

Aarhus School of Architecture // Design School Kolding // Royal Danish Academy

Waterscapes of Value

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Publication date:
2018

Document Version:
Publisher's PDF, also known as Version of record

Document License:
Unspecified

[Link to publication](#)

Citation for pulished version (APA):
Wiberg, K. (2018). *Waterscapes of Value: Value creation through climate adaptation in everyday landscapes.*

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Waterscapes of Value

VALUE CREATION THROUGH CLIMATE ADAPTATION
IN EVERYDAY LANDSCAPES

KATRINA MARSTRAND WIBERG

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PHD THESIS 2018

AARHUS SCHOOL OF ARCHITECTURE



PhD Thesis 2018

Katrina Marstrand Wiberg

AARHUS SCHOOL OF ARCHITECTURE



For Frida & Aia

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PREFACE

- (I) Acknowledgements
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- (IV) Abstract and research question

(I) ACKNOWLEDGEMENTS

My PhD research is essentially founded on the sharing of knowledge with others. In this respect, I am indebted to several people and I am thankful to:

- The Aarhus School of Architecture for funding the PhD project, and for choosing to take in a research-dreaming practitioner.
- My supervisors for invaluable input and discussions. In particular, I have appreciated working with Professor Tom Nielsen for his valuable contributions regarding urban landscapes. Likewise, I would like to thank Professor Emeritus Niels Albertsen for opening up a whole new world of justification and theory.
- The PhD school, for creating a shared forum for PhD research, led by the head of research the late Johan Verbeke and research coordinator Hanne Foged Gjelstrup
- My amazing proofreader Susan Carruth, who is fortunately also both a researcher and an architect and skilled (and patient) in the art of 'Danglish'. She also was supportive, knowledgeable and generous with reflected comments during the process.
- Sofie Pelsmakers for jumping in last minute as researcher and architect with proofreading skills – I look forward to returning the favour.
- Research Lab 1 for being a progressive and open-minded forum for sharing and developing research.
- The incredible AAA Library, particularly Henning Grauballe and Betinna Odgaard for helping with my endless questions: you always succeeded in solving my challenges.
- Professor Nancy Rottle for hosting me at the Green Futures Lab and the University of Washington, introducing me to approaches to water, and multiple other sources of help in the context of Seattle and Portland.
- Professor Catharina Dyrssen for being so dedicated and generous regarding methods and modes of knowledge creation.
- Professor Emeritus Kenneth Olwig for providing me with new understandings on the concept of landscape.
- Professor Emeritus Thomas Sieverts for on-site perspectives while walking the Hidden Aaby Passage with me.
- Colloquium Urbane Landschaften for knowledgeable discussions, peer-review and feedback that have helped to develop my research

- Martin Prominski and Hille von Seggern for valuable discussions on knowledge creation in landscape architectural research and design research
- All the case study actors from the Aarhus Municipality for letting me into their 'engine room' and being so open-minded. A special thanks to Mogens Bjørn for the generous offer on letting me follow the three live case studies; Signe Iversen for helping and providing numerous maps and discussions; Ole Helgren for providing deep knowledge with great humour; Lone Mossin for generously sharing knowledge, introducing me to soil and water and, later enlightening me of the 'Beredskab's' part in urban development strategies.
- The case study actors from the water company, particularly Anne Laustsen and all other actors present at meetings, for sharing their knowledge.
- Former and present PhD colleagues for always making it enjoyable to go to work, and sharing knowledge and laughter at the Green Table.
- Mo Krag for the always-good office atmosphere; Anne Mette Boye for fruitful discussions on methods, and urban landscapes; and Elizabeth Donovan and Anna Holder for sharing knowledge and laughter, and introducing me to new knowledge about Danish culture and subtle habits. I am grateful for this collegial, open-minded and sharing environment.
- Thomas Clemmensen for introducing me to what would later become my case study actors; Stefan Darlan Boris for sharing knowledge on the river valley; Jens Chr. Pasgaard for generous advice; Martin Odgaard for knowledge on maps; Morten Daugaard for peer-review and feedback; and Niels Nygaard for open-minded discussions and offers of help when I looked a bit tired.
- Rikke Wistoft for being a friend with a big heart and Anne Trollehave for the heartwarming offers of support, including Thai soup and hot meals, Martin Laursen for last-minute aid, and to patient friends that hopefully will help me to re-socialise me soon.
- And, last but not not least, thank you to my husband Nikolaj, for the incredible support in the final run and innumerable balcony conversations on value, justification, climate change and water; my father Bo for driving the watershed of Columbia River, including photo stops every 200 meters: and my mother Helle for all your incredible help and patience throughout with a distracted daughter.

For Frida & Aia

In memory of Li

(II) READERS GUIDE

Practical structure of the thesis

This thesis is a monograph with a PDF version as a single document, whereas the printed version is divided into three booklets due to binding limitations.

Outset

The thesis is design research with a multi-method approach as methodology in the context of Research through Designing. The research design employs real-time (live) case studies as action research, using landscape architectural design and research methods and tools such as mappings, diagramming and field trips.

Thesis structure

The thesis is structured thematically in 6 parts as follows:

Part 1 Context formulates the background to the research project according to the author's starting point, the field and the theme of the research.

Part 2 Methods describes the research design and methods, including describing how the methods have developed during the research process. Part 2 also introduces the outsets for the 3 case studies provided in the thesis.

Part 3 Water; this section provides a brief introduction to the thematic fields of the research related to water, climate change and the Anthropocene as well as blue-green infrastructures and contemporary climate adaptation in urban landscapes. Additionally, a contextualisation is offered to the (Aarhus, Denmark) cases studies, alongside a brief introduction to the Danish Planning system and status of the Danish Municipal Climate Adaptation Plans.

Part 4 Value; this chapter engages the core themes of value and attribution of value through an investigation into value theory and theoretical components of justification and value judgment. The aim is to facilitate an understanding of differentiating value systems and valuations in the context of transdisciplinary actors outside landscape architecture.

Part 5 Cases; describes and analyses the 3 case studies that are the fundamental basis of the research. Each case study is concluded by an array of propositional reflections, as concurrent and action-oriented responses to what can be learned from the case studies.

Part 6 Outcomes; is the final chapter and addresses the knowledge production and contribution of the research, and provides a reflection on, and broader contextualisation of the key themes derived during the research process. This is followed by a conclusion and suggestions for further research.

(III) TERMS, ACRONYMS AND ABBREVIATIONS

Throughout the writing, some terms are used interchangeably, or with particular meaning, or to encompass delicate distinctions between them. Several acronyms are also used throughout. Hence the importance to clarify the use of these terms and acronyms.

TERMS

Knowledge exchange and collaboration across disciplines

Transdisciplinary - in the thesis, I collectively use the term transdisciplinary as it allows a holistic approach for composite collaboration, without requiring the dissolution of disciplines. Transdisciplinary approaches are also referred to in the context of Mode 2 knowledge production, engaging wicked problems, e.g. environmental and societal real-world problems (Alvargonzález 2011; Bernstein 2015). Bernstein also exemplifies an embedded transdisciplinarity in relation to engaging water-issues (ibid). The terms inter-, trans- and multidisciplinary are related but not interchangeable. However, during the research process, some phases or encounters were performed in a multidisciplinary rather than trans-disciplinary manner. The case study actor encounters were set in an interdisciplinary context, sometimes creating multidisciplinary knowledge. The theories employed draws on different disciplines, whereas the research itself was performed individually. Some of the landscape architectural Propositional reflections of the research could suggest interdisciplinary approaches as they dissolve some of the existing boundaries between disciplines.

Cross-sectoral- is used to denote case study contexts with human actors from different sectors (e.g. the municipality and the water company), working on the same project.

Soft Traficants - is a crude translation of the common Danish term 'bløde trafikanter'. It denotes pedestrians and cyclists, vulnerable to automotive transportation, often important in Danish urban planning.

ACRONYMS & ABBREVIATIONS

The research is using the following abbreviations in the text:

Research themes and field:

CA|HOW = Climate Adaptation and Handling of Water

CA= Climate Adaptation

CC= Climate Change

LArch= Landscape Architecture/Landscape Architectural/ Landscape Architect

RtD= Research Through Designing

6RJ = 6 Regimes of Justification

HMB = Høje Målebordsblade; late 19th Century maps of Denmark

LMB = Lave Målebordsblade; 1901-1971 maps of Denmark

Case actor affiliation:

DWA= Centre for Environment and Energy, Water Environment and Agriculture (Center for Miljø og Energi, Vandmiljø og Landbrug), a municipal department of Aarhus Municipality

AKO= Aarhus Municipality /Municipal actor from Aarhus Municipality

AWC= Aarhus Water and Utility Company (Aarhus Vand; the water and utility company in Aarhus).

(IV) ABSTRACT AND RESEARCH QUESTION

ABSTRACT¹

Value creation through climate adaptation in everyday landscapes

Climate change, changing waterscapes and increasing urbanisation signal uncertainty in relation to practices of living and settling. Furthermore, climate adaptation entails the need for space and spatial retrofitting of urban landscapes, thereby questioning current contemporary landscape practices in urban development. This, therefore, implies and implicates diverse interests and diverging value judgments, making changing waterscapes and CA|HOW prone to land-based value disputes.

This research is a landscape architectural response to climate adaptation related to precipitation in the climatic context of Denmark. The starting point is value creation through climate adaptation in everyday urban landscapes; the ordinary places that sometimes go less noticed. The point of departure was to engage the early project phases, by exploring 'missed' opportunities which could form the basis and strategy for value creation, at a strategic level of qualitative approaches considering transdisciplinary knowledge creation as key in climate adaptation. The research was conducted as landscape architectural Research through Designing (RTD) in three real-time CA|HOW case studies with elements of action research in the context of Aarhus, Denmark. The research outcomes consist of a range of landscape architectural propositional reflections, based on the case study learnings.

RESEARCH QUESTION²

- How can landscape architecture and landscape architectural processes contribute to plural value creation in the everyday urban landscapes of CA|HOW, with regards to cross-sectoral and transdisciplinary collaborations in early project phases?

¹ Excerpts from the UK Summary

² The contextualisation of the research question is described in Part 1 Context, Chapter 1.1, 1.2 and the development and justification is expanded in Part 2 Methods, Chapter 2.1, 2.2.



PART 1

CONTEXT

PART 1 CONTEXT

CHAPTER 1.1

MOTIVATIONAL CONTEXT &
FIELD

1.1.1 Motivational context

Researcher's Background and presumptions

Research Question

1.1.2 Field

Contextualisation of the research subject matter

1.1.3 Preliminary expected outcomes and transferability



P1_C1

MOTIVATIONAL CONTEXT & FIELD

1.1.1 MOTIVATIONAL CONTEXT

RESEARCHER'S BACKGROUND AND MOTIVATION

Professional background in a Danish context

In Denmark, the working fields of landscape architecture and planning in design offices are integrated to a considerable extent. This is reflected in the Danish educational system, which offers four different educational entries into this field. In summary AAA and KADK educate architects and landscape architects and who can also be a hybrid between architects, planners and landscape architects. The KU educates Horticultural graduates, and the AAU educates Urban Designers as civil engineers. In practice, whether in municipal or commercial design offices, all of these disciplines tend to merge into one broad, collaborative working field. This means that the professional distinctions between landscape architecture, planning and urban design are less obvious and commonly integrated. Coming from the AAA tradition, I graduated as Cand. Arch, thus being a 'hybrid landscape architect and planner' working with landscape, planning and urban design.

Professional and personal motivation

The motivational context of this research is both professional and personal. For nine years, I worked in landscape architectural/planning offices on projects from small-scale designs to large-scale strategies, including aesthetic assessments for technical, infrastructural projects and end-user and citizen involvement processes. During these years, I often found that 'better' landscapes would have been feasible and possible within almost the same budgets. It wasn't because of collaborators obstructing LArch value creation that 'better' projects were not delivered. Rather, I experienced that LArch sometimes came into the process a little too late and therefore became adversely affected by the decisions made in earlier project phases.

Maintenance of urban landscapes

Concurrently, I had a feeling of regret each time that I saw repair works on, for example, roads, only to notice a few weeks later that the urban landscape was sealed off with asphalt again; the only perceivable difference being lower friction and less small potholes. These efforts also held the capacity for creating better urban landscapes: when the machinery is out, it will take only a little more resources in monetary terms to go beyond the minimum. Of course, I knew that the practical divisions between responsibilities caused this existing approach. For example, the water company is responsible for repairing underground pipes and could therefore not allocate money to softer values; the municipal department is responsible for maintaining the road, and thereby was not in the same 'money and responsibility box' as the department for green areas, and so forth. However, there seemed to me to be latent potentials in the everyday city for creating better landscapes.

Seeing potentials in neglected areas

Furthermore, since I was a student at the AAA, I have had an interest in not-so-privileged spaces. This has entailed an enjoyment of working with neglected, unwanted or just ordinary spaces of certain aesthetic appearances, for instance, infrastructure, and leftover spaces.

CA|HOW as an obligation and responsibility

Finally, I have personal motivation in seeing climate adaptation as an important, shared matter and responsibility with particular relevance to urban landscapes. Together, these reasons shaped the research subject matter, and the research question regards engaging with how LArch can contribute to early, transdisciplinary phases in CA|HOW urban landscapes – with the intention to create ‘better’ landscapes. At the departure point of this research, I framed plural values as ‘added-value’, as this was the common term in practice for framing value creation beyond capacity.



Figur 1.1.1: Jægergårdsgade, Aarhus, February 15, 2017



Figur 1.1.2: Jægergårdsgade, Aarhus, March 9, 2017

RESEARCHER'S PRESUMPTIONS

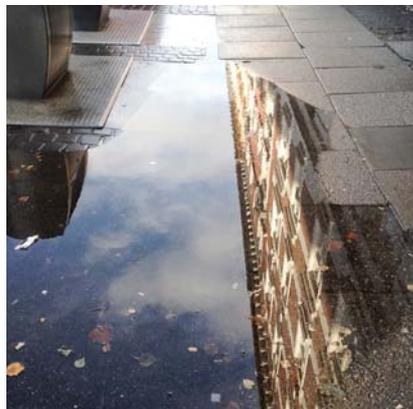
Value exists and the dualism of objective <subjective does not

During the research, I was confronted with own assumptions, which permeated the research design and methods. On an ontological level, I realised that presupposing that the world exists of both objective and subjective elements is not necessarily an obvious stance, seen from a philosophical point of view. The objective elements could be, for example, the physical environment, existing with/without humans. The subjective elements could be individual interpretations of how the surrounding world is interpreted and aesthetic considerations. At an epistemological level, I realised that assuming that research could not only actively engage values but also aim for better was, also, not necessarily obvious.

Both of these realisations may partly be rooted in the profession of LArch. LArch entails working with physical properties alongside aesthetic properties, embodied experiences, and speculative stances on the future, often in the same workflows and projects. The profession, as such, is embedded within the notion of creating better. It is hard to imagine a landscape architect aiming for something to become worse or of no importance (neutral).

From added-value to plural values

Noting these assumptions tells of the reasons behind why I had to change the framing of added-value into a search for plural values. Furthermore, assuming that 'subjective-objective' elements and processes can work together became a focus area to explicate, including that of aiming for 'better'. Although it did not begin by subscribing to any one specific theoretical framing, the research seemed, in quite a few ways, to inscribe itself into frameworks related to pragmatism.



1.1.2 FIELD

CONTEXTUALISATION - THE RESEARCH SUBJECT MATTER

Climatic changes and changing waterscapes adds complexity and uncertainty to our practices of living and building. CA|HOW responds to exactly this complexity. CA|HOW requires physical space – land, which is owned by someone – and, often, solutions have to find their place in urban landscapes. Finally, adaptation compels costs and efforts. Acknowledging and embracing plurality, by drawing upon subjective and objective world views, could be more important than ever.

Water as a resource and adaptation as a potential

Climate change influences the hydrological cycle, and thus changes waterscapes at the scale of the planet. The results influence human lives and practices at all scales – as well as those of other living matter. The Danish context, characterised by increased rainwater, is a privilege compared to areas experiencing drought: freshwater is a vital matter per se. Thus, this research considers water as a valuable resource, taking the approach that adaptation is a potential of societal and public relevance. The outset of this project is therefore the acknowledgement of water as a positive resource and the research question reflects the assumption that climate change adaptation and the handling of water represent an opportunity to achieve multiple societal and environmental benefits *as well as* the belief that pushing the plurality of values could help qualify both adaptation and ‘better’ landscapes.

Climate change and changing waterscapes in Denmark

The geographical and climatic context of this research is Denmark, which is projected to receive more precipitation and increasing extreme weather events in the form of cloud bursts in the near future (see Chapter 3.2 on Climate change). This research engages with Danish adaptation measures in urban landscapes, connected to surface water caused by precipitation. This means that sea level rise is not part of the research.



Figur 1.1.3: Left: water patterns, inner city street Aarhus. Right: invisible water - everyday notions of water at village waterworks, Denmark.



CA|HOW responsibilities in Denmark

In Denmark, water-utility companies¹ are currently privatised and thus are formally separated from public ownership. As flood risk has societal consequences at many levels, larger CA|HOW projects in Denmark often are initiated within a municipal context in collaboration with the local water utility company. Nevertheless, even smaller scale projects, e.g. initiated by a property owner or group of citizens, still need to collaborate with both the local water company and the municipality to obtain permissions and qualify how the project would influence, for instance, downstream neighbours, public roads, and recipients. In this way, Danish CA|HOW projects rely heavily on cross-sectoral and transdisciplinary collaboration. At a practical level, the knowledge required for qualifying CA|HOW-projects is complex and spans from, e.g. hydrological calculations, economic and legislative frameworks to local knowledge on citizen priorities and soil conditions together with personal interests or beliefs. Seen from a practical, physical/spatial perspective, CA|HOW measures will often have to find their place in urban landscapes as retrofitting within areas already built upon and divided into a fine-grained mesh of administrative lines. Therefore, the research question addresses collaboration across disciplines and sectoral boundaries in CA|HOW projects. This is explored through case studies, providing a real-world context in order to achieve empirical and practice-based knowledge on the research objective.

¹ Danish water companies are privatised, although the major stockholders are the municipalities. The water/utility companies are in charge of and responsible for drinking water, sewage water and sewers (piping) in public areas (outside private properties). This includes the distribution system (piping) as well as wastewater cleaning processes/plants and water quality.

Figur 1.1.4: Everyday notions of water

Everyday urban landscapes and low-cost CA|HOW

European historical city centres often represent a conglomerate of interests and values, e.g. cultural heritage such as historic buildings, high prices for land, multiple users and various functions, narratives and symbolism. This conglomeration of tangible and measurable values forms key drivers for the initiation of best practice CA|HOW projects.

For example, Copenhagen showcases artistic projects with multiple programs, accommodating diverse functions and interests.

Danish suburbia covers vast areas with a relatively low building- and population density and does not represent the same conglomeration of economic and cultural heritage interests as the historic city centres. Furthermore, suburbia is somewhat mono-functional and, often, not so very troubled from a socioeconomic perspective. This means that the time and costs that can be allocated to CA|HOW in suburbia are very different from, e.g. Copenhagen City

The 'everyday' landscapes of suburbia with residential, commercial, institutional and industrial functions are also dependent on establishing CA|HOW-measures. It seems plausible to expect that significant portion of these measures will be hosted in urban landscapes as low-cost, on-ground facilities. Furthermore, even with projections of more precipitation, most days are likely to continue as 'business as usual' with no cloudburst, leaving the urban landscapes maybe not dry as such, but at least not flooded either. This results in the primary function of adaptation facilities being out of use most of the time. For this reason, the research focuses on LArch approaches for creating CA|HOW with ambitions beyond capacity and flow, so that the measures are also valuable on an average day with average, Danish weather conditions of just 'grey'.



Figur 1.1.5: Left: everyday notions of water, inner city street on a rainy day - hard surfaces, Aarhus Right: water services before undergrounding- potable water as urban amenity.

Promoting plural values - homogeneity vs. heterogeneity

The handling of water is imbued with cross-scale implications that go beyond the efforts of the individual or single property. In CA|HOW, consequences can be manifold and raise discussions on 'here and now' values as well as debate on our notions of the common good and the living conditions of future generations.

The notion of promoting plural values as something beneficial is partly based on the acknowledgement of diverse actors, and partly on the fact that water in urban landscapes has been subjected to the 'command & control' trajectory since the Industrial Revolution. With climate change, singularity and homogeneity show their vulnerability and lack of capacity to adapt to uncertainty and recover from changing conditions.

Transdisciplinarity and knowledge creation

In CA|HOW, the measurable qualification of water's flow is complex and foundational. CA|HOW is crucially dependent on water professionals, e.g. soil and hydrology experts and geologists, to provide qualitative and quantitative knowledge. Compared to these scientific methods, landscape architectural methods are rather exploratory and ambiguous. The aim of this research was not to dispute qualitative methods. Rather it aims to contribute to collective knowledge creation under the presumption that it requires different bodies of knowledge to qualify climate change adaptation and value creation. The objective is to contribute to informing decision-making regards directions to action. And, not least, to infuse such actions with potential value creation in urban landscapes.

1.1.3 PRELIMINARY EXPECTED OUTCOME AND RESULT

EXPECTED OUTCOME

At the outset, the research specified a real-world problem of how to achieve CA|HOW while also creating better, everyday landscapes.

Furthermore, the research question asked the question of *how to*, implying a focus on the mere methods of this research (RTD, LArch):

How can LArch methods and approaches be useful in transdisciplinary contexts of value creation in the urban landscapes of CA|HOW.

The aim was to provide two strains of knowledge production:

- *To identify fields of value creation in low-cost CA|HOW where landscape architectural methods and processes could be useful.*
- *To contribute to developing LArch methods for promoting value creation in transdisciplinary contexts.*

Initially, the outcome of this research was expected to be an array of possible values that could be achieved through CA|HOW. For example, the exemplification of spatial qualities and functions that could resonate with different actors and diverse interests. However, the result became somewhat different: water as an actor encouraged a larger scale to the research and its outcomes.

EXPECTED TRANSFERABILITY

Throughout history, water has had a crucial impact on our living conditions involving water disputes on ownership, distribution, and responsibilities related to water quality, prices and water management, including the public's right to clean drinking water. These disputes continue to the present- and are likely to endure into the future too. The Danish situation of adaptation to more precipitation is, no doubt, a simpler and less conflictual context. However, I expect some of the elements of this research to be transferable to a broader context. Climate adaptation takes the effort of the many, e.g. different disciplines, sectors, businesses and, not least, citizens. The discourse of this research relates to broader discussions on values and changing waterscapes. The aim is that, hopefully, some of the outcomes of this research on CA|HOW and value creation in urban landscapes will be transferable to other contexts.

PART 1 CONTEXT

CHAPTER 1.2

LANDSCAPE ARCHITECTURE AS
THE FIELD

1.2.1 Contextualisation

Introduction

1.2.2 Landscape

Etymology and notions of landscape

Landscape in this research context

Urban landscapes and everyday landscapes

1.2.3 Landscape Architecture

Landscape architecture as a profession

Landscape architectural thinking and making

Ecological thinking in landscape planning and design

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Maps used in this research



P1_C2

FIELD

1.2.1 CONTEXTUALISATION

INTRODUCTION

This research considers the medieval plaza, the suburban parking lot, business headquarters, residential gardens and sheds, agricultural fields and protected wildlife reserves as landscape. I consider 'landscape' as an intertwinement between the physical environment, its processes and practices attached to land-use; thus landscape is deemed inclusive of what is also called urban (please see the etymology section below).

The following is a brief introduction to how landscape, landscape architecture and landscape architectural practices are understood and used in this research context. I must emphasise that the approaches, ways-of-thinking and methods specifically concern landscape architecture, planning and urban design, from now on referred to as landscape architecture. This does not mean, however, that each element exclusively applies to landscape architecture as opposed to other professions and fields. For example, architecture and industrial design have related methods for knowledge creation departing in the shared practice of media such as drawings and models to project imaginative thinking into a specific proposition of what could be. Likewise, geographers also work with cartography and relations between the 'natural environment' and human practices. As this research context is concerned with landscape architectural approaches to value creation in the urban landscapes of CA|HOW, set within a transdisciplinary context, the perspective is bounded within landscape architecture. Throughout this thesis, particularly in the methods, value and case chapters, I concurrently provide descriptions of how I consider landscape architectural practices and notions of landscape in the specific contexts of the research. This introduction lays out my approach to landscape architecture: seeing landscape architecture as a means of thinking and making through its practices. Furthermore, this approach to landscape architecture takes a rather practical stance to unfold the interventionist objective of the research question.

Structure

In the below, I touch upon the term and conceptualisation of Landscape, followed by an introduction to how the concepts of urban landscape and everyday landscapes are used in the research. Furthermore, I provide a contextualisation regards what I mean by landscape architecture and landscape architectural practices, including attention to mapping as a method, followed by a functional description of the historical maps called 'Høje Målebordsblade', as these maps have been foundational in all three case studies.

1.2.2 LANDSCAPE

ETYMOLOGY AND NOTIONS OF LANDSCAPE

The conceptualisation of the term landscape is complex and has changed over time, dependent upon cultural notions and human practices.

Even today, the concept of 'landscape' differs between languages and cultures, e.g. from denoting a territory, to a legal entity, to a place of aesthetic value. Efforts in defining landscape in relation to culture are ongoing, e.g. exploring the concept of cultural landscapes through post-industrial sites, films and heritage (Roe and Taylor, 2014). The unsettled nature of landscape is also revealed when defining cross-national landscape policies¹, and thus, a recognition of how the term landscape can be interpreted differently in dissimilar languages is demanded. For example, based on a report² by the European Council, Thorén et al exemplifies that a Spaniard might associate landscape with 'scenery or piece of land as surveyed from a viewpoint' whereas a person from Bosnia Herzegovina might perceive landscape as a 'composition of natural and cultural values in an environment' (Thorén and Jørgensen, 2016, pp. 141–145).

The geographical landscape context of the cases in this research is Jutland. This Jutlandic landscape was formerly understood through the landscape polity of Jutland, 'Jyske Lov', of 1241. Olwig explains how, historically, the Old Norse meaning of landscape (*landscapr*) denotes "*conditions in a land, its character, its tradition or customs*" (Olwig, 2008). In this sense, landscape was understood as political and formed by practices. In 16th Century Renaissance Europe, new techniques for perspective drawing prompted the conceptualisation of landscape to enter a new interpretation: landscape as scenery (Cosgrove, 1999; Olwig, 2002), as often described with reference to Italian and Dutch painters. These two meanings of landscape point towards how the concept of landscape has close ties to notions of nature, practices and aesthetics. The aesthetic and polity meanings are used in dictionary entries on etymology. For example, the Oxford Dictionary of Etymology describes landscape firstly as scenery, and secondly as a regional tract (Onions, 1996). Defining landscape at a conceptual, theoretical level is a comprehensive task that falls outside the scope of this research. However, the above is mentioned because, even today, different understandings of landscape as polity, scenery and likely hybrids possibly influence the various interpretations of contemporary landscape.

1 E.g. the European Landscape Convention

2 Council of Europe (CoE) (2015) Landscape in languages and laws in the States Parties to the European Landscape Convention. 18th Feb. 2015. ("European Landscape Convention. CEP-CDPP (2015) 5E. 8th Council of Europe Conference on the European Landscape Convention. Landscape in languages and laws of the states parties to the European Landscape Convention," 2015)

Waterscapes and the dualism between human and nature

"[...] it is water that shapes the natural landscape through marine, glacial and above all fluvial action. It is the sine qua non of human life."
Quote Cosgrove (Cosgrove, 1990, p. 2)

Human cultures and civilisations have been founded upon the control and appropriation of water, and human practices of dwelling (be they nomadic, migratory or longer-term settlements) and the understanding of landscape is inevitably bound to its counterpart in flux: waterscapes³ reclaiming and disclaiming dry land. The - sometimes ambiguous- relations between dryland, water and human interests are, of course, addressed by landscape architects too. In *The Granite Garden*, Spirn provides an overview of urban water regimes, drawing on the history of the 19th-century practice of burying creeks and streams underground, right up to the water practices in the US today, where creeks and streams are being daylighted once again (Spirn, 1984, pp. 129–168).

The understanding of landscape as consisting of and being formed by both human constructions and practices together with natural processes is unfolded in the *Granite Garden* (Spirn, 1984). Here, Spirn explicates the interconnectedness of conceptualisations of urban and nature through theories and field descriptions. Spirn exemplifies how it is necessary to overcome the dualism between human and nature, urban and rural, and to start seeing and understanding landscape as a whole. Although the Anthropocene was not yet announced, the thinking in the *Granite Garden* reflects the landscape architect of the Anthropocene in the embedding of ecological thinking as further described in the following section 1.2.3 (see Part 3 Water, Chapter 3.2, 3.3). The notion of landscape inevitably involves notions of nature and how we interpret the relationship between human and nature. This research presupposes that in the context of climate change in the Anthropocene, a dualism between human < nature is defunct and extinct (see Chapter 3.2).



Landscape in this research context

Generally speaking, landscape refers to outdoor spaces. For the practical purposes of this research, I take a concrete stance, framing landscape as the physical properties of land tied to natural processes of living and non-living matter in cross-scale relationships with human processes and practices. In this way, I consider human-made surfaces as integrated into the concept of landscape. For example, the impervious building functions as lee to humans, providing a hard rock terrain, diffracting waters flow, while still being the same landscape. Taken together, the physical properties provide certain affordances, both functionally and aesthetically, with reference to different actors (see Chapter 4.5, Affordances). For example, asphalt surfaces with tiny cracks provide a miniature habitat for the dandelion, while the same landscape seen at a little larger scale, as a stretch, affords bicycling. At a larger scale again, on a hot day, the accumulated asphalt stretches may contribute to urban heat islands, affording distress to human beings.

³ The intertwined relationships between humans, human civilisations, urbanisation and water are thoroughly engaged in the extensive series "A History of Water", providing a comprehensive body of articles by a variety of disciplines on how water and human living are inevitably bound together from the perspective of, e.g. geopolitics, early civilisations, history of ideas, and urbanisation. ("A History of Water » Vol 1 Water and Urbanization," 2010, Ideas of water from ancient societies to the modern world, 2010, Rivers and society, 2010, Water, geopolitics and the new world order, 2010; Tvedt, 2013; Tvedt et al., 2006).

Figur 1.2.6: A visual intertwinement of human practices and natural processes.

Landscape, processes and relationships

In this context, landscape and urban landscapes relate to Sieferle's concept of 'Total Landscape' (Sieferle, 2004) as framed by Martin Prominski (Prominski, 2005), quote: "*[...] this new approach towards landscape highlights three previously neglected issues: uncertainty, processes and relationships. As a spatial and temporal terrain, the landscape is continuously changing in an unpredictable way, steered by the relationship of the site with its specific context – an evolving system instead of a static image.*" In a more practical sense, this means that landscape is not defined by formal designs or planning distinctions but rather covers what is often called urban, rural and everything in between, acknowledging landscape as being defined by processes, relationships and uncertainty. This approach seems both practical and meaningful when engaging with climate change and waterscapes of uncertainty. This is further mentioned in Section 1.2.3 on Landscape Architecture.

Urban landscapes and everyday landscapes

As a term, urban landscapes denote landscapes in urbanised areas, in this context with a perceivable level of human construction. Where the urban landscape stops and some other landscape starts is, however, not well-defined, as it depends upon which lens or scale is applied, e.g. if it is building density, population density, the extent of human influences on or below the surface. In this research context, I engage with 'everyday landscapes' that are embedded within urban landscapes, but with a focus on the ordinary, as opposed to the extraordinary. The difference between these terms is that I see the 'full range' of urban landscapes to necessarily include, e.g. dense city centres. In this thesis, I shift between these terms somewhat interchangeably, as all three cases are set in everyday, urban landscapes with suburban traits such as lower population density and less diversity than what is often seen in Danish historical city centres. In this research context, the term everyday is used to denote the research objective of attending to CA|HOW-projects in ordinary places with ordinary economies, thus far from high-profiled projects with extensive economy.

Everyday urban landscapes in this research context

I refer to everyday landscapes at a practical, quite literal level and, thus, not as a theoretical conceptualisation. In using the term everyday landscapes, I refer to the landscapes that we experience every day around our homes, on the street, on the way to work, and that we might not always pay attention too while on the move to somewhere else. Everyday landscapes are far from the spectacular grand views and experiences of tranquillity in national parks and wilderness areas, and are, likewise, not as intense, dense and diverse as inner-city cores, picturesque medieval cities or the smooth high rises of major cities. The everyday landscapes are those that we are passing through on our way to get milk, to catch a bus, to park a car, entering the office building and so forth. They are the in-between spaces, the leftover areas, the boring places, the ordinary, the taken for granted and not-so-very-noticed spaces. The ordinary land-

scape is a backdrop for everyday practices.

The first case in this research is set in residential suburbia, engaged with the everyday landscapes of daily lives mainly centred on private, detached houses and lawns behind hedges, sometimes presented to passers-by through front yards of finely manicured lawns or interlocking paving. The second case is set in business/institutional suburbia, meaning the everyday landscapes where people commute to work, which then, when workers return home, become an expanse of empty parking spaces, like vast fields of asphalt, for the night. The third case is set in a mixed-use area, including brownfields, public facilities, villas and social housing. Here, the everyday landscapes are represented by bicycle lanes, sports fields, mall parking, parks, wild-growing hedges and desolate lawns in social housing areas, together with mossy, left-over spaces that fall between the stools of ownership and planning. Although less inhabited, the everyday landscapes in this context are also the monocrop fields surrounding the suburb or the semi-wilderness along the stream, inhabited by water-appreciative-species, runners, the homeless and biologists. The everyday landscapes of CA|HOW are also retention basins that on a dry day appear as lawn-covered hollows in the urban landscapes, waiting for the rain.

Perceivable spaces with different levels of connectivity

The everyday landscapes in this research context are important as spaces of connectivity. This relates to a description of *Zwischenstadt*, provided by Sieverts (Sieverts, 2003, p. 9): "*The Zwischenstadt can develop any diversity of settlement and built form, so long as, as a whole, they are intelligible in their settlement network and, above all, remain embedded as an 'archipelago' in the 'sea' of an interconnected landscape. In this way, the landscape becomes the glue of Zwischenstadt.*"

What the everyday landscapes share is an experience of the ordinary and sometimes left-over/forgotten spaces, forming networks on different premises. They are, possibly, best described by their contrast; well-organised spaces with a high level of design intentionality, functionality and economic efforts. The aesthetics of everyday landscapes provides experiences of the well-known or appear as aesthetic-offsets from planning, ownership and technical facilities, bearing a resemblance to the aesthetics described by Nielsen as superfluous⁴ landscapes of the urban (Nielsen, 2001). What is essential in this research context is that these are perceivable and, mainly, accessible spaces. This does not necessarily mean that they are public but rather that they form perceivable experiences attached to land-use while moving through the urban landscapes. The practical use of the term everyday landscapes and how to 'see' these will depend on the 'lens', the point of view, intention or need of the viewer. Everyday landscapes can be experienced and approached at the very small, local scale of, e.g. a corner between an industrial area and residential houses, but also at the rather large scale of settlement patterns that provide a patchwork of spaces and land-use that together form a larger stretch.

⁴ 'overskudslandskaber' a Danish concept provided by Tom Nielsen (Nielsen, 2001)

EVERYDAY LANDSCAPES - CASE AREAS



Figur 1.2.7: Everyday landscapes in Lystrup (top left), Skejby (below), and Aaby (top right), Aarhus larger city area.

1.2.3 LANDSCAPE ARCHITECTURE

LANDSCAPE ARCHITECT AS A PROFESSION

The profession 'landscape architect' is relatively new and the exact meaning is still disputed internally in the profession, for example, debate over whether the profession should inscribe itself deeper into the sciences or if it should sustain a closer relationship to the arts. According to Ndubisi, this relates to Thomas Kuhn's paradigm on the structure of scientific revolutions, which entails internal dispute within the profession/discipline when it develops (Kindi and Arabatzis, 2012; Ndubisi, 1997).

The European tradition of landscape gardening developed into the profession of landscape architecture during the 19th and early 20th century, with roots both in the arts and the sciences (Thompson and Steiner, 1997). In the late 18th and early 19th century, the French architect and surveyor Jean-Marie Morel (1728-1810) coined the term *architecte-paysagiste*. The terms landscape and architecture appeared together for the first time in the book 'On the Landscape Architecture of the Great Painters of Italy' by Gilbert Laing Meason in 1828, not as denoting a profession but referencing to Italian landscape painting. As a profession, the term landscape architect was also referred to in some British publications in the 1830s by reviewers (Disponzio, 2014). The terms landscape architect and landscape architecture were taken further into forming the profession in the 1860s when Frederick Law Olmsted and Calvert Vaux used the term 'landscape architect' to denote their profession in the competition entry to Central Park, New York (Waldheim, n.d.) (Disponzio, 2014). This is regarded as the turning point for the designation of the profession. Although developing out of landscape gardening, the profession of landscape architecture was founded on bodies of knowledge from different disciplines. For example, Frederick Law Olmsted and Calvert Vaux had backgrounds in, e.g. farming, journalism, chemistry and building architecture (Stevenson, 1977; Zaitzevsky, 1982).

This aligns with the embedded multimodality in landscape architecture and why it showcases a tradition of working in transdisciplinary manners, using knowledge from, e.g. the sciences, the humanities and arts together with embodied knowledge from field trips and inclusivity of sensory sensations.

Working cross-scale

In a Danish context, the term landscape architecture encompasses cross-scale working areas from the design of small green areas to urban design and larger scale landscape planning. In Denmark, these working areas are performed by an array of disciplines, e.g. civil engineers, horticulturalists, geographers, architects and landscape architects. This might not be far from a more general history of landscape architects, for example, F.L. Olmsted was doing larger planning on nature conservation as Yosemite and Niagara Falls (Beveridge et al., 1995; Stevenson, 1977; Zaitzevsky, 1982), and Ian McHarg provided larger scale methods of landscape planning that could be used down to single-lot designing (Spirn, 2000). This embedded cross-scale approach means that landscape architecture often encompasses landscape planning too. This is also the case in this research and the terms landscape planning, landscape design and landscape architecture are used somewhat interchangeably depending on the context (scale, purpose).

Transdisciplinarity in landscape architecture and planning

As mentioned, landscape architecture is rooted in both the sciences and the arts. In its essence, it is a practice embedded in combining different strains of knowledge and engaging transdisciplinary collaboration. Ndubisi describes landscape planning as a multidisciplinary practice, where the landscape architect interprets and integrates various sources of information and putting this into form as an offer of options (Ndubisi, 1997, p. 12). However, although landscape architecture is embedded in transdisciplinary knowledge and collaborations, in practice, the profession can be challenged by other practices by only letting the landscape architect enter the project at a quite late stage of the project. As put by Stokman and Jørg; the landscape architect may enter projects at a late stage to beautify (Stokman and Jørg, 2013, p. 7). This resonates with my own experiences in practice and has been foundational to the research question and research design, which aim at engaging with and entering the early project phases. With regards to climate adaptation, such projects are highly dependent on a broad range of knowledge from different disciplines, civic sciences and so forth. As an example, this is also reflected in renowned, larger architectural offices such as AECOM, Buro Happold and Atelier Dreiseitl, which use transdisciplinary workflows.

LANDSCAPE ARCHITECTURAL THINKING AND MAKING

Multi-modal knowledge creation in LArch

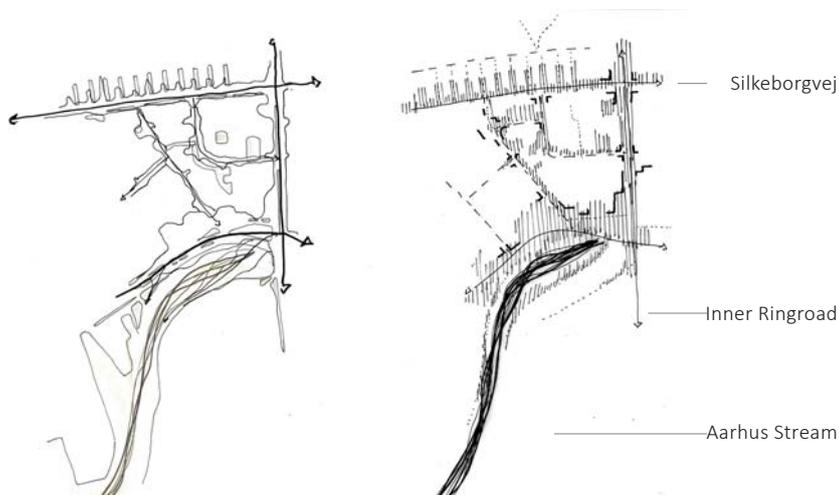
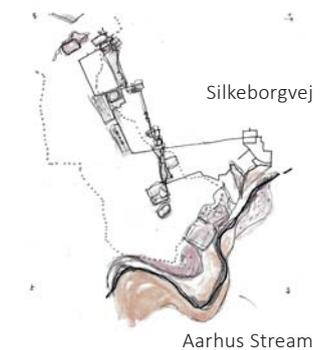
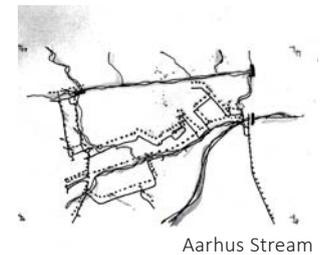
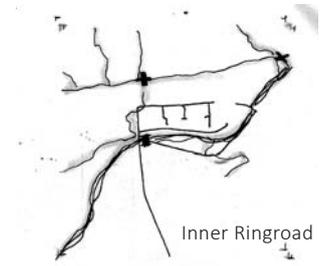
The following is a brief, practice-based contextualisation of how I consider landscape architectural methods and knowledge production in this research context. As the term suggests, the profession of landscape architecture is concerned with physical landscape properties. Thus, it is necessarily inclusive of the physical and objective properties of 'what is'. I understand LArch practices as occupied with multi-modal approaches that connect physical, objective properties with more subjective elements. For example, by combining knowledge on soil texture and the sensory sensation of a place, functions, history and interplays between human and non-human actors, water's flow patterns, aesthetics and materiality, and then employing this aggregate of knowledge to produce improved comprehension of relational aspects. This necessitates that objective parameters are connected with speculative, sensual or intuitive parameters. Read together; these inform a multidimensional approach to the situated design of what could be or the visualisation of what is. Thus, I see landscape architecture as a multi-modal profession concerned with the relations between *what was*, *what is* and *what could be* in what is called landscape.

The process of connecting what is sometimes described respectively as objective and subjective knowledge requires openness and sensitivity towards intuitively following ambiguous hunches and feelings; pragmatic intuition. In the *Language of Landscape* (Spirn, 1998), Spirn exemplifies this integration by describing landscape through personal, visual narratives alongside environmental properties. For example, describing what the root system of a tree needs to remain alive, while simultaneously narrating sensory experiences of value. This approach relates to aspects discussed in the chapter on value theory; is intrinsic value connected to the object or is it relational, and, if so, how far do these relations span? (see Part 4 Value, Chapter 4.1, 4.2, 4.3).

Human and non-human actors in LArch

"[...] it is the relationships between the elements that are decisive – their sociality or in-betweenness [...] we could interpret landscape architecture as designing an adventure of relationships." Quote, Martin Prominski (Prominski, 2014, p. 18)

Landscape architecture is concerned with the interplays between physical properties and actors that vary from non-human-living actors like flora, fauna, fungi, and non-human-non-living but dynamic actors such as soil, wind and water. In the field of landscape architecture, the non-human actors are, quite literally, connected to human-made-non-human actors, e.g. via costs, machinery and material use. Some actors are of the present, other of the past, as a narrative or indications on an old map, others again are of the speculative or projected future. In this way, landscape architectural thinking engages with relationships between diverse actors, including those of hidden affordances and knowledge, drawing upon past landscape properties in dialogue with speculative future affordances. The approach presented here relates to Prominski's discussion⁵ on the potential of landscape architecture to support an understanding of the interconnectedness of nature and culture in the Anthropocene.



Figur 1.2.8: Top row. Sketches of field trip routes (Case 3). Top: flow paths and Ringroad. Middle: flow paths and local plan areas. Bottom: the stream-area with one of its sub-catchments. Figur 1.2.9: Left row. Walking routes with interpretations of everyday spaces along roads and streets close to the Inner Ringroad, Silkeborgvej, and the Aarhus Stream (Case 3). Left: full lines indicate roads/streets, softer lines indicate the visible 'void' spaces when moving. Right: dark angles indicate buildings as junction markers, hatch indicates accessible areas.

5 Prominski suggests the term 'Andscapes'

ECOLOGICAL THINKING IN LANDSCAPE PLANNING AND DESIGN

“An ecological approach to urban design is not new; it is grounded in a tradition of basic concepts and principles. Ecological urbanism is critical to the future of the city and its design: it provides a framework for addressing challenges that threaten humanity, such as global warming, rising sea level, declining oil reserves, rising energy demands, and environmental justice, while fulfilling human needs for health, safety, and welfare, meaning and delight.”Quote Spirn (Spirn, 2012, p. 1)

The preceding sections describing this research in relation to landscape and landscape architecture in the time of climate change in the Anthropocene, relate to what is coined as ecological urbanism. Although not seeking inscription in ‘isms’ as such, the appropriation of landscape architecture in this research context relates in many respect to that of ecological urbanism and ecological landscape planning at the levels of thinking and making. Moreover, this happens at the thematic level of engaging with the adaptation of urban landscapes as a response to climate change, with concern to the living conditions of future generations, whether human or non-human actors. In its very essence, an ecological approach is a break with the dichotomy between concepts such as human vs nature, and urban vs nature. The following provides a brief contextualisation of ecological urbanism and planning with a summary of how it relates to this research (please see further mention of ecological approaches in Chapter 3.3 Green Infrastructure).

Ecological urbanism as a term

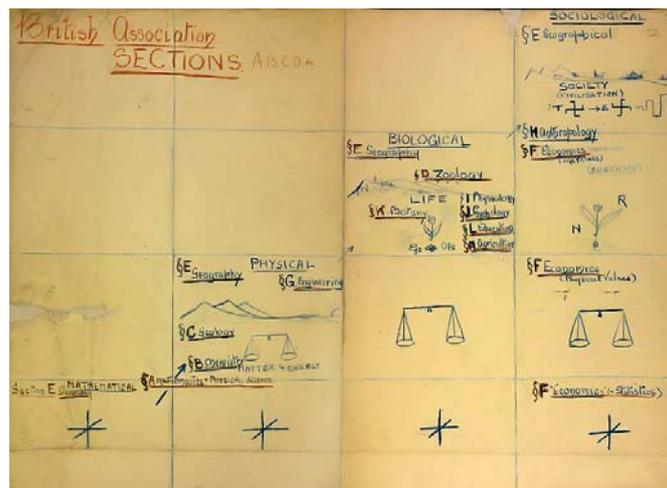
“Many progressive cities already have active sustainability policies and procedures for the greening of the urban environment. But most of these plans are largely pragmatic, with a focus on energy reduction or the addition of green spaces. The question is: Could such efforts be transformed by the approach of ecological urbanism? Couldn’t the everyday elements, needs, and functions of the city be creatively imagined in new and unconventional ways that are not simply subjugated to the imperatives of the ecological?” introduction to Ecological Urbanism by Mohsen Mostafavi (Mostafavi et al., 2011, p. 33)

In the context of landscape architecture, urban design and planning, ecological thinking is denoted by an array of terms, e.g. ecological landscape planning, ecological design, ecological urbanism. Ecological urbanism stems from Landscape urbanism and draws from ecology. The term was coined in 1998, and became mainstreamed at the conference⁶ Ecological Urbanism: Alternative and Sustainable Cities of the Future, and its associated exhibition at the Harvard University Graduate School of Design, 2009, followed by the book ‘Ecological Urbanism (Mostafavi et al., 2011; Odgaard, 2014, p. 87).

⁶ <http://ecologicalurbanism.gsd.harvard.edu/conference.php>
<http://ecologicalurbanism.gsd.harvard.edu/exhibition.php>

From advising early settlement to ecological urbanism

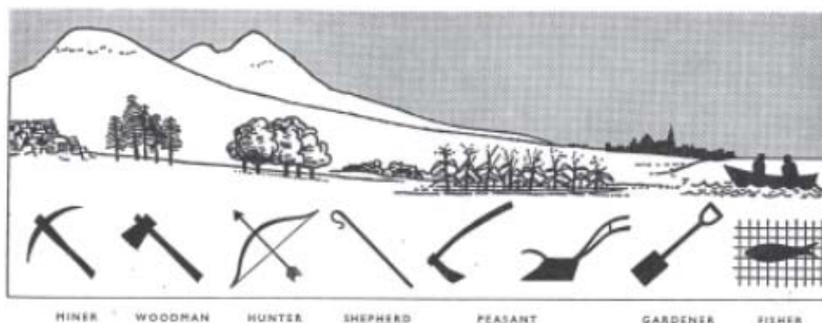
Though the term is quite new, the ecological approach is not. Spirn provides an overview of ecological urbanism in a historical context, showing how the thinking and making of ecological urbanism is rooted in history (Spirn, 2012). She describes ecological urbanism as the linkage between theory and the practices of urban design and planning 'as a means of adaptation, with the insights of ecology' (Spirn, 2012, p. 1), meaning an approach departing in acknowledging relationships and processes between human and non-human actors with mutual impacts. What is further important is that ecological urbanism is not a style but a starting point from ecological principles (ibid). The following heavily draw upon Spirn, who exemplifies how Hippocrates mentioned air, water and places, Vitruvius explicated how the layout of streets and buildings should respond to seasonal patterns, providing for the health of individuals and communities (ibid), as well as warning against the siting of a city with a marsh in its neighbourhood (Vitruvius Pollio and Morgan, 1960, p. 17). In the mid-15th Century, Leon Battista Alberti advised the siting of cities to be agreeable with nature to accommodate health, safety, convenience, dignity and pleasure (Spirn, 2012). To a large extent, these historical recommendations for siting settlements follow a common logic of human settlement, e.g. locating villages concerning orientation to sun and wind, terrain and water bodies. As framed by Spirn, early agricultural settlements were based on an interplay between cultural values and the deep structures of the landscape (Spirn, 1993, p. 11).



Figur 1.2.11: 'The Thinking Machine', a visual method of connecting different types of knowledge, developed by Patrick Geddes in the 1880s as a personal modus of developing thinking and ideas. Source: Wiki Commons / National Library of Scotland

The Valley Section - connecting the urban and the rural through landscape practices

In more recent times, the biologist and geographer Patrick Geddes formed part of developing an ecological approach to planning. In his 1915 book *Cities in Evolution*, Geddes proposed the unity of city and region as fundamental in planning with attention to life-processes, suggesting that city and countryside were an organic whole (Spirn, 2012, p. 3). This is illustrated in the famous 'Valley Section', showing the relationship between natural properties and human practices, thus, crossing geographical scales, passing the city gate (Geddes, 1972, 1971; Meller, 1990; Spirn, 2000). According to Geddes, the Valley Section was adaptable to any scale (Geddes, 1972, pp. 322–327). He advocated that, before planning, it was necessary to perform regional surveys that were 'not restricted by city limits and not, arbitrarily broken up by political boundaries', suggesting how cities were more accurately part of city regions⁷ (Geddes, 1971, p. ix,23-25). Geddes proposed a system for performing regional surveys departing in the relationships between human practices and the environment; the place-work-folk approach (Ndubisi, 1997, p. 15). Geddes' approach to connecting the physical landscape and geography with practices and forms of life relates to ecological planning. Furthermore, it has some resemblance to the Norse conceptualisation of landscape, as illustrated by Spirn referring to the English and Nordic etymology of landscape as "[...] the mutual shaping of people and place—to encompass both the population of a place and its physical features: its topography, water flow and plant life; its infrastructure of streets and sewers; its land uses, buildings and open spaces." (Spirn, 2005, p. 397) (see section 1.2.2 on Etymology).



Figur 1.2.12: The Valley Section, 1909 was developed by Patrick Geddes to show the city as part of the region, conurbation, connecting the city and region through human practices and natural properties. Source: Wikimedia

The environmental movements of the 1960s and the ecological inventory

"The ecological view requires that we look upon the world, listen and learn. The place, creatures and men were, have been, are now and are in the process of becoming. We and they are here now, co-tenants of the phenomenal world, united in its origins and destiny." Quote McHarg 1969 (McHarg, 1969, p. 29)

Ecological thinking in landscape architecture and planning developed further together with the environmental movements of the 1960s, and since then there has been increasing interest in employing ecological knowledge in the field of urban design. A landmark contribution in the understanding cities as systems, beyond physical structures, is Jane Jacobs famous 1961 book "The Death and Life of American Cities", which significantly contributed to seeing human processes as part of the built environment of the cities (Jacobs, 2011; Spirn, 2012, p. 4; Tyrnauer, 2017).

Seeing nature, cities and human settlement differently from that of the modernistic projects is particularly exemplified by Ian McHarg (McHarg, 1969; Pickett et al., 2014, pp. 151–152). In 1969, Ian McHarg's seminal book *Design by Nature* (McHarg, 1969) presented methods to integrate ecological thinking in landscape architecture and planning, framed as the 'ecological inventory'. McHarg provided hands-on methods for how to integrate natural and human processes in the planning and design of, e.g. infrastructure and residential areas. McHarg advocated that humans were destroying nature instead of sustaining it as a vital source: "clearly the problem of man and nature is not one of providing a decorative background for the human play, or even ameliorating the grim city: it is the necessity of sustaining nature as a source of life, milieu, teacher, sanctum, challenge and, most of all rediscovering nature's corollary of the unknown in the self, the source of meaning." , Quote McHarg (McHarg, 1969, p. 19). McHarg called ecology 'not only an explanation but also a command' (Spirn, 2000, p. 112), and was indeed clear-cut on ethics and moral implications. This is particularly explicit in the chapter 'The Plight' (McHarg, 1969, pp. 19–31) and the 1969 film 'Multiply and subdue the Earth' (Hoyt et al., 1969).

From ecological planning to designing – challenges of implementation

McHarg provisioned a specific methodology for ecological planning; the ecological inventory. He showcased a framework for overlay mapping physiographic features (a survey of the ecological inventory), seeing processes as values to qualify optimal, multiple land-uses and their degree of compatibility (McHarg, 1969; McHarg et al., 2007; McHarg and Steiner, 2006; Spirn, 2000). According to McHarg, designing was an evolutionary strategy to identify problems and opportunities otherwise missed (Spirn, 2000, p. 4).

However, ecological approaches to planning and design still encounter some challenges when going from the level of planning into the actual designing and making of projects. Firstly, the relationship between analysis and planning versus the operations of designing the actual project is not self-evident. Secondly, the translation of ecological thinking into the physical world of construction is in risk of being translated only as a metaphor.

Spirn mentions this first issue, describing how Ian McHarg's firm⁸ made the master and development plan for the 'Woodlands⁹ Community' (Spirn, 1973) (the Woodlands is further mentioned in Chapter 3.3, 6.2). The masterplan was based on the methods of the 'ecological inventory'. However, the firm was not hired for the actual design of individual developments, and, more generally, the firm was often disconnected from implementing the planning further into smaller scale designs (Spirn, 2000, p. 110). Prominski discusses the second issue of taking ecological thinking into actual projects. He argues that there is a need to change the ideal of static, Arcadian landscape images and turn it instead into landscapes as evolutionary systems (Prominski, 2005); yet such landscape architectural approaches might not correspond to the idea of landscape held by, e.g. residents and developers. Also, investors and design programmes might have different understandings and priorities relating to landscape.

