”Landscape is presented as a place of escape from the ills of the present and anxieties about the future”

(Corner 1999, p. 9).

NATURAL GROWTH

A LANDSCAPE APPROACH TO GROWING THE FUTURE SUBURB

NATURAL GROWTH

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ABSTRACT

The planners' or urban designers' challenge is to bridge from vast empty lots and hectares, to future becoming of a vibrant suburban environment with flourishing social life, interaction between inhabitants, buildings and landscape and a societal anchorage to the location. Another challenge of the urban planner is to account for the impact of expected climate changes

One can ask: Is it possible to combine these challenges and make a long-lasting attractive suburban development that continuously attract new dwellers and satisfy existing inhabitants?

This master thesis deals with the initiatives and desires to regenerate suburbs and suburban developments in Denmark. The thesis is motivated by a belief of a process-minded method on growing the future suburb, letting it gradually flourish from its existing settings. The master thesis works with the boundless city (den grænseløse by) by applying a landscape urbanism approach, where the landscape is used as the central and integrated element in the becoming city.

In 'open field' suburban projects, large and dense settlements are commonly hinged onto very small rural villages. Often, this is controlled through either long-term and stable master plans, allowing little space for future change and what might come or incremental zoning plans with no long term strategic scope. This thesis is a debate contribution to solve the design and planning challenges for suburban developments of the future

This master thesis uses Lisbjerg, a suburb of Aarhus, as a case study for how regeneration of suburban living and the rethinking of future rural extension and dense suburban settlements can be integrated into a process oriented approach. The thesis is an independent contribution to the 'Lisbjerg Bakke project' with a suggested approach for the development of the suburb Lisbjerg near Aarhus.

The master thesis will attempt to unleash Lisbjerg from the stereotypical category of the suburb. It will make Lisbjerg to an "ever" expanding landscape city. It will seek to preserve important landscape elements of Lisbjerg and its surroundings as well as introducing new recreational and functional landscape elements.

In the future Lisbjerg, dense contemporary dwellings and experimental practices will meet nature in a process of creating a spatial synergy. Phasing and porosity of the layout is considered to ease, as well as add to the uncertainty of the course of development, and for enhanced changeability of spaces in relation to future demands of the suburb. Therefore, future suburban Lisbjerg is grown out of its existing settings, from the hilltop and down. Challenges of rainwater management on a sloping terrain becomes an opportunity to create coherency between the existing village and the new rural extension.

CONTENTS

PREFACE

This master thesis is completed by Cecilie Lehmann Egeblad and Katrine Støtt Bøjer, as part of Urban Design at Aalborg University, Department of Architecture, Design and Media Technology, Architecture and Design during the period of February 1st to May 18th, with final examination in May 2017.

This master thesis uses Lisbjerg, a suburb of Aarhus, as a case study for how regeneration of suburban living and the rethinking of future rural extension and dense suburban settlements can be integrated into a process oriented approach.
This thesis is an independent contribution to the 'Lisbjerg Bakke project' with a suggested approach for the development of the suburb Lisbjerg near Aarhus.

The official development plans for Lisbjerg has been under political debate during the term of this thesis and therefore not released to public. This master thesis is therefore completed with no restrictions to the latest development plan. The intent of this thesis is to bridge between master planning agendas and almost 'autonomous non planning agendas' in a context that would allow plans, behaviour and needs to evolve.

ACKNOWLEDGEMENTS

We would like to thank our supervisors from Aalborg University: Simon Wind and Thomas Ruby Bentzen, whom have provided us with great guidance and knowledge throughout the master thesis. A special thanks to COWI employees: Claus Otto Nielsen and Lisa Bak Rasmussen, for providing us with external guidance, insight and material on the development of Lisbjerg, and Lars Frederiksen for setting us up with Scalgo Live. Finally, a thanks to Bofællesskabet Horsager, who kindly invited us to stay for a common dinner of homemade sushi at our meeting with them.

ill. 1 Aerial view of Lisbjerg and Aarhus

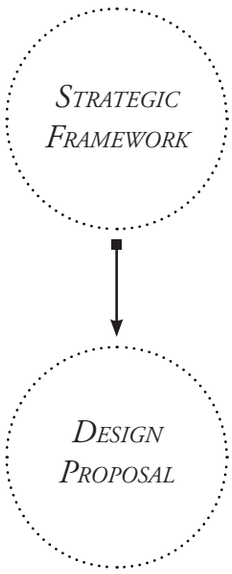
INTRODUCTION

GROWING FUTURE SUBURBAN LIVING

Urbanisation has caused continual expansion into the suburban landscape, and very large and dense settlements are often hinged onto very small rural villages. Often, this is realized through long-term and stable master plans, allowing little space for future change and what might come. In principle, the targeted areas need sense of place and anchorage. What attracts one to live in one of these suburbs?

This master thesis is motivated by a belief of a process-minded approach to growing the future suburb, letting it gradually flourish from its existing settings. The thesis works with the boundless city (den grænseløse by) with a landscape urbanism approach, where the landscape is seen as a leading and integrated element in the city. Plans of this master thesis consider a site's processes and tries to find itself positioned between non-planning and masterplanning, without a terminal point and applicable for many processes of change. Plans may explore the 'becoming', but final results and demands may change over time. The future is often not as we may have imagined.

The master thesis takes point of departure in the regeneration of suburban living and the rethinking of future dense suburban settlements, exemplified through the rural extension of Lisbjerg, Aarhus. Lisbjerg is interesting as a site case study, because of its hilly terrain, rainwater challenges and manifold landscape types in proximity to Aarhus. The thesis investigates the opportunities of landscape and nature in relation to growing future, suburban living.



ill. 2 Thesis structure

READING GUIDE

This report is divided into two larger chapters: Strategic Framework and Design Proposal. Each of these are divided into sections. The sections are numbered for the reader to follow the hierarchy and each section will have a small introduction to its content.

The Strategic Framework shapes the foundation for the project, through analysis and research on themes related to designing future, suburban living.

Firstly, the chapter introduces the master thesis scope and motivation. The reader is provided with an introduction to the research conducted on the theme of suburbs and suburban living. In relation to this, four reference projects are presented. Next, a section elaborates on a more in-depth introduction to the future suburban site of Lisbjerg, Aarhus. In addition to this, an introduction to the existing village Lisbjerg is presented, introducing the site specifics and issues of rainwater management. An outline of the municipal visions for the suburban development project. This leads to the vision, research question and methodology of this thesis. The following section introduces applied theory investigating the fluid city, the nature of a place, good urban form and social spatiality. The strategic framework is lastly narrowed down to five essential design parameters.

The Design Proposal presents the reader with the design proposals for future suburban living in Lisbjerg. First, the reader is presented with the three overall themes. Next the reader is presented with the three zones of growth, which explains procedure of development and the geographical context in which three detail proposals are positioned. A conceptual section timeline presents the staging of suburban living in Lisbjerg, before the reader is presented with conceptual plans and sections for all three details.

Lastly, an appendix will contain a transcript from interview, municipal illustrations and calculations on rainwater management.

In addition to the report, there is an attached drawing folder.

1.0 STRATEGIC FRAMEWORK

This chapter presents the development of a strategic framework, leading to recommendations for a future rural extension of Lisbjerg.
The chapter introduces to the perspective of the master thesis, firstly by introducing to the theme of danish suburbs and the discussion of which this master thesis origins: the suburban regeneration. Secondly, by presenting an outline of trends in suburban living, and the tendencies and challenges of current suburban projects.

The chapter presents the site of Lisbjerg, its potentials and challenges, and the municipal visions for the suburban project 'Lisbjerg Bakke'. This leads to the vision and research question of this thesis and the methodological approach. Finally, applied theory is presented, investigating the fluid city, the nature of a place, good urban form and social spatiality.

The strategic framework is narrowed down to five essential design parameters.

Ill. 3 Lisbjerg open fields

THE SUBURB

In perspective

The traditional suburb

What we may recognize as the suburb inherits from the post-industrial era. The suburbs arose as a necessary alternative to the unhealthy living in the dense, industrial city. (Jørgensen 2013) The idea came from the enthusiasm of the English Garden Cities, advocating separation of functions and green for all. A place where nature and community could be aligned. Ebenezer Howard's original concept of the Garden City was widely spread through the western world. From this concept, the leading disciplinary ideologies of the suburb was born. After the second World War, the suburb was seen as the central concept of the welfare state. Quickly, moving to the suburb became an evidence of moving up the social ladder. (Ibid.) Since then, the status and understanding of the suburb has changed. (Kvorning et al 2012)

From the notion of a "suburb", the suburban area is defined as something relative to the central city. It is understood that these are something *subject to the city*. (Kvorning et al 2012) The ideals related to the suburb has undergone many changes since the post-industrial age, and these changes are for example seen in the many adjustments of the Copenhagen 'Finger Plan' through the decades (Ibid.).

Characteristically, suburbs are seen as dependent on the urban centers. This is from the perspective that the urban centers contain all the general urban functions. A larger urban area is typically defined by the historical urban center, because of its history and symbolic significance. (Ibid.) Expansions of the suburban areas caused a re-definition of post-industrial suburbs in the 1960's, as "independent and self-functioning cities with own centres". (Ibid.)

In recent years, the ideals of what created the suburb in the post-industrial age has changed in favour of the dense city. The suburbs have grown closer to their larger regional cities and have created large polycentric urban areas in the Danish landscape. This has made it more difficult to define 'the suburb' as an independent category, clearly separated from urban centers. (Kvorning et al 2012)

However, we might traditionally recognize the suburb by these same characteristics: They have a relatively low density, and mainly present single-family housing and large areas of housing blocks. There is a clear distinction between typologies and a sharp functional separation. Physically, they are also separated by distances and infrastructure. The car is a highly prioritized means of transport, and therefore, the infrastructure is based on the car. (Kvorning et al 2012)

Continuously, the suburb, is subject to discussion and change. For many years, the extensive modernistic planning and its suburban landscapes has met a severe critique both in Danish context and globally. In Denmark the critique particularly came from the Environmentalists of the 1970's due to the suburb's large energy consumption and socially isolating structure (Kvorning et al 2012). Overseas, Canadian Jane Jacobs was one the early critics to point out that the modern city does not give breeding ground for a good urban life in public spaces: '*Does anyone suppose that, in real life, answers to any of the great questions that worry us today are going to come out of homogeneous settlements?'* (Jacobs 1961, p. 448). There are too few people and too much space. The streets and green spaces are boring. There is a lack of urban functions and variety. All of which prevents these places from becoming lively urban areas, supporting a public life (Jacobs 1961).

The suburban regeneration

Lately, in a time battling global warming and climate changes, the suburban landscape is again met with criticism for its consumption of resources, interference with landscapes and natural habitats, it's often gentrifying consequences, homogeneity and inability to accommodate new lifestyles (Kvorning et al. 2012,

ill. 4 view towards Lisbjerg hill

Maas et al 2010). Many actions have been and is being done towards re-thinking these developments. National and municipal planning policies seek to strategize new suburban development, and those suburbs already built around our cities, are now subject for wide scale transformation processes. In these processes lies an extensive reshaping of the suburban liveability and quality, an updating of the suburbs deriving from the post-industrial era. Great Danish examples are the City in Between project and Kickstart Tornhøj in the Danish suburban area of Eastern Aalborg (Nielsen 2012, Realdania 2017).

With growth challenging both cities' outer limits and their vertical limits, it is necessary to find alternative residences, in close proximity to larger cities. It seems, there remains a solid demand for detached housing in Denmark in the next few years (Fremforsk n.d.). This demand is mainly centered in the larger urban areas, in the capital and in the eastern Jutlandic areas.
Regional capital municipalities are competing with surrounding country municipalities, in order to attract inhabitants, and especially persuading young families, to stay in the urban peripheral areas. People have become more willing to commute, and therefore, it becomes a task for municipalities to offer appropriate housing in proximity of the city (Fremforsk n.d.).
Currently, there are many young projects, of new suburban developments, descending on vast, agricultural fields in the Danish landscape. Most of them aim to attract a greater number of inhabitants. These are further elaborated in a later chapter (cf. p. 26). The following section introduces future lifestyles of suburban living and objectives for those who choose to live there.

ill. 5 View from Lisbjerg edge

FUTURE SURBURBAN LIVING

Developing for change

"I think that things are going to change just because people get too damn bored with what they have." (Jacobs 2000, no pagination)

The suburban life

The vibrant city is characterized by high density, life and variety of functions placed within short distance. The suburban settlement is in many ways a contrast to the vibrant city. In the suburb, people seek recreational values in the form of nature and open spaces, a contrast to the high speed and congestion in the city (Realdania By & Byg, 2012).
The suburban lifestyle has in recent years become popular, especially among young families (Jensen et al., 2014). The suburb is a popular place for settlement, because of the surrounding nature, a limited amount of traffic, good relations for children and a good neighborhood. In the suburb, there is a focus on local communities and good relations. Something that is difficult to create in the more individual central city.

In recent years, the demographic development has set new demands for the housing typologies and urban spaces in the suburb. One in seven 30-49-year-olds are living alone in Denmark (Danmarks Statistik, 2017).
The demands to households and lifestyles are diverse. This means that probably also in the future, suburban living will have to be continually rethought from the post-industrial example (cf. p. 14). The settlements need to be open for change, and there is a need for finding new alternative ways of living in the suburbs.

The traditional physical structure of the suburb, with its fixed frames, is disposed to retain certain daily routines, a divided life and a large consumption of resources. Its functionally organized structure, with separated islands of houses, is unimaginative and unhealthy for a stable urban life. New family types and new ways of living, makes it important to increase the urban quality of the suburbs, with attractive urban spaces where people can meet, and where communities can arise to meet with changes and tendencies of the future (Jensen et al., 2010).

Lifestyles and future trends

The concept of lifestyle is related to the conceptualization of new ways of living in urban areas, and the new role of the home (Ærø, 2002). According to sociologists Thomas Johansson and Frederik Miegel, the concept of lifestyle has changed over time, from a structural to a more individual concept, where the individual has the space to act freely. They believe the concept of lifestyle consists of three levels: a cultural (life forms), a social (ways of living) and an individual (lifestyle). Lifestyle should in this sense be understood, as a combination of values, attitude and actions, and not through one single level (Jensen, 2002).

The quality of the city has an influence on the lifestyle, as the city creates the framework for good urban life. The perception of good urban life has changed through the years, as has the conditions for the urban development. Together with urban tendencies, this has created new urban patterns and new ways of living. But what are the challenges of today's cities, and which trends will we see in the future?
The development of different trends is based on three parameters: current trends, the historical development and today's trends. Urban development should be created according to the surrounding society and its tendencies, but at the same time, we need to emphasize the uncertainty associated with future tendencies (Realdania Arealudvikling, 2010).

Ill. 6 Housing preferences

ill. 7 Hjortshøj co-housing

ill. 8 Regen Villages, Effekt

”One in seven 30-49-year-olds are living alone in Denmark” (Danmarks statistik, 2017)

Future trends and scenarios of the society can be divided into three types of trends: *mega trends*, *everyday trends and urban trends*. When these are integrated into the considerations, it is possible to create a projection of where and how we would live in the future. Nothing claimed on the validity of the projection.

Megatrends can be described as global movements, that have consequences for the physical and social state of the world. It can be movements like globalization, urbanization, variability in housing, jobs and partners and an increased individualization. Here, social changes in society, alters the society from a collective to an individualized society.

Everyday trends are the trends affecting the citizens in their daily use of the city, regarding work, home and free time. The composition of these factors affect the direction of the city’s development. However, everyday trends are very uncertain in the future, because they are more specific than the mega trends.

The last type of trend is city trend. They are more directly related to different types of urban development methods and specific urban phenomena. They characterize the development of the city now and in the future (Ibid.)

Future living

The population has become increasingly differentiated, both in terms of family composition and in terms of age and lifestyle. The demographic development has changed, and new family compositions has emerged, while more and more people are living alone (Danmarks Statistik, 2017). Many households consist of only one person, and it is expected, that by the year 2020, one third of the households in Denmark will consist of only one person. This contributes to an increased need for social contact outside the home in urban community spaces. These spaces should create space for all different groups in the society and for different activities (Gehl, 2010).

Here co-ownership may also be central to the residential development, as it replaces personal ownership, which will be more affordable for the increasing number of singles in the future. Therefore, more things, like transportation, common areas etc. may have to be shared in the future. It is both practical and will create a bigger social contact between citizens (Realdania Arealudvikling, 2010; Realdania By & Byg, 2012). According to Danmarks Statistik the number of households with more than one family has increased by 35% since 2008 (Ingerslev, 2016). There has also been an increased demand for communities and co-housing, as sustainable living and co-housing has become more popular. People are drawn towards the outskirts of the city to live sustainable and self-sufficient (Ibid.). An example of this development is ‘Regen Villages’, made by the Danish architectural collaborative EFFEKT, which is an example of a self-reliant eco-village. In these areas, there is a strong focus on communities and self-alteration and urban gardening is cultured. This way of living can be interpreted as a counter reaction on the urbanized city with scarce space and dominant tendency towards individualization, by going back to the roots and the farm lifestyle. In this case the value to the suburban inhabitant is the eco friendliness. *“Suburbs may potentially experience increasing popularity in the future, where we are likely to be willing to move even further after our jobs, but still seek cities, experiences and stories”* (Realdania Arealudvikling 2010, p. 11). Like co-housing, co-creation has also become a more widespread tendency as a cooperation that creates added value in urban development areas.

Today the suburb has great value to the settling children families, searching for proximity to daycare, playgrounds, nature etc. In the future, suburbs may offer more and appeal to different segments searching for different activities and qualities of nature, sports clubs, types of community, sustainability etc.

It is not possible to predict the exact future trends, and how we would live in the future. But by means of time, analyzes of the past and present trends, and projections, we may create an understanding of the development of the future. We need to be open for changes and for alternative ways of living, especially because more people are living alone, something that should be incorporated in the development of new urban areas.

ill. 9 Chickens in a frontyard

REFERENCE PROJECTS

THE FUTURE, DENSE SUBURB

Studies of new suburban development projects on 'open field' reveal a similarity in strategies (cf. reference projects on pp. 26-27).

Sustainability and mitigation of climate changes have become trends and criteria, when we develop our cities. Climate adaptation and sustainable urban drainage systems (SUDS) have become a matter of course and smart technology and the notion of 'smart cities' are moving closer. Both themes also impact the branding strategy of suburban projects.

It has come to our awareness, that we should live closer together in order to be more sparse with resources. Some new suburbs communicate dense living, as contrary to detached housing, an example this Vinge and NærHeden (Frederikssund Kommune (n.d.). These developments are imagined as dense neighbourhoods with less streets and more green. The projects are seeking new ways of living, granting inhabitants to live closer to their neighbors and share more space (Frederikssund Kommune (n.d.); Nærheden (n.d.); Tækker Group (n.d.); Nye (n.d.)). For example, as owner of property in Nye, one does not own the landscape, only the foundation the house is build on. The landscape is common space to create different spaces between houses than the traditional private gardens divided by hedges. (Nye (n.d.))

The typologies traditionally associated with the suburbs, have been substituted in many of the projects with low-dense housing, row houses, townhouses and housing blocks, all ranging between two and four stories. Several of the projects adapt a mixture of typologies as a means to accommodating diversity, in a variety of lifestyles, as this is another value attached to the future suburb. (Ibid.) The projects (Frederikssund Kommune (n.d.); Nærheden (n.d.); Tækker Group (n.d.)) envision a greater diversity, however the actual diversity outcome is questionable. Many of the projects primarily brand an attractiveness for young families, narrowing to a market segment (Nærheden (n.d.); Tækker Group (n.d.))

"NærHeden is the future suburb - a whole new way of dwelling and living in the suburb. Here, it is easy to make the daily life work with transport, groceries and leisure time and easy to meet and engage in common interests." (Nærheden (n.d.))
"Here, there is proximity to the Capital, nature and each other." (Nærheden (n.d.))

"Vinge is far from the traditional suburb. Vinge will be a city, where you have the landscape up close and nature in your back lawn. The gathering point will be the green heart - an attractive and living urban common, which connects Vinge's different quarters. The S-train station will be the centerpoint, which will also accommodate stores, occupation, institutions, space for sports and play and other public facilities." (Frederikssund Kommune (n.d.))

Nature has also been given a new place. The proximity of the natural elements play a larger role in future suburban living, and it goes hand in hand with an increased awareness towards caretaking, natural habitats and biodiversity. This is particularly seen in the example of Naturbydelen, Ringkøbing K (Naturbydelen (n.d.)). Because housing areas are more dense, and there is less private space surrounding the dwellings, green spaces are of great importance. In many of the projects, a large green recreational space becomes the leading concept for the plan. Nærheden and Vinge are examples (cf. pp. 26-27) (Frederikssund Kommune (n.d.); Nærheden (n.d.)).

CHALLENGES

Are the future suburbs so similar in strategies, because this is how all suburban areas should look like in the future? The previously mentioned strategies have seemingly derived as solutions to societal challenges or as simple adaptation to changes in lifestyles and behaviour. Could

the similarity also be partly reasoned by the situation in Denmark, where often the same people are drawing master plans for several of the suburban project?

The master planning agenda is difficult. Master plans may be perceived almost rolled out onto its context as a carpet. In worst case, the existing is not taken into account at all, or is not paid much attention to. The challenge is that it is much faster to roll out a carpet than creating something through a long and open process.

ill. 10

ill. 11

NYE

Tækker Group & CEBRA

Size:	*115 ha* *approx. 15.000-20.000 inhabitants*
Time frame:	*no information*
Main attraction:	*proximity to Aarhus* *landscape is shared space*
Branding phrase:	*"Variation, balance, life"*

Working with the existing:

A cluster suburb next to the existing village. The plan has no physical linkage to the existing village, but emphasizes the existing terrain. (Nye (n.d.))

+

+ Housing in nature
+ Common spaces, large non-privatized spaces
+ Not more dense than a traditional suburb, but new typologies,
+ allowing more nature
+ 25% rental housing

ill. 12

ill. 13

VINGE, Frederikssund

Frederikssund Kommune, Henning Larsen Architects & Tredje Natur

Size:	*370 ha* *approx. 20.000 inhabitants* *approx. 4000 occupational places*
Time frame:	*2035*
Main attraction:	*S-train station* *'Green heart' as gathering point (green park in centre of the urban structure)*
Branding phrase:	*"Levende by. Nærværende natur."*

Working with the existing:

The development is positioned between two rural villages, but closest connected to the largest. A green area lies between the existing and the new. The two minor detached housing areas central in the urban area are integrated in their current form in the urban structure. The existing infrastructure and path system is integrated. The existing farms are far from the visions of the dense city, which Vinge is aiming for, but are integrated as pauses in the urban spaces. (Frederikssund Kommune (n.d.))

+

+ Hierarchy of green, recreational spaces
+ A variety of recreational activities
+ Dense housing areas
+ Development based on public infrastructure
+ Green corridors with surface solutions to rainwater

ill. 14

ill. 15

NATURBYDELEN, Ringkøbing K
Ringkøbing-Skjern Kommune & Realdania By
SLA

Size:	*84 ha* *approx. 1000 dwellings*
Time frame:	*2040-2045*
Main attraction:	*living in fjord nature* *sustainability*

Branding phrase: "Nature before houses. Houses in Nature "

Working with the existing:
The settlement is positioned at the length of the fjord next to the urban center of Ringkøbing K. The projects revolve around the existing landscape and fjord nature (Naturbydelen (n.d.))

+
+ Nature first, then buildings
+ Origin in the area's character, the landscape in particular,
+ A different suburb, dense housing in nature,
+ Common spaces, large non-privatized spaces
+ Strategies of realization and staging of project to follow societal development and variation in demand,
+ Visions of citizen participation in the processes and framing of activities and attractions

ill. 16

ill. 17

NÆRHEDEN, Høje-Taastrup
Høje-Taastrup Kommune & Realdania By & Byg
Arkitema

Size:	*65 ha* *approx. 8.000 inhabitants* *some occupational places*
Time frame:	*2021-2035*
Main attraction:	*only 20 min with train to Copenhagen main train station* *A loop of green*

Branding phrase: "The Future Suburb"

Working with the existing:
A loop of recreational green creates a green connection to the existing city and the loop will become a gathering point for the city's dwellers. A bridge connection across the train tracks also allows for a linkage between the new and the existing city for both cars, the walking and cyclists. (Nærheden (n.d.))

+
+ A variation of typologies on relatively smaller plots,
+ Focus on the future, dense suburb,
+ Awareness to existing nature,
+ Common spaces, small private spaces,
+ Dense development with intimate urban spaces, small private areas and common facilities,
+ Focus on meeting places and recreational spaces

A newer example of a suburb Jakriborg (cf. ill. 18-19) was quickly established without contextual bonds (Jakriborg (n.d.). This though, might not produce a more stable future for the urban settlement.
The suburban development plans come with varying timeframes. Some of the development plans are long-term and to a certain degree flexible, for example NærHeden, as the plans are executed in smaller parts, starting with a recreational loop to bond the new to the existing. Naturbydelen, Ringkøbing K works with a process of caring for the landscape and nature first, and then building. (Naturbydelen (n.d.)) Looking backwards to how much society and our urban form has changed, and glimpsing towards manifold processes of change, it is unimaginable, that master plans are very reliable for the future and that a process-minded planning is more relevant.

The market often steers the project in a simplified direction. Investors steer the process and results.
But areas addressed or accustomed specific sections of the population, as homogeneous suburban developments, are prone to cause gentrification to an area (Kvorning, et al. 2012). Housing areas built with few housing typologies do not keep up with current and potential change in age and household compositions. In this, there might be a fear of whole neighborhoods as isolated residential areas, which turn inwards and turn their back on the surrounding landscape. We must be aware of the risk of expelling selected residents from existing villages (Kvorning, et al. 2012). This argues for also prioritizing a development in relation to the existing villages, which these new suburbs are hinged onto.

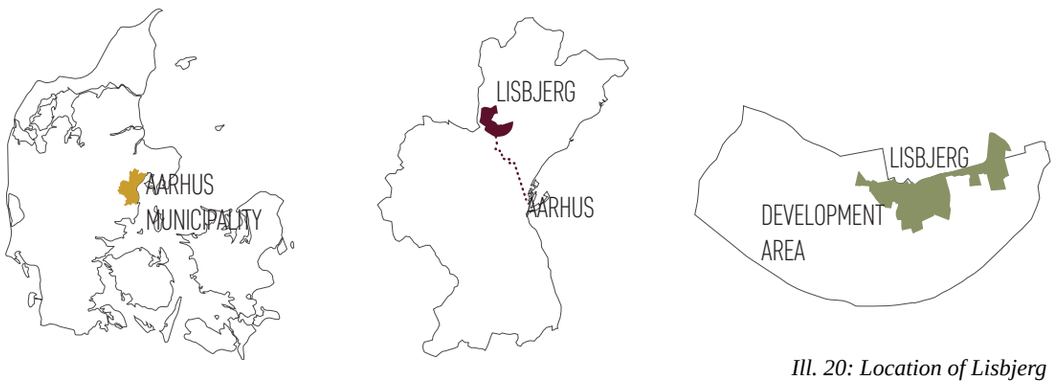
Could it be possible to think the presence of the existing villagers and the new residents into the process of development? Could the development of the new suburbs grow from the existing, and take the sometimes decayed, rural villages into account? To which degree should the existing context, landscape and processes of the site influence the plan?

