
3. Social relationships

4. Control
5. Contact with the natural environment (van Dorst 2012, 229-230)

Within these needs, all the criteria from Appleyard and Lintell could fit.

1. *Traffic hazard* and *Stress, noise and pollution* into **Health and security (or safety)**
2. *Social interaction* into **Social relationsships**
3. *Privacy and home territory* into **Control** and **Material prosperity, income inequality, inequality happiness**
4. *Environmental awareness* intro **Contact with natural environment**

Health and security (or safety) is associated with the service of a good health care system, regulations regarding low air, water and noise pollution, a design of public space to allow for opportunities to exercise, have a stroll or bike, as well as authorities ensuring low crime and design of public space to ensure low fear to go out at night (van Dorst 2012).

Material prosperity, income inequality, inequality happiness is associated with diversity, a good community, room for minority groups (van Dorst 2012). People will want to compare oneself with others, and in this regard people tend to cluster with comparable groups of people, within income, lifestyle or culture (van Dorst 2012). Because of this, education and opportunities here fore should also be associated with this need. Clusters are often seen with companies, one of the most famous *Silicon Valley* in California, housing many top tech companies, but the same is trues-for people. In *Beverly Hills* in Los Angeles, rich famous people cluster, in *Harlem* New York, Afro-americans cluster, and in Denmark we see ghettos in all the larger cities, eg. *Brøndby Strand* a suburb of Copenhagen (figure 7.0), *Vollsmose* a district within Odense, and *Gellerup* a district within Aarhus. True for these three danish examples, is that they all have a homogenous group of people, within the same income range, lifestyle and culture. The areas share the same design for public spa-

FIGURE 7.0 - SOCIAL HOUSING IN BRØNDBY STRAND (INSTALLATOR.DK 2013)

ce, as well as the design of the buildings and apartments sizes also are quite similar. Even though that within the perceived liveability people will tend to cluster, it is not recommendable, as it may discriminate minority groups (van Dorst 2012). As the title of this need, is associated with problems, a better title might be *Diversity*, which is something to strive for in both housing sizes, a mix of owners and tenants, employment, age, lifestyle and cultures.

Social relationships is associated with tolerance, associations (sports, banko, music etc.), and social relation to neighbours (van Dorst 2012, Appleyard and Lintell 1972). As studied by Appleyard and Lintell (1972), street design and bad *Health and security (or safety)* can influence the amount of social relations that people have. Tolerance can be achieved both having politicians express a tolerant mindset, but also tolerance in public spaces (eg. old people, handicapped, religious, culture). Associations tend to gather people across any inequality, and they will make for at good community, with people caring for each other. As the title of this

need is focussed on relationships, the title from Appleyard and Lintell (1972) *Social interaction* would fit better to group the needs within.

Control is associated with perceived freedom, individualisation, tolerance and identity (van Dorst 2012). People need to be able to control their social interactions, which can be facilitated by the built environment, but also the physical environment itself (van Dorst 2012). Opportunities to individualise ones territory or ones streets, increases both identity, care for the environment and improves happiness (van Dorst 2012). The title of this need is quite simple, and dœs not imply in a clear way how control is seen. *Control and identity* gives a better understanding of what is included in this need.

Contact with the natural environment is associated with greenery in the urban environment, access to parks or nearby forests (Van Dorst 2012). Elements of water like a stream through the city, harbour bath or beach activities are also included. As discovered in *2.1.2 Mobility and liveability* greenery and trees in the streets can also have an effect on the perceived stress and noise coming from traffic.

Though not on the list for basic needs, Liu (1975 in Pacione 2001) also had *political condistions* as a criterion. The importance of **Governance** is a valuable need, to inspire change and improve liveability. Governance can be on all levels, be it the state, the municipality, an organisation or a local association. Through governance, and often democracy, there is room for liveability to flourish as a vision.

2.1.4 Summary of defining liveability

The findings in *2.1.2 Mobility and liveability* explored a definition of liveability linked with the mobility indicator *traffic* (Appleyard and Lintel 1972). It suggests that traffic has a high influence on the level of liveability achievable for a street, thus the influence can be mitigated by a good street layout, or by reducing the speed and number of vehicles. Though it lacked focus on issues such as *diversity*, the un-

derstanding of liveability formed a base for further exploring the understanding of a general liveability. This definition was therefore compared to the criteria found by Liu (1975 in Pacione 2001). The criteria was found to be almost similar to that of sustainability, but *political conditions* adapted to *governance* was a valid point to include in an understanding of liveability. van Dorst (2012) used the basic needs criteria normally used to rate countries' happiness, and added the perspective of urban planning.

The criteria from Appleyard and Lintell (1972) was merged with the basic needs of van Dorst (2012), and added *governance* to form a general understanding of liveability. To summarise, the understanding consists of the aspects *Health and Safety, Diversity, Social Interactions, Control and Identity, Contact with the Natural Environment* and *Governance*.

This completes the first phase of the experiential approach on observation and reflection, moving on to forming an abstract concept.

2.2 Facilitating liveability concept (FAC)

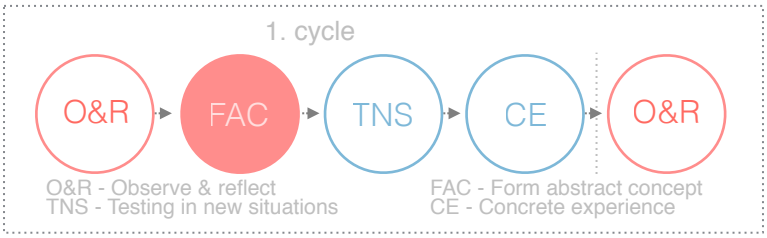

FIGURE 3.2 - STEP 2: FORM ABSTRACT CONCEPT

In this chapter the first draft to a liveability concept is described in as much detail as possible, but without focus on the entire spectrum of indicators. Though these will prove to be very important, the aim of this study is to make a concept, from where the indicators can be operated. This chapter will there adhere to forming an abstract concept within the experiential approach.

2.2.1 Where to begin?

At an early stage of this study, focus group meetings were held with practitioners having experience with liveability and mobility. At the meeting the point of discussion was that they should test out a draft concept, and test the intuitiveness and features. This study will not focus on which indicators are relevant, though indicators are needed for the concept for it to be able to be tested. At the time the draft had no indicators, but was only a framework, and the discussion therefore turned to indicators regarding mobility and liveability (Friis and Petersen 2016). The indicators discussed revolved around a hypothetical case of a street in the center of Aarhus. They presented three presumed indicators, that they thought would be of importance:

1. Modal split - a comparison of different modes of transport
2. Distribution of individuals - what spaces are people using and how

3. Freight efficiency - how are freight delivered and how can it be optimised (Friis and Petersen 2016)

It was discussed that it was important to have in mind what the negative consequences of actions towards better liveability would have, and if the development could be shown in an index. At this time nor the planners or the interviewer had the knowledge to exemplify such an index, but the findings and methods from Appleyard and Lintel (1972) could be one way to measure the perceived liveability before and after change was made. It was discussed that the vision for the draft concept, focused on mobility, was to enhance the use of public transportation and people using bicycles.

To add these presumed indicators to the concept, they must be studied to see how they affect the level of liveability, to be able to advise on how they each should be handled.

The first indicator, *modal split*, could be studied with inspiration from Appleyard and Lintell (1972), as well as Bosselmann, Macdonald and Kronemeyer (1999), using the same methods but swopping the effects of traffic for areas with different division of modal split. Such a study would find the ideal range of modal split for the researched areas, and explore how the effect on liveability is perceived. This could be generalised to be true for similar areas.

The second indicator, *distribution of individuals*, is not linked only to mobility, but is a more general indicator of liveability.