As an example, Odgaard studied three Danish projects claiming landscape ecological content for promoting biodiversity (Odgaard, 2014). None of them actually did provide this: the biodiversity of the projects was rather what Nina-Marie Lister calls 'designer ecology' (Odgaard, 2014, p. 289). In other words, a representation, rather than integration, of ecological processes. Lister advocates that ecological design requires attention to adaptive designs (Czerniak et al., 2007, pp. 35–58). This relates to what Prominski describes in 'designing landscapes as evolutionary systems' as an ability to design in a way that enables acceptance of 'uncertainty, complexity, uniqueness and value conflicts' (Prominski, 2005).

⁸ Wallace McHarg Roberts & Todd (WMRT)

⁹ established 1974

From Arcadian landscapes to non-equilibrium states

The actual implementation of ecological thinking and making in projects requires acknowledgement of a key premise of ecology; uncertain states. The above examples of Woodlands, expectations of Arcadian landscapes and designer ecology share the core issue of missing out on opportunities, which could be obtained by designing and planning with complexity and uncertainty by engaging adaptive systems. The plant ecologist S.T.A. Pickett also address this dilemma in designing. Pickett et al. describe how urban designers tend to rely on what Pickett calls metaphor rather than scientific knowledge, and sometimes rely on static metaphors for value, e.g. connectivity, equilibrium, stability, completeness and wilderness, thus assuming a classical, equilibrium paradigm of ecology (Pickett et al., 2014, p. 152). This is opposed to the concept of a non-equilibrium state that provides the ability to adapt and adjust (Pickett and Cadenasso, 2002, p. 374). In this sense, the before-mentioned challenges relate to the difficulties in progressing from an understanding of the ideal 'equilibrium state', relating to the 16th century notion of landscape as scenery (please see section 1.2.2 Etymology), to accepting a 'non-equilibrium state' of the landscape.

In landscape architecture, the landscape ecologist Richard T.T. Forman is currently highly influential and renowned for his contributions to landscape-, road-, and urban ecology. Forman's works connect ecological science with the spatial patterns of the land, created by the interweaving of human and natural processes, e.g. land mosaics and patch dynamics (Forman, 2008, 2014, 2003, 1995). This development in urban ecology is rooted in acknowledging the hybrid nature of systems- inextricably encompassing both human constructions and biophysical features (Spirn, 2012). According to Ndubisi, the important concept here is reciprocal 'relationships' embedded in ecology (Ndubisi, 1997, p. 11).

As discussed, this research was not inscribed in an ecological paradigm, nor did it take its starting point in ecological urbanism. Nevertheless, the embedded conceptualisation of landscape, urban, city and nature, including seeing urban landscapes from a relational and processual perspective, relates to an ecological approach; ecological urbanism as described by Waldheim and Spirn (Mostafavi et al., 2011; Spirn, 2012). Both the methods employed and the case study findings point in this direction too. Furthermore, the core subject- water, as a matter in flux and adapting to climate change- constitutes a focus on cross-scale dynamic processes relating to ecological urbanism.



Figur 1.2.13: Arcadian landscape painting by Harckert, 1805. Source illustration: Wiki Commons

SAMPLES FROM LARCH RESEARCH AND STUDIES

“Approaches to ecological design demand a broad understanding of the interrelationships between environmental processes and human needs. There is no such thing as a ‘blank slate’ when designing from a perspective that embraces ecological thinking.” Quote Nancy Rottle and Ken Yocom (Rottle and Yocom, 2010, p. 8)

The below is a brief sketch of inspiring examples of studies, practice and research representing ecological thinking in landscape architecture, at a level that develops the field and profession. They are selected based on their methods and processes of designing, which provides narratives relating to the relationship between water-land-scapes. Of course, many others would deserve to be added – these represent just a few samples to indicate a prevalent direction. Please also see Chapter 3.4 Best Practice Examples.

Rottle and Yocom have examined how urban ecological design and planning has been integrated into the profession of landscape architecture, including an exploration of how concepts from the ecological sciences have been applied in design. In this, they highlight an array of implemented, contemporary case studies of ecological designs (Rottle and Yocom, 2010), disseminating ecological design through the themes of systems, dynamics, project processes, operations, and places.

At the level of visualising, narrating and implementing processual, ecological designs, James Corner and Field Operation’s project Fresh Kills Park showcases a scenario-based master plan for the transformation of a former landfill into parkland and a natural coastal wetland buffer. Kongjian Yu and Turenscape provide numerous examples of restoring wetlands in polluted sites with a delicate approach to inviting in human actors, thereby making the wetland an integrated part of the urban, for example the Qiaoyuan Wetland Park (Saunders and Yu, 2012). Furthermore, Georges Descombes and Atelier Descombes Rampini offer an implemented project with the Renaturation of the River Aire. In this project, the river, which had been canalized in the 19th century, was restored using a design that was informed by the dynamics of water, but without erasing the traces of the canal-history (Clemmensen, 2018).

In the context of the representation of the relationship between human-, and natural processes attached to landscape practices, some renowned projects are James Corner and Alex S. MacLean’s Taking Measures of the American Landscape (Corner and MacLean, 1996), which illustrates the interplay between natural and constructed landscapes. Alan Berger’s book Drosscapes (Berger, 2006) addresses ‘waste’ landscapes, and Richard Misrach and Kate Orff’s Petrochemical America (Misrach and Orff, 2012) unfolds the story of landscape practices with devastating

impacts. All three books use delicately aesthetic photographs, mappings and writings to disseminate complex 'stories' about human landscape practices. The latter two in particular concern landscape practices with severe consequences for humans and life on Earth.

At an analytical and strategic level of landscape planning, Ian McHarg's works in *Potomac* and *Woodlands* showcase ecological planning and methods at a very tangible level, thus informing options for change through ecological pragmatism and sensitivity (McHarg, 1969; Spirn, 1973). This approach is taken further by Anne Spirn into the context of process; integrating lay-actors in the design and planning process in the Mill Creek Project (Spirn, 2005, 1991).

Taking water-dryland dynamics into the propositional context of complex, non-static relations between human interests and waterscapes is exemplified in, e.g. the spatial typologies that inform river design and spaces provided by Martin Prominski et al. in the book *River.Space.Design* (Prominski, 2012). Moreover, the *Wasseratlas: WasserLand-Topologien für die Hamburger Elbinsel* provides a dynamic interpretation of the relationship between water-dryland in the context of a larger industrial harbour and the city of Hamburg. The approach is discussed through mappings, diagrams and photos, pointing towards scenarios for action using water and its dynamics to present opportunities and constraints (Stokman et al., 2008).

At a methodological and methods level, Mathur and DaCunha provide renowned studies of water-landscape dynamics, settling, and the making of peace with water. Their publications, *SOAK: Mumbai in an Estuary*, *Mississippi Floods: designing a shifting landscape* and *Deccan Traverses: The Making of Bangalores Terrain*, visualise important discussions on settling with water through delicate and complex mappings, amongst other formats (Mathur and Cunha, 2001, 2006a, 2009).

In terms of exhibitions and catalogues, which aim to reach a broad audience, a few to mention are the *Out There: Landscape Architecture in the Global Terrain* (Lepik et al., 2017), which explored city and countryside as single-systems embedded in ecological systems, and *Urban by Nature* (Brugmans et al., 2014), IABR 2014, which engaged with discussions on human landscape practices in the Anthropocene. Such a summary as this is dangerous, as it serves to illuminate all of the projects, studies and research which could and should have been mentioned as well. A more comprehensive review, however, is beyond the scope of this research.

CORE METHODS IN LARCH

The study of physical landscape properties, such as surface characteristics, vegetation, gradient, permeability, building typologies, connectivity and so on is a foundation of landscape architectural methods.

This includes the unearthing of possible underground information, e.g. hidden streams, alongside attributing value to notions of a sense of place and sensory experiences. From this departure point, landscape architectural knowledge creation often includes exploratory methods, interconnecting hard- and soft facts, relations between the past, the present and speculative/possible futures (scenarios). At the level of knowledge production, I find that the methods of mapping and field trips are at the heart of landscape architecture.

Field trips

The field trip is a core practice, contributing to embodied knowledge production through 1:1 haptic, tactile and visual experiences as an integrated method of sensing and analysing. Field trips as a practice and method have manifold variations, with the mutual characteristic of being present 1:1, situated, in specific landscapes.

Using maps for mapping

The geographer and soil scientist Angus Hill along with landscape architects Philip Lewis and Ian McHarg have each contributed methods for mapping landscapes that are inclusive of both natural and human processes (Ndubisi, 2002, p. 25). Particularly, the earlier mentioned framework of Ian McHarg did influence not only the mapping methods of today but also provided the foundation of GIS (Geographical Information Systems) and the development of the EIS¹⁰. Today, GIS methods are foundational in planning, and increasing numbers of local and global platforms are offering access to comprehensive bodies of GIS information.

¹⁰ I expect the EIS to be the equivalent to the Danish VVM-assessment (Vurdering af Virkninger på Miljøet: Environmental impact assessment or EIA-assessment).

MAPPING AS A PRACTICE OF KNOWLEDGE PRODUCTION AND AS A 'RESULT'

Tracing vs mapping

In the context of this research, I do not discuss mapping as a theoretical endeavour. I am, however, aware that a rather large field of important works exists on just this topic. I employ some of the approaches of Cosgrove and Corner. However, I have some reservations regarding Corner's division between a map as a tracing and mapping as an original activity, drawing upon Deleuze and Guattari (J. Corner 1961-, 1999, pp. 213–214). As described by Albertsen, clearly, the reproduction of a map is not *mapping*. However, if the act of mapping as a tracing should equal *what is*, this would mean that 'there was a direct covering correspondence between the map and an already known territory' (Albertsen, 2015). Mapping consists of selective processes regarding what to visualise, how to order it, and how to visualise this. This applies, I would say, to intuitively-driven mapping as well as maps with the purpose of propagandising specific worldviews. Maps always have agency with different gradients of openness toward interpretations. For example, maps have varied concerns regarding power-knowledge, facilitating specific agendas, or concerns with providing alternative perspectives. Nevertheless, in this research, the approach towards mapping as a means of knowledge production and visual communication is aligned with Corner's description of how mapping functions as a means of communication through its use of analytical measures of factual 'objectivity', and, furthermore, how mappings reformulate things, thus engendering new sets of possibilities (J. Corner, 1999). I further inscribe the mapping practices of this research into Cosgrove's description of the a priori of *scale, framing, selection and coding*, where the map is different from the territory through acts of selection. Cosgrove describes such maps as cartographic representations that combine geometry and graphical images with numerical and alphabetic inscriptions and texts (Cosgrove, 2014, p. 9,11,12).

Mapping – tangibility vs intangibility

Some of the virtues of mapping as a process and a result are the capacity to visualise both tangible and intangible matters and relations across different scales and levels, e.g. geographical- and time-scales. Different maps provide different logics of scale and meanings, depending on their purpose at the time of production. In this way, mapping enables access to information across different timespans within a land-based reference. In this research, the practice of mapping is intended to provide insights and transparency by visualising some of the processual knowledge production. In this way, mappings represent different modes of knowledge other than that of the 'external' material that I used, e.g. planning and flood maps. Thus, I have used the practice of mapping as a method that creates relational linkages between different bodies of knowledge, connected through a shared attachment to geographical areas.

Mapping and water-Land delineations on maps

The below is a summary of the ambiguity between changing waterscapes and water delineations on maps. Carter explicates the arbitrary construct of visualising the coast as a line; arbitrary, as this delineation will, *per se*, exist as a dynamic zone, sometimes belonging to water and at other times to land (Carter, 1999). Although Carter refers specifically to coastlines, I find that it has relevance to surface water in urban landscapes too: the thin line on a map delineating a local stream does not describe, *less confine*, the stream in the event of a cloudburst. Eventually, the stream reclaims land outside of the designated line on the map or dries out, thus becoming a narrative of a former condition. It is possible, therefore, that such static modes of visualising natural processes contribute to the contemporary blindness of water as a dynamic matter in urban development when locating buildings.

Ian McHarg's overlaying maps technique was used to reveal and compare (qualify) the interaction of social and natural processes. For example, a thorough mapping of the Potomac River Basin Study, showing, e.g. buried floodplains and vacant land in low-income areas. These mappings visualise both visible and underground (invisible) bodies of water, e.g. aquifers, dynamic water-land features as tidal inundation, and intertidal habitats (McHarg, 1969, pp. 58-60,86-89,110-115; Spirn, 2012, pp. 13-14). (Spirn, 2000, pp. 104-106) (McHarg, 1969, pp. 58-60,86-89,110-115; Spirn, 2012, pp. 13-14). These are, however, challenged by the provision of static images and contemporary mapping techniques, which have been put forward in the search for more dynamic visualisation of 'how processes operate in space and time' (Spirn, 2000, pp. 13-14), for example, by Mathur and Da Cunha and James Corner (please see earlier sections).

In the context of pushing the boundaries of contemporary mapping, embracing relationships and dynamic processes between human practices and water, once again, Mathur and Da Cunha as well as James Corner offer exemplary projects, pushing forward knowledge creation and representations of landscapes in flux (Corner and MacLean, 1996; Mathur and Cunha, 2001, 2009, 2006b) (please see earlier section with Samples).

MAPS USED IN THIS RESEARCH

The Danish 'Høje Målebordsblade'

During this research, I have particularly drawn on knowledge from historical-, flood-, and planning maps, together with aerial photos. Combined, these have provided essential information for field trips and further mappings of the case areas. The historical late 19th Century maps, Høje Målebordsblade (HMB), have proved a notable and valuable source of information on landscape characteristics and former surface waterscapes with relevance to flood risk.

The 'Høje Målebordsblade' are topographic maps established during the period of 1842-1899 and based on a quite precise measuring model for field surveys (Michaelsen, 2004). Originally, these maps were intended for military usage, covering all of Denmark except Southern parts of Jutland¹¹. The HMBs show contour lines, wet and humid areas, forest, land-use, and parish boundaries. This telling of the recent history of land-use patterns combined with larger landforms is helpfully highly legible.

What is particularly useful about the Høje Målebordsblade (HMB) is not only the level of accuracy that they display- which allows for translocation of their information onto contemporary maps and thereby the support of field trip comparisons- or indeed their prioritised levels of information. It is also the time of their production- the late 19th century - as this was the breaking period of urbanisation and water control in Denmark. The measuring surveys foundational to the HMB maps were finished in the 1880s, which is approximately the same time that large-scale and extensive reclamation, embankment and drainage schemes were initiated (Bredsdorff et al., 1973, p. 31). Thus, they provide valuable records of 'last minute' information on the relationships between larger landforms, settlement patterns and waterscapes of recent history before the trajectory of undergrounding surface water and construction activities blurred the connectivity between local terrain and larger landforms. Today, the Høje Målebordsblade have been scanned and are publically accessible online¹², free of charge.

11 This part of Jutland belonged to Germany at the time

12 <https://download.kortforsyningen.dk/content/dtkh%C3%B8je-m%C3%A5lebordsblade>

SKRIFT. OG SIGNATURPLAN
til
Generalstabens Maalebordsblade.



Højdeforskjellen mellem Kurverne er paa Landjorden 5 Fod, i Havet 6 Fod (1 Favn). Højde- og Dybdetal i Fod.

Forkortelser.

	Kirke		Gaard		Trigonometrisk Station
	Sogn		Gaarde		Sanct
	Fredet Mindesmarke		Pg ^d eller Præsteg ^d		Store
	Milepæl		Hus		Lille
	Postcontoir		Huse		Gamle
	Teglværk		Skole		Nørre
	Vejmølle		Telegraf		Sønder
	Vandmølle		Dampskorsten		Øster
	Møller		Vindkørn		Vester
	Vindmotor				

Figur 1.2.14: Legend from the HMB maps, showing landscape properties and land uses, e.g. buildings, roads, contourlines, types of vegetation, and surface water. Source: Kortforsyningen.dk



PART 2

METHODS

PART 2 METHODS

CHAPTER 2.1

OBJECTIVE AND RESEARCH QUESTION

2.1.1 Contextualisation

2.1.2 Objective and aim

2.1.3 Research question



P2_C1

RESEARCH CONTEXT, AIM & OBJECTIVE

2.1.1 CONTEXTUALISATION

VALUES AND POTENTIAL DISPUTES IN URBAN LANDSCAPES

Urban landscapes accommodate all kind of human activities as well as natural processes. Thus, they entail diverse interests and value judgments too. Most people would likely agree to aim for good, better or best on an overall level. However, the complexity of plural values and potential disputes do not enter the stage until the value judgments have consequences, for example, when a CA|HOW-measure influences human and non-human actors through decisions on who is to pay and who is to provide land or change local practices. The more value pluralism that exists, the more various standards of measurement that can likely be expected necessary.



CA|HOW projects in urban landscapes are bound to affect diverse interests, and thus provide differentiating value judgments and potential disputes. If CA|HOW measures are implemented in urban landscapes without the intention of creating values beyond the capacity for water, these measures would still push multiple interests, and therefore trigger value discussions and likely disputes. For example, if a CA|HOW measure is located in front of somebody's garden, there is potential for the blocking of a favourite parking spot, the damaging a valued row of trees or a dispute over how tax-payers' money is used. These are all examples of conflicting interests in urban landscapes of CA|HOW. Accommodating plural values might facilitate diverse actors, but it does not, however, answer the question of how to perform value judgments in order to decide upon an aggregate level of well, or worse. From this perspective, the objective of facilitating plural values is to acknowledge dispute and contribute to providing a direction for action. The above considerations have contributed to shaping the research question towards an openness through exploring how to engage with plural values in CA|HOW urban landscapes.

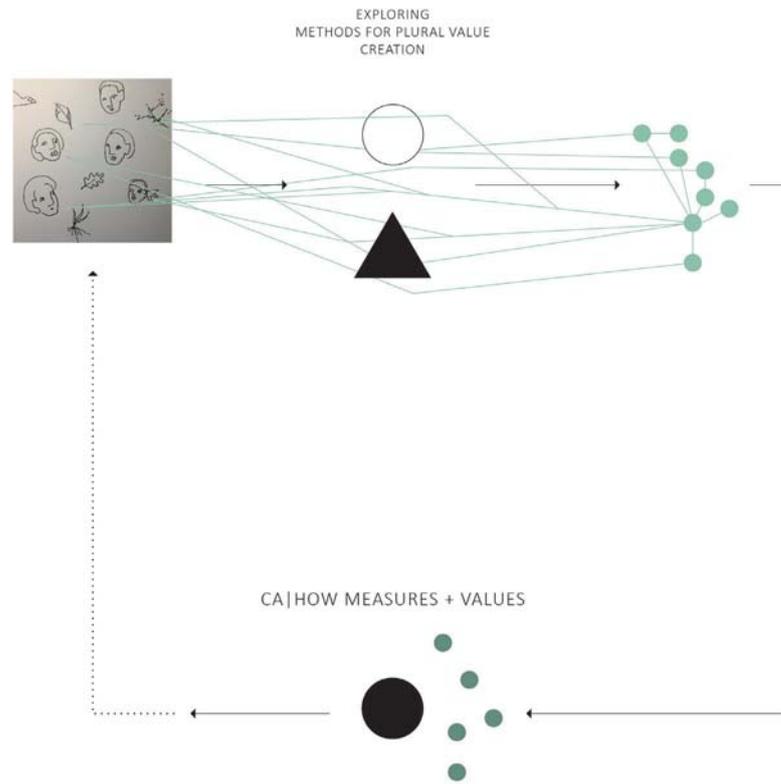
2.1.2 OBJECTIVE AND AIM

A RESPONSE TO CLIMATE ADAPTATION

This research is a landscape architectural response to climate change and adaptation to changing waterscapes. Climate change already enforces transitions with spatial and societal implications in urban landscapes. Climate change and adaptation necessarily demand the involvement of many interests and fields of knowledge, together influencing our surroundings. The underlying construct proposes that the physical measures of climate adaptation (CA) and the handling of water (HOW) (from now referred to as CA|HOW), in combination provide a positive resource for valuable changes in the everyday urban landscapes of suburbia.

The objective of this research has been to provide knowledge on how to promote potentials for creating plural values in CA|HOW-projects with a departure point in landscape architecture. The research suggests that transdisciplinary collaboration and dialogue can facilitate the creation of holistic projects beyond that of singular disciplines. This is not to dissolve the importance of the disciplines, but rather to unfold potentials of dialogue and exchange between different bodies of knowledge and perspectives.

The aim is to contribute to developing methods and practical approaches regarding how to engage with and discuss value creation in the everyday urban landscapes of CA|HOW. This has led to the question of *how* to engage CA|HOW in urban landscapes in order to instigate value creation beyond considerations of capacity, flows and disaster control.



Figur 2.1.2: Different actors and bodies of knowledge creating diverse values through CA|HOW with LArch interaction.

2.1.3 RESEARCH QUESTION

FIELD, FRAME AND THEMES

The context of this research is primarily landscape architecture and the creation of values beyond that of the capacity for water and monetary benefits relating to climate adaptation and water handling in urban landscapes. This is framed through low-cost, CA|HOW measures related to surface water caused by precipitation in the everyday landscapes of Denmark. From this starting point, the aim has been to explore transdisciplinary and cross-sectoral modes of collaboration in relation to waterscapes and value creation in CA|HOW in early project phases (please see Chapter 2.4 on case selection). The entry point is therefore practice-oriented and focuses on value creation in the context of CA|HOW projects with low cost/average¹ project economy: the everyday context. The research consists of four themes; climate adaptation, handling of water, actors, and plural values.

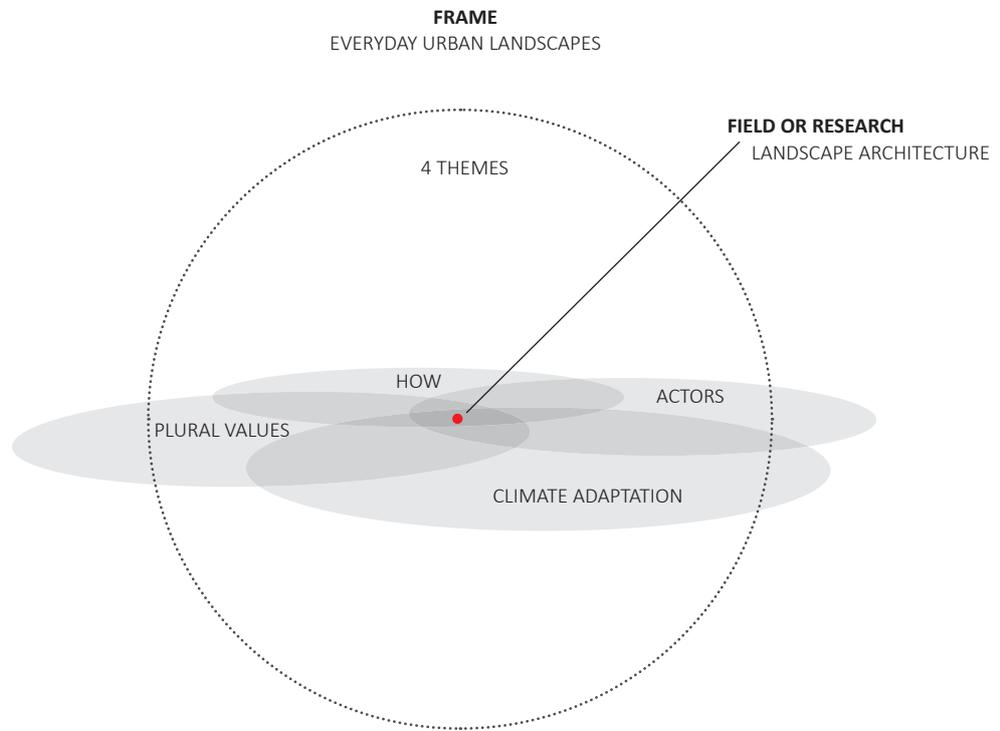
RESEARCH QUESTION

- How can landscape architecture and landscape architectural processes contribute to plural value creation in the everyday urban landscapes of CA|HOW, with regards to cross-sectoral and transdisciplinary collaborations in early project phases?

PROFESSION, METHODS	FIELD	AIM	CONTEXT HUMAN ACTORS	CONTEXT PROCESS
<ul style="list-style-type: none"> Landscape architectural based methods and thinking <p>(using mapping, diagramming, field trips, planning documents, technical drawings, aerial photos, combining hard facts and 'soft' facts in knowledge creation)</p>	<ul style="list-style-type: none"> Everyday urban landscapes of CA HOW. Climate change and increasing precipitation in Denmark <p>(in the climatic and geographical context of areas located in Aarhus Municipality. Situated in a Danish planning context)</p>	<ul style="list-style-type: none"> To promote value plurality for the common good <p>(by exploring methods for how landscape architectural methods can contribute to plural value creation through climate adaptation in everyday landscapes)</p>	<ul style="list-style-type: none"> Cross-sectoral, transdisciplinary collaboration, engaging different professions/disciplines <p>(by listening, learning, questioning, using landscape architectural material to exchange and develop different bodies of knowledge in a transdisciplinary context)</p>	<ul style="list-style-type: none"> Real-time early project phases <p>(in the processes prior to designing a form, before final political/planning consent and public hearings, by following leads on value potentials, multi-modality)</p>

Figur 2.1.3: Breaking the research question into its sub-elements. The schematic shows it with regard to the profession and methods, the field, the aim, and the context seen as human actors and process, in relation to the research question.

¹ 'Average economy' is not indicated or measured as a comparison of different project economies, but coined as an interpretation of 'normal' projects and budgets, which, relatively anonymously, are taking place in the current Danish context of CA|HOW projects. High-profile projects such as e.g. Musicon, Kokkedal-the blue-green garden city or Climate Quarter Skt. Kjelds (Copenhagen Climate Resilient Neighbourhood) are considered as not-average project economies, as these projects have more privileged budgets and were initiated as part of larger schemes that aim to revitalise specific areas or protect historic city centres, alongside CA|HOW.



Figur 2.1.4: The departure is landscape architecture, the field is framed within urban landscapes with four themes; water handling, climate adaptation, plural values, and actors.

PART 2 METHODS

CHAPTER 2.2

RESEARCH DESIGN AND METHODS

2.2.1 Contextualisation design research

2.2.2 Theoretical paradigm and perspectives in this research

2.2.3 Qualitative research in this context

2.2.4 Research Design

2.2.5 Methods

 LArch RTD, ANT, Interaction Research

 Real-time cases

2.2.6 Knowledge creation

2.2.7 Documentation

2.2.8 Ethics

2.2.9 Final reflections on the research methods

2.2.1 CONTEXTUALISATION DESIGN RESEARCH

FRAMINGS OF DESIGN RESEARCH

The following is a brief, introductory contextualisation of discussions on knowledge creation in Design Research within the design professions. Design Research is a developing field and it is a concept with several meanings. With reference to Thomas Kuhn's work on the structure of scientific revolutions (Kuhn and Hacking, 2012), Design Research does not have one agreed paradigm and it is interpreted in various manners by both other research traditions as well as from within the creative professions themselves. In the following sections, the contours of some of the developments and standpoints on design research are briefly discussed. However this is not to reframe or to provide a conclusive answer as to what Design Research is, as this is outside the scope of the dissertation. Instead, the purpose of this discussion is to provide an overall contextualisation of the epistemology and methods of this research approach, as deployed here in this thesis.

The search for scientific methods in design

Nigel Cross (Cross, 2001) outlines two notable attempts to define design in a scientific research context in the 1920's and 1960's. The first venture was related to Modernism with its trust in industrial development and 'objective' scientific methods. Here, Design Research was expected to deploy scientific methods such as measurability, to improve design, architecture and planning in a rational manner. The aim of doing so, was to improve living conditions and to solve societal challenges. Nigel Cross describes the 1920's as oriented towards scientific design as products, referring to, e.g. Le Corbusier and Theo van Doesburg (DeStijl). The second Design Research venture was in the 1960's, and this approach was directed towards a scientific design process, referring to, e.g. Buckminster Fuller and Herbert Simon. What the two Design Research ventures shared, was a trust in scientific methods as being objective, possibly universal, and transferable to design methods. Nigel Cross points out that the search for scientific methods of design failed and hence new approaches emerged during the 1970's, as described in the following section.

Wicked problems

A turning point happened in 1973¹ when Rittel and Webber formally described the concept of 'Wicked' problems as opposed to 'tame' problems (Rittel and Webber, 1973), exemplifying this in the context of planners, as a profession dealing with complex, societal problems. They framed 'wicked problems' as ill-defined and complex problems that are never fully solved, but rather re-solved over and over again, dependent on how the question asking is framed: what questions do we pose and which means do we include in the problem-solving? They suggested that this was a turning point, going from asking What do Systems do? rather than What are they made of? leading to the harder question of What should these systems do? Wicked problems denote a path to more open-ended and propositional knowledge production in Design Research.

Knowledge creation as reflection in action

The understanding of the knowledge production in the design professions was further developed in 1983 by philosopher Donald Schön and his seminal work 'The reflective practitioner' and 'Educating the Reflective Practitioner' (Schön, 1987a, 1987b). Schön's works became highly influential as a theoretical framework of design research and is still widely referred to. What is particularly useful is Schön's description of the knowledge creation in architectural research, practice and teaching, through the concept of reflection-in-action. Schön describes design knowledge production as an on-going reflection and synthesis during the action of making, e.g. drawing and dialogue. In his books, Schön carefully investigates the skilled knowledge creation of the design field without deciphering it into a fixed standard of measurement or schematics. According to Schön, reflection and knowledge creation was enacted through practising and making. Schön de-mystifies the knowledge creation through designing and pointed to the trained, intuitive processes of evaluation and synthesis in design-making, coupling subjective and objective properties and processes. Schön's work is often used as the theoretical framework of Design Research at an epistemological level.

1 same year as deep ecology was introduced by Arne Naess

Prepositions prescribing modes in design research

Frayling's article 'Research in Art and Design' of 1993 (Frayling and Royal College of Art, 1993), is still widely referenced and discussed. Frayling draws heavily on the arts and artists, and takes this into the context of research in the arts and design. Frayling's framework suggests categorising design research as research into, through, or for, art and design. The preposition denotes the research approach, and further prepositions have since been suggested. From the perspective of research through (or by) designing, Frayling's categories tend to merge during the research process. For instance, Research for Design could investigate how to provide knowledge that could inform design processes and methods, at some point then, Research for Design might turn into Research by Design as in creating knowledge through these very methods, e.g. by exploring 1:1 testing of a subject matter.

Furthermore, Jonas provides a thorough introduction and discussion of design research in 'Exploring the Swampy Ground' (Jonas, 2012). Jonas, referring to Glanville (1997) and Findeli (2006), discusses Design Research by the prepositional categories of research as, about, for and through design (Grand and Jonas, 2012), where research through design requires 'objective' scientific input generated by research for and about design. Jonas addresses another recurring issue: what kind of knowledge production Design Research is and the epistemology it is embedded in. Jonas seems to suggest that design research is a paradigm completely different from any other research method. This relates to the discussion within Design Research about the connection, or the divergence, between 'artistic' and scientific knowledge production (Weidinger and Feldhusen, 2015).

Mode 1 and Mode 2 knowledge creation

The different conceptualisations of Design Research are tied to discussions about the knowledge claims of design-thinking. This connects to the concepts of 'Mode 1' and 'Mode 2' knowledge creation introduced by Gibbons et al. in 1994 (Biggs, Karlsson, and Riksbankens jubileumsfond 2010, 223–39; Gibbons 1997; Grand and Jonas 2012; Prominski 2015). Roughly, Mode 1 is the development of scientific knowledge within each discipline, while Mode 2 is the searching for knowledge to solve real-world problems, often in multidisciplinary teams, as a context-driven, interdisciplinary approach to knowledge creation. The concepts of Mode 1 and Mode 2 can be useful to frame knowledge creation in Design Research, though, in more recent literature on design research, the concept of Mode 1 and Mode 2 knowledge is disputed (Belderbos et al., 2008; Hessels and van Lente, 2008; Weidinger and Feldhusen, 2015). For example, some authors frame Mode 1 and Mode 2 as a difference between knowledge creation on what is, and knowledge creation on what could be (Glanville, 2005), others even suggest adding a Mode 3 (Hipola, 2005).

Sum up - knowledge production in design research

"Schön set the corner stones of design knowledge with this description of the interplay of intuitive and analytical elements within the design process. The meta-theory of "reflective practice" has taught us that design can neither consist only of unfathomable subjective artistry nor of operational, objective methodology. This knowledge is applicable to all design disciplines. [...] the design process as Schön's theory is already so persuasive and provides a good foundation." Prominski, quote (*Design Research:265*)

Based on the Design Research readings, it appears that internal discussions on Design Research particularly revolve around two levels. Firstly, at an epistemological level of whether Design Research is solely intuitive or tacit and has to be accepted on this premise, or not. Secondly, the very methods of performing Design Research are also discussed. Here, there seems to be a difference between the fields of, e.g. building architecture, product design, and landscape architecture (Biggs et al., 2010; Grand and Jonas, 2012; Kimbell, 2011; Koskinen and Gall Krogh, 2015; Krogh et al., 2015; Prominski, 2015; Seggern et al., 2008; Weidinger and Feldhusen, 2015). The approach of regarding intuitive, or tacit, and scientific knowledge as having to follow separate research designs do not seem appropriate regarding landscape architectural design research, which builds upon multi-methods/methodological plurality. However, the above discussions highlighted what might be 'unique' or specific to Design Research is not the use of methodological pluralism, e.g. mixing physical material with the immaterial and engaging personal encounters, nor is it the element of aiming for better, or the speculative approach of what could be. For example: speculative, explorative approaches would appear embedded in, e.g. astrophysics and in another example, normative aims are likely embedded in e.g. the medical sciences. Using multi-methods, combining hard and soft facts are not alien to the research of other disciplines either. For example, in psychology, Chamberlain et al. describes studies where the researchers are using interactive approaches of following and getting to know their participants, using diary entries, and photographs in explorative manners to study their research objective. (Chamberlain et al., 2011). Another example is the Dutch philosopher Erik Rietveld, who studies the concept of affordances with a direct linkage to making 1:1 spatial experiments (Rietveld and Kiverstein, 2014)(see Chapter 4.5 Affordances). For landscape architecture, what is distinctive to design research appears to be the integrated component of reflection-in-action as described by Schön, where the process of making is a process of analysis and synthesis in action, forming a foundational methodological component. The key distinction might then be whether one accepts using tacit, intuitive, speculative, open-ended and ambiguous methods together with hard facts and interdisciplinary knowledge as part of the knowledge production in design research. In this research context, both Schön's approach to (skilled) reflective practices and Rittel and Webber's definition of wicked problems seem useful as an overall theoretical framework in this research context of Research through Designing in landscape architecture.

2.2.2 THEORETICAL PARADIGM AND PERSPECTIVES IN THIS RESEARCH

SCHÖN, WICKED PROBLEMS AND ELEMENTS OF PRAGMATISM

Admittedly, I decided upon research methods before being clear on philosophical assumptions. In retrospect, I realise that decisions pertaining to appropriate methods in a research context reflect ontological and epistemological presuppositions, whether conceded or not. Hopefully, this retrospective reflection provides transparency on this matter.

At the outset, the research was not framed within a specific theoretical paradigm. Rather, the departure point was a practice-based stance. As described in the contextualisation of Design Research and RtD, section 2.2.3, there is not one, agreed-upon paradigm or theoretical framework, as such. However, the theoretical framework of Schön (Schön, 1991, 1987b) is seminal in describing knowledge production using design methods and thereby seems to be an appropriate theoretical base for the research. Furthermore, Rittel and Webber's metaphor of 'wicked problems' (Rittel and Webber, 1973) and how they connect this to designerly thinking resonates well with the subject matter: value creation in the context of CA|HOW urban landscapes is rather complex, and hence can hardly be 'solved' as such, but it can be approached as a wicked problem.

Beginning with a non-specified theoretical paradigm stresses the importance of being as transparent as possible, in order to acknowledge presuppositions and assumptions. Here, John W. Creswell points to how the researcher ought to provide knowledge on one's own background, thus allowing transparency regarding the researcher's interests, interpretational frame and eventual bias relating to one's own gain (please see section 1.1.1 on motivational context). As Creswell puts it, in reference to Guba (Creswell, 2013); "our basic set of beliefs guides (our) actions." As the subject matter of this research connects CA|HOW with the aim of promoting plural values, my personal presuppositions become quite important. As an example, the first version of the research question used the term 'added-value', thereby implicitly connecting to specific world-views and assumptions on values (please see Chapter Value, section 4.4.1, 4.4.2).

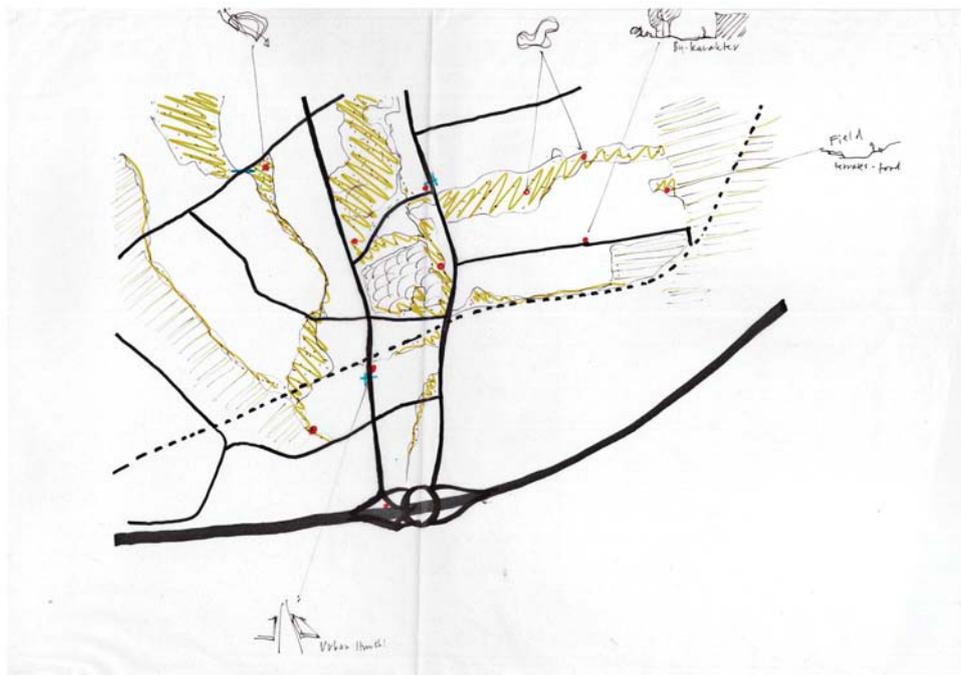
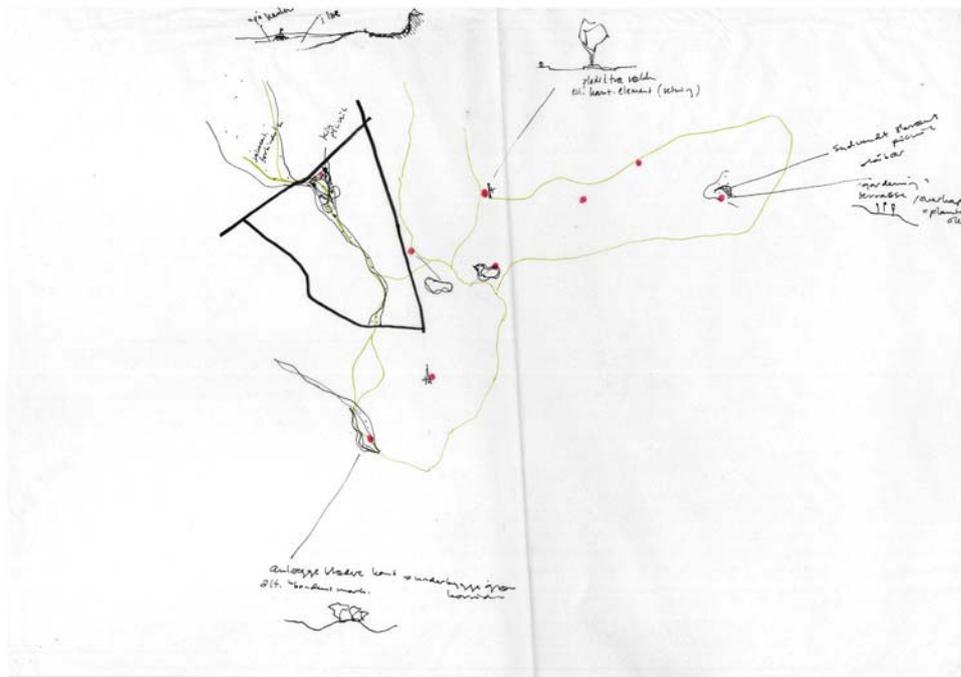
Pragmatism knowledge claims in landscape architectural Research Through Designing (RtD)

Re-examining this research, I find that even though I did not subscribe to a specific philosophical paradigm, the research seems to revolve around elements from pragmatism. This reflects an ontological stance that sees the world as being real and, on acceptance of this realness, taking a practical approach to discussing 'how it works'. At an epistemological level, this means the acceptance that reality is not one entity, and that, in order to obtain knowledge on the real-world, it is of use to employ multiple tools reflecting both what is often distinguished as objective and subjective data of the real world. Drawing on Creswell, this research relates to what he frames as pragmatism (Creswell, 2013; Melles, 2008). Lenzholzer et al.'s position regarding 'research through designing' (RTD) is described by reference to Creswell's overview of knowledge claims and associated research methods (Creswell, 2013). By connecting to Creswell's framework, they inscribe LArch RTD into acknowledged methods of research, at the same time as maintaining the opportunity to use methods and tools that are specific/common to LArch. Within this framework, Lenzholzer suggests four categories of LArch RTD connected to Creswell's categories of (Post)positivism, Constructivism, Advocacy and Pragmatism. Each category is defined by what kind of design knowledge it produces, which type of research question it addresses, and relates this to the RTD methods and criteria of evaluation. In other words, they comply with generally accepted research frameworks while also sticking to the core elements of LArch, employing *designing* as a foundational part of the knowledge production.

Knowledge production and landscape architectural Research Through Designing (RtD)

Design research has many meanings and interpretations. In this context, I use the term Research Through Designing, as I find it has the capacity to include LArch methods, drawing on Lenzholzer et al. and their proposal that 'landscape architecture needs to be addressed as a dynamic, highly complex larger scale natural and cultural system' (Lenzholzer et al., 2013, p. 121). They distinguish designing from design so that processes and diverse scale levels are included as *designing*.

The type of knowledge creation in this research relates to what Albertsen discusses when he compares the science lab and the design studio as *spaces of practices* that are locally situated (Albertsen, 1994) and that as research environments have similarities to that of the reflective practitioner (Schön, 1991, 1987b). Albertsen suggests that the difference between the design studio and the scientific lab is that designers are not obsessed with 'literary inscription', and, furthermore, that design processes do not follow a logical sequence, instead allowing situations to 'talk back' and thus initiate reflection and a preliminary understanding of the action (Albertsen, 1994, p. 6)(*ibid*:6). This description expresses the form of knowledge production constituted by visual-material means in this research context. Prominski goes further, providing a distinction between the macro level and the micro level of designing, where the micro level is a rather analytical and relational process of investigation (Seggern et al., 2008, p. 273). Somewhere in-between the micro- and macro levels, Prominski addresses an 'intermediary level of structured knowledge bundles which are neither totally specific nor universal' (*ibid*:273). This well describes the data of this research, which have been gathered at the micro level- specific locations and situated actor encounters connected by water in urban landscapes of Aarhus. The result of this research thereby consists of sequences of propositional LArch reflections that 'answer' the research question from different angles and at different levels, providing frames, or guidelines, to inform other actors. This research, therefore, is enacted at what Prominski terms the intermediary level, exemplified by the matters and methods engaged in 'Test Case Aaby' (Chapter 5.2).



Figur 2.2.5: Mapping layers from Case 2 Lystrup; investigating relationships between location of retention basins and e.g. local spatial characteristics, green spaces and larger vegetation patterns, primary infrastructure.

Theoretical frameworks supporting the research process

Theoretical frameworks have not served to frame the research from the outset. Rather, the cases were the vehicles that drove discussions and reflections, following which, seemingly relevant theoretical frameworks were employed. This approach is in contrast to testing or developing a specific theory. The purpose of using theoretical frameworks has been to provide interpretational armatures, pushing forward reflections on empirical experiences. In short, the framework of 6 Regimes of Justification (Boltanski and Thévenot, 2013) and the concept of Affordances (Gibson, 1979; Rietveld, 2014) have proved particularly productive as interpretational frames, acting as an engine for knowledge production and reflection of the research (please see Part 4 Value, chapter 4.4, 4.5). A shared relation to pragmatism connects the theories that have proved productive for this research. They both focus on situated, contextualised approaches and actions; are inclusive of how human and non-human-actors influence each other in a relational manner; and neither of them subscribe to the dualism between the subjective and the objective (see section 4.2.2). Instead, they share an acknowledgement of the physical environment as being real as well as aesthetics and perception.

As an example, the term added-value has been helpful in communicating with practice-based actors, but it has been close to counter-productive in discussing values and developing LArch entry points into value creation in CA|HOW. During Case Lystrup, a value dispute during a meeting encounter made me question my approach and my assumption that I could interact via the term added-value. The experience prompted me to reflect upon whether the concept of added-value was actually useful to my research objective: to add more values to a value dispute seemed to offer only further incompatibility. I realised that value creation required attention to justification and this was when the framework of 6 Regimes of Justification was introduced (Albertsen, n.d., p. 54; Boltanski and Thévenot, 1999). This is further described in Case Lystrup (Chapter 5.1) and the Value chapter 4.4 on justification, which goes into more depth regarding the theories employed.

2.2.3 QUALITATIVE RESEARCH IN THIS CONTEXT

The research presented here is design research in the field of landscape architecture. It is conducted as Research through Designing rooted in Qualitative Research, as described by Creswell (Creswell, 2013, pp. 42–48), as well as the LArch RTD approach of pragmatism as described by Lenzholzer (Lenzholzer et al., 2013). The research uses methodological pluralism (also termed multi-methods), as the research design aimed to facilitate different modes of knowledge creation on the same subject matter. The use of multiple qualitative methods also indicates that the research design has not been static and that the methods have developed during the research process. Creswell describes how participant meanings are important. In the case chapters 5.1-3, I have sought to reflect multiple perspectives from the case actors, as well as the implications for non-human actors such as settlement patterns and the waters flow. The research has used interventionist methods, often instigated by bringing my own LArch material in as a response to the emerging themes of a case, as prompted by both meeting encounters and the non-human actors of the cases. LArch material was introduced in an effort to further value creation, but the material also functioned as a possibility to give voice to the case actors. During this process, and when writing the cases, I have sought to emphasise openness and reflexivity regarding my own presuppositions and interpretations. During the writing process, providing transparency by accounting for multiple perspectives and the complex and dynamic factors at stake has been a focal point. Below, I offer some background on the methodology and methods employed. This is followed by the Chapter 2.3 and 2.4 on the conceptualisation of Design Comments, and the selection of the cases and criteria, including an overall introduction to the cases.

Relevance and open-ended research question

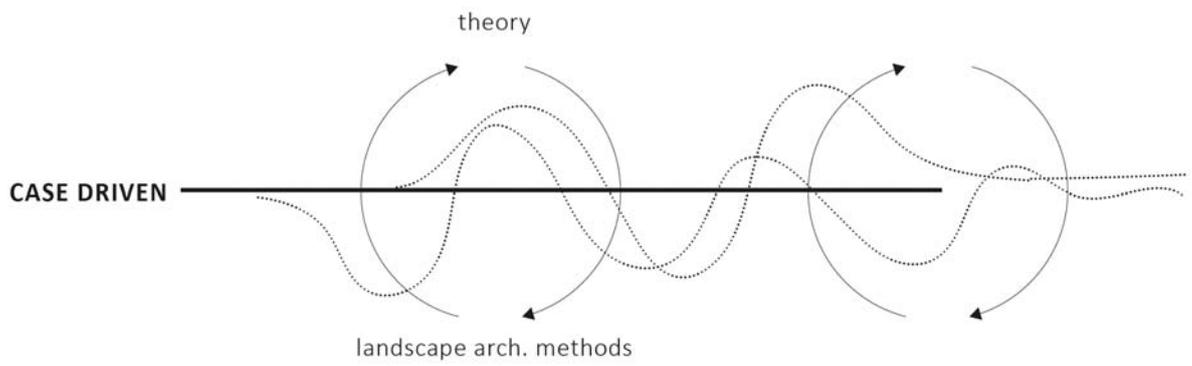
- How can landscape architecture and landscape architectural processes contribute to plural value creation in the everyday urban landscapes of CA|HOW, with regards to cross-sectoral and transdisciplinary collaborations in early project phases?

My interpretative lens has been the investigation of how landscape architecture can contribute to value creation in CA|HOW everyday landscapes. The Motivational Context describes the assumptions that I took with me while carrying out the research. To narrow down the rather broad topic of climate adaptation and water, I focused on precipitation and the flow of surface water in urban landscapes in the climatic context of Denmark. The relevance of the research is substantiated by the Danish State requiring all municipalities to establish a climate adaptation plan by the end of 2013; all municipalities focus on water as their primary adaptation issue.

2.2.4 RESEARCH DESIGN

METHODOLOGICAL PLURALISM

The research question, the methods and the objective of this research are interconnected. Creswell defines this as methodological congruence. The research question is intentionally open-ended in order to act as a means for the researcher to be open towards broadening own knowledge. A wicked problem is not likely to be ultimately solved or to provide universal cause-and-effect conclusions. This is reflected in the chosen methods: they have to enable the collection of various data in multiple forms. The data have been analysed and reflected upon with reference to landscape architecture, meaning that other potentials of value creation were omitted. For example, the meeting encounters also revealed structural issues that could have been analysed to find processual, organisational and regulatory elements with potential for value creation in CA|HOW. Such leads have only been followed if they were also attached to physical landscapes. If not, they are not described here. To establish knowledge on the complex subject of value creation in CA|HOW everyday landscapes it seemed reasonable to use methods capable of providing different modes of knowledge. Methodological pluralism (multi-methods) was an entry point to providing knowledge from various perspectives, such as using objective, measurable knowledge of physical landscape properties and relational knowledge provided by situated actor encounters together with designerly knowledge provided through drawings. As the research uses design methods as its core, validation and evaluation criteria are not based on, for example, triangulating data. Instead, the data have been analysed through the reflective process of making. These design 'operations' of mapping, claims, and propositional reflections have been qualified by using planning maps, historical maps and visual methods like photography. The visual material employed for qualification is used concurrently to describe the cases, aiming to provide transparency and allowing the reader the possibility of different interpretations.



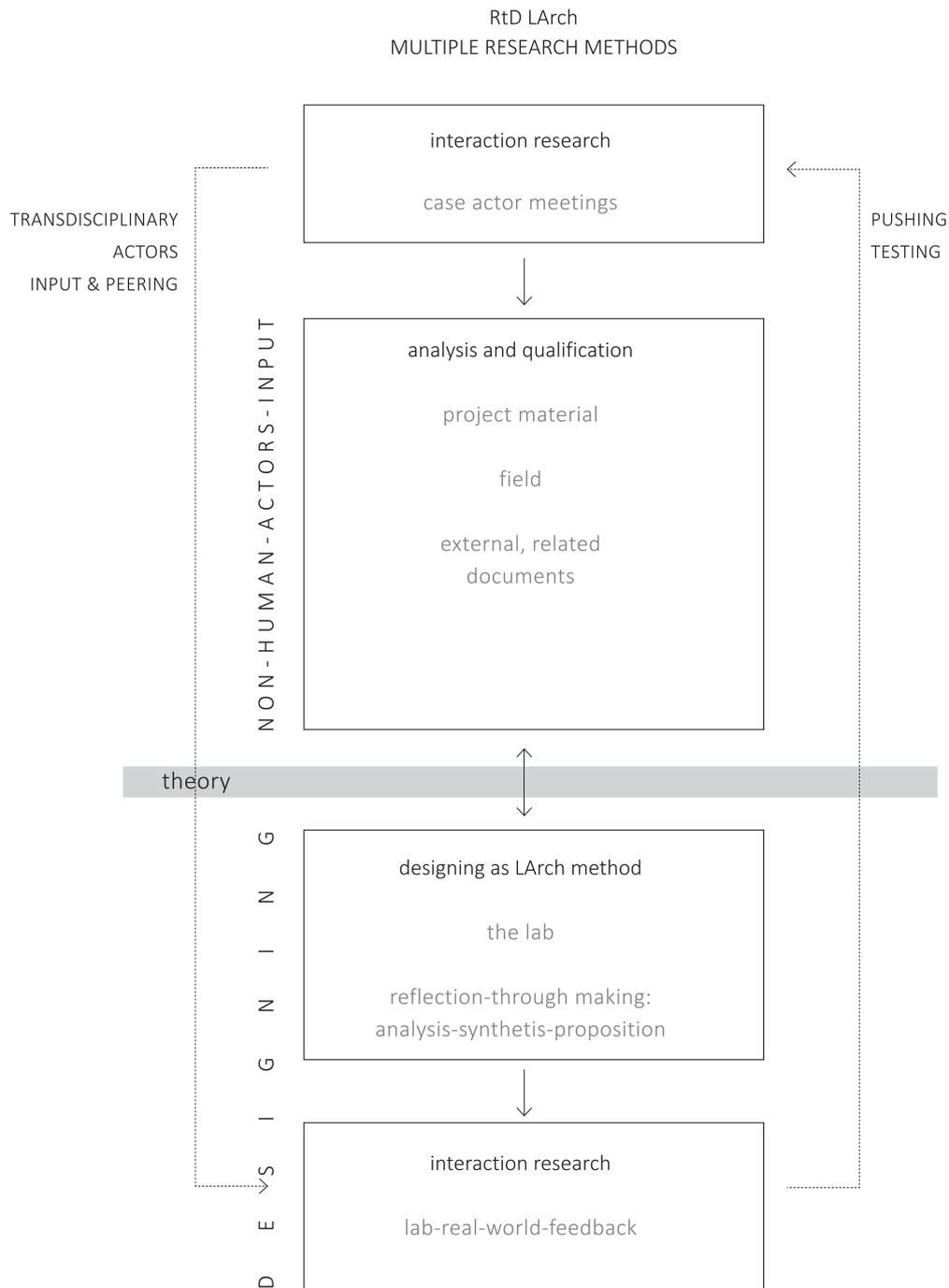
Figur 2.2.6: Dynamic, iterative knowledge creation in real-time processes where case studies form the spine. The research uses landscape architectural methods and tools. Theories inform the leads and knowledge from the case encounters with transdisciplinary actors.

2.2.5 METHODS

A few elements were decided upon at the very outset: using LArch methods and interacting with transdisciplinary, real-world actors in the early processes of low-cost CA|HOW projects.

Initially, I did a practice-based version of a literature review: a 'screening' of the contemporary Danish CA|HOW scene by attending conferences and network seminars with actors from municipalities, regions, water companies and practitioners. Simultaneously, I studied high-profile, on-going CA|HOW-projects. This gave further form to methods and the case criteria and selection (see Section 2.3, 2.4).

I decided to use real-time cases to form the contextual backbone of the research, providing a situated exploration of 'how to' push plural values among transdisciplinary actors in CA|HOW projects. As described in the motivational context, the research was motivated by LArch-practice experiences and how decision-making in the early project phases could alter opportunities for value creation in later phases. To investigate this, I wanted to achieve informal insights, not polished by formal records. My presumption was that entering 'the black box of decision-making' would provide situated knowledge on practices of valuation, revealing potentials for value creation. The research was conducted as following real-time cases, using LArch methods and interaction.



Figur 2.2.7: Research through Designing in landscape architecture using multi-methods. Diagrammatic overview of the approach in terms of how the multi-methods are expected to feedback into its other: the diagram illustrates how the different research methods, the different types of data and the repeated human case-actor encounters inform each other in the process of knowledge creation.