The master thesis will explore the challenges of suburban development through a case study of the Danish example of Lisbjerg, Aarhus. The site of Lisbjerg and the development project at the Lisbjerg hill will be elaborated in the following chapters.

Ill. 18-19 Earlier attempt at rethinking a suburb in a low and dense settlement. Jakriborg is an example of a dense suburb, created in the image of an “old city”, possibly with the cities surrounding Østersøen as prime example. The vision was to create an urban life from before Modernism intervened. *(Jakriborg, n.d.)*

INTRODUCING LISBJERG

SITE PRESENTATION



Ill. 20: Location of Lisbjerg

The 'Lisbjerg Bakke' suburban project is chosen as an exemplification for this thesis, because of the project's relatively enormous scale and time frame, and because the project has been on the paper for a long time (cf. p. 44).
The development project is based on the existence of the small rural village, Lisbjerg. With the development project's 550 hectare perspective area, the 'Lisbjerg Bakke' suburban project is the largest of all urban development project currently being planned in Denmark. To compare, Ørestaden in Copenhagen constitutes an area of 310 hectares.

There are some general challenges of planning the suburban area, which corresponds to what has been stated in earlier discussion ofthe suburb (p. 24). Additionally, there are some challenges when it comes to rainwater management and linkage to the existing village Lisbjerg. The project reaches 30 years out in the future, with a perspective of 50 years, and origins in the pressure of space in the regional capital Aarhus. 'Lisbjerg Bakke' becomes a settlement, solving a practical problem for Aarhus.

In the following, Lisbjerg as site and place will be introduced. Afterwards, the development project 'Lisbjerg Bakke' will elaborated in further detail (cf. p.

Ill. 21 Lisbjerg, view from the hill

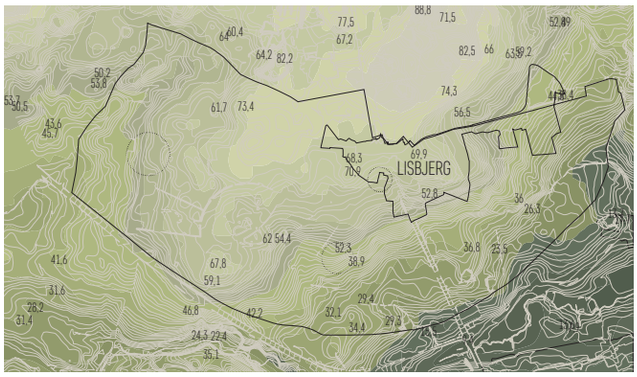
44).

LISBJERG VILLAGE

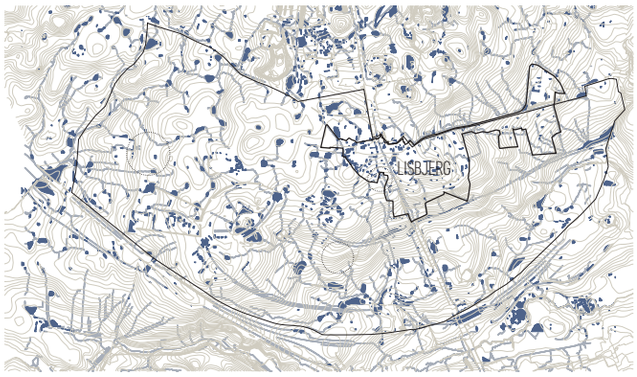
Lisbjerg is a small rural village of 886 inhabitants and 46 hectares, placed on the top of a hill in near proximity to Aarhus in the eastern region of Jutland, Denmark. The site is limited by Lisbjerg forest and the incineration plant to the North, the Djursland highway to the South, the E45 highway at West, and the neighboring village Nye and suburb Lystrup at East (cf. site limitations on ill. 22).

The site of Lisbjerg is characterized by its topography, nature, water and infrastructure and the land is valuable project land for multiple reasons. Its characterizing topography allows for great wide views of rural land and at the same time Aarhus is so close, that when looking south, you can see its skyline from almost every point. From here, you also literally see the close connections to infrastructure. It could not be closer to highway infrastructure, linking you to the rest of Denmark. And concurrently, you get a valuable nearness to nature with the 280 hectare forest, moving in from north and the wetlands, meadow and stream moving across at the very the base of the hill.

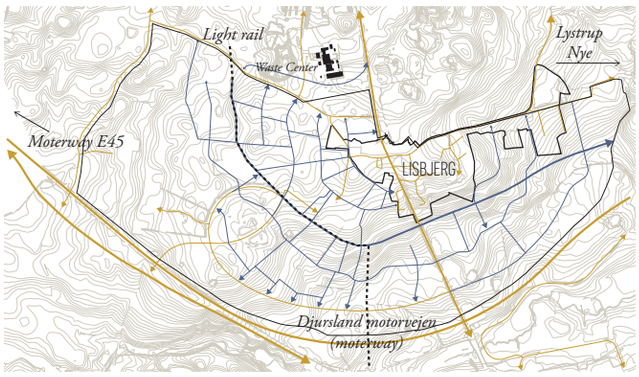
The specific site characteristics of Lisbjerg are also challenges in the development of the area. Either these could be seen as obstacles or opportunities. Lisbjerg is placed at the top of a hill, sloping down towards the city of Aarhus. Due to the terrain, the development needs careful consideration to rainwater management, when developing the land. As, the hilly terrain of Lisbjerg is seldom seen in the Danish landscape, allowing various characters of the landscape, created by the flow of water.



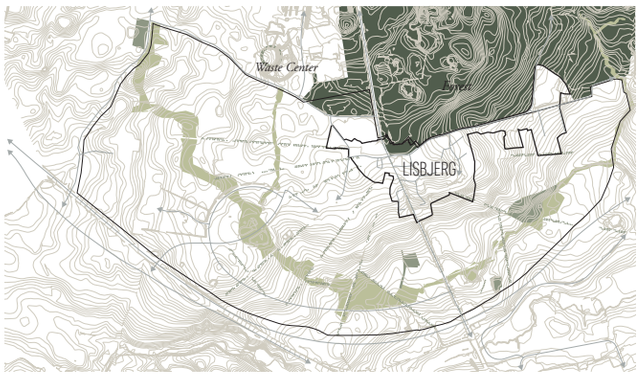
TOPOGRAPHY



WATER



INFRASTRUCTURE



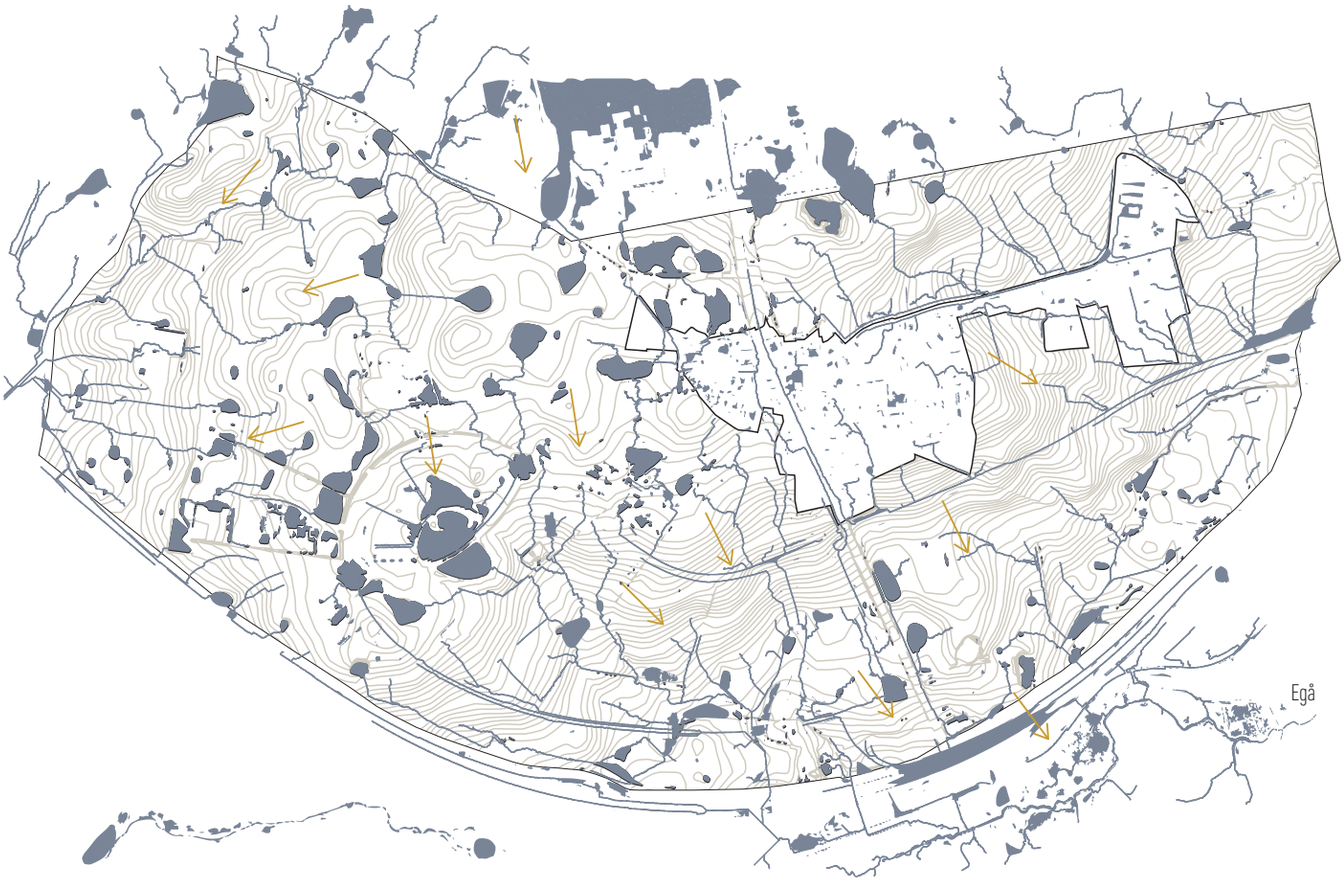
NATURE

Ill. 22 Mappings

RAINWATER CHALLENGES

The flash flood mapping (ill. 23) shows the hydrological flow downhill and to natural depressions in the landscape. The slope of the terrain, naturally leads water south of the hill, and much of the rainwater is transported through the lower meadow. The rainwater is allowed to cross with roads through underpasses and then flows into the stream Egå. From here the rainwater is led further into Egå Engsø and eventually flows into Kattegat. (cf. Appendix 4). In black the areas flooded during a 100 year event is presented. Precipitation statistics by DMI (Denmark's Meteorological Institute) show that there is a range from 41.8 mm to 55.8 mm in this area for 10 to 100 year rainfall events.

These are decisive reasons, why rainwater should be managed carefully and integrated in any development project on the hill. Rainwater must be handled largely, delayed and stored within the development area, in order to prevent lower areas, both natural depressions and downhill, from being flooded during flash floods.



ill. 23 Flash Flood Mapping showing the hydrological flow downhill and to natural depressions in the landscape. In black is presented the minimal amount of rain for which is flooded during a 100 year event (55.8 mm) (DMI (n.d.))

A WALK IN LISBJERG

Site analysis

An analysis of place, frames the existing village and is basis for the knowledge integrated in the design process. It contributes to a symbiosis between the existing settings, and the proposal for suburban living in Lisbjerg. To understand the current situation in Lisbjerg and to build an impression of the site and its context, Lisbjerg has been visited several times, at winter and at spring, giving two very different atmospheric impressions of the site.

Lisbjerg is a rural village full of contrasts. On the following pages, an image analysis seeks to unfold the character of Lisbjerg as a place (cf. p. 38-39). The site was visited and captured at winter, when it was snowing, and again at spring, when trees were starting to grow leaves. Noticeable is the small village church, placed on the top of the hill, visible from 'Forten', a small village square next to the pizzeria and a bus stop on Randersvej. This is the place where the urban functions are clustered. The broad Randersvej is a large contrast to the narrow winding streets that are elsewhere in the village.

Next to the church on the highest point are the remains of Lisbjerg's history as a viking settlement.

There is a large mix of typologies, ranging from old farm houses to detached housing, low-dense housing and student apartment blocks. The newest settlements are found east of Randersvej, where a co-housing community is located. Lisbjerg has a history of co-housing due to the village's proximity to Aarhus, and there are several of them. The many contrasts: the tall, crooked trees, the neatly cut hedges, and the meeting with chickens in a weedy front lawn, forms a certain village atmosphere.

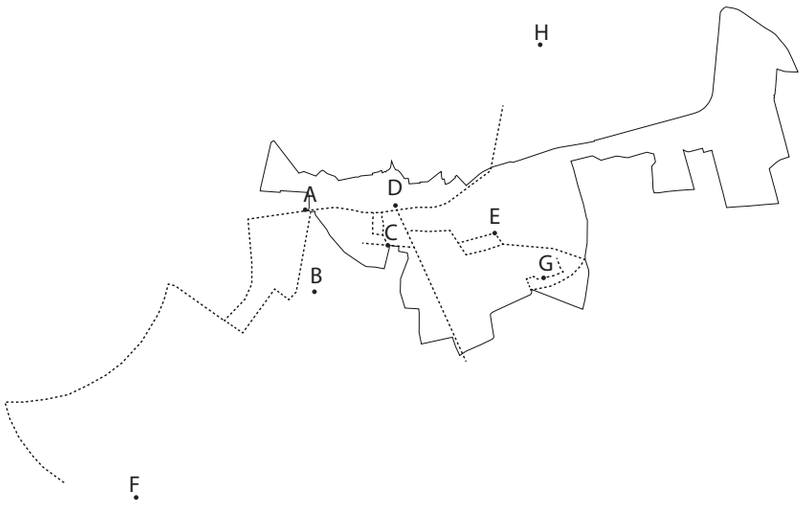
Ill.24 Forten and view to Lisbjerg Church

A: Edge of the village
Small row houses are located at the edge of the village. A path leads towards the new sustainable houses (AL2 Bolig) located close to the school.

B: 'Lisbjergskolen'
A long path through the open landscape connects the school, in the south, to the village.

C: 'Smoven'
The area is characterized by old farmhouses and small roads. From the houses, there is a wide view over the landscape towards Aarhus.

D: Randersvej
The trafficked road cuts through Lisbjerg and divides the city in two areas. The houses along the road are varied in style, where some of them are old and 'tired'.



E: The area around the church

This area in Lisbjerg is characterized by Small winding roads and the central church that dominates the area. Near the church is a small urban garden located on the corner of a road.

F: From the bottom of the hill

From the bottom of the hill it is possible to catch a glimpse of Lisbjerg school and the new buildings of 'Ringgården' housing association looking over the hilly landscape.

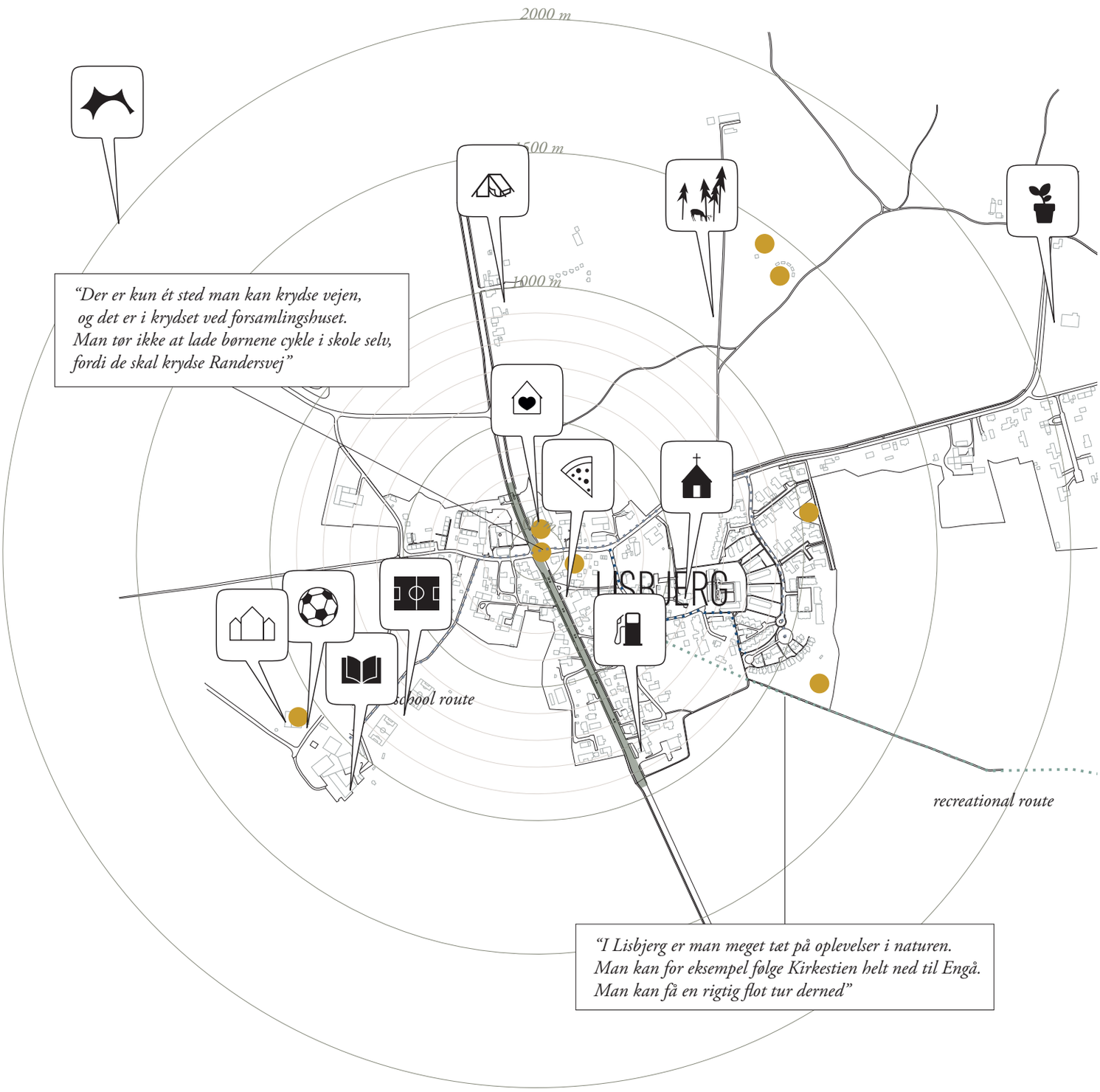
G: Horsager co-housing

Horsager consists of row houses overlooking 'Egå Engsø' and the surrounding landscape. Near the co-housing the church path (kirkestien) leads towards the meadow.

H: The forest

The forest is to be found in the northern part of Lisbjerg. Here a 'Viking area' is located with a playground and small shelters.

ill. 25 Image analysis Lisbjerg


2000 m
1500 m
1000 m
"Der er kun ét sted man kan krydse vejen,
og det er i krydset ved forsamlingshuset.
Man tør ikke at lade børnene cykle i skole selv,
fordi de skal krydse Randersvej"
LISBJERG
school route
recreational route
"I Lisbjerg er man meget tæt på oplevelser i naturen.
Man kan for eksempel følge Kirkestien helt ned til Engå.
Man kan få en rigtig flot tur derned"

Lisbjerg is a place of many lifestyles and houses, much more than the 'tired' houses that are experienced along the broad and busy Randersvej. The village does not have a clearly defined physical organisation. The village is positioned on the hill as an extrovert and outreaching village, reaching towards the landscape.
Existing nodes and meeting places are also found outside the borders of the village, enhancing the interface between the village and the rural. The nodes are an opportunity to grow connections.

Ill. 26 Analysis of nodes, service functions and activities in Lisbjerg with input from interview with Lisbjerg residents at Co-housing Horsager (cf. p. 83 ; Appendix 5)

THE REGIONAL CITY

LISBJERG IN A REGIONAL CONTEXT

Today people are willing to move long distances between their home and their workplace, and the geography is therefore not an important aspect. Many people move great distances every day, and therefore stay different places throughout the day. Here, the concept of the regional city occurs and becomes a reality.
Lisbjerg is dependent of the regional context, both in terms of work and daily functions, because a large part of the residents commute to work.

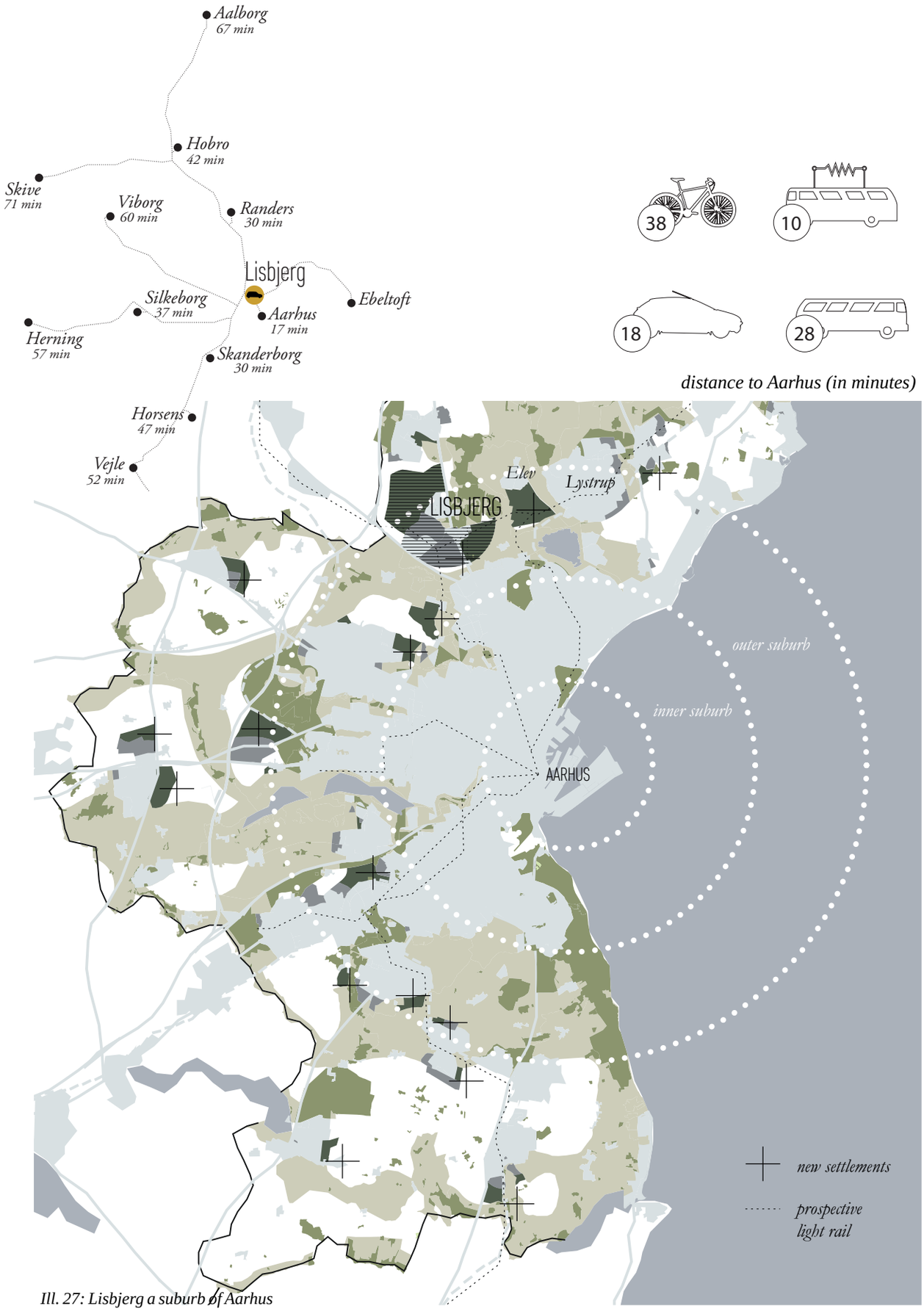
The urban development has moved towards the formation of large urban regions. Urban regions arise from the fusion of existing cities, making the regions polycentric, as they consist of many centers. Region Midtjylland has also developed into a polycentric area with a high interaction of commuting (Grundfelder, 2013). In the regional city, the traditional understanding of the city as an independent unit disappears. Where the traditional city, is to be understood as: a center with a surrounding suburb and open land around. Instead, it becomes harder to distinguish between land and the city and the concept of the 'boundless city' (den grænseløse by) occurs. The cities grow into the open land and the open land becomes a part of the urban region as an attractive place to live with the urban functions in commute distance (Nielsen et al 2013).
Lisbjerg is located in the region *'Region Midtjylland'*, with Aarhus as the main city. Lisbjerg is a part of Aarhus Municipality. The city has direct access to the freeway E45. Due to this close connection, there is easy access to other cities in the region. Where the cities: Aarhus, Randers, Silkeborg, Horsens and Fredericia are important 'magnets' for commuters in the region. The regional pattern contributes to relatively short commuting distances in the region and to a high number of commuters. The relatively high number of commuters are linked to the population density, in an area and the distance to urban centers. High densities and short distances between functions create less car driving (Grundfelder, 2013).

The close connection to the freeway makes Lisbjerg an attractive place to live, because there is a good network of infrastructure to other cities. Regarding this, studies also find that young families do not want to commute more than half an hour to an hour to work (Levinsen, 2015).

The boundless city

How does the progress of the boundless city affect our cities? According to Tom Nielsen and Thomas J. Clemmensen, a focus has, in recent years been on the *'right city'*. Many areas developed with the boundless city, are not considered as part of cities (Nielsen et al., 2013). Instead of seeing these areas as opposed to the city, they should be perceived as a duality between the local and the regional. The duality between the local area and the regional context of urban and regional scale is important, especially for the strengthening of sustainability in the local area (Kvorning et al., 2012). A public transport network connecting the local area to surrounding major cities, is essential for a sustained development. Therefore, the new light rail system connecting Lisbjerg to Aarhus, and other cities in the future, will secure that Lisbjerg will become a desirable place to live. The establishment of the light rail can contribute to Lisbjerg as a more attractive city in the future.