The third indicator, *freight efficiency*, can also use the same methods as Appleyard and Lintell (1972), not only including residents as respondents, but also businesses which receive the goods. The areas studied would be ones which uses different mode of freight. Such a study would find how these modes of freight impact the perceived liveability.

As seen with the study of traffic (2.1.2 Mobility and liveability) a study of a single indicator can be quite comprehensive in itself, and though the indicators found by

the practitioners were meant to be used in the concept, the analysis of doing so will be too comprehensive. Instead the focus is aimed at facilitating a concept with the knowledge presented until this point.

2.2.2 What to include in a concept

To be able to facilitate the understanding of liveability from *2.1.4 Summary of defining liveability*, the data of the area in question, needs to be extracted.

Vision

A vision for change should be explicit, to be able to govern the actual output coming from the work with the concept.

Economy

The vision should be backed by a commitment as to how the initiator plans to fund the changes, and a budget may be described, to better be able to recommend solutions within that frame. The initiator could also state that whatever solutions would be recommended, they would be executed no matter the price.

Scenario and scale of environment

A description of the scenario and the scale is essential for the concept to guide for which indicators are more relevant for each case (combination of scenario and scale).

Of common scenarios are the current types of zoning: residential, industry, business, mixed and greenfield. The vision should describe in which direction the change is heading for the current scenario, eg. an industrial harbour district wanted developed into a new mix of residential and business district.

The scale aspect should determine some ground data for both the current state of the area and in which variation the scenario is. Area size and number of inhabitants clarifies the density of people, where in sparse populated areas some indicators might not be applicable and vice versa.

Demography

Sociœconomic data describing the demography adheres to the need for diversity, and data on age, income, religion, employment, apartment sizes and distribution of owners and tenants gives a clear overview of the citizens within the area. For the case of Denmark, these information are often already known by the municipalities, and can be found in their own GIS maps, but otherwise useful are Geomatic.dk (Geomatic 2016). The data mentioned here is some base knowledge that is of use for choosing which indicators are relevant, though the particular indicator might need more or other data not mentioned here.

Studying indicators

It is often indicators, that are discussed as being liveable or not, and their purpose for liveability is core to making it operational.

"Indicators" are instruments to measure liveability on a particular field. In research the term is also know as parameters, elements, variables and factors.

Inspiration towards which indicators to include can come directly from the vision, but also the research used in this study such as Liu (1975 in Pacione 2001), Pacione (2001), Appleyard and Lintell (1972) and van Dorst (2012). In any case, the indicators selected, need to be analysed, using relevant quantitative and qualitative methods for each indicator. A survey or public meeting is a necessity to both understand the citizens, and give them the chance to contribute with perception of the area. This helps giving them some responsibility for the neighbourhood and will strengthen the social interactions and care for the community.

Generic data on nation, region and city

Some generic data might be applicable for some indicators. To make the easy of use better on the long term, the same data found in *Scenario and scale of environment* and *Demography* should be found for the nation, region and city. With this data, the area in question can be compared to the these data, as a way to indicate insufficiencies that may need extra attention.

If the concept were to be adopted by a municipality, this exercise needs only be done once, as it would be the same data needed in every situation. The municipality or organisation to adopt the concept, is encouraged to update this information every few years, in order to be up to date with the development of the city, region and country.

Much of the information can be found on Geomatic.dk (Geomatic 2016).

How to use results

The output would be a picture of how well the environment in question dœs compared to the city, region and nation by using quantitative data, but should also describe the current situation from the citizens point of view and their thoughts on the vision. This concept analysis would result in proposed solutions oriented towards the specific environment in question, with respect to the political vision (governance) as well as the citizens.

The concept is not directed towards rating cities or neighbourhoods, as the use of this type of information is redundant in improving the liveability of the area. Instead the concept focuses on insufficiencies, action taking and uniting the community and thereby increase the perceived liveability.

2.2.2 Framework for concept

The concept described in *2.2.1 What to include in a concept (FAC)* will be divided into three groups, the first one regarding *Data collection* to get some ground knowledge about the area. The second group is *Vision and commitment* that serves as the driver for the project at hand and relates to what changes are wanted from the underlying basis found from the data collection. The third group includes steps regarding *Action taking* where indicators are analysed and solutions are proposed. An overview of the concept is:

1. Data collection
    1.1. Scenario
    1.2. Scale
    1.3. Demography
    1.4. Generic data on nation, region and city
2. Vision and commitment
    2.1. Vision
    2.2. Economy
3. Action taking
    3.1. Analysing indicators
    3.2. Proposed solutions

First group - Data collection

Step 1.1 - Scenario

The initiator will describe the current situation of the area, by choosing which description is most suitable. Common situations are *residential, industry, business, mixed* and *greenfield*.

Step 1.2 - Scale

The initiator will enter data regarding the *area size* as well as the *population* for the area. The density of the population can then be calculated.

Step 1.3 - Demography

The initiator will describe the demography with data on *age, income, religion, employment, apartment sizes* and *distribution of owners and tenants*. Each will be specified with a certain range to choose from.

Step 1.4 - Generic data on nation, region and city

The data needed here same as for *Step 1.2 - Scale* and *Step 1.3 - Demography*, though instead of adhering to the specific area in question, this data should be for the city, the region and the nation. If the initiator works at a municipality, this data can be reused for other projects as well.

Second group - Vision and commitment

Step 2.1 - Vision

The vision for change is what will drive the process forward. The initiator should answer *why* the changed is wanted and to what extend the proposed solutions will be implemented. If a change in scenario and scale is projected, a description of the new scenario and scale should be included in the vision.

Step 2.2 - Economy

This step is meant to describe what commitment the initiator is able to provide. A budget may be provided to describe the investment in the project. If possible each solution should propose how much it would cost to implement, which can direct which indicators will be proposed as solutions.

Third group - Action taking

Step 3.1 - Analysing indicators

Each indicator should describe the method for analysis, beyond what is already known. A public meeting should be held, to present preliminary evaluation of the presumed liveability, and the citizens will then be able to comment and contradict the preliminary findings, expressing their perception of liveability.

A challenge arise for the concept at this point, as to how many indicators to use. Earlier trials in creating a concept for sustainability started with 58 indicators, but proved too complex. After tests in practice it was changed to first 51 indicators, and lastly a version 2.0 with 23 indicators, making it more operational (Realdania 2016). This liveability concept will take point of departure from these learnings, and aim for around 25 indicators to be used.

Step 3.2 - Proposed solutions

From the studies of the indicators, solutions can be proposed. They should be described with these elements:

- what can be achieved
- what are the downsides
- what is the estimated cost of implementation
- suggestion for implementation schedule

Ideally every solution is implemented, but it will rely on the initiator to choose to do so, or select among the proposed solutions. Maybe the improvement will be to small for it to be worthwhile, or the budget is limited. If the scenario is greenfield, the solutions is hopefully all implemented, as the are will be planned simultaneously.

2.2.3 Summary of facilitating the concept

In this chapter the knowledge found in *2.1 Towards defining liveability* was reinterpreted into tangible elements that enables the user to study the liveability of an area. These elements were then again formed into a framework with concrete steps, as a suggestion for how to use liveability operational. The concept is now at a point where indicators to be used in the concept need to be decided on, and afterwards the concept is ready for testing.

When the concept has been tested, an alternative entry system could be developed to ease the use. If an online system were created, so that the user on a map selects the area in question, then the system should hold all the data that are entered in group one - data collection. This way the user would move forward more quickly, making it less time consuming.

2.3 Discussion of findings

The found definition of liveability is based on two case studies on liveable streets and two studies on the basic needs for liveability. The approach towards liveability is the ecological approach, which studies the interaction between the individual human being and its environment. This approach is deemed best suited for a study on liveability in correlation with urban planning, as it is the environment in which the human lives, that can be changed through urban planning. Other approaches were also presented (Pacione 2001), though some of these has a closer correlation to sociology and psychology studies.