GAINING PRELIMINARY INSIGHTS ON CONTEMPORARY, DANISH CA|HOW PRACTICES

A practice-based, introduction to the Danish CA|HOW-scene

The research process started with an initial, practice-based ‘screening’, aiming to provide current knowledge on CA|HOW in a Danish context. This consisted in participating in eight² practice-oriented conferences and seminars with a focus on contemporary Danish CA|HOW projects and approaches between September 2013 to January 2014 (see Appendix 1 for detailed programs). What these events shared was their ‘practical’ focus on collaboration between different actors, from policy-makers to municipal planning departments, utility companies, consultants, researchers and community groups, alongside a focus on creating plural values, mainly framed as ‘added-value’ (Merværdi), in the context of CA|HOW.

To contextualise the level of information and insights provided by these events, I describe the content-based set-up of the first ‘Vandplus Conference’ of September 2013. Selecting this conference as the ‘Vandplus’ initiative was highly influential on Danish CA|HOW. The conference was titled ‘Skab byliv med klimatilpasning’ (‘Create urban life through climate adaptation’) and financed by two larger Danish Foundations³ in the built environment; Realdania and LOA together with the Danish Environmental Ministry. Keynote speakers were, among others, from Realdania, LOA and Ida Auken⁴. From the practice world there was keynote speaker Herbert Dreiseitl providing insights to their projects in Potsdamer Platz, Berlin and Nansenparken, Oslo. A plenum debate session accompanied this with, among others, member of the Danish Board of Nature and the ‘Task Force Climate Adaptation’. The conference further presented a relatively new project ‘Rabalderparken⁵’ in the Musicon area of Roskilde. Furthermore, the focus was on the following, on-going Danish CA|HOW-projects; sØnæs, Gladsaxe Idrætsanlæg, Kokkedal- den blågrønne haveby, Solrød Kilen, and Lindevangsparken. For example, Solrød Kilen⁶ was a climate adaptation project founded on upgrading a leftover area for a retention basin together with being a recreational, public space. Another example was Lindevangsparken⁷, which was a climate adaptation project

2 (a) Vandplus konference 5th of September 2013. Skab byliv med klimatilpasning. Financed by Realdania, LOA and the Danish Environmental Ministry. (b) Vandplus conference 8 th January 2014. (c) C2C og bæredygtigt byggeri og arkitektur i praksis, 25th September 2013.

(d) Fremtidens Vejr – Fremtidens Byrum, 8th of October 2013.

(e) Klimatilpasningsdag Region Midt, 9th October 2013. Vand I Byer, Projekt Klimaskole

(f) Klimatilpasning I Portland, Melbourne og København, 10th of October 2013

(g) Vand I Byer, Citizens in Climate Adaptation, 11th October 2013

(h) Klimatilpasning, storytelling og borgerinddragelse, 29th January 2014.

2 Realdania and LOA, are two influential Danish foundations with focus on the build environment: Realdania By & Byg is a foundation developing experimental buildings, urban areas and preserving historical buildings through philanthropic investments and active co-ownership (source Realdania website <https://realdania.dk/om-os>, translated by author).

The LOA Foundation develops and supports construction/buildings for sport, culture and leisure and offers consultancy within this field. LOA is focused on architectural and functional quality aiming to inspire the development and create better and new opportunities for activity (source <https://www.loa-fonden.dk/om-fonden/>, translated by author).

3

4 Ida Auken was then Danish Minister of Environment

5 providing a concrete detention basin as a skate park

6 Solrød Municipality, opened ultimo 2016

7 Frederiksbjerg Municipality, opening ultimo 2015

developing a new urban park space together with retention area (see Part 3, Chapter 3.5 for further mention of the first three projects). The conference set-up also provided a walk and talk through the climate adaptation project 'Selsmosen' in Høje Tåstrup and an array of stalls/workshops making it possible to gain further information from the stakeholders of the projects. Altogether, the key discussions on the Vandplus conference revolved around climate adaptation with 'merværdi' (added-value): how to invest intelligently together with new modes of collaborations between utility companies, municipalities, businesses, citizens and researchers. The conference participants represented a broad range of actors: from state-level to municipal level and local community groups; from utility companies and private businesses to research- and educational institutions; from politicians and municipal departments to private actors and from small firms to large companies. Attending these events provided insights into contemporary, recurring discussions, approaches and challenges of different actors in the new⁸ era of CA|HOW and how this might apply to all of the 98 Danish municipalities (see Part 4, chapter 4.6 on Danish municipal climate adaptation plans).

8 The Vandplus Conference of 5th September 2013 had approximately 213 participants. 32 municipalities were represented with 81 persons; 20 utility companies with 36 representatives, 3 research/educational institutions (Aalborg university, Copenhagen University, Aarhus School of Architecture) were represented, 45 consultants from an array of both small and larger firms together with politicians and representatives at the statelevel; By-, Bolig- og Landdistrikt Ministeriet, Miljøministeriet, Naturstyrelsen and Vejdirektoratet (The City-, Housing-, and Rural district Ministry, Danish Ministry of Environment, the Danish Nature Agency and the Danish Road Directorate), note that of some of the Danish Ministries have merged and changed their names since.

As all Danish municipalities were obliged by the Danish state to provide municipal climate adaptation plans by the end of 2013.

LARCH RTD WITH INTERACTION AND ANT

Research through Designing (RTD) has been conducted via LArch methods of reflection-in-action in an interplay with Interaction Research and elements from Actor-Network-Theory. Together, they comprise an exploratory research design. Documentation and qualification are provided mainly through visual material such as maps, mappings, photos, and sketch logbooks from meetings. These data constitute the qualification, reflections and discussions of the thesis.

The LArch methods particularly employed mappings, as continually used during the research and field trips. The aim was to use existing knowledge on, e.g. flow paths, infrastructure and physical characteristics of locations in new configurations, pointing to alternative relationships and affordances. The methods furthermore consisted of documenting and qualifying aspects of the research by reading planning documents, studying maps and so forth. This is a classic modus of documenting common to landscape architecture: from lab to field and back and vice versa.

Using multi-methods is not new to LArch as a profession. During the research, the methods have developed into a more integrated approach, which has started to form into what I propose as a method: Design Comments. Design Comments have been used to promote the exchange of different knowledge and perspectives in transdisciplinary contexts.

The foundation for this was mappings that articulate landscape affordances and potentials for action. The Design Comments became an integrated method, pushing how RtD LArch knowledge can contribute to the collective skilled practices of seeing affordances as well as propositions for what 'could be' attached to real-world problems. This is described in Chapter 2.3 Design Comments, and the concept of affordances is further discussed in the Chapter 4.5 Affordances.

	TYPE	DATA & DOCUMENTATION	KNOWLEDGE PRODUCTION ON
INTERNAL CASE-INFORMATION	meetings <i>(situated actor encounters)</i>	- logbook notes - email correspondances	<i>insider knowledge on</i> - practices - disciplines and value attribution - practices in CA HOW - processual/procedures - facts on CA HOW
	project material	- project drawings - visualisations - movie clips	- visual communication of CA HOW projects - design practices - practices of locating CA HOW projects
EXTERNAL CASE-INFORMATION	external, related documents	- planning documents - flood maps - historical maps - aerial photos	- physical LA context of CA HOW - planning context - historical LA properties - settlement patterns and urban development
	field	- field trips - visual documentation <i>(photos, diagrams, notes on maps)</i>	- embodied experiences <i>(scents, tones, lines of vision, movement)</i> - spatial characteristics of UrbLA - building practices, building materials - visible landscape properties <i>(topography, typology, infrastructure, scale, barriers, vegetation, water bodies)</i>
DESIGNING CASE-INFORMATION	lab	- mappings, diagramming - reading	- rendering new configurations and relations - connecting past-present-future landscapes - rendering affordances - propositional affordances <i>(strategic)</i> - synthesis and analysis of case info
	lab-real-world	- actor encounters using lab material	- pushing value discussions - activating actors collective knowledge - testing LArch approaches - responsive research; letting actors meanings count

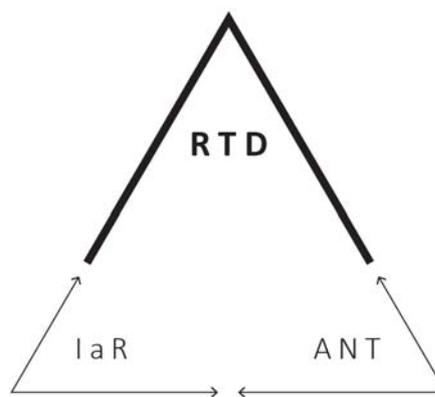
Figur 2.2.8: The diagram provides an overview on the types and modus of data collection and what it is meant to produce knowledge on, within different categories of case-information.

Follow the actors and interact

Employing real-time cases and using interaction has meant that I, as a researcher, influenced the case encounters and intentionally took an active role in the cases. I was deliberately influencing my subject matter of research. This is not a new situation or discussion in research and to claim full neutrality between subject and object, researcher and the researched, is well-acknowledged as impossible: researchers always influence the field of research and vice versa. In general, researchers will, of course, be aware of this. In the present context, the influence of the researcher has purposefully been sought through intervening using LArch tools. The research objective was always made clear to the case actors in order to provide as much transparency as possible, including when new actors entered meetings. However, unintentional or unnoticed influences have most likely formed part of the case encounters too.

From the outset, it was important to acknowledge relationally- and network- dependent interplays between human and non-human actors. Following on from this, the ANT perspective has enabled a situational interpretation, where human interactions are coupled with the relevant non-human actors of the project. The connection between Actor-Network-Theory (ANT) and LArch RTD is that ANT specifically addresses the relational interplay between human and non-human actors in forming situations and actions. Connecting human and non-human actors relates to the core practices of Larch, for example, by connecting human movement, water's flow, sensory sensations, the feeling of safety, light, scents, seasonal changes, vegetation types, biodiversity, soil conditions, materials, costs, structure and the size of planting holes. During the case encounters, I followed the human case-actors together with the non-human actors of the project, e.g. project drawings and the physical areas designated for CA|HOW-projects.

LArch RTD as method
addressing value creation in urban
landscapes and 'the how to'



Interaction
lab-real-world-feedback, meetings
addressing transdisciplinarity and the
'how to'

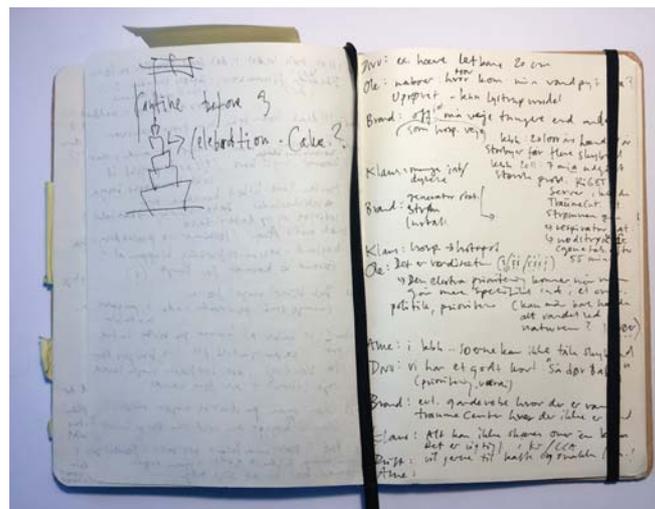
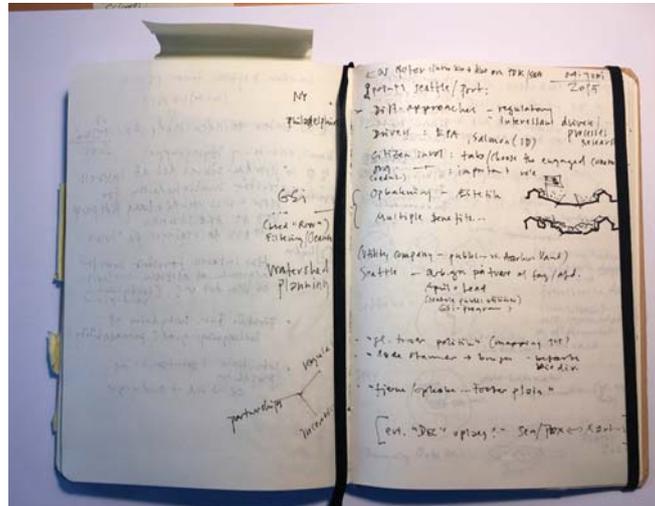
ANT
analysis and qualification
project material, field, external,
related documents
broadening knowledge on subject
matter

Figur 2.2.9: The diagram shows Research through Designing (RTD) as the leading method with elements of (inter)action Research (IAR) and Actor-Network Theory (ANT).

Being present and situated

"I plunge into my notebook, trying to inscribe carefully traces of the discussions I have witnessed just moments ago. In doing so, I was trying to maintain a regime of presence that, although temporary, had to be prudent, imperceptible and not aggressive vis-à-vis the actors observed."
 Quote Albena Yaneva (Yaneva, 2009, p. 39):

To some extent, the cases of this research were followed using a spatial-ethnographic-ANT-approach, related to what is described by Albena Yaneva in 'The making of a building' (Yaneva, 2009). Yaneva describes how she makes an effort to maintain a regime of non-aggression vis-à-vis presence and thus has to make her notes afterwards. This same approach provided real-world insights on transdisciplinary and intersectoral practices of CA|HOW. The situated encounters delivered informal, behind-the-curtain knowledge on the subject matter. The difference, however, is the interactive component of this research. The meeting encounters were not observation studies; they were the arena of interaction. The Interaction research consisted of establishing a transdisciplinary dialogue on value creation in CA|HOW real-time, real-world problems. The interactions focused on pushing value creation by introducing material, aiming to activate existing knowledge, and hopefully to push the skilled practices of value creation in the transdisciplinary contexts of CA|HOW. The responses from the case-actors functioned as a concurrent testing/qualification of the LArch methods. Albertsen describes how 'things (non-human actors) and human actors are the mediators of each other' (Albertsen, 2002). To explicate the concept of a mediator, Albertsen describes it in contrast to the communicator that is supposed to disseminate knowledge as unaltered as possible, whereas, quote Albertsen, own translation: "the mediator is active and positive. It [the mediator] is doing something itself that cannot be reduced to effect or distortion of something else. A mediator is never exactly the cause or the consequence of its associated mediator. [...] an actant can, literally, be anything that is acknowledged to be the source of an action" (Albertsen, 2002, pp. 17–18). The concept of 'mediator' describes quite well how the LArch methods of mapping and interacting with tangible material became a mediator of knowledge exchanges.



Figur 2.2.10: Sketchy notes from meeting encounters

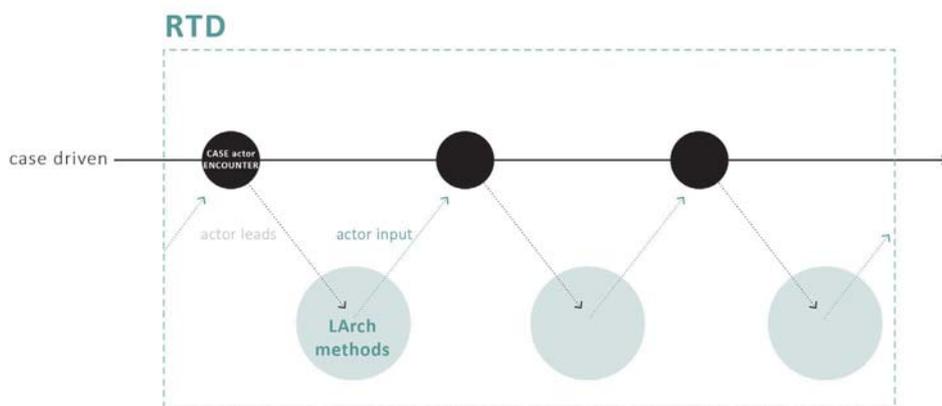
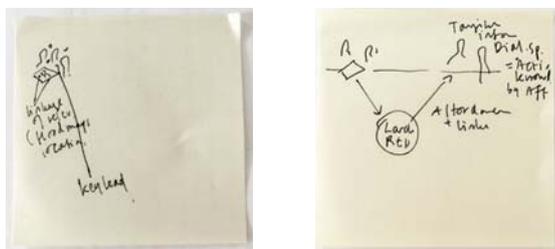
Real-time cases and situated learning

Following real-time cases provided situated, in-depth, imperfect knowledge. For a start, the intention was not to try to follow every aspect of the processes or actor behaviour in the cases, and neither was it possible to attend all meetings. In addition to this we must also exempt email correspondence, phone calls, ad hoc meetings in the corridors, informal chats at other meetings, pre-existing actor constellations, power-relations, sectoral practices, former collaboration experiences or stressful situations caused by working conditions, printer breakdowns, interfering media headlines or politicians special areas of interests – all of which go on unbeknown to me. Conversely, the actors provided me with additional background information on, e.g. prior experiences of troublesome public processes or challenges in cross-departmental and cross-sectoral collaboration. These insights gave me a deeper contextual understanding of the subject matter and thus also the setting for value creation.

The process of following real-time cases meant being part of situated 'in-between' situations, which also changed my research perspective. It drove the need for employing theoretical frameworks relating to value, enabling me to go beyond my initial, practice-based assumptions on value creation as 'added-value'. In this way, the real-time cases informed, formed and changed the discussions, analysis and conclusions of the thesis. Another question is how Interaction research establishes a relationship between researcher and the actors followed.

Contextual and temporal perspectives

The temporal perspective further emphasises these research characteristics: I followed the cases on-off for two years and four months. During this time span, I achieved situated knowledge on the actors' practices and work fields related to CA|HOW including how they became acquainted with my methods and me as a person. The temporal perspective led to a deeper understanding of the actors' worlds and broadened my contextualised knowledge of the subject matter. It also led to a sense of growing personal relationships. The door swings both ways when interacting over time, and the consequences are two-fold: it provided situated knowledge, and it also instigated a lessening of the distinction between researcher and the researched and less distancation. The maintenance of the research objective was the continuous baseline. Contextual circumstances have likely furthered the openness of the actors: the clearly stated 'soft' objective (added-value) functioned as an entry point. Furthermore, I represented an 'individual' actor without economic or positional interests (position within their organisation), I, therefore, I did not represent private interests (protecting my property or sales value), political interests (the AAA funded the research) or media interests in creating headlines. The temporal perspective of following the cases for a longer timespan played a role too, as this necessarily meant knowing each other differently than if I had followed them for a short time. In addition to this, the time perspective also resulted in changing actor constellations.



Figur 2.2.11: Top: Sketchy reflection notes on the methods. Bottom: Structural outline of the iterative elements of the research process of following case leads, studying these further through LArch methods and tools, and then, taking this knowledge into the next case encounter as an continuous process of learning and producing knowledge through the case studies.

2.2.6 KNOWLEDGE CREATION

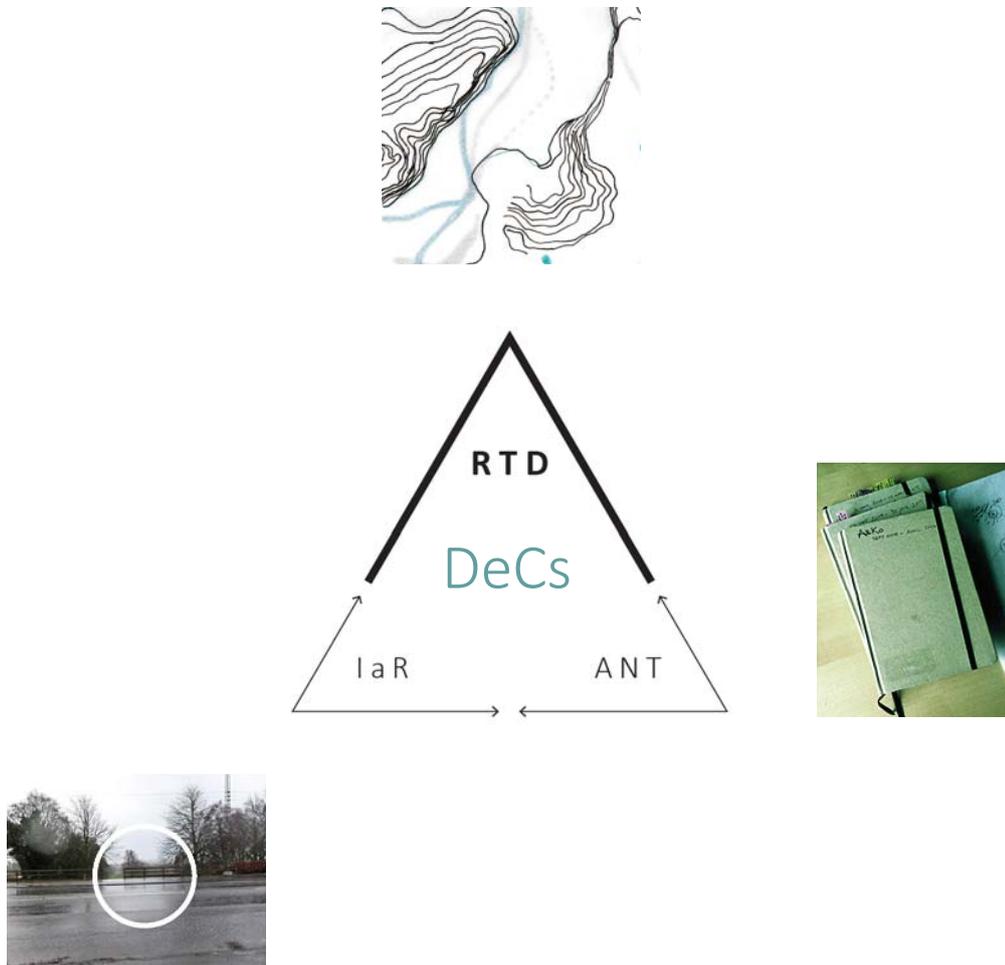
DATA AND THEORY

Collecting data

A foundational element of the data collection has been its conduction in 'natural settings' such as meeting encounters and field trips. Meeting encounters provided face-to-face situated knowledge and insights into informal value discussions and modes of valuation. I interacted as a researcher, posing questions and bringing material to prompt questions and promote more open-ended discussions on value creation in CA|HOW.

Using multi-methods also means establishing diverse data collection. In this context, this ranges from details on a project drawing, notes and quotes from meeting encounters, planning documents, photos and own experiences in the field. The process of on-going data collection, analysis and synthesis (sense-making) consisted of reflecting on meeting experiences, comparing those to details on project drawings, historical- and planning maps, and going on field trips to experience the areas being discussed at the meetings in order to achieve an embodied sense of the areas connected to the project drawings.

During the research, I worked with the data, aiming to identify re-occurring themes, patterns and categories within data with very different characteristics. For example, an emerging theme has been up- and downstream relations and how administrative boundaries fall short when it comes to sudden increases in surface water. At the case meetings, a re-occurring discussion was how stakeholders had different incentives to act upon CA|HOW and how regulations relating to CA|HOW were bound by administrative lines, e.g. property lines. The flood maps showed how water was crossing administrative boundaries and field trips revealed spatial characteristics in the urban landscapes that would act to pass on the water to downstream neighbours. This formed different data on the same theme of up-downstream relations and became a theme that I have developed further in the cases.



Figur 2.2.12: Design Comments as an effort to integrate the multiple methods and their knowledge creation to inform each other during the research process.

2.2.7 DOCUMENTATION

CREDIBILITY, TRANSPARENCY AND DOCUMENTATION

Documentation

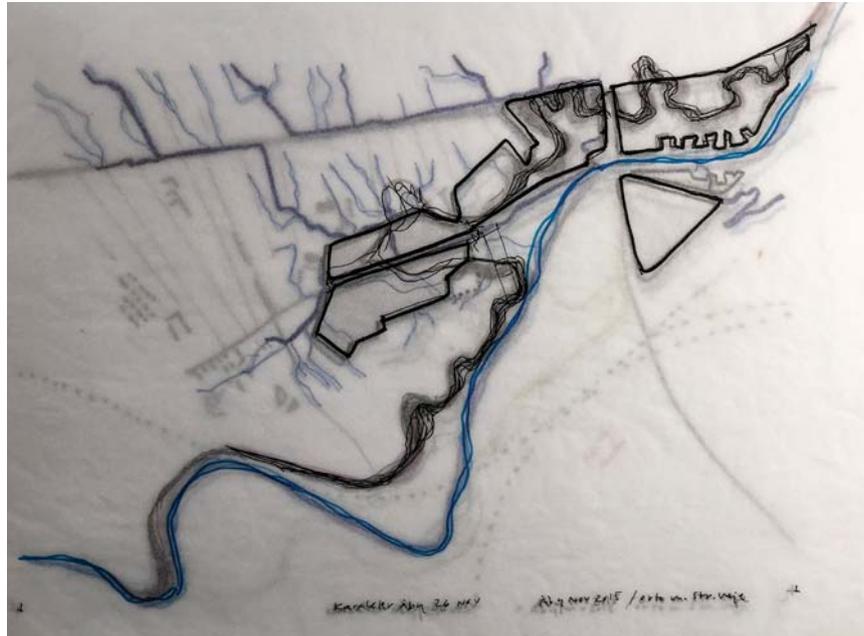
The research data consists of logbooks⁹ based on meetings with actors from the CA|HOW cases, project drawings and visualisations, maps (flood maps, planning maps, aerial photos, historical maps, geomorphologic maps), the physical landscape (field trips), sketching, diagramming and mapping. The various methods have provided a pool of varied types of knowledge, allowing and informing different perspectives on the same subject matter. Theoretical frameworks from sociology and philosophy have further informed this research, substantiated by applying it to landscape properties.

Uncertainties (credibility) and bias

Real-time cases cannot serve the purpose of backtracking or seek a full account of processes, boundaries or actor behaviour. Rather, real-time cases can provide nuanced, situated and sensitive insights. Following real-time cases is fundamentally embedded with uncertainties, e.g. project time frames that keep changing, varying actor constellations, as well as a lack of (traditional) precision in the documentation, as no recordings were made. As said, in real-time cases, it is not possible to follow every aspect of a process or actor situations.

I did not record the case meetings, and mostly, I took my notes after the meetings. This technique of documentation emerged from my first experiences of following the meetings. When I started a meeting by scribbling as many notes as possible into my notebook, it seemed to change the actor behaviour and situation. The informal openness changed into a more 'careful,' 'politically correct' rhetoric. It became apparent that this would leave me with less insight into value discussions, which seemed to be carried out via more informal modes of communication. Too much or explicit 'note-making' led to situations providing less information on my subject matter. One of the reasons might be that the cases all took place in the public realm of a municipality and thus held political sensitivity. To seek transparency of the situations and thus, this research, I paid careful attention to providing as much contextual sensitivity and transparency in my interpretations of situations, including comments on personally surmised influence during the encounters. I emphasise this in the writing of the case chapters.

⁹ During the meeting encounters I took some sketchy notes, and, afterwards, notes were made as detailed as possible. This technique relates to the observations and techniques provided by Albena Yaneva (2009) as mentioned earlier. Admittedly, I suspect an anthropologist to be more skilled in this technique than I was.



Figur 2.2.13: Top: mapping layers from Case Aaby

Figur 2.2.14: Bottom: aerial photo with flow path projections.
Source: AKO

2.2.8 ETHICS

ETHICS VS. OPENNESS AND STRINGENCY

The research methods challenged the research codex itself regarding accuracy, openness and, in particular, ethics. When the DWA allowed me in, I also accessed on-going, sensitive information and actor behaviour in a politically sensitive context. The admission ticket was acquired due to the research field and objective: to explore potentials of added-value. The concept of added-value was of great interest to them, and probably also seemed 'harmless'. As a researcher, I saw added-value as a harmless objective, and I did not expect to encounter any serious ethical considerations. During my encounters, I experienced openness from the case actors far beyond my expectations.

What is legitimate to publish when, in an atmosphere of trust, the researcher is being allowed to follow sensitive information and actor behaviour in real-time? The sensitivity of information challenges both the researcher's need for documentation and openness as well as the demand for a code of ethics with respect to the involved actors. As a researcher, I naturally had to comply with the responsibility to provide research with credibility and stringency. Confronted with unexpected sensitive information, I had to carefully scrutinise whether it was of significant interest to the research or 'merely' of interest on a more general level. If it was not crucial, I left it out. If crucial, I investigated the topic from the point of departure of the urban landscapes without quoting directly.

These considerations became especially evident during Case 2. Here, the flood maps from the municipal climate adaptation plan showed that vital sections of a large hospital were flood prone. Unexpectedly, this case became critical and sensitive, and I had to agree not to publish on this while it was ongoing. The critical issues of this case emphasised fundamental discussions in CA|HOW: the critical question of whether flood risk is caused only by water or if it is also caused by contemporary building styles, choice of location, material usage and settlement patterns. Furthermore, it brought to my attention the interdependencies between up- and downstream actors and the challenge of administrative boundaries. In this way, the criticality of this discovery raised important discussions that could be transferred to other contexts of CA|HOW in urban landscapes.

2.2.9 FINAL REFLECTIONS ON THE RESEARCH METHODS

Using multiple methods, including creating LArch data as mappings, is time-consuming and provides data that are not always compatible in and of themselves. In this context, the data have been connected through water in specific urban landscapes. The multimethod approach has therefore been difficult to document in a traditional manner. For example, due to the aim of being present and informal at the meetings, the logbooks are not transcripts, as the meeting encounters served to provide leads for LArch action and each entry has not been the subject of a full analysis. Rather, the logbooks have functioned as memo-notes to reflect upon the discussions at the meetings. This necessarily requires prioritisation of which leads to follow. If the meeting encounters had been the sole object of the research, the research would likely have delivered different findings on the potentials of value creation. However, in this research context, I decided to follow the leads with specific relevance to LArch in urban landscapes.

TPART 2 METHODS

CHAPTER 2.3

DESIGN COMMENTS

2.3.1 Introduction

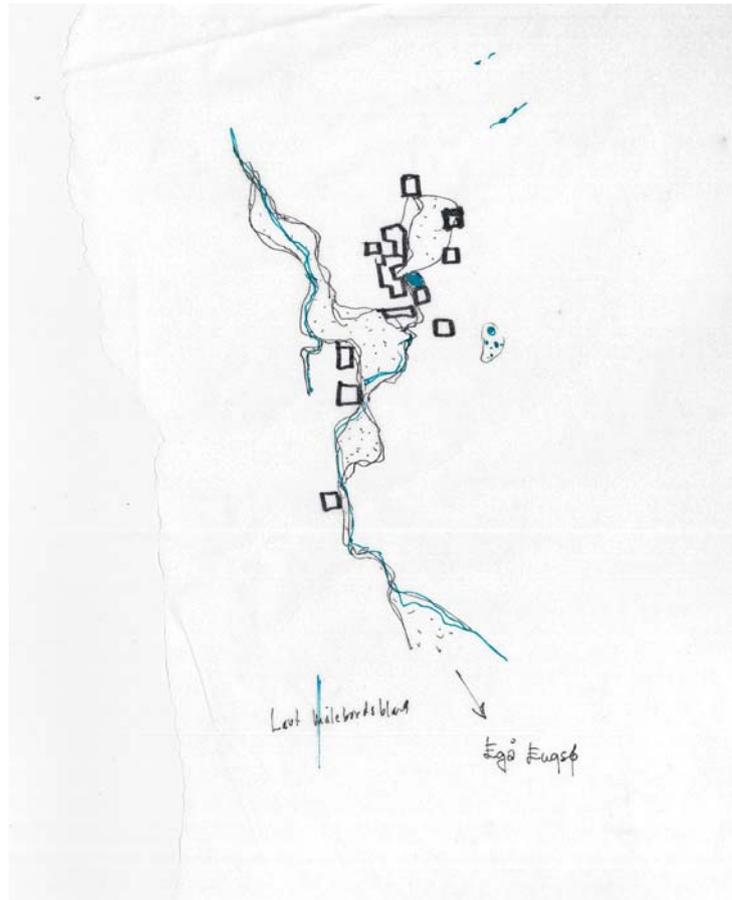
2.3.2 Contextualisation

2.3.3 Design Comments as an integrated method

2.3.4 Design Comments – components and function

2.3.5 Design Comments in this research context

2.3.5 Sum up



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DESIGN COMMENTS

2.3.1 INTRODUCTION

ABSTRACT

Developing methods during the research

Initially, this research set out to study the real-world problem of CA|HOW from the perspective of landscape architecture. As described in the research methods, I employed multi-methods to achieve different sets of data. Furthermore, I decided on taking an interventionistic approach. Early in this research, I found a need to integrate the chosen methods in order to enable different sets of data to inform each other concurrently, as opposed to having separate strains of knowledge. This process is what has developed into what I frame as Design Comments, consisting of four components: a *LArch Space*, *Formatting*, *Linkage of Relevance* and a *Dialogical Space*. Based on my preliminary experiences during the research, I suggest that Design Comments have the potential to be further developed.

Structure

This chapter starts by contextualising what is meant by the term Design Comment, followed by an explanation of the need to integrate the multiple methods used into the conceptualisation of Design Comments. Hereafter, I unfold the 'components' and functional aspects of Design Comments, followed by a review of some of the experiences gained from using this approach in the research and reflections upon the process. Finally, I provide a reflectional sum up on how the methods and processes constitute the modus of generating knowledge and reflection. The designerly tools employed includes intuitive, tacit and open-ended workflows intertwined with hard facts, materiality and actions. Landscape analysis, sketching, sensing, photography and dialogue have formed the basis of the interplay between theory and drawing, diagramming and action, analysis and scenario making. However, during the research, I encountered a need to conceptualise the methods and practices and discuss how these functioned in a research context.

2.3.2 CONTEXTUALISATION

FUNCTION AND PURPOSE OF THE DESIGN COMMENTS

Background of Design Comments

In its very essence, what is referred to as ‘Design Comments’ in the following sections is an integrative framing of well-known landscape architectural methods and practices. The term ‘Design Comments’ aims to conceptualise a multi-methods approach in the context of landscape architectural research through designing and action research which embraces transdisciplinary encounters.

In the first year of my research, I presented on climate change and adaptation at two¹ conferences. Here, landscape architects (or other creative professions) were sparsely represented, and the dominant professions represented other types of knowledge production fundamental to CA|HOW. As my research addressed potentials of value creation in transdisciplinary collaborations, it became concurrently necessary to be able to explicate the research methods to other disciplines. I searched the general literature on qualitative research methods; for example on case studies I engaged with real time and not e.g. sequential or comparative case studies (Brinkmann and Tanggaard, 2012; Flyvbjerg, 2006, pp. 219–245; Neergaard, 2007; Wang and Groat, 2013; Yin, 2014). With regards to the interventionistic approach, I explored Action Research (Albertsen, 2013, 1994; Eikeland, 2012) and Critical Utopian Action Research (Bladt and Nielsen, 2013; Svensson and Aagaard Nielsen, 2006). While generally the literature on qualitative research methods proved instructive, it did not fully fit the modes of knowledge production. This was possibly caused by projective elements and because making is so deeply embedded in design-thinking/landscape architecture as a means of knowledge production. Hence the development of ‘Design Comments’ as a conceptualisation to clarify knowledge production in landscape architectural methods which was rooted in an (inter)action research context. The starting point was that of using ‘design-production’, such as drawings and diagrams, to create a dialogical format with the aim to promote the sharing and developing of knowledge in transdisciplinary contexts, inclusive of hard and soft knowledge.

¹ Circle2- Adaptation Frontiers: Conference on European Climate Change Adaptation – research and practice. Lisbon, Portugal, 9-12 March 2014, Session ‘Transition, ethics, values and equity Peer reviewed abstract and oral presentation. 3rd Nordic International Conference on Climate Change Adaptation - Adapting to Change: From Research to Decision-making, DTU, Copenhagen, DK, 25-27. Aug. 2014, Session Limits and Opportunities. Peer reviewed abstract and oral presentation.

Integrating multiple methods and knowledge exchange

Design Comments have served as an emerging method for tackling how to address the research question from multiple angles. As the cases were followed in real-time, the Design Comments (from now DeC) have similarly been employed in 1:1 real-time encounters. It has been essential to this research to actively use methods from LArch, including during interactions with other disciplines. From this perspective, the DeCs have functioned as a means of combining LArch methods with transdisciplinary interaction. The focus has been on transplanting knowledge creation from LArch into other realms, with the objective of opening up a dialogue for alternative and collective knowledge creation relating to value creation in urban landscapes of CA|HOW. This has included a wish to expose my discipline's knowledge creation and presuppositions to external knowledge claims and agendas. In this way, the DeCs have supported the relational and transdisciplinary aspects of the research by activating situated knowledge 'in the human-actor spaces', by using LArch methods. All-in-all, the DeCs have developed into functioning as a process (reflection, analysis), as material (physical material such as mappings and visual analysis) and as actions (actor encounters, promoting LArch knowledge, receiving alternative knowledge and peering).

ETYMOLOGY

Connecting the terms of 'design' and 'comment'

The connection of the words *Design* and *Comment* frames the methodological intentions of the DeC approach.

Design: In this context, I use the term 'Design' to represent designerly thinking as defined by Rittel (Buchanan, 1992; Kimbell, 2011; Rittel and Webber, 1973) as well as the reflection-in-action aspects described by Schön within the LArch RTD approach of *designing*, as described by Lenzholzer et al. (Lenzholzer et al., 2013).

Comment: The term 'Comment' denotes a suggestive, imaginative approach to communicating. Comments, or commentary, allow a plurality of responses, making them different from a claim, an answer, or a solution. In this context, 'comment' connotes an effort to promote dialogue by articulating potentials and enabling more open-ended options. This stands in contrast to a presentation or statement of the 'best' solution(s).

designˈ dɪzaiːn plan, scheme, purpose XVI (Sh.); plan for a work of art XVII. Earliest forms *deseigne*, *diseigne*, *designe* – F. †*des-seing*, †*des(s)ing* (mod. *desein* purpose, plan, from which is now differentiated *dessin* drawing, draft), f. †*deseigner* (see next).
designˈ dɪzaiːn A. point out, designate; B. plan, purpose, intend XVI; C. delineate, draw XVII. In form – F. *désigner* indicate, designate, and L. *dēsīgnāre* mark out, point out, delineate, depict, contrive, DESIGNATE. All the meanings derive ult. from the L. word, but sense B has been affected by DESIGN¹ and F. †*deseigner*, sense C by F. *désigner*, †*désigner* (an alteration of *deseigner* – It. *dīgnare*). So **designate** *dēˈzɪgneɪt* †indicated XV (once), marked out or selected for office, appointed or nominated. XVII. – L. *dēsīgnāre*, pp. of *dēsīgnāre*, f. *dēsīgnāre* – J + *signāre* mark, SIGN; see -ATE¹. **designate** vb. appoint or nominate for office XVIII; point out, name XIX. f. pp. stem of *dēsīgnāre*; see -ATE¹. **designaˈtɪən**. XIV. – (O)F. or L.
desire dɪzaɪəː wish for. XIII. – (O)F. *désirer* = Pr. *desirar*, It. †*dēsiderare* = L. *dēsīderāre* (see DESIDERATE). So **desire** sb.

comment kəˈment ˠcommentary XV; explanatory note XV. – L. *commentum* invention, contrivance, (in Isidore) interpretation, comment, f. *comment-*, pp. stem of *commentisc* devise, contrive, f. *com* CON- + **ment-*, base of *mens* MIND. Hence (or – F. *commenter*) **comment** vb. (formerly *kament*). XVI. (An earlier verb meaning 'devise, invent' XV was – medL. *commentāre*, L. -*drī*, frequent. f. *comment-*, *commentisc*.) So **commentary** kəˈmentəri (hist.) memoir(s), as in Caesar's Commentaries; systematic series of comments XV. – L. *commentārius*.

-driam adj. used sb. (sc. *liber* book, *volūmen* volume), f. *commentāri*. **commentator** kəˈmentətər ˠchronicler XIV (Trev.); writer of a commentary XVII. – L.

Figur 2.3.15: The etymology of 'comment' and 'design'. Source: The Oxford Dictionary of English Etymology 1996.

THE NEED FOR INTEGRATING MULTIPLE METHODS

Multiple methods and different strains of knowledge

In Chapter 2.2 on research design and methods, I described how employing methodological pluralism supports the open-ended research question in a LArch RTD context, and how this research relates to ‘the pragmatism knowledge claim’ as described by Creswell and Lenzholzer. However, this in itself does not answer the hands-on practical question of which methods to employ. From the perspective of LArch, I have found that a multi-modal approach to connecting various strains of data is a common modus of LArch knowledge creation, including that of intervention and action. This real-time, transdisciplinary aspect, however, creates further knowledge heterogeneity. To support the objective, there was a need to provide situated linkages between these different bodies of knowledge.

Establishing an interplay between different sets of data

The decision to develop methods during the research process was taken with the intention of exploring how parallel strains of data could inform each other while maintaining LArch as the base: DeCs seek to integrate multiple methods so that they can inform each other. For example, exposing LArch material to external questioning and peer review, the different knowledge claims were pushed into transdisciplinary contexts. The external DeC modus became the testing ground of the ‘how to’ of the research question in a real-time process. However, integrating different methods and knowledge claims stresses the importance of *how* to transport knowledge from one situated context to the other.

Transporting diverse knowledge between different situations

In the ‘LArch Space’, knowledge was established by means of combining various data, e.g. cross-referencing different geographical scales, time perspectives, and sensory sensations from the field trips, and transported this data through figuring and propositional diagramming as a mediator, as described by Grocott (Grocott, 2012, p. 3). Transporting knowledge also connects to what Albertsen describes in relation to the ANT approach of Latour; atmospheres have to be transformed into some moveable state in order to travel in time and space, and this mediation must have a *specific* character or type (Albertsen, 2012, p. 73). The aspect of transporting (some) of the knowledge from the *Landscape Architectural Space* into the *Dialogical Space* was prepared through a *Formatting* phase and activated through the presence of tangible LArch material as the medium in the Dialogical Space.

2.3.3 DESIGN COMMENTS AS AN INTEGRATED METHOD

4 COMPONENTS

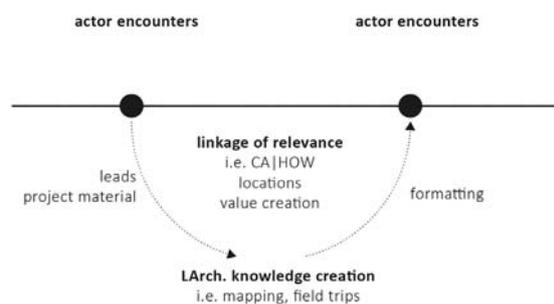
In the following, I contribute a more general perspective on Design Comments as methodological components, while referring to the interactions and experiences of this research process.

The Design Comment is a combinatory method consisting of two overall components: an internal LArch Space of design methods and an external Dialogical Space for situated knowledge exchange. These phases are connected by a transitional phase where the internal LArch material is formatted for external dialogue; this transitional phase acts as a practical vehicle for transporting knowledge. In action, the Design Comments are fundamentally connected through sharing a Linkage of Relevance (relevance criteria). I term these LArch Space, Dialogical Space, Formatting, and Linkage of Relevance. I must stress, however, that it is not a schematic as such, but rather a methodological framing of process and content.

What is important regarding Design Comments is the base: using existing, common modes of knowledge production in LArch. Some of this knowledge is then taken into a Dialogical Space as a catalyst for creating situated knowledge in diverse actor constellations.

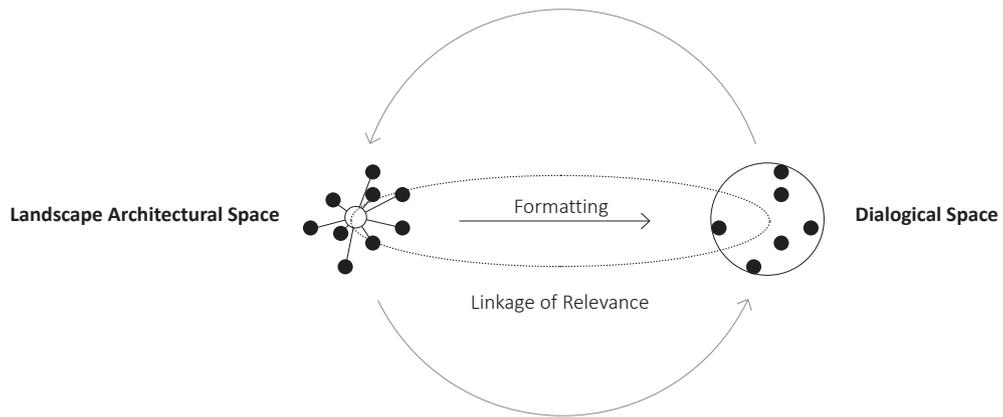
The Landscape Architectural Space - an internal and divergent modus of knowledge creation

An internal LArch Space acts as a modus for establishing knowledge on the subject matter, using common landscape architectural methods and tools with continual transdisciplinary input from the on-going case experiences. In each case, this was the phase where I went on field trips, studied historical maps, posed questions to the case actors on soil conditions, hydrology, regulations and so forth. What is important is how the phase allows for designerly knowledge production, e.g. drifting via mapping and sketching. The LArch Space is a 'generous' phase of various and diverging directions. In this research context, this has been an internal space: other disciplines were consulted for their professional knowledge, but their *interests* or work fields were not aligned with or facilitated.



Figur 2.3.16: The Design Comments supports an iterative process of shifting between different modes of knowledge creation, with concurrent transdisciplinary encounters, to feedbacking knowledge back into the research.

Formatting the dialogical encounters, including of what type of Larch produce to bring. In this context; roundtable encounters with tangible, unfinished/work-in-progress sketches.



An internal space of knowledge production, using e.g. planning-, and historical maps, field trips, mapping and diagramming.

A shared subject matter of concern. In this research context; flood maps, specific places, and interests in value creation, e.g. beyond calculations of the capacity of retention basins.

An external space of knowledge production, using landscape architectural 'produce' pro-actively to push the shared knowledge in transdisciplinary encounters, and to feedbacking knowledge into the research.

Figur 2.3.17: Design Comments as 4 components, integrating landscape architectural methods, such as mapping and field trip, aiming to promote dialogue and knowledge exchange, based on a shared subject matter of relevance to the situation, in the context of transdisciplinary interaction.

Dialogical Space - an external modus for exchanging knowledge

The external, Dialogical Space consisted of interactions with other disciplines, using the LArch material as a pivot point.

The Dialogical Space purpose is to promote dialogue by bringing alternative perspectives to the table without the strictures of solving a problem based on one, specific agenda, and to support informal and open-minded situations. The Dialogical Space strives to promote differentiated or even divergent knowledge as part of qualifying collective knowledge creation. The presumption here is that different disciplines and diverse actors each hold some of the keys to 'seeing' and unlocking potentials in the shared real-world 'problem'.

In this research, the knowledge creation was concerned with CA|HOW, aiming to point towards alternative modes of 'seeing' affordances in urban landscapes. This is further described in Chapter 4.5 on affordances. In the Dialogical space, I used LArch material to visualise alternative meanings and affordances, as a means of developing dialogue on plural values with the case actors.

Linkage of Relevance - mutual relevance and specificity

The internal – LArch Space- and the external – Dialogical Space- modes are connected by a clear Linkage of Relevance that ties together the involved case actors, including the researcher, who share the same real-world problem: mutual relevance attached to a level of specificity, e.g. specific locations and a need for problem-solving.

The assumption, based on my experiences during the research, is that this clear, mutual relevance is also what facilitates the bringing of 'strange' or unknown material. The Linkage of Relevance is where open-ended and ambiguous LArch material connects to real-world problems and actors from outside the field of LArch. In the context of this research, the Linkage of Relevance consists of using the flood maps of specific geographical areas related to needs of CA|HOW as a departure point.

Formatting

Formatting is the transition phase that transports knowledge between the LArch Space and Dialogical Space, aiming to establish a symmetrical dialogue. In this research, Formatting involves selecting LArch material together with preparing the ground for situated encounters.

2.3.4 DESIGN COMMENTS IN THIS RESEARCH

TANGIBLE WORK-IN-PROGRESS

Open-ended LArch material and professional map users

I chose to bring original material into the Formatting phase; hand-drawn mappings on tracing paper and diagrammed photos together with narratives on my 'sense of place' as shown through photographs. In this research context, it is important to note that the case actors all use maps as a professional tool in their daily work. That might not be the case in other actor constellations. Bringing original drawings was an attempt to provide a different mode of 'tangible representation' than GIS maps and their innumerable layers and endless zoom options. In this sense, the LArch material was far from the 'objectivity' of GIS. The hand-drawn mappings and diagrammed photos visualised more open-ended and 'incomplete or unfinished' sets of information. The aim was to provide a sense of 'additional visibility and sensitivity' by integrating the visual material as a tactile and accessible part of the conversation; open to different interpretations and alternative modes of 'seeing' the urban landscapes in comparison with planning and GIS maps. The work-in-progress feeling of this material prompted witty comments such as 'bringing the sandwich wrapping paper'.

Formatting for symmetrical dialogue

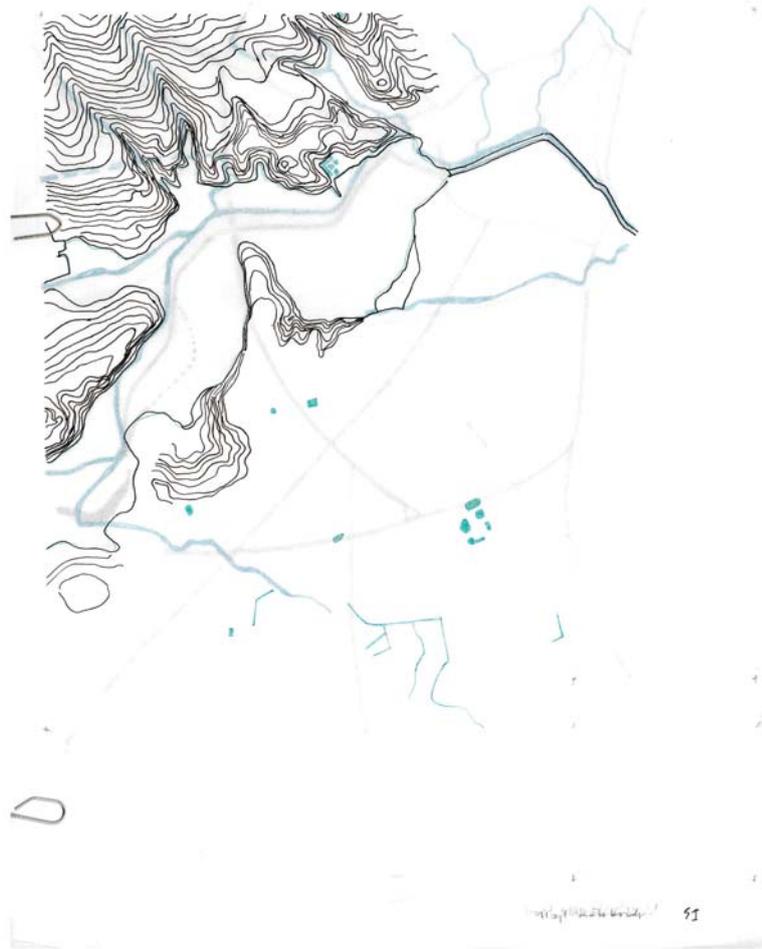
Another choice made relating to formatting was the decision to use analogue material: 'maps on the table' rather than slideshows on the projector. This was an effort to establish an 'equal', symmetrical, dialogical space in contrast to a presenter-audience relationship; thus, inviting their knowledge.

Situated vs Decontextualised LArch material

On one occasion, (please see Chapter 5.3, Case Aaby) an actor entered into a DeC encounter, and, after a while, was interested in bringing some of the mappings to a meeting with a developer to facilitate the developer's understanding of landscape properties in relation to water and land-use. The request to use the material was phrased as: "Do you have any 'real' material?" The comment, while superficially unflattering towards my mappings, represents how the hand-drawings were interpreted as a 'work-in-progress'. This experience pointed towards how the material was *situated* in a specific actor-project-problem context: showing open-ended material for situated dialogue is different from bringing decontextualised material to a developer meeting.

Specificity providing space for alternative interpretations

As aforementioned, the Linkage of Relevance was CA|HOW, and using the flood maps as a geographically tied reference was foundational in forming mutual relevance and meaningfulness. However, the material that I brought to the table was not delineated by the same cartographic boundaries as the actors otherwise had to comply with, e.g. ownership, catchment delineations, and jurisdictional boundaries (see chapters on Case Lystrup and Skejby. Rather, the material pointed towards relational interdependencies, landscape affordances and sensory experiences in connection with water's flow (please see Case chapters). The specificity of geographical locations made it feasible to add alternative layers of knowledge, e.g. drawing property interdependences as crisscrossing lines. This specificity enabled the dialogue to become situated within the daily work fields of the actors and likewise rendered their comments transferable into my subject matter. At several encounters, the case actors have commented on their appreciation of this: specificity seemed to pave the way for introducing more ambiguous, radical or sensitive approaches. This specificity could be expressed, for example, through diagrammed photos framing mosaic landscape elements, which visually communicated what I found to be of spatial and aesthetic value. What seemed of particular use was how the associations sparked by the LArch material triggered both personal experiences and professional knowledge, thus, opening a dialogical space inclusive of both professional and personal dimensions relating to the subject matter. This is further elaborated in Chapter 5.2, Case Skejby.



Figur 2.3.18: Top: Layers from Case Aaby mappings on historical terrain and waterscapes and primary infrastructure, emphasising the moraine hillsides hidden under the contemporary city. Brought to actors encounters Figur 2.3.19: Bottom: Layers from Case Skejby mappings brought to actors encounters, showing different land-uses, programmes and functions.

2.3.5 SUM UP DESIGN COMMENTS

DESIGN COMMENTS AS A MODUS OPERANDI IN LARCH RTD

Proposing Design Comments as a research method is not to be interpreted as claiming to present a fully-developed method. Rather, the intention is that Design Comments hopefully contribute to further advancing LArch RTD methods by framing and enabling design thinking and interaction in the context of transdisciplinary collaboration. Design Comments suggest a means of integrating multiple methods using processual and tangible material together with interactions. Furthermore, they represent an effort to integrate some of the 'common' methods and tools of landscape architecture into research. During the research, the DeCs served as an extroverted modus operandi, taking the qualities of LArch 'making and thinking' into dialogical interactions. Rendering landscape affordances visually and accessibly became a vehicle for discussing value creation in CA|HOW. The DeCs emphasise the dialogical relationship between material, creation, interaction and actors. And, due to its dialogical format, this method steps back from subject-object dichotomies. The actors' responses formed a concurrent qualification and peer-review of my methods, feed-backing into and informing the overall research process and findings.

The temporal and personal aspects

This chapter described the components and experiences of Design Comments during the research process. However, what has not been discussed here are the personal and temporal aspects. For example, how following and interacting with a case over a longer time span influences trust and openness, or how the main actors have been drivers and, thus, when the constellations of actors changes, some of the mutual knowledge disappeared or halted. Furthermore, the approach of DeCs might also rely on smaller group sizes to accommodate symmetrical dialogue and informal exchange of knowledge. I have not yet had the opportunity to test the DeCs in larger groups, but I would expect larger groups to be influenced more by power relations. I include these aspects in the final reflections and conclusions of the thesis.

PART 2 METHODS

CHAPTER 2.4

CASE SET-UP

2.4.1 Contextualisation of the cases

2.4.2 Real-time cases and early phases

2.4.3 Case selection

2.4.4 Case criteria

2.4.5 Introduction to Case 1, 2 & 3



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CASE SET-UP

2.4.1 CONTEXTUALISATION OF THE CASES

CASE SET UP – EXPECTED KNOWLEDGE CREATION

Why use cases?

CA|HOW projects were employed as case studies to provide a real-world setting closely bound to my profession and field; LArch and urban landscapes.