The city is fluid. Increased network of infrastructure contributes to the dissolution of the borders of the city, due to reduced distances. A city is affected by the development of other cities in the region. As cities are not static, changes and displacement are constantly taking place throughout the city: changes between functions in the center, and functions pushed to the periphery, or changes in housing preference and attractiveness. These changes are of great significance for suburbs and their future development (Kvorning et al., 2012). And this also affects the perception of the city. The traditional perception of the city is no longer limited. Now it has more floating boundaries, where people, and information flows, constitute the city of today, as a social, cultural and economic entity.



Ill. 27: Lisbjerg a suburb of Aarhus

Ill. 28: Connections to nearby cities

MUNICIPAL PLANS FOR LISBJERG

MUNICIPAL VISIONS FOR 'LISBJERG BAKKER'

LISBJERG BAKKE - THE NEW CITY IN LISBJERG
Lisbjerg is a rural village located in the outer suburban periphery of Aarhus. The area is characterized by its hilly landscape and historically star shaped division of property. Because Lisbjerg is located on a hill, the village has a wide view over Egådalen and Aarhus bay (cf. ill. 29; ill.30)

Today the village has 850 inhabitants, but will over the 20-30 years expand to approximately 25.000 inhabitants. This significant expansion makes Lisbjerg Bakke the largest urban development project in Denmark.
Aarhus Municipality describes the development project as 'the new city in Lisbjerg' and is perceived as an addition of a district to Aarhus, and not as an expansion of the existing village (Aarhus Kommune, 2014). The municipality thus distinguish between Lisbjerg and Lisbjerg Bakke as two different cities.

The development project is one of the largest development projects in Aarhus municipality, and the project process has been in progress for several years, through various stages. This has resulted in two different development plans. The first development plan from 2009, and a new development plan for Lisbjerg Bakke, which will be released in the near future.

The intention of the new development plan is not to illustrate a 'snapshot' or a final result of the development of Lisbjerg Bakke. Instead it should function as a more dynamic process plan for the area. At the same time, the municipality wants a concrete development plan for the area, which will provide a precise picture of the new city (Aarhus Kommune, 2014).

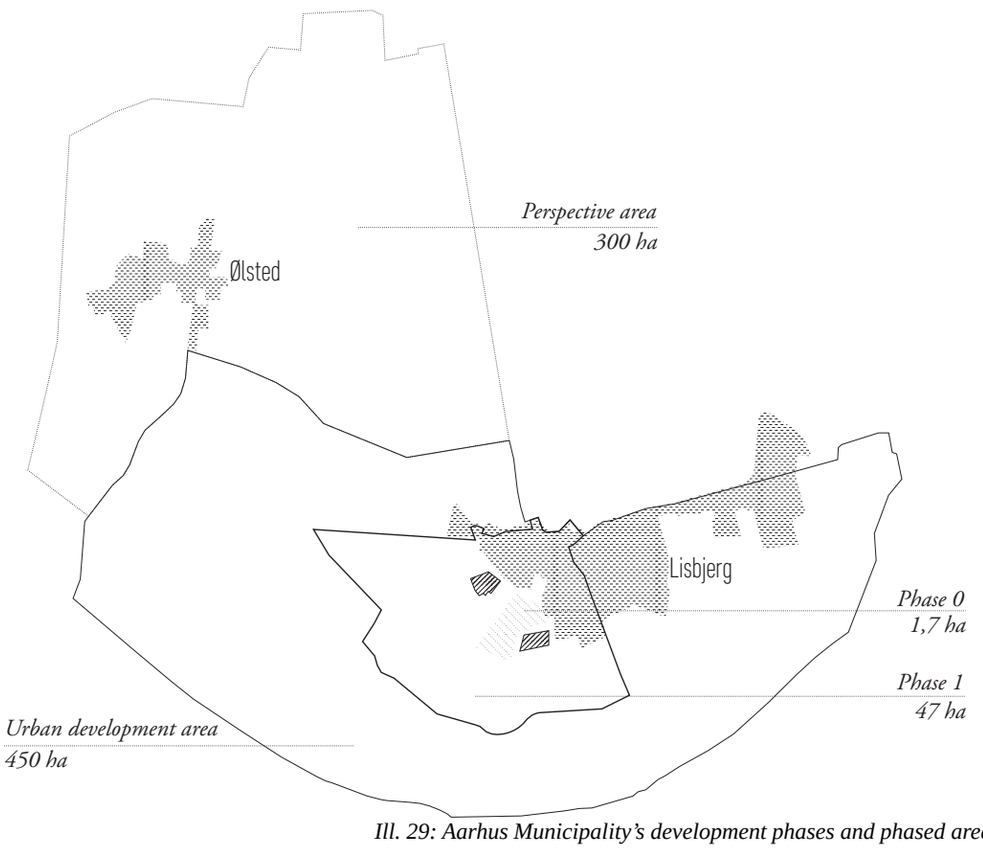
As a tool in the development, seven fundamental values for the project are established and forms the basis for further planning (cf. Appendix 1). These values should function as guidelines for the future development of the area. The seven values are: *sustainability, accessibility, urban quality and diversity, nature and landscape quality, architectural quality, historic anchor and public involvement* (Aarhus Kommune, 2014 p. 8). These are all important values to involve in an urban development project. Unfortunately, the municipality has not described how to ensure these values in the project or developed parameters for how these values can be secured and implemented in the urban development.

The development of Lisbjerg is divided in different phases; 'phase zero', 'phase one', the development area and a perspective area.

In addition to the seven principles, the architectural firm Vandkunsten has developed some dogmas for the first stage of the development, stage zero. These dogmas should contribute to maintaining the overall intentions, and ensure the desired character in the build-up-area (cf. Appendix no. 2). The dogmas are; edges, diversity in materials and settlement, green wedge, access, parking and yard. The vision is, to create a city where the urban area fuses with the existing village (Vandkunsten, (n.d.))

The municipality has, in collaboration with Cowi, prepared a development plan for 'phase one', which is the part of the development area currently under planning. The development will take place over the next 20-30 years. The total area of the development area is 450 hectare.

In relation to the first development plan from 2009, the municipality has prepared a quality manual for the green areas, 'Den Grønne Kvalitetshåndbog'. The manual forms the basis for the realization and implementation of the green values and structures in Lisbjerg Bakke. The manual includes the themes; *identity, sustainability, nature, history, proximity, health and coexistence*, which should contribute to the exploitation of the green qualities. The green structures are divided in different types of areas. The green structures consist of the existing

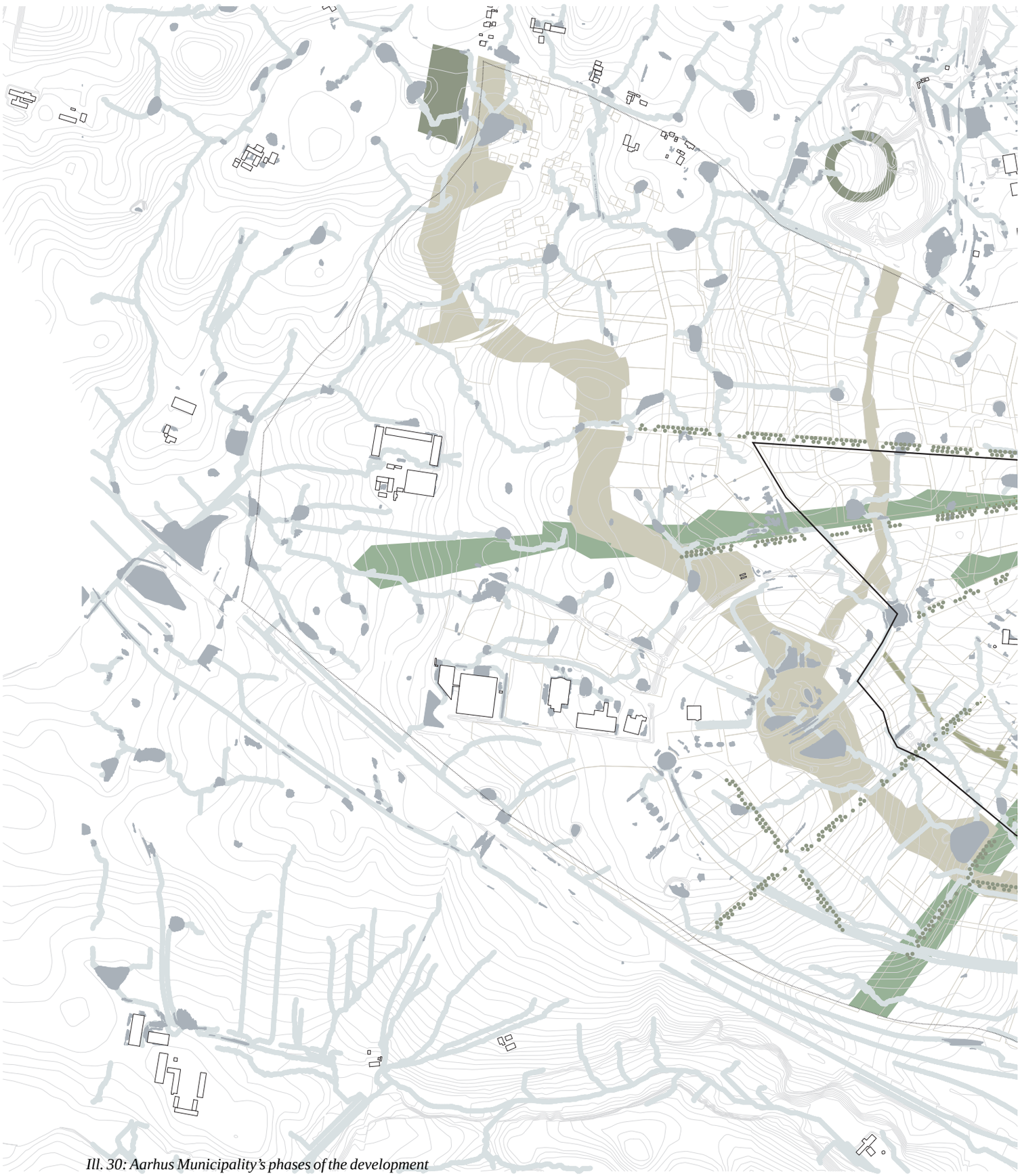


Ill. 29: Aarhus Municipality's development phases and phased areas

nature, a landscape park, byfælleden, alleys following the original star division, and primary and secondary wedges (Aarhus Kommune, 2009). The recreational spaces are envisioned to support connections, diversity and community, where the historical landscape must be maintained and tie the city together (cf. Appendix. 1).

"The historical windbreaks of the village, which follow the original "star partitioning", is kept in the form of green areas with paths, connecting the city transversely to the arterial roads. This secures that the original identity will be found and recognized in the whole city" (Aarhus Kommune, 2014 p. 9)

The long-term plans of the prospective area, is not as fixed as the other phases. Lisbjerg will eventually be merged with Ølsted.



Ill. 30: Aarhus Municipality's phases of the development


Kirkestien (church path)

A DENSE CITY

The vision for Lisbjerg Bakke is a dense area, where qualities from the city and village are combined in a dense 'forby' (pre-urbanization). The urban density will secure urban functions related to a 'forby' of 25.000 inhabitants. A strategy that will secure density and balance between the quality of life and the city. The cultural heritage, in form of the landscape, the rural village and the history should be the foundation for the identity of the 'forby'. It will be based on the culture of Lisbjerg in a new story.

The vision of Lisbjerg Bakke concerns managing the building plots, as islands in an ocean of recreational green space. The surrounding nature should be drawn into the buildings.
Nature should "into the built and "all the way into the living rooms" of each house. This may be secured by integrating the secondary green areas internally in each built-up area." (Aarhus Kommune, 2014 p. 7)

The dense 'forby' is seen as a response to urban sprawl and suburban conditions. Family homes are the focal point in the future Lisbjerg, where a dense settlement offers younger families the opportunity to live in close proximity to Aarhus. Bente Sørensen from Aarhus municipality says, that younger families would like the opportunity to have a small garden, but would also like to have access to common green areas, something which they have the opportunity for in Lisbjerg.

Bente Lykke Sørensen, head of housing and project development, Aarhus municipality:

"Young families do not want to look after a garden. They want the possibility of a small private garden area, but also acesss to green areas and public transport. In Lisbjerg one has the downtown and the large city in the front yard and nature in the backyard." (Jyllandsposten 2016)

How will a focus on younger families contribute diversity in Lisbjerg? Especially, when an increasing amount of people today are living alone (Danmarks statistik, 2017). Would there also be space for singles in Lisbjerg?

The master thesis does not relate to the existing plans for the future development of Lisbjerg. Mainly because the latest development plan for Lisbjerg, has not yet been published. Also, because it is partial independent of the existing plans, from 2009, and the vision for future development of Lisbjerg, from 2014, where only few fragments of the municipality's visions will be involved. The division of the green areas will be further developed through the master thesis. The proposal by Vandkunsten, for one of the sub areas, will not be further developed through the master thesis, but will be included as a part of city's settlement.

Ill. 31 New low-dense housing in Lisbjerg

Would you like to live in Lisbjerg ?

80 % of the asked Aarhus citizens says ”no”.

(Fremforsk 2014, p. 54)

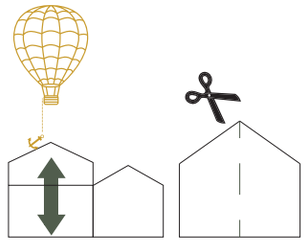
VISION

Vision statements

These are vision statements of this master thesis. visions of a suburban development at Lisbjerg. Essential is the holistic approach to the development, an integration of different processes and relations, which are critical for the creation of ‘an attractive and diverse “forby”’

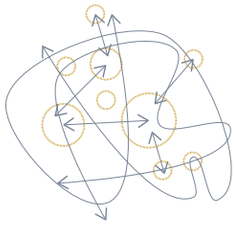
Integration of social spatiality

A large part of today’s daily routines takes place outside home. Therefore, it becomes increasingly important to create communities and reasons for dwellers to meet between their houses. Densification points and centers are formed as places where urban life and local communities are noticeable. Shared tasks, projects and community life call for involvement and a reason to become engaged.



A dynamic plan

The settlement should be well-suited to meet with the variability of society and nature. Therefore, the settlement is managed dynamically with possibilities of adjusting to changing needs, trends and biological processes. The plan is long-term, and spatial towards the unexpected and self-emerged events.



Ill. 32 Vision diagrams

Integration of village

The future suburban landscape should be something that grows as opposed to extensive master planning laid out as a carpet. The character of the new is to grow directly out of the existing. Unavoidably, an attachment challenges the traditional boundary between the rural and the village. But to prevent segregation, the settlement and the village is beneficially treated as a whole. The project focuses on nursing the seam between the existing village and the new settlement.

Integration of landscape

Nature and landscape are seen as leading forces in creating communities and pull dwellers out of their houses. This means that blue and green should come close, and preferably, right up to dweller's front door and windows. Blue and green elements are integrated in principles for the organizing of physical structures. Islands of the built and surrounding ocean of recreational green are united. A landscape of water is integrated as a medium in creating community and diverse, recreational urban spaces. Water flows between the new and the old.

Understanding of place

What sets this settlement apart from other choices of residence? Few are attracted by a run-down rural village or naked fields. The project introduces a mental land development and a development well-rooted in a sense of place. Character stretches beyond physical elements and landscape. Manifold atmospheres are used as a means of appealing to different lifestyles and types of community.

RESEARCH QUESTION

”How can we, exemplified through the rural extension of Lisbjerg, rethink the future dense suburban settlements from a process-minded perspective?”

Ill. 33 A hollistic view

METHODOLOGY

In this section, focus will be on the master thesis' methodological approach. In the following, the structure of the thesis, choice of site and empirical methods is introduced. Afterwards, the underlying theory of science will be elaborated.

Project structure

The master thesis' structure is divided in two main chapters: the strategic framework and the design proposal (cf. ill. 2 p. 10). The output of the strategy is five regulating parameters, which is important tools to include in the future development of Lisbjerg.

The structure of the master thesis will be narrowing from the overall problem to the final design (cf. ill. 34). Through this structure, the overall problem will be defined through the motivation of the project. Hereafter, Lisbjerg as an example will be introduced, through an introduction of the site and the municipal visions for the development project. The overall objective has been to obtain an understanding of the challenges and potentials of the development of the village. Afterwards the output of the introduction will be combined in an overall vision for a holistic approach to the development of Lisbjerg. This will be followed by a more concrete research question, which will form the basis of the master thesis: "How can we, exemplified through the rural extensions of Lisbjerg, rethink the future dense suburban settlements from a process-minded perspective?"
Subsequently, the research question will be unfolded in the strategy, through theories, literature studies and relevant reference projects. The result of the strategy, will lead to the parameters. From the parameters, design themes and principles can be derived, to ensure the involvement of the parameters in the design. The design themes should contribute to the creation of the 'final' design proposal: our vision for the future suburban settlement, with Lisbjerg as an example.

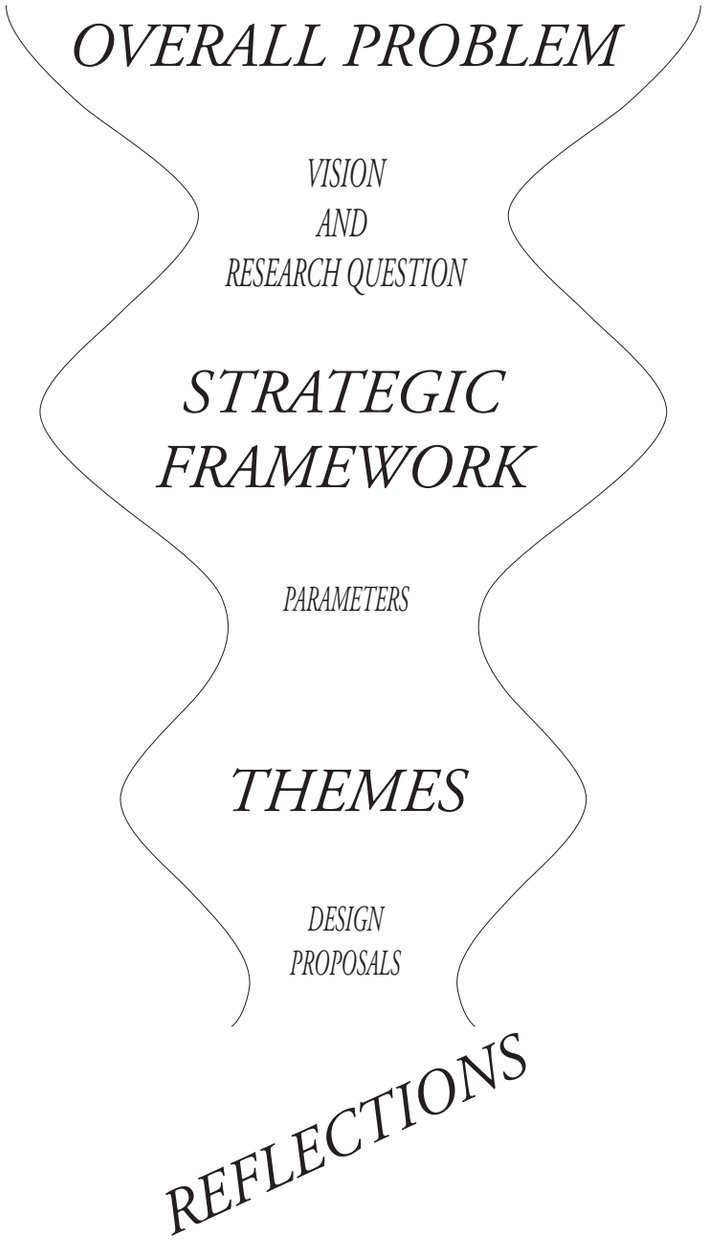
Delimitation

In the study of major issues, such as the suburbs of the future, it is necessary to demarcate the project. The thesis is utopianly related to the planning of the good city and is not related to the overall frames and restrictions. The process idea of starting small is related to economy in a more abstract sense, because there is an opportunity to handle social and vegetative land development process.
In addition, there has not been a focus on the mobility and the planning of infrastructural connections. In this, the future light rail is included, which will connect Lisbjerg to Aarhus. However, there has been a focus on how the light rail can be included in the branding of Lisbjerg and what the light rail can generate.

Field of Study: Lisbjerg

The field of study is the urban development of the rural village Lisbjerg, located outside Aarhus. Lisbjerg is chosen, because it is a large development project, which has been through an ongoing process for several years. Due to the long process, the project has been caught in a long master plan agenda and is therefore a big project to accomplish.
The municipal visions for Lisbjerg is not a development of a traditional suburb. Instead, it should be perceived as a residential addition to Aarhus. The new area will have its own center along the main street 'Bygaden'. In the development of the area, the light rail should be a dynamo that connects Lisbjerg to Aarhus. The proximity to Aarhus is the main focus of the branding of the project, something which makes the project realizable.

There has been an interest in working with future dense city and the management of water of the city. These issues are interesting, because they extend into the future, and creates an opportunity to form utopian thoughts, about how we would live in proximity to nature, in the future: suburban living in nature.



Ill. 34 Methodology structure

Existing plans

Throughout the thesis period, it has not been possible to obtain the latest development plans for Lisbjerg. Therefore, the project is based on the old development plans from 2009. Due to this, the existing plans are not included, instead small fragments of the plans have been used in the development of the design proposal. However, this has not had an impact on the project process, as the project seeks to be independent of the master plan.

Through the process, there has been a collaboration with COWI, which has provided easy access to necessary material – but only materials that they have been allowed to hand over. The new plans for Lisbjerg have not been available, because they have been in political debate, throughout the thesis period.

Method perspective

In the preparation of the empirical data collection of the project, both quantitative and qualitative methodological approaches are involved. By complementing both methods, a more thorough understanding problem and the site can be achieved. The duality between static data collections, calculations of the rainwater and theory, interviews and studies of reference projects contributes to the outcome of the strategic framework.

Literature

The literary studies will provide an elaborate understanding of the overall problem, and the theoretical framework of the master thesis. The overall objective of the study has been to obtain an insight in the theoretical framework, in which the project unfolds. Literary and theoretical studies of landscape urbanism, fluid planning, future urban lifestyles

Reference projects

The project also involves studies of relevant reference projects. An investigation of other master plan projects is included to exemplify similarities with other projects. The study is focusing on how these projects have included the existing village and the surrounding context, as well as their time frame. In addition, it is elaborated where these projects are placed in the field of non-planning and fixed master planning.

Interview

In the qualitative empirical data collection, an interview with residents from Horsager co-housing in Lisbjerg is included. The purpose of the interview has been to achieve an insight in the residents perception of the development project and how the residents have been included and informed about the process. In addition, it has also been important to identify existing communities in Lisbjerg and where they occur.

The interview is semi-structured, where some overall themes have been prepared before the interview. In general, there have been an attempt to ask neutral questions, to ensure the informants are not guided in a specific direction (Kvale & Brinkmann 2009). However, it allows them to express their own opinions tell their own stories.

To include the children and the young in the interview, a map of Lisbjerg and some stickers was included. This gave the children an opportunity to mark places, functions and areas, which form them has an impact. This could for example be a nice playground, sport facilities, the school, the forest or something completely different. This created a foundation for a discussion, among the adults, about Lisbjerg and the future development of the village and their wishes for what it should bring.

Technical method

The technical approach to the project is hydrology and water management. Therefore, calculations and investigations of the rainwater management have been made with the purpose of achieving an understanding of flooded areas of the future. It should provide an insight

Ill. 35 View of Aarhus periphery from Lisbjerg hill

in future amount of rainwater and, which is necessary to handle locally in the area.

Theory of science

The epistemological considerations of the master thesis are studied through the hermeneutical interpretation process, where there has been worked iterative between the different phases (between strategy and design). Therefore, there has been a holistic approach to the master thesis, where new knowledge has been obtained through studies of literature, theory, reference projects and studies of the hydrological factors. This contributes to a constantly movement between the phases and a continued development of the whole, where the different elements all contributes to the final design (Pahuus 2007).

In the analysis of Lisbjerg, there has been a phenomenological approach, where local activities and social relations in the village are localized and interpreted. Just as important are the registrations of the physically, sensually and aesthetically impressions of the village to achieve a better understanding of the village and the surrounding landscape.

APPLIED THEORY

This section introduces applied theory of this master thesis: Hillier on fluid planning, Corner on Landscape Urbanism in regards to the concept of the boundless city (den grænseløse by), Massey on sense of place, K. Simonsen on social spatiality and Jan Gehl on good urban form.
This narrows down towards defining spatial categories and urban form for the future suburb.

THE FLUID CITY

FLUIDITY, TIME AND SCALE

"We need to re-invent planning as a strategic future-oriented activity, taking into account the unknown, open up for new possibilities, towards a planning as becoming instead of planning as fixing" (Hillier 2007, p. 17).

Could we think of alternative ways to work with urban development? And could we manage the new generation of suburbs differently than past examples? This chapter consists of three parts. The first introduces the notion of fluidity in cities. The second describes the shift in the physical setting of our cities, then elaborates on a morphological and process-minded approach towards cities. And the third part introduces spatial planning and cases where a resilient and spacious planning has been essential to the projects. The chapter should provide the reader with a theoretical framework as a basis for understanding the most central aim of this project: to grow.