The definition found is therefore a valid assumption of what is the core within liveability, trying to explain indisputable elements.

The use of the definition on the other hand is highly disputable and the concept found here, with its aspects and steps towards finding liveable solutions to urban planning problems, is not effectively the only way to use the definition. What the concept is, is a valid suggestion as to how a liveable solution can be found, when working with this definition. The cities and technology are in constant change, and therefore liveability will need to be change with it. The concept and the indicators use with it will have to be discussed by both researchers and planners to be improved over time, as both the tendencies in cities change and cities get smarter.

This study is aimed at solving the problem of both how discuss what liveability is, as a definition of the term is not well known, and how to process this into being operational. The concept would not have been the same if an other approach had been used, and therefore the perspective of the ecology approach is eminent. The concept is on an early stage, and improvements will most possibly be made by further studies, though it is usable as a point of departure.

The concept is almost ready for the next phase in the experiential approach , being testing in new situations. Though first the indicators will have to be found an analysed.

3. Conclusion and reflection

In this chapter the conclusion will be presented followed by reflections on the study and suggestions for further studying.

3.1 Conclusion

The conclusion follows the structure of the research questions, first answering the work questions *How can a general comprehension of liveability be made?* and *How can the definition be made operational?*, to be able to answer the research question *How is liveability defined in the context of urban planning and how can it be facilitated into a tangible concept?*.

In *2.1 Towards defining liveability* liveability were explored to consist of perceived, apparent and presumed liveability. Perceived liveability is how the individual perceives their environment, where the presumed liveability is what presumed to improve the liveability. Eg. an element can be improved in an environment, but the element has no concern for the individual, the apparent liveability was not improved. The apparent liveability is the perfect balance between perceived and presumed liveability, so effectively a balance between how planners shape the environment and how this is perceived by the individual. To be able to find this balance a knowledge database have to be built for the use of liveability, effectively the concept formed in *2.2 Facilitating liveability concept*.

How can a general comprehension of liveability be made?

Liveability is not currently a well defined term, and within an urban planning context it is seeing rise in its popularity among politicians and urban planners. Though it is something that they want to improve in their city, they are vague in

when trying to describe the term, and it may be used as a buzzword in a political agenda.

The findings from *2.1 Towards defining liveability* proves that mobility and liveability has a correlation in finding solutions towards problems related to traffic, and an understanding of liveability is formed based on the mobility studies and a literature review. One study showed that the higher amount of traffic, effecting noise, pollution, and safety, the lower the perceived liveability is. Another study revisited the methods, but used different case streets, including high traffic streets with boulevard design, instead of normal conventional streets. This proved to improve the perceived liveability compared to a normal street design, and the boulevard design was concluded to be one solution to both allowing for high traffic streets and still have a relatively high perceived liveability.

The definition of liveability used in the mobility and liveability studies, was examined within the ecological approach and from the analysis on understandings of liveability a definition was formed to include the aspects *Health and Safety, Diversity, Social Interactions, Control and Identity, Contact with the Natural Environment* and *Governance*.

Good *health and safety* should be ensured through a good health care system and actions towards low air, water and noise pollution should be taken. The environment should ensure low crime and fear at night. A good community aims for *diversity* in income, education, housing conditions, lifestyle, age, culture and religious beliefs. *Social interactions* within the diverse community should ensure tolerance and good relation to neighbours. Having a range of association activities for the community to engage in, strengthens the social relations and care for the community. To be able to influence and personalise the local area, a sense of *control and identity* should be given to the citizens. This ensures a perceived freedom, and the identity of the physical environment can flourish by enabling creative minds. *Contact with the natural environment* like urban gardens, parks, forests or

water elements ensure a richer quality of life, and brings more life within the built environment. To leave room for ideas to flourish and become integral in the community or development plans, good *governance* should be ensured on both political levels as well as in association activities.

How can the definition be made operational?

The aspects of the definition gives a good understanding of how liveability should be interpreted within the context of urban planning, but the definition itself is not operational.

The core of the concept relies on the study of indicators, and the use of the knowledge that these provide. The target group of users are urban planners working in a municipality, architects and consultants, though its actual use may be of interests for a variety of organisations too. The indicators to be studied should be related to the six aspects of the definition, though they may relate to more than one aspect, making a strict framework with eg. five indicators for each aspect undesirable. From experience working with a concept for sustainability, a tangible amount of indicators are approximately 25, as too many makes it too complex to fathom. A study devoted to find the most relevant indicators has to be executed, taking point of departure in the definition found in this study.

The aim for improving liveability is to exceed mediocrity on as many indicators as possible. To excel on a few indicators, will not necessarily improve the liveability, as it is the combined perception of liveability, that makes the difference. A high crime district would not be perceived as liveability, even though the streets were designed to be so on other aspects. A metaphor for this is to picture a wooden barrel where each wood board represents an aspect of liveability. The longer the board, the higher the quality of liveability is. If water was poured into the barrel - the water representing the total combined liveability - the water would run out near the lowest board, making the total quality of liveability only as high as the lowest

aspect. Therefore all aspects must be entertained with the same level of attention to uphold the highest quality of liveability.

How is liveability defined in the context of urban planning and how can it be facilitated into a tangible concept?

Though it is the indicators that are core to analysing the liveability, their usability is facilitated through the forming of a concept. The concept is constructed with ease of use in mind and consists of eight steps guiding the user to obtain the relevant data needed to analyse the liveability. The eight steps are divided into three groups of *Data collection, Vision and commitment* and *Action taking*.

Data collection includes four steps that describe the area in terms of scenario, scale and demography. These form some base data about the area, that is of use when working with the indicators and solutions. The scenario represents which type of area is analysed, being either residential, business, industry, mixed or greenfield. Scale represent number of residents, area size and density of people. Demography describes the diversity of people, collecting data on age, income, religion, employment, apartment sizes and distribution of owners and tenants. The fourth step is collecting data on the nation in the same fields.

The group *Vision and commitment* consist of two steps, vision and economy. The concept is built on the desire for change for an area, and this is described as the vision. The vision is based on the knowledge found in *Data collecting*, giving the user a basis to describe where changes should be focused. The economy step, should describe how the vision is planned to be funded, and thus committing to the project.

The third group is *Action taking* and consists of analysing indicators and proposed solutions, utilising the information from the first two groups. A public meeting will help understand the citizens view on the matter of the vision as well as how they perceive the indicators. After a public meeting, the indicators can be analysed according to the methods applicable to them, and a sound conclusion can be fo-

und for each one. From the analysis of indicators, proposed solutions can be found utilising the information found in all three groups. They describe what can be achieved, what the downsides are, what the estimated cost of implementation is and a suggestion for an implementation schedule.

The solutions found will have sound basis in liveability, and will have to be found by the user knowing the context. A final and complete concept can pose suggestions as to which solutions is advisable, but the solutions cannot be computed to a specific result.

3.2 Reflections and further studies

The concept is based on the understanding of liveability and is assumed to be useful for the practitioner and is assumed to improve the liveability. These capabilities need to be tested thoroughly before the concept can be recommended as a good solution. But before such tests can start, a sample database of presumed indicators needs to be produced, and each indicator will then have to be evaluated as to which methods are best for each particular indicator. Such a study also needs to evaluate each indicator in correlation with scenario, scale and demography in order to correctly recommend solutions towards liveability. Different from sustainability which is defined as social, economic and environmental sustainability, which has indicators attached to each of these three aspects, the liveability definition is a way to study indicators and examine their influence on all six aspects to determine how it influences the environment in good and bad ways. The example with traffic from the study of mobility, would have a bad influence on health and safety if traffic was high, though the streets allowing for this traffic enables the individual to drive the city by car and thus improving control. The issue is the same with the solutions, where one solution might solve several challenges, but also have a negative effect on others. The challenge with using this knowledge and provide good solutions need further studying to provide a good method for presenting the results. A presumption can be to use a simple SWOT analysis (Ctb.ku.edu 2016), to analyse how the solutions do within the definition and which indicators the solution is based on.