The cases have functioned as vehicles that inform and explore the research question: 'how to create plural values in the everyday, urban landscapes of CA|HOW? The cases have been followed in real-time during the early phases, and then left to continue their implementation in the public realm and physical environment. In the following, I describe what is meant by real-time cases and early phases in this research context, followed by case selection and criteria.

As a method, the cases were intended to produce knowledge on the following:

- broadening LArch knowledge in the field of low-cost CA|HOW in everyday, urban landscapes.
- gaining insights on nuanced value claims and practices in transdisciplinary and trans-sectoral contexts
- identifying potential areas where LArch methods could contribute towards or facilitate the research objective of creating plural values within CA|HOW.

2.4.2 EARLY PHASES IN REAL-TIME CASES

INCENTIVES FOR EARLY PHASES AND 'REAL-TIME' CASES

What is meant by 'early phases' and 'real-time'?

Early phases are not a formally defined project phase from x-y. In this context, the term refers to the decision-making phase before a project physically enters the public sphere, e.g. before political consent, public hearings, implementation and building phases. The phrase 'real-time' case is used to express cases that are in progress in the real-world (as opposed to a retrospective case study).

Early project phases

This project suggests that the decision-making carried out in early, pre-public processes is critical regarding the determination of potential value creation- beyond the handling of water- in the later phases of CA|HOW projects. The early project phases are when fundamental decision-making takes place; laying out the foundational premises of a project. This includes decision-making related to regulations, building programmes, costs and evaluation criteria of tender material.

The focus on the early phases was prompted by my prior experiences in LArch practice, where I noted that decision-making in the initial project-processes at times, unintentionally, constrained possibilities for value creation in later phases. This, I found, was not due to ignorance or ill-will, but rather a matter of misaligned different professions, responsibilities and working modes. For example, if it is stipulated early in the process that the entrance level of buildings must be 60 cm above ground level to avoid flooding, the project cannot easily incorporate alternative solutions for solving flood risk later on. In contrast, if it is merely stated that water must not be able to enter the building at the same height of 60 cm, alternative solutions are still possible. Furthermore, the earlier a LArch process or element is integrated into a project, the more feasible such an approach often becomes. And vice versa: LArch elements of value creation suggested during later phases of a project are easily rejected, due to the knock-on effects on other parts of the project, which most likely will therefore entail monetary costs. This, in a nutshell, is the motivation behind studying the early phases of a project. However, engaging during the early phases is not a silver bullet: it does not guarantee value creation in the later phases, nor does it immunise against value being removed later on in the process. Regardless, early engagement holds the potential for embedding a 'generosity' towards value creation in later phases.

PURPOSE OF USING REAL-TIME CASES

Informal, situated knowledge

I chose to explore the subject matter in a situated, relational manner, in order to gain informal insights into e.g. argumentations from different disciplines, sectors and actor constellations. This decision was based on the assumption that a real-time engagement would give current, inside knowledge on tacit practices, which in turn would function as leads as to where LArch could contribute to opening up possibilities for further value creation. In this way, the cases were not serving the purpose of back-tracking or seeking credibility as 'full' or total accounts of processes, boundaries or actor behaviour. The cases instead served to achieve 1:1, informal, nuanced and sensitive insights into values, which were not likely to surface as accountable data.

Formal decision-making and underlying or disregarded values

Minutes of meetings function as a formal, sometimes even legally binding, document, recording decision-making, agreements, progress, timeframes and responsibilities, amongst other things. For the very same reason, minutes do not necessarily convey the underlying discussions leading to decisions. Minutes of a meeting are not usually in the form of a transcript, and this becomes particularly important when the subject matter under discussion is value: disputes on value are likely to take place before the decisions and are not necessarily recorded in the minutes. Formal, recorded decisions reflect the prioritised values but not the values disregarded, and thus do not necessarily reveal potential or neglected values either. Furthermore, not all value discussions are appropriate for the minutes of a meeting, as minutes are prone to be distributed to a broader audience without reference to the *situated* context. Following real-time cases as a situated approach to actors and material has served to provide insights into subtle practices, informal conversations, tacit and practice-based knowledge and valuations. The approach of following cases real-time has thereby allowed insights to the more nuanced potentials of value creation. These empirical insights have shaped the central discussions and analysis of the thesis, and have been the testing ground for developing the concept of Design Comments. Taken together, the cases have functioned as a driver of both the content of, and a reflection on, the thesis.

2.4.3 CASE SELECTION

Selecting cases - constrained or pro-active actors

During September and November 2013, I carried out a practice-based screening of Denmark's contemporary CA|HOW scene (see chapter 2.2, 2.2.5). For this, I attended CA|HOW seminars, networks and conferences with a focus on added-value in CA|HOW-projects. The participants came from municipalities, regions, water companies and practitioners. During plenary discussions and sessions, I noted a divergence between how municipal actors were framing the immense constraints involved in CA|HOW, as caused by legal and administrative frameworks and new modes of collaboration, e.g. the division of responsibilities and costs between municipalities, water companies and the Forsyningssekretariat¹. Some actors seemed pro-active towards CA|HOW, despite the fact that they were subjected to the same legislative and economic boundaries. Others seemed simply overwhelmed by the responsibilities. Both approaches would be relevant to the topic of this research, however, as this research takes its starting point in the use of LArch methods, it seemed less pertinent to follow the perspective of institutional or administrative boundaries. Thus, it appeared likely most productive to follow pro-active actors. These initial experiences gave form to some of the case-selection criteria.

Key actors and geographical distances

Following cases in-actu has meant that I have had to accept that my data would consist of temporary and incomplete knowledge: there was no way to obtain a full picture of actors and their behaviour. And there could be only single, one-time attempt. For this reason, it was preferable to find key actors willing to provide 'additional' insights and answer my ad hoc questions, as I would not have a chance to 'go back and check'. In addition to this, I realised that real-time cases put some constraints on the geographical area that I could cover: if the intention were to attend ad-hoc and informal meetings, then several hours of commute would not allow me to participate in short-notice meetings.

1 'Forsyningssekretariatet' (The Supply Secretariat) is part of the Danish Competition and Consumer Authority, e.g. making decisions on maximum prices for drinking and waste water management

CASE CRITERIA			
1	TOPIC	CA HOW projects initiated and executed in urban landscapes with existing settlements	
2	ECONOMY	Everyday adaptation and feasibility' representing 'average' project-economy (opposed to iconic, high-endprojects)	
3	TRANSFERABILITY	Current CA HOW-projects of public relevance, common challenges	
4	SCALE	Different geographical scale implications and planning levels. The 'generic' scale distinction XL-XS is used to make the concept of scale 'operational'. XL-L (extra-large, large) = region, municipality, larger urban area planning levels of the municipal planning document L-M (large-medium) = suburb, town, a larger quarter planning level of 'rammeplaner', sektorplaner, local plans S-XS (small) = a group of properties, individual property planning level of local plans.	
5	DECISION-MAKING	Real-time cases in early project phases.	
6	COLLABORATION	Transdisciplinary actors and cross-sectoral collaboration in a public context: actors from a municipality and a utility company should be part of the project team	
7	ACCESS/OPENNESS	Key actors allowing the researcher to attend internal meetings and gain access to informal information.	
8	PRO-ACTIVE ACTORS	Key actors should engage with CCA HOW and values in a pro-active manner.	

	EXPECTED KNOWLEDGE PRODUCTION	CASE 1 LYSTRUP 	CASE 2 SKEJBY 	(TEST)CASE 3 AABY 	
	real-world, generalization providing knowledge with relevance to other 'everyday' adaptation projects in urban landscapes	+ Covering the suburban town of Lystrup	+ Suburban mixed use area	+ Urban landscapes inside Outer Ring Road	1
		+	+	no project economy as an outset	2
		+	+	+	3
	landscape based cross-scale approach to provide knowledge on relations between larger and smaller areas and its associated planning levels	+ M	+ M-S	+ S-L	4
	Providing real-time knowledge on transdisciplinary and intersectoral agency in real-life, practices, modes of collaboration and different valuations	+	+	before actual projects	5
		+ Municipality and water company	+ Municipality and water company	+ Municipality	6
		+	+	not relevant	7
		+	+	+	8

Figur 2.4.20: Schematics of the case criteria related to their expected knowledge production and the Case 1, 2, and 3.

2.4.4 CASE CRITERIA

Common denominators and generalisations

The unifying case criterion was that the cases should represent contemporary, low-cost CA|HOW of public relevance in everyday urban landscapes. As the departure point was waterscapes and LArch, I also decided that different, geographical scales and planning implications were fundamental in selecting the cases. Finally, the cases should all be in their early, pre-public phases in the context of transdisciplinary and cross-sectoral collaboration. Taken together, I expected these criteria to be representative of low-cost CA|HOW in urban landscapes within a Danish context.

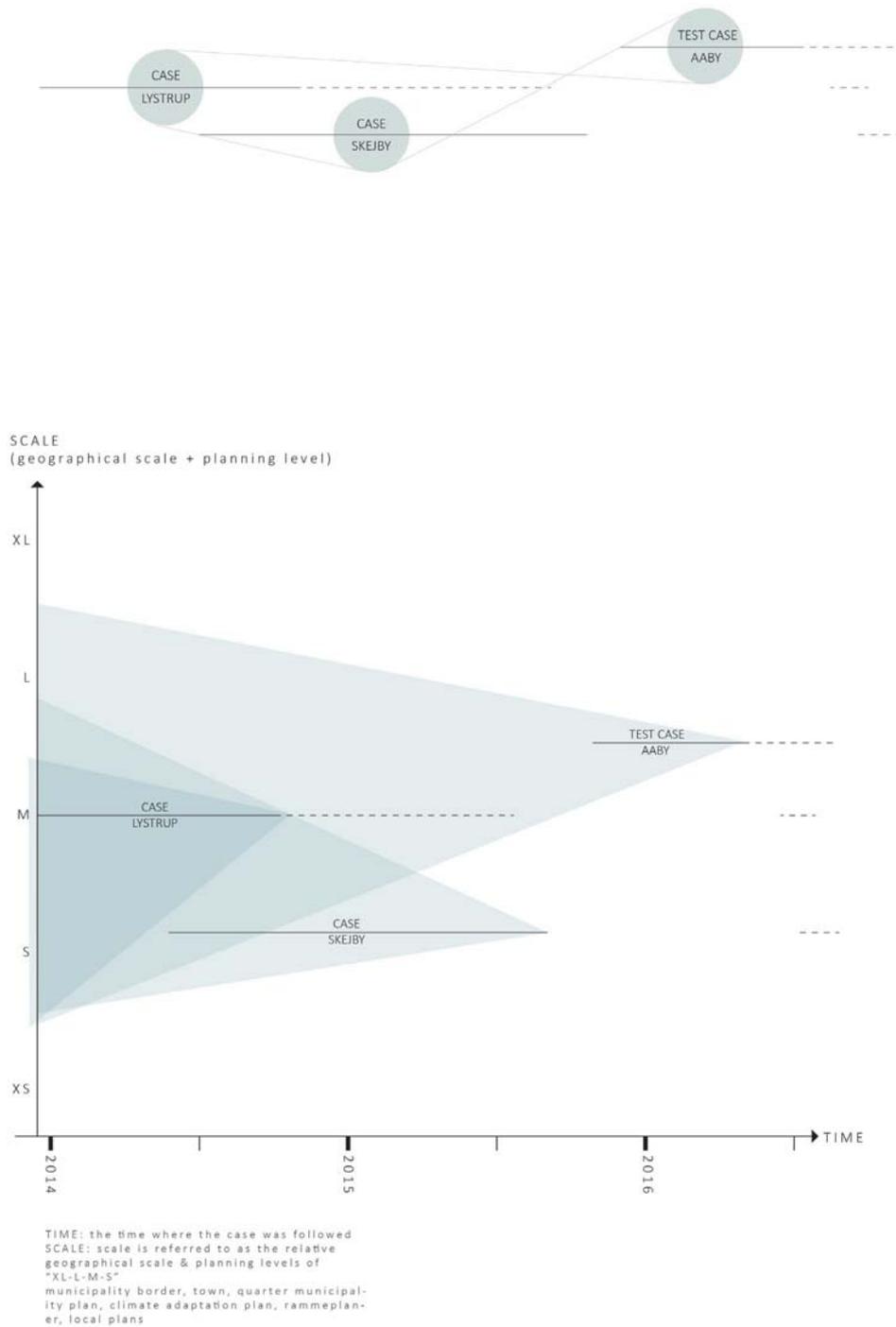
These criteria ought to be distinguished from representativeness in case studies, e.g. comparing cases in sequential case studies. Nevertheless, due to the Danish state demanding a Climate Adaptation Plan from all municipalities, together with the commonality of the field of urban landscapes and surface water, a level of generalisation is expected (Brinkmann and Tanggaard, 2012; Flyvbjerg, 2006).

In addition to the above, the common criteria of following of pro-active, key actors as well as working within a limited geographical distance, allowing me to attend informal meetings, were taken into account.

Coincidental Opportunities

I managed to find three cases within the same municipality. This was merely a coincidental opportunity², which enabled me to follow the same human actors- and the same water- across different (geographical) scales and planning levels. The Case Criteria diagram gives an overview of the criteria and the expected knowledge creation in relation to the cases. This is followed by a brief overview of the three cases.

² Thanks to former colleague Thomas Juel Clemmensen



Figur 2.4.21: Top: the three case studies shown chronologically, indicating their duration, and how the learning outcomes influenced each other. Bottom: the case studies cover different geographical scales (vertical) and timespans (horizontal).

2.4.5 CASE INTRODUCTION

CASE 1

Case Lystrup - CA|HOW in the everyday landscapes of suburbia

Followed: December 2013 – September 2014 (+ a few encounters between Sept. 2014- August 2015) and further studied as propositional LArch reflections.

Subject: Lystrup is a suburban town outside of Aarhus. The CA|HOW project was a pilot aiming to create a holistic CA|HOW-plan, covering the entire town. It consisted of 12 subprojects, mainly retention basins. In many ways, Lystrup resembles the settlements patterns, building style, infrastructure, paving strategies and material usage found in many Danish suburbs that have experienced growth since WW2. In this way, Lystrup represents values and practices that correspond to a broader picture of CA|HOW in urban landscapes in Denmark at a medium scale.

Set-up: I followed key actors from The Municipal Department of Environment and Water LAV during internal meetings and project meetings with other municipal departments, Aarhus Water Company (AWC), and external consultants.

Key actors: DWA, AWC, consultants

Researcher's interactions: Researcher engaged through attending meetings, interacting with questions and tangible material.

Documentation: logbook, email, project drawings, flood maps, planning maps and historical maps as well as my own mappings, diagrams and photos.



CASE 2

Case Skejby - the catchment of Skejby Business Park

Followed: May 2014- September 2015 and further studied via propositional LArch reflections.

Subject: The Skejby case represents a general and challenging aspect of CA|HOW- retrofitting existing built-up areas that host functions of societal importance. The region's largest hospital is located in Skejby, and the case is addressing cross-scale issues relating to CA|HOW. Potential flooding influences both a local and a larger geographical scale, as the hospital serves the region and not only the municipality. This case represents elements of urban retrofitting involving different actors and stakeholders across property lines, functions, and interests.

Set-up: I was allowed to attend selected confidential meetings and had access to selected confidential flood maps.

Key actors: DWA, AWC, consultants, local stakeholders

Researcher's interaction: Interacting through Design Comments that were developed during the interactions in Case Lystrup.

Documentation: logbook, email, project drawings, flood maps, planning maps and historical maps, as well as DeCs.



CASE 3

Test Case Aaby – the hidden passages - a 1:1 testing ground

Conducted: October 2015-April 2016, and further studied via propositional LArch reflections until December 2016

Subject: Case Aaby was originally not a case but an assignment, becoming a 1:1 testing ground as the assignment shared the research objective and methods used in Case Lystrup and Skejby. Case Aaby employed the knowledge and the development of DeCs produced by the former cases in a real-world project. It covered different geographical scales (from the very local to the city of Aarhus), thus also addressing different planning levels (from the Municipal Plan, through the CAP14 to Local Plans).

Set-up: Initially, an assignment for Aarhus Municipality based on the foundational work of Case Lystrup and Skejby. This was then further developed and referenced to the former cases.

Key actors: DWA, Aarhus Municipality

Researcher's interactions: Researcher engaged through attending meetings, interacting with Design Comments through mappings, field trips and narrated diagrammed photos.

Documentation: the resulting two booklets of the assignment, flood maps, planning maps, historical maps and LArch material such as e.g. mappings, diagramming, fieldtrips and photos.





PART 3

WATER

PART 3 WATER

CHAPTER 3.1

WATERSCAPES AND SETTLEMENT PATTERNS

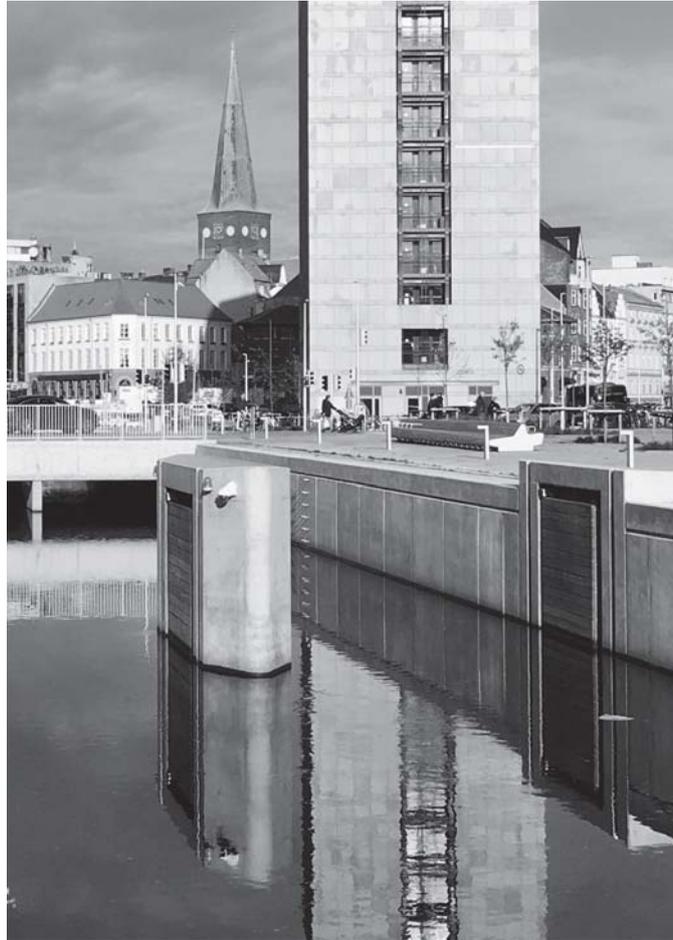
3.1.1 Introduction

3.1.2 Contextualisation – settling with water

3.1.3 Water, settlement patterns and landscape properties

3.1.4 Aarhus – waterscapes and settlement patterns

3.1.5 Sum up



P3_C1

WATERSCAPES AND SETTLEMENT PATTERNS

3.1.1 INTRODUCTION

ABSTRACT

The dynamic matter of water has always been key to human settlement. At present, the need to adapt to a climate that delivers more water (in a Danish context) becomes a need to assign land for hosting physical CA|HOW measures. This entails a discussion regarding how our urban landscapes are, and can be, formed to facilitate water and how today's urban landscapes are formed through a relationship or dialogue between what is constructed by humans and 'natural' landscape properties. To act in a manner that is informed both by the present and future, it seems necessary to look back at the history, including recent history, of urban settlement patterns. This chapter ventures a whistle-stop tour of the recent history of urbanisation and its relation to waterscapes

Structure of this chapter

Firstly, I provide a brief introduction to settlement patterns and waterscapes in the overall context of Western cities, including their suburbs. This is followed by introducing specifically Danish settlement patterns in relation to water and landscape properties. Thirdly, I introduce the case study area of Aarhus with a focus on the relationship between city, settlement patterns and waterscapes. Finally, I provide a brief contextualisation of climatic fluctuations and implications on contemporary settlement patterns.

3.1.2 CONTEXTUALISATION – SETTLING WITH WATER

A BRIEF HISTORY OF WATER AND URBANISATION

Ancient water control

Since ancient times, human settlements have sought to control water. The cultivation of crops and holding of livestock demanded more permanent settlement opportunities, and with that a greater dependency on water supply, and history tells of impressive built structures for facilitating the control of water. Looking back on the history of larger, urbanised civilizations, successful water control has played a major role in the success of civilizations. For example, in 3100 BC, a pharaoh was depicted in the later renowned irrigation systems of Egypt. Egypt's water management was based on regionally coordinated engineering between local irrigation basins, prospering from the River Nile. Nonetheless, it is important to note that the system was dependent on the larger watershed, receiving water from 4500 km further south in Africa (Rivers and society, 2010). In China, the Grand Canal was built between 5-600 BC, reaching the impressive length of 1776 km, stretching across the empire (Tvedt et al., 2006). The Mayan civilization converted wetlands to farmland through sophisticated irrigation canals. And in more recent European history, Venice's sophisticated waterworks (Cosgrove and Petts, 1990) and the Dutch systems of polders are both world renowned and irrevocably intertwined with their respective regional and metropolitan histories of urbanisation ("A History of Water » Vol 1 Water and Urbanization," 2010, Rivers and society: from early civilizations to modern times, 2010; Tvedt et al., 2006).

In the above examples, control of water has provided prosperity and consolidated power and legitimacy for the rulers of China, Egypt and Mexico. Likewise, unstable water resources or failures in water control have also caused regimes to fall, contributing historical examples of how waterscapes have played a determining role in the development of societies. Large civilizations have risen and disappeared with their waterscapes ("A History of Water » Vol 1 Water and Urbanization," 2010, Rivers and society: from early civilizations to modern times, 2010, Water, geopolitics and the new world order, 2010).

A FEW CENTURIES OF WATERSCAPES IN CONTROL

Urbanisation and changing notions of water

The Industrial Revolution was the beginning of an era of large scale, systematised water handling, in both the European and North American continents, and to an extent never before seen. From the late 18th century, the industrialisation of the Western countries induced a densification of urban areas far beyond prior historical experience. This increase in population and growing urbanisation in turn caused intensified and non-regulated use of water. Water consumption was not only consumed for the vital human practices of drinking, cooking and bathing; the new industries also required large amounts of water for production. This development put pressure on both water supply and the discharge of water. In particular, a lack of sanitation and the absence of excess water control resulted in polluted drinking water and successive outbreaks of waterborne, epidemic diseases such as typhoid and water cholera, which spread rapidly due to the very same causes of its origin; increased density, poor water quality and a lack of central water management. Water, so often a founding reason for the very location of urban settlements, changed from being an integrated and invaluable resource into a threat.



An underground trajectory

The growing acceptance of the concept of hygiene was instrumental in the measures taken to address water as a threat. From the mid-19th Century to the early 20th Century, large scale, underground sewers were installed in larger cities. Pioneered by remarkable feats of engineering, water became a matter to be hidden and directed by piping, pumping and draining. Water was separated into different systems for drinking and sewage/grey water. Urban waterways like creeks and streams were considered part of the 'water threat' and, thus, also often undergrounded. The efforts successfully relieved many of the problems including the spread of diseases, improving public health and living conditions, as well as allowing businesses to prosper. This labyrinthine structure of subterranean piping represented a technological capacity that apparently held no limits as to its physical and geographical extension. Water was apparently under control.

Figur 3.1.1: Top: "The Silent Highwayman" (1858). Death rows on the Thames, claiming the lives of victims who have not paid to have the river cleaned up. Punch Magazine 1858.

Source: Wiki Commons.
Figur 3.1.2: Middle: Brighton Interceptor Sewer 1874.

Source: Wiki Commons.
Figur 3.1.3: Bottom: Underground sewersystem Lystrup, DK
Source: Aarhus Municipality

Homogeneity and industrial justifications of water

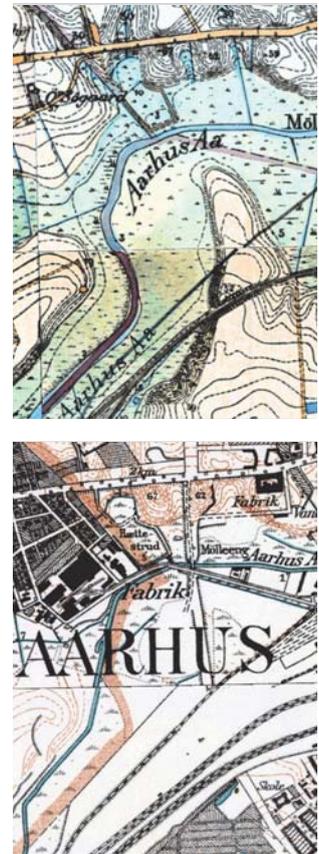
Hiding and undergrounding the waterways liberated the urban population from the nuisance of polluted water. It also provided opportunities for using drained land for alternative land-uses, offering the possibility of inhabiting the surface waterways. With the opportunity to settle differently and more freely, contextual readings of matters such as proximity to water and terrain properties no longer determined human settlement. Revised land-uses emerged alongside the new practices of settling in low-lying areas, former wetlands or locations with a high groundwater table. Concurrently, from the 18th Century and onwards, large drainage schemes transformed agricultural practices, allowing intensive farming in formerly wet, low-lying areas. For water, the Industrial Revolution was the beginning of the utilitarian trajectory of a water regime founded on the engineering of command and control. Water became a commodity, and the underlying practices and devices of water were rendered invisible. At the same time, waterscapes were in many ways disconnected from social and cultural life (Tvedt, 2014, Vigano, 2016 (Shannon, 2013; Tvedt and Oestigaard, 2014; Water urbanisms, 2008).

New water practices expanding into other practices

With water under control, the locating of new settlements became based on proximity to other infrastructures, work places or simply convenience and affordability. Expanding areas of impervious paving became an overwhelmingly common building practice. The new water practices were also taken further by developers, investors and also came to be reflected in current planning practices, which designate land-use in terms of administrative boundaries rather than necessarily correlating to the appropriateness of the landscape properties and their associated waterscapes. This is discussed further in Chapter Case Skejby 5.2 and Aaby 5.3. The flood maps of the Danish municipalities (MIM, 2016. IGN, 2013) illustrate this point; a marked proportion of building stock is located contrary to what might be seen as water-wise locations.

An industrial trajectory of the civic and the urban

Employing the 6 regimes of justification as a starting point, the HOW of industrialised cities seems, to a high degree, to have been legitimised as being for the common good, enacted through the value principles of the industrial regime of justification (efficiency and prediction) (please see Chapter Justification 4.4, and Chapter Case Lystrup 5.1). This has been a utilitarian approach in a not-very-troublesome compromise between the Civic regime (promoting the health of all citizens of the city) and the Market regime (stable water supply for labour and production). From The 6 regimes of justification, the recent history of water control seems to be designed based on singular justifications, leading to armature-based water management, and a disregarding of the understanding of water as a vital matter in constant flux.



Figur 3.1.4: Going from dynamic surface-waterscapes to control, Aarhus Stream
 Top: Late 19th Century HMB map
 Bottom: Early 20th Century LMB map. Source: HMB, LMB: GST

3.1.3 WATER, SETTLEMENT PATTERNS AND LANDSCAPE PROPERTIES

LANDSCAPE PRACTICES FORMING SETTLEMENT PATTERNS

“As early as in the 15-16th Century it was noted in the regional descriptions that the water courses were used as divisions. The medieval Landscape Laws were occupied with the complicated division-problems that occurred when a stream changed its course naturally.” (Porsmose, 1990, p. 20), authors translation¹.

Landscape-based settlement patterns and Commons

Formerly, Danish villages were located so as to afford access to natural resources. When Denmark was still an agricultural society, functional and administrative divisions of land were often related to access to resources. The location of a village was usually closely related to local landscape properties; sub catchments were critical and often a significant criteria in the establishment of parish boundaries. These landscape practices, then gave way to the priorities of farming and livestock. A formalised allocation of different types of pasture and fields provided a shared access to natural resources². This included the concept of the Commons as an area of shared resources- in Danish, ‘Fælled’ - in fields outside of the village. This sharing of resources was carefully bound to an understanding of landscape properties such as terrain and slope, soil conditions, orientation towards the sun and the wind, humidity and, of course, water bodies. The practices aimed to distribute and give access to water as well as a way to use the capacity of the fields depending on their humidity and suitability for growing crops and grazing (Bjýrn, 1988a; Olwig, 1984; Porsmose, 2008a).

Land-use division

Landscape as a practice informed land-use and the division of land. In late 19th Century HMB maps, some of the interconnectivity between settlement, land-use, landscape practices and their appertaining waterscapes can be traced (Bredsdorff et al., 1973; Olwig, 1984; Porsmose, 2008b). The HMB maps make visible how old parish divisions often followed sub-catchments or divided the sub-catchment lengthwise by their recipient streams. Catchment and sub catchment delineations influenced both property lines and the location of infrastructure. Today, disconnected traces of this remain legible in current settlement patterns and infrastructural layouts.

¹ (Porsmose 1990, 20)”Allerede I 1600-1700-tallet noteredes det I egnbeskrivelser, at vandløbene overalt ydnyttedes som skel. [...] Allerede de middelalderlige landskabslove beskæftiger sig med de indviklede skelproblemer, der opstod, når et vandløb skiftede leje på naturlig vis.”

² From the perspective of settlement patterns and waterscape, as this does not mean, however, that the distribution facilitated common people with equal or fair access to resources.

Waterscapes and private property lines

In Denmark, fields were still divided according to landscape practices until the comprehensive Agricultural reform and Enclosure of the late 18th Century. After the Enclosure, the sharing of natural resources changed into the division of land into parcels of private farmland and 'enemærker'³. This development changed the notion of the commons into private property, and as a consequence, procedures such as following a stream or sub-catchment and sharing waterscapes as a common resource were discarded. This land-use development is still traceable on HMB historical maps, identifiable via, for example, star shapes of land, individual farms and constructed canals running perpendicular to the gradient (Bjýrn, 1988b). When tracing the blue lines, orthogonal to the former 'højryggede agre' (high furrows), one can see the patterns of the human-made canals. The canals represent how each property now had to handle its water in-property. In themselves, these simple blue markings tell the story of how watery pastures, sparked by the Enclosure, were re-divided and transitioned into current settlement patterns detached from local terrain-water-considerations.

Contemporary settlement patterns and surface waterscapes

Landscape practices based on the interdependencies between waterscapes, landscape properties and settlement patterns are historically well-known (Porsmose, 1990, 2008a). Nevertheless, contemporary settlement patterns, planning and ownership practices do not embed landscape practices and the dynamic logics of water. This is not necessarily out of ignorance, but rather because the knowledge became almost unnecessary in a contemporary context.

A considerable part of today's Danish building stock was built from the 1950s and onwards, including larger, suburban areas with residential houses and industrial/business areas. The relatively new water-practices has meant that, in many areas, contemporary settlement patterns are poorly located in terms of water, further constituted by impermeable surfaces, buildings being located in low-lying areas, and the layout of buildings creating barriers redirecting water and so forth. This is a common, shared trait in Danish suburbia.

This commonality of settlement patterns and material usage is further emphasised by contemporary planning practices and building codes, which demand significant numbers of parking spaces. In addition to this, construction practices of maximising the 'value' of the property by intensifying functions through terrain alterations and impermeable elements must be added. These are common traits in everyday landscapes of suburbia. These relatively new practices are now challenged by climate change and waterscapes of uncertainty. I venture further into these issues in Case Skejby and Lystrup.

3 Enemærker roughly translates into domain

3.1.4 AARHUS – WATERSCAPES AND SETTLEMENT PATTERNS

INTRODUCING AARHUS AS A CASE AREA



Aarhus in numbers

Aarhus is located in the temperate, costal climate of Denmark. It is the second largest city in Denmark and the largest urban entity in Jutland, part of which is called the Eastern Jutland Metropolitan Area. Aarhus municipality is the second largest Danish municipality with approximately 331,000 inhabitants⁴. Its area is the 44th largest out of 98 municipalities, covering an area of 469 km². Aarhus city has approximately 265,000 inhabitants and covers an area of 91 km². The municipality is one of 19 municipalities in the Central Region of Jutland.

Urban development and settlement principles

The basic, settlement principle of Aarhus can be seen as its recognisable inner city; a centre particularly defined by its Latin Quarter (medieval city) and newer developments along the stream towards the harbour. The inner city is surrounded by residential quarters dating back to the late 19th and early 20th Centuries, located on the surrounding hillsides. These quarters are generally defined by urban blocks (karré) with inner courtyards that formerly contained buildings and functions such as workshops and small-scale livestock holding. Today, the courtyards often function as shared, green spaces for the residents of the blocks.



The port

Aarhus is recognisable by its large industrial port, which, still today, is growing and host to industrial activities. Some of the piers closer to the city centre are currently being developed into residential and business areas.



Figur 3.1.7: Top: Aarhus is located at 56.2N 10.10E. Middle: White line shows the Aarhus Municipality. Right: The landscape properties of the Aarhus River Valley as the departure of settling in the area. The River valley seen from the Inner Ring Road towards West. Source: aerial: GST; Photo: Nikolaj Knudsen



Aarhus 2012



Aarhus approx. 1980



Aarhus approx. 1960



Aarhus approx. 1920



Aarhus approx 1880

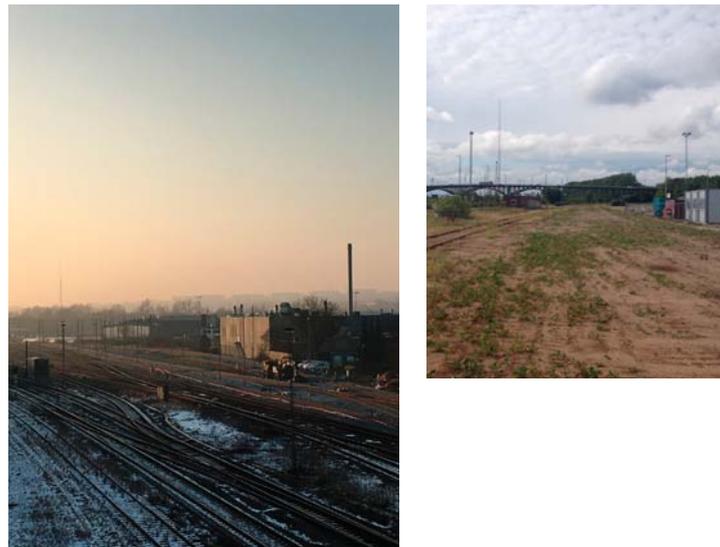
Figur 3.1.8: The urban development/expansion of Aarhus in the period 1880-2014
Maps and aeria: source GST

Architectural icons

Aarhus also has some architectural icons, which provide some navigational references within the city. Some of the most well-known are The Town Hall by Arne Jacobsen, Aarhus University, and, in recent years, the city has also become recognisable for an array of larger-scale buildings with iconic facades and geometries, some of which having public purposes as the library Dokk1, the Godsbanen with workshops and venues, and the Hothouse.

Infrastructure and expansion

Aarhus' development and structural image are both reminiscent of other historical European cities: the city is defined by a central port with a medieval city core as a recognisable centre, with expansion occurring outwards in rings, connected by radials. Over time, the city grew via suburban areas, merging with smaller existing villages. The development of the city's infrastructure has facilitated the growth pattern of urban development. First, the Inner Ring Road was built in the late 1930s followed later the Outer Ring Road, connecting the radials stemming from the city centre. Aarhus is currently experiencing growth both in buildings and new inhabitants. Investors and politicians have strong interests in properties that are available for urban development as investment prospects. These properties are mainly found in areas with the potential for change from a former land-use designation. The former industrial areas of the harbour and in the river valley are of particular interest due to their proximity to the inner city and connections to larger infrastructures on both a regional and local scale. These areas are currently extensively used, and, significantly, they formerly belonged to water.



Figur 3.1.9: The river valley just West of the inner city centre has been an industrial area and defined by the railway lines, currently, it is prospect for new urban development, thus land-use changes



Figur 3.1.10: In many respects, the architecture of iconic buildings forms part of the inner city image to a broader audience
 Figur 3.1.11: Photo:
 a+f+g+d:Nikolaj Knudsen
 b: Gustaf Lohm
 c: Grethe Knudsen
 d: Wikimedia, commons

AARHUS AND ITS WATERSCAPES

Larger water bodies and geomorphology

Aarhus is located on the edges of large water bodies, with lakes to the west and Aarhus Bay and the Kattegat Sea to the east. It is also at the mouth of a west-east river valley, and the inner city is still centred on the banks of a central stream, connecting the hinterlands to the sea.

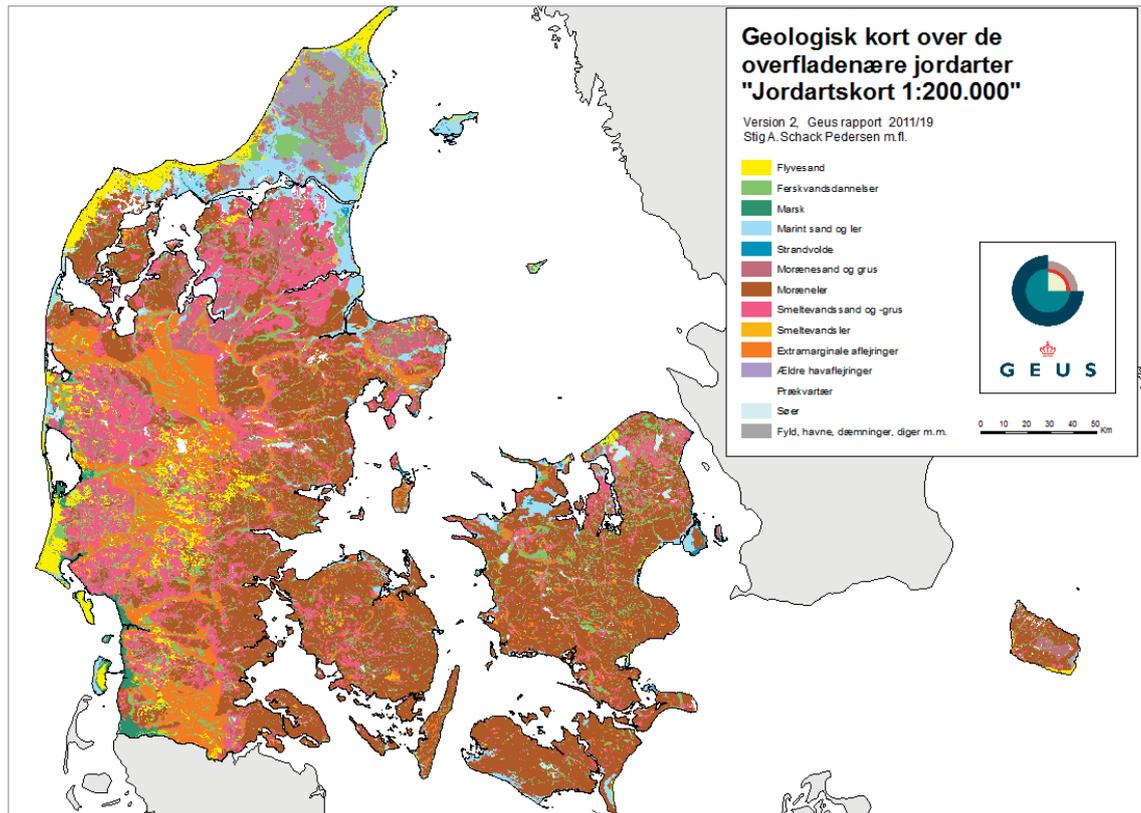
Aarhus belongs to a watershed that covers the coastal areas around the Aarhus Bay. The larger terrain properties of the area are shown on a Geomorphologic map by Per Smed: the Aarhus area is characterised by its tunnel valleys formed during the last glacial period (Weichsel Period) 11,700 years ago. Its moraine-clay hillsides define Aarhus to the north and the south, meeting on the low-lying grounds of the river valley. Looking at the current 3D model of Aarhus, these landscape properties still read clearly. At a slightly larger scale, the area of contemporary Aarhus is defined by three river valleys: Giber Å, Ådalen and Egådalen.



The River Valley as an opportune location for settlement

The city's relation to water is reflected in its name: Aarhus derives from Aros, meaning the mouth of the stream. This name was also used for other settlements in Denmark and Norway with similar waterscape relations. The river valley has hosted settlements for the last 9,000 years, and the existence of Aros can be traced back to the 800th Century when it was a Viking settlement (Terp Laursen, 2012, p. 20). The settlement was initially located in what is now the inner city around the cathedral. At that time, the settlement was on a small island in what was formerly a fjord in the River Valley. Sedimentation, provided by water's flow towards Aarhus Bay, the south-oriented hillsides, and easy access to water all provided rich fauna for hunting and arable lands for growing crops. In this way, Aarhus was located due to 'classic' landscape based-parameters including access to water, food, transportation and protection.

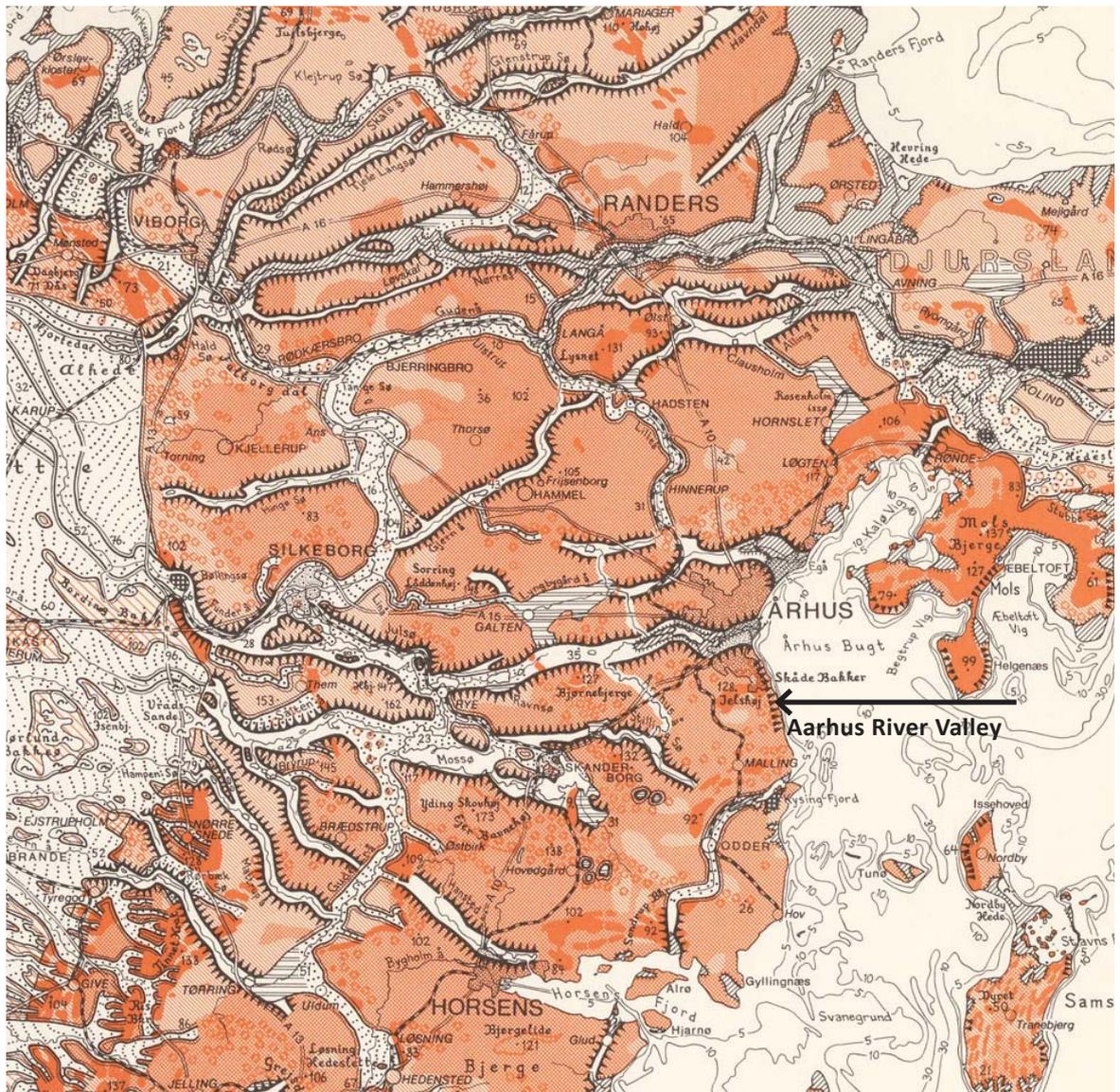
Figur 3.1.12: The Town Arms of Aarhus, plate on railing above Aarhus Stream.



Figur 3.1.13: The geological map of soil types 'near the surface' provides an overview at the scale of Denmark, telling the story of the last glacial period, relating to the logics of the geomorphologic map (following page).
 Source: GEUS.dk

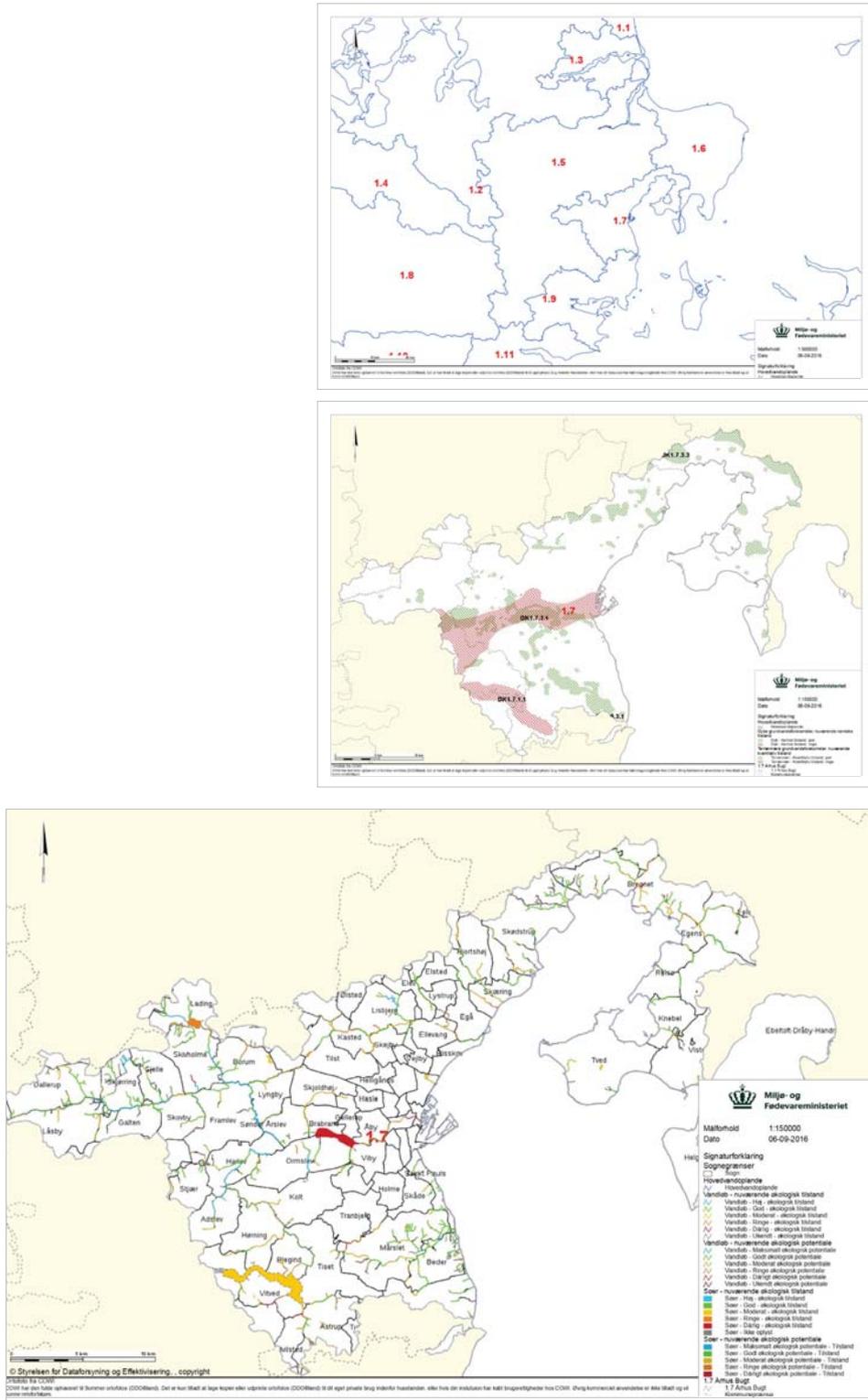


Figur 3.1.14: A tracing of surface water and wetlands on the late 19th Century historical maps (HMB), emphasizing blue-green passages, wetlands, moist fields, canals, streams, and lakes.
Source: GST / blue tracing KW

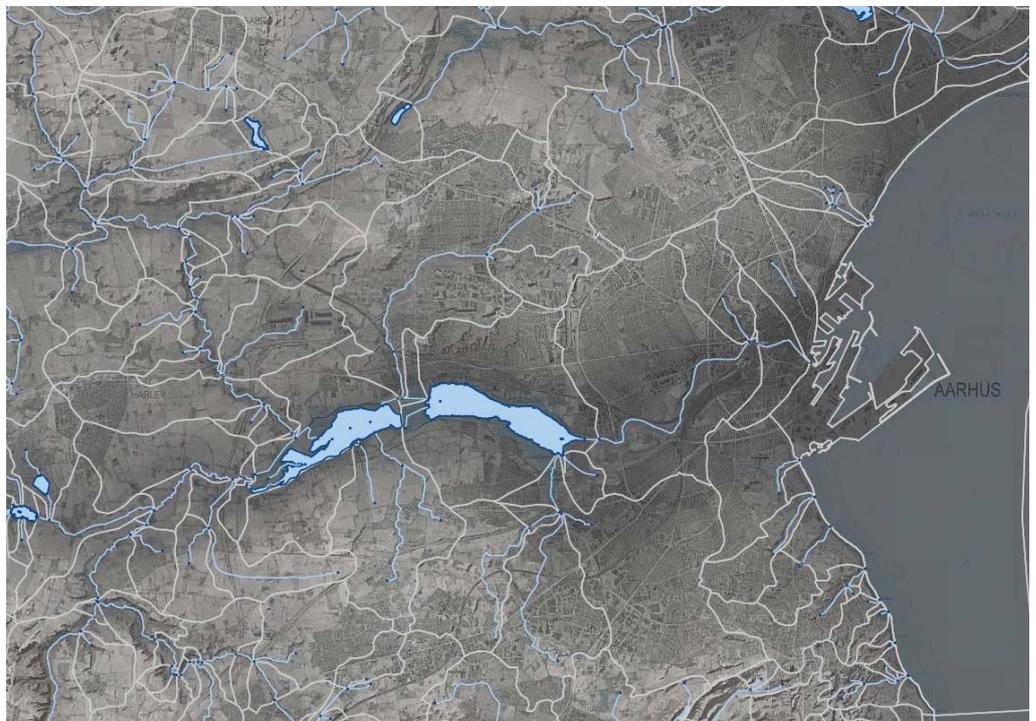


Figur 3.1.15: Geomorphologic map, Eastern Jutland. Aarhus River Valley and its hinterland stretching 50 km westwards to the Jutlandic Ridge and the sandy heath plains. The overall directions of the terrain, show part of a landform with gradients and soils formed by waterscapes for almost 12.000 years. Ice and melting water have formed the tunnel valleys and moraine hills, a trait that has been further developed in the interglacial period, where surface water continuously found its way in the corridors for thousands of years. This has created soil conditions where the smaller grain sediments have been washed out, creating capillaries leading water: soil conditions formed by waters movement. Source: Per Smed

Watershed and catchments in the larger Aarhus area



Figur 3.1.16: Top: Aarhus is located in water district 1.7, the catchment covers the larger Aarhus Bay area. Middle: Main catchment and groundwater. Bottom: The main catchment Aarhus Bay with main tributaries and parish delineations. Source: MiljøGIS



Figur 3.1.17: Top: Contemporary, larger landform of the larger Aarhus area. Bottom: as above, but with white lines indicating the catchment areas and blue showing surface water.
Source: QGIS
Visualisation: Nikolaj Knudsen



1903. Aarhus Stream, Aagade (Stream Street)



1885, Aarhus stream at the sluice bridge, Aarhus Mølle (Mill) and Vesterbro Mølle



1890. Aarhus Stream from the Slusebroen (sluice bridge) towards East, city centre



1870. Aarhus Stream looking North-East, Slusebroen to Mølledammen (Mill Dam)



1865. Aarhus Stream from the West

Draining and restoring wetlands in the river valley

In 1962, Hedeselskabet (The Danish Heath Society) initiated construction work to regulate the Aarhus Stream at the east and west ends of the lake, meaning that the area available to water was diminished by more than 25 per cent (Terp Laursen, 2012, p. 20). Nowadays, the river valley contains two larger lakes with wetland areas just in the hinterlands of the city; Brabrand Sø (Brabrand Lake) and Årslev Eng sø (Årslev Lake), which was recently restored as wetlands and a lake.

The stream - from resource to nuisance

The older part of the city is located at a stream, formerly named Mølle Å (Mill Stream), and now known as Aarhus Stream (Aarhus Å). The central passage was the ford around what is now called Immervad⁵: the best location to cross the stream back in time. Just as in other expanding Western cities, the vital stream became a nuisance during the 19th Century. Aarhus Stream had become heavily polluted due to a growing number of industries and an increasing number of inhabitants. The stream became the carrier of industrial wastewater from spinning mills, a glue factory, a tannery, a brewery and an abattoir alongside other sources of sewage in large amounts. Nevertheless, the stream was essential to the provision of drinking water, as well as for washing and bathing for less-privileged inhabitants. In the 19th Century, the stream was considered responsible for Staphylococcus outbreaks as well as Cholera and Typhus epidemics (Lundskov, 2016, p. 12; Terp Laursen, 2012, p. 15,20,30). Furthermore, the stream switched from being a primary infrastructure that connected the hinterlands to the sea, into being a barrier to contemporary urban practices. Newer modes of transportation, together with an expanding city and harbour, prioritised land-based, infrastructural connectivity between the north and south sides of the stream and towards the harbour. In this period, the stream changed from being considered as a natural resource into being viewed as a foul barrier for the city, as framed in a newspaper of 1909: 'Den stinkende, dybe muddergrøft'⁶ (Aarhus Stiftstidende, 24. Sept. 1909).

⁵ The term 'vad' means ford

⁶ "The stinky, deep mud ditch"

Undergrounding and re-surfacing

Since the late 19th Century, different solutions for handling the stream were discussed, and, finally, during 1932-33 the stream was undergrounded and covered by dry infrastructure; Åboulevarden (the Stream Boulevard) (Lyngsø Pedersen, 2010; Ramböll, 1933; Terp Laursen, 2012, p. 20).

The undergrounding lasted until 1995-1996, when the stream was re-opened as a canal. The new area along the stream, now freed from cars, was mostly designated for leisure and business. Despite some initial resistance, the stretch became very popular, particularly for restaurants, and its pedestrianisation has made it popular for strolling and as a 'hang-out' for young people. Today, the stream once again forms the inner spine of the city with new programmes, enclosed by hard edges and carefully designed pedestrian bridges, railings, and outdoor seating. The stream has become an inner city icon of business and leisure –for visitors from outside Aarhus as well as locals.

In-between hinterlands and bay

From the point of view of water, the stream remains, of course, important to Aarhus beyond leisure, as it still functions as the outlet for the larger catchment of the river valley. In light of projections of increasing rain events and a rise in sea level, the stream becomes more important than its associated leisure programs: it is the mediating water body between the hinterlands and the sea. The spatial characteristics of steep, concrete retaining walls and rectilinear geometries do not, however, provide a flexible space for water. This puts pressure on the outlet and the areas where the river valley channels its water into the designed stream. A new lock has been constructed at the outlet to protect the inner city from storms and high tides by pushing seawater inwards. With more precipitation, the mouth of the stream and the larger river valley regain their importance for the settlement of Aarhus.