Appearing and disappearing city landscapes

"When the safety net dissapears - which means the predictability dissapears - the process, the course, time and the temporary become new models" (Høyer 2003, p. 39)

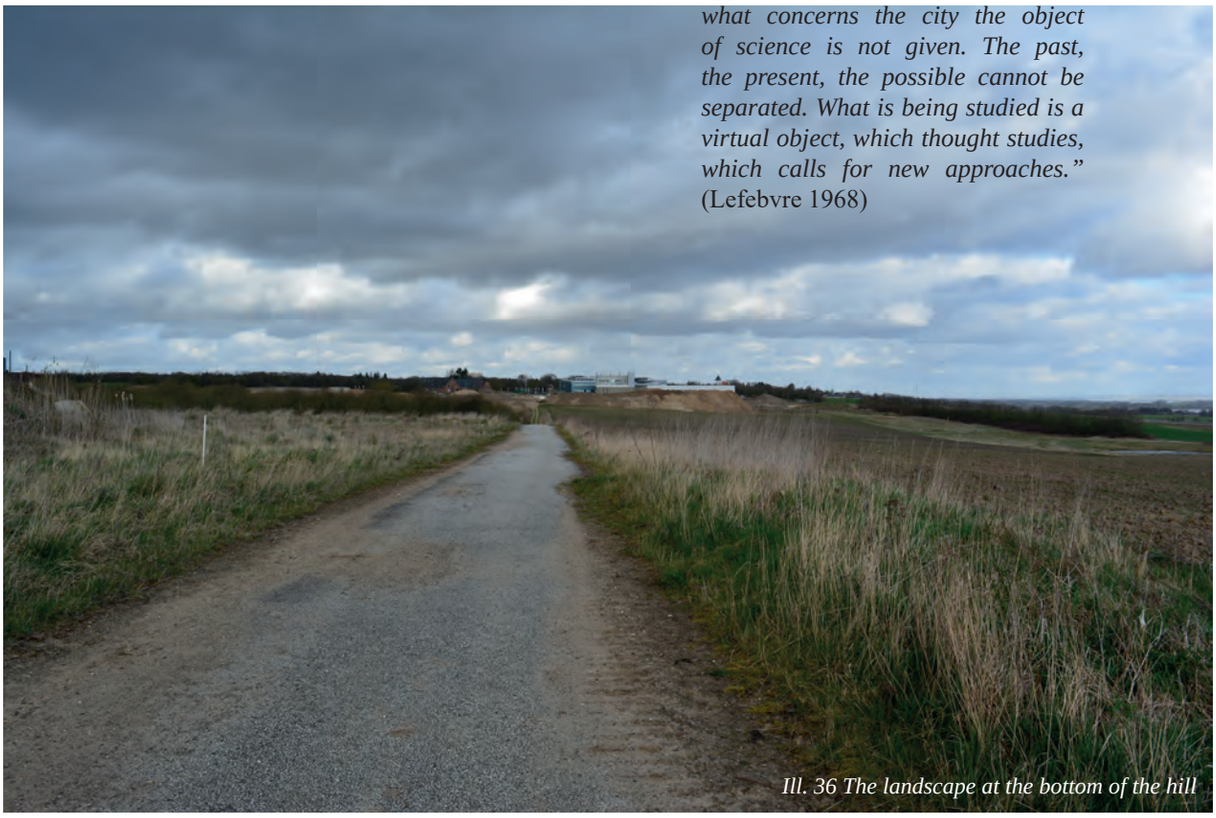
The physical setting of cities is, and has been, undergoing great changes. The border between what is city and what is the rural/ the landscape/nature is being challenged very visibly in the Danish landscape. In this process, the disciplines of architecture, urban design, planning and landscape architecture have lately been fusing together. (Kvorning et al 2012, Pollak 2006, Jørgensen 2013)

What was traditionally known as divided into city and the rural is now a landscape of elements melting together. It has especially been on the agenda of Landscape Urbanism to convince the disciplines to leave out the terms 'city' and the 'rural landscape' and enforce landscape as one unifying term (Høyer 2003). Landscape Urbanism *"invests in the ground itself as a material for design, using the landscape as both as structuring element and a medium for rethinking urban conditions, to produce everyday urban spaces that do not exclude nature."* (Pollak 2006, p. 126). In 'Terra Fluxus', James Corner argues for the hybrid practice of Landscape Urbanism for which he sketches four themes: processes over time, the staging of surfaces, the operational or working method, and the imaginary (Corner 2006). This makes for a paradigm shift in how we design, plan and build our cities.

The past, present and the possible

The aim is to acknowledge that places are made of flows of becoming (Nyseth 2012). As in the case of Lisbjerg, much of the rural villages and suburban areas of Denmark have lost their initial function. Traditionally, the village was once clearly defined. The border between

"The prescription is: there cannot be a going back (towards the traditional city), nor a headlong flight, towards a colossal and shapeless agglomeration. In other words, for what concerns the city the object of science is not given. The past, the present, the possible cannot be separated. What is being studied is a virtual object, which thought studies, which calls for new approaches." (Lefebvre 1968)



Ill. 36 The landscape at the bottom of the hill

city and landscape was much sharper. And the function of the rural village was widely known and defined by its physical setting in the rural landscape. Now, after a period of still stand, these areas are now undergoing new transformation. Steep urbanization has raised a new need for these rural areas, especially surrounding the larger Danish cities and those linked to public transport. The former rural villages are being envisioned with new regional functions.

With the new generation of suburbs, the Danish landscape is once again meeting change and changes create unsurety. There are still questions of how to define and manage the physical settings. But these moments of doubt, however, are *"precisely the moments when systems are open to new insights, ideas and behaviour"* (Laws and Rein 2003, p. 175). We need to appreciate those moments of doubt, in which something new is really possible.

Fluid planning

The above states many reasons why it is necessary to rethink the way we plan our cities. Now, the important question is how to plan for the fluid city. Many disciplines have tried to answer to this, and fluidity and flows could even be seen as a whole new paradigm shift (Nyseth 2012). There is unlimited theory on this topic. So to narrow it down, the following attempts to sum up Jean Hillier's recommendations for planning the fluid city.

Firstly, acknowledging that no processes of change take note of a master plan. To Hillier, plans are moments of stability, a temporary fixity, and spatial planning an experimental practice. (Hillier 2011) However, the challenge might be how to manage fluidity without losing control. There needs to be some form of institutional size, which to some extent translates the fluidity into a strategy. Fluidity "gone wild" would in some sense mean giving up the ambition of steering anything. But at the same time, processes open for the unexpected allow for democracy and liveliness in urban planning. (Nyseth 2012)

Secondly, identifying and taking note of current processes of change. By identifying those processes of change that are in progress, there is also large probability that work is being done within a field that has acknowledged the necessity of change (Kvorning 2012). Foresighting, speculation, and experiments, are argued as alternatives to classical master planning, because these methods demand that we think about futures not yet directly recognized. It is important however to understand that our current needs and wants may not obviously be extended to allow prediction of the future. They may transform in ways we cannot understand or control. (Hillier 2011)

Thirdly, experimenting. Fluidity is often related to planning experiments, as a potentiality and a chance from which planning can be re-invented. Hillier argues that planning has to

be open to what may come: “We need to re-invent planning as a strategic future-oriented activity, taking into account the unknown, open up for new possibilities, towards a planning as becoming instead of planning as fixing” (Hillier 2007, p. 17). The task should be “to test out ... how different innovations may perform in different spatio-temporal circumstances” (Hillier 2007, p. 250). In a planning context, fluidity can be seen as a more experimental planning practice. It is a practice more open and transparent towards future possibilities (Hillier 2007).

A holistic approach and consideration to the many processes of the city is a possibility of designing our cities to also succeed with future changes. It is not possible to plan 30 years ahead nor depict the future. However, looking at current processes of change is a tool towards clearing the urban landscape for what might come. And there is a limit to fluidity. Some decisions have to be made, and plans have to create some fixity. Masterplanning nor non-planning is the solution to planning for the fluid future of cities. The trick is to find and strike a happy medium.

The city is boundless

“Cities are not static objects, but active arenas marked by continuous energy flows and transformations of which landscapes and buildings and other hard parts are not permanent structures but transitional manifestations. Like a biological organism, the urbanized landscape is an open system, whose planned complexity always entails unplanned dross in accord with the dictates of thermodynamics.” (Berger 2006, p. 203)

The city is fluid and virtual in many senses (Lefebvre 1968). It is everchanging with processes that are both visible and invisible. Periodically, new ways of using the city appear, including changes to the value we put to our environments. Tendencies, especially in relation to new demographical developments, show alternative ways of living and interacting socially. The city is equally a physical setting as much as it is social relations and the communities, which we create and participate in (Kvorning 2012). The city is affected by different ways of creating a home and creating communities. It is important to acknowledge when speaking of processes that the city is not a solitary functioning entity.

Ill. 37 Synergy of water and tree

“Nowhere are the power and the feeling of nature stronger than in the tree roots: The crooked branches, the amorphous sequences, the non-geometrical, the non-hierarchical. Tree roots are everything that the built architecture is serving for - but cannot reach. They are the order of nature.”
(Andersson, 2014 p. 57)

THE NATURE OF A PLACE

THE POWER OF NATURE

Is it possible to secure cities for the future, through a more locally rooted planning, where an expansion of the city grows out of the existing? Can we create more durable solutions in the urban planning of new urban areas, based on the sense of place, aesthetics of nature and atmosphere, and by that secure a locally rooted planning?

URBAN NATURE

"Earth water and roots are connected. The matter, in which the roots grow, is the matter of which our civilization is made. Of clay, of mud, of earth. Formed into tools that make our life comfortable, rich and evoke our sense." (Andersson, 2014 p. 31)

Process Urbanism says that cities and nature should not be separated or seen as opposites, but the circulation of an ecosystem should be balanced with the development of society. This means that the city is part of a system where all processes are interlinked. Sudden changes in an environment may affect, or even threaten, the whole system. Here, Process Urbanism also works to make urban planning and programming more open and flexible to allow for spontaneity. (SLA 2011)

Another way of seeing city and nature as interlinked is through the concept of ecosystem services, which are 'the aspects of ecosystems utilized (actively or passively) to produce human well-being' (Fischer et al 2009). In unity, the ecosystem integrates both plant, animal and microorganism communities as well as the nonliving environment. P. Opdam divides the services, which human seek into three categories: production services, such as agricultural crops and fibers, regulation services, such as the purification of water by marsh vegetation and the pollination of commercial plants by wild bees, and social services, such as the perception of beauty in nature and the influence on human mental health. (Opdam 2013) Ecosystem service humans with daily nutrients and other resources, flood and disease control, as has great spiritual, cultural and recreational benefits.

In the discussion about future suburban living, our aesthetic sensation of the world is important, when we are creating the development of the future city and the life therein. The development of the city should be based on the biological processes, including both natural and social life. Here the concept of urban nature can be included in creating better synergy between the constructed and the grown environment. People are moving towards the cities, causing an expansion of the city into the open land. According to Steen A. B. Høyer, there is no longer a sharp defined distinction between nature and the anthropogenic; these are rather a influencing each other as holistic process (Høyer, 2003). The cities flow into the open landscape, due to the expansion of the cities. The cities are no longer a contrast to the open land; instead open areas of suburban settlement are created in the periphery of the cities with large recreational areas.

Due to the urbanization, there will be less space in the cities in the future, both for people and nature. However there is a need for living close to nature, 'urban nature', also in the dense cities. Nature should be included in the urban areas. We need to live in proximity to nature, in order to cope with increasing climate and environmental challenges. The concept of urban nature is not meant as nature in urban areas or a gentrification of urban spaces. Instead it is a way of improving the quality of life in the city. Nature makes us happier and creates a sense of place or the feeling of belonging to a specific place or neighborhood in the city (SLA, 2016).

SENSE OF PLACE

"It is therefore impossible to proceed far with a

"Nature: The abiotic, non-living matter like wind, water, light, temperature and sand, that together with the living matter, the biotic, forms everything. "The ever-changing and different states of being which all have their own purpose."
This is my suggestion for which atmospheres we shall base our future on: Our cities, our countryside, our world."
(Andersson, 2014 p. 49)

Ill. 38 'Tree socks' of moss

Ill. 39 Old trees in Lisbjerg

discussion of space and time without inworking the term 'place'. This in turn has implications for how we 'place' things and how we 'think' of 'our place' in the order of things in particular. But the word 'place' also carries a surfeit of meanings (Harvey, 1996 p. 208)" (Mazanti, 2002 p. 56-57)

Space and time is essential for how we understand and perceive the world. The production of space should be interpreted as socially produced, where the understanding of spatiality both has a social and a human dimension. A central concept for Kirsten Simonsen is 'social spatiality', which originates from the dialectic between social practice and social processes. Spatiality is an integrated part of social practices and social processes, through which the place is produced (Mazanti, 2002).
Like Simonsen, Doreen Massey perceives the understanding of space, in connection to social relations expanded in time and space, where the concept of sense of place emerges. A Place should be considered as a process and not as something fixed. Instead places are a network of social relations (Mazanti, 2002).

The production of space should be considered as a social process, consisting of spatial and timely variations, where both individual and social experiences have an impact on the sense of place, and how it is created (Mazanti, 2002). Sense of place is about belonging to a place, and the way people living in a place experiences it. Place has, like aesthetics, an important role in the way people senses, feels and interprets the world. Places are perceived individually, as people have different experiences of a given place. This creates a variety of representations of the place.

Local Roots

A place is a representation of something that 'Is'. But how can we create urban spaces, with a specific quality and identity, which separates it from other places?

Place should be understood as dynamic and changeable, and not as having a specific identity. The character of a place is produced through an interaction between social processes and physical characteristics (Urban Lab, 2015). Sense of place emerges, where local communities can occur.
The place can be characterized by two concepts; connection and anchoring. Connection connects us to other people and places, and without connections we will never move away from the place. Anchoring is what makes it a special place. Without anchoring, people will just pass by the place.

In the creation of sense of place, the history of the place is important. This includes the existing urban life, community and commitment: the physically anchored communities and the story of a place. Therefore, places are founded in social relations, identity and history. The best knowledge of a place is achieved, through local involvement and integration of the specific characters of the place. A good development of a place, is based on both social, physical and the invisible (the stories and the atmosphere of a place) values of a place, which all contributes to the sense of place – a meaningful place with identity and atmosphere (Urban Lab, 2015).

The aesthetic of Nature

Every biological element is a part of the process of nature. And what represents the processes of nature more than the tree: "A tree consists of three parts: Its foliage, its trunk and its roots." (Andersson, 2014). All three parts of the tree are important for the biological process of nature, even the roots (Andersson, 2014). The roots are essential for the sense of place, as they represent the aesthetic feeling of nature and the anchoring of a place. Where the branches of the tree reach up into the air while the roots penetrates the soil (Stender, 2015). Stig L. Andersson believes the roots are useful in the creation of the empowerment of aesthetic, as they illustrate the

difference between the build and the aesthetics of nature (Andersson, 2014). It is important to emphasize, that aesthetics is not the beauty of how things look. Instead it is the sensory combination of all our feelings, senses and emotions – the most universally human thing. Therefore aesthetic is about how something feels, smells and sounds. It makes us wonder, reflect, think and discover our surroundings. The power of aesthetic is formed of both living and non-living matters of nature.

"Nature: The abiotic, non-living matter like wind, water, light, temperature and sand, that together with the living matter, the biotic, forms everything. "The ever-changing and different states of being, which all have their own purpose." (Andersson, 2014 p. 49).

The perception of nature depends not only on aesthetics; it is also about the atmosphere of a place. Atmosphere can be understood as the individual senses of a specific place. *"Atmosphere is a thin film of enclosure around our world. Without our vaporous, water filled atmosphere, life on Earth - or indeed life anywhere - would not exist."* (Andersson, 2014 p. 51).

Both the existing social, biological and natural processes are important in the production of a place, where physical and mental anchoring contributes to the understanding and identification of a place. Trees, water, wind and soil are all parts of the processes of nature, and they all have an influence of the nature of a place. The green spaces should accommodate the inhabitants and the communities, as well as allowing staged biological processes of the development, with space for the designed and the self-regulatory nature. Herein, the water should be integrated, as a recreational mediating element, creating a sense of atmosphere and aesthetics.

SOCIAL SPATIALITY

CREATING RELATIONS IN THE FUTURE SUBURB

"Space is sometimes understood as the 'emptiness' between buildings - a view which turns the question of space merely into a question of openness" (Simonsen, 1996, p. 495).

The first part of this chapter reasons awareness to life and space between buildings, through the notion of 'social spatiality', where *"space is conceived as social space or, more precisely, as social spatiality"* (Simonsen 1996, p. 502). The second part defines spatial categories contributing to a solid urban life in the future suburb. The third part adds concrete physical conditions concretizing towards a physical framework for a design.

Space in social theory

Social spatiality origins in a discussion of space in social theory and in which way spatiality and social understanding are intertwined. Simonsen's understanding of space, as social spatiality, is strongly inspired by Lefebvre and Giddens' approach to time and space.
The basis for K. Simonsen's viewpoint is that the spatial, and the spatial forms, here cities, are integrated parts of social practices and social processes. (Simonsen 1996)
Simonsen stresses three basic principles for how she believes space should be treated theoretically:

The spatial must be perceived with origin in the social and cannot be perceived or analyzed as an independent category. The production of space and change should be analyzed and understood in its contextual frame. Space is not merely a social construct. The social is fundamental, but contains the spatial as an inherent quality.
Space has to be understood as inseparable from time. Social practices and social processes are situated in time as well as space, and they contain both a social temporality and a social spatiality.
The concept of social spatiality finally allows space to be incorporated in social theory, as an symbolic and existential category. Previously, this aspect has only been investigated in phenomenological humanistic geography, particularly in the discussion of sense of place. Existentiality and meaning constitute important parts of the spatiality of social practices, making social spatiality a subjective concept. (Simonsen 1996).

Through Simonsen and the previous chapter it is argued that spatiality should be understood as affected by different atmospheres and social processes. In this project, the aim is to create a good basis for living in Lisbjerg. What does it take to create a good place to live? Could the right spaces create solid communities and involvement in a village? And could social processes be allowed to also create space? In the following paragraphs, spatial and social categories are defined as important for a solid urban life in the future suburbs. Afterwards, these are accompanied by physical restrictions.

Homes for the rooted and the temporary dweller

Diversity can be handled through a variability of spaces and dwellings offered for inhabitants. The variability of dwellings must accommodate both those looking for a temporary settlement and those rooting and building their dream home. While the temporary housing accommodates a high turnover with new dwellers bringing in new ideas, the rooted dweller builds a home and impacts their surroundings. There must be space for both, as there are many different objectives for dwelling somewhere and how long one stays.

A rooted dweller builds their dream home and impacts their surroundings. The home is related to identity and "soul work" (Beck-Danielsen et al 2004). It is often highly impacted by it dweller with DIY projects and

might be a house, which needs a caring hand before moved into. It is part of a mental anchoring, where the dweller identifies with the space, and the social spaces surrounding it, which makes a home. The dweller lives here for many years and is likely to be well-rooted in the community.

The temporary dweller brings in new ideas and culture to an area, and engagement in the local community is dependent on the dweller and the community. The home is related to the contemporaries of the modern nomads. There is a larger replacement in these homes as they are symbols of a "rootless" existence. The temporary might be the stranger, who comes today and stays till tomorrow. One that comes and becomes part of a group, but not necessarily permanently. The temporary dweller participates and yet remains distant from other "native" members of the group. The stranger is a mobile category and is not bound to specific places. (Simmel 1903)
The temporary home is often a house ready to move in. It is temporary housing and therefore, preferably for some dwellers, more economically affordable.

Between homes
The zoning and physical setting surrounding the home is important for the likelihood of creating relations near the dwelling. Edges and zones of a degree of privacy or publicity have large impact, as well as which functions exist in the space. It is likely to be influenced by a sharing mentality between dwellers. (Gehl 1971)

The quarter
The quarter consists of several homes. It is limited by floating boundaries. This meaning that the span of an area forming the quarter is subjective to each dweller. The definition of the quarter is subjective and relative to its social spatiality and processes. The quarter can be made up by both concrete communities and imagined communities (Raahauge 2004)

Nearrecreation
The recreational area closest to the home is important for leisure and for creating relations within a quarter. These areas may make up local identification points or "totem poles", as it is a well-known space for some dwellers, recognizable from specific physical settings and atmospheres. The effect of this area, and its function, varies according to scale, zoning and typology (Durkheim 1972). The suburb provides value to its inhabitants through a combination of social and recreational values. Recreational values, such as outdoor activities, sports, micro farming. Spatial and societal values, such as places to nurture personal relationships, societal connections and a sense of safety. Collective farming and sports clubs are for example activities mixing recreational and societal values in space.

The village
The open community is found in the village, where activities and events invite in all citizens. It is often the more well-rooted citizens taking part of the practicalities in hosting community events. Especially children are often the reason why some dwellers would be more likely to have roots in the local community. The broader community is found in the community life and cooperation between several smaller villages. It might be soccer teams gathering children from villages in the area, or a summer festival between a group of villages. These forms of relations are called tertiary social relations. (Jørgensen 2013)

The City
With few exceptions, dwellers will travel the city to work. The city is also place for leisure, as this is where one might find more niche activities and shopping options. It is reached by an infrastructural web from the village: either going by highway, public transport or bicycle paths. (Jørgensen 2013)

Designing Space

How are these thoughts translated into urban design? The previous definitions need to be accompanied by concrete physical conditions making them beneficial for a framework for designing spaces.

Back to basics: Life, space, houses

The critics of the earlier suburban expansion, the advocates for good urban form and good public life, emphasized the great importance of public urban space to ensure urban and societal cohesion. While Canadian Jane Jacobs (1916-2006) highly advocated for an diversity and complexity of the dense city, architect and planner Jan Gehl (1936-) is one of the newer Danish advocates for good public space. Through his time, he has managed to become a global role model of people-based design. With the perhaps most famous phrase "Life, space, houses" , he has advocated how to create good urban spaces, inviting and accommodating people (Jacobs 1961, Gehl,2010). Jan Gehl is a theorist, who truly understands how to translate the fluidity that exists between houses into practical restrictions for a good urban form to support good urban life. His ideologies work very well together with the spatial theory of K. Simonsen, as Gehl argues for firstly designing life between buildings, space and then houses: *"When the city's space and connections has been decided on, houses can be placed, emerging the best possible coexistence between life, space and houses"* (Gehl 2010, p.208)

How are spaces between houses shaped to form good urban life? And how is a sense of community established without forcing anyone to contribute?

Places to meet and gather are important in the future suburb. And what happens in between houses becomes important for shaping smaller communities and "naboskab" (neighbourliness). According to Gehl, the area surrounding the home and other spaces in the city can be activated in numerous ways:*"That people and events gather in time and space, is a requisite for anything really taking place, but most decisive is it, which activities are allowed to develop."* (Gehl, 2007, p.121)

Gehl argues that if there are any practical duties to maintain in the outdoor spaces, dwellers are more likely to activate the spaces in between houses. (Gehl 1971) He also argues that narrow facades with a lot of doors (15-20 doors per 100 meter facade), embellished with edge zones of urban furniture, plants or decoration, activate spaces far more than long, clean facades.(Gehl 2010)

"Smaller children seldom move more than 50 meters away from their front door, and even in this modest radius, the distance seems to play a role. The children play more often with the neighbors children than with the children living just a short distance away." (Gehl 2010, p. 109)

Ill. 40 Freiham North
West of Munich, at the interface of city and countryside, a new urban district of Freiham North is developed. But not as a continuation of peripheral areas with detached houses, but similar to the visions for Lisbjerg, as an extension of the densely built-up city. A park is to creates a transition to the landscape, as a tool towards maintaining the experimental appeal, which is often inherent at the interface of city and country. (Czechowski 2017, West8 n.d)

Ill. 41 Mobile common house by Raumlabor

How are new, or potential, residents involved before moving into their homes?
"The utopian spirit of bricolage that characterizes all of these projects demonstrates a new understanding of what architecture can be. Instead of being static, everlasting, inflexible and expensive, it can be removable, mobile, a stage for all kinds of scenarios." (Raumlabor 2008 p. 5.)
In order of creating space for public life and temporarity in the plan, it is profitable to look towards Raumlabor, the Berlin based group of architects working with a playful approach as a critique of dominant architectural production and official planning processes. Raumlabor have some great ideas for creating communities in a fluid environment. They work with small-scale interventions and involve local residents in the future of their neighborhood. Here, Raumlabor uses temporary and mobile community housing and assists social processes (Raumlabor et al 2008)

A common ground between Lisbjerg and new or potential residents can be strengthened by working with mobile communities and temporarity. These should form meeting places and recognizable nodes with linkage to the existing village. Placing these as nodes in an acceptable distance from the developed edges of Lisbjerg, and making sure that paths connect all nodes, will create different atmospheres and experiences along the way from the inner village to the outer periphery.

In relation to creating good urban life, how dense should the future suburb be?
A report on density (Kvorning et al 2009) shows that there is a relationship between density and urban functions in an area. According to this report, a brutto density above 65 percent shows necessary functions of walking distance in an area and supports cycling and walking, and a social life. A density above 100 percent will secure space for both housing, occupation and service functions and the density still allows for surfaces of open space. (Kvorning et al 2009)
A problem, which reduces urban life, is when building cities densely and buildings become too tall. Gehl argues that urban life surrounding large buildings is critically reduced. People in tall buildings, both at home and at work, are less prone to come down to the urban spaces than those living in the lower five stories. The building height should not exceed six stories, as anything taller than this will violate the visual connection to the street level. (Gehl 2010)

The mentioned report on density (Kvorning et al 2009) argues that the recommended densities might as well be achieved through relatively low settlements, which involves well-known building typologies. In this relation, there should be reason to be aware of typologies, which have somewhat slided out of the repertoire. This is for example the dense row house and minor clusters of high and low buildings. (Kvorning et al 2009)

An acceptable walking distance in the future suburb is a relatively fluid concept, however Gehl argues that one is willing to walk 500 meters in larger cities. This of course is particularly lower for the smaller area of Lisbjerg. And it will always be a matter of a combination of distance and the quality of the route. If the path is straight and seemingly endless, without breaks in atmosphere or giving the pedestrian an experience along the way, the walking distance will be tiring. This may be described as the "tiring length perspective". A path rich in experience and comfort will allow one to forget the distance and enjoy the walk.(Gehl 2010) A challenge in Lisberg right now, is that there is nothing to walk to.

Ill. 42-45 Densities of Danish cities (Kvorning et al 2009)

GROWING TOGETHER

Meeting Lisbjerg residents

Think big, start small

It can be practical not to plan to much from the beginning. It has been such a long time for the plans of the Lisbjerg suburb that it might be practical to start small.
This might also give people the idea that it will happen. The credibility of the project is strengthened from the beginning, and that the project grows in people's consciousness also create something before it physically exists. An urban development project of this size is not only the physical, but also everything else, which might be difficult for one to grasp.

In this case - if Lisbjerg should be grown - who should grow it? Where does the growth come from?
Where do you start?

And what should cause people to want to live in precisely Lisbjerg, apart from any other new suburb? Can you create a community and an urban life, which one wants to become part of? Is it possible to link new residents with existing residents in Lisbjerg already before the new move in?

Exactly how, and if, spaces in the city are claimed, is difficult to plan for. This thesis believes that the development is ideally planned in minor stages and follow up on the form of space continuously from grown experiences. Let us see where they walk and then create the paths afterwards.

Since the project is built on open fields, there is no knowledge on how these areas are used today. To invite in can be a medium towards finding out, what kind of place Lisbjerg should be. It is therefore important not to plan to much, but to give stakeholders the possibility of contributing. Stakeholders without economic interest in the area. An involvement of the existing residents during the development may catalyze a motivating force. Can we involve some of those already engaged with the urban life in Lisbjerg?

Ill. 46: Hjortshøj, cows in the city

Ill. 47: Hjortshøj, Pop-up event

Hello Lisbjerg

In the pursuit of finding the stakeholders in Lisbjerg, several communities were contacted. Of these, co-housing community Horsager was found the most clear group of stakeholders, engaged with urban life in Lisbjerg. A pleasant phone conversation led to an invitation to participate in a common dinner at the co-housing community. Before dinner, an interview with residents and their children was conducted, giving manifold insights on their city: challenges and qualities, nodes and meeting places, mental distances and community (cf. p. 5 transcript; p. 56 methodology).