As well as further studies on the concept itself, studies to find the relevant indicators also need to be executed. From the study on mobility, the cases used took place in USA, and a similar study could be interesting to do in Denmark, to see if the same tendencies occur.

The further studies of the concept should also explore how to improve the ease of use for the concept. It can take the form of a folder, or an online tool, but in this

age where a smartphone is almost a necessity, a combination of an online tool and an app to be used when analysing indicators, could be interesting to study.

Within the experiential approach used for this study, only *observation & reflection* and *forming abstract concept* was covered. This study was aimed to form a liveability concept, leaving out the focus of studying particular indicators to be included in the concept. When a future study of the indicators have been done, the *testing in new situations* phase can start in collaboration with planning practitioners, testing the concept on an actual case. After testing the *concrete experiences* can be evaluated, and the cycle can start again, making improvements on the concept.

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Appendices

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4. Social interaction (Appleyard and Lintell 1972)
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Appendix 1

Interview guide

Erik Jespersen, Direktør for Teknik & Miljø

1. Hvorfor er liveability kommet på dagsordenen i Aarhus?
2. Hvilke udfordinger ser du i at arbejde liveability?
3. Mener du at der kan udarbejdes en "plan" for liveability på hele Aarhus by, som kan danne en slags ramme og lette arbejdet med liveability i konkrete sager?
4. Ser du et behov for øget forskning af begrebet, og hvordan liveability skal håndteres i forskellige scenarier?
5. Mange personer har forskellige holdninger til hvad liveability er. Bør der holdes et større møde/workshop blandt medarbejderne, for at få en bedre forståelse af begrebet?
6. I det fremtidige arbejde med liveability i kommunen, er det så din forhåbning at blive fri af at skulle bruge konsulenter i arbejdet med liveability?
7. Rambøll's liveability værktøj har over 200 indikatorer. Vil det som kommune være interessant at få adgang til et mere simpelt værktøj, som gør den kommunale medarbejder i stand til selv at arbejde med begrebet i et givent projekt?
8. Ser du en sammenhæng mellem liveability og vækst?
9. Mener du at liveability hjælper til branding af byen på nationalt og internationalt plan?

Appendix 2

Traffic hazard (Appleyard and Lintell 1972)

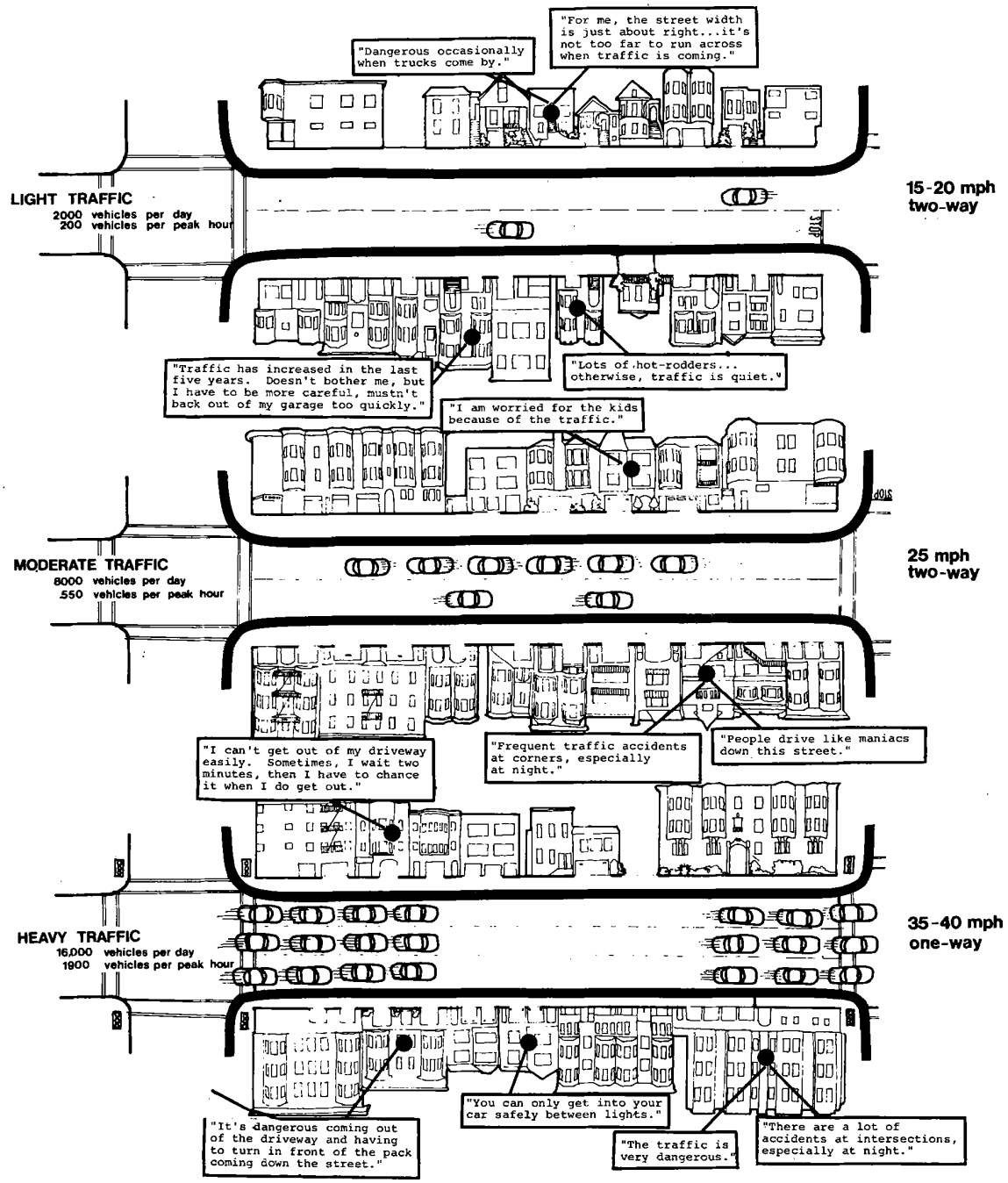

FIGURE 4 *Traffic Hazard*

Appendix 3

Noise, stress, and pollution (Appleyard and Lintell 1972)