2016. Aarhus Stream, inner city



Appr.1980ies. Åboulevarden on the buried stream



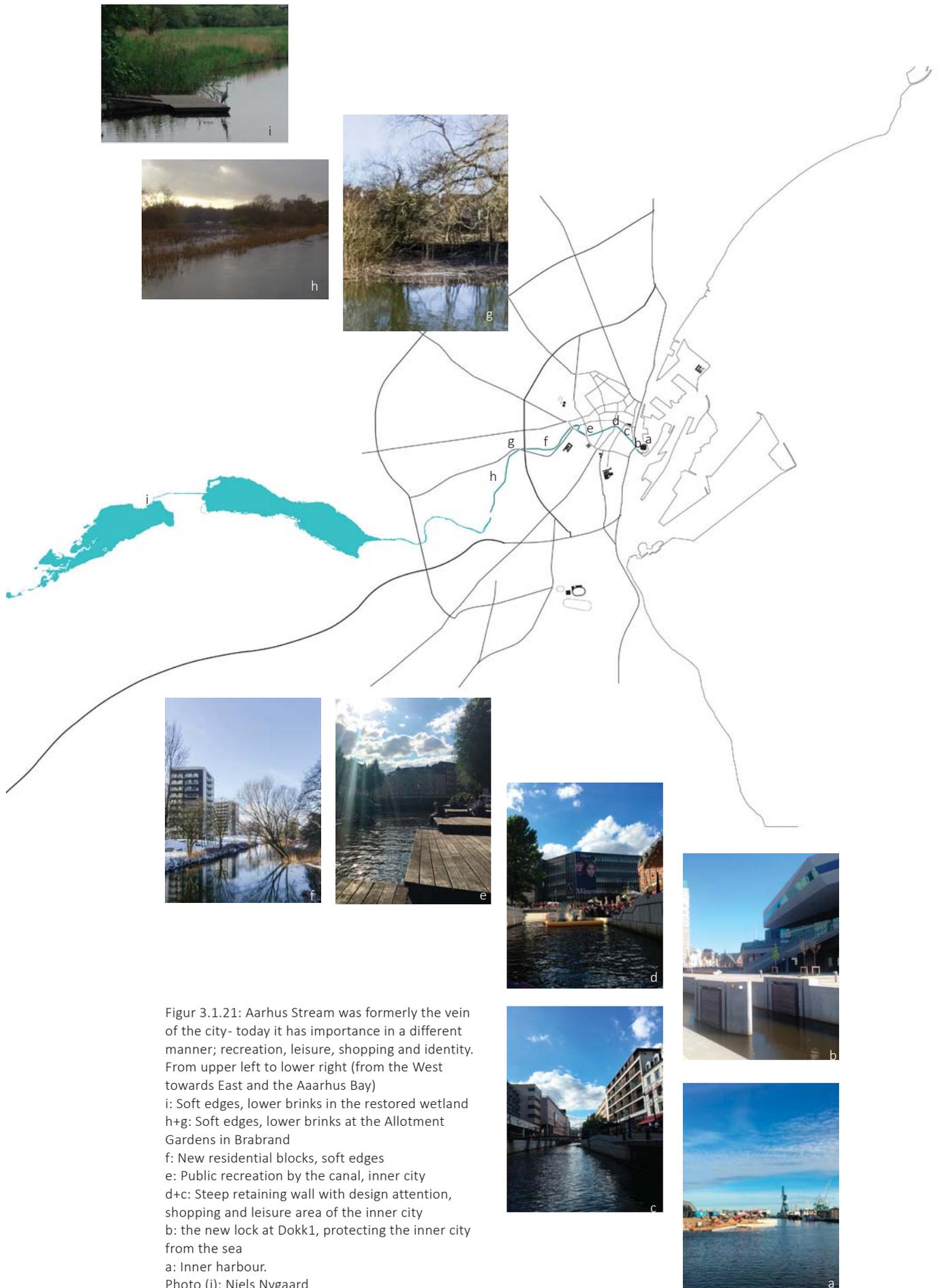
Appr.1933. Aarhus Stream, inner city



1878, Immervard seen from Ågade (The Ford seen from Stream Street.). The stream is recognised by steep edges and lines by trees. Except from the trees, the spatial characteristics at the present day stream are very similar to the late 19th Century



Figur 3.1.20: Top: Surface waterscapes as visible in the late 19th Century with outline of the Aarhus harbour 2014. Based on HMB, GST (mapping and graphic: KW). Bottom: The larger Aarhus area shown with greyscales indicating the degrees of surface cover
Source: MiljøGIS / greytones: KW



Figur 3.1.21: Aarhus Stream was formerly the vein of the city- today it has importance in a different manner; recreation, leisure, shopping and identity. From upper left to lower right (from the West towards East and the Aarhus Bay)
 i: Soft edges, lower brinks in the restored wetland
 h+g: Soft edges, lower brinks at the Allotment Gardens in Brabrand
 f: New residential blocks, soft edges
 e: Public recreation by the canal, inner city
 d+c: Steep retaining wall with design attention, shopping and leisure area of the inner city
 b: the new lock at Dokk1, protecting the inner city from the sea
 a: Inner harbour.
 Photo (i): Niels Nygaard

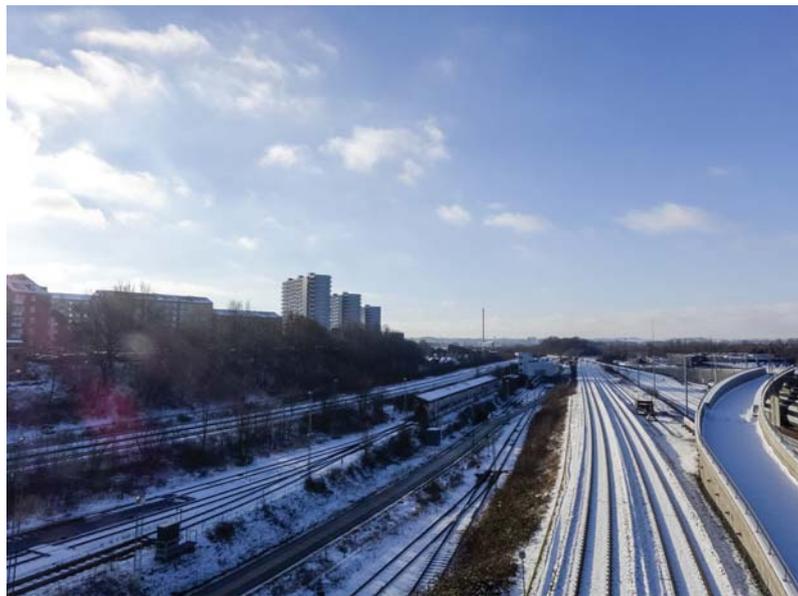
3.1.5 SUM UP

SETTLEMENT PATTERNS AND TRANSFERABILITY

The urban development of Aarhus in a broader context

Clearly, water has been a vital actor in the location and growth of human settlements long before modern times. However, the practices relating to the relationships between landscape, water and settlement have, for many years, had no meaningful, requisite use to society and communities other than professionals in water management. The technological developments of recent history have provided new affordances of controlling water. Water has become simply a part of large drainage schemes, rendering former landscape-based considerations non-essential for settlement practices. Furthermore, massive urbanisation has required vast amounts of water, lowering the ground water table, and creating even more dry-land. In addition to this, during the heydays of post-war urban development, there was a 'dry' period in Denmark. This lowered the groundwater table even further, affording human settlement in low-lying areas and former wet fields. Suburbia is the newest addition to the built city, and it covers extensive areas. The challenge lies in the fact that these settlement patterns and building practices are founded on logics other than those of landscape properties.

Aarhus was originally located at a large waterbody for reasons of transportation, defense and access to natural resources. Since the Industrial Revolution, and in particular since the early 20th Century and following WWII, urban development has relied upon command & control approaches to handling water. In many respects, the location and urban development of Aarhus are remarkably similar to that of other fjord cities in the East Jutland Metropolitan Region as well as reminiscent of other European cities. Indeed, the city's recent history regarding handling water resembles that of many other Western cities. Reflecting on the settlement patterns of Aarhus, water has been disciplined via the principles of modernity, succeeding in promoting the health of its citizens, industrial interests and supporting new modes of transportation (from the water- to land-based). All-in-all, this has provided the freedom to settle without much concern for surface water. The power of water has somehow been forgotten in everyday landscapes, likely changing the very notion of water also. But now, climate change and changing water-scapes questions these patterns of urban development.



Figur 3.1.22: Top: Looking East from the Inner Ringroad towards the inner city. The railway tracks demarcates the low-lying River Valley, meeting the plateau of the historical city centre on its way to the harbour and bay, flanked by hillsides. To the left is seen new urban developments rising in the River Valley.

Bottom: Looking West from the Inner Ringroad through the River Valley and the low lying hinterlands of the city. The hillsides are accentuated by the residential blocks on the plateau

PART 3 WATER

CHAPTER 3.2

CLIMATE CHANGE IN THE ANTHROPOCENE

3.2.1 Introduction

3.2.2 Contextualisation – climate change and urban landscapes

3.2.3 Climate change and waterscapes

3.2.4 The epoch of the Anthropocene

3.2.5 Landscape architecture and climate change in the Anthropocene

3.2.6 Sum up- climate change and diverging interests



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CLIMATE CHANGE IN THE ANTHROPOCENE

3.2.1 INTRODUCTION

ABSTRACT

Climate change in this research context

Climate adaptation, including new approaches to handling water, is taking place in response to climate change. The subject matter of this research is CA|HOW, and thus, not climate change as such, but rather adaptation as a practice in urban landscapes. However, even during the timeline of this research, the evidence for climate change has seemingly become even more overwhelming, and climate change scenarios are continuously updated due to new data and refined methods for measuring, calculating and modelling future projections. Climate change is often framed as global warming. If the Earth's climate is becoming warmer, this is reflected via changes in the hydrological cycle, with legible impacts globally and locally. At the same time, the epoch of the Anthropocene has been announced as an indication of human responsibility for climate change. This chapter provides a brief introduction to the current 'status' of climate change in relation to water. This subject is further introduced in the context of urban landscapes of the Anthropocene, placed in relation to landscape architecture, planning practices, and potential value disputes.

Structure

Firstly, I contextualise how urban landscapes and climate change are both bound by land-use and settlement patterns, as well as outlining current trends in climate change projections. Secondly, I approach climate change in relation to changing waterscapes, followed by a brief introduction to the Anthropocene as related to landscape architecture and practices in urban landscapes.

3.2.2 CONTEXTUALISATION- CLIMATE CHANGE AND URBAN LANDSCAPES

Climate change is global – and water is urban

Climate change and changing waterscapes challenge current human practices in urban landscapes. This is particularly relevant as, currently, 54 percent of Earth's 7.3 billion population lives in urban areas. By 2050, the urban population is projected to grow by another 2.4 billion (United Nations Population Division, 2014). A growing global population and increasing urbanisation combined mean that more areas are likely to be built upon and sealed with impermeable surfaces. Current urbanisation practices favouring impermeable surfaces already challenge the handling of surface water. Even without climate change, adaptation as a retrofitting of urban landscapes might well be necessary.

Land-use and ownership

An increasing urban population is likely to put pressure on land-use, water politics and jurisdictional boundaries, particularly if water reclaims dryland. In such a future, conflict over values is liable to arise, including conflicts involving urban landscapes. For example, a rise in sea level will impact highly-populated lands, such as the delta regions of Bangladesh and the Mississippi. Frequent flooding of urbanised areas will likely also have consequences for large-scale migration. Water does not acknowledge administrative boundaries such as property lines and planning zones, and it acts without concern for whether terrains are 'natural' or human constructions. From this perspective, changing waterscapes question current divisions of land, territories and the existing mesh of administrative boundaries. Within urban landscapes, CA|HOW will have to find its place regarding physical space. Thus, it will become necessary for CA|HOW to claim land within existing boundaries and ownership.

Uncertainty and value dispute

Climate change provides a new level of uncertainty and complexity that is foundational in how we approach urban landscapes and associated human practices. Climate change is, furthermore, essential regarding seeking value creation in urban landscapes, raising questions regarding what we find to be of value, and which values we choose to enforce or instigate. This touches upon larger scale discussions as well as very local and individual interests; climate change is prone to trigger disputes in urban landscapes. To mitigate negative consequences for human interests and promote livability, we might need to employ alternative methods for discussing values and land-use boundaries in urban landscapes.

CLIMATE CHANGE PROJECTIONS IN NUMBERS

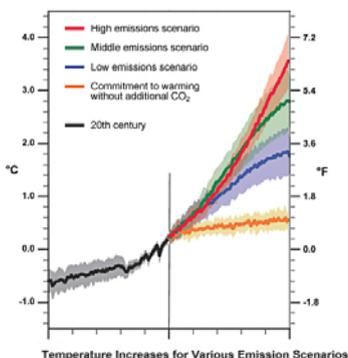
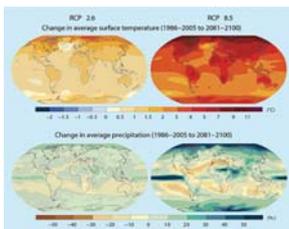
Pecuniary values and human costs

Climate change and changing waterscapes have large socio-economic and environmental consequences (IPCC, UN), pushing and stressing values in many ways, from human lives, human practices and ecosystem collapse to high costs for financial assets. Recent research calculates the cost of climate change to range from between \$2.5 trillion to, in a worst-case scenario, \$24 trillion (Dietz et al., 2016). From this perspective, climate change influences a broad range of value systems, and adaptation is often based on a cost-benefit analysis regarding whether to perform CA|HOW or not

Anthropogenic forces and heat-trapping gases

The Intergovernmental Panel on Climate Change (IPCC) has made projections for climate change and global warming since their first official report in 1990. In the 4th assessment report of 2007 (IPCC, AR4), it was finally possible to compare the projections with observed data. This showed a 0.2°C decadal increase in the global average temperature, corresponding to the prediction of 0.15-0.3°C (AR4, 2007)(IPCC, 2007a) (IPCC, 2007a)(IPCC 2007b). According to NASA, this path of increase is enough to create severe global effects (Northon, 2015), as even small changes in Earth's temperature influence the weather system on a global scale. This influence encompasses a broad array of water-based implications, including sea level rise, changing precipitation patterns, drought and heatwave, stronger and more frequent precipitation events, the ice-free Arctic in summer, losses in agricultural productivity and, in some areas, longer frost-free seasons.

According to IPCC's 5th Assessment Report (IPCC, 2013a), the increasing temperature of Earth's climate system is now unambiguous. The temperature increase is primarily due to a growing concentration of heat-trapping gasses in the atmosphere. Ice core drilling has provided data on Earth's climate going back at least 800,000 years, which shows that the level of heat-trapping gases has not been as high as it is today for at least 800,000 years (Nielsen, 2009) (Antarcticglacier.org, 2015). The emission gases are mainly the result of human actions and the prioritisation of economic growth, combined with general growth in population. Without further mitigation measures, Earth's temperature will rise by another 3.7-4.8 °C compared to preindustrial levels (IPCC, AR5, 2013). Natural climatic fluctuations are influencing Earth's climate too, for example via solar activity patterns, cosmic radiation as well as earth-bound causes such as volcanic eruptions that release greenhouse gases into the atmosphere. (UCAR, n.d.; USGS, n.d.) (NCAR, USGS). However, according to AR4, the last 50 years of solar and volcanic activities alone, without human activities as described above, would in fact likely have caused climatic cooling (IPCC, 2007b).



Figur 3.2.23: Top: projected, changes in global average surface temperatures and precipitation. Bottom: projected temperature increases in various emission scenarios. Source: IPPC AR5



Figur 3.2.24: Top: Wet and dry infrastructures, compact programs provided by terrain and water-scape alterations, Holland 2016
Bottom: Interplay between water and land, constructed and natural processes, Venice 2016.

3.2.3 CLIMATE CHANGE AND WATERSCAPES

Hydrological cycles and asymmetrical patterns

Earth's hydrological cycle is closely interrelated to the atmosphere's temperature and the radiation balance. Evidence of increasing temperatures, of both the air and the oceans, is accumulating. Furthermore, the icecaps are melting fast, showing a considerable loss of mass over the last 50 years (IPCC, 2008, pp. 27–35). In this way, waterscapes and water systems are influenced by large-scale atmospheric circulation patterns intertwined with other variables, such as asymmetrical patterns taking place at different time scales, from the annual (monsoon) to the decadal (El Niño) to the multi-decadal Atlantic Oscillation. (DMI, 2016a; IPCC, 2008, p. 47)

The slow oceans

According to AR5, the increase in sea levels since the middle of the 19th century has been taking place faster than average changes during the two thousand years before this time. And this speed of increase has likely risen further since the early 20th Century, with scenarios predicting a 40-60 cm sea level rise by the year 2100 (IPCC, 2013a). However, there is not yet full consensus on the correct modelling of this prediction. IPCC expect the climate to change more in the 21st Century than in the 20th Century, providing an array of climate scenarios, ranging from 'optimistic' and 'low-emission' to 'worst case' 'high emission' scenarios. Even the 'best case', low-emission mitigation scenario (RCP2.6) expects Earth's temperature to keep rising for the rest of the 21st Century, and it will take decades to slow down the global warming effect, as the oceans respond very 'slowly' to such changes (IPCC, 2013b). However, the first decade of the millennium has proved record-high emissions, which are far beyond the 'best case' scenario.

Clouds and vapour

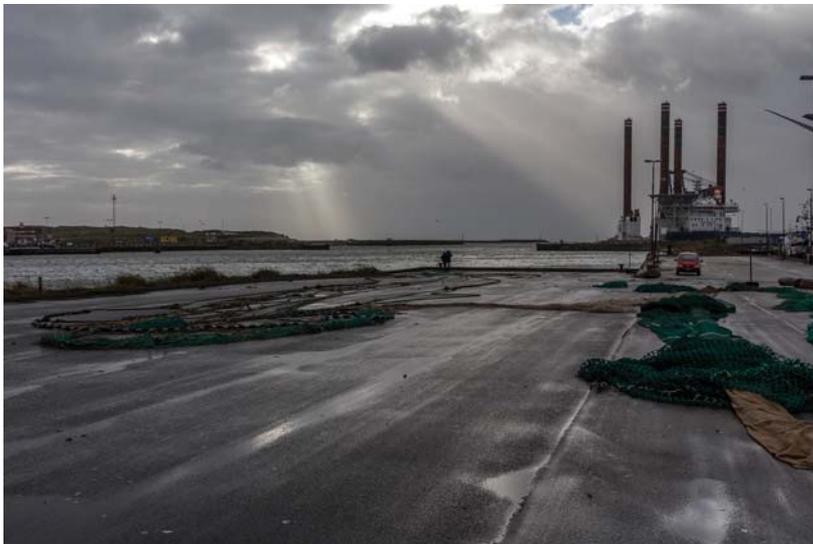
Research carried out in 2016 suggests that climate projections have underestimated the level of fluid vapour in clouds (in contrast to ice crystals), which could lead to higher global warming than expected (Tan et al., 2016). This research context does, of course, not disseminate numbers and statistics on climate change and global warming. But these facts and figures are mentioned to exemplify the complexity of climate projections and their relationship with water; expectations on the content of liquid water or ice crystals in clouds can be decisive in climate change simulations, pointing towards how accumulated consequences can be more extensive than projected.

CLIMATE CHANGE PROJECTIONS IN A DANISH CONTEXT

Danish climate change projections are, of course, intertwined with larger-scale, global and regional projections. The scenarios used in Denmark have their point of departure in the IPCC scenarios and models scaled to the more local context of Denmark.

With 8,750 km of coastline surrounding the country, any global sea level rise will impact Denmark. For example, in the context of Aarhus, some of the most expensive residential areas are located near the coast, as well as port industries, which have the associated risk of leaking pollution if flooded (Moeslund et al., 2009).

Based on the A1B-scenario for the period 2014-2050, the scenario for Denmark projects a warmer climate with higher levels of precipitation in the form of rain together with more frequent extreme weather events. By the year 2050, the scenario projects climatic changes to register as 24 fewer days of frosty weather, 40 more days of growing season, more heat waves, more rain and more wind (Aarhus Kommune, 2014; DMI, 2016b; Klimatilpasning.dk, 2014). In summary, besides sea level rise, Denmark seems to be becoming warmer and wetter in the future. As such, rain-water is a resource; the crucial part is what happens when the rain hits the surface of the terrain.



Figur 3.2.25: Industrial harbour at the Danish Westcoast, antropogenic surfaces and sea-fed landscape practices together with the natural processes of the sea and sky.
Photo: Nikolaj Knudsen

3.2.4 THE EPOCH OF THE ANTHROPOCENE

A GEOLOGICAL TIMESCALE OF EARTH

"The 'Anthropocene' [...] designates the period of Earth's history during which humans have a decisive influence on the state, dynamics and future of the Earth system." Quarternary Stratigraphy, (SQS, n.d.)

Originally coined by the biologist Eugene Stoermer in the 1980s, the term Anthropocene was popularised by the atmospheric chemist and Nobel Prize winner 1995 Paul Crutzen in 2000. Defining geological time is the responsibility of the International Stratigraphy Commission (ICS, 2016), and the Working Group on the Anthropocene (SQS, n.d.). They have now voted to designate the Anthropocene as the successor of the current subdivision of geological time: the Holocene Epoch starting 11,700 years ago at the end of last glacial period. The Holocene has been a relatively stable, climatic period where humankind prospered and developed major civilisations.

The formal starting point of the Anthropocene Epoch has not yet, however, been formally agreed upon. According to Quarternary Stratigraphy, the beginning of the Anthropocene is often suggested as coinciding with the emergence of the Industrial Revolution, around 1800 CE. Other suggestions have been posited, for example, the beginning of the Holocene, or around 1950, when nuclear test bombings produced fallout that is traceable in geological layers on a global scale. However, there does seem to be a consensus that we are currently in the Anthropocene. This is a turning point on a planetary scale; human processes have as much or more impact on Earth's systems as natural forces.



Figur 3.2.26: Antropogenischer Terrain als rekonfigurierte Oberflächen mit intensiven Landnutzungspraktiken. Landwirtschaftliche Felder als Patchwork umgeben große Braunkohlefelder als gigantische Treppen zum Untergrund, Ruhr District, Deutschland 2016

Water and land-use practices in the Anthropocene

“The epoch of the Holocene is, as far as we know, the only stable state of the planet that can support the modern world.” Quote Rockström et al. 2014 (Rockström et al., 2014, p. 1249)

The challenges of climate change and changing waterscapes in the Anthropocene are closely connected to land use and human practices, including that of increased urbanisation. Water represents one of the nine planetary boundaries¹, which are “priorities relating to human-induced changes to the environment”. To estimate the global water boundary, it is necessary to employ a bottom-up approach by down-scaling the planetary boundaries to the regional and local scale, such as river basins, watersheds and sub-catchments. Currently, 25% of the rivers on land are highly affected by overuse, and many economically important river basins are closing, e.g. the Indus, Colorado and the Nile River (Rockström et al., 2014, p. 1252). Rockström et al. describe how human activity in the Anthropocene have even influenced the amount of water provided by the atmosphere and how the availability of water is influenced by land-use as a consequence of environmental cross-scale-changes and interactions. Ecosystem processes modify the hydrological cycle and vice versa, and Rockström et al. point out that the hydrological science community recognises “*the need for a new focus on hydrological systems as a changing interface between environment and society*” (Rockström et al., 2014, p. 1250). This emphasises the impact and interaction of human activity on water availability but also the impact of water issues on human activity as well as the need for balancing this relationship, all of which relating to landscape practices, both context and subject of this thesis research.



1 The nine planetary boundaries, according to Rockström et al.: 1. Climate change 2. Change in biosphere integrity (biodiversity loss and species extinction) 3. Stratospheric ozone depletion 4. Ocean acidification 5. Biogeochemical flows (phosphorus and nitrogen cycles) 6. Land-system change (for example deforestation) 7. Freshwater use 8. Atmospheric aerosol loading (microscopic particles in the atmosphere that affect climate and living organisms) 9. Introduction of novel entities (e.g. organic pollutants, radioactive materials, nanomaterials, and micro-plastics). Four of the boundaries (number 1, 2, 3, 4) have already been crossed, which indicates entering a danger zone, a climatological tipping point. Source: Stockholm University, <https://www.su.se/english/about/news-and-events/press/press-releases/four-of-nine-planetary-boundaries-now-crossed-1.218003>

Figur 3.2.27: Water in the air - vapour or ice crystals?
Photo Nikolaj Knudsen

The Anthropocene as a productive concept

“even the most transformed novel eco-systems embedded with the most intensively used and densely populated anthromes can retain essential habitats for most native plants species [...] at levels similar to those of native eco-systems” (Ellis, 2014, p. 26)

Climate change in the Anthropocene is both a geological epoch and a conceptualisation of human actions and influences with our planetary environment. This refers to the classical dualism of whether the human species forms an integrated part of nature or not (see Part 4 Value).

The dualism between humans and nature is not a new discussion, going all the way back to Plato (Spirn, 2012). However, climate change in the Anthropocene is tipping the balance: as humans we are putting ourselves, and other life forms on Earth at risk by ignoring the interconnectedness of human-natural systems. At the same time, new opportunities might arise too from understanding and acting on this relationship.

The Anthropocene is both a premise but also a productive concept as a driver for investigation and action, placing attention to the relationship between human and ‘natural’ processes as interconnected systems. Besides stratigraphy, the Anthropocene is used conceptually in other contexts and fields. For example, geographer Erle C. Ellis is developing methods for describing novel eco-systems and gradients of human-natural land-uses and practices, as new modes to understand and articulate landscape. This, he calls, socio-ecological patterns of anthrome landscapes (Ellis, 2014, p. 25), where anthromes appear as mosaics and novel ecosystems. Ellis’ maps show gradients of how humans and land-use practices have shaped eco-systems. For example, he uses categories such as ‘residential, irrigated cropland’, ‘rainfed villages’ and ‘populated forest’. These categories seem productive in a different sense than that of the rural-urban planning distinction, as they open up for the acknowledgement of gradients, and thus, more contextualised practices.

One of the themes that seems of relevance to landscape architecture in the field of urban landscapes, are novel-ecosystems. An example, is provided by Palta et al. studying the occurrence of, and benefits from, what they frame as ‘accidental wetlands’, which unintentionally exist from human actions and which exhibit ‘characteristics of novel ecosystems’ (Palta et al., 2017). Locally in Aarhus, ‘Aura’2 at Aarhus University, conducts research on the Anthropocene as a transdisciplinary research area from disciplines such as anthropology, philosophy and biology. Additionally, at the Aarhus School of Architecture, Stefan Darlan Boris established the Landscape Laboratory Eskelund at a former landfill area in the Aarhus river valley (Boris, 2016). The Eskelund Laboratory is currently experimenting with what they call ‘Godsbanepodningen’ (‘The Freightyard Grafting’), a 1:1 transplanting of ‘valuable nature’ found at the former industrial site Godsbanen (now exposed to dense urban development) to Eskelund, further East of the city centre.



Figur 3.2.28: Top: Urban landscape of water, hard surfaces and animal traces, Aarhus 2016 .

Figur 3.2.29: Bottom: Plate on curbside telling the story of water as interconnected, cross-scale matter, Seattle 2015

3.2.5 LANDSCAPE ARCHITECTURE AND CLIMATE CHANGE IN THE ANTHROPOCENE

“But, as we have seen, man has reacted upon organised and inorganic nature, and thereby modified, if not determined, the material structure of his earthly home.” George Perkins Marsh, 1864 (Marsh, 1974, p. 13)

In the early 19th century, Alexander von Humboldt became the first scientist to talk about harmful human-induced climate change, based on observations on how the forest enriched the atmosphere with moisture, had a cooling effect and a retention function by protecting against soil erosion. All of these capabilities were altered by human actions and Humboldt notes that this has unpredictable impacts on future generations (Wulf, 2015, p. 5). During the 19th century, a growing awareness of the consequences of human actions arose. Among others American conservationists, George Perkins Marsh articulated the consequences of human impacts, while arguing that nature could be used to mitigate harmful human actions (McHarg and Steiner, 2006, p. 13).

Changing landscape practices in the Anthropocene

“[...] the fact that we live in the Anthropocene will result in new and assertive prospects for action in the field of design, planning and governance [...]. What opportunities do these hybrid forms present for organizing the urban landscape in an appealing and livable way? What new terminology can we use to discuss the city in the Anthropocene?” quote Sijmons 2014 (Sijmons, 2014, p. 18)

The Netherlands presents landscapes with century-long practices of extreme water management, such as reclaiming dry land from wetlands using dykes, dams and mills. For centuries, the Netherlands has succeeded in providing considerable land reclamations through extensive, anthropogenic waterworks. Today, however the Netherlands is challenged by changing waterscapes: the country is coastal based and is low-lying at the mouth of main European rivers; it is increasingly vulnerable to sea level rise and alarming volumes of surface water from the hinterlands of Europe. At present, the country experiences a pressing need for adapting to more water, partly as an adaptation of its anthropogenic measures of water control. In recent times, the Dutch government even changed its approach and policy, going from ‘taking care of flood prevention’ to that of a risk-assessment on safety (Broekhans and Correljé, 2008). The Anthropocene has also been addressed in landscape architecture and the arts, as in the quote above by landscape architect Dirk Sijmons from the International Arkitekturbiennale in Rotterdam (IABR 2014) ‘Urban by Nature’ (Brugmans et al., 2014) discussing design, planning and landscapes in the era of global urbanisation in the Anthropocene.

Urban and nature as obsolete dichotomies in the Anthropocene

With or without the Anthropocene term; integrated worldviews that regard human and natural processes as intertwined, including that of interlacing the past with the present and a speculative future is not a novelty to landscape architecture (Spirn, 1997). In the Granite Garden of 1984 (Spirn, 1984), thus more than a decade before the Anthropocene became popularised, Spirn provides meticulous insights into the then prevailing notions of dividing nature and urban, addressed through the themes of City and Nature, Air, Earth, Water, Life and The Urban Ecosystem. Spirn argued how the dichotomy between human and nature, urban and rural are obsolete. The Granite Garden offers explanations and together with landscape-based design and planning recommendations is framed as 'a plan for every city', thus not only calling off the dualism but also offering guidelines to action and changing of landscape practices (Spirn, 1984, pp. 85, 124, 166, 225, 260).

Since then, Stokman and Jørg point out how the contradiction between human and natural must be resolved (Stokman and Jørg, 2013, p. 8), while Sijmons addresses the importance of seeing human interventions as part of natural forces, with effects at a global scale. Sijmons argues that the Anthropocene calls off the 'pseudo-opposition' between 'nature' and human society' (Brugmans et al., 2014, p. 14). With departure in the Anthropocene, Prominski points to the persistence of the dualism/dichotomy between nature and human, concluding that the profession of landscape architecture is already capable of integrating designing 'in unitary modes, going beyond the dichotomies of nature and culture' (Prominski, 2014a, p. 18). This discussion is still of contemporary relevance to practice. For example, the Danish planning system and the current urban development in Aarhus, support dichotomies between human ><nature and urban><rural (nature) through the administrative zoning which divides rural and urban areas, and through administrative, land-use boundaries. This dichotomy is also evidenced in Chapter 3.5 on the Danish Planning System, and the case studies in this thesis (see Part 5 Chapter 1-3), show how human expectations to the performance of our built environment seem disconnected from natural forces and the interplay between human actions.

Landscape architectural thinking and making

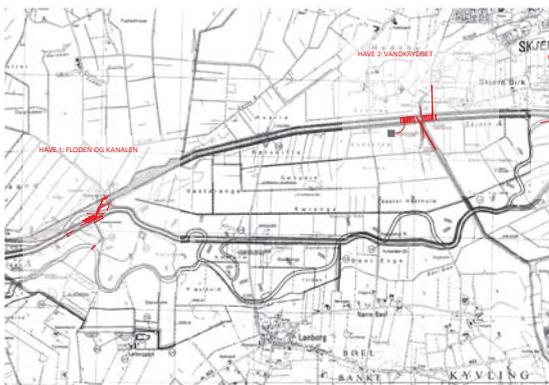
The notion of 'landscape as being shaped by human and natural processes' (see Part 1, Chapter 1.2) is likely the key why the concept of the Anthropocene seems so familiar and productive to landscape architecture. The embedded notion of the Anthropocene in landscape architecture is visualised in the book 'Taking Measures across the American Landscape'. Here, James Corner and aerial photographer Alex S. MacLean provide a visual narrative of the landscape and the interweaving between natural and human processes as the landscape-shaping forces. The photographs frame the interplay between natural forces and human constructions as landscape practices form the contemporary landscape of America (Corner and MacLean, 1996). Additionally, Mathur and Da Cunha use well-known approaches, visualising the interplay

between urbanisation, landscape properties and the dynamics of water, framed as ‘making peace with water’ in their books *Mississippi Floods*, *Soak*, and *Deccan Traverses* (Mathur and Cunha, 2009, 2006, 2001).

In Chapter 3.4, a selection of contemporary, influential best practice examples are presented, which exemplify an integrated understanding of human-natural processes bound with aesthetic considerations. These examples are celebrated for their conversion of post-industrial works or sites into public areas, allowing vegetation and activities to grow over time, thus changing abandoned, often polluted sites into prospects for the present and the future. What these projects have in common is their transformation of yesterday’s functions into a public good and their display of hybrid-processual aesthetics in urban landscapes. Or, as framed by Alan Berger, coining the term Drosscape:

” Both dross and scape are created and destroyed by processes and values derived from, or because of cultural tastes and actions. Drosscape is the creation of a new condition in which vast, wasted, or wasteful land surfaces [...] are modelled in accordance with new programs or new sets of values that remove or replace real or perceived wasteful aspects of geographical space [...]” (Berger, 2008, 2006, pp. 236–237).

In a Danish context in the field of landscape architecture and designing in the Anthropocene, Thomas Juel Clemmensen has experimented with approaches to designing in the Anthropocene in the context of a nature-restoration project in Skjern river valley. Clemmensen provides insights into how the designing of nature-restoration-projects can be a point of departure in integrating anthropogenic measures from the former draining project into the restoration design itself as spatial and aesthetic traces of intertwined human-nature processes, thus providing a narrative of the local history of landscape practices.



Figur 3.2.30: Sketching strategies for a designing of the Anthropocene, titled ‘The Garden 1: The River and the Canal’ in Skjern river valley, from the book ‘Kulturnatur’ by Thomas Clemmensen. Source and copyright: T. J. Clemmensen.

Environmental movements and mainstream media

Preceding the term Anthropocene, the environmental movements of the 1960s became a reaction to the dichotomy between human and nature embracing an ecological approach (see Chapter 3.3). In landscape architecture and planning, one of the responses was the 1969 film “Multiply and Subdue the Earth” where Ian McHarg advocated a need for changing the perception of human dominion over nature (Hoyt et al., 1969). The film raises some of the same questions, and statements on how we as humans need to change our thinking and behaviour as we are part of nature. The same goes for the later 1982 film *Koyaanisqatsi* (Reggio, 1982), which visualises a relationship between human and nature that is out of balance. The reason for mentioning both early philosophers, scientists, landscape architects, exhibitions and films is to underline that the discussion on the dualism between human and nature has been ongoing for an extended period in diverse fields. In recent times, this human><nature tension was taken into the context of the visual and mainstream media.

As such, the framing of the Anthropocene relates to both value theory and ecological thinking. The concept of the Anthropocene provides an opportunity to change the perception of the long-term dualism, offering a conceptual foundation upon which we can discuss the intertwined human relationship with nature together with *what is of value*. Chapter 4.1, 4.2, offers a brief introduction to value theory, including that of dualisms. In summary, the Anthropocene offers a conceptualisation of the dualism human><nature in the context of landscape architecture that can be further advanced, explicating existing methods and approaches in our dialogue with non-landscape architects (see Chapter 5.3, Case 3 and Part 6.2 Reflection).

3.2.6 SUM UP - CLIMATE CHANGE AND DIVERGING INTERESTS

“Welcome to the Anthropocene. Humans have changed the way the world works. Now they have to change the way they think about it, too.”
Headline, leaders section, The Economist, 26th May 2011(The Economist, 2011)

Climate change places particular focus on Earth’s rising temperature and emissions. From this entry point, climatic change and discussions regarding the mitigation of its effects invade business spheres, including carbon fuel vs other energy sources, touching upon individual interests and common practices. Climate change entails dispute on what is good, what is valuable and what adaptation is good for (or not). For example, does nature have intrinsic or universal value or is nature a means and end to achieve other values? This, in turn, touches upon value judgments regarding whether individual gains can justify a means and ends that harm the common good. From this perspective, justifications for action are likely to diverge, and value judgments on means and ends are prone to dispute. In the Value Chapter, I further discuss value judgment and justification.

The Anthropocene in this research context- value judgments and Natural vs Anthropogenic forces

Climate change influences not only the environment that we inhabit and form part of; it also disturbs our worldviews and value judgments of human practices. These are considerations of the relationship between human and nature that have been discussed since the advent of Ancient Greek philosophy. At present, this interplay connects to the fact that we are now in the geological epoch of the Anthropocene. The epoch of the Anthropocene takes its starting point in observations in geology, pointing out that human influences have become decisively important to the Earth’s systems. From the perspective of philosophies of value, climate change in the Anthropocene questions humans’ relation to, and moreover conceptualisation of, nature. And this happens at both ontological and epistemological levels, i.e. are human beings part of nature or different from it; how do we attribute value to nature; and do humans have an obligation beyond that of human interests? In this regard, the Anthropocene also seems relevant at a conceptual level of value judgment. CA|HOW in urban landscapes is entangled with physical landscapes, which themselves are shaped by human practices and human responses to water. In this way, the Anthropocene seems an embedded premise. In this research context, the Anthropocene also relates closely to discussions within the Value Chapters, particularly the classic dualisms between, for example, human >> nature and objective>>subjective worldviews: the Anthropocene overlooks dualisms in favour of dynamic relationships, for good or bad.

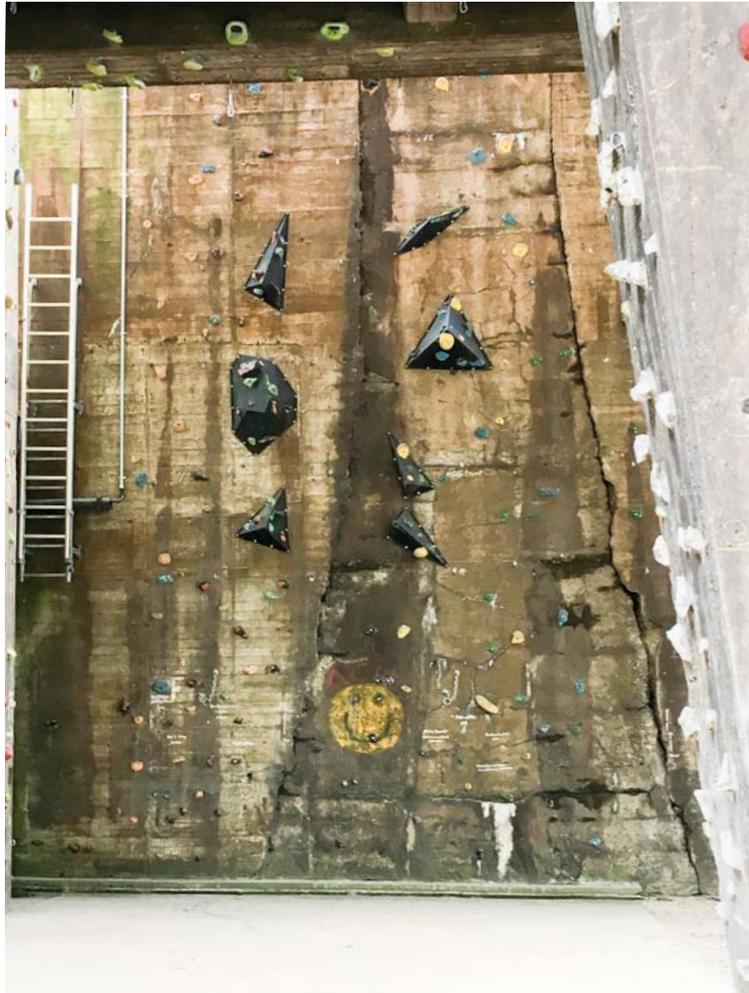
Dualisms and planning in the Anthropocene

The Anthropocene is of epistemological, conceptual and methodological relevance to LArch practices, and as a means to interpret and articulate affordances as relationships in urban landscapes. As Prominski suggests (Prominski, 2014b), LArch thinking and methods are already inclusive of bridging such dualisms, and thereby implicitly integrating a conceptualisation of the Anthropocene. However, contemporary Danish planning has not yet arrived at this conclusion, and, thus, articulating the interplay between human and non-human actors might indeed be a core element for LArch to promote in both transdisciplinary collaboration and when communicating CA|HOW and landscape affordances to a broader public.

Case experiences

During my cases, I found that there was a need to address the relationship between human constructions and natural properties. For example, how settlement patterns and material practices form an integrated part of the terrain and, thus, acting together, influence waters flow. In Cases Lystrup and Skejby, the strict planning distinction between rural and urban is challenged by increasing precipitation and human interest in protecting existing settlements through adaptation. In Case Aaby, I found that the remnants of historical blue-green passages in-between and underneath human constructions have considerable potentials for reconciling urban landscapes with increased surface water. During all of the case studies, the 'classical' distinctions present in planning, as well as how we 'see' the city and urban landscapes, seemed inadequate for the task of pointing forwards to alternative affordances relating to CA|HOW. Planning distinctions and ownership practices do not appear to promote integrated thinking regarding affordances and practices in urban landscapes.

In Case Aaby, I use the term Anthropocene at a methodological level, aiming to conceptualise the relationship between human practices and the physical environment. Here, I explore the concept as an entry into analysing landscape affordances in urban landscapes, including at the propositional level regarding how to approach sub-catchments in the urban landscapes of the Anthropocene.



Figur 3.2.31: Duisburg Nord, 2016. Post-Industrial assemblage as a reflection of the Anthropocene, concrete walls form rocks, provided with grips for climbing and former industrial-use tanks are used for diving.

PART 3 WATER

CHAPTER 3.3

GREEN INFRASTRUCTURE AND ECOLOGICAL THINKING

3.3.1 Introduction

3.3.2 Contextualisation

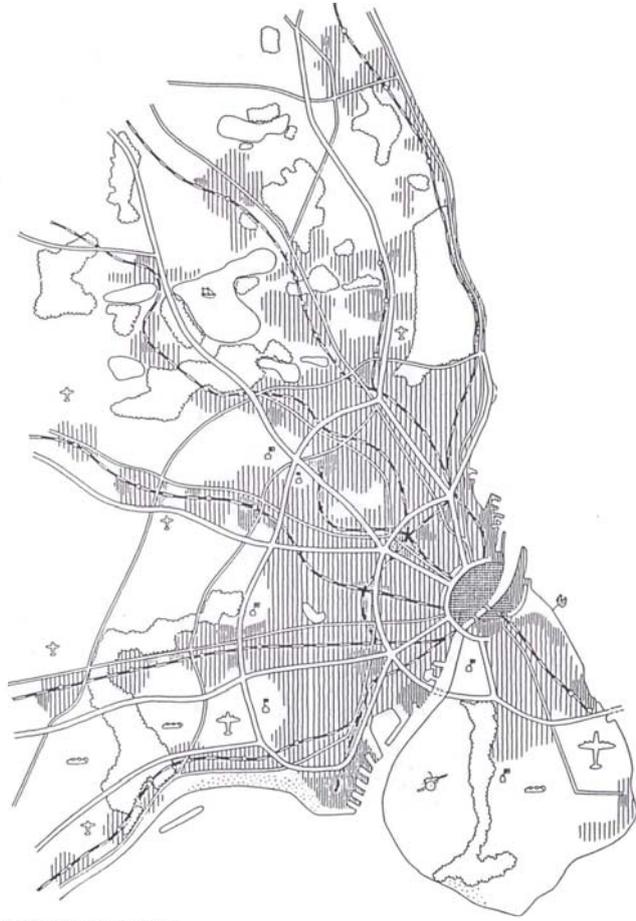
Terminology

Key concepts in green infrastructure

3.3.3 A brief history of public parks and green infrastructure

3.3.4 Linkages between public parks, green infrastructure and urban ecology

3.3.5 Sum up



Langtidspanen - en principskitse.

Svend Strandbergs optegning af Fingerplanen til "Status 1950".

P3_C3

GREEN INFRASTRUCTURE AND ECOLOGICAL THINKING

3.3.1 INTRODUCTION

GREEN INFRASTRUCTURE IN THIS RESEARCH CONTEXT

Green infrastructures can be traced back to the 19th century and are increasingly evolving around the world as a response to, among others, urbanisation and climate adaptation, with multiple benefits.

When this research began in 2013, more and more attention was being paid to surface water management in Denmark; ‘green solutions’ to handle increasing precipitation. Engaging with (surface) water demands a cross-scale approach per se, and, naturally, I was aware of relationships between the very local scale, e.g. a single property, and the larger scale, e.g. a district and town planning. However, the research objective was to take on an exploratory approach for studying opportunities for value creation that were slipping through the net in the early processes of CA|HOW-projects in everyday landscapes. In other words, the focus was not a study of green-infrastructure. Nevertheless, in the search for value creation, opportunities related to green infrastructure emerged. During the case studies, a pattern emerged: one of the highest potentials in relation to the research objective was to be found in former blue-green passages, hidden beneath the contemporary urban fabric. The case learnings pointed towards how the deep structures of the urban landscapes were disconnected, yet still held opportunities for supporting CA|HOW and value creation if re-connected into blue-green passages. This is demonstrated in Part 5 Case 1-3, Chapter 5.1, 5.2, 5.3, and reflected upon in Part 6 Outcomes. Clearly, then, the case study findings on the potential for blue-green passages connect to the concept of green infrastructures, and, therefore, this chapter offers an introduction to green infrastructures.

Structure

The following provides a brief contextualisation of green-infrastructure supported by a succinct introduction to the history of the concept and its relation to public parks and urban ecology in a Western European and US context.

Figur 4.3.1: Front illustration shows the Fingerplan of Larger Copenhagen Area as a principle sketch of the long-term plan, “Status 1950”. Source Egnsplankontoret 1947, 1; Source: (Jensen 1990, 37) BHU Skrift 2

3.3.2 CONTEXTUALISATION

TERMINOLOGY

From grey to green infrastructure

The term Green Infrastructure is somewhat new, although the concept and underlying practices have developed over more than 200 years (Benedict and McMahon, 2006). Since the 1980s, scientists and conservationists have proposed that ecosystems are included within the term infrastructure. Before this, infrastructure denoted human network constructions and assets provisioning goods and services. In 1984, a group of scientists proposed the term Ecological Infrastructure as one of five principles to guide ecological city planning (Silva and Wheeler, 2017). The term green infrastructure was coined in 1994 as a response to the acknowledged term ‘grey infrastructure’, which in water management denoted piped, often undergrounded, infrastructural measures (Firehock, 2010), and by 2004 this term became dominant. (Silva and Wheeler, 2017). In Europe, however, green infrastructure is still often named Green-structure or Urban Green-structure (Werquin et al., 2005). Regardless, as the term green infrastructure is becoming the most commonly used, I refer to it as green infrastructure or GI, denoting blue-green infrastructural systems.

In 2006, the concept of green infrastructure was further clarified by a working group under The [American] Conservation Fund and mainstreamed in the associated publication by Benedict and McMahon, *Green Infrastructure – Linking Landscapes and Communities* (Benedict and McMahon, 2006). They provided a definition of green infrastructure which is still widely accepted: “*Green Infrastructure: Our world’s natural life-support system – an interconnected network of waterways, wetlands, woodlands, wildlife habitats, and other natural areas; greenways, parks, and other conservation lands; working farms, ranches, forest; and wilderness and other open spaces that support native species, maintain natural ecological processes, sustain air and water resources, and contribute to the health and quality of life for communities and people.*” (Benedict and McMahon, 2006, pp. 281–282). As seen in Benedict and McMahon’s definition, green infrastructure covers a rather broad field, encompassing a wide range of terminologies and differences in its application and scale. Common typologies are urban forests, constructed wetlands and green belts. Sometimes, smaller scale measures¹ such as green roofs or walls seem to be also included under the term.

ecology, oecology /iːkəˈlɒdʒi/ (bot.) study of the relations of plants and animals with their habitat. XIX. – G. *ökologie* (Haeckel), f. Gr. *oikos* house (used for ‘habitat’) (cf. *wick*?); see *-LOGY*.

eco-logical /iːkəˈlɒdʒɪkəl/ *NAMES* /ˈlɒdʒi/ *adj.* **1** connected with the relation of plants and living creatures to each other and to their environments: We risk upsetting the ecological balance of the area. **2** an ecological disaster (= one that alters the whole balance of ecology in an area) **2** interested in and concerned about the ecology of a place: the ecological movement **adv.** *ecologically* /ˈkɪl/ *adv.* The system is both practical and ecologically sound. **ecologist** /iːkəˈlɒdʒɪst/ *NAMES* /iˈkɒl-ɪ/ *noun* **1** a scientist who studies ecology **2** a person who is interested in ecology and believes the environment should be protected. **ecology** /iːkəˈlɒdʒi/ *NAMES* /iˈkɒl-ɪ/ *noun* [u] the relation of plants and living creatures to each other and to their environment; the study of this: *plant/animal/human ecology* *o* the ecology movement *o* Oil pollution could damage the *fragile ecology* of the coral reefs.

eco-system /iːkəʊsɪstəm/ *NAMES* /iˈkɒu-ɪ/ *noun* all the plants and living creatures in a particular area considered in relation to their physical environment

¹ In this research context, I do not consider green walls or roofs green infrastructures, unless they provide a larger-scale, coherent connectivity, beyond the single property, as a green wall itself is an ‘off the grid’ measure rather than an infrastructure.

Figur 4.3.2: Fig. XX Etymology ecology, ecological, ecosystems. Top: Oxford Dictionary of Etymology (Onions, Friedrichsen, and Burchfield 1996; Hornby and Wehmeier 2009). Middle and bottom: Advanced Learners Dictionary.

KEY CONCEPTS IN GREEN INFRASTRUCTURE

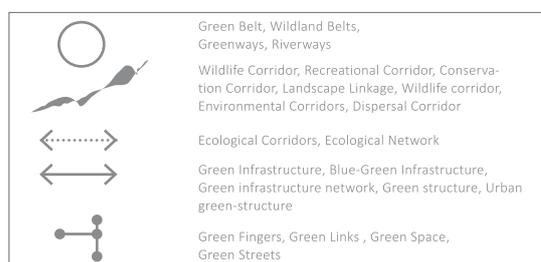
Green-spaces as components in green infrastructure

Fig.4.3.3 provides a non-exhaustive, roughly categorised listing with examples of the different terms for 'green' components that can form part of, or develop into, green infrastructure, such as a green space, park, street or recreational corridor. These do not, however, necessarily provide a green infrastructure in or by themselves (Benedict and McMahon, 2006, pp. 280–285). For example, a greenway takes its departure point in recreation, whereas a green infrastructure originates in ecology. According to Benedict and McMahon, green infrastructure may often, however, take its starting point in, e.g. a greenway, which is then further developed into green infrastructure, inclusive of further benefits (Benedict and McMahon, 2006, p. 35; Hellmund and Smith, 2006, pp. 2–3). At a general level, what connects these components is their configuration as infrastructural bands of 'green' (vegetation) using 'nature' as the foundational approach and focusing on achieving multiple benefits at an infrastructural and societal level.

Green infrastructures as multipurpose networks

Drawing on the work of Jack Ahern, green infrastructure is defined as a land-based network that makes use of natural processes to provision for human (cultural), biotic and abiotic needs. It is a multifunctional and multipurpose approach that supports both ecological and cultural values. A widely accepted resource model used in landscape planning and GI is the ABC (Abiotic, Biotic, Cultural), which takes its starting point in the relations between human, biotic and abiotic systems (Ahern, 2007, p. 268). Green infrastructure originates from ecological goals (Benedict and McMahon, 2006, p. 15), implying long-term time perspectives, cross-scale geographic implications, and multi-functionality attached to land use. As such, the term green infrastructure covers a broad span of strategic approaches to using 'green' systems while serving human interests. Substantial work on assessing ecological benefits is being carried out with attention on creating multiple values through green infrastructure. Some important factors in this endeavour are size, diversity, and distribution, together with their design and how they are managed (Werquin et al., 2005, p. 135). According to Benedict and McMahon, the concept is inherently interdisciplinary, evolving from various disciplines and rooted in studies of land and the relationship between human and nature (Benedict and McMahon, 2006, p. 23). Moreover, Jack Ahern is explicit in his belief that Green Infrastructure planning has to be practised in a trans-disciplinary manner (Ahern, 2007, p. 282).

Figur 4.3.3: shows examples of different names for green strategies that can form part of, or which designates, green infrastructure. In addition to this, comes the specific blue-approaches, such as LAR /- WSUD – Water Sensitive Urban Development, Sponge City, Water-centric cities, which do/can form a foundational element in green infrastructure strategies- or vice versa.



Green infrastructure and ecosystem services

"[Green Infrastructure is] a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas. On land, GI is present in rural and urban settings."(European Commission, 2013, p. 3)

Green infrastructure is often described as an ecological framework with social, environmental and economic benefits, thus supportive of the three E's of the Brundtland Report of 1987². The European Commission provides a definition of Green Infrastructures in the above quote, with attention paid to environmental features and ecosystem services. Multimodality, expected multiple benefits and the need for assigning land to provide green infrastructures all generate a focus on measurable results and the cost-benefits of green infrastructure. As the departure point is in ecological functions as systems, thus ecosystems, green infrastructure is often closely tied to ecosystem services. The Millenium Ecosystem Assessment report of 2005 describes ecosystems as *"the dynamic complex of plant, animal, and microorganism communities and the nonliving environment interacting as a functional unit"*, whereas *ecosystem services are the benefits derived from such an ecosystem; benefits on which humans are 'fundamentally dependent'* (Program 2005, 5).

Ecosystem services³ are an important part of the EU's strategy and policies on green infrastructure, as the notion allows a quantitative translation of the wide span of benefits that can be achieved from green infrastructure into pecuniary terms of 'investment', thus a standard of measurement comparable to other investments. In this sense, ecosystem services benchmark and measure, supporting decision-making by, e.g. municipalities and professionals, as they provide a monetary valuation, translating natural assets into the same currency as other concerns of local governments (Ahern et al., 2014, p. 254,256). Ecosystem services also provide performance indicators that can link planning, designing and management *'in a spatially explicit manner'* (Ahern, 2013, p. 1212). However, it is beyond the scope of this research to go further into this topic. Part 4 Value, Chapter 4.2, touches upon how the standard measurement of 'nature' as provided by ecosystem services can be disputed when considering different attributions of value.

2 Environmental protection, Economic growth, Social equity

3 The Millenium Ecosystem Assesment 2005, defines ecosystems in 4 categories wherein the Supporting services are considered as fundamental to the others: Supporting services, e.g. soil formation, photosynthesis, and nutrient cycling / Provisioning services, e.g. food, fresh water, fiber, fuel, (genetic resources, biochemicals, natural medicines, pharmaceuticals) / Regulating services e.g. air quality, climate, water and erosion regulation, water purification, waste treatment, disease- and pest regulation, pollination and natural hazard regulation / Cultural services, e.g. services that provides spiritual-, religious-, aesthetic-, educational and recreational benefits/values.