"There are actually many activities, but was is needed, is more people. Often something is happening in the village hall, but there could without difficulty be more people to participate in these arrangements. Just being able to fill out the spaces." (cf. transcript, appendix 5)

Existing villagers are indeed welcoming new neighbors in Lisbjerg. It would only be a profit to the village. The villagers are missing functions and wishes for new functions in their village. They hope for more functions, and especially the parents, are hoping that a supermarket might be an outcome of the development and an increased number of inhabitants. As one of the young girls shouted that: *"it takes an hour to get to a really great public swimming pool!"*(cf. transcript, appendix 5) , it seems that also the younger ones are hoping for new attractions in their city.

There are too few places to meet with friends in Lisbjerg. Nodes and places to meet are important for engaging with fellow citizens.
"Right now, it is Kresten handling many of the activities in the village. And he is really good at it. But it is hars to gather enough people. It is almost all village children, who have to participate in the activities. If only the city was twice as big, there would be more activity and community." (cf. transcript, appendix 5)

It was stated that the development needs to contribute to Lisbjerg's existing community and vice versa. There is a need for engagement in the community as there are few people maintaining community activities as it is today. However, there are many activities going on, especially in the existing Lisbjerg common house.
The residents elaborated on the, from their perspective, need for both the temporary and the rooted dweller, as the rooted dweller might be more engaged in the community, and the temporary dweller and a larger change in inhabitants, might bring new ideas, urban life and culture to Lisbjerg. This could for example be students with their way of inhabiting the urban spaces.

However, the belief in the carrying out of the project is partly doubted at the community: "

It is probably doubtful that it will ever become that large. And it is probably very long-term, if anything is to happen at all, in that scale. " (cf. transcript, appendix 5)

The residents wish that the development was planned more directly out of the old and historical Lisbjerg and the existing community. They would like to be brought into the planning. The residents suggest finding inspiration in Hjortshøj. Here, the existing community was the driving force and made sure that something happened. The residents wanted a city park and could not wait for the top-down planning, so they made their own city park with a couple of grazing cows (cf. ill. 46). They see a couple of things that could also be improved in the existing village (cf. transcript, appendix 5). As the residents of Lisbjerg are willing to engage locally in the development of Lisbjerg, the residents should be involved. They have large interest in growing the future of their village.

STRATEGIC PARAMETERS

The strategy has unfolded different aspects on how the vision could be realized. These five parameters are physical outputs of the strategy (cf. ill. 48 parameters). In the design proposal, presented in the following chapter, the parameters are used as regulating tools.

The parametres should make it possible to steer the physical surroundings and processes, and hence influence ‘the good, future suburb’. The parameters take part in the changeability of the plan as they can be adjusted to contextual changes and future demands.

PLANNING

The development should position itself between non-planning and master-planning, making it a framework open for changes.

LIFE

The best basis for urban growth is created from balancing the self-regulatory and changeable with the fixed and designed.

SPACES BETWEEN HOUSES

Floating boundaries between houses will link outside and inside, private and public environments.

DENSITY

The viable city is encountered through densities of 65 percent and above, with typologies related to the low-dense settlements.

VARIABILITY IN TYPOLOGIES

Variability according to trends and demand is handled through a mix of typologies of housing and recreational space,

Ill. 48 Parameters

2.0 DESIGN PROPOSAL

LISBJERG LANDSCAPE CITY

Let us start out by putting Lisbjerg into a new category, releasing the city from the stereotypical category of the suburb: Lisbjerg is a landscape city.

The history of Lisbjerg, the current and the future of Lisbjerg, is based on its relationship to the landscape. Future suburban Lisbjerg is grown out of its existing settings, meaning that Lisbjerg should grow from the hilltop and down.

This chapter presents our design proposals for a future rural extension and suburban living in Lisbjerg.

Ill. 49 Landscape City

THREE THEMES

Main concepts of design

The following sections elaborate on three themes for the landscape city Lisbjerg: Scaping Water, Claiming Nature and Growing Roots.

These themes are divided into sections for the readability, but should be seen as concepts, tightly related and intertwined (cf. ill. 33).

The themes are main concepts for the design of this master thesis: A green infrastructural system integrated in the development of Lisbjerg, as a means of growing Lisbjerg from the hill top and down, managing rainwater and connecting the existing with the new (cf. ill. 50).

A process down the hill

Ill. 50 Boy with ship

SCAPING WATER

SCAPING WATER

A LANDSCAPE OF WATER MEDIATING BETWEEN THE EXISTING AND THE NEW

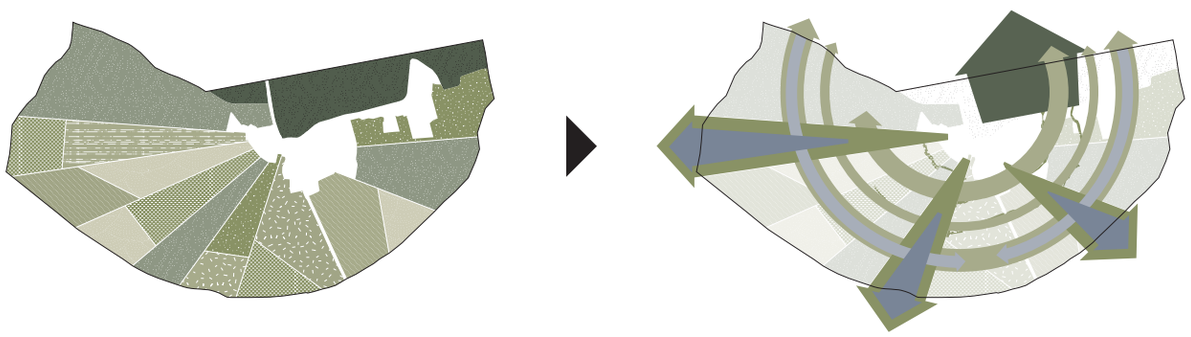
A landscape of water accommodates multiple purposes and users:

In delaying the rainwater on its way downhill, lies an opportunity to explore and take advantage of surface water, as a binding medium between the old and the new. The water becomes a mediating element, connecting the existing residents and the new very physically, with a blue route from the top of the hill to the bottom, and with places to meet and find common ground: in nature.

Water exploits the terrain and enhances the types of nature that are, and have been present in Lisbjerg: the common, the forest, the marsh and the meadow. A swampy terrain should not be forced to be a traditional, large green urban park.

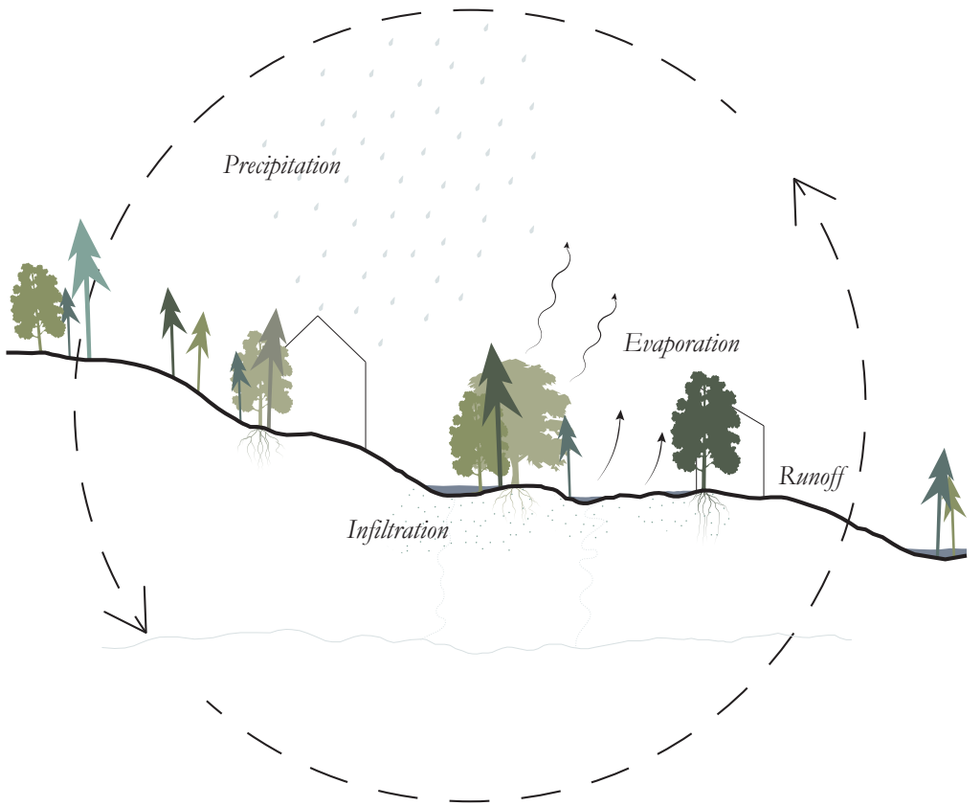
Water and landscape are hierarchized in a blue and green infrastructural system (cf. ill. 51 hierarchy). The system is functional for managing rainwater, and for creating various recreational and ecological routes. It offers different possibilities of engaging with nature and finding disconnection in the suburb.

Water affords multi-generational recreation, as substitution for the traditional playgrounds. A different perspective on water in Lisbjerg creates playscapes beyond the swing.



Ill. 51 Transition from a production farmland to an integrated hierarchical landscape of blue and green.

A hierachy defines types of landscape and transports rain water.



Ill. 52 Hydrological processes

The blue and green infrastructure

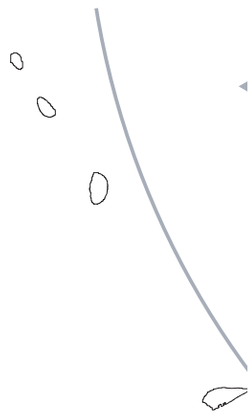
Water is nature, and nature is water. As water is a necessary resource for natural elements to survive, trees and other vegetation take part of rainwater management through infiltration and evaporation (cf. ill. 52hydrological processes). In transverse green corridors, vegetation help slow the rainwater runoff on its course downhill. Through green downhill branches, rainwater is transported from the top of the hill, to the bottom, where the water flow is released to the stream Egå (cf. ill. 54 Rainwater system; ill. 53 Principles for Rainwater Management; Appendix 6).

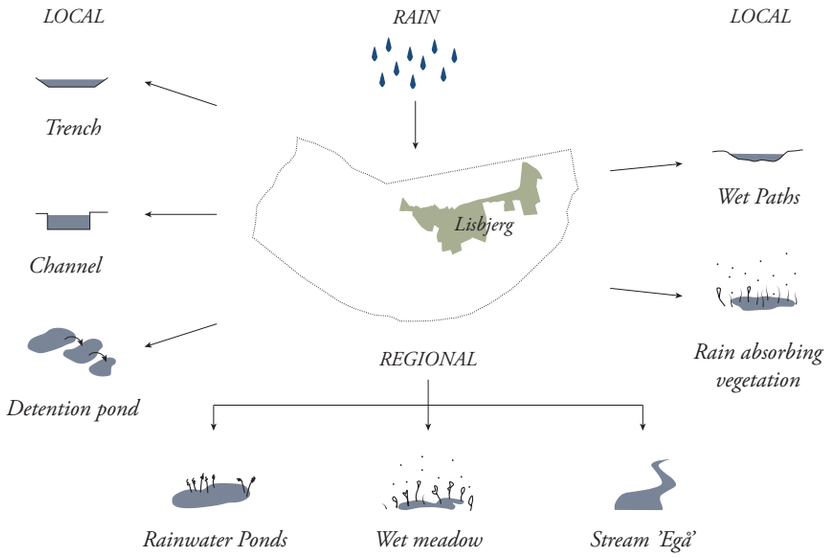
From the top of the hill (A), rainwater is collected in trenches and transported to the rainwater marsh (B) (cf. Appendix 6). The rainwater marsh functions as a wet detention pond, delaying and naturally cleansing large amounts of rainwater from the north-west part of Lisbjerg. From here, the water is slowly discharged to a channel through the downhill branch, before it ends up in a detention pond in a green corridor to be further delay (C). The rainwater is transported to an underpass at Bygaden to reach 'the cascades' (D-I).

'The Cascades' area (D-I) is a repetitive series of smaller wet detention basins, inspired by the functionality of rice fields. It collects both a smaller amount of rainwater from a section of Bygaden and water from top of the hill (cf. appendix 6). The design allows for an overflow between basins, creating a landscape on the terms of water.

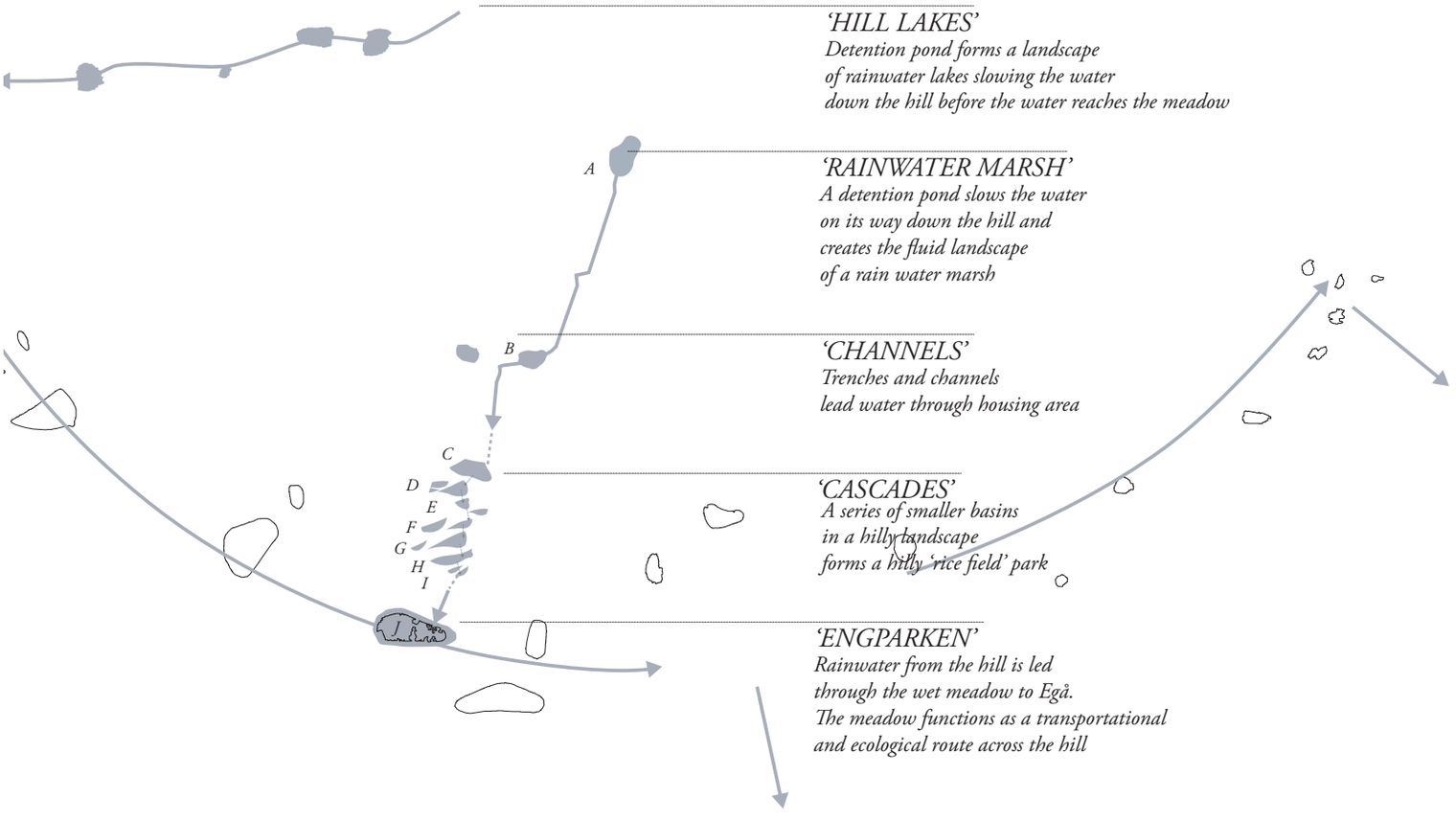
The rainwater is led through an underpass to the meadow 'Engparken' (J), where very large amounts of rainwater is stored, delayed and naturally cleansed. It is necessary to slowly discharge the rainwater into Egå to secure the natural conditions of the stream.

A similar approach is possible through all the green branches. For example, the terrain depressions at the eastern corner of Lisbjerg may shape a series of 'hill lakes', as wet detention ponds, delaying and transporting the water into the meadow (cf. ill 54).





Ill.53 Principles for Rainwater Management



Ill.54 Rainwater system

CLAIMING NATURE

CLAIMING NATURE

Urban living as in the city, but green as in the countryside

Urban living as in the city, but green as in the countryside

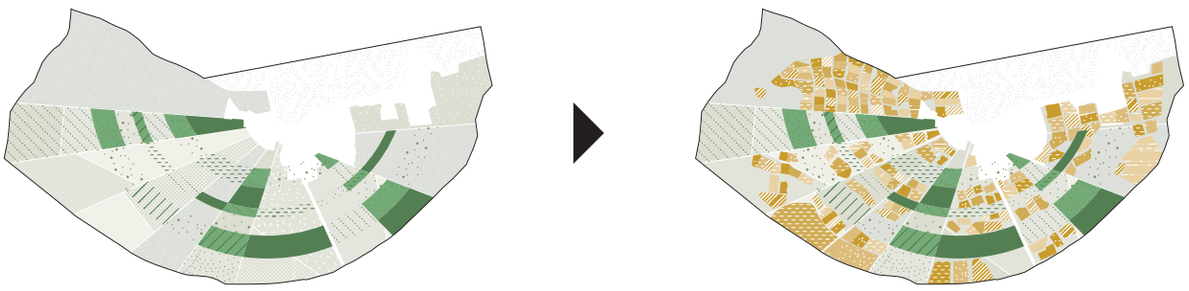
A diverse Lisbjerg should have a diverse nature. This diversity lies in the DNA of the hilly landscape. The natural processes change from the hilltop to the bottom of the hill.

The hierarchical layers of blue and green (cf. ill. 51 hierarchy) make multiple qualities of nature possible:

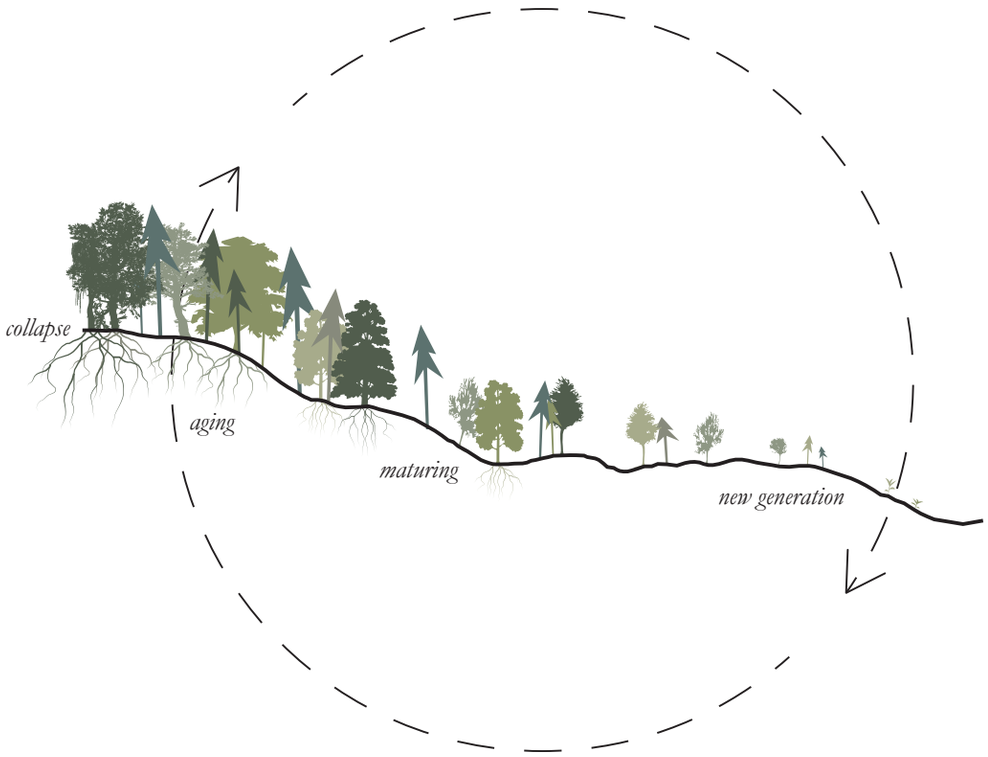
Nature is practical. It is thought into the early stages of the development. Nature contributes as an integrated means to a soft transitioning between the rural and the new settlement. The rural expansion of Lisbjerg starts with a vegetational land development (cf. ill. 56 biological processes). A vegetational growth is useful for managing rainwater: storing, delaying, cleansing and transporting, through the branches and corridors in Lisbjerg.

Nature's processes have space in Lisbjerg. In relation to shaping many different qualities of the green, the self-grown is nurtured and balanced. This means, that there is space for the designed as well as the self-regulatory nature. The self-regulatory creates natural habitat and increases the biodiversity of the landscape, which once was a mono-cultural farmland (cf. ill. 55 Farmland). Nature accommodates the self-grown events. It takes part in an open, experimental transition of the interface between the village and the rural (cf. p. 57 Growing Roots).
Nature's processes create space in the start-up phases of the development, allowing green areas, not to be fully designed from the beginning. With few resources, nature will regenerate on its own.

The variety of nature in Lisbjerg benefits with many possibilities for both new and existing residents. The hierarchy of blue and green creates a variety of recreational spaces: the near, the local, the corridor, the park, the branches. Some green spaces are intimate and very local, while others possess a very public character.



ill. 55 From a mono-cultural production farmland to a diverse suburban settlement



ill. 56 Biological processes

In Lisbjerg, everybody has nature in close distance. By not having traditional private gardens and front door parking, residents can benefit from large common areas. These are influenced by the residents, and are aiming towards creating local communities. Different types of landscape characterize future Lisbjerg's potential many quarters. Ecosystems and biodiversity shape a physical and mental sense of place for each resident.

Nature in Lisbjerg is 'hverdagsnatur' (everyday nature). Nature is not only to look at and for disconnect after a long day at work. Nature is to live in and to use on daily basis. It is for cultivating and for harvesting in micro-farming, so one can grow own carrots and learn where food comes from. Nature is close and possible. It frames the urban life in the future suburb. Green and blue spaces contribute to Lisbjerg residents and to community building.

GROWING ROOTS

GROWING ROOTS

Temporarity and the experimental meets nature

Growing out of the existing is the first and most important criteria for Lisbjerg. Integrating and making use of existing nodes in the village, can be beneficial for the whole linkage between the new and the existing (cf. ill. 58).

The mono-cultural fields of Lisberg are re-shaped into a diverse recreational patchwork (cf. ill. 55). Blue and green elements play a role in creating new, successful recreational meeting places, which invite both new and former residents. In these, there are space for the unexpected. Most rewarding are the spaces that users may influence on their own.

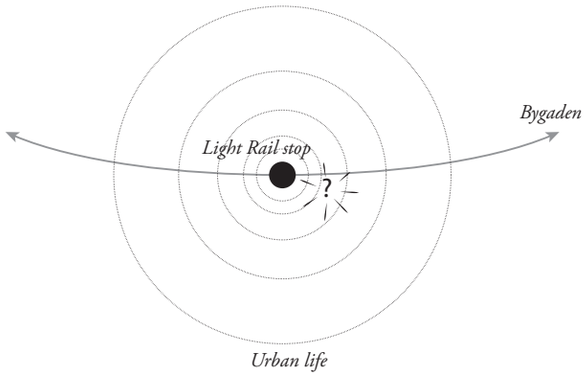
"The best way to plan for downtown is to see how people use it today; to look for its strengths and to exploit and reinforce them. There is no logic that can be superimposed on the city; people make it, and it is to them, not buildings, that we must fit our plans." (Jacobs 1958, p. 160)

Growing Lisbjerg is a process. Growing the city, allows for changes along the way and for the possibility of integrating knowledge, on how spaces are used. Lisbjerg is developed from experiences, and built in phases, to be open for changes and unexpected contributions (cf. ill. 59)

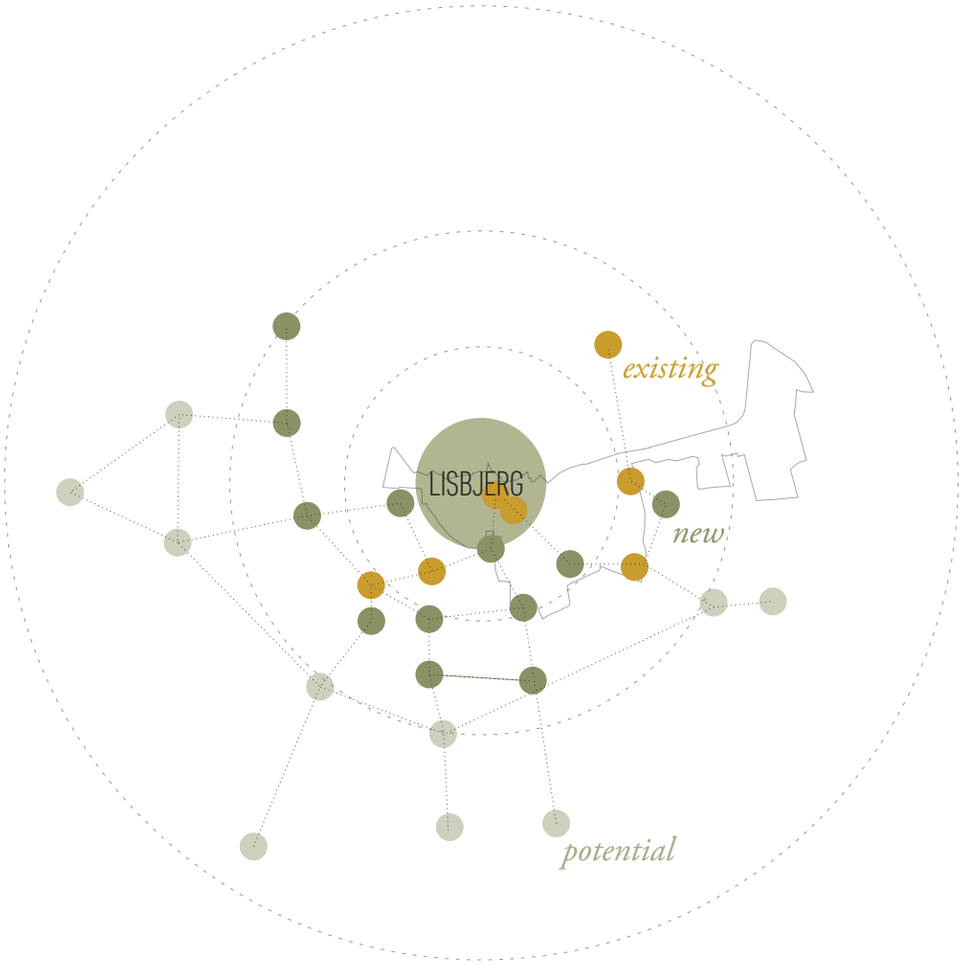
The lightrail contributes as a catalyzer for urban growth. Though, the development cannot solely rely on the driving force of the light rail as there is uncertainty onhow much urban life the light rail can generate in Lisbjerg. The affect it has on its surroundings may be concentrated in a certain aerral range (cf. ill 57).