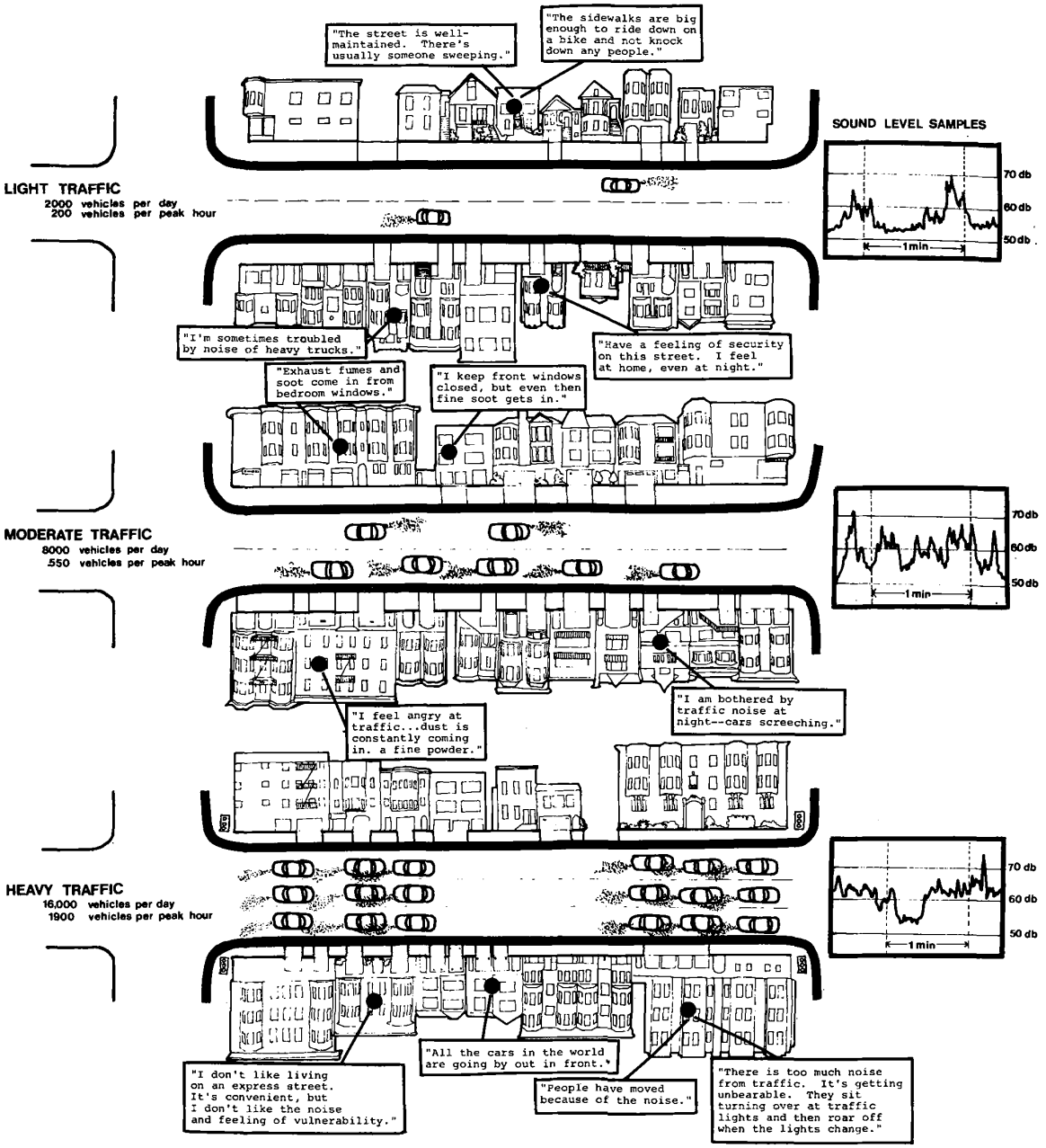

FIGURE 5 *Noise, Stress, and Pollution*

Appendix 4

Social interaction (Appleyard and Lintell 1972)

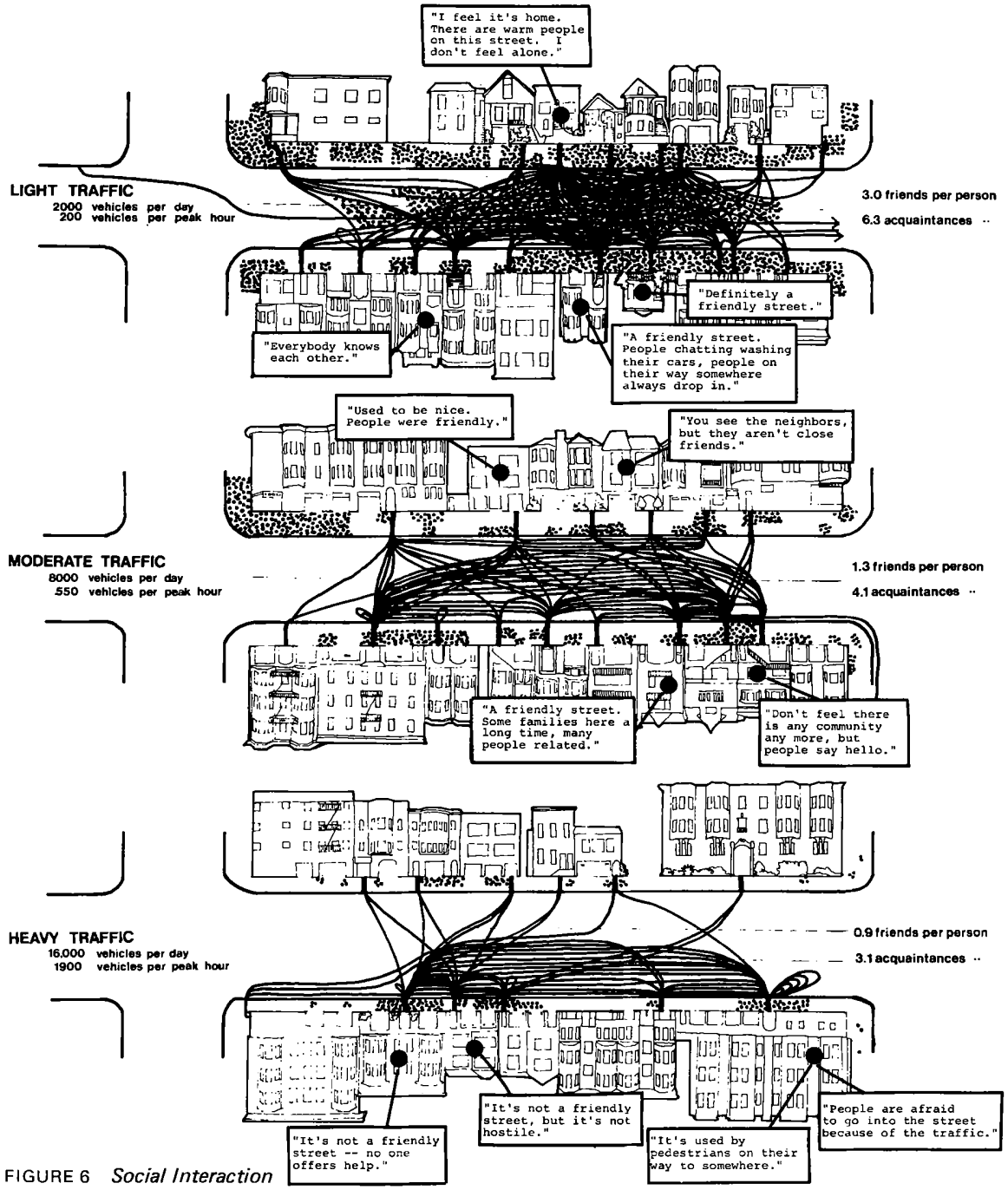

FIGURE 6 *Social Interaction*
Lines show where people said they had friends or acquaintances. Dots show where people are said to gather.