The European Environment Agency and Landscape Convention on green infrastructure

“GI [green infrastructure] is a successfully tested tool for providing ecological, economic and social benefits through natural solutions. It helps us to understand the value of the benefits that nature provides to human society [...]” (European Commission, 2013, p. 2)

Currently, 60% of the EU population live in urban areas, and the European Environmental Agency (EEA) states that green infrastructure solutions have an important role to play in urban areas. In line with this, EU has policies targeted at developing green infrastructures, expected to benefit individual and communities at physical, psychological, emotional, and socio-economical levels. The multiple benefits relate to, e.g. health (clean air, water quality), a greater sense of community and civil society, the combat of social exclusion, education, climate adaptation, mitigation, and the boosting of biodiversity. Green infrastructures are expected to have the potential to strengthen urban development, including at a regional scale, with attention to the connection between rural and urban areas. The EEA also addresses values such as job creation and ‘*appealing places to live and work*’, with GI forming part of ‘*protecting, conserving, and enhancing the EU’s natural capital*’ (European Commission, 2013, p. 4; European Environment Agency, 2017). In this way, the benefits of GI expected by the EU cover a broad span of values. Moreover, the European Commission on Environment considers GI important in flood management, referring to the Natura 2000 network as a central part of the European green infrastructure (Europakommisionen, 2010; Jørgensen et al., 2016; Thorén and Jørgensen, 2016; Thorén and Ruggeri, 2016). From this departure point, GI strategies are important to support other key policies in the EU. Furthermore, it is stated that it is a cost-effective strategy⁴ (European Commission, 2013, p. 3). This relates to the focus on ecosystem services as a means to calculate the (pecuniary) benefits gained from sound ecosystems.

“The European Landscape Convention commits the signatory states to emphasize the development and protection of urban green in order to enhance the quality of life and well-being of the population. It states that a qualitative urban landscape supports European values like democracy and human rights, and that the authorities have a special obligation to increase the awareness of the value of the urban landscape.” (Jørgensen et al., 2016, p. 13). According to Jørgensen, principle issues in the current European Landscape Convention resemble the agenda of the attribution of values achieved through public green spaces suggested by C. C. L. Hirschfeld in the 1790s (see the quote, section 3.3.3). Jørgensen mentions; (1) the promotion of landscape as part of a common, shared, local heritage and identity; (2) the understanding of landscape as a crucial factor contributing to well-being and quality of life; (3) the principle of the right to engage and take part in landscape development (Jørgensen et al., 2016, pp. 13–15).

⁴ The European Commission refers to a cost-benefit ratio of approximately 3-75

3.3.3 A BRIEF HISTORY OF PUBLIC PARKS AND GREEN INFRASTRUCTURE

THE PUBLIC PARK AS A PREDECESSOR OF GREEN INFRASTRUCTURE

" [...] a wise civic government can establish special places for public walks, either within the city or close to its gates. Such areas are intended for exercise, enjoyment of the open air, recuperation from workday activities, and congenial conversation [...]. Public gardens should be regarded, according to sound principles of the authorities, as a necessity for any city dweller. [...] by approaching each other more closely, the different classes improve themselves in the seemliness of their manners and their confident reserve as well as in friendly courtesy and sympathetic engagement. Here, unimpeded, everyone attains the right to rejoice in nature." Quote by Hirschfeld 1779-1785, edited and translated by Parshall (Hirschfeld and Parshall, 2001, pp. 406–407)

In 17769-1785 the Danish-German professor in history and arts, Christian Cay Lorentz Hirschfeld, proposed the concept of public parks (Volksgärten), in his book *The Theory of Garden Art* (Hirschfeld and Parshall, 2001). Although Hirschfeld was addressing garden art, he conceptualised the public park as a place for educational and social purposes, where different 'classes' should approach each other to develop understanding and tolerance. (Jørgensen et al., 2016). The reason for mentioning the rise of the public park in this research context is to emphasise the longer trajectory of denoting multiple values to public, green areas, as also seen in the later concept of green infrastructure.

During the 19th century, public parks were developing in most major European cities in response to increasing urbanisation and poor living conditions for the many. A (green) public park was considered 'nature', as opposed to urban, the city. The public park was attributed with values relating to democracy, as an acknowledgement of the public beyond the concept of classes, as well as expected to provision positive influence on, e.g. hygiene, general morale, and cultural values. Public parks became the vehicle for access to 'nature', offering recreation, and enabling urban residents to escape stressful urban environments. This was also a relevant subject in America. As an example, the physician John Rauch, gave a talk in 1868, named: "Public Parks: Their Effects upon the Moral, Physical, and Sanitary Conditions of the Inhabitants of Large cities: With Special Reference to the City of Chicago" (Ranney, 2004, p. 45).

The public park specifically attributed, sought and constructed plural values in urban landscapes through the means of 'nature' in urban contexts. In this way, the concept of public parks evolved as the 'healing' counter to increasing urbanisation and the massive societal changes triggered by industrialisation.

Interconnected park systems

“In Buffalo and Boston, Olmsted also expressed urban precedents for the “hubs” and “links” composition to which green infrastructure networks aspire.” Quote, Eisenmann (Eisenman, 2013, p. 298)

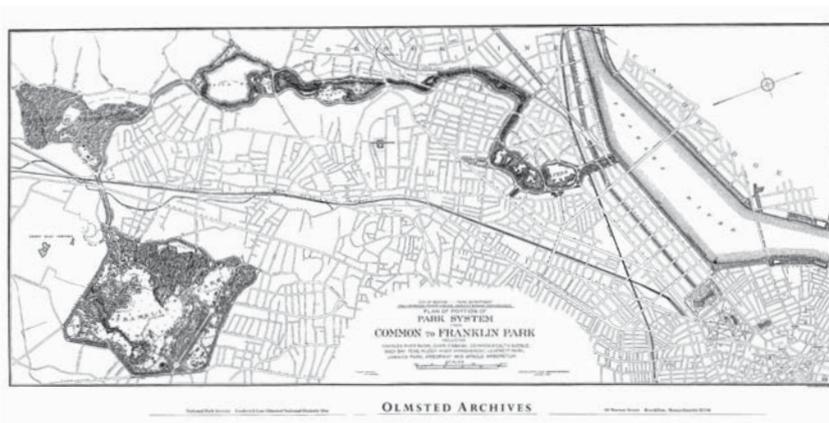
Today, the most renowned early examples of large park systems, relating to green infrastructure, are those of Frederick Law Olmsted. Karsten Jørgensen even describes Olmsted’s work as being a 19th-century program for future green structure planning (Thorén and Jørgensen, 2016, p. 18). In the mid-19th century, Olmsted was in Europe, where he visited the public Birkenhead Park in the UK, designed by Joseph Paxton. F. L. Olmsted was inspired by the combination of its social and aesthetic values, integrated as democratic spaces within the English Garden tradition. F. L. Olmsted believed in that *“by providing people with opportunities to come together in healthful outdoor settings, he could encourage a democratic community and help to civilize America”*, Quote Ranney (Ranney, 2004, p. 43). In his work, F.L. Olmsted integrated traffic separation, the use of native species, concepts for water management, and combining floodwater storage and recreation, while also addressing water quality, and particularly, the larger-scale concept of interconnected park-systems. For example, Boston’s The Emerald Necklace, including the Fens and the Back Bay in Boston, was the first metropolitan scale park system, combining environmental design with urban planning. (Spirn, 2000, pp. 305–306). This was the world’s, presumably, first constructed⁵ wetland, where F. L. Olmsted used plant species for brackish water in a former salt marsh as a direct development of the original conditions (Spirn, 1984, pp. 147–148) (Rawson, 2014). In this way, the large park systems also became a means to improve urban life outside the physical space of the parks too. Despite being established in the second half of the 19th century, the results remain exemplary, including the renowned Central Park in New York, and the large park systems, such as the Emerald Necklace, and Chicago’s South-Park System (Beveridge et al., 1995; Spirn, 1995; Stevenson, 1977; Zaitzevsky, 1982). Today, the works by F.L. Olmsted have been showcases for almost 150 years, thus providing insights into the long-term perspectives and benefits of park-systems.

⁵ Since industrialisation, urban development has often utilised low- and wetlands areas to reclaim dryland through fill-and-drainage strategies to expand the possibilities of areas for urban settlement, thus the reconstruction of wetland represented the opposite approach

Greenways and the environmental movement

Since the nature conservation/restoration movement of the 19th century, emergent benefits from public parks for the recreation of the workforce and the larger scale project for providing recreational park-bands have developed considerably in the US (Eisenman, 2013; Ranney, 2004; Spirn, 2000). From the early 20th century and onwards, Europe has also implemented larger-scale green belts (Jørgensen, 2016). What is more, in the 1970s, an approach of 'ecological networks' emerged (Benedict and McMahon, 2006, p. 33), demonstrating a further focus on systems-thinking and going beyond the notion of green.

The greenways movement particularly influenced an attention to landscape development. Benedict and McMahon describe six milestones of the green infrastructure development. The three first, starting in the 1850s with the writings of Henry Thoreau and George Perkins Marsh (*Man and Nature*), the introduction of 'greenbelts' in the UK, and the concept of linked park systems, as designed by Frederick Law Olmsted (Benedict and McMahon, 2006; Eisenman, 2013; Spirn, 2012). The fourth milestone is what Fabós describes as the post-war environmental decades (Fabós, 2004), recognised as the period of the landmark books of Rachel Carson's '*Silent Spring*', which catalysed broader environmental awareness, alongside Ian McHarg's '*Design with Nature*'. In this development, Aldo Leopold's book of 1949 '*A Sand County Almanac*' also became influential for viewing humans and nature as interconnected systems and seeing the land as a living organism by envisioning communities 'that embraced all the living things within it' (Benedict and McMahon, 2006, p. 29). According to Benedict and McMahon, since the 1990s there has been 'growing emphasis on linkages' and scale, landscape patterns and processes as well as participatory consensus and decision-making in the approaches to green infrastructure (Benedict and McMahon, 2006, p. 25).



Figur 4.3.4: The 1894 Plan for part of the interconnected park-system 'The Emerald Necklace' in Boston, designed by F. L. Olmsted. Source: Wiki Commons, by the National Park Service Olmsted Archives, Boston Park Department & Olmsted Architects.

Early green infrastructure in a Scandinavian context

“An overall plan for the development of a larger city is naturally a highly complicated piece of work, much as living in a city is complicated in itself. All conditions are related and affect each other. One cannot plan one part of the city without engaging the planning of other parts of the city.” opening quote ‘The intention of the proposal’, *Fingerplanen*, Steen Eiler Rasmussen 1947 (*Egnsplankontoret*, 1947, p. 9), authors translation⁶.

One of a few examples of early Scandinavian ‘green infrastructures’ which still influence planning today is the Norwegian 1934 Oslo plan for a green corridor network. Another is Sweden’s Park Program as developed in 1938, which was an important green urban element that aimed to provide an array of positive benefits to the urban environment, such as climatic effects, functional and social values and the promotion of the preservation of cultural and natural monuments (Jørgensen, 2016, pp. 13–19).

In Denmark, the most renowned example relating to green infrastructure is The Proposal for a Regional Plan for the Larger Copenhagen Area⁷ of 1947: “The Finger Plan”. The Fingerplan was a development planning framework for the larger Copenhagen area. It was a strategy to support growth (buildings, road infrastructure) while also accommodating ‘free stretches’ of green in between the urban fingers’, enabling urban residents to have access to recreation and nature. The plan was never officially approved, but nevertheless proved highly influential to the urban development of the greater Copenhagen area (*Egnsplankontoret*, 1947, p. 3; Jensen, 1990, p. 4). Today, 70 years later, the plan is still referred to, and it covers a comprehensive area (at least in a Danish context), affecting land use in 34 municipalities (*Egnsplankontoret*, 1947; “Fingerplan 2013- Landsplandirektiv for hovedstadsområdet planlægning,” 2013, “Hvad er fingerplanen?,” 2017; Jensen, 1990; Johansen and Juul Møller, 2016).

A more recent Danish example, relating to blue-green infrastructure, is the Copenhagen Cloudburst Plan, framed as Green Climate Adaptation, and showcasing the Copenhagen Climate Quarter⁸, which aims to support urban life by promoting public spaces, biodiversity, remediating urban heat islands, accommodating bicycling, regenerate vulnerable neighbourhoods, and so forth (see Chapter 3.4 Best Practice Examples).

6 “Hensigten med skitseforslaget”, indledning Steen Eiler Rasmussen. “En samlet Plan for en hel Storbys Udvikling må naturnødvendigt blive et meget kompliceret Arbejde, ligesom Storbysamfundet selv er kompliceret. Alle Forhold hænger sammen, griber ind i hinanden. Man kan ikke Planlægge én Del af Byen uden at beskæftige sig med Planlægningen af de andre bydele.”

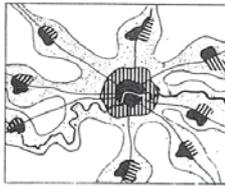
7 Forslag til Egnsplan for Storkøbenhavn

8 <http://klimakvarter.dk/> <http://tredjenatur.dk/portfolio/klimakvarter/>

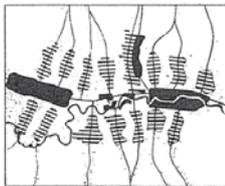


Soria y Mata:
Forslag til "Linearby" der for-
binder to eksisterende Byer.

LONDONS FREMTIDIGE BYTYPPE -
to af de foresatte Forslag.
(Fra "Towards a new Britain")



Planetbyssystem



Båndbyssystem



Byspredning paa længere Sigt -
efter en 50 Aars Plan.
(Fra Saarinen: "The City".)



Figur 4.3.5: Left: The Fingerplan was based on principle discussions and standpoints on urban development of 'Storby Regioner' (larger city regions), e.g. by comparing existing European cities and concepts of urban development, such as the Planet City system, the Linear City, and the Band City. Right: The Fingerplan front cover of 1947. Source: Egnsplankontoret 1947, p.1, 25

3.3.4 LINKAGES BETWEEN PUBLIC PARKS, GREEN INFRASTRUCTURE AND URBAN ECOLOGY

Including processual thinking

From the perspective of urban landscapes, there is a related trajectory between the development of ecology and public parks/urban green leading to what is today framed as green infrastructure, tied together by the changing landscape practices of industrialisation and increasing urbanisation. The below is a brief outline of the thinking and conceptualisation of ecology, spanning from classification and entities to processes (Spirn, 2012, p. 8), which occurred during the same period as the emergence and elevation of public parks.

The scientist Alexander von Humboldt (1769-1859) became highly influential due to his writings in the early 19th Century, articulating an understanding of the Earth as a whole system. His works inspired numerous other renowned scientists and writers of the 19th century, such as Henry Thoreau (*Walden, Life in the Woods*, 1854), Charles Darwin (*The Origins of Species* 1859), and the father of nature conservation George Perkins Marsh (*Man and Nature*, 1864): all of these influential thinkers engage with the interplay between humans and nature (Skage, 2016; Wulf, 2017, 2015). In 1866, the German zoologist Ernst Haeckel coined the term ecology⁹ to denote the relationships between living things and their environment. The Danish botanist Eugen Warming was among the earliest ecologists, introducing the ecology of plant societies in the late 19th century¹⁰, leading to the founding of ecology as a discipline. According to Martin Odgaard, *landscape ecology* in its current form of field and conceptualisation can be traced back to the German geographer and botanist Carl Troll¹¹, who coined the term in 1939 (Odgaard, 2014, p. 63). Ecology and ecological thinking connect to the concept of ecosystems. Inspired by E. Warming, the eco-system concept was introduced in biology by the British botanist Sir Arthur Tansley in 1935 (Spirn, 2012, p. 4). From Tansley's first description of ecosystems as the 'transfer of material between organisms and their environment', he refined the conceptualisation as a 'whole systems approach' inclusive of humans, human-generated processes and structures. Pickett and Cadenasso emphasise that what is important about the ecosystem concept as framed by Tansley is that it goes beyond the dualism of human and nature, being inclusive of humans, human processes, as well as their artefacts:"[...] in his seminal definition, [Tansley], *was at pains to emphasize that ecologists should study ecosystems that incorporate humans and human-generated processes and structures.*" (Pickett and Cadenasso, 2002, p. 2).

9 As the word Ökologie, in Haeckels book 'Generelle Morphologie der Organismen'

10 Warming, E. (1895) *Plantefamfund - Grundtræk af den økologiske Plantegeografi*

11 *The Geographic landscape and its Investigation*, 1950

Pickett and Cadenasso's Three Tides in Urban Ecology

To provide an overview of the development of ecological thinking with relevance to landscape architecture, I draw upon Pickett and Cadenasso, who provide an overview of the development of urban ecological science as three 'tides' during the 20th century (Pickett and Cadenasso, 2013). The 1st Tide was during the 1920s, when Tansley coined the term ecosystem, and a few years later, the urban sociologists Robert Park and Ernest W. Burgess applied the ecological concept to the urban area, with a focus on space and social differentiation in the city. This resonated with biological ecology. The 2nd Tide was in the 1960-70s. Here, the biologists Howard and Eugene Odum developed the ecosystem concept into an area of research, making it a paradigm in ecology, seeking '*to understand the reciprocal metabolic connections between biological and physical systems*' (Pickett and Cadenasso, 2013, pp. 35–37). This developed into the budgetary approach, now fundamental to ecosystem science, and gave rise to industrial ecology and urban metabolism. The 2nd Tide contributed to how the 3rd Tide conceptualises the city as an ecosystem, which is central to urban ecology. The 3rd Tide gathered pace during the 1980s and remains ongoing. The 3rd Tide attempts to bridge '*social and biological knowledge, and it acknowledges the spatial heterogeneity and fine-scale dynamics as a feature and cause of urban change*' (Pickett and Cadenasso, 2013, p. 39).

3.3.5 SUM UP

INCREASING URBANISATION AND THE RISE OF PUBLIC PARKS AND ECOLOGICAL THINKING

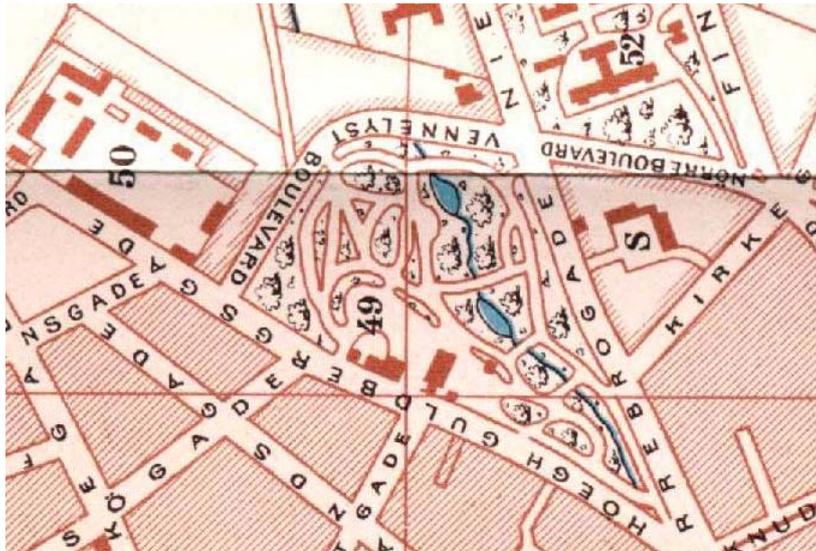
Green infrastructure is rooted in ecosystem thinking, meaning that dimensions beyond, e.g. recreation or conservation, are required in order to qualify as green infrastructure. Isolated efforts, short-term solutions or smart-growth do not in themselves qualify as green infrastructures either (Benedict and McMahon, 2006). Nevertheless, historical Greenways can be exemplary green infrastructure that integrates ecological thinking (Hellmund and Smith, 2006).

During the 19th century, many Western cities provisioned public parks. This was in response to rapidly growing urbanisation, new industrial practices in both rural and urban areas, together with deficit side effects to human living conditions in the western cities of the late 18th to early 20th century. Public parks aimed to create multiple benefits for urban inhabitants, particularly through recreation and opportunities for socialising in green, public areas, under the notion of 'nature'. In the same period, the understanding of nature and the relationship between humans and nature was changing too, and early ecological thinking was developing. Ecology was rising, firstly, as a conceptual understanding of the world as being connected at a larger systems scale, as opposed to, e.g. a taxonomy or classifying single organisms. With the conceptualisation of ecosystems, the dichotomy between human and nature dissolved, at least in theory. The synchronisation between increasing urbanisation/Industrialisation, the development in ecological thinking, and the rising of public parks, leading to greenways and green infrastructure has been formed through the continuous exchange of knowledge between, e.g. biology, psychology, geography, nature conservation and sociology. This also extends to landscape architects who, using theories from different fields and professions, have transported this conceptualisation and knowledge into landscape design and planning.

The development from public parks to formalised policies on the benefits of green infrastructure, e.g. in the European Landscape Convention, represents some fundamental aspects of what is considered of value. Today, green infrastructure is a growing field, often deeply connected to ecosystem services and the attribution of value, referring back to the expectations of values provided by green, public spaces, as formulated in the late 18th century. For example, the emphasis on multi-functionality and the attribution of values at different levels, e.g. physical health, mental health and stress, culture, morale, the need for 'nature' and the promotion of tolerance and democracy together with water management and concerns for biodiversity

The acknowledgement of the influence of urbanised areas over much larger tracts of land than they actually cover, requires a systems-thinking

approach towards landscape practices, relating to that of ecological thinking. Taken together, the trajectory of public parks and green infrastructure represents landscape-based efforts for responding to the conditions produced by increased urbanisation and changing land-use practices. The spatial answer was the provisioning of public green spaces with an array of functions and sensory experiences via planning land use for the common good. With climate change and further urbanisation, this might be more important than ever.



Vennelyst Park

Cathedral

Aarhus Stream



Figur 4.3.6: From wetland grazing to private investment to public park: the 'Vennelyst Parken' is the oldest park in Aarhus. Until 1824, it was a swampy area, serving local farmers as public grazing for cows. By 1824 the private entrepreneur Høegh Guldberg rented the land and established a private park with events. The park had an entrance fee. By 1957 the area became part of the Aarhus University Campus, renowned for its buildings, designed by architect C. F. Møller, and the park area by landscape architect C. Th. Sørensen. Sources: HMB map: GST, map 1914: Aarhus Wiki, photos: Gustaf Lohm

PART 3 WATER

CHAPTER 3.4

THE MEASURES -BEST PRACTICE EXAMPLES

3.4.1 Introduction

3.4.2 Examples of contemporary international Best Practice built projects

3.4.3 Examples of contemporary Danish Best Practice built CA|HOW
projects

3.4.4 Sum up



P3_C4

THE MEASURES - BEST PRACTICE EXAMPLES

3.4.1 INTRODUCTION

ABSTRACT

This chapter provides an overview of a small selection of contemporary¹ best practice examples related to value creation in urban landscapes in the context of changing waterscapes of the Anthropocene. The overall aim of this chapter is to provide a few best-practice examples of real-life projects with related research themes and approaches as this thesis. The examples are though, high profiled projects, as opposed to the starting point of this research. The selected examples draw on international and Danish best practice built projects at different scales, spanning from local design measures, urban regeneration and larger scale landscape strategies. The 'Fresh Kills Park' project by James Corner and Field Operations is possibly the most well-known and referenced ecological design project (Please see Chapter 1.2), and many more projects could, obviously, be added.

However, the examples were selected based on their relevance to the research objective and the themes laid out in Chapters 1.2 (landscape architecture and urban landscapes), 2.1 (methods), 3.2 (climate change and the Anthropocene) and 3.3 (green infrastructure). While mentioning some projects in Asia, mostly projects in Denmark and Northern mainland Europe as well as Seattle² and Portland in the US were included. Some of the projects have rainwater management as starting point without explicitly stating climate adaptation as such. Other selected projects exemplify integrated climate thinking in the Anthropocene, without necessarily stating this.

What connects the examples and, which formed the basis for their inclusion, is that they represent at least three of the following four characteristics: (a) The project represents thinking/making in the Anthropocene (whether stated explicitly or not), thus integrating notions of human-nature and challenging nature-urban dichotomies; (b) The project showcases climate adaptation measures about water in urban landscapes, while simultaneously embracing value creation to the public beyond water management itself; (c) The project represents an approach of 'making peace with water', as opposed to a defensive approach; and (d) The project is located at a polluted or low-profiled site in urban landscapes, turning these into more ecologically diverse areas for the common good.

Structure

Firstly, a few examples are provided on best practice built projects in an international context. These are then followed by a few Danish climate adaptation projects implemented during the time-scale of this research.

¹ Mainly 21st Century projects

² During the PhD study, I had a brief stay as a visiting scholar in Seattle, University of Washington/ Green Futures Lab, setting up informal meetings with local stakeholders and making numerous field trips to the green street projects in Seattle and Portland.

3.4.2 EXAMPLES OF INTERNATIONAL BEST PRACTICE BUILT PROJECTS

GREEN INFRASTRUCTURES – UPSCALING, DOWNSCALING

Green streets and rain gardens in Seattle and Portland

Seattle Green Streets³ and the Portland Green Street program⁴ are visionary strategies, representing a strategic city-scale approach, where the green streets function as the blue-green infrastructure of the urban watersheds. The Green Streets programs are using the connectivity between smaller scale measures and scaling this up to the level of the urban watershed⁵ at a district level, and vice versa. In both cities, the Green Streets provide multiple benefits, described as increasing urban green spaces, improving air quality and reducing summer air temperatures, replenishing the groundwater reserves, diminishing Combined Sewer Overflows (CSO), improving water quality, promoting community building and enhancing local sensory/aesthetic sensations (Lukes and Kloss, 2008; Sterrett et al., 2015).

The initial driver in the Seattle Green Streets project was the Environmental Protection Agency⁶ (EPA) because stormwater run-off and CSOs threatened salmon species in the Puget Sound, hence meeting the EPA's regulatory response became the driver of the departure of the project (Rottle, 2015). The need for climate adaptation further strengthened the initial strategy, and it was, also, developed into promoting cycling. The author's own field trip (non-statistical) 'snapshot' experience suggests that Seattle Green Streets showed higher numbers of pedestrians and bicycles than neighbouring 'non-green streets'. Another cross-scale initiative in Seattle is the '12.000 Rain Gardens⁷ in Puget Sound'. In a Danish context, a goal as high as 12.000 rain gardens is in itself a remarkable and ambitious approach and interesting as a bottom-up, up-scaling approach. Another example is Portland Green Streets Program⁸, (Ahern, 2013, p. 1208; Rottle, 2015) which supports a 'Green Street Steward Program⁹' initiative, as a community-based involvement of residents who maintain the Green Street Right-of-Way areas. The Portland approach promotes citizen participation and sense of ownership towards public areas and the common good as well as lessening public expenses on maintenance-related issues. From a Danish perspective, this co-creation is highly interesting.



3 <http://streetsillustrated.seattle.gov/urban-design/green-streets/green-street-locations/>
http://www.seattle.gov/dpd/cs/groups/pan/@pan/documents/web_informational/p2205694.pdf

4 <https://www.portlandoregon.gov/bes/article/414873>

5 As a contextual note; Seattle provides a very accessible, online overview of its urban watersheds, which is very different from the notion and communication of watersheds in DK.

6 United States Environmental Protection Agency

7 <http://www.12000raingardens.org/>

8 <https://www.portlandoregon.gov/bes/45386>

9 <https://www.portlandoregon.gov/bes/52501>

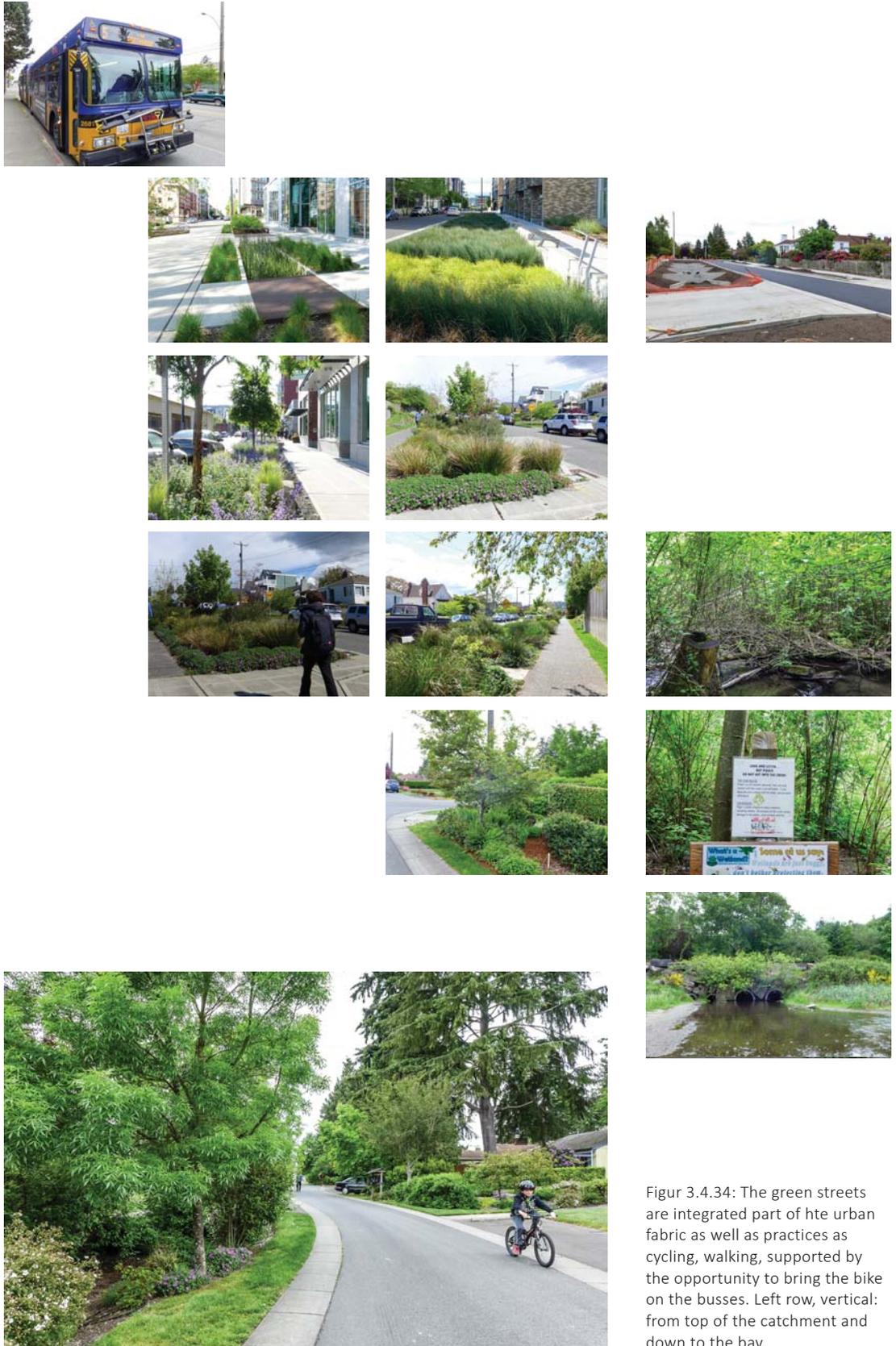
Figur 3.4.32: The threatened salmon, which started it all, seems as an important part of the urban identity

GREEN STREETS Portland, Oregon



Figur 3.4.33: The green structures are interated in public areas, such as busstops, public benches, and roundabout raingardens, as well as offering space for pedestrians and cyclists.

GREEN STREETS
Seattle, Washington



Figur 3.4.34: The green streets are integrated part of the urban fabric as well as practices as cycling, walking, supported by the opportunity to bring the bike on the busses. Left row, vertical: from top of the catchment and down to the bay.

CITIZEN INVOLVEMENT



Figur 3.4.35: Walking the Green Streets in Portland tells of a impressive level of citizen involvement- both as initiatives and with regard to maintenance. Top right: This is not a raingarden, but the owner decided to take care of the ROW to make it lush. From a Danish perspective, this is highly inspirational.

GREEN INFRASTRUCTURE – RESTORING URBAN WETLANDS AS PUBLIC RECREATIONAL AREAS IN PORTLAND

Smaller scale measure – urban recreational area

At a smaller scale in Seattle, is the Tanners Spring Park which was designed by Atelier Dreiseitl and is a public recreational area in a former industrial district, regenerating as a popular mixed-use Portland downtown area. The location was formerly a wetland at Tanner Creek, close to the Willamette River. Little springs in the area have been daylighted, and biodiversity is prioritised, integrating humans, flora and fauna in the same space (Dreiseitl and Grau, 2009)(field trip spring 2015). On my fieldtrip, the park seemed very popular as a spot for urban recreation for different age groups, showcasing how different values and processes related to water, biodiversity and urban life can coexist in city centre.

Medium scale measure – restoring floodplain and reversing human settlement patterns

At a more medium scale is the Foster Floodplain Natural Area in Portland, which is a restored floodplain at the Johnson Creek. The area is next to a primary road into Portland with an industrial area on the other side of the road. Before the measures, the area regularly flooded, and the neighbouring industrial area caused polluted run-off water. The public Foster Floodplain Natural Area represents flood control together with restoration planning. It is now a public area with emphasis on biodiversity. What is particularly interesting is the 'Willing Seller Program', a strategy of buying out willing residents to change the land-use from residential to 'nature'. Thus, this is an example of a strategy of reversing urbanisation and making 'nature the partner' in the city's urban development (Sterrett et al., 2015, p. 224)(Sterrett et al., 2015, pp. 217–229) (field trip spring 2015, meetings with Kaitlin Lovell, Ivy Dunlap: Bureau of Environmental Services, Portland). In a Danish context, this would (still) be considered a radical approach. However, it is likely an approach which needs to be discussed in the near future, as Denmark also experience recurring flooding in some urban areas.

**TANNER SPRINGS PARK,
PORTLAND, OREGON**



Figur 3.4.36: The park design take on the narrative of the railroad with tracks forming a curving wall between the park and the road/pedestrian street behind it, facilitating the surrounding mixed-use buildings. The park present space sharing, different functions, time, seasons, and values- from recreational space to birds nesting. Fieldtrip, spring 2015

**FOSTER FLOODPLAIN,
PORTLAND, OREGON**



Figur 3.4.37: The floodplain has been re-settled and space has been given back to water. A road is separating the restored floodplain from the neighbouring industrial area. What they share is a need for giving room to water- and a need for avoiding polluting the freshwater. Brinks are soft with trunks on the sides and vegetation and old wood are left to transform naturally. Traces of the former settlement in the floodplain are seen as subtle geometries of yesterdays buildings, and moss covered concrete structures. Fieldtrip, spring 2015

GREEN INFRASTRUCTURES - CONSTRUCTED URBAN WETLANDS AND PUBLIC RECREATIONAL AREAS IN CHINA

Larger scale measures- restoring urban wetlands

Providing an impressive range of best practice examples at a larger, urban scale is the well-known architecture practice Turenscape in China, lead by architect Kongjian Yu. Their work is exemplified by projects such as the Qiaoyuan Wetland Park, the Qunli Stormwater Park and Houtan Park in Shanghai.

The Qiaoyuan Wetland Park is renowned for its eye-catching aesthetics provided through a cluster of ponds and seasonal pools embraced by red trails. The area developed from being a natural wetland to a shooting range, then transforming into a garbage dump and urban stormwater drainage sink. Thus, a highly polluted area and restoring the wetland was the starting point in Turenscape's concept of 'The Adaptation Palettes', focusing on 'letting nature do her work'. It has become a very popular public park with the multiple benefits of stormwater management, increasing biodiversity together with recreational and aesthetic opportunities for the densely populated neighbouring districts (Landezine, 2011; Saunders and Yu, 2012, pp. 116–123) Qunli Stormwater Park departs by using the landscape as a 'sponge' to surface water management, as opposed to underground hard engineering and sealed surfaces. The area is surrounded by dense, urban development (buildings, roads). The park was designed from the departure of ecological approaches and provides multiple benefits through ecosystem services. For example, collecting, and cleansing stormwater, recharge of aquifers, preserving and promoting biodiversity. Design wise, the restored wetland is surrounded by a pattern of skywalks and pavilions, facilitating recreation of the human residents (Saunders and Yu, 2012, pp. 152–163). Houtan Park in Shanghai provides another example of urban water management which embraces ecosystem services, natural processes and biodiversity together with improving urban living conditions to humans by providing recreational, green spaces (Ahern, 2013; Rottle and Yocom, 2010) (Saunders and Yu, 2012, pp. 34–41, 184–190). This is also the case of the Dreiseitl Bishan Park and watershed designed by Atelier Dreiseitl. It is built on landfill as both a water cleansing measure and a district regeneration project of providing access to green, outdoor areas to the residents (Dreiseitl and Grau, 2009)



Figur 3.4.38: Tianjin Qiaoyuan Park. source: Wikimedia

WATERSCAPES AND MEASURES OF THE ANTHROPOCENE

Larger-scale measures - Room for the River and the Q-Team

The 'Room for the River'¹⁰ project' in the Netherlands is a unique example of climate adaptation in the Anthropocene. The Netherlands is a nation and territory based on land-reclamation and water control, and with changing waterscapes, the country is becoming more vulnerable. It has even been necessary to reframe policies and give areas (space/room) back to the water to protect human interests in other places. One of the renowned approaches is the flood mitigation-project aiming to accommodate higher water levels: the motto is 'Room for the River' lead by state Landscape Architect of the Netherlands, Dirk Sijmons, as a safety measure for 'four million people in the Dutch Delta'¹¹. It uses a wide range of measures, e.g. deepening the riverbed, temporary water storage, dyke relocation, high water channels, and de-poldering¹². It consists of 39 sub-projects at strategic locations in the Dutch river deltas. What is particularly interesting is the methods used in 'Room-for-the-River': besides water management, it was decided that the project should also offer spatial quality. To do this, they organised a 'Quality-Team', with as task to assess, inform and support the development of the sub-projects from a qualitative point of view. The Quality-Team coached and peer-reviewed the landscape strategies and design processes, thus qualifying the goal of spatial quality beyond hydraulics. The approach included methods of Research by Design with an emphasis on interdisciplinarity, collaboration, and cross-scale thinking, geographically as well as on policy level, down to local levels (lecture and conversation with Dirk Sijmons, Centre for Strategic Urban Research, Annual Conference, 5th March 2015) (Klijn et al., 2013).

Larger scale measures- using past structures for future urban landscapes

Using past structures, the Emscher Park is a multifunctional blue-green network, transforming former industrial sites into industrial heritage together with habitat restoration and water cleansing, (Ahern, 2013; Braae, 2015). A renowned part of Emscher Park is the Duisburg Nord, designed and implemented from 1990-2002 by Latz + Partner. Duisburg Nord exemplifies a landscape architectural project departing from an integrated understanding of the intertwinement and opportunities of human-natural processes (Braae, 2015). Today, the Duisburg Nord offers recreational walking trails, physical activities such as diving courses and rock climbing, cafés, cinema, guided tours and concerts (fieldtrip 2016).

10 <https://www.ruimtevoorderivier.nl/english/> <http://worldlandscapearchitect.com/room-for-the-river-nijmegen-the-netherlands-hns-landscape-architects/#.WqPjCOco9PY>, <https://www.rijkswaterstaat.nl/english/water-systems/protection-against-water/room-for-the-river.aspx>

11 <http://waterandthedutch.com/wp-content/uploads/2013/08/Room-for-the-River.pdf>,

12 De-poldering means to remove part of, or all, of a dike protecting a polder, thus reversing the concept of reclaiming land as polders, and instead giving room (back) to the water.

DUISBURG NORD, RUHR DISTRICT, GERMANY





Figur 3.4.39: Duisburg Nord. Post-Industrial assemblage with vegetation 'growing wild' and the industrial plant is deteriorating, forming an intertwined aesthetic experience of the processual interplay between human and natural forces. At a larger scale, The Duisburg Nord is part of a larger network, green infrastructure, of the Emscher Park, Ruhr District, Germany, 2016

3.4.3 EXAMPLES OF DANISH BEST PRACTICE BUILT PROJECTS

THE COPENHAGEN CLOUDBURST PLAN AND MASTERPLANS

Closer to home, the Copenhagen Cloudburst Masterplan 2012 originated in the municipality's Climate Adaptation Plan 2011. On 2nd July 2011, Copenhagen experienced a '1000 year' cloudburst event, with some areas receiving 150 mm of rain in 2-3- hours. This cloudburst event caused severe flooding with significant societal and economic consequences¹³, fuelling the attention to climate adaptation beyond the existing focus on reducing CO² emissions. As such, the cloudburst event became a vital driver for speeding up climate adaptation related to water in the city (København Kommune, 2012, 2011; Lund Christensen, 2014). Since then, Copenhagen experienced even more cloud burst events, e.g. in September 2014 and 2017. The Copenhagen Cloudburst Plan 2012 is a strategic planning document showing the flow paths, urban catchment areas and service levels for Copenhagen. It was developed by the Copenhagen Municipality and the water company HOFOR with COWI as consultants. (København Kommune, 2012). Four of the urban catchments were developed as 'Cloudburst Concretisation Masterplans' by Rambøll/Atelier Dreiseitl in 2013.

The Copenhagen Climate Quarter

In 2013, the Danish landscape office 'Tredje Natur' also developed a 'City Centre Cloudburst Strategy' together with Copenhagen Municipality and HOFOR. Tredje Natur was also designing the strategy for the first 'Climate Quarter' in Denmark. Other driving forces than climate adaptation initially sparked the underlying focus on urban regeneration, and the 2011 cloudburst made a case for establishing a synergy between the two. Both the cloudburst masterplan and strategy emphasized managing surface water while also creating a liveable city based on blue-green structures creating 'added-value' to everyday life in the city. The Climate Quarter is showcasing climate adaptation in inner-city areas with an emphasis on citizen involvement, together with high-end designs of plazas and streets. As a note, Aarhus is the second biggest city in Denmark, and the geographical context of the case studies of this research. It does not though, present an equivalent to the above mentioned examples in Copenhagen.

Other Sources: Citizens in climate adaptation – seminar on approaches and experiences, Vand I Byer 11th October 2013 (see appendix 1).

¹³ The estimated costs were 6.2. billion Danish Kroner

DANISH EXAMPLES OF CLIMATE ADAPTATION PILOT PROJECTS WITH ADDED-VALUE

With a Danish focus on adapting to ‘more water’ and the municipal obligation to provide climate adaptation plans by the end of 2013 (see Chapter 3.5), the Realdania Foundation, LOA Foundation and Naturstyrelsen¹⁴ (Nature Agency) instigated climate adaptation initiatives called *Vandplus* (Water Plus) (Realdania, n.d.; Vandplus and Klimatilpasning.dk, n.d.). Realdania further instigated what they call *Klimaspring* (Climate Jump). This included supporting an array of pilot-projects with particular attention to providing climate adaptation with *Merværdi*¹⁵ (added value). The *Klimaspring* initiative defines added-value within five categories (Realdania, *Klimaspring*, n.d.); Sundhed og velvære for byens borgere (Health and well-being to the residents of the city); En mere miljøvenlig og biodivers by (A more environmental friendly and biodiverse city); Sociale forhold og sammenhængskraft (Social cohesion); Bedre infrastruktur i byen (Improving urban infrastructure); Forskønnelse af byen (Beautification of the city). Realdania frames their initiative as ‘from water to growth’. The following provides a few best practice examples set within the Vandplus context or supported by Realdania and LOA, as they are influential to the current Danish approach to climate adaptation. The *sønæs*¹⁶ project transforms the area of former, low-lying sports fields at the Viborg Lakes, into a cleansing pond with an array of recreational facilities relatively close to Viborg city centre. Among others, it exemplifies recreational trails, info cabins, and activities such as 100 ways to cross water. It was designed by Møller & Grønborg and opened in 2015. The Kokkedal Project, also named The Blue-Green Garden City¹⁷, was a pilot project with the overarching aim of using climate adaptation measures to connect currently disconnected parts of the city, to create attractive outdoor spaces to meet, socialise and to bring nature closer to the citizens. Schønherr Landskabsarkitekter designed it in the period 2012-2017. The Gladsaxe project, named Water on the Sideline, was using a need for improving existing sports fields as an opportunity to incorporate climate adaptation measures, e.g. using sports fields as retention basins while also creating new, informal activities to invite in the community. Bisgaard Landskab & Hans Henrik Øhlers designed it in the period 2013-2015. The Rabalderparken¹⁸ Project in Roskilde, combines stormwater management with regeneration of an area in the form of a skate park that also functions as extreme rain storage. Nordarch and GHB Landskabsarkitekter designed it in 2012.

14 The Ministry of Environment and Food of Denmark, Nature Agency)

15 Sundhed og velvære for byens borgere (Health and well-being to the residents of the city)
En mere miljøvenlig og biodivers by (A more environmental friendly and biodiverse city)
Sociale forhold og sammenhængskraft (Social cohesion), Bedre infrastruktur i byen (Improving urban infrastructure), Forskønnelse af byen (Beautification of the city). Source Realdania.
<https://klimaspring.dk/om-os/fra%20vand%20til%20v%C3%A6kst>

16 <https://realdania.dk/projekter/soenaes>, <http://mgarkitekter.dk/index.php/projekter/62-sonaes-klimatilpasning-og-parkstrategi>

17 <http://schoenherr.dk/projekter/kokkedal-den-blaagroenne-haveby/>

18 <http://wsud-denmark.com/musicon-roskilde-skate-park-storage-for-extreme-rainfall/home-page/34775>, <http://musicon.dk/rabalderparken>



Figur 3.4.41: sØnæs, Viborg, Denmark, part of the Vandplus initiative (designed by Møller & Grønberg)- also on a winterday the public area is used for sports and recreation. The red poles indicate the level of water, not in meters but by mainstreaming water-knowledge; the marks on the poles tell of the water level in e.g a 50 years and 100 years rain. photo: Ny S. W. Ø.

3.4.4 SUM UP

VALUE CREATION AND BEST PRACTICE EXAMPLES

These projects communicate and exemplify a process-oriented interplay between human constructions and natural processes over time, often provisioned as public spaces with a certain aestheticising of former industrial sites being taken over by vegetation and natural processes of diluting built structures

Generally, the best practice examples of built projects exemplify different approaches to creating plural values through ‘spatial stacking’ and multifunctionality through water management (Ahern, 2013). All of the presented projects also focus on creating recreational spaces open to the public. Though the project examples are mainly of the 21st Century, the ideas of combining, as example, sports fields or recreation with retention basins are not new. For example, Chicago¹⁹ and Michigan showcased this already in the 1960s (Spirn, 1984, pp. 150–151) and the Back Bay Fens in Boston, designed by F.L Olmsted, was established in 1879, and functions as an historical best practice example of green infrastructure and restoration of urban wetlands (Spirn, 2000, pp. 305–307). With climate change and the increasing urbanisation, the need to implement multifunctional strategies with ‘spatial stacking’ is becoming more crucial than ever. However, while the examples show public areas and initiatives accommodating the common good, the presented Danish best-practice examples were co-funded by external parties with the aim to promote interest in and knowledge of value creation in climate adaptation. Hence, the level of (economic) attention differs between the case study areas in this research context.

19 The Melvina Ditch Detention Reservoir, operated by the Metropolitan Sanitary District shows flood control together with recreation, and Clinton River, City of Mt Clemens, Michigan shows sewage control and park in 1967 (Spirn, 1984)

PART 3 WATER

CHAPTER 3.5

DANISH CLIMATE ADAPTION PLANS

3.5.1 Introduction

3.5.2 Contextualisation- Planning and water management in Denmark

3.5.3 The Danish Climate Adaptation Plans



P3_C5

DANISH CLIMATE ADAPTATION PLANS

3.5.1 INTRODUCTION

The following is a brief outline of the Danish planning system and the overall responsibilities of private properties and water utility companies in relation to handling water. This is followed by an introduction to Danish climate adaptation plans, as the climate adaptation plan of Aarhus has been the departure point for all three cases in this research.

3.5.2 CONTEXTUALISATION – PLANNING AND WATER MANAGEMENT IN DENMARK

OVERALL PLANNING SYSTEM

The Danish Planning Act

The Danish State has responsibility for defining general national planning guidelines and strategies, whereas the municipalities hold the responsibility for implementation. At the municipal level, there is an overall distinction between Open land (Åbent Land) and Urban areas (Erhvervsstyrelsen, 2015)

Municipal Plan & appendices

Denmark is divided into 98 municipalities. These municipalities are each responsible for establishing planning within their respective boundaries. Every 12th year the municipalities publish a longer-term planning document: The Municipal Plan. This plan is supported by a municipal planning strategy (Planstrategi) that is revised every 4th year. All new planning documents and revisions to them have to go through public hearing phases. The municipality plan consists of a main-body of text (Hovedstruktur) with associated frameworks (Rammer). In addition to this, there is an array of appendices relating to thematic planning topics, e.g. new urban development plans, wastewater plan or environmental assessments. The Climate Adaptation Plans are one such appendix. These documents are the frame for Local Plans (Aarhus Kommune, Kommuneplanlægning, n.d.; Erhvervsstyrelsen, Kommuneplanlægning, 2015)

Local Plans and Climate Local Plans

Local Plans are planning documents made at the municipal level. They are a prerequisite for all large new build or renovation projects that have substantial influence on their surroundings. For example, when changing land-use, demolishing an existing structure or a new construction. The Local Plan is a detailed plan for a designated area. It defines the functions and programmes of the area, location and extent of buildings, infrastructure and open spaces, and often include some specifications regarding materials, building heights and so forth. The Local Plan cannot, however, demand change to existing legal activities and structures. Local Plans are legally binding and a public hearing phase is necessary before the City Council can approve them. However, discretionary dispensations can be made (Aarhus Kommune, n.d.; Erhvervsstyrelsen, 2016). Currently, a new term is emerging: Climate Local Plans.

Water - utility companies and the handling of water

Danish water and utility companies must observe specific legislation, as decreed by the state (Forsyningssekretariatet). Such companies are privatised but owned by municipalities and/or users, and have to comply with regulations on water taxing (prices) and specified standards on the quality of drinking water, sewage treatment, pricing, and the maintenance of pipes in public areas. In addition to this, Danish water companies are obliged to follow the rules on CA|HOW. Currently, water companies cannot allocate expenses to e.g. vegetation or recreational facilities (SVANA, n.d.).

Private property and handling of water

Private properties are responsible for handling water within their own property lines and are prohibited from discharging water onto other properties, including public areas. The exception to this is in the occurrence of extreme weather events (BYG)(Bygningsreglementet DK, n.d.). Currently, there is a focus on discouraging rainwater from entering the sewer system and instead handling it within property boundaries, e.g. through infiltration and retention. The Danish term for this approach is LAR; originally meaning Lokal Afledning af Regnvand (Local Discharge of Rainwater) but now often interpreted as Lokal Anvendelse af Regnvand (Local Usage of Rainwater).

3.5.3 THE DANISH CLIMATE ADAPTATION PLANS

CLIMATE ADAPTATION PLANS IN DENMARK

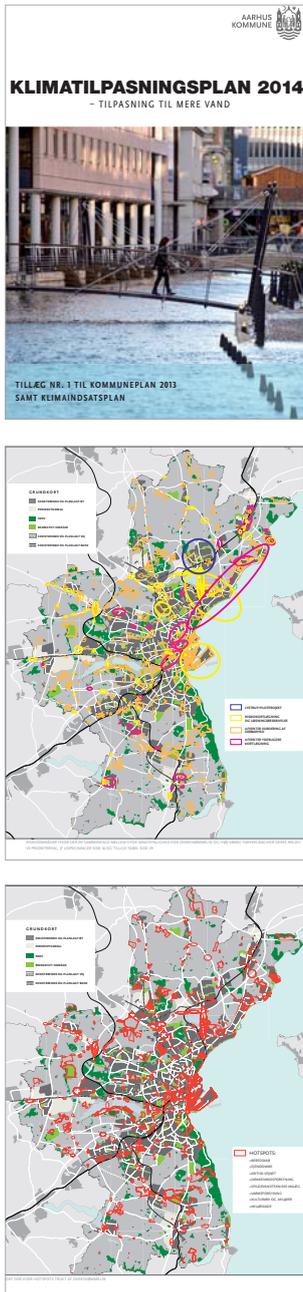
By the end of 2013, all 98 Danish municipalities were obliged by the state to publish a climate adaptation plan. As a planning document, a climate adaptation plan (from now CA plan) functions as an appendix to the municipality plan. Each municipality had to establish this new planning strategy simultaneously, without the benefit of any experience in this area.

Water as a focal point for value and risk mapping

The climate adaptation plans have an overall focus on water and flood-risk maps. Hydrological calculations were the crucial tool used to establish CA plans; defining flood prone areas, analyses of the probability of flooding, and correlations with values of societal relevance. This process led to the production of risk maps, where risk was defined as the probability of flooding put in relation to values at stake. This in turn led to the designation of locations where flooding damage would be most critical. Here, value was defined in relation to holding societal importance, and was therefore generally associated with primary road infrastructures (e.g. ambulance roads to hospitals), important functions (e.g. nursing homes and schools, which demand a larger number of 'responders' to aid evacuation, and thus could leave other areas without help), risk-based land-use (e.g. polluted areas or storage for toxic materials, which could be washed into the surroundings or pollute drinking water), cultural heritage (e.g. historical buildings, archeologic sites), high-density areas (where large numbers of people would be impacted), and other critical infrastructures (e.g. sub power-stations providing electricity for crucial functions as hospitals) and so forth.

Flood maps, vulnerability and prioritisation

The actors working on the CA plans necessarily had to discuss not only values and their legitimacy, but also how to put value into numbers, and furthermore how to prioritise and visualise this information in a feasible manner. These plans were sensitive, as they provided information with implications that could influence e.g. real-estate markets, insurance prices and so forth. Furthermore, they had a general, political sensitivity, as it was difficult to know how citizens would react upon realising that flood risk did not necessarily prompt municipal investment in CA|HOW projects. In this way, the risk- and value maps reflected the need for valuation and prioritisation due to climate change and water at a societal level.