Experiments are used as a driver for the area, as a temporary character. When new areas of Lisbjerg are being transformed, experiments are used as a strategic means of generating life. It brands and 'sells' the idea of living in Lisbjerg.

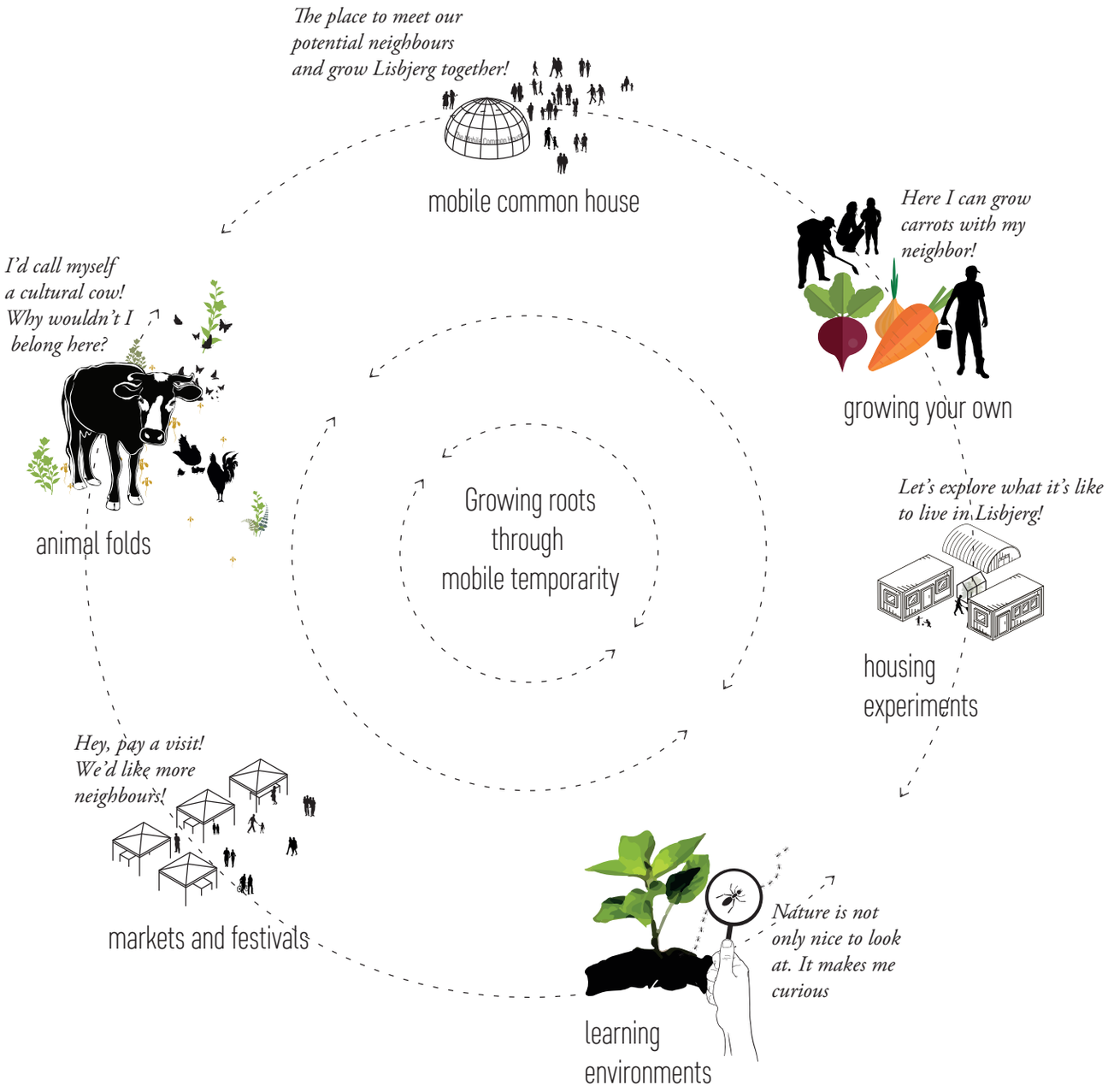
In principle, all open field areas need sense of place and anchorage. Here, temporarity is used as a platform for community. The proximity - and visual connection to the periphery of Aarhus, speaks for a more experimental approach to the development. Pop-up markets, temporary park installments, animal folds and a mobile commonhouse are placed in the interface between the village and the rural (cf. ill. 59). Here, temporarity and the experimental meet nature.



Ill. 57. Lightrail as growth.



Ill. 58. Growing from the existing, and out, by connecting existing nodes with new nodes. A web of nodes becomes a stabilizer of the growth.



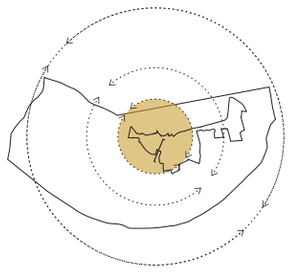
Ill. 59 Growing roots through mobile temporarity

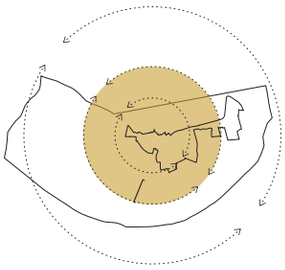
THREE ZONES OF GROWTH

THE VILLAGE EDGE

This zone is the starting point of the development in Lisbjerg. The rural extension of Lisbjerg grows from the existing. In early phases, existing villagers are involved as driving forces, contributing to a connection of the new residential areas. At the village edge, the aim is to dissolve physical and mental borders between the existing and the new residents. Here, water serves as a connecting, gathering and leading element. Green recreational spaces create anchorage and opportunity to meet.

Starting at the village edge, care-takes the image of Lisbjerg as a potential place to live. Starting here, generates value to the existing village. It creates and prepares future building projects with a mental land development. The growth starts in the existing settings, taking notice of local social trails and existing footprints. This is to generate a sense of place.

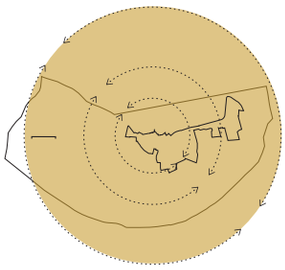




THE DENSE SUBURB

This zone relates to the expansion of Lisbjerg, towards Bygaden and the light rail route. The development is dependent of the catalyzing effect of the light rail. The density surrounding Bygaden depends on the scale of the development. Ideally, densification should be most concentrated along Bygaden.

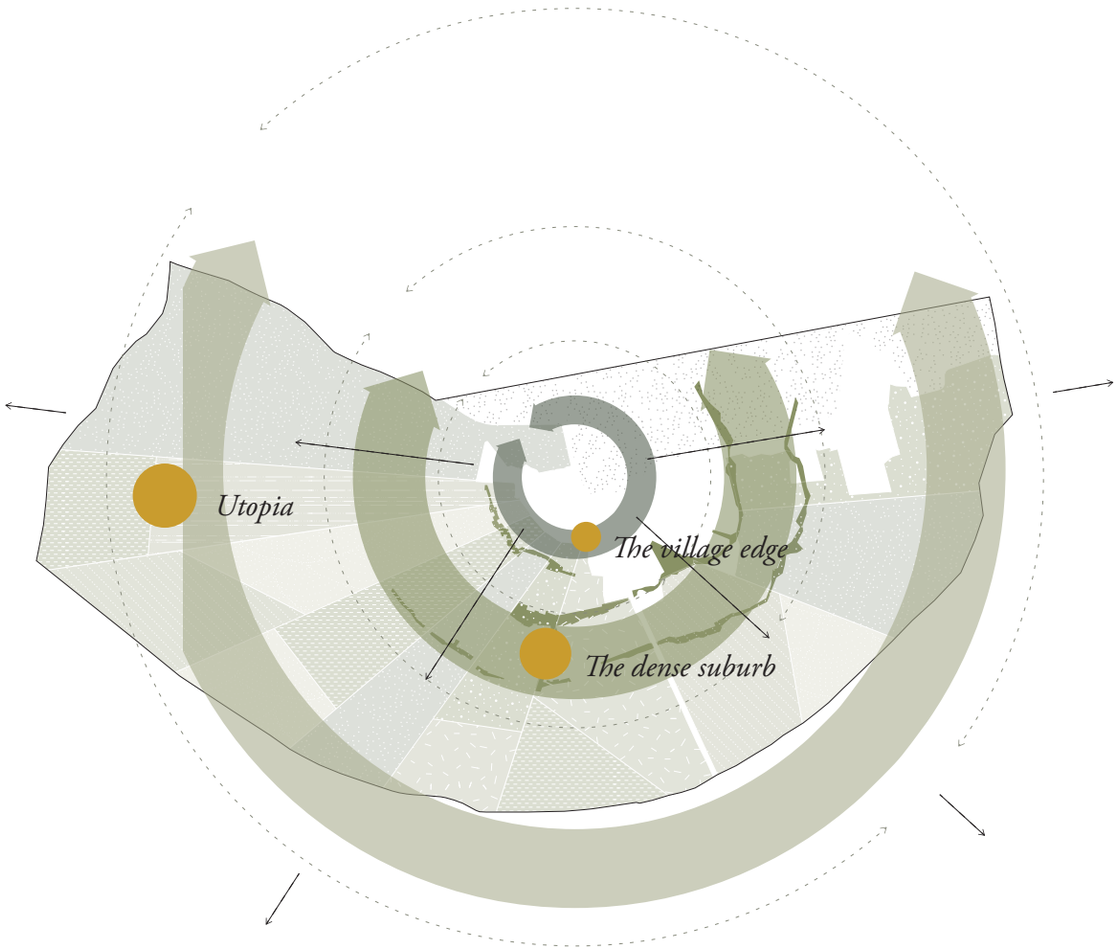
A starting point is a process of developing the recreational areas. These are different from the traditional concept of a park. Green spaces are allowed to self-set, and later, when the area is built, the park can be updated according to status quo on development. The gradual development eases the uncertainty of the course of development. Before constructing permanent building masses, urban life is generated. This is done through experiments with temporary housing as a means of 'selling' the idea of living in Lisbjerg to potential residents.
Spaces are to a degree flexible and can be claimed for another use, if demands of the suburb were to change again. For example, flexible plots allow for several typologies, and building mass is constructed as multi-affordance typologies. This creates security if the development at Lisbjerg should relapse.



UTOPIA

This zone is characterized by a large uncertainty. Therefore, the proposal for this zone is based on experiments as speculation and exploration of the "becoming". Because the zone is located on the periphery of the development area, there is space for experimenting with alternative housing typologies. The interface between the village and the rural is met by an infrastructural boundary.

A vegetational land development is initiated during the early development phases. A forest of trees is planted, to create a green edge towards the trafficked roads at south and west. The forest edge affords a different landscape and lifestyle at the bottom of the hill.
In this zone, there is greater space for natural processes and living in nature. Temporarity and experiments in the landscape, for example animal folds, start the process of specific place-making and branding the area as place to live.



ill. 60 Zones of growth. Growing the village in stages from the existing, and out. Within each zone, setting an examples of how it could be done.

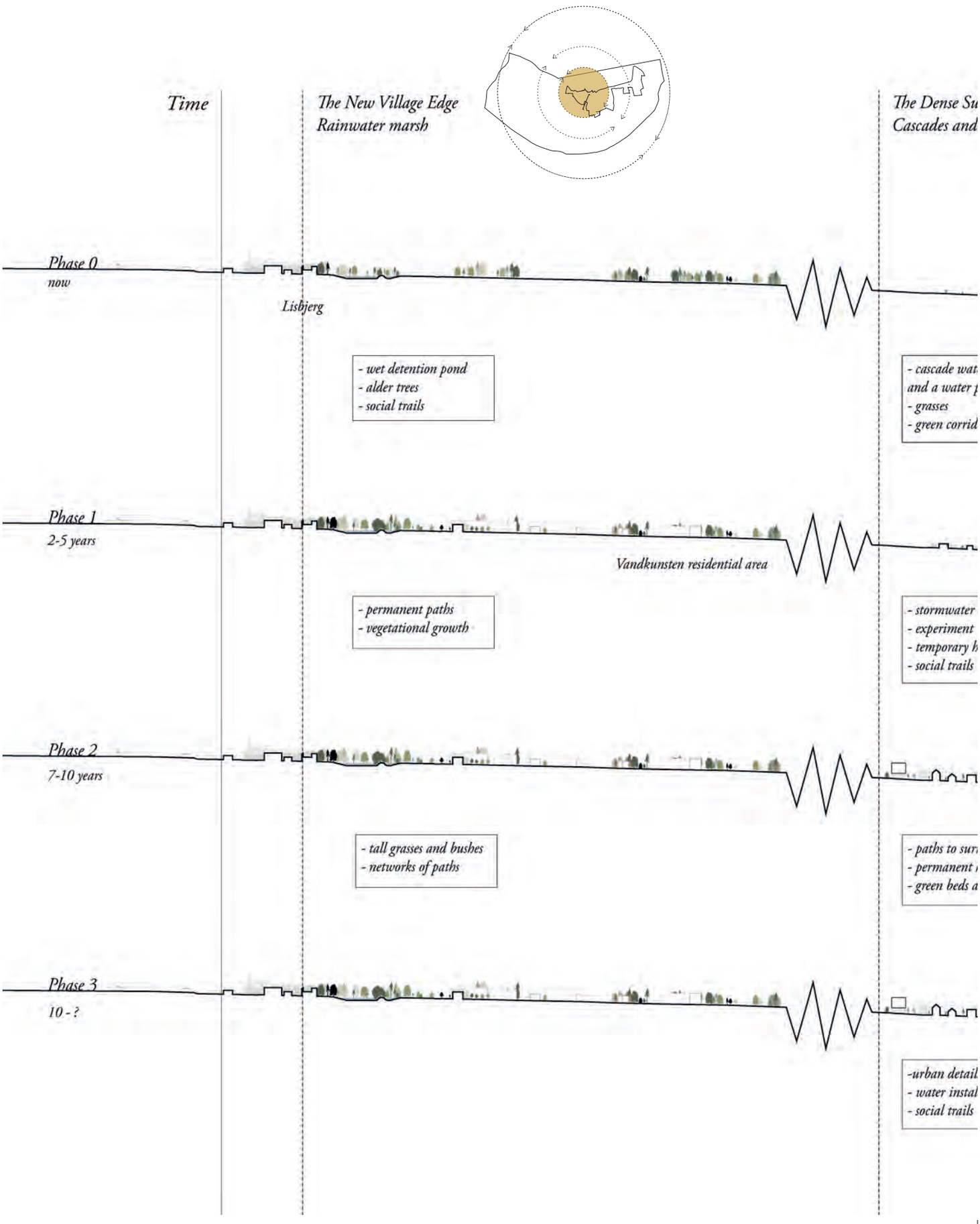
THREE DETAILS

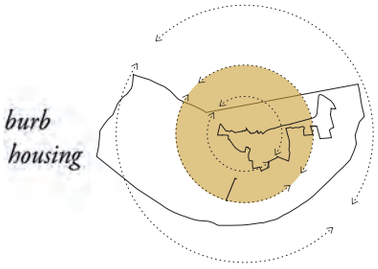
Introduction

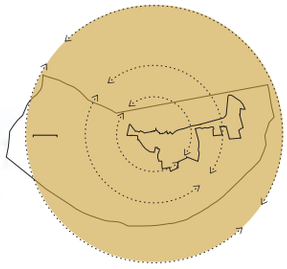
The following present design proposals of this master thesis in three details. The three details represent the suggested approach for the development of the suburb, Lisbjerg, near Aarhus.
The details are presented through an abstract timeline, sections and conceptual plans.

The timeline shows a phasing of the development, through an abstract hill section. It describes four phases of the development and of Lisbjerg's growth from the hilltop and down.
Landscape sections of the three details are abstractly placed, therefore the timeline should be read as a means to presenting an overview of the contiguous growth. The same section is shown, gradually developed over time and through the four phases: phase 0, phase 1, phase 2, phase 3.

ABSTRACT TIMELINE







er system: basins, natural edges
ump

or: trees and grasses

-tree growth from existing
windbreaks

channel

ousing

- experiment
- livestock
- learning environment

ounding areas
housing
nd smaller trees

- forest growth
- forest housing
- social trails

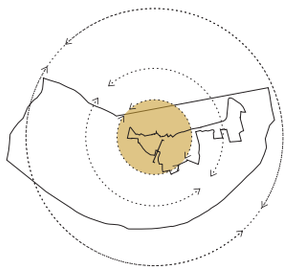
s and furnishing
lations
between houses

- dense forest
- re-purpose of existing farm
as community space

Ill. 61 Abstract timeline

THE VILLAGE EDGE

RAINWATER MARSH

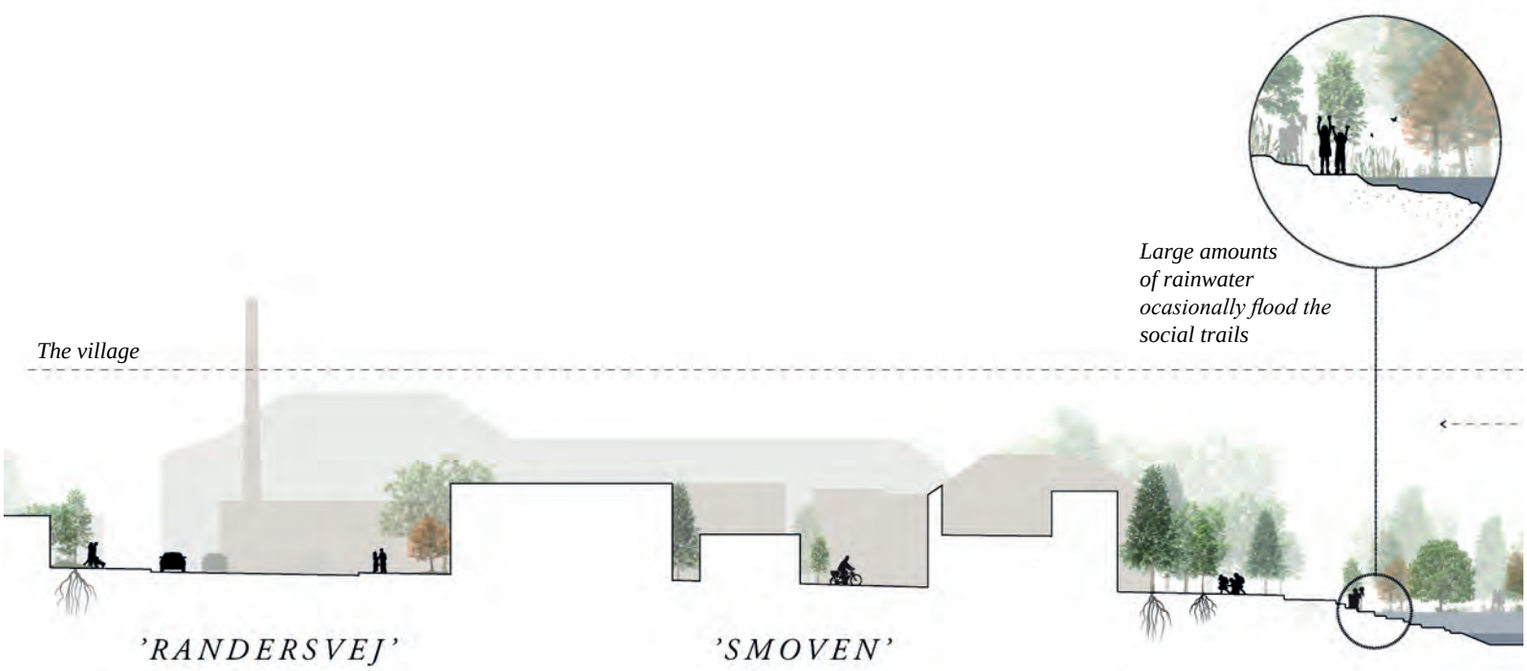


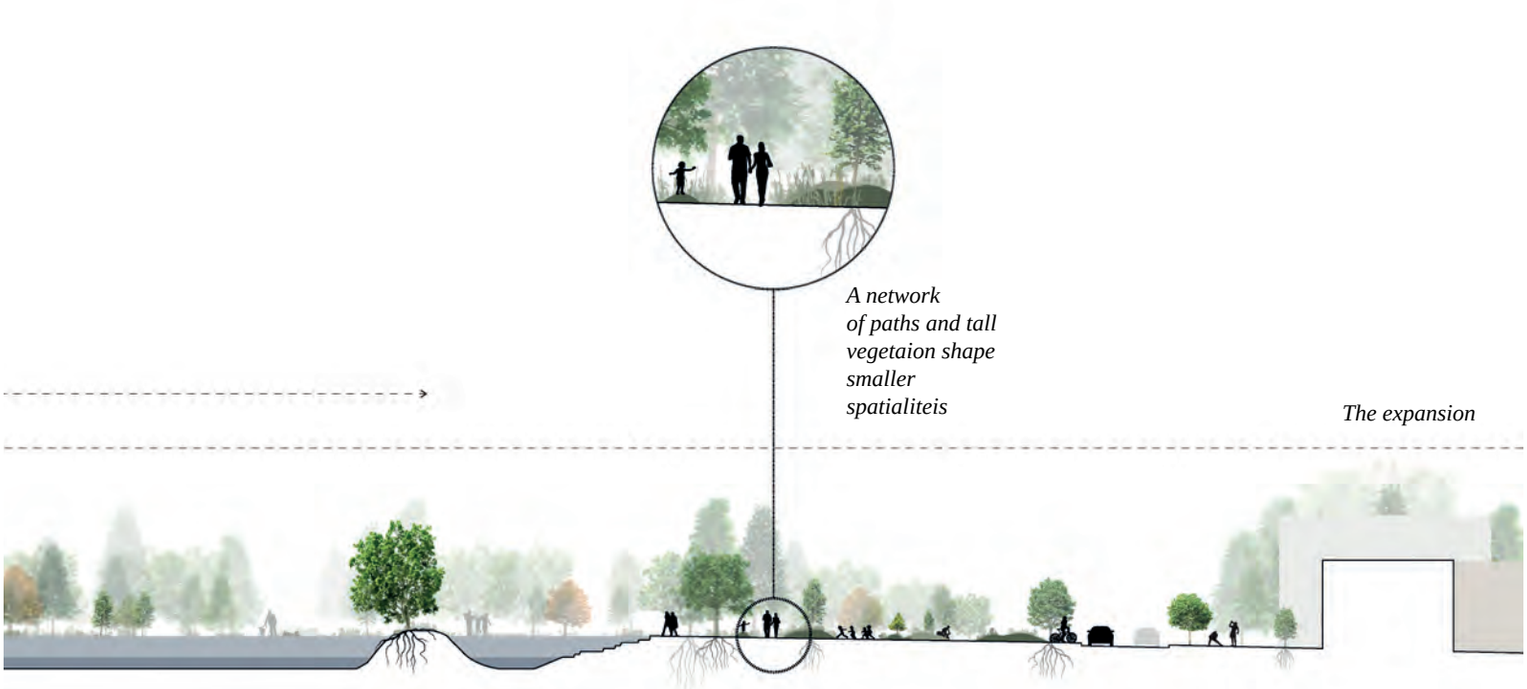
The marsh references to a well-known east Jutlandic landscape: the marsh.
A rainwater marsh creates a natural edge at the meeting between the existing village and the new additions to Lisbjerg. The marsh is a gathering point and a recreational meeting place.

The rainwater marsh is a “camoflashed” retention pond, dimensioned to manage a 5-year rainfall event with a volume of 2300 m3. Rainfall events above this size is led through an emergency outlet to the nearby soccer field, to manage the risk of flooding surrounding residential areas (see appendix 6). In the stormwater system, the marsh delays the downhill water flow and keeps deposited sediments at the bottom of the holding area. A sand and oil collector cleanses the runoff before it leaves the system. It has a permanent water table and islands with alder trees, giving the pond a character of a recreational marsh landscape.

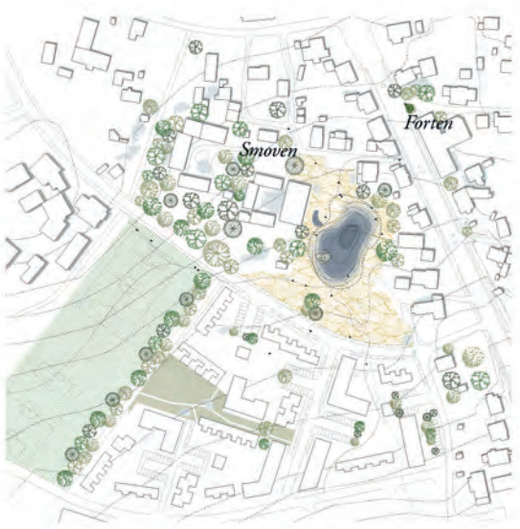
Dense trees contribute to holding water, as well as contributing to a certain spatial atmosphere. Alder trees are planted early to allow a process of integrating with the site.

The permanent pool of water varies in response to precipitation and runoff from the contributing areas. The physical settings changes largely according to seasonal weather conditions. Trees shift colours, paths and islands appear and disappear.



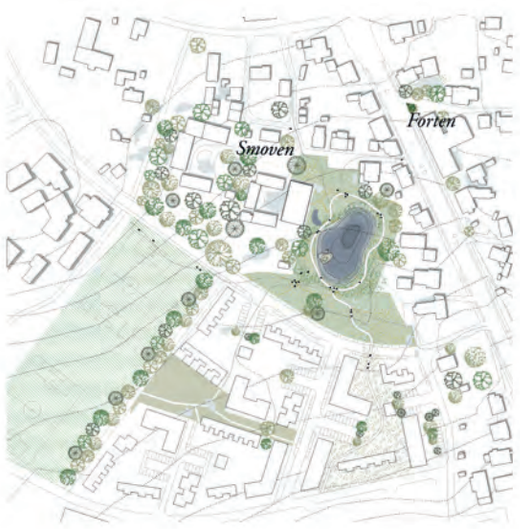


Ill. 62 Rainwater Marsh section



NOW

In the first phases, the wet detention pond is established as a rainwater marsh, to take part in the green and blue infrastructural system in Lisbjerg. Alder trees are planted, giving these time and space to grow roots and frame the recreational space. Social trails are gradually stepped by residents of Lisbjerg. Experience is gained from how the place is used during this phase.