Appendix 5

Home territory (Appleyard and Lintell 1972)

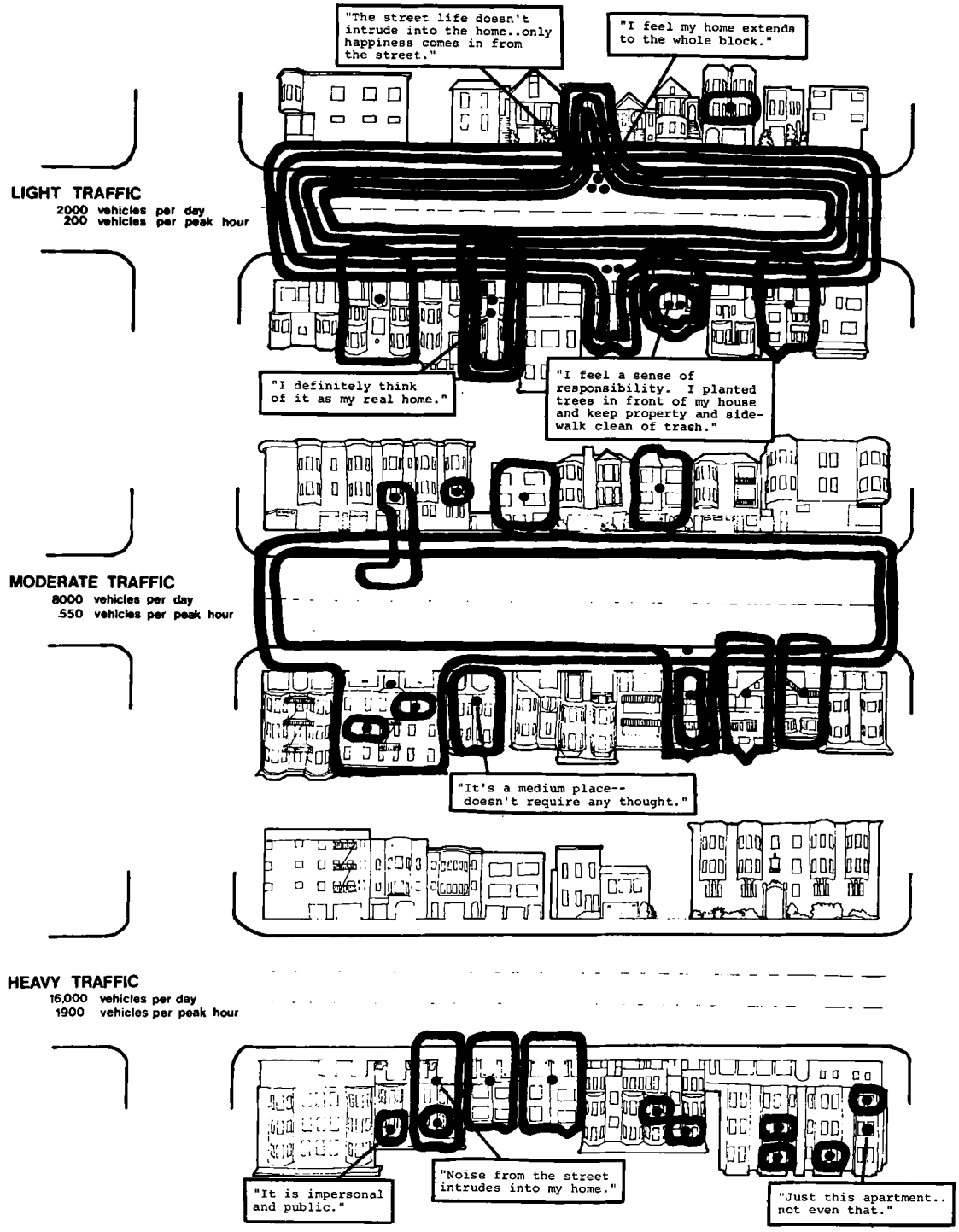

FIGURE 7 *Home Territory*
Lines show areas people indicated as their "home territory."

Appendix 6

Environmental awareness (Appleyard and Lintell 1972)

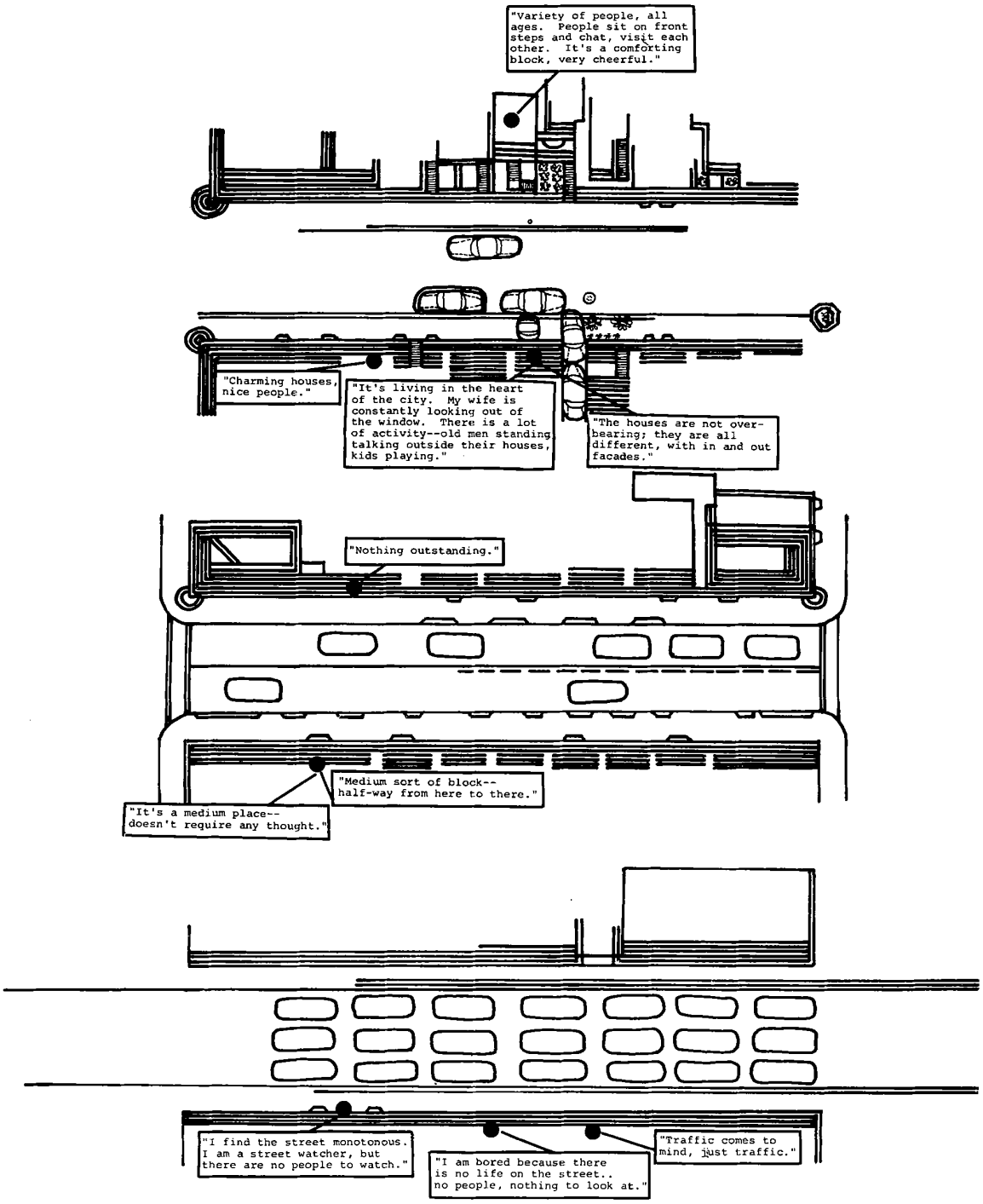

FIGURE 8 *Environmental Awareness*
Composite of maps people drew of their streets. Lines indicate number of times feature was drawn by residents.