Figur 3.5.42: Top: The municipal Climate Adaptation Plan 2014, adapting to more water. Middle: Risk-, value- and priority map. Bottom: Hotspots in risk of flooding
Source: CAP14, p1, 5, 26

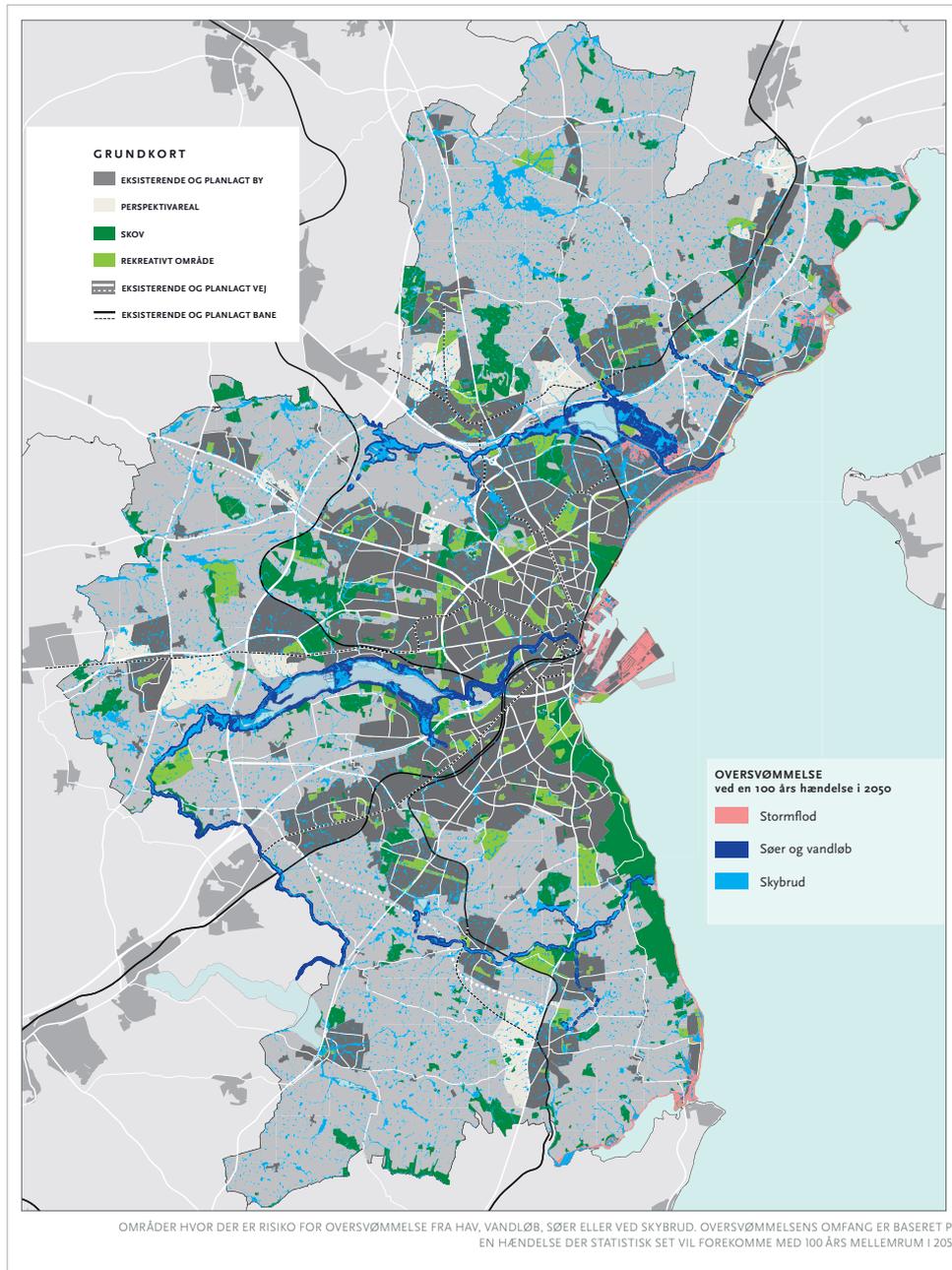
Cross-scale and cross-sectoral planning implications

The CA Plans had cross-scale implications in both a physical and administrative sense. CA plans are essentially multi-scalar, as they cover sizeable geographical areas and involve politics and governance at a large scale. Their impact, however, is also relevant at the smaller scale, as the plans impact individuals, specific buildings, local properties and neighbourhoods.

At a planning level, the term 'appendix' indicates a document that is subordinate to the municipal plan. However, CA plans have implications that influence other appendices, as well as the main body of the Municipality Plan. Moreover, they influence other areas of planning and sectors with no prior direct engagement with water at a general level. Thus, the CA plans can inform, influence or put pressure on numerous departments, sectors, businesses and citizens. Furthermore, they touch upon planning regulations such as land-use and zoning, local plans, subdivisions of land, building details, infrastructure, contingency plans, liability and responsibilities, involvement processes, priorities of investments and so forth. For example, the flood risk- and value maps of CA plans provide information that is likely to influence planning and zoning issues usually assigned to Departments of Planning & Building. Similarly, they influence land use and recreational issues assigned to the Departments of Park & Nature, as well as matters of infrastructural capacity, boundaries and design usually assigned to the Departments of Road & Traffic. The CA plans therefore have the potential to heavily influence other appendices, creating new modes of interdependency between a variety of sectors, departments, disciplines and practices.

The Climate Adaptation Plan 2014 of Aarhus (CAP14)

In Aarhus Municipality, the CA Plan was named *Climate Adaptation Plan 2014: adapting to more water*. This document has been essential to the cases of this research project. As in all other municipalities, The Climate Adaptation Plan of Aarhus Municipality (From now on CAP14) was commenced by calculating flood maps and appurtenant value maps. Value was defined as belonging to functions essential to society and locations with vulnerable citizens, e.g. hospitals, nursing homes, kindergartens, emergency generators and primary roads for the emergency. Correlation between the probability of flood and at-risk value led to the recognition of hotspots, and flood-prone areas of societal interest were designated as 'focus-areas' (Aarhus Kommune, 2014, p. 27,29) (please see Appendix 4).



Figur 3.5.43: Projected risk of flooded areas caused by the sea, streams, lakes or a cloud burst as a 100 years event year 2050
Source: CAP14, p11



PART 4

VALUE

PART 4 VALUE

CHAPTER 4.1

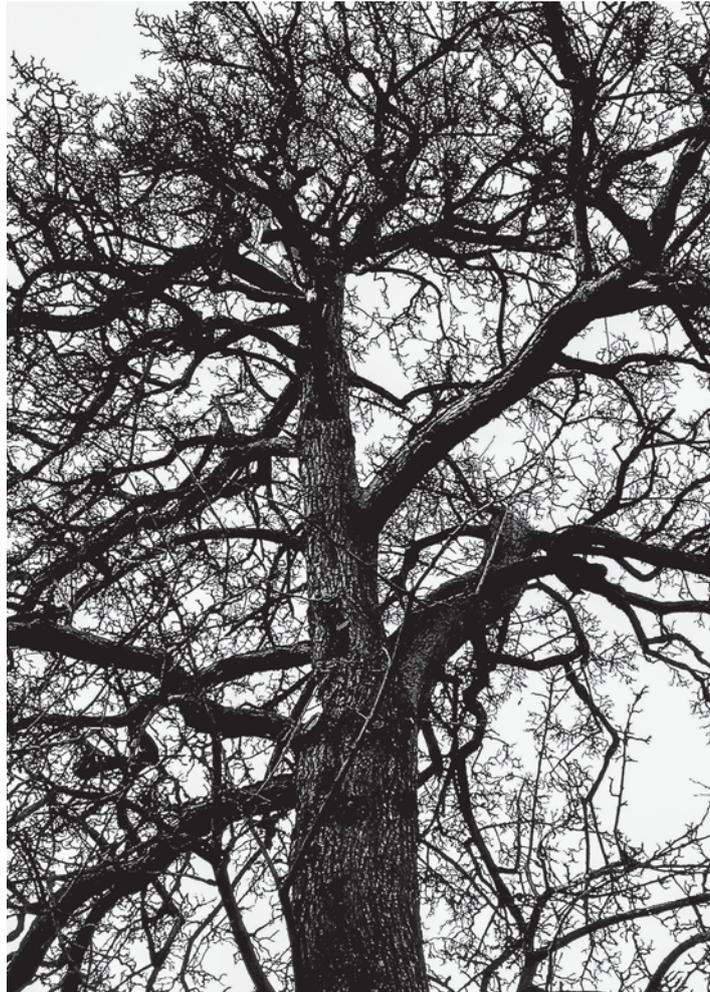
CONTEXTUALISATION & ETYMOLOGY

4.1.1 Introduction

4.1.2 Contextualisation

4.1.3 Etymology

4.1.4 Added-value



P4_C1

CONTEXTUALISATION AND ETYMOLOGY

G O O D

B A D

4.1.1 INTRODUCTION

PURPOSE

This section explores value theory outside the field of landscape architecture. Engaging theories from other fields, e.g. biology, sociology, psychology and philosophy, is not new to landscape architecture. Employing other value theories represents an exercise in understanding the human actors from other disciplines and professions related to the real-time case studies within the context of this research. While landscape architecture as approached here, is embedded with multi-layered values (see Part 1), human actors in urban landscapes obviously follow a variety of other 'logic of values'. Hence this section aims to seek and provide some understanding why using multiple values across different geographical scales, time perspectives and various actors might not always resonate when implemented in the 'real world', despite these seemingly being embedded in landscape architecture. Employing value theory across disciplines is hence a means to shed some light on the notion of value outside landscape architecture and possibly finding ways to address value plurality in line with the research objective.

Values in everyday life and society

Value judgments are fundamental on basically all levels imaginable in research, society and daily life practices: theoretical, practical or intuitively driven. In everyday speech, value is often articulated by the terms good, better or worse. Value is a disputable concept, often sought to be scaled (fixed) by standards of measurement with the help of specific methods, devices or a framework of beliefs. Today, the conceptual understanding of value influences everyday practices, religion, research methods, political economy, economics and political discourses.

Defining value

Value theory stems from ancient philosophy and numerous theories have been offered on the concept of value, what is good, what is 'goodness' and its counterparts. History illustrates re-occurring searches for sources of value, universal values and transcending laws on values in the philosophy of religion, psychology, aesthetics, law, economy, and the sciences as such. Conceptualisations of value have been used to interrogate and comprehend societal order, practices of democracy, economics, amongst others. The concept of value and perceptions of good, or bad, are closely connected to the creation of knowledge and moral philosophy, contributing to discussions throughout history, in both theory and practice. Debates on what is good and how do we know encompass a broad range of ontological positions (Ragans, 2015:209-229). For example, does value even exist, and epistemological standpoints (Ibid:187-196), e.g. how do we find knowledge on values; and differentiating methods to define value, e.g. how we observe, verify and which devices we use.

VALUE IN THIS RESEARCH CONTEXT

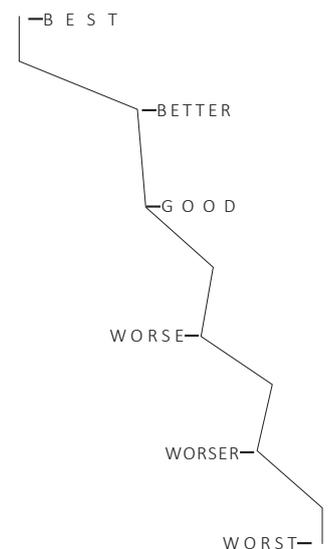
Setting out to explore 'value creation' and 'better' urban landscapes in a research context necessarily involves a reflection upon the concept of value. Reasonable questions include: how do we engage value and the concept of 'better' without defining *good*? Better for whom or for what? How do we qualify 'better' and its close associate 'worse'?

A dissertation on value theory is beyond the scope of this research. Part 4, Value, is an effort to contextualise conceptualisations of value and value judgment, as a core subject matter for this research. The value discussion in the following sections takes a pragmatic stance towards how to approach value, worth and justification, inclusive of uncertainty and (peaceful) disputes on value, as well as relating this to the context of this research.

Value and landscape architecture

Clearly, discussions regarding values and value judgments are not in any way exclusive to landscape architecture. However, landscape architecture is a profession, amongst others, with an integrated intention for creating better, not worse. Even in cases where landscape architectural processes and projects seem to create 'worse,' the intention was likely to create 'good' and better. Furthermore, the field of landscape architecture is concerned with multi-layered issues and processes of space, place, time and actors.

Landscape architecture is inclusive of both human perception, e.g. sensory aesthetics, and tactile wayfinding, as well as naturalistic properties including soil conditions, climate, and terrain. Landscape architecture is concerned with scalable, but non-fixed, processes of time and geographical spaces, e.g. processes of vegetation, biotopes, water and aesthetics (please see LArch introduction, Chapters 2.2, 2.3). From its very outset, landscape architecture invites a plurality of actors and processes prone to differentiating value judgments.



Figur 4.1.8: The Ladder, with degrees of good: added-value implies a value-ladder, each step representing degrees of good ascending from some value to somewhere with more value.

4.1.2 CONTEXTUALISATION

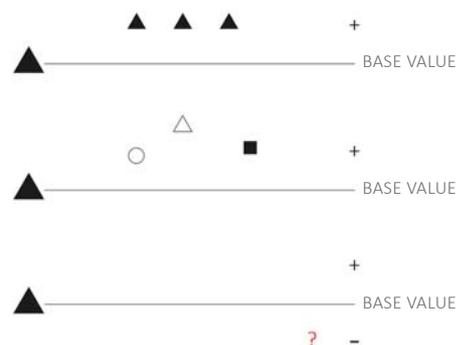
THE 'GOODS' OF THEORY AND PRACTICE

A brief venture into Western value theory was an eye-opener into axiology, meta-ethics, ontology, epistemic values, and semantics. Admittedly quite far from my own profession and field, I began with the presumption that values exist and that aesthetic value together with measurable values (fact) was elementary. Through my brief engagement with value theory, I realised that it was not necessarily obvious that aesthetic value and measurable value could work together: in value theory, aesthetic and natural properties seemingly have an unresolved relationship. Value theory sheds light on how conflicting value judgments can stem from different ontologies with incommensurable worldviews, e.g. on the attribution of value to nature. This became explicit in my readings on Intrinsic Value. Philosophies on value became almost paralyzing: it suddenly appeared incredible that it was possible to function in real-life, making decisions, collaborating and living with other human or non-human actors. Even the existence of a landscape architecture based on relationships between values across time and space started to appear as an unrealistic practice. But, looking up from theory and into the everyday landscapes, I found that a pragmatic point of view was necessary for this context: despite differentiating conceptions of value, 'good' and non-peaceful disputes, peaceful co-existence regardless also succeeds in everyday practices. A physical realm of value judgments and value creation, for better or worse, is taking place nevertheless. As a landscape architect, there still seems to be room for the notion of 'better.'

Value and messy, non-linear processes

My journey into value theory made it clear how important it was to stick to my objective and my field: a practically-oriented context of landscape architecture attached to physical landscapes with real actors in real-time processes. The need for value theory with the capacity to operate within real-life omits quite a few theoretical strains, e.g. positivism, projectionism, and relativism. I did not encounter any '*ism*' from value theory, in its purest, theoretical form, to be productive in the context of LArch and everyday landscapes. In this context, value theory needs an element of common-sense logics: it needs to be capable of acknowledging the existence of both subjective and objective values, partial knowledge, messiness and nonlinear processes far from the ideal. This includes a capacity to accept a belief in good will and the common good, as in 'what we do matters.'

Figur 4.1.9: Added-value implies a base value together with either or a mix of these (a) More of the same value will lead to better, value (b) A conglomeration of values (a plurality of values) will form better value altogether. In the context of CA|HOW in urban landscapes, added-value would most likely refer to plural values, as more of the same value in a CA|HOW measure seems of no value as added-value e.g. over-oversized retention basins or surplus infiltration in the same location without providing other values. In this context, more of the same does not provide added-value but rather a CA|HOW measure with too much of the same.



4.1.3 ETYMOLOGY

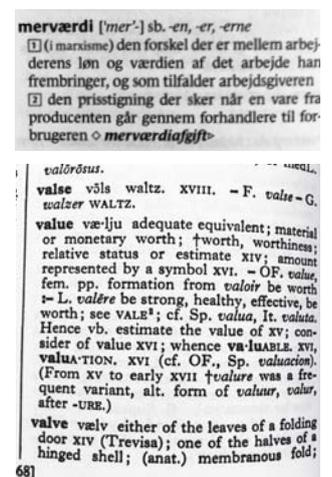
Value is good

Value is often expressed through an ascription of good, better, best and their counterparts. Colloquially, valuations¹ such as good, better or less good are used as a modus of prioritisation without necessarily explicating what good, or not so good, actually means. However, to agree upon what is valuable, good, better, or worse presupposes an agreement on what is of value and how much value it represents: an implicit standard of measurement. If the standard of measurement is not explicated or agreed upon, value-disputes are likely. The basic linguistic and semantic implications of the words value, good and worth might seem straightforward and interchangeable. Nevertheless, conceptualisations of value and good form re-occurring discussions in philosophies on value: if value *is* good, then *what is* good and does *what is good* inform what *ought to be good*. Does *good* ascribe value or does value ascribe good?

Etymology and Dictionary entries on value and added-value

The word value functions as both a noun and a verb, meaning it can refer to an object or subject of value as well as an action or process of value. The etymology of value closely relates *value* to *worth*: value is something², an element and/or process, which holds worth. The Oxford Advanced Learners Dictionary and Politikens Nudansk Ordbog³ provide some insight into the usage and meaning of value and worth. The first example of value-as-noun refers to monetary value: ‘*how much something is worth in money or other goods*’, thus referring to exchange-, market- or instrumental value, representing common standards of measurement of today.

The Danish term for added-value- ‘Merværdi’- is closely related to the German word Mehrwert. In translation, ‘Merværdi’ means ‘more value’ or ‘more worth’. In English, the word added-value might be framed somewhat differently, pointing towards different contexts of the use. However, the underlying implications of the word are comparable to the usage and meaning in Danish.



1 Difference between valuation and evaluation. Valuation is an estimate of something's worth, often used to mean what it is worth (e.g. pecuniary worth). Evaluation is an assessment, a review

2 For the sake of simplicity, I now refer to 'something' as an inclusive term of both objects, elements, actions and processes

3 Politikens Danish Dictionary

Figur 4.1.10: Top: Merværdi Politikens Nudansk Ordbog med Etymologi 2005. Bottom: Oxford Dictionary of English Etymology, Oxford Advanced Learners Dictionary 1996.

4.1.4 ADDED-VALUE

IS ADDED-VALUE 'MORE GOOD'?

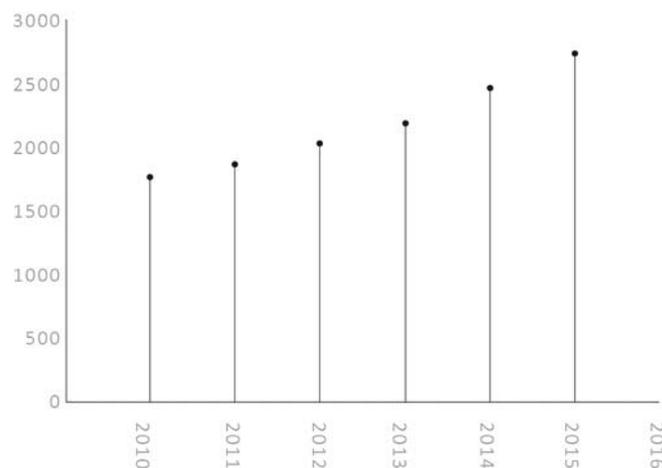
Added-value in Financial Analysis and Political Economy

In contemporary Financial Analysis, added-value is defined as the price at which the product/service is sold minus the cost of its production. In this context, added-value is considered to be *good*. Here, the measuring standard is monetary value provided to stakeholders. Externalities are not put into the equation, and it does not in itself provide a moral stance or ethics of good and bad. In Political Economy, added-value is often associated with the concept as described by Karl Marx: Mehrwert (surplus value). Here, added-value is the benefit that a capitalist gains from the efforts of his workforce. In this regard, added-value is an exploitation of workers and, thus, not good. In both of the above, added-value is measured in monetary/labour elements, and the definitions of added-value are similar. However, the question of whether added-value produces *good* value is differentiated.

As a term, added-value implicitly suggests that more value is more good, without providing a standard of measurement. It does not answer the underlying questions relating to value: is more value better value and what is more value good for? I go more into this topic in Chapter 4.3 Good Vs. How Well. In itself, the concept of added-value does not necessarily define the outset value or its final value. Nor does it reveal the means and ends or the standard of measurement. At best, the term becomes equivocal. This is further discussed in Chapter 4.2 on Value theory.

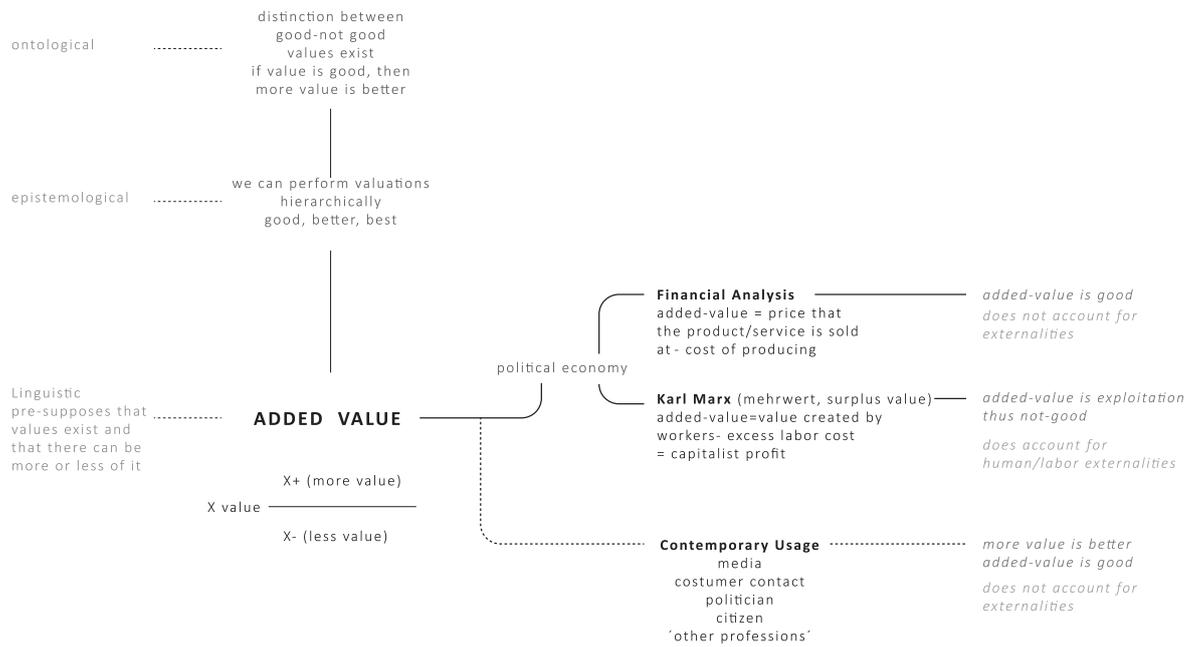
Added-value as a common term in Denmark

Added-value (Merværdi) is a common term in Denmark. According to Infomedia, the usage of the term Merværdi (added-value) in Danish media has risen by 54 % between 2010 and 2015, implying that it is a common and popular term. In a Danish context of contemporary CA|HOW-projects, the concept of 'Merværdi' is repeatedly used to suggest the achievement of multiple benefits without (high) extra costs. In this research context, I found it necessary to change my use of added-value into plural values (see Value Chapters and Case Lystrup).



Figur 4.1.11: Bar chart on 'Merværdi'. The chart shows a 54% increase in medias usage of the term 'merværdi' in the six years period 2010.01.01-2015.31.12, calculated from 'all media types. Source Danish Infomedia 2016.10.14

Common associations/connotations of the concept added-value



Figur 4.1.12: Conceptual diagram, added-value. The concept of Added Value is a common term in economics with particular two diverting, classical strains.

PART 4 VALUE

CHAPTER 4.2

EXTRACTS FROM VALUE THEORY

4.2.1 Introduction

4.2.2 Contextualisation Value Theory

4.2.3 Value Dualisms and value conflict

4.2.4 Value Compositionals – extracts from value theory

4.2.5 Sum up- value in this research context



P4_C2

EXTRACTS FROM VALUE THEORY

4.2.1 INTRODUCTION

“The value of the whole must not be assumed to be the same as the sum of the values of its parts.” G.E. Moore, Principia Ethica, 1903, (Moore, 1976, p. 28):

Added-value as an ambiguous term

Added-value was my initial framing for value creation in this research context. As described in earlier chapters and Chapter 5.1 Case Lystrup, the term became unproductive as it was too ambiguous and did not tell of whether added-value was more of the same value or plural values. In this chapter, I look into how value has been theorised, its common dualisms, and conflicting value judgments. The purpose is to inform the value-driven research objective of ‘how to’ create values in urban landscapes.

Value in theory

As a brief, non-comprehensive introduction, this chapter makes reference to some of the classical theoretical discourses on value theory from fields other than architecture. The aim, however, is not to provide a historical or philosophical account, but rather to inform value discussions in the practical context of landscape architecture. The purpose is to provide an overall perspective of some of the tendencies in value theory and conceptualisations of value with relevance to the everyday landscapes of CA|HOW and its actors. I must stress that an exhaustive discussion on value theory and theorists is outside the scope of this research, and no doubt more sensibly carried out by another discipline.

Structure of this chapter

In this chapter, I outline some of the more well-known and re-occurring dualisms relevant to value theory. I then introduce the Naturalistic Fallacy and the Is-Ought problem, as both are relevant to an understanding of the differentiated working methods employed by e.g. natural or social sciences and design research, including claims on validity. To establish a more practical interpretation of values and value judgment, I provide an extract from value theory, as understood from my LArch perspective. Here, I outline some re-occurring elements in value theory as *Value Compositionals*. Finally, I sum up with a few examples in the context of waterscapes, urban landscapes and climate change.

4.2.2 CONTEXTUALISATION OF VALUE THEORY

WHAT IS VALUE IN THEORY?

Axiology – ethics and aesthetics

Even today, value theory and value judgment represent core ideas and controversies that can be traced back to Ancient Greek philosophy. Value Theory can be connected back to the philosophical study of Ethics & Aesthetics, as posited by Greek philosophers such as Protagoras, Socrates, Plato, and Aristotle. Their theories on value have been drawn upon and discussed for more than two millennia¹. The connections between value, ethics and morality are reiterated in classical texts² concerning value theory from the Enlightenment and onwards. The moral dimension is reflected in titles such as David Hume's 'A Treatise of Human Nature', Immanuel Kant's 'Grounding for the Metaphysics of Morals' and John Stuart Mills' 'The Logic of the Moral Sciences'. At the beginning of the 20th Century, philosophies on Ethics and Aesthetics were collectively framed as 'axiology' by Paul Lapie on *Logique de la volonté* (1902) and by Robert S. Hartman in *Grundriss der Axiologie* (1908). Axiology is mainly concerned with the classification of what *is* good and *how good* it is. Contemporary developments in value theory are found within the natural sciences, social sciences and the humanities. In particular, the philosophies of sociology, psychology and, economics are concerned with an understanding of value at the level of meta-ethics and ethics, including frameworks for applicable methods of value judgment. Despite these efforts, the nature of value is not resolved or agreed upon. However, re-occurring themes and approaches seem to point to a shared core, despite attributing different *conceptualisations* of value.

UNIVERSALISM



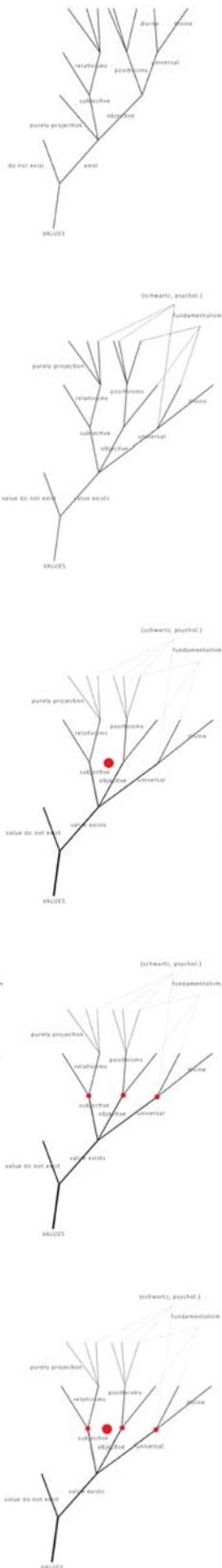
OBJECTIVISM



SUBJECTIVISM

1 Protagoras, 481-411 BC/ Socrates 470-399BC/ Plato 427-347 BC/Aristotle 384-322 BC.

2 David Humes: A Treatise of Human Nature: Being an Attempt to Introduce the Experimental Method of Reasoning into Moral Subjects (1738-1740). Immanuel Kant: Grounding for the Metaphysics of Morals (1785). John Stuart Mills: The Logic of the Moral Sciences (1843). Karl Marx: Das Kapital (1867). G.E. Moore: Principia Ethica (1903). G. H. von Wright: The varieties of Goodness (1963). Robert S. Hartmann: The Structure of Value: Foundations of Scientific Axiology (1967). Shalom H. Schwartz: The Theory of Basic Human values, *Universals in the Content and Structure of Values* (1992).



Figur 4.2.13: Diagram; diverging branches of conceptualisation and attribution of value.

Searching for Universal Value and the source of value

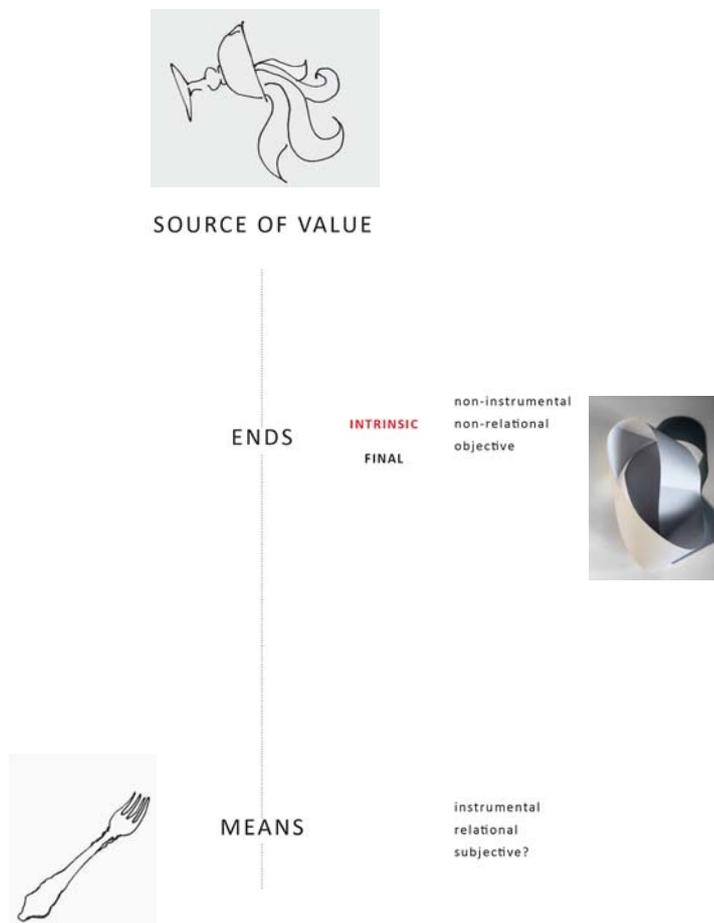
The definition, or indeed dismissal of, Universal value is a pivotal discussion in value theory, sometimes framed as a quest for the Source of value. According to Korsgaard (Korsgaard, 1986)- simplified here for brevity- Aristotle narrowed his search for the source of value down to the final good: *contemplation* as an exercise for understanding. 2000 years later, Kant reflected upon this and suggested that the source of value is a structure of justification where the goodness of the means is conditioned by the goodness of the ends they served. For Kant, *good will* is the source of value. Korsgaard explains this as a consequence of Kant's humanism (Korsgaard, 1986, p. 488). G.E. Moore (Moore, 1976, pp. 64–65) also refers to the source of value by discussing J.S. Mills' utilitarian 'Greatest Happiness Principle'; the ethical principle of an action is right as long as it promotes the greatest happiness to the greatest number of humans affected. These examples of the quest for ultimate value as universal or the source itself, are, human-centered approaches to the source of value.

Recent searches for universal value systems

Even today, Universal value is still sought by some, although with a new interpretation that allows for plurality and an array of universal values. Below, I provide a few examples from different fields within the last 50 years. The logician and philosopher, Robert S. Hartman, claimed to provide what he termed a 'Value Science'. Hartman was not searching for philosophical answers but rather what he saw as a scientific definition of value. This was an approach aiming to make value measurable at a general level. To do this, he created algorithms to calculate levels of worth as standards of measurement, and ultimately defining value (Hartman, 1967a). Hartmann's quest also tells of classic dualisms within value theory; the distinctions between what is framed as scientific and objective vs. 'subjective' value attributions. A different approach is taken by social psychologist, Shalom H. Schwartz, who performs extensive, cross-cultural studies relating to universal values. According to Schwartz, he has found a shared universal organisation of human motivations, and thus values (Schwartz, 2012), 1992). At an organisational and global level, the UN also claims to define universal values, e.g. the Unesco World Heritage Convention defines what they call Outstanding Universal Value (OUV) in global cultural heritage (UNESCO World Heritage Centre 2017) and UN's Millennium Development Goals (United Nations, 2000) has coined six universal values; freedom, equality, solidarity, tolerance, respect for nature, and shared responsibility (Annan, 2010; United Nations, 2000).

The unresolved question of 'what is value'

The above examples not only show different approaches to what is of value and how to provide a shared standard of measurement, whether that be at calculable or interpretational levels. They also indicate that the overarching question is unresolved: what is value? As in the examples, the universal good as well as sources of good can be attributed as originating from sources as diverse as the human mind, embodied-human-properties, culture and morality, cross-cultural psychological features, physical cultural heritage, design, mathematics or global human rights. The search for universal values or the source of value are not solely theoretical projects; they relate to everyday practices due to a quest for defining what *is good*, followed by the ethical and moral questions of whether *good* implicates an obligation to *seek good*. Discussions regarding universal value are also relevant to discussions regarding 'the value of nature', due to a strong connection with what is framed as Intrinsic Value in value theories. Universal value and the source of value are furthermore connected to discussions on the relationship between human & nature, body & mind, individual & society. The various conceptualisations of what is value suggest dualisms, indicating why value judgments can be conflicting and create dispute.



Figur 4.2.14: Som values seem to appear within a hierarchy, some more practical than others, intrinsic value is hard to grasp and is sometimes described by contrast.

4.2.3 DUALISMS AND THE IS-UGHT COMPLEX OF VALUE

DUALISMS IN VALUE THEORY

Value theory is embedded with dualisms³. In the following, I outline some of the major dualisms, and thus potential conflicts. As the theoretical strains in value theory seem to be innumerable via fine-grained variations, I provide some common dualisms, addressing issues of value judgment by pointing to overall comparability and incommensurability. To contextualise, I relate them to common 'isms' within value theory at a general level. The purpose of this is to shed some light on real-life practices of value judgment and common perceptions of value with the potential to cause disagreement due to embedded understandings of value. For example, a landscape architect argues for the prioritisation of aesthetics, the developer finds this purpose vague, pointing to the undocumented cause-and-effect in monetary terms. In such a case, the consideration of aesthetics is likely regarded as a subjective value (and therefore not 'real') by the developer, whereas the landscape architect finds aesthetic considerations to be objective (and thereby 'real'). In this way, the differentiating attributions of value can be seen as dualisms between, for example, what is real and what is not, and thus become incompatible.

I must stress that the following discussion on value theory has a practice-oriented objective; distinctions between philosophies are far more nuanced and not as sharply divided as put here. In the following, I particularly draw on Korsgaard, O'Neill, Rønnow-Rasmussen and G.E. Moore (Hirose and Olson, 2015; Korsgaard, 1986, 1983; Moore, 1976; O'Neill, 1992; Rabinowicz and Rønnow-Rasmussen, n.d.; Raz et al., 2005).

Figur 4.2.15: Value theory has been closely connected to conceptualisations of the divine as being universal. A significant development was framed in the 13th Century Paris Thomas Aquinas. Aquinas defined a clear division between theology and philosophy as a distinction between facts and the divine. This grip separated religion and feelings on value from the physical, measurable world: description was parted from ascription. However, this was not a dualism between the subjective (as relativistic) and objective (as positivistic or naturalistic): the divine was regarded ultimate and not less real as the 'facts' trajectory. Though attributing value to both fact and the spiritual is not part of the sciences today, the principle division between 'facts' and emotions/spiritual elements, is still foundational to the sciences.



³ Often related to the evaluative approach of defining goodness vs. badness or the deontic (moral stand) approach of defining rightness vs. wrongness

Dualism Objectivity >< Subjectivity

Distinctions between objectivity and subjectivity are central to philosophies of value. The search for defining value and good stems back to Ancient Greek philosophy (at least), which also revolves around distinctions between objectivity and subjectivity. In more recent history, discussion surrounding the objective and the subjective particularly developed within value theory⁴ during the 18th – 19th Centuries. Sociology, economy and psychology have in particular formed debates on the concept of value, centred on morality, aesthetic preferences, human psychology, behaviour and social order.

Objectivity is attributed as a search for neutral, fact-based knowledge, describing the real, empirical world through, for example, naturalistic properties. Objectivity subscribes to methods of ‘pure’ description as the way to define value. On the other hand, subjectivity attributes knowledge based on feelings, beliefs, moral codex and so forth. The key difference is whether it is considered only possible to define values as ‘real’ when found in the physical realm, or if values are temporal preferences projected by individual and/or group preferences in a specific context. This is closely connected to whether absolute (universal) values exist or if values are always relative to culture, time, place, individuals, and groups. Although contemporary sciences and philosophies might agree that both subjectivity and objectivity exist in a not-so-clear and divided arrangement, the distinction still influences value disputes, e.g. when a construction site is planned on burial land or a spiritual site.

Objectivity-Subjectivity as Positivism vs. Relativism

The notion of objectivity and subjectivity as opposites is often related to both Positivism and Relativism. Positivism as a philosophy considers value as real and part of the measurable, physical world, claiming that verified (positive) facts can be derived from natural phenomena (empirical evidence), deviating therefore from theology and metaphysics. Positivism and its various, related discourses are often used interchangeably with objectivity and description, and it has significantly shaped approaches to value and value judgment in the sciences today. A full-blown relativism, in comparison, considers all value attribution as subjective and thus, equally true and equally good. The ambiguous implication is that it leaves a status quo: if everything is equally valuable or good, thinking and acting for ‘better’ becomes irrelevant. For the same reason, most value theories in this path are only relatively relativistic. Relativism rejects ideal (universal) values as it considers morality, value and meaning as being relative to other understandings.

4 E.g. David Humes, Immanuel Kant, Saint-Simon, Karl Marx, Émile Durkheim, Max Weber (relates to the periods of Enlightenment, Scientific Revolution, French revolution, and Industrialisation).

DUALISM DESCRIPTION >< ASCRIPTION

Methods and normativity

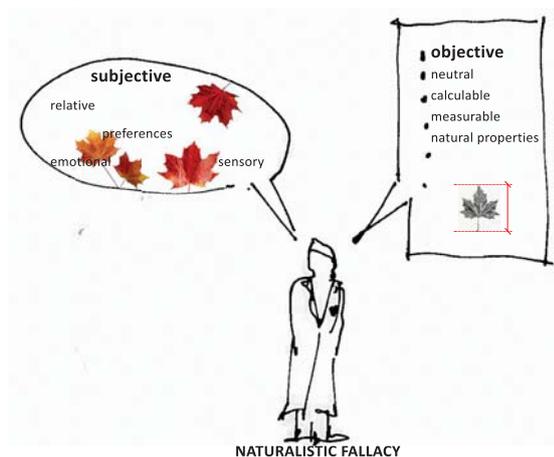
The complex of description vs. ascription of value is foundational in value theory and scientific methods. The distinction between description and ascription has moulded different theories and methodological approaches in both the natural and social sciences, in particular regarding how to achieve validity and truth when discussing values and value judgment. As aforementioned, the search for objectivity is at the origin of some of the core methods still used in the sciences, which are based on measurability, deduction and so on. However, the complex of description vs. ascription forms contradictions and paradoxes, or at the very least practical difficulties, relating to how to perform objective description, even in the natural sciences.

The Is-Ought problem

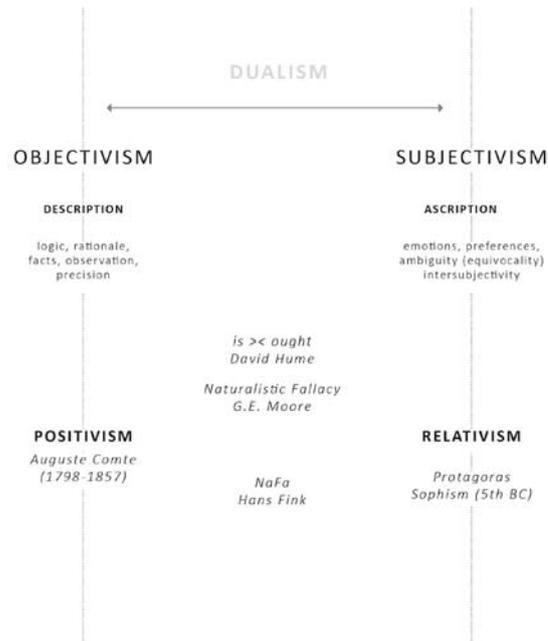
The demand to provide 'pure' objective descriptions has formed a classical complex, famously framed by Hume in 1739 as the '*is-ought*' problem, which states that it is not obvious how one can move from descriptive statements to prescriptive, normative ones. Hume was pointing out that description tends to lead to a prescription that guides action. The underlying value question for Hume was how to define what *is* good based on description, and how this relates to what *should* be good, how things *ought* to be. This complex is still relevant as it questions how to transform 'objective' knowledge into action. In this era of climate change and the epoch of the Anthropocene, the is-ought problem remains a relevant discussion.

The Naturalistic Fallacy

The is-ought complex was further elaborated, although somewhat differently, by philosopher G. E. Moore in his volume *Principia Ethica* of 1903. Moore framed what is still known as the Naturalistic Fallacy: the paradox of performing ostensibly objective measurements when the measurement is designed by, carried out and evaluated via subjective human beings. Thus, descriptions within the natural sciences mix natural properties with ascription of quality and good, ergo a claim to naturalistic objectivity is a fallacy per se. In chapter 4.3, I describe how the philosopher Hans Fink deliberately performs the Naturalistic Fallacy to qualify value judgment.



Figur 4.2.16: The is-ought problem leading to the concept of the Naturalistic Fallacy.



RECCURRING DUALISMS IN VALUE THEORY

- **Universal >< General:** This is a classic dualism. Universal value sometimes connects to the philosophical approaches in theology, religious beliefs and the notion of a universal ideal.
(Universalism is a different matter)
- **Good >< Bad:** This relates both to the evaluative strains of goodness >< Badness and Deontic strains of Rightness >< wrongness. Though value theory tends to see the Deontic and Evaluative approach as being different, they could both be seen to focus on the ethic/moral discussion of what is good and what ought to be good.
- **Divine >< Earthly:** The distinction between the divine, or spiritual, and the earthly has been discussed over millennia. Even today, religious beliefs cater for this distinction, although not as a dualism but rather as a hierarchy with the Divine as superior (Universal).
- **Human >< Nature:** The distinction – or integration – of human beings and what is often called nature (not human-made in origin) is important to the conceptualisation of value. This is a dualism with a very direct impact on everyday practices, policies, politics, and economics, not to mention impacting 'nature' and humans directly.
- **Objectivity >< Subjectivity:** Disputes on objectivity vs. subjectivity are essentially about what is considered 'real'. Fact-based sciences and economics have a history of claiming objectivity; other theories, such as relativism, provide arguments for values being purely subjective, e.g. as being in the mind of the valuator. In common practices, interpretations of subjective and objective might appear quite different, as what is considered subjective by one might not be so from another point of view.

Figur 4.2.17: Diagrammatic overview of recurring dualisms in value theory.

4.2.4 VALUE COMPOSITIONALS - EXTRACTS FROM VALUE THEORY

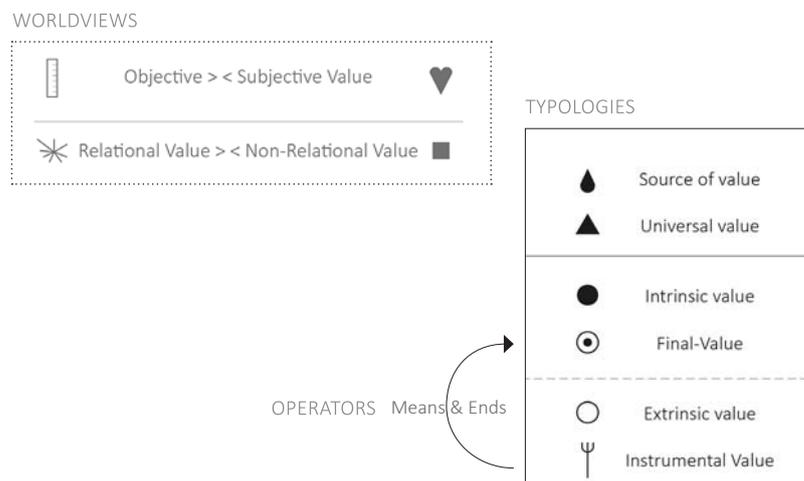
EXTRACTS FROM VALUE THEORY

Value theory has provoked an array of approaches, from arithmetic measuring of value (Hartman), through discussions of nature and intrinsic value (O’neill, 1992) to Aristotelian contemplation (Korsgaard, 1986). Admittedly, it was not self-evident how to translate this variety and breadth into real-life value discussions relevant to everyday landscape practices of this research.

However, these differentiated theories of value do seem to agree on a number of re-occurring themes and use a relatively calibrated value vocabulary, enabling a shared set of keys that can be used to unlock values despite varied viewpoints. In other words, these shared terms and themes appear to serve different ‘functions’, enabling different compositions of value. The following is an effort to extract re-occurring ‘named value elements’ from theory, and thereby to shed some light on why it can be difficult to discuss and agree upon what is of value. I refer to these as Value Compositionals.

I must stress that the Value Compositionals do not describe one particular theory. Philosophers of value would likely, and rightly, claim that what is described is not exactly what they meant. However, to take the readings into a practical-pragmatic realm, I had to transfer the knowledge into a more operational and comprehensible modus for my research objective. Establishing the Value Compositionals was an effort to provide an interpretational overview to inform my understanding of value pluralism and incommensurability in the context of urban landscapes, water, and climate change.

In the Value Compositionals, I particularly draw on the following readings: (Frederiksen, 2014; Hartman, 1967b, n.d.; Hirose and Olson, 2015; Korsgaard, 1983; Moore, 1976; Rabinowicz and Rønnow-Rasmussen, n.d.; Raz et al., 2005; Schroeder, 2016; Stanford Encyclopedia of Philosophy, n.d.; Wright, 1963).



Figur 4.2.18: Principles of the Value Compositionals shown as 3 groupings of World Views, Typologies and Operators.

4.2.5 SUM UP – VALUE IN URBAN LANDSCAPES

EXAMPLES OF VALUE COMPOSITIONALS AT PLAY IN URBAN LANDSCAPES

Value Compositionals are a simplified manner with which to frame in-depth philosophies of value theory. Once again, I have to stress, in deference to the original sources, that the intention of this is the translation of complex and nuanced theory into the practice of everyday, urban landscapes and landscape architecture in the context of CA|HOW. The following exemplifies how different world views and usages of value typologies are present in everyday landscapes of CA|HOW and transdisciplinary contexts. The motivation behind this is the belief that perhaps paying attention to worldviews and value typologies could inform how we engage with, and resolve, conflicting values.

Examples - The oak, a piece of tree and the value of nature

Attributing value to an old oak, as an intrinsic value, may differ from the value attributed to the same tree by a developer, who might see value in a piece of tree via cutting it down as a means and end to monetary value and thus, the monetary value of a new building on the tree's site of more value. These would represent different worldviews: the developer might find that the oak's intrinsic value is rather subjective. Conversely, the other point of view would likely find that, within a value typology, the end value of a new building ranks lower than that of the intrinsic value provided by the oak. Another example could be that of different world views between Ecosystem Services (ES) and Deep Ecology (Næss and Naess, 2005; Næss and University of Oslo. Centre for the Development and the Environment, 1993; Sessions, 1987). ES might find DE rather subjective, whereas DE could claim that the objectivity of valuing natural systems within pecuniary standards of measurement is in fact non-objective or biased. In the example of ES vs. DE, both schools of thought share the same principle in highly valuing nature, but their respective world views differ and the applied value typologies are similarly different. DE applies intrinsic, possibly universal value to nature whereas, in ES, value becomes a means and end operator to obtain End value for human interests without an ethics or moral obligation.

The central purpose of this section was to frame values through Value Compositionals by identifying common themes and elements embedded in value theory and value judgment, and thus to articulate value pluralism. Learning from value theory, I find that world views and the application of value typologies seems to influence value judgments and standards of measurement at a practical level. Different conceptualisations of value are likely to provide different standards of measurement, thus representing potentials for embedded incommensurability. In the context of urban landscapes and transdisciplinary collaboration, different value judgments are fundamental. In the following chapters, I discuss some practical elements relating to qualifying value judgments and justifications.

TPART 4 VALUE

CHAPTER 4.3

GOOD VS. HOW WELL

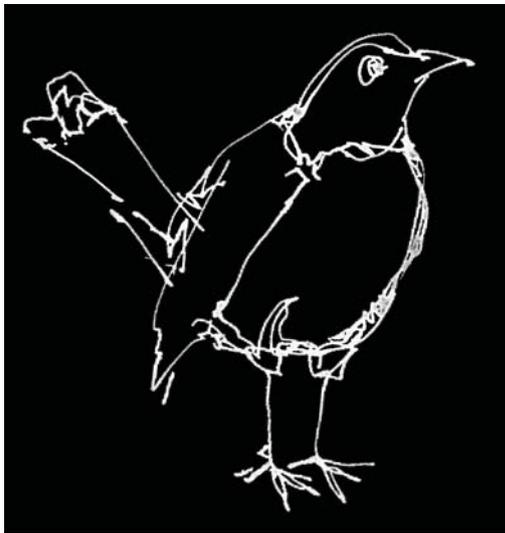
4.3.1. Introduction value judgments

4.3.2 Good, better or how well

4.3.3 The Good Blackbird

4.3.4 Dishwashing and externalities

4.3.5 Sum-up



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GOOD VS. HOW WELL

4.3.1 INTRODUCTION

VALUE JUDGMENTS

"I will, therefore, not try to avoid the classic and common questions in value theory, but rather address them once again as abstract they might be, to test some analytic philosophical and logic-semantic ideas for what I will show is a naturalistic and pragmatic clarification of the philosophical questions on the essence of quality and value judgment, which one anyway ends up with when one discusses motorcycles, teaching or literature." Quote, Fink (Fink, 2012, p. 184)(Author's translation).

There are countless texts on how to use the term *good*, ascribing worth to anything from a piece of bread, a walk, music, political ideologies or a life. The attribution of value is closely related to the conceptualisation of *good*, and its implications closely connect to philosophies on knowledge creation, ethics, aesthetics and morality. This chapter discusses value judgment and the concept of good from the approach of Danish philosopher Hans Fink. Fink argues that we can perform value judgments in a relational yet objective manner by paying attention to linguistics. Furthermore, he exemplifies an approach to bridging the classical dualism between subjective and objective value, in what he frames as a logical imperative.

In the following, I draw upon work by Hans Fink, in particular the article "Når værdidommen falder" / "When passing the value judgment" (Ibid:183-202). In this piece, Fink presents a pragmatic approach to performing value judgments in a practical context, focusing on *how* to perform value judgment as a practice. Furthermore, he provides an entry point into how to bridge the apparently differentiated world views of subjectivity and objectivity. As described, I see this as fundamental to LArch as well as for addressing value creation in urban landscapes.

4.3.2 GOOD, BETTER OR HOW WELL

QUALIFYING GOOD

"[...]sketching the contours of a naturalistic alternative, trying to understand values as facts and judgment as descriptions. [...] this is an effort to break the automatic connection between objectivism and absolutism on the one side and relativism and subjectivism on the other hand, and an attempt to formulate a relativism without the underselling of projection, and an objectivism without the overbidding of fundamentalism." Quote Fink (2012:190)(Author's translation).

Fink provides what he frames as a naturalistic pragmatic stance on the philosophical questions on *quality* and *good* and how to perform value judgments. Fink exemplifies how classic value dualisms, provided by the differentiated worldviews of objectivity, subjectivity and positions on relational processes, can be used together as a composition, providing a tool for value judgment. To do this, he outlines a position on values and value judgment that bridges the dualism between e.g. the natural sciences and humanities. This bridging is what makes Fink's approach particularly useful in both theoretical and real-world, practical realms. Fink frames this stance as a 'naturalistic alternative' to, amongst others, projectionism¹ and relativism, instead allowing value judgments on quality, value, worth, and goodness in a pragmatic manner. Fink argues that, from a philosophical point of view, it is possible to bridge elements from oppositional value theories, e.g. relativism and projectionism, which otherwise are usually in conflict due to differentiated world views. Fink's proposal is both pragmatic and radical, as reflected in the above quote. To do this, Fink deliberately performs the Naturalistic Fallacy². It is somewhat radical to make use of the Naturalistic Fallacy³ to bridge the, usually opposing, dualisms in value theory: the distinction between description and attribution of value. Fink claims that it is possible to combine description with a value judgment, at least if the *contextual* premises are clear. According to Fink, the ambiguity that lies in discussions regarding *good*, is also a matter of a misinterpretation between *being good* and *being good for* something. Fink argues that good and goodness are not about *being valued* but about *deserving* to be valued (p.187).

1 David Hume, a treatise of human nature, 1738-1740

2 G.E. Moore, Principia Ethica, 1903

3 Fink does not aim to solve the underlying is-ought complex of the Naturalistic Fallacy, but suggest precision in value judgment as an entry into being inclusive of moral or ethical issues

4.3.3 THE GOOD BLACKBIRD

FROM GOOD TO WELL – ADJECTIVES AND ADVERBS

"virtually no other adjective than 'good' (and its closest equivalents and counterparts) can be used to cover such a broad, ontological 'terrain.' [...] Apparently, quality can exist in something within very different in different contexts, although without 'quality' or 'good' are experienced as particularly ambiguous words." Quote Fink (ibid:185)(authors translation).

As described in this thesis, the conceptualisation of 'good' has been endowed with many traits in philosophies on value, and the term still triggers ambiguity and dualisms within value theory. According to Fink, there is a linguistic reasoning in this, which ought to be addressed. Fink argues for linguistics as a means to bridge standpoints in value theory by paying attention to the distinction between adverbs and adjectives and their denominating functionality. To explicate the difference, he uses the famous 16th Century quote by Joseph Hall⁴: *"God loveth adverbs, and cares not how good, but how well."*

Good as an adjective does not in itself explicate what kind of goodness; what something is *good for*. When good is attributed to a relatively generic subject (see section 4.3.3), then there is no common ground, no standard of measurement, from which the value judgment can be performed. Using good as an adjective creates a linguistic ambiguity that leaves external judgment ambiguous or impossible.

In contrast, *adverbs* allow for comparison through denomination and graduation- degrees of 'well' - because adverbs are referential to the actions and processes to which good is attributed. In their very essence, adverbs are concerned with properties of processes as they are bound to explicate the details of how to interpret verbs, adjectives, and other adverbs, as a valuator of sentences. In this way, adverbs provide a linguistic key to the long-sought-after standard of measurement. Not as a fixed standard or scale like e.g. the metric system, exchange currencies or algorithms. Rather, it is a pragmatic, and practical, dynamic standard of measurement based on *contextualised relevance*, forming a bridging point between objective and subjective world views.

⁴ Fink, 2012:191. Fink's reference: Joseph Hall (1574-1656, bishop of Norwich). Here quoted from Charles Taylor: *Sources of the Self. The Making of Modern Identity*. Cambridge, 1989, quoting from Charles H. George and Katherine George: *The Protestant Mind of the English Reformation*, Princeton 1961:139n.



A GOOD CARRIER PIGEON

typology: pigeon

basics skills/characteristics
carrier pigeon:

- ability to fly
- ability to carry (smth)
- ability to return (homing)

standard of measurement:
(goodness is dependent on how well the below standards are performed)

- navigation
- endurance
- strength
- speed
- precision
- reliability



A GOOD BLACKBIRD

typology: blackbird

basics skills/characteristics
good-blackbird:

- ?

standard of measurement:

- ?

Figur 4.3.21: Standards of measurement and the problem of being a good blackbird. Fink argues that value judgment can be approached as a comparative logic. Instead of firstly paying attention to the adjective, we should rather look towards the adverb first.

THE PROBLEM OF BEING A GOOD BLACKBIRD

"The simple but peculiar and radical theoretical grip is to carefully distinguish between adjective and adverbial value judgments in order to understand the character of adverbial value judgments as forthright description, and its basic position as a prerequisite of all other value judgments. Quality is fundamentally an adverbial phenomenon. It is basically centered on the way in which "Good" is a logic adverbial adjective that is used to state objective characteristics about the judged, not as an isolated judgment but together with more or less successful processes, which in some cases very well can be of experienced, subjective character." Quote Fink (Fink, 2012, p. 190) (authors translation).