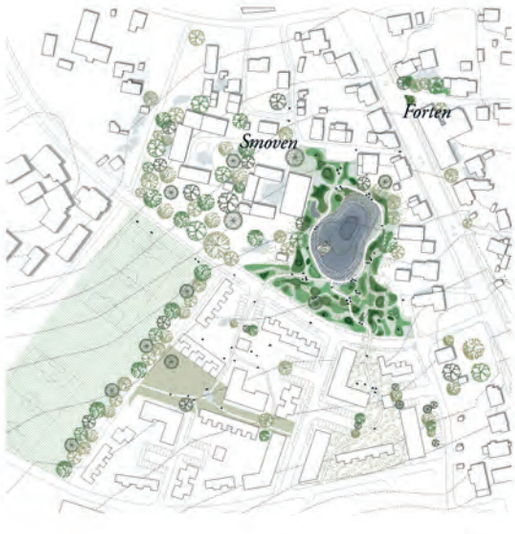


2-5 YEARS

Some of the social trails are transitioned into more permanent paths creating linkage to the new residential area, built south of the lake by Vandkunsten (cf. ill. 30). Vegetational growth has developed surrounding the lake, contributing to biodiversity and life surrounding the marsh.

Ill. 63Rainwater trench

Ill. 64 Alder trees



7-10 YEARS

With time, crooked alder trees will surround the lake, framing the space and creating an intimate urban breathing space in the dense suburb. Tall grasses and smaller bushes are placed to form a network paths and smaller spatialities. The organizing of the site becomes more permanently designed.

Ill. 67 Marsh concept plans 1:5000

Ill. 65 Glisholm stormwater lake

Ill. 66 Mud park by SLA

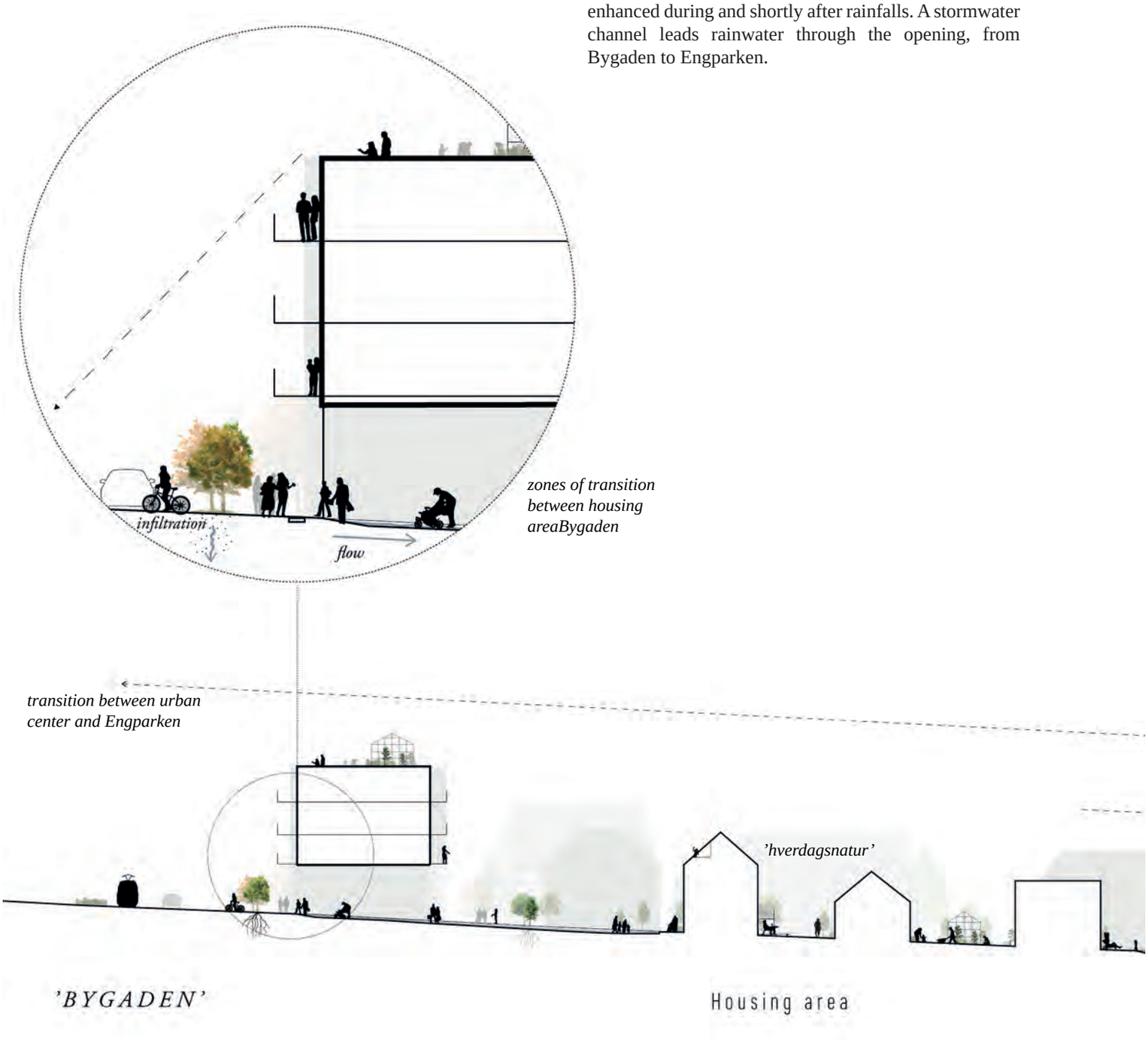
THE DENSE SUBURB

Cascades and housing

Section of the housing area

Through the housing area, a green transversal corridor connects to neighbouring sites. The green corridor is a flourishing green common space, a pleasant pause linking to neighboring areas, and a collector of excess rain on its way downhill.

To invite in from Bygaden and create pass-through, an opening is cut through the lower stories of a building. The strong connection to the vibrant street Bygaden is enhanced during and shortly after rainfalls. A stormwater channel leads rainwater through the opening, from Bygaden to Engparken.

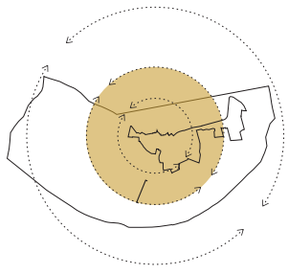


ill. 68 Section 1:500

‘Hverdagsnatur’ (everyday nature) shapes suburban living in Lisbjerg. Spatialities between houses form opportunities to create neighbor relationships. The green and non-trafficked surroundings create a safe setting, where children can play, while adults engage in community gardening.

The organizing plots of the housing area allow glimpses of activity between buildings and on buildings from Bygaden and other surrounding streets. Narrow facades and niches along with edge zones - in form of plant boxes, benches, greenhouses and semi-private balconies, porches and open roof terraces - activate the building masses and the spaces in-between. It creates the possibility of contact between people, at urban level and those in their homes or common areas. Surrounding each house are transition zones, that are not completely private nor completely public. There are no private gardens. It contributes to many points of exchange between inside and outside, allowing nature to come close.

The porosity of the layout is considered, to meet with future demands of the suburb. For example, a hard-surfaced parking lot is harder to change later. Instead, less permanent and softer materials may be used.



absorbtion of excess rainwater and local gardening

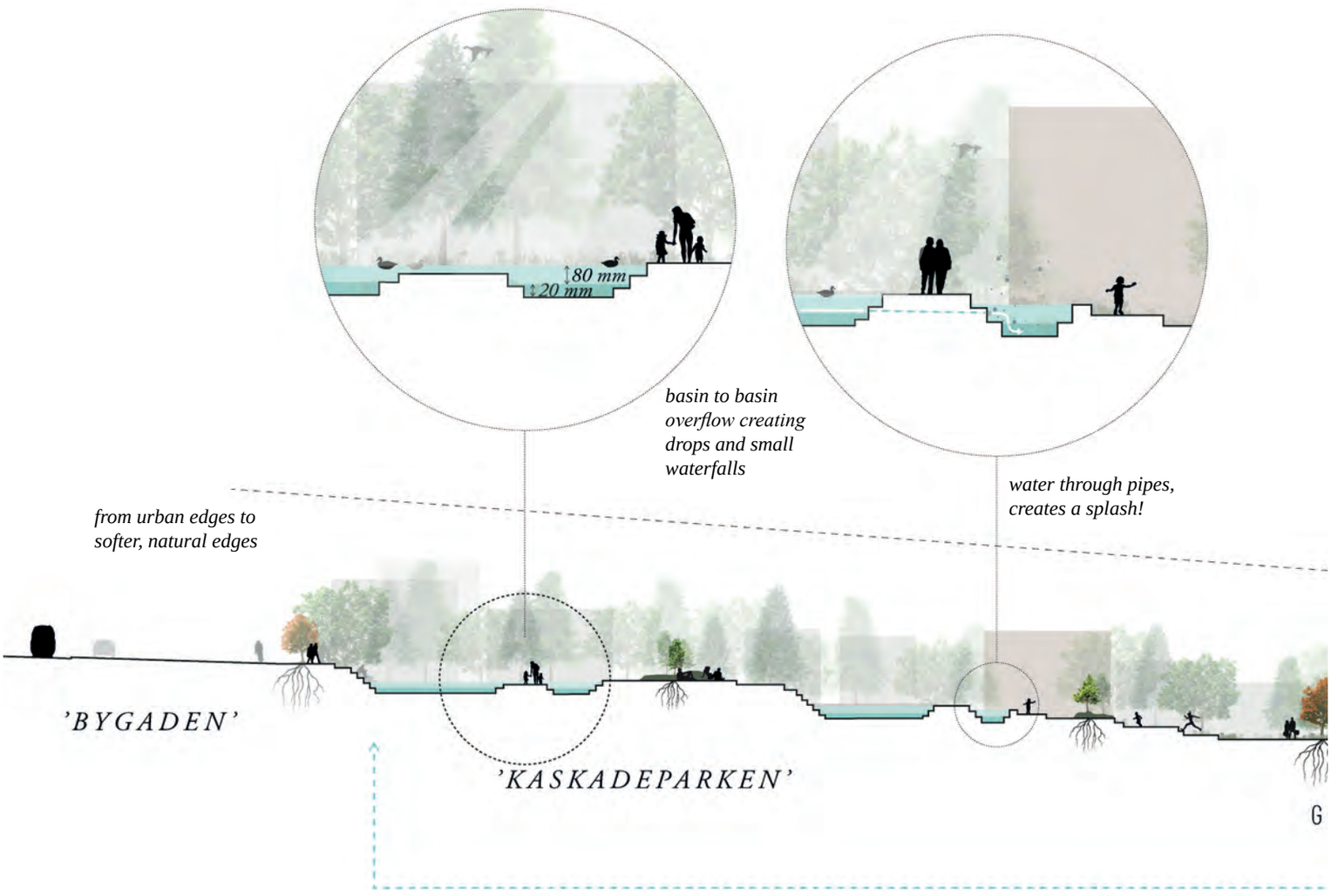
an ecological and social route and gathering point

’ENG-PARKEN’

SECTION OF CASCADES

The Cascades are a repetitive series of smaller wet detention basins, inspired by the functionality of rice fields. It collects both a small amount of rainwater from a section of Bygaden and water from top of the hill (cf. Appendix 6).

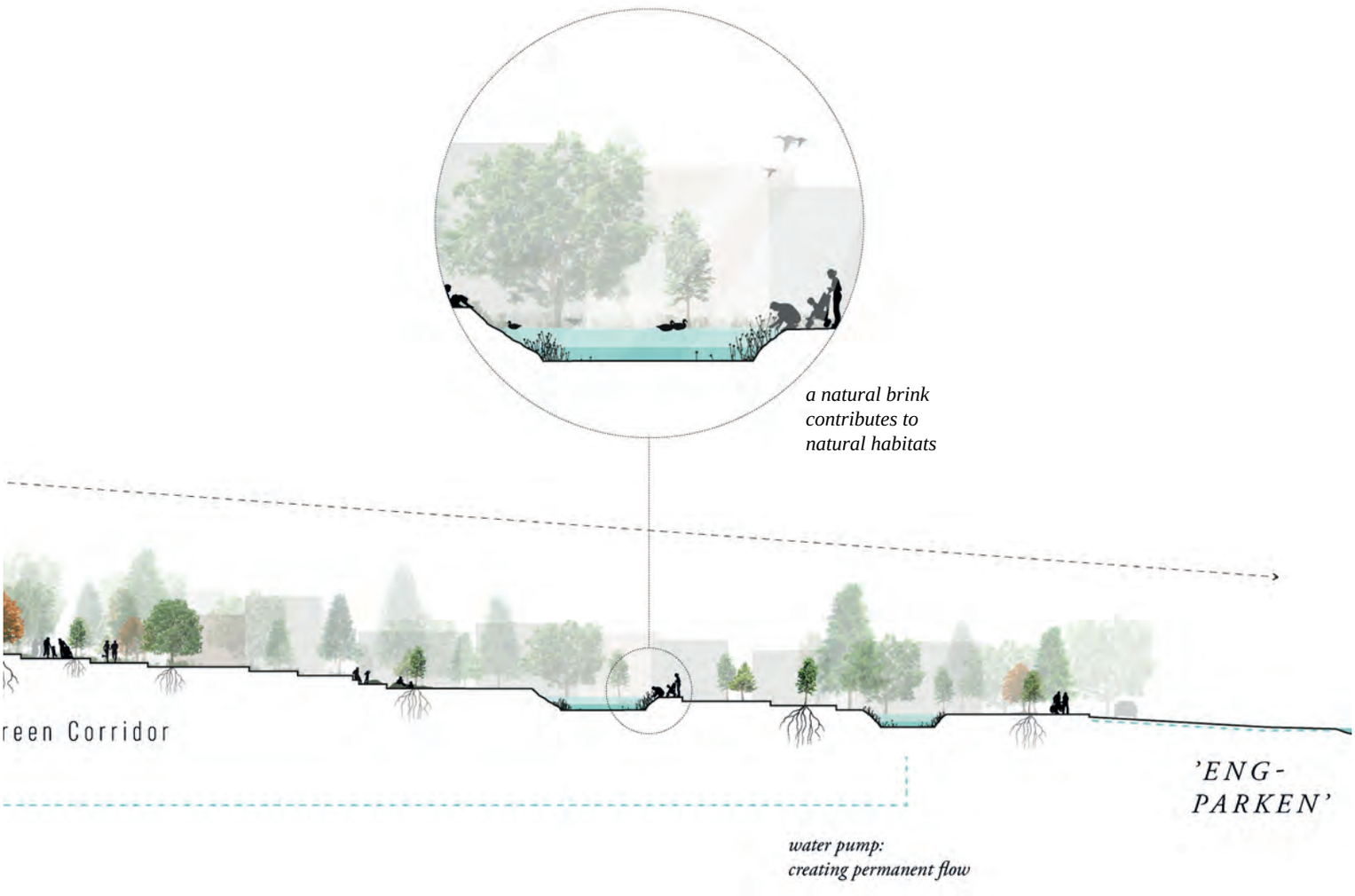
The space forms a recreational area different from the traditional concept of a suburban park. The Cascades form a multi-affordable recreational space, as a playful landscape, not only accommodating the family section.
It takes part in the blue and green infrastructural system of Lisbjerg, contributing to managing rainwater,



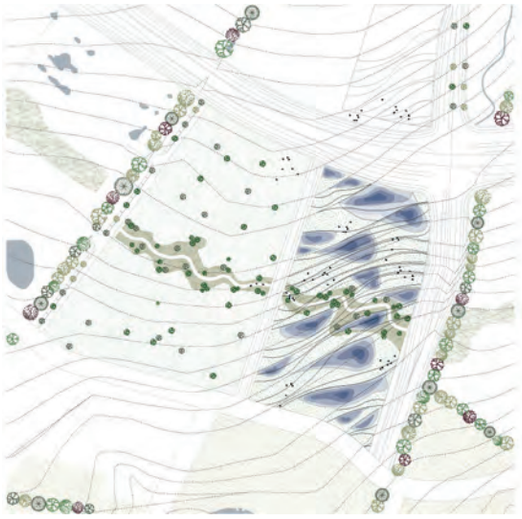
biodiversity, recreation and social interaction in proximity to Bygaden. Even if the development of the surrounding areas should fail to happen, the branches create spectacular lines of sight from Bygaden and downhill, towards the skyline of Aarhus.

The basin edges contribute to an atmosphere more urban at the interface with Bygaden and more soft at the interface with the meadow Engparken. This is also resembled in the water flow, where a greater discharge flow contributes to a more noisy drop between the upper basins, and a reduced discharge flow contributes to a calm stream and a soothing atmosphere.

The Cascades are developed gradually and in this process, nature is integrated and used actively. The landscape is characterized by a designed framing of what nature develops on its own. For example, the table of water rises according to events of rainwater and overflows between basins, creating a landscape on the terms of water.

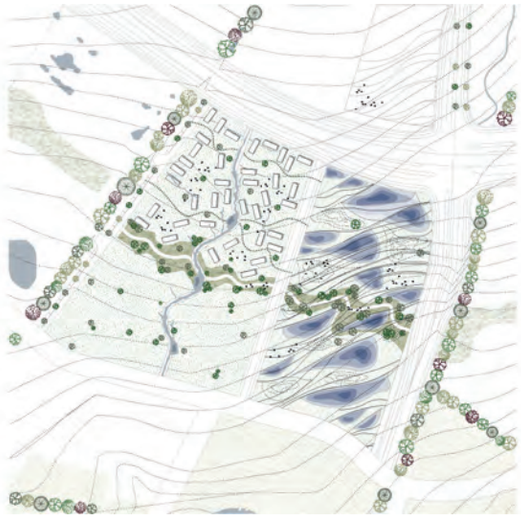


Ill. 69 Section of Cascades 1:500



NOW

In the first phase, the water system is established in the cascades: basins, natural edges and a water pump to secure circulation. Few grasses are planted and allowed to self-grow through the first phase. A green corridor is established, differentiating from the cascade landscape: tall trees and grasses makes a connection to the neighbouring area.

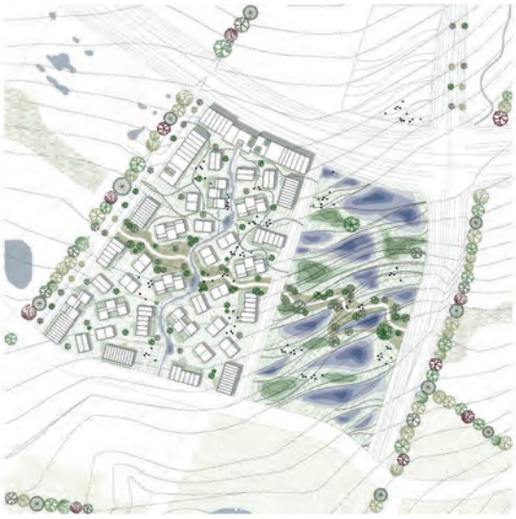


2-5 YEARS

A vegetational growth of the cascades and green corridor have established biodiversity before the site is permanently built. A traversing stormwater channel is placed to transport rainwater from Bygaden to the meadow. Temporary housing is placed in the northern part of the open field, meeting Bygaden (cf. p. 104). The housing is an opportunity for potential residents to try to live in Lisbjerg.

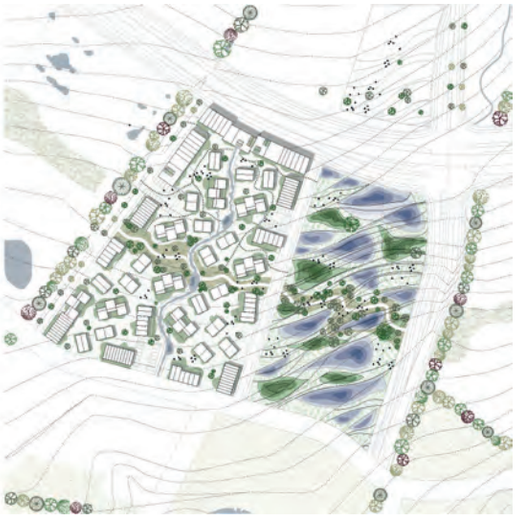
Ill. 70: urban water

Ill. 71: Rice field



7-10 YEARS

Experiences from temporary dwellings are used, to create path connections to the cascades and other surrounding areas. Permanent housing is built, creating a housing area with is densest edge towards Bygaden, embracing clusters of diverse housing. Green beds and smaller trees are placed in the cascade.



10-? YEARS

The cascades are more thoroughly designed. Urban details and furnishing is applied. Water installations create a more playful atmosphere, making the cascades an alternative playground and recreational space in relation to the nearby housing areas and urban life in Bygaden. Social trails in between houses in the housing area are stepped, and further develop the landscape.

Ill. 75 Conceptual plans of the cascades & housing 1:5000

Ill. 72: Rice field

Ill. 73: Ørnbjerg, MVRDV

Ill. 74: "Hverdagsgrønt"

UTOPIA

Swallowed by nature

It is imaginable, that Lisbjerg was once covered with a dense forest of trees. The atmosphere of the forest housing, contributes to the process of specific place-making, while branding Lisbjerg as place to live.
As the periphery of the development area allows for a higher degree of experimentation, the forest housing features a larger architectural freedom. The area allows for experiments with the becoming and is spatial towards acting out extremities of current lifestyles.

Forest housing accommodates living in nature. What is sought in the current and future suburb is closeness to nature. Of the areas in Lisbjerg, nature makes itself most obviously available in this housing area. Dense clusters of tall trees, surround clearings of autonomous semi-

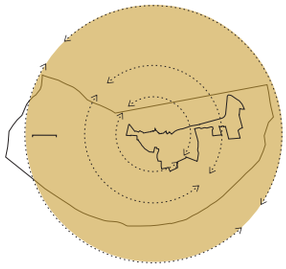
sharing large green spaces for multiple uses

' F O R E S T HOUSING'

livestock fold

detached houses. Large spaces allow for livestock and micro-farming.

The meeting with an existing rural building, is explored in a process of gradually integrating the existing into the developed area. Here, the planting of rows of trees contribute, as the trees are gradually spread across the open fields, eventually covering the whole area. The trees also contribute to preventing excess rainwater from flooding the low-lying roads. Housing and the existing farm are ‘swallowed’ by nature.



the forest marsh collects rainwater and delays the further flow

the existing farm building is re-appropriated for community microfarming and local festivals

’FOREST MARSH’

existing farm building

Ill. 76 Section of forest houses 1:500

CONCEPT PLANS OF THE FOREST HOUSING

NOW

As starting point, trees are planted from two existing windbreaks, to soften the outer edge of the development area and protect from the trafficked roads. It is also a process of creating spatiality on a vast agricultural field. The vegetational land development shapes the starting point for a physical anchorage.

2-5 YEARS

A livestock fold forms an experiment, creating a temporary atmosphere at the periphery of Lisbjerg. It forms an attraction point, and a learning environment for the Lisbjerg school and residents. It catalyzes a recreational value and mental anchorage.

Ill. 77 turf houses

Ill. 78 nature 's close

Ill. 79 Trees with 'socks'

7-10 YEARS

The forest is gradually spreading across the open fields. Forest housing with large architectural freedom is established. Gradually as the landscape is claimed by its residents, social trails are being stepped.

10-? YEARS

The forest has spread to ‘swallow’ both the existing rural building and the forest housing. The existing rural building is re-purposed, as a space for community and a gathering point for both the forest houses and Lisbjerg residents.

Ill. 82 Conceptual plans of the forest housing 1:5000

Ill. 80 Abandoned chinese fishing village

Ill. 81 Areas of Horsager co-housing, Lisbjerg

ENDING

Concluding remarks and reflections

CONCLUDING REMARKS

The initial objective of this thesis 'Natural Growth' was to contribute with a process-minded approach to the discussion of future, dense suburban settlements with origin in the site of Lisbjerg, Aarhus.

With this master thesis, the 'open fields' of Lisbjerg have been transformed into a dense landscape city with origin in a natural growth from the existing village, and from the hilltop and down.

The great challenge of rainwater on the sloping terrain was turned into an opportunity to create coherency between the existing and the new. In the development of future, dense Lisbjerg, temporarity and experimental practices meet nature. Phasing and open-endedness in the plan have been considered to ease the uncertainty of the course of development.

Five parameters are regulating tools in the design of 'the good, future suburb'. The parameters take part in the changeability of the plan as they can be adjusted to contextual changes and future demands.

Three overall themes are main concepts for design of this master thesis: A green infrastructural system integrated in the development of Lisbjerg, as a means of growing Lisbjerg from the hill top and down, managing rainwater and connecting the existing with the new.

Research on recent Danish suburban development has shown that form and values of the suburb are continuously changing. Through the design proposal, the development of Lisbjerg is understood through a means of time, analyzes of the past and present trends, and projections. The plan for Lisbjerg finds balance between autonomous non-planning and fixed masterplanning, as neither is the solution to planning for the fluid future of cities. Some decisions have to be made, and plans have to create some fixity.

As an important part of place-making, branding and creating mental anchorage, a sense of place has been created in the design proposal for Lisbjerg. It helps potential residents to actively choose living in Lisbjerg. What makes the site of Lisbjerg, was concluded to through analysis and sensorial investigation. The design proposal improves the mental image of Lisbjerg, from its current projection of the 'tired' houses, experienced along the broad and busy Randersvej, into the place where suburban living in nature and landscape is possible.

The contrasts and great variety of Lisbjerg is reflected in the proposed diversity of recreational spaces. The design proposals considers the social processes of Lisbjerg as an important driving force for development. It was exposed through an interview with a group of Lisbjerg residents, that there are some resident stakeholders that are willing to become involved in the development. The Lisbjerg village is not a inwards centered and introvert community, but on the contrary, an extrovert and outreaching village, reaching towards the landscape.

REFLECTIONS

Modernism has taught us to be afraid of moving too drastically, when developing our cities. We are afraid making the same “mistakes”, because you see how many modernist “products” malfunction today. For example Gellerupparken in Aarhus, a rationally planned housing area, which has been stamped as ghetto, and for example the sewer systems, which are under pressure, because they no longer have the necessary capacity.
We have spent more on correcting and adjusting the modernism “mistakes” than there has been spent on building the modernist creations. (Jensen 2017)
However, the modernist planners acted towards solving societal problems. Back then modernism had to take choices, such as sanitation and extensive engineering design to create better livability than what existed in the city at that time. It was attempted through a sprawl of building mass and additional infrastructural systems to fight breakouts of illness. At that time it was a brave attempt to improve and create a better future.