Appendix 7

Boulevard cross sections (Bosselmann, Macdonald and Kronemeyer 1999)

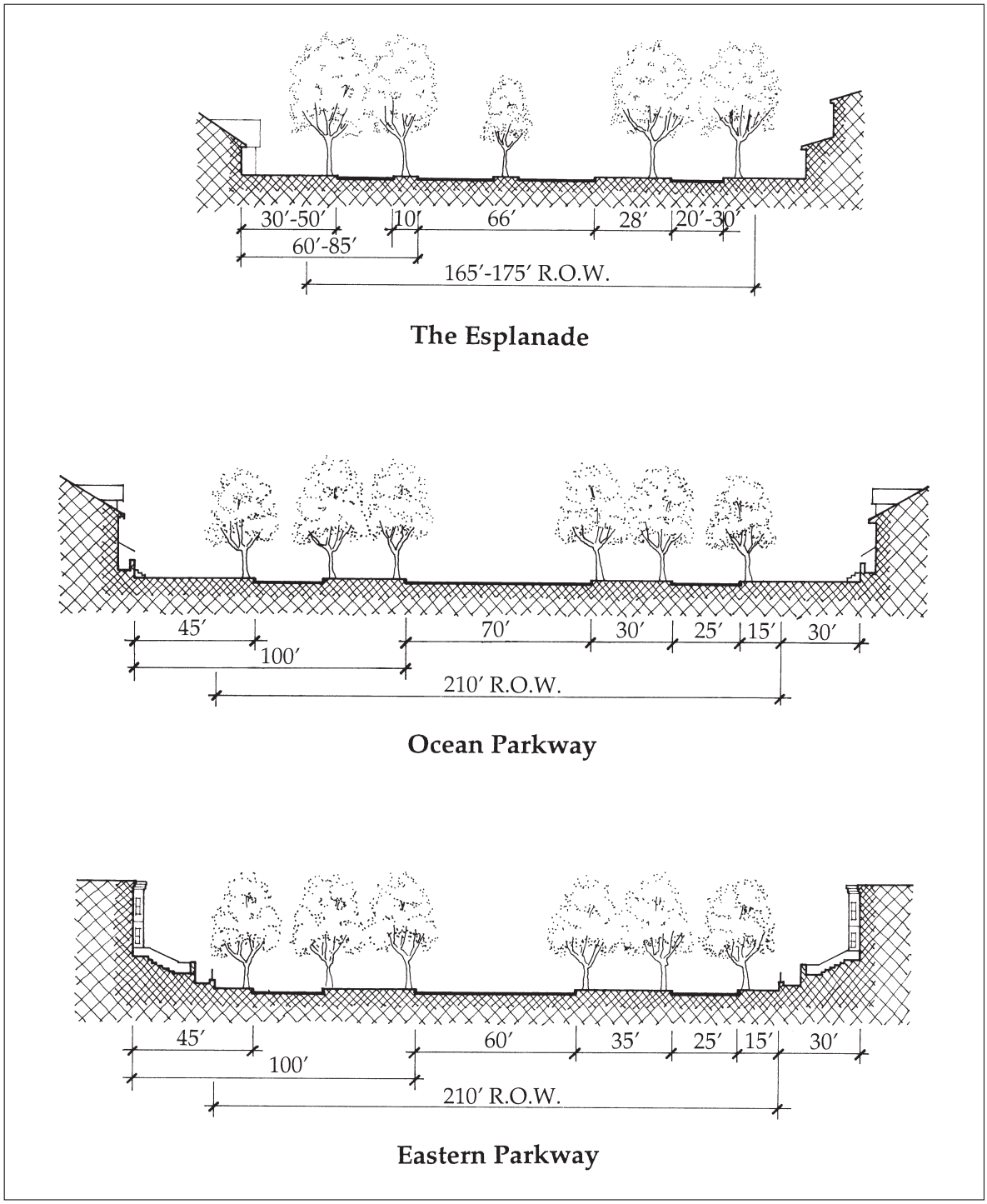

FIGURE 1. Boulevard cross-sections.

Appendix 8

Traffic volumes etc (Bosselmann, Macdonald and Kronemeyer 1999)

TABLE 1. Traffic volumes, vehicle speeds, and noise levels: Esplanade, Ocean Parkway, and Eastern Parkway street groups.

Street	Average Daily Traffic Volume	Average Vehicle Speed	Noise Level (Percent of time > 65 decibels)
Esplanade	**24,200**	**37 mph**	**45.3%**
East First Street	14,500	32 mph	64.9%
Laburnum Street	80*	25 mph	0%
Ocean Parkway	**42,040**	**35 mph**	**14.7%**
Avenue P	13,480	22 mph	57.1%
East 7th Street	1,120	17 mph	0%
Eastern Parkway	**44,440**	**27 mph**	**48.6%**
St. John's Place	4,000**	27 mph	15.8%
Lincoln Place	1,520	10 mph	0.8%

*Low traffic volume was due to the suburban nature of the neighborhood.
**Highest traffic volume on any nearby residential street.

Appendix 9

Social interaction etc (Bosselmann, Macdonald and Kronemeyer 1999)

TABLE 2. Neighborhood friends and acquaintances: Esplanade, Ocean Parkway, and Eastern Parkway street groups.

Street	Average Number of Friends and Acquaintances
Esplanade	**1.9**
East First Street	3.6
Laburnum Street	2.7
Ocean Parkway	**4.5**
Avenue P	2.3
East 7th Street	5.5
Eastern Parkway	**6.3**
St. John's Place	3.3
Lincoln Place	4.7

Appendix 10

Social interaction
(Bosselmann, Macdonald and Kronemeyer 1999)

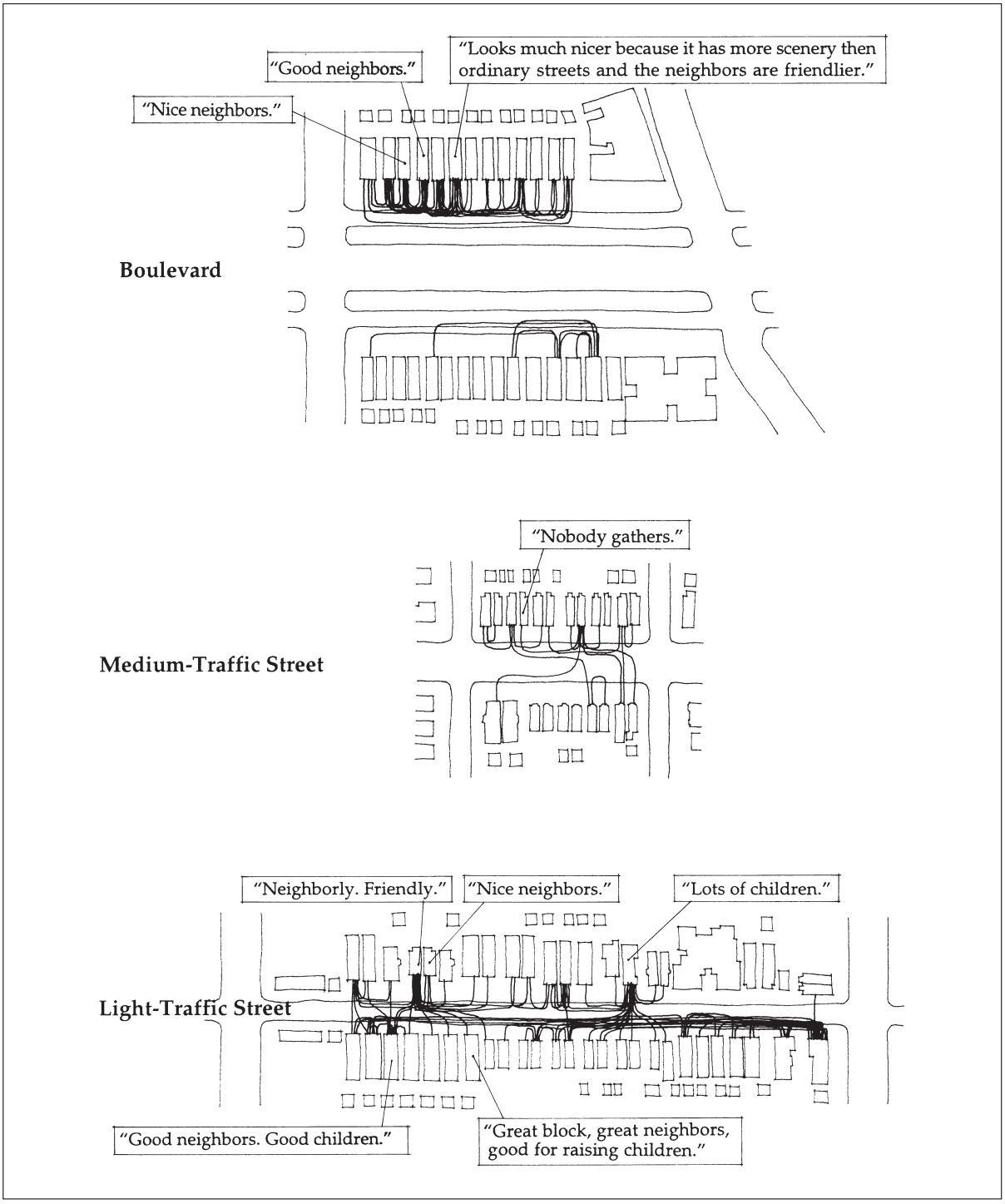

FIGURE 2. Composite maps showing location of residents' neighborhood friends and acquaintances: Ocean Parkway street group.

Appendix 11

Home territory
(Bosselmann, Macdonald and Kronemeyer 1999)

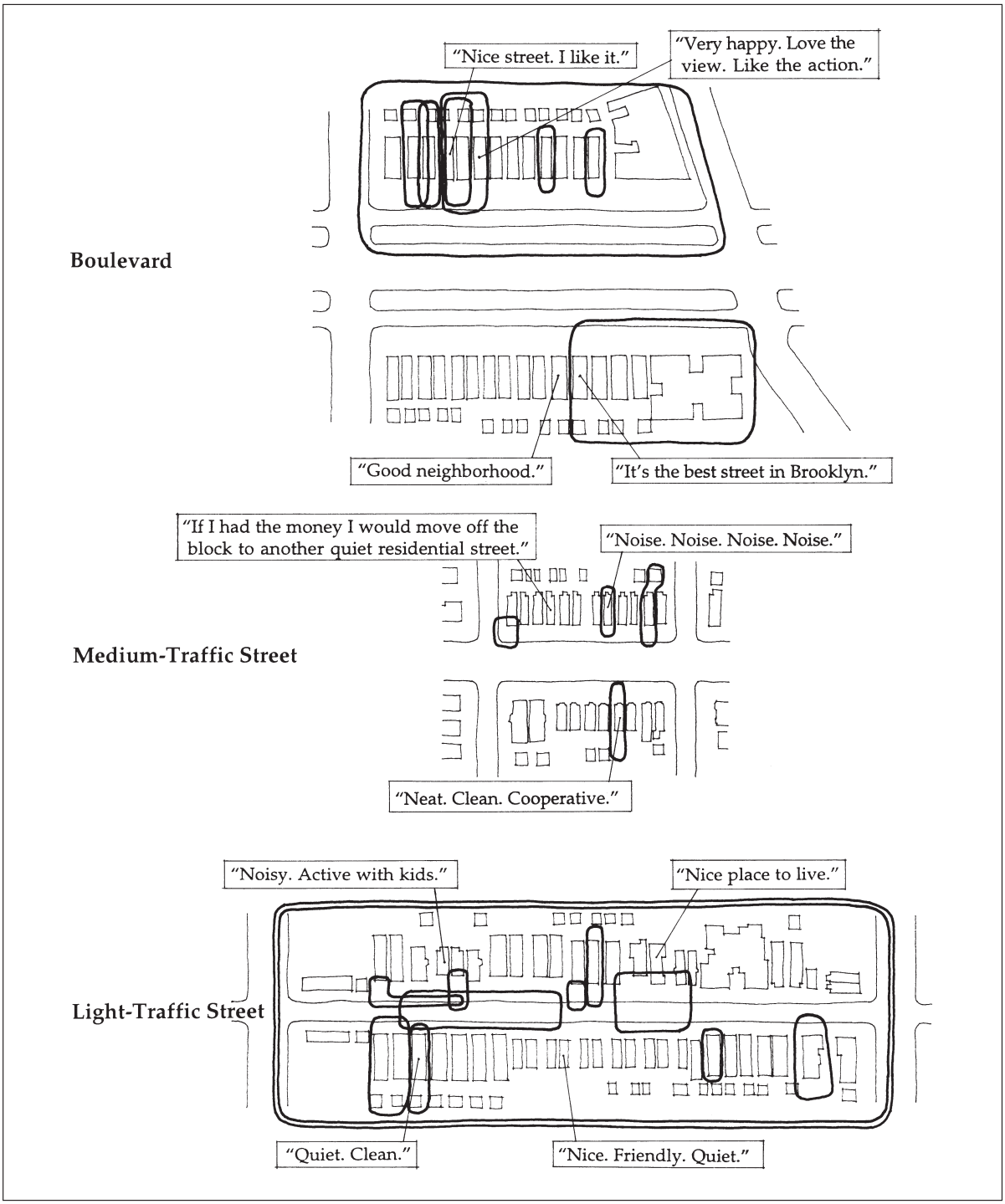

FIGURE 5. Composite maps showing what residents considered their home territories: Ocean Parkway street group.

Appendix 12

Page on liveability from the original corporate plan for Environmental and Engineering Management of Aarhus Municipality (2015)

2015

Liveability

Vi skal gøre byvækst og fortætning til en vinderdagsorden, ikke mindst lokalt i de områder, hvor byen vokser.

Byens vækst giver os muligheden for at gøre Aarhus mere "liveable".

Vi skal tænke liveability ind i sammenhæng med alt, hvad vi gør.

Det kan handle om at skabe flere fælles grønne og blå rekreative arealer eller flere levende og attraktive byrum, når vi i øvrigt udvikler byen. Eller det kan handle om, at aarhusianerne skal opleve et større medejerskab til vores fællesarealer.

I 2015 former vi en fælles udviklingsramme for arbejdet – bl.a. i form af City Lab, liveability-målinger og 360 graders perspektiv på byudvikling.

"Vi skal forene høj levestandard og livskvalitet mens Smilets by vokser"

STØRRE PLANER PÅ VEJ	2015	2016	2017	2018
Fælles udviklingsramme				

2016

Liveability

Vi skal udnytte byens vækst og forandring til at gøre Aarhus mere "liveable", og vi skal gøre det, så det bliver en vinderdagsorden, ikke mindst lokalt i de områder, der forandres.

Liveability skabes gennem de kulturelle, sociale og fysiske aktiviteter i byen, via et godt samspil mellem byens aktører og på baggrund af god byplanlægning. Liveability handler om, at byen i dag skal være skøn at være i, men også at vi skaber rammerne for, at den i morgen er lige så rar at leve i. Vi skal tænke liveability i sammenhæng med alt, hvad vi gør.

I 2016 udbreder og forankrer vi den fælles forståelsesramme for arbejdet med liveability.

Konkret vil vi:

- Indtænke liveability i vores daglige opgaver.
- Udvikle arbejdet med liveability i forhold til udvalgte opgaver (kommuneplanlægning, byplanlægning, kommunal arealudvikling, almene boliger, byggesager og byrum)
- Gøre liveability til en del af et værktøj til 360-graders perspektiv på byudvikling.
- Udvikle et koncept for Aarhus' Liveable City Lab – et bylaboratorium, som på sigt bliver en del af vores nye hus i Gellerup.

"Vi skal forene høj levestandard og livskvalitet mens Smilets by vokser"

STØRRE PLANER PÅ VEJ	2016	2017
Udbredelse/forankring af den fælles forståelsesramme		

Indsatsområder

Hjem igen