Today, the centre of rotation in planning and architecture is sustainability. It has become a large societal problem that we use to many resources in comparison to the capacity of our Earth. Only in Denmark we would in theory need five Earths to maintain our resource consumption. (kilde)
We are now excavating waterways and wetlands, which were firstly banished from the surface during the modernisms pipe laying. Since, it has come to planners awareness that the water is beneficial in solving this new societal problem, and that the water benefits the whole ecosystem and human welfare. It is now indicated that nature should become part of the city again and minimize paved surfaces.
Who knows, which mistakes we are making now and will have to correct in the future?
We should dare to act. What we need is a balance between non-planning and masterplanning.

What is like to live in the future suburb? Trends show that we want to move out of the city and out in the suburbs again. What causes this?
It could be because we have become unsatisfied with the spatial limits of the inner city and crave the green surroundings, sometimes the wrong green surroundings, however, which the suburb affords. Or it could be because we are given more value for our money - as in space.
Perhaps we have finally had enough of dense and tall buildings, as it seems cities are only growing taller. Glancing at recent strategies for inner cities, it could also be reasoned by the car-free zoning of cities, causing troubles in finding spare parking lots, when returning from a long day at work.
Could the municipalities also have contributed to the suburban trend by refreshing our memory of it? The many strategies of suburban regeneration and transformation processes are branding the suburb at new.

We might be persuaded to believe that we really do get the best of the suburb, as in space, and the best of the city, as in urban functions, in the future suburban settlements.

We want to live in nature. What causes this? And does it have any connection to the agenda of sustainability and increased biodiversity? How do we want to use nature? Is it just to look at? Or is it for cultivating`and harvesting? Or something completely else?
In the utopian periphery of Lisbjerg, nature is allowed to grow more or less uncontrolled. In an urban context one would have to control it in one way or another. Can nature be something else in the suburb? Is it possible to live dense and still have large green areas? Without stretching far from human-scale.

What is ‘hverdagsnatur’? (everyday nature)
A home is something which we define ourselves with. We do not spend much time in our homes. But when er are there, is nature then a possibility of disconnecting? Is that why we value it so highly?

Ill. 83 Nature in Lisbjerg

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ill. 69: Section of Cascades (own section)

ill. 70: Urban water, Wishard healing waters, Indiana: http://www.fluidity-design.com/projects/wishard-memorial-hospital-healing-waters/ [Accessed 13-05-2017]

ill. 71: Rice field terrace: (https://s-media-cache-ak0.pinimg.com/originals/c8/7d/d7/c87dd7d814932771d9566cbd98f1d9d7.jpg) [Accessed 13-05-2017]

ill. 72: Rice field, Bali, Indonesia: (http://hqworld.net/gallery/details.php?image_id=1045) [Accessed 13-05-2017]

ill. 73: MVRDV, Hagen Island, Ypenburg: (https://st.hzcdn.com/fimgs/e9f1eb72022601ee_2579-w618-h492-b0-p0--contemporary.jpg) [Accessed 13-05-2017]

ill. 74: Hverdagsgrønt, Tower House, Australia: (http://www.aa13.fr/wp-content/uploads/2015/04/Tower_House-Andrew_Maynard_Architects-16-590x566.jpg) [Accessed 13-05-2017]

ill. 75: conceptual plan of the cascades and housing (own plans)

ill. 76: section forest (own section)

ill. 77: Turf Houses, Iceland:(http://cdn.zmescience.com/wp-content/uploads/2015/09/trio-of-icelandic-turf-houses.jpg.990x0_q80_crop-smart.jpg) [Accessed 13-05-2017]

ill. 78: Nature's closeOYO, House GeoPo, Belgium: http://www.archdaily.com/386204/house-gepo-open-y-office/ [Accessed 13-05-2017]

ill. 79: Trees with sock's (own picture)

ill. 80: Abandoned Chinese Fishing Village Being Swallowed By Nature 1 Available at: http://mymodernmet.com/wp/wp-content/uploads/archive/UaQ-rX8EWSS63ASj13cS_houtouwan1janeqing.jpg [Accessed 21-02-2017].

ill. 81: Co-housing in Lisbjerg (own picture)

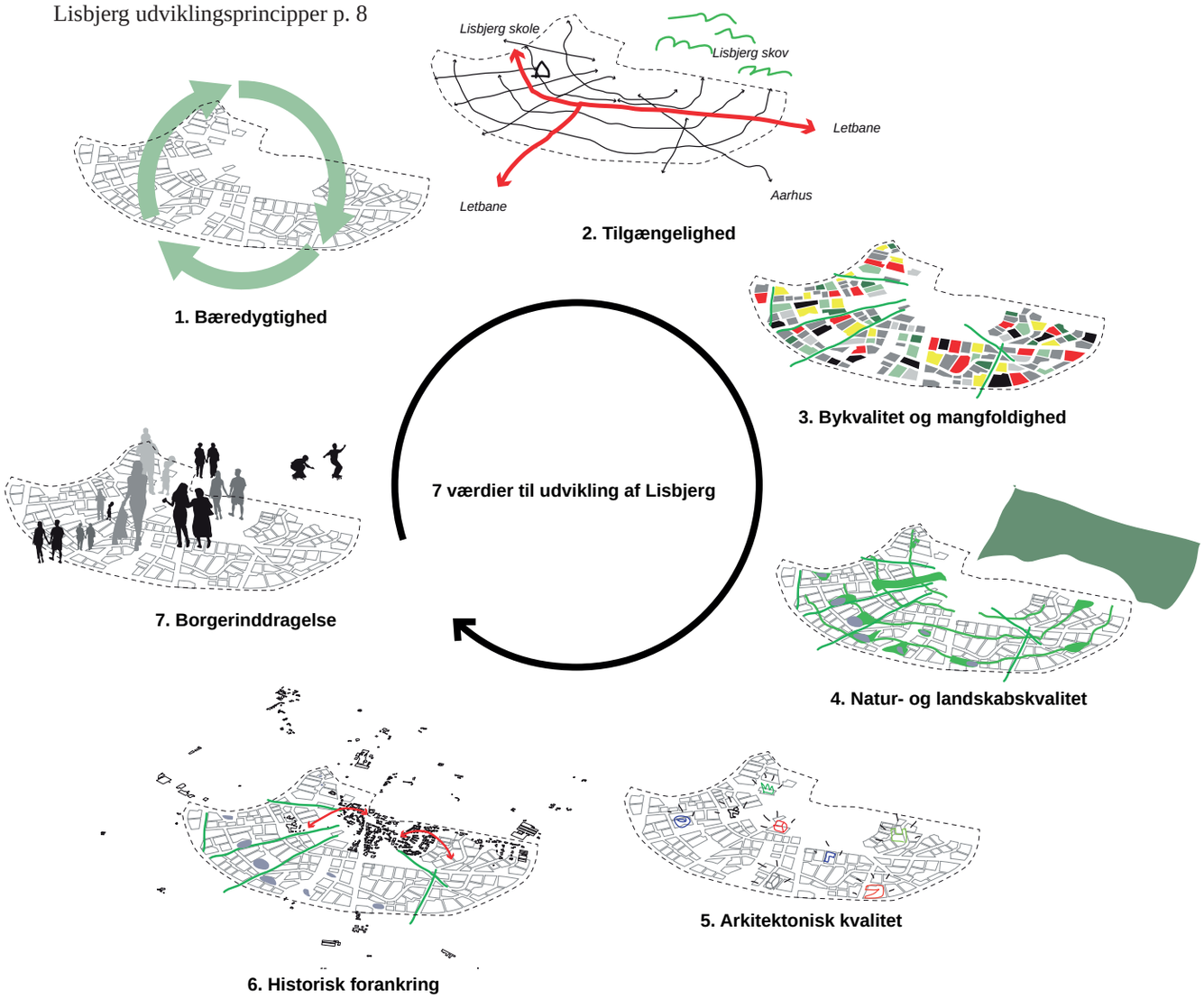
ill. 82: conceptual plan: area 3 (own plans)

ill. 83: nature in Lisbjerg (own picture)

APPENDIX

APPENDIX 1

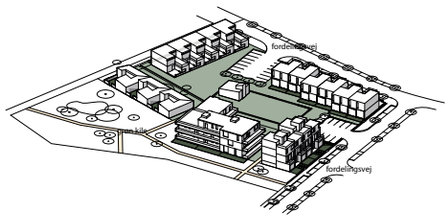
Værdigrundlag for Lisbjerg Bakke, Aarhus Kommune (2014) Fremtidens Lisbjerg udviklingsprincipper p. 8



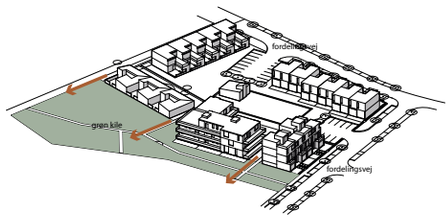
APPENDIX 2

Vandkunsten: udviklingsprincipper,
Vandkunsten (2014)
Inspirationsmappe for Lisbjerg
Bakke p. 17

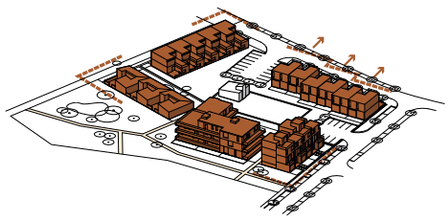
1. Gårdrum
Hvert delområde samles om et gårdrum.
Der sikres private haver mod syd og vest samt mod fordelingsgader.
Havezonen skaber en blød overgangszone mellem privat og offentlig.



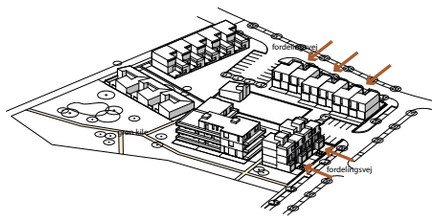
2. Grøn kile
Delområderne varieres mod de grønne kiler, så der skabes større sammenhæng og variation mellem det grønne og det bebyggede.



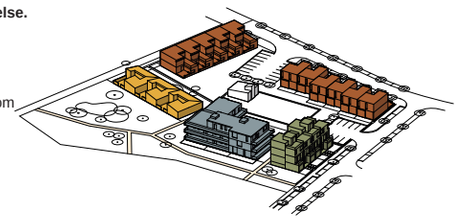
3. Kantzone
Bebyggelserne placeres, så gård- og gaderum defineres tydeligt.
Hjørnet bebygges, så hvert delområde kantes ud mod gaderne.
Der opstår en by, hvor bebyggelserne mimer karréstrukturen.



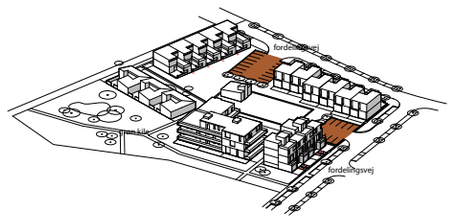
4. Adgange
Indgange placeres ud til fordelingsgader. Gaden aktiveres og bliver samling for det uformelle mødested i byen.



5. Diversitet i materiale og bebyggelse.
Der skal tilstræbes en typologisk diversitet indenfor hvert delområde.
Dvs. bebyggelsen bør sammensættes, så der opnåes forskelligartethed i såvel udseende som anvendelse. Rækkehuse, gårdhavehuse, etageboliger og punkthuse sammensættes inden for hvert delområde, gerne med en blanding af ejer, lejer og almene boliger.



6. Parkering
Sammenhængende parkering indenfor delområdet må ikke overstige 20 pladser, og forskydes ift. hinanden. Parkering placeres aldrig på hjørner eller langs vejen, men vinkelret på vejen.
44% af parkeingen afvikles på det enkelte delområde, hvor de resterende 56% udgør kantstensparkering i fordelings- og boliggaderne.

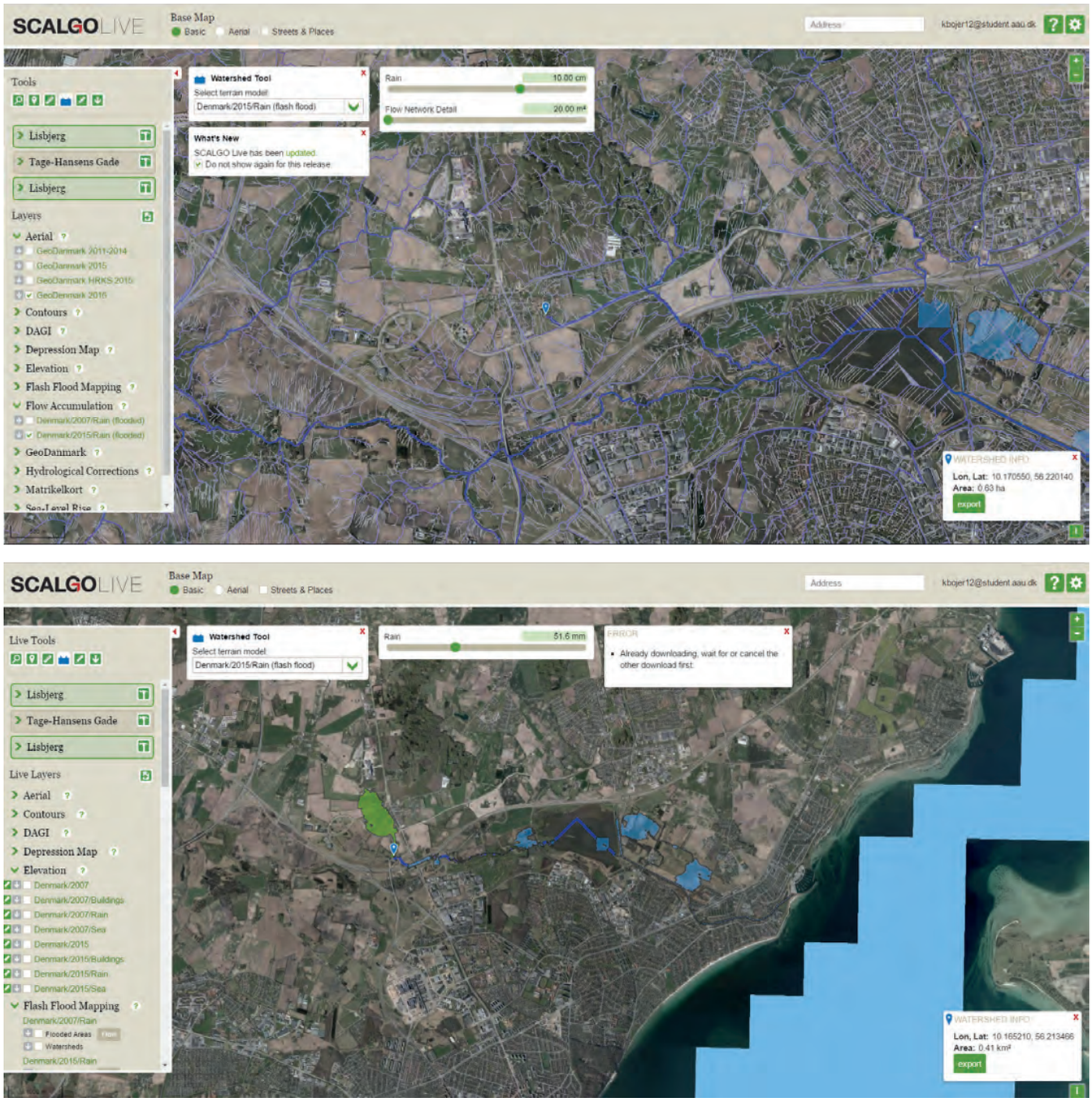


Appendix 3

Lisbjerg Byfælled, Aarhus Kommune (2009) Grøn kvalitetshåndbog for Lisbjerg - første etape p. 38

Appendix 4

SCALGOLIVE, Available at: Scalgolive.dk



Appendix 5

INTERVIEW TRANSCRIPT

COMMON DINNER AT CO-HOUSING HORSAGER

Interview transcript
Interview with Horsager co-housing in Lisbjerg.
The interview was conducted on April 10, 2017, in the time period between 18.00 and 21.00.

Hanne:
"Der er fællesspisning, banko, disco, musik og foredrag i Beboerhuset til voksne og børn. Ikke så meget til Emils alder. Ja, og så er der big band og spejder."

"Det er lige nu Kresten, der står for mange af de aktiviteter, der foregår i byen. Og det er han rigtig god til. Men det er svært at skrabe folk sammen. Det er næsten hele byens børn, der skal deltage i de enkelte aktiviteter. Hvis nu bare byen var dobbelt så stor, så ville der være flere aktiviteter og foreninger."

"Det er fint, hvis det er en hel masse familier, der kommer til byen. Så kan det være, der kommer den svømmehal vi gerne vil have. Det kunne sådan set være fint bare med et supermarked. "

"Det må gerne være blandede beboer, der kommer til byen. Måske er det godt med en blanding af midlertidige beboere og de mere faste. De unge bidrager med noget liv. De sidder måske og griller og har bålaften. Måske kan de tilføre byen noget kultur og skabe nogle aktiviteter for Emil. "

"I Lisbjerg er man meget tæt på oplevelser i naturen. Man kan for eksempel følge Kirkestien helt ned til Engå. Legepladsen med svævebanen oppe skoven er super fin. Den er oplagt at besøge, når man får gæster. Alt er i gåafstand, man kan godt lade børnene gå alene ned på den lille legeplads, fordi der er mange stier og mindre veje som de kan gå på."

"Randersvej er svær at krydse når man er på cykel. Der er kun ét sted, hvor man kan krydse vejen, og det er i krydset ved beboerhuset. Man tør ikke at lade børnene cykle i skole selv, fordi de skal krydse Randersvej (hvor man må køre 60 Km/t)."

"Det er nok usandsynligt, at det nogensinde bliver så stort. Og det er nok meget langsigtet, hvis der overhovedet skulle ske noget i den størrelsesorden. "

Kresten:
"Der er egentlig mange aktiviteter, men det der mangler er flere mennesker. Der sker tit noget i beboerhuset, men der kunne sagtens være flere folk til at møde op til de her arrangementer. Bare dét at kunne fylde lokalerne ud."

"Det skal ikke være alt for mange enlige, ældre og studerende, for de bor her midlertidigt. De midlertidige beboere bidrager ikke til det lokale fællesskab.
Der bliver nødt til at være nogle, der har interesse i lokalsamfundet. Det er fint, at de bor her (de unge), men man ser dem ikke i lokalsamfundet. Der skal flest af den slags tilflyttere, der slår sig ned."

"Man kan godt være lidt pessimistisk omkring letbanen. Den giver både Lisbjerg en fantastisk nærhed til Århus, som vil gøre byen attraktiv i forhold til at flytte til byen. Og at der kommer flere tilflyttere kan måske på den ene side hjælpe til, at der kommer flere funktioner i byen. Men det kan på den anden side, sådan lidt pessimistisk set, også gøre at man har lettere ved at rejse til Lystrup eller Århus og bruge deres funktioner. Så kan man bare tage derhen. Så er det slet ikke nødvendigt at skabe noget i Lisbjerg."

"Man kunne godt arbejde mere ud fra det gamle og historiske Lisbjerg og det eksisterende lokalsamfund. De nuværende beboere skal tænkes ind i planerne.
Man kunne godt finde inspiration i Hjortshøj. I Hjortshøj var beboerne med til at skabe drivkraft og sørgede for, at der skete noget. Der kunne også godt ske noget forbedring inde i byen."

Emil:
“Der sker ikke noget her. Der er ikke rigtigt noget at lave. Så skal man ind til byen (Århus).
Der er en ungdomsklub, hvor man kan gå 3 gange om ugen, men de har ikke åbent så lang tid. Kun til kl 19. Og så er der en boldklub. Der er en svævebane oppe i skoven. Der er meget fint deroppe.”
“Man kan tage stierne ned til krydset ved beboerhuset (Randersvej), for det er farligt at krydse over længere nede.”

Små børn (i munden på hinanden)
Dreng: “Der er også en ‘lillebitte’ legeplads.”

Lille pige: “Ja. Der er en frø, der står med åben mund, og det er en skraldespand!”

Anden lille pige: “Jeg har prøvet at være der!”

Lille pige: “Det ta’r en time for at jeg kommer til en rigtig go’ svømmehal!” (mor retter til max. 30 min)

Ulla:
“Man skal tænke over, hvad det er for et lokalsamfund, som man bygger i.”

“Der er nogle fysiske rammer, der gør Lisbjerg mere attraktiv i forhold til Lystrup. Fordi man kan se det nordlige Århus. Nærheden til Århus giver noget synergi.”

“Der har været orienteringsmøder om planerne, som man kunne vælge at møde op til.”

“I Hjortshøj var man også bange for, at det var en hel masse parcelhuse, men det blev noget helt andet. Måske tendensen ikke er til at bo i parcelhuse. Måske vil man gerne have noget lidt mindre og dele lidt mere.”

“Vi har ikke noget imod, at der kommer nye beboere. Det er kun dejligt. Vi vil gerne byde dem velkommen i byen.”

Ungt par:
“Vi har kun boet i Lisbjerg siden november. Vi har hørt, at de har været i gang med projektet, men det er vist lang tid siden. Der sker nok ikke noget de næste 30 år. Det er først, når vi er 65. Så er vi nok ligeglade til den tid.”

“Vi vil bare gerne have et supermarked.”

Appendix 6

STORMWATER MANAGEMENT

CALCULATION AND TECHNICAL NOTES

Calculation of basins

Calculation of the volume of a larger basin in the node between the village and the new development for a 5 year rainfall event with a duration of nearly 2 hours:

T=5 years

c	*28070*
α	*0,76*
ϒ	*1,2*
Fr	*11 ha*
Outlet restictions	*10 L/s/ha*
Qout	*110 L/s*

Reduced catchment area Fr is found for village area of 4 ha and 30% built area and Fr estimated for a new urban area of 15 ha and 65% built area

The max rain duration is:

tr,max = ((-ϒ· c· (α· 1)· Fr)/Qout)^(1/α)

tr,max = 6696.3 s or nearly 2 hours

The maximal volume of water to be stored in the basin:

vol = (ϒ · c ·(tr^-α) ·Fr-Q_{out}) ·tr

vol = 2332.5 m^3

Calculation of series of basins

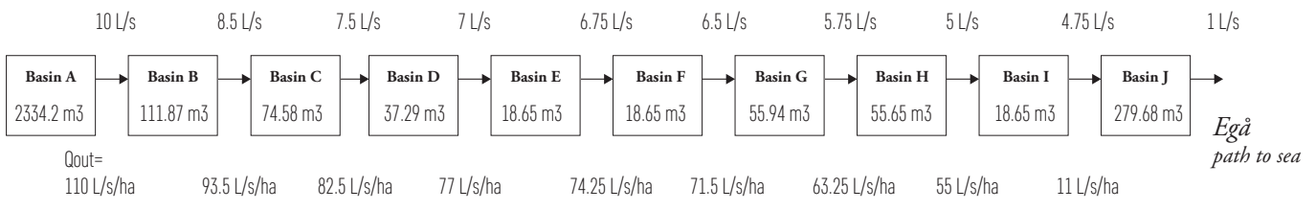
The following calculations are basis for estimating the volumes of each basin in a series (cf. diagram below):

$vol_B = (Q_{AB} - Q_{BC})\cdot t_{r,max} + t_{tømning}$

$vol_C = (Q_{BC} - Q_{CD})\cdot t_{r,max} + t_{tømning}$

$t_{tømning}$ [s] = vol [m3] / Q_{AB} [m3/s]

The series of wet detention basins from the wet marsh at the village edge to its outlet in the stream Egå




15 ha
65% built
area
4 ha
30% built
area
10 L/sec
0.54 ha
30% built area
1 L/sec

Calculation of stormwater channel

Calculation of the minimal volume of a dry stormwater channel in the new residential area for a 5 year rainfall event and a duration of 4 hours and 30 minutes:

T=5 years

c	*28070*
α	*0,76*
ϒ	*1,2*
Fr	*0.54 ha*
Outlet restrictions	*5 L/s/ha*
Qout	*2.7 L/s*

The max rain duration tr,max (as in earlier exmaple) is found as *16669,7 s or 4 hours and 30 minutes*

The expected discharge/flow Q [m^3/s] is calculated with a reduced catchment area Fr of 0.54 ha and based on the premise:

$$Qin = \text{if } t > T_{rmax};0;\ \gamma \cdot c \cdot t_{r,max}^{(-\alpha \cdot Fr)}$$

$$Qin = 11.25\ L/s = 0.0113\ m^3/s$$

The minimal accepted height of the channel h is then calculated from:

$$Q = A \cdot M \cdot R^{(2/3)} \cdot \sqrt{I_0}\text{ , since } Q = V \cdot A$$

$$Q = (w \cdot h + s \cdot h^2) \cdot M \cdot ((w \cdot h + s \cdot h^2)/(w+2 \cdot h \cdot \sqrt{1+s^2}))^{(2/3)} \cdot \sqrt{I_0}$$

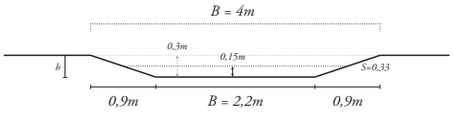
R: The hydraulic radius [m] is the ratio between cross sectional area of the channel and the wetted perimeter of the channel
M: Manning no. for a gravel bottom with some weeds 25 m1/3/s
A: The cross sectional area of the channel is 4 m
I0: The slope of the channel is 0.33
w: The width of the channel is 4 m

The minimal accepted height of the channel:

h = 0.14 m

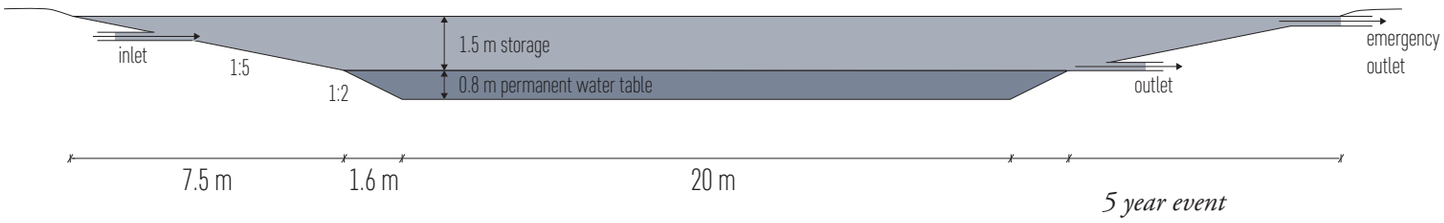
The channel is dimensioned with a height of 0.14 m, also allowing a heavier rainfall event (cf. illustraion sjowing cross section of the stormwater channel on following page)

Cross section of the stormwater channel



1:100

Cross section of the rain water marsh
(wet detention pond)



5 year event
detention volume of 2300 m3

1:200