From a philosophical-linguistic perspective, Fink exemplifies how value judgment and notions of *good* and *well* can be dealt with through comparative logic. This is carried out by paying attention to the adverb as the denominator of measurement, which tells of how much and in which way some thing, action, or process is good, or rather: *how well* they are or perform. Thus, the adverb can shed light on how something is measured and what it is *good for*: an adverbial standard of measurement of *how well* instead of *how good*. The adverb brings a dimension of comparability and introduces degrees of goodness (ibid:193).

Fink elaborates on the distinction between adjectives and adverbs (ibid:187-8, 195-196) by exemplifying that it is impossible to know, discuss, or even agree upon, what is a 'good Blackbird'. A value judgment of what is the good part of the blackbird is impossible. One can have a favourite Blackbird and so forth, but, in itself, no one really knows what a good Blackbird is. In this example, good is used as the adjective, and it would take an adverb to come closer to agreement, or disagreement, on whether this actually is a good blackbird. We lack information on what good means in this context: what is it good for and for which process it is good?

Fink explains how this is in contrast to 'a good carrier pigeon,' where the verb carrier, connects to the noun. Here, *good* denominates how well the specific process/action of 'carrier' is performed. It opens up for the possibility of a standard of measurement on how well it carries letters and returns home, and, thus, a key is provided for understanding what this pigeon is good for and how well it can do something: how it can be a good carrier pigeon. Quote, Fink (ibid:200) (authors translation): "*Conception of value is the recognition of something as complex as an object's properties in dynamically interpreted contexts.*"

4.3.4 DISHWASHING AND EXTERNALITIES

DISHWASHING AND THE VALUE JUDGMENT OF PROCESSES

“if two equally dirty plates have been dish washed, and both have become cleaner, but one of them has become cleaner than the other, then the cleaner plate has been better cleaned.”

“The truth of an adverbial value judgment is not dependent on whether the dish washing was an intentional activity deliberately ruled by certain values. If two, equally dirty plates are left in the surf, and the tide cleanses one of them more than the other, it is better cleansed, even though nobody notes it. The plate is just lying there, being better cleansed. This is to underline, that intention is not pivotal to determining value in general and that I speak of processes in general and not about activities or practices.” Quote Fink (ibid:191-192)(authors translation).

Fink further exemplifies the logics of value judgment through an example of dishwashing and its degree of cleanliness. Fink is fully aware that value judgment is often more complex than dishwashing. However, the example provides a linguistic understanding of how adverbs can form the key to performing value judgments and degrees of better, independent of emotional attachments or preferences. From this departure point, a value judgment can be conducted (measured/evaluated) in a relatively pragmatic and objective manner, or, at least with an accuracy equivalent to our technical and conceptual capacities at the time of the assessment. If we describe an object or process as precisely as possible via its objective characteristics and see these in the context of dynamic, relations and processes and their success, then we can make a pragmatic and ‘objective’ value judgment. Thus, Fink’s approach inscribes itself in both relativism and objectivism. The element of relativism is present through Fink’s acknowledgement that contextual, dynamic and relational parameters need to be agreed upon. The element of objectivism, or naturalism, is evident in the insistence that description can provide knowledge for a sound and precise value judgment relating to the Ends. Therefore, the effective means becomes the good ends.

EXTERNALITIES IN VALUE JUDGMENT

World views, relational implications and moral stances

“An adverbial valuation is, provisionally, the basic level of an adjectivistic process-evaluation.[...]The adjectivistic value judgment is always conditional. [...] Which process is the best, the most important or the most relevant as the relatively objective departure of evaluation, are questions that in principle have an answer, if one attach a specified third process as the departure of valuation. The importance of this process can once again be judged by a fourth process and so forth [...]”Fink, quote (ibid:197).

It is one thing to explicate how we can perform value judgments in a pragmatic manner if the referential processes and Ends are made clear enough to allow a standard of measurement. It is quite another thing to perform more complex value judgments. Therefore, Fink continues by addressing the implications for goodness as provided by other values. Fink frames this as *externalities*- relational processes, and ends that are affected by, for example, the good dishwashing. The level of the goodness of cleaning is reasonable measurable. In addition to this, the processes involved are relationally connected to other processes at both smaller and larger scales: dish washing involves using water, most likely detergents, a container, a dish-washing brush, spatial configurations, a state of mind of the dishwasher, light conditions, and so forth. When we agree on the goodness of dishwashing, this judgment might still be overruled by the consequences it has on external, relational processes: if the dishwashing results in polluting a stream and the fish stock dies, then what defines good dishwashing might be reconsidered. The plates are still cleaned as well as before, meaning that the level of cleanliness is consistent, but overall goodness is questioned, and parts of the processes could need to change. Possibly, good dish washing might involve a lower level of cleanliness in order to do ‘well’. In a way, Fink adds a level of ethics, or moral standpoints to value judgments. This is related to the Value Compositionals of relational vs. non-relational world views in value judgment. Furthermore, this touches on the value Operator of means and ends. Good dish washing is dependent on a moral stance of weighing means and ends, contextualised by externalities as relational interdependencies. The value judgment of a process might be good in a first sense, but it does not hold a universal good. Thus, Fink’s claim: *the value judgment is conditional*. Fink relates externalities to an obligation of providing criteria of relevance, according to the knowledge available, an ethic or moral stance: the success of one process is no excuse for not taking account of other relevant processes within the value judgment.



Figur 4.3.22: Processes doing well or not so well, with or without human intentions, indicating examples of external relations as tide, algae, seaweed, steps, spills, Venice 2016

4.3.5 SUM-UP

Linguistics and standards of measurement

To summarise, by providing precise linguistic standards of measurement through paying attention to the comparative logic of adverbs instead of looking firstly to the denomination indicated by the adjective, we can perform objective value judgments in a pragmatic yet relatively objective manner. This stands in contrast to projectionism and relativism. However, objective or not, this does not insure against incommensurability. As in the example of dishwashing, even if a standard of cleanliness is provided and agreed upon, the extent of relational processes to be included might not similarly be agreed upon.

According to Fink, it is possible to engage in a value judgment if we consider it in a contextual relation to certain things, situations, and processes. In this way, Fink goes beyond discussions regarding *what is good* and enters instead into *how something is good* and what it is *good for: how well*. What seems particularly useful for this research is how Fink's approach connects into everyday linguistics and common sense logics in a practice-oriented context. It seems reasonable to suggest that most people, outside of philosophy or theory, find themselves possessing some capacity to perform value judgments, including an acceptance of subjective and objective valuation criteria, depending on the context.

Bridging worldviews and value judgment in CA|HOW

Fink's approach, allowing for both objective (naturalistic) descriptions as well as what is often framed as subjective argumentation, seems useful to LArch and the subject matter of this research. From a practical stance, Fink exemplifies how the conceptualisation of good, better, best or worse can be discussed through the comparative logic of how well. Furthermore, Fink's bridging of the dualism in value theory can be useful as a means to engage with value creation and the notion of 'better' processes in everyday landscapes of CA|HOW. Dishwashing and cleanliness represent value judgments with a relatively straightforward comparability, likely without the complication of overly complex external factors. It does not answer, however, what happens when different value judgments and conflicting values meet. This leads us back to the core value issue of this research: added-value as value pluralism. In this context, added-value is used to suggest value plurality. However, with value pluralism, the standards of measurement are not necessarily shared and, as CA|HOW is a 'wicked problem', the relational processes are not easily defined. Thus, value dispute is also likely.

Two issues are at stake here: firstly, how one judges Means and Ends. Secondly, the fact that the more relevant externalities (different processes) that there are in existence, according to the current state of knowledge (pro-tanto), the more difficult it becomes to perform the value judgment. Value judgments can be carried out in accordance with each confined process, but the comparison between primary, secondary, tertiary or quaternary processes might not hold shared standards of measurement. Value pluralism imposes complexity on value judgment, and even if each process is described with as much precision as possible, these processes might not be easily compared.

The complex nature of externalities and plural processes relate to the diverse interests and processes in urban landscapes of CA|HOW. For example, if an adaptation project is calculated to have the correct capacity locally, but leaves downstream with further flooding, then it could be a good, local adaptation measure, but without the goodness to nominate it good overall. As soon as biodiversity, future generations, ownership and economic interests are added as externalities to value judgments of CA|HOW measures, then complexity drastically multiplies. In the following chapter I discuss value pluralism and how we might be able to articulate and discuss value judgment and plurality through justification, while also acknowledging dispute.

PART 4 VALUE

CHAPTER 4.4

JUSTIFICATION AND VALUE PLURALISM

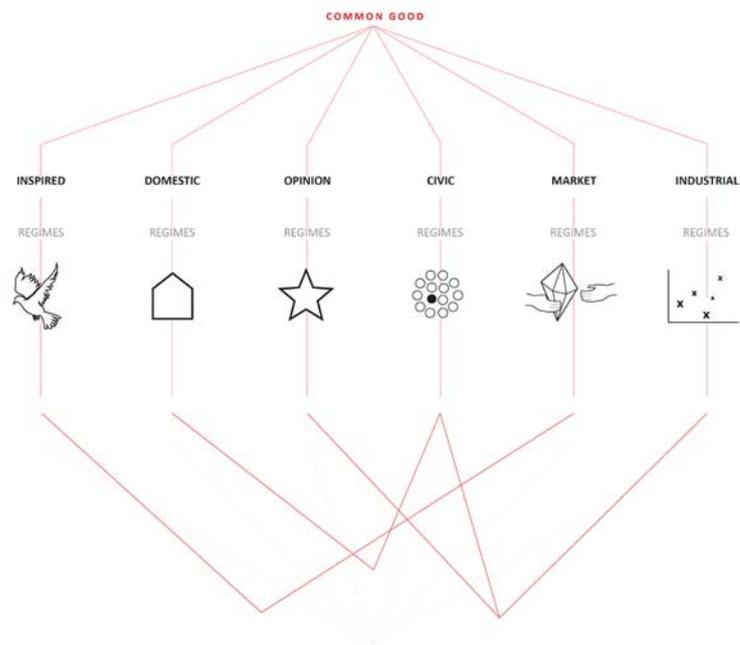
4.4.1. Introduction to Justification & Value Pluralism

4.4.2 The 6 Regimes of Justification

4.4.3 A shared humanity and the common good

4.4.4 (Pre) Public situations of human and non-human actors

4.4.5 Sum-up- Justification, water and landscape architecture



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JUSTIFICATION AND VALUE PLURALISM

4.4.1 INTRODUCTION

JUSTIFICATION AND VALUE PLURALISM

Fink has shown how it is possible to qualify value judgments while also bridging the dualism between relativistic and positivistic approaches. However, as value theory shows, the conceptualisation of value is not resolved. Thus, value pluralism is foundational to the 'nature' of value. This means, that even when providing the needed precision for a standard of measurement, we might not agree anyway: someone else is likely to provide a different standard of measurement on the same subject matter. Value pluralism is prone to dispute and value judgment is likely to provide incommensurability.

In the urban landscapes of CA|HOW, it seems reasonable to expect differentiating, and conflictual, interests. At an overall level, this is likely to include differentiated conceptualisations of value. For example, different world views on what is valuable: is promoting biodiversity of value in itself without a defined End value for human beings or is valuing biodiversity a subjective world view of only relative value to the individual? Or non-aligned valuations of what should be included as relevant relational processes or factors: are upstream actors included in the process of determining what is causing flooding to downstream actors? Is quality of water or sense of place included in evaluations? Similarly, with different value typologies: do urban environment need to achieve economic growth, and thereby have End value, and how does this correlate with cutting down trees to make space for development, when others find the trees have intrinsic value? In short, plural values are likely to be represented by different standards of measurement that, while potentially equally legitimate, are also the cause of incomparability, and thus difficulties in value judgments.

Value and worth closely relate to justification¹ as a core element in performing a value judgment. This chapter brings the value discussion further into the realms of plurality and value dispute by employing the framework of the 6 Regimes of Justification as provided by Laurent Thévenot and Luc Boltanski.

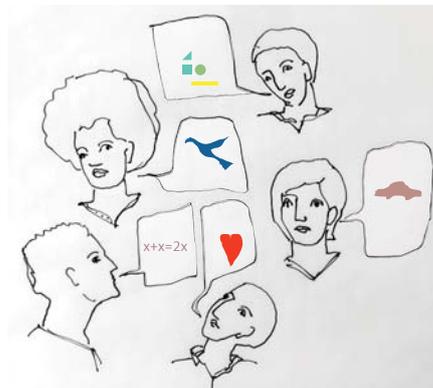
1 justification stems from 'justify,' an act of justice

Justification and compromises across world views

Fink's linguistic reading of value judgments, specifically his call for greater precision in the articulation of processes and ends, seems useful for this research, as it is a practical entry point that acknowledges both objective and subjective values. As in the dishwashing example provided by Fink, the more complex the value judgment, the more externalities are likely relevant, thus making it more difficult to reach an operational level of precision that will enable the performing of a value judgment. In the context of climate change and changing waterscapes, this precision is further stressed by uncertainty.

Externalities in urban landscapes and CA|HOW are manifold and cross-scale. Urban landscapes and water are relationally bound to ownership and planning boundaries, land-use and settlement patterns, sub catchments and watersheds, soil properties and terrain, socioeconomic factors and growth paradigms. In addition to all of this, we must consider attachments to place, childhood memories and valued trees. All of the above provides specificity and a level of precision attached to a real world context. However, precisely because of this, there is a tendency for incommensurability and dispute. In order to engage with plural values at an operational level, a framework is needed to discuss and acknowledge plurality and disagreement. The difficulty lies in doing this without erasing or neglecting values, while simultaneously being appreciative of different values without entering into a relativistic position where all values are equally *good*.

This is precisely what Boltanski and Thévenot provide with their framework 6 Regimes of Justification: a common denominator for a shared humanity and common good bound into a framework addressing different modes of justification. Thus, the framework acknowledges plurality and differences from the very outset by framing six common modes of justification that in themselves do not share a standard of measurement. The 6 regimes represent an acknowledgement of different world views, inclusive of plural value typologies, which are likely to be incompatible. In addition to this, they point towards how different regimes can form alternative compromises across incompatible justifications, going beyond necessarily sharing worldviews or necessarily agreeing on value typologies.



Figur 4.4.23: Various actors with different lines of argumentations, creating incompatible standards of measurement.

4.4.2 THE 6 REGIMES OF JUSTIFICATION

INTRODUCING THE FRAMEWORK 6 REGIMES OF JUSTIFICATION

The 6 Regimes of Justification is presented by the French pragmatic sociologists Luc Boltanski and Laurent Thévenot. They offer a way of identifying and justifying values with their 6 Regimes of Justification (Boltanski, 2006): *the Inspired, the Domestic, the Opinion, the Civic, the Market and the Industrial Regimes*. The six regimes of justification are in reference to what Boltanski and Thévenot call Orders of Worth. The framework provides a methodological approach to understanding patterns of dispute and justification as contextually aligned argumentations, as found in (peaceful) disputes in the public realm of contemporary France. They suggest that it likely also applies to other Western countries influenced by the same political philosophies that the authors have used as Grammars for the regimes (Albertsen, 2002:57) (please see section 4.4.2 on the Grammars). The authors explicate that the six regimes are not exhaustive, and that other regimes are likely to exist or arise; indeed, both authors have suggested a seventh regime. Boltanski has proposed the Project order and Thévenot and Lafaye (2000) have suggested the Green order. Laura Centemeri has provided further insights into this possibility (Centemeri, 2013).

In this context, I have decided to stick with the original six orders of worth and their regimes, as they have proved adequate as an explanatory framework and their flexibility seems to provide enough contextual variation so as to inform the value creation in this research. Once again, this is a theory that has emerged far from my own field and discipline, and sociological analysis is beyond the scope of this research. By using this framework, I have to stress that I am aware that the original conceptual framework is much more complex than how I draw upon it. In this research context, it has been adequate to use the overall principles of the conceptual framework: I bring in the framework for practical-pragmatic reasons and not as philosophical pragmatism.

In the following, I particularly draw upon the book by Boltanski and Thévenot; 'On Justification' (Boltanski and Thévenot, 1999; Boltanski and Thévenot, 2013) and their article 'The Sociology of Critical Capacity' (Boltanski and Thévenot, 1999; Boltanski and Thévenot, 2013). I begin by providing a brief description of the 'concept' of the six regimes, followed by some background showing how the regimes have the potential to bridge between dualisms in value theory in a practical context relevant to urban landscapes and CA|HOW.

Real world dispute and patterns of justification

The distinctions between the 6 regimes of justification (from now on 6RJ) take departure in real-world disputes, and this is a key reason why the framework has been productive for the objective of interpreting and pushing values in this research context of urban landscapes. What is particularly useful is how the 6RJ provides a common denominator of a shared humanity and the common good. Building on this foundation, the authors explicate and acknowledge differences, and thereby also (peaceful) dispute, through different patterns of justification. The 6RJ provides an approach to address value pluralism *'that might enable us to escape having to choose between formal universalism and the kind of unlimited pluralism'* (Boltanski,1999:365).

Exemplifying the 6 Regimes of Justification

Below is a brief introduction to each of the 6 regimes of justification (Boltanski, 1999:370-370) (Boltanski, 2006:159-211).

The Inspired regime: what is justifiable and thus considered valuable, is creativity, artistic modes, free-spirit thinking, religious or spiritual beliefs.

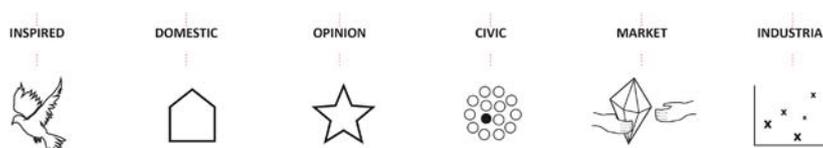
The Domestic regime: what is justifiable and thus considered valuable, is trust, loyalty, tradition, and family.

The Opinion regime: what is justifiable and thus considered valuable, is whether others consider something valuable or not, the more support, the better.

The Civic regime: what is justifiable and thus considered valuable, is whether there is a greater purpose being served e.g. society, institutions, local community or a common good.

The Market regime: what is justifiable and thus considered valuable, is whether something is tradable or marketable (not to be interpreted as economy, the financial world).

The Industrial regime: what is justifiable and thus considered valuable, is standards, generalisation, measurability, calculability, and established methods.



Figur 4.4.24: Diagramming pictograms for the 6 regimes of Justification.

Non-aligned value judgment and justification

Boltanski and Thévenot have identified 6 commonly used modes of argumentation as seen in (peaceful) public dispute. Each regime relates to an order of worth, pointing towards what is considered valuable and justifiable in the specific situation.

The 6RJ explicates how argumentations can be contextually aligned to the specific situation of a dispute, as opposed to the difficulties provided by non-aligned argumentations. It provides groupings of shared 'standards of measurement', modes of justificatory equivalence. A situation is not, however, necessarily acted out through a single, calibrated justification: situations can be ambiguous (Boltanski, 1999:374). For example, some actors might find that the just and appropriate argumentation in a dispute is that of market growth whereas other actors find that the worth lies in that of social cohesion. Different regimes attach different justifications to the same matter. This provides a level of incomparability between the regimes and a need for compromise arises (ibid:375).

Resonating with LArch practice experiences

From a practical perspective, the 6 RJ framework strikingly resonates with my own LArch practice experiences. The descriptions of the justifications resemble those of disputes in practice situations. For example, at project meetings or in public hearing phases where there might be an engineer claiming to have calculated the best solution (Industrial) an architect explaining the importance of aesthetic values (Inspired), a developer justifying building more densely due to real-estate interests (Market), politicians agreeing to revise urban planning to facilitate a landmark building to brand the city (Opinion), citizen groups justifying how an existing public green space is of more importance to health and social coherence (Civic) and homeowners disagreeing over proposed changes to their local road (Domestic). In a practice context, these represent common justifications within projects, going on at the same time and in the same space. The 6RJ provides a real-world understanding of how come we can talk about the same topic and arrive at entirely different (value) judgments on what is good and justifiable.

Contextualised justification and human actors

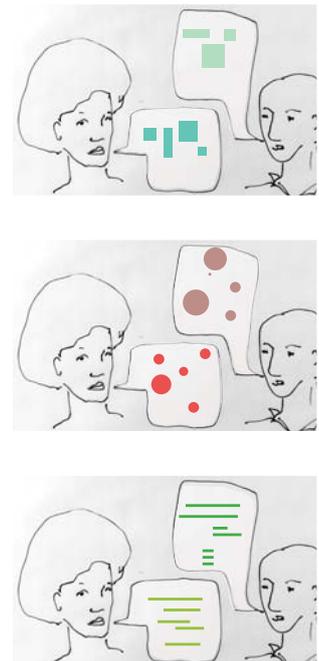
"In order to understand the actors' capacity for criticizing, we had to construe them as endowed with the possibility of shifting from one form of justification to another while remaining true to a consistent set of requirements." (Boltanski and Thévenot, 2013, p. 15)

What is particularly important in the context of urban landscapes is that the 6RJ represents a variety of world views and value typologies based on situated contextualisation, thus specificity. It does not claim to provide universal valuation criteria. Indeed, it only 'functions' when contextualised. In this way, the framework provides an understanding of plural values and value judgments, including an understanding of incommensurability: some situations (processes) demand certain types of justification than in others, and the framework acknowledges how justifications are subject to change depending on the situation. This is opposed to models that define actors by class, gender or individual interests: the 6RJ framework *expects* actors to shift their justifications according to the given context of acceptability and relevance. Using the previous example, the developer is likely to provide different justifications when the sea view from his house is blocked by new buildings.

Attributing human actors with competences

"[...] our undertaking respects a distinguishing characteristic of human beings, namely that they are reasonable: they have judgment. In order to judge justly, one must be able to recognize the nature of a situation and adapt to it." (Boltanski and Thévenot, 2013, p. 144)

Boltanski and Thévenot specifically attribute human beings with the competences of justification and just judgment, resonating with the practical notion of human beings as being able to perform value judgments in their everyday lives without necessarily turning to violence or only benefitting oneself. Thus, they go beyond the expectations of human behaviour as seen in e.g. Rational Choice Theory. Boltanski and Thévenot offer an approach with the fundamental characteristic of linking real-life, situational and relational justification competences with a more general understanding.



Figur 4.4.25: Justificatory contextualisation. Various actors with situated alignment of justifications, putting arguments to test.

4.4.3 A SHARED HUMANITY AND THE COMMON GOOD

ORDERS OF WORTH AND SHARED HUMANITY

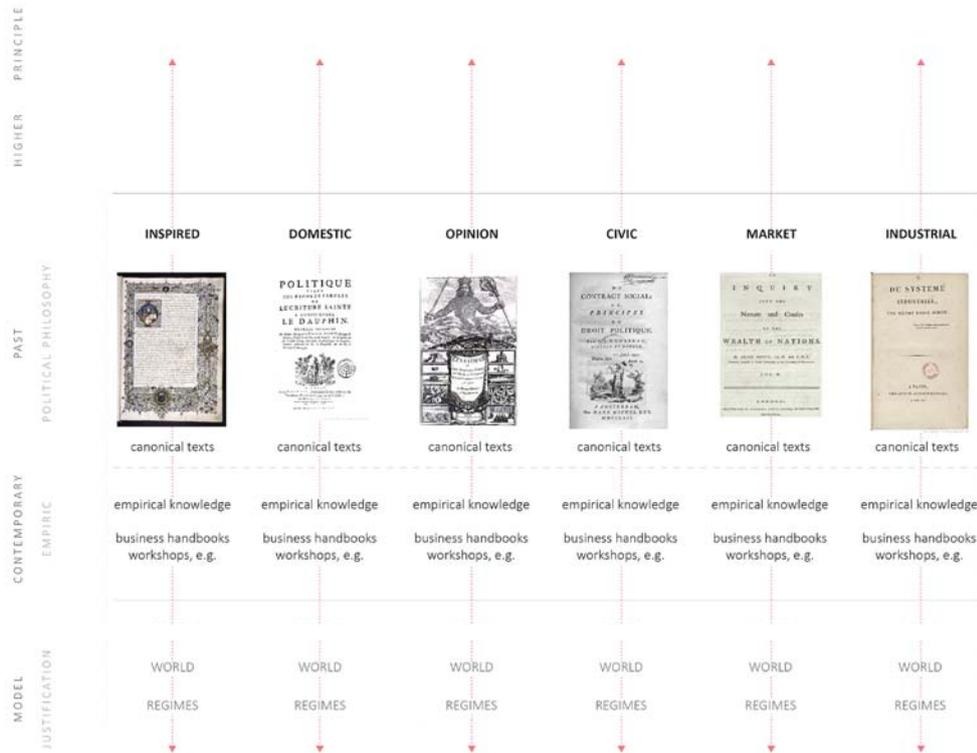
"[...] We have chosen classic works of political philosophy that offer systematic expressions of the forms of the common good that are commonly invoked in today's society."(Boltanski and Thévenot, 2013, p. 66)

'On Justification' is based on different bodies of knowledge, namely empirical² data and classical texts from political philosophy, aiming to *'find out the legitimate worth available to the persons in ordinary situations, when they have to make their grounds explicit and to yield justifications'* (Boltanski and Thévenot, 1999, p. 365)(see diagram). In this work, they identify a shared notion of justice. From this, they relate their framework to the higher principles of a shared common humanity and common good (Boltanski and Thévenot, 1999, p. 361; Boltanski and Thévenot, 2006, p. 74). In this way, the authors emphasise that the framework of justification needs to be understood in a societal context of human equity, thus a society that acknowledges equity between human beings as such, meaning, e.g. not a society with slaves (Boltanski and Thévenot, 2006, p. 74).

The orders of worth are not bound to specific social domains or classes, rather they co-exist in the same social space (Boltanski and Thévenot, 1999, p. 365). The founding theory that they draw upon consists of a study of canonical texts from political philosophy. The selected³ six canonical texts are referred to as grammars of the six orders of worth. Although different, the grammars have a common trait: they share a goal of constructing a common humanity (Boltanski and Thévenot, 2006, p. 13). This foundation of a shared, common humanity is what constitutes the overall linkage between different orders of worth and justification. In this way, Boltanski and Thévenot points towards a shared notion of justice and the common good, that in dispute is articulated through commonly accepted argumentations deemed appropriate to the situation. By doing this, the 6RJ addresses justification as being situated and at the same time it reduces some of the complexity of justification, thus making interpretation comprehensible (ibid, 2006:127).

² Based on empirical knowledge from field observations, empirical experimental workshop/ tests, contemporary behavioural business handbooks.

³ Saint Augustine: *The City of God* (413-426 ce)(Inspired); Jacques-Bénigne Bossuet (1627-1704): *Politics Drawn from the Very Words of Holy Scripture* (Domestic); Thomas Hobbes: *Leviathan* (1651)(Opinion); Jean-Jacques Rousseau: *On the Social Contract; or, Principles of Political Rights* (1762)(Civic); Adam Smith: *The Wealth of Nations* (1776)(Market); Henri Saint-Simon, *Du Systeme Industriel* (1821-23)(Industrial).



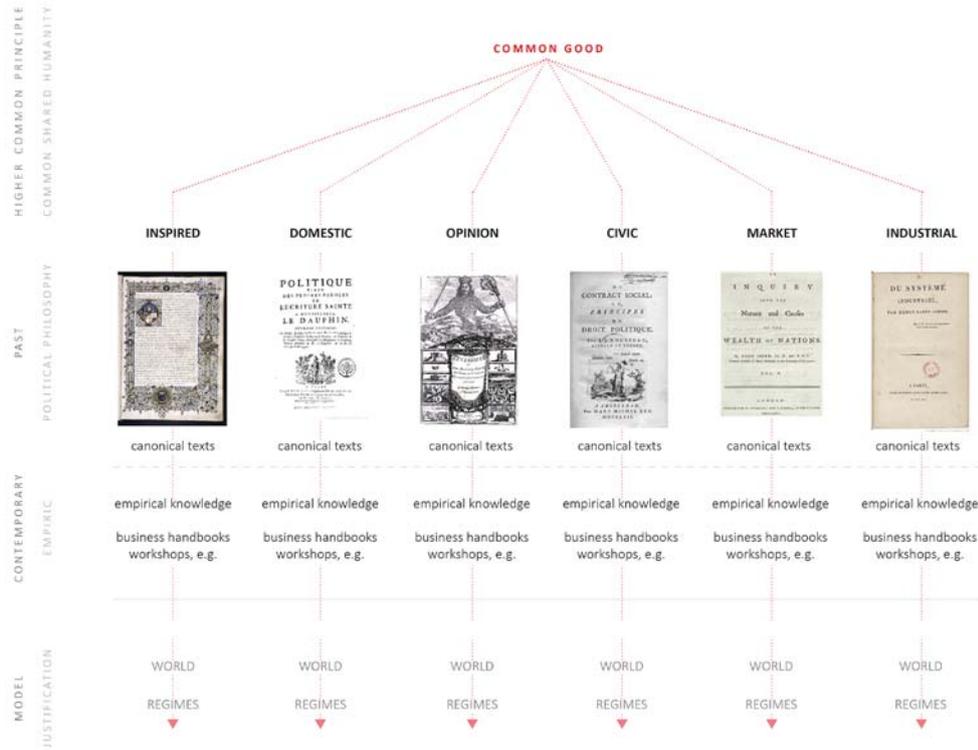
Figur 4.4.26: Diagram of the 6 Regimes of Justification. Each regime (and world) is based on a canonical text as its 'Grammar'.

Equivalence as a contextualised standards of measurement

"[...] one has to bring together different sets of people and objects and to make connections between them.[...] Persons seeking agreement have therefore to focus on a convention of equivalence external to themselves." Boltanski and Thévenot, quote on equivalence in dispute (Boltanski and Thévenot, 1999, p. 361).

According to Boltanski and Thévenot, claims of justice in a public dispute have to be substantiated through argumentations that can be accepted as relevant in the public. In one context, this might entail justification of the Industrial regime, providing measurable, technical arguments, e.g. infiltration ability, capacity or levels of pollutants, whereas other situations of dispute require justifications from the Domestic regime, e.g. of tradition or the perceived safety of one's family. What is important in public dispute is the establishment of justificatory equivalence. In public, the appropriate justification is not about private or emotional concerns, but rather externalised facts that are relevant to the situation.

The framework of 6 Regimes of Justification implicitly connects to Hans Fink's attention to linguistics regarding the use of adjectives and adverbs. According to Boltanski and Thévenot, it is not justifiable (in public dispute) to make a claim that: 'this is a good masterplan. Therefore I am right'. The adjective needs to be qualified. Boltanski and Thévenot add an interpretational frame to this, allowing for a situated understanding. According to Boltanski and Thévenot, argumentation needs to be qualified and contextually fit in order to substantiate claims on right, better or worse. The need for qualification is a matter of comparability, which the authors address by pointing towards justificatory equivalence as a path to solve a dispute: a contextualised calibration of justification, aiming to reach a compromise on what is just, thus good or at least an acceptable agreement. Without equivalence, the outcome of a (peaceful) dispute is more likely to be resolved without concern for justness or a common good. For example, disputes determined through power relations of position (who has the most influence outside public justice) or strength (violence).



Figur 4.4.27: Diagram 6RJ. Though different, the 6 Regimes of Justification are connected through a shared, higher principle of a shared humanity and the common good.

4.4.4 (PRE) PUBLIC SITUATIONS OF HUMAN AND NON-HUMAN ACTORS

Equivalence and externalities

The rules of acceptability and the establishment of equivalence go well with two important elements in the previous value discussion provided by Fink. The 6RJ framework connects to Fink's approach through the acknowledgement of objective, naturalistic descriptions together with a pragmatic notion of contextual relevance and the everyday life capacity of actors to perform value judgments beyond social constructions. Furthermore, the acceptance of different justifications regarding the same subject matter being present at the same time and in the same space, while attributing different values and seeing different relational properties, seems to be related to Fink's description of externalities, and the need to define relevant processes in any value judgment.

Composite assemblages and situations

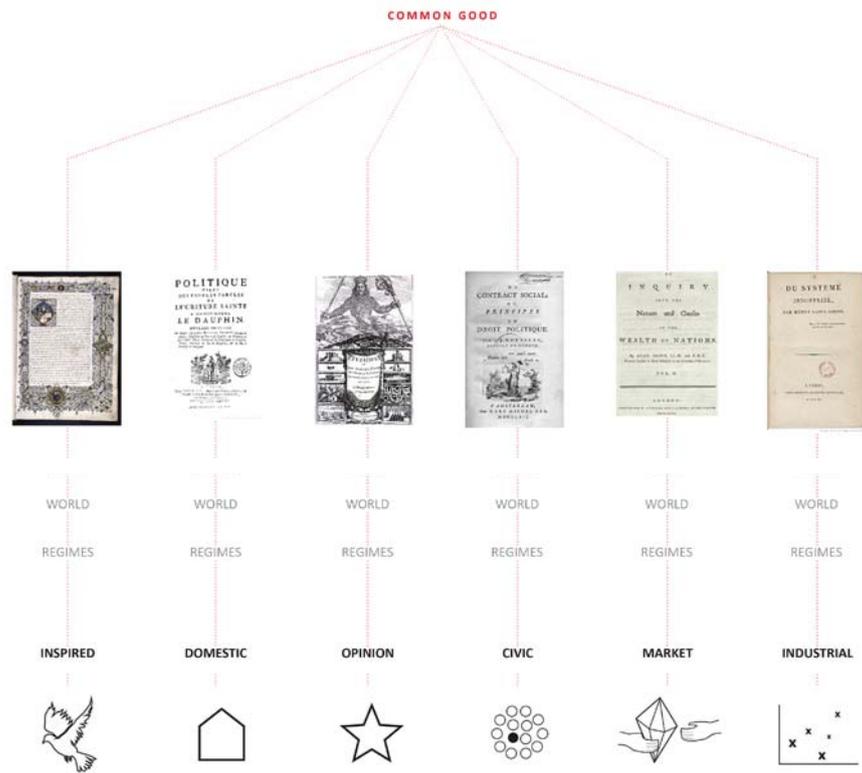
"Disputes involve not only human persons but, also, a large number of objects.[...] The frame must be designed to deal with disputes in the real world, that is, it must be able to describe the way disputes link together persons and things." Boltanski and Thévenot (Boltanski and Thévenot, 1999, p. 361).

The relations between person-states and thing-states constitute what Boltanski and Thévenot calls a *situation*. In the situation of a (peaceful) dispute, a composite arrangement of human and non-human actors is set as an aligned argumentation that is contextually fit for the regime of justification (ibid: 360-361). Boltanski and Thévenot, relate to Actor-Network-Theory in the way that they inscribe human and non-human actors as forming parts of a situation (Boltanski and Thévenot, 2006, p. 18, 1999, p. 366). As described in the chapters 1.2, 2.2, I find that the element of including human and non-human actors is a foundational element to landscape architecture.

The inclusion of human and non-human actors also links the 6RJ to Fink's approach to performing a value judgment: justification is about making relevant, meaningful, acceptable, connections (relational implications) by assembling different sets of relevant elements. This forms composite arrangements of human and non-human actors.

Public dispute - Justification and a public sense of justice

The regimes of justification are set in a public context. Boltanski and Thévenot make a distinction between modes of justifications in the public realm and what they call the 'affective regime' and 'regime of familiarity' (Boltanski and Thévenot, 1999, p. 362). The affective regime represents situations of dispute in the context of e.g. love, violence, and family relations. Boltanski and Thévenot argue that the affective regime go beyond the need to establish equivalence because such situations of dispute are likely to draw upon preceding situations, circumstances and emotions that are not necessarily consistent in their line of argument in a generalised, public, sense of justice. External listeners to a family dispute might not see any logic or justice in the justifications (Boltanski



Figur 4.4.28: Diagram 6RJ; different regimes of justification, have been used in this research context as more simplified principles than the authors intention. Acknowledging the shared humanity and the common good aligns with this research context and researchers notions.

and Thévenot, 2006, pp. 336–338). According to Boltanski and Thévenot, this is in contrast to public disputes requiring generally acceptable justifications. The 6RJ is therefore specifically set in the context of public disputes and not inclusive of all other disputes.

To solve a situation of public dispute through justificatory agreement or compromise without violence (Boltanski and Thévenot, 2006, pp. 343–344), the involved actors need to establish a commonly accepted equivalence in justifications: a shared standard of measurement.

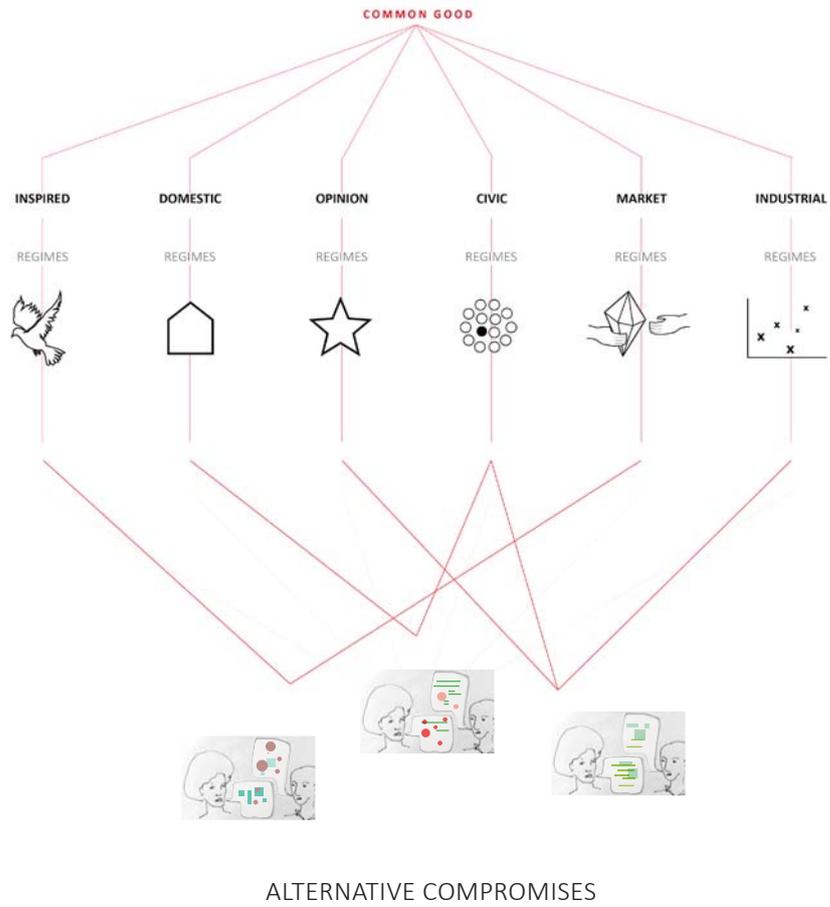
Public and pre-public in this research context

Boltanski and Thévenot specifically address public dispute. This is different from the context of this research. However, I find that the cases have been enacted in what I consider as pre-public situations, primarily because the cases were situated in a public municipal context and the subject matter of the cases was a public issue. The municipality is, in its very origins, a public affair, and decision-making and projects are supposed to reach the public (citizens) at one stage or another. The actors from the water company also have public responsibilities.

The cases took place in a project-actor context with a high level of ‘public’ consciousness, and this is what I call ‘pre-public’. All decisions from municipal actors were weighed regarding their future liability in a public sphere, while, at the same time, the actors had to make decisions and act in advance of public announcements or hearings. The case actors had to accommodate the future public life of the project at the same time as they established the foundation of the projects (handling the complexity of CA|HOW and establishing a solid foundation for the project through political support, cost-benefit analysis, acquiring land and so on).

The situations were not yet public disputes; rather, they represented a context of potential public disputes, acknowledged and articulated on a pre-public level. The meeting discussions by the case actors had a concurrent and strong link to what they *expected to be disputable* in public and what would be legitimate in subsequent, mandatory public phases. Attending the case meetings revealed a working context that was highly politicised and sensitive: eventually, the CA|HOW projects would, lead to public hearings, as well as demands of approval from the city council and potential media coverage. This meant that the actors seemed constantly aware that, at some point in the future, their decisions were prone to be exposed to public dispute.

In the context of my cases, I find that the case-actors situations and the associated physical context of public, urban landscapes formed a pre-public context intended for the public and prepared for public dispute. If water is included as an actor, the relevance of a public context of justification is further stressed. Within the pre-public context of the cases, the contours of potential, future public dispute were ever present.



Figur 4.4.29: Diagram 6RJ. Different regimes of justifications forming alternative compromises. This option does not require that the actors change their world-view, rather it is about seeing a 'third' potential/solution for solving dispute.

4.4.5 SUM UP - JUSTIFICATION, WATER AND LANDSCAPE ARCHITECTURE

THE 6 REGIMES OF JUSTIFICATION AS AN ANALYSIS FOR VALUE CREATION

The framework of 6RJ belongs to the political social sciences and it does not propagandise pluralism or action. This research does. Nevertheless, the framework resonates with pre-public and public justifications experienced in the cases and as well in landscape architectural practice. Furthermore, climate change and CA|HOW is deeply embedded within diverse justifications and is taking place in urban landscapes of public interest, thus also being prone to dispute. Transforming elements from the 6RJ into an interpretational, action-oriented context seems to be useful in acknowledging diverse and plural values. Using the 6RJ in this way is, of course, to render it eligible for the prompting of questions from other research discourses.

RELEVANCE TO URBAN LANDSCAPES AND THIS RESEARCH

In a practical context, the 6RJ has the capacity to 'function' as a scale-less and dynamic approach useful to real-world actors. In this research context, this means human actions and the dynamic processes of water in urban landscapes. From the perspective of LArch and water, it seems particularly useful that the framework provides contextual, temporal and scalar flexibility in approaching justifications and differentiating values. The 6RJ acknowledges that actors are most likely to represent more than one regime. According to the relevance of the subject matter, time, space and other actors, actors are likely to shift in their justification (and thus, regime) depending on the situation (2006:15, 1999:365). Thus, it does not suggest fixed modes of actor behaviour. The 6RJ provides an approach that is generic *and* specific at the same time, going beyond that of 'formal universalism or unlimited pluralism'. What is further relevant is the forming of compromises between different regimes of justification.

Water, urban landscapes and value pluralism

The fundamental actor of this research is water. Water does not represent any justification or regime, it does not argue, it only acts. The implications of water, however, influence all 6 regimes of justifications. In itself, water pushes justifications and value judgments with relevance to public interests and the common good. Furthermore, urban landscapes represent several values, and thus, justifications, simultaneously.

In my case encounters, I have employed the framework of justification in an exploratory manner: both as an interpretational tool to 'decode' values through justification patterns as well as in a propositional manner in order to push value pluralism through different justifications.

This is a LArch RTD approach oriented towards action and, of course, it differs from the original intentions of the framework and its sociological foundation: the framework of the 6 Regimes of Justification was not intended as a *modus operandi* and Boltanski and Thévenot make no claim for plural values being *good* or preferable compared to singularity.

Water as a resource pushing plurality and dispute

During the research, the framework of the 6RJ have been useful as an interpretational frame in the context of the human case-actors (individuals, municipal departments) with different agencies and justifications while simultaneously representing a collective awareness of (future) public disputes and the common good (see Case Lystrup). In addition to this, at a primary level, water as a resource is a public matter, even when held in private hands, e.g. as businesses selling bottled water or watering golf courses, or larger operations like fracking that contaminate drinking water. Water is a public affair that attributes plural values and disputes.

The inspirational regime: About HOW that could be poetic, explorative, creative HOW projects, holistic thinking, deep ecology

The domestic regime: About HOW that could be to prevent a residential house of a flooded basement, safe environment for the family

The opinion regime: About HOW that could be media wanting to create headlines to gain readers interests or politicians wanting to accommodate public opinion here and now or respond to former flood damages by initiating defensive measures, e.g. the building of dikes

The civic regime: About HOW that could be clean drinking water for future generations or local involvement processes

The market regime: About HOW this could be elements or techniques, like filters, materials and technical solutions, which could be exported to or traded with others, thus marketable.

The industrial regime: About HOW that could be hydrological calculations, capacities and measured soil conditions

PART 4 VALUE

CHAPTER 4.5

LANDSCAPE AFFORDANCES

4.5.1 Introduction to Affordances

4.5.2 Contextualisation of Affordances

4.5.3 Gibsonian Affordances

4.5.4 Design-related application of affordances

4.5.5 Affordances and skilled practices

4.5.6 Sum up – affordances – LArch and urban landscapes of CA|HOW



P4_C5

LANDSCAPE AFFORDANCES

4.5.1 INTRODUCTION

“Affordance: A quality of an object or environment that allows someone to perform an action.” The Oxford dictionary of English etymology (Onions et al., 1996)

The original concept of affordances addresses potentials of action in the physical surroundings, enacted by humans and other living actors. In this chapter, I discuss the concept of ‘affordances’ as productive to landscape architecture in the sense of articulating potential value creation connected to physical landscape properties and real-life actors. What seems further useful to landscape architectural methods is that affordances are inclusive of aesthetics.

Structure of this chapter

In the following, I outline a few of the strains of how to interpret affordances as a concept with regard to the subject matter of this research. Firstly, I provide a contextualisation followed by a brief introduction to James J. Gibson, who invented the concept of affordances. This is accompanied by an introduction to some of the developments in different fields using the concept of affordances in design-related contexts. Here, I particularly address how the concept of affordances frames and bridges human behaviour with its physical surroundings. This is followed by an example of a multi-layered, experimental and propositional approach to affordances. As a sum up, I discuss the relevance of affordances to landscape architecture, CA|HOW urban landscapes, and value creation.

4.5.2 CONTEXTUALISATION AFFORDANCES

Affordances as a concept and relevance to urban landscapes

“The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill [...] It implies the complementarity of the animal and the environment.” Gibson, 1979 (Gibson, 2015, p. 1)

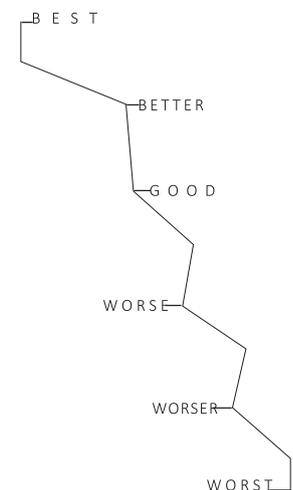
The term affordance offers a key to describe, understand and design potential actions in our physical environment. It is a term originating from the 1970s, and yet it is a concept that is still developing. Much work on affordances is referred to as a *Gibsonian* approach, as it remains closely tied to its founder, the ecological psychologist James J. Gibson. Gibson coined the term to conceptualise how we perceive and interact with the environment outside of our body and mind as part of his work on developing theories on psychology on visual perception. Gibson’s aim was to connect physical properties with perception, seeing both as being real and together forming potentials of action.

Affordances represent possibilities to be found in physical environments, with reference to the actions of humans and animals. For example, an oak tree provides affordances of food to certain species, shade and lee to livestock, and climbing to a human. Affordances are about value, meaning and action. However, in their essence, affordances are not value-laden in the sense of being positive or negative, good or bad. It requires contextualisation with reference to a specific actor to define whether the affordance is *good for* something. The concept of affordance is situated and contextualised, thus it varies depending on actor context. It is a relational-dependent and situated concept that can help form the foundation for qualified value judgments. Furthermore, it is an ‘out-of-the-laboratory’ approach, concerned with real-world observations of properties and interactions.

GOOD



B A D



Diverse applications of affordances

Conceptualisations and applications of affordances have been developed in research on environmental information (physical properties) and human behaviour (psychology), for example by the psychologist Harry Heft in the field of psychology and environmental studies (Heft, 2010, 1996)

(Heft, 2010, 1996). The concept of affordances is also used in other fields, extending outside of psychology. For example design and user experiences (Norman, 1988), Human Interface Design (Gaver, 1991), Human-Computer-Interaction (McGrenere and Ho, 2000), building design in engineering and architecture (Maier et al., 2009; Maier and Fadel, 2009), landscape design of therapeutic gardens (Grahm, 2010), cultural heritage valuations of urban landscapes (Alves, 2014) as well as in art and teaching methods (Rietveld and Kiverstein, 2014). Furthermore, the term has been used as an integrated term in describing landscape and aesthetics (Brook, 2013).

Affordances and their relation to landscape and aesthetics

16th and 17th Century epistemologies regarding the philosophy of perception and its relation to our environments have had a bearing on today's understandings of psychology. According to Heft, there is an historical linkage between environmental perception and aesthetics that also relates to the notion of landscape (Heft, 2010:9-10). This relates to how Brook describes the historically complex question of whether aesthetics reside in the response of the experiencer or in the qualities of what is perceived (Brook, 2013:108). I mention this here in order to underline some foundational links between studies in perception and aesthetics and notions of landscape.

Once again, psychology is, of course, a different discipline from landscape architecture. However, as I will touch upon further along, visual perception, human behaviour and how we understand and describe the interplay between actors and their physical environment is closely connected to landscape, landscape architecture and *designing*. As a practice, LArch working methods define and articulate landscape as a context of living actors together with physical surroundings, often defining aesthetics as embodied information connected to the environment (designed or natural) as well as the actor's history or capabilities (Heft, 2010; Brook, 2013). Although the concept of affordances stems from psychology, it seems particularly relevant to designerly professions.

4.5.3 GIBSONIAN AFFORDANCES

GIBSONS CONCEPT OF AFFORDANCES

"In the last few thousand years, as everybody now realizes, the very face of the earth has been modified by man. The layout of surfaces has been changed, by cutting, clearing, leveling, paving, and building. [...] Why has man changed the shapes and substances of his environment? To change what it affords him. He has made more available what benefits him and less pressing what injures him [...]" Quote, Gibson, 1978 (Gibson, 2015, p. 121).

In 1977, American psychologist James J. Gibson invented the term and concept of affordances in his article 'The Theory of Affordances' (Gibson, 1977). This was further elaborated in his book of 1979, *The Ecological Approach to Visual Perception* (Gibson, 2015). Until then, the word 'afford' existed only as a verb. For Gibson, affordances denoted information on possible provisions of the physical environment as potentials for the action of actors. Gibson was developing a theory in psychology, now generally known as ecological psychology. This work intended to provide an alternative to some of the cognitive approaches to psychology that suggested that the behaviour of observers were purely relativistic to their perception and the physical environment (Gaver, 1991, p. 1; Heft, 2010). In contrast to this, Gibson claimed that visual perception was not only a matter of internalised, subjective processes; it also included objective, physical elements (Gaver, 1991; Heft, 2010; McGrenere and Ho, 2000). In this way, Gibson renounced the dualism between a subjective and an objective worldview, thus also bridging the dichotomy between perceiver and the environment. Gibson's concept of affordances accommodated an alternative, *third* world view inclusive of both. The approach forms an ontological and epistemological compromise in response to classic dualisms.

As aforementioned, I find that bridging subjective-objective dualism is fundamental to supporting the propositional arenas of designing in a landscape architectural practice-realm. Furthermore, Gibson's framing of how we as humans have changed the physical environment to suit our need for affordances seems relevant to the understanding of the Anthropocene and changing waterscapes. The human practices of pro-actively provisioning affordances are what created the Epoch of the Anthropocene as such.

One world with plural perceptions of affordances

"An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behaviour. It is both physical and psychical, yet neither. An affordance points both ways, to the environment and to the observer." Quote, Gibson (Gibson, 2015, p. 3).

Gibson claimed that there was only one diverse world, altered to different extents, and perceived according to the actor, human or animal. According to Gibson, this did not make the world ultimately subjective or relativistic. He continued by renouncing the classic dualism between artificial and natural environments, cultural and natural environments, and mental and material products. In his work, he elaborated landscape affordances through examples from both the natural environment (e.g. a cliff) and designed environment (e.g. a doorway) (Gibson, 2015; Heft, 1996).

Affordances and Visual Perception

"The object offers what it does because it is what it is. To be sure, we define what it is in terms of ecological physics instead of physical physics, and it therefore possesses meaning and value to begin with. But this is meaning and value of a new sort. [...] The perception of its affordance should therefore not be confused with the temporary special attraction it may have." Quote Gibson (Gibson, 2015, p. 130).

The above quote expresses that Gibson considered affordances as being real and existing, even while not being perceived. However, Gibson does state that affordances 'have to be visible in ambient light', connecting affordances to optical information (Gibson, 2015, p. ch.8:12; Shaw and Bransford, 1977, pp. 67–68). This could imply that the concept of affordance is only useful regarding visible, physical features together with the eyes of actors. Based on Rietveld and Heft's writings (Heft, 2010, 1996; Rietveld and Kiverstein, 2014), I find, however, that the claim on visibility is rather related to Gibson's field of *visual perception* in psychology, meaning that the affordance exists, enacted or not. To be enacted, it needs, however, to be perceivable in some way. Designing includes visualisation of not-yet-visible-in-real-life affordances as potentials in the physical world. From this perspective, Gibson's claim on visibility could be inclusive of e.g. drawings or animations as mediators. This is likely why the concept has been used and developed within design-related fields since its introduction.

AFFORDANCES AND LIVING ACTORS

Surface properties and affordances

Gibson explicates his concept of affordances by using examples of how a terrestrial, horizontal surface affords to support the adequately sized and proportioned animal. Fig. 4.5.39 show a hard-edged, impervious, roadscape with the affordance of low friction movement for humans. The hard-edge separation between cars and pedestrians affords safety to human actors. On a day with 'normal rain', the gradient, impermeable surface and the repetitive system of sewers lead of water into the underground sewer system, affording continued movement to humans. If a cloudburst hits, the affordances of the road change into directing water on the surface, altering the affordance of human mobility and perception of safety. The affordances of the roadscape are therefore contextual, depending on the weather. For human interests, the *good* roadscape affordance is perceivable in dry weather or normal rain. In heavy rain, the roadscape provides negative affordances. Furthermore, when the roadscape turns into a riverbed, it affords the washing out of pollutants, flushing these into the recipient. With reference to living actors like fish stock, this is also a negative affordance. In itself, the roadscape affordances are neither good nor bad. It is only when situated and referenced to living actors that the affordance of the roadscape can be put to a value judgment. In this case, the value judgment of the affordance of a river-roadscape would likely be "not so well" or bad. Living actors qualify affordances.

Integrating natural and constructed landscape properties

The above example relates to how Gibson sees the environment as both the natural and human-altered. When rain meets the roadscape, human constructions and natural terrains become one, and the contemporary landscape offers alternative affordances. In the context of landscape architects collaborating with other professions and water-lays, affordances might be a productive focal point in explaining the interplay between how we construct urban landscapes and its associated positive/negative affordances. Case Aaby explores this point further.



Figur 4.5.30: Top: Hawthorn affords protection for the growth of more vulnerable vegetation. Sprig and shoots afford food for deer and hares. Its berries afford food to birds. Its flowers afford food for insects. Its xylem affords a strong material for human's woodwork. The scent of its flowers and overall appearance afford sensory, aesthetic sensations to humans, likely animals too.

Photo: Nikolaj Knudsen
Bottom: astroturf. False affordances(Gaver) or misinformation(Gibson) in urban landscapes. Astroturf seems to afford infiltration, but with a membrane is does not, it rather pushes surface water forward to some other location. It seems to afford living organisms like plants and biotics, but it does not. Astroturf affords a stable surface for running and playing e.g. football, also in winter. Misinformation or false affordances, depending on who is referenced: though it looks permeable, it does not afford permeability. It looks green, but it does not afford biological lifeforms as it is rather toxic.
Photo: Mathias Meldgaard

4.5.4 DESIGN-RELATED APPLICATION OF AFFORDANCES

Affordances and the design of everyday objects

Donald A. Norman has been influential regarding the concept of affordances in design terms, particularly through his books 'The Design of Everyday Things' and 'The Psychology of Everyday Things' (Norman, 2001, 1988). For Norman, 'everyday things' referred to common, functional artefacts such as switches, door handles and user interfaces on stoves and keyboards. He described affordances as tangible properties that could be effectively perceived (sound, touch, vision) and thereby inform action. Norman applied the concept of affordances as a prescriptive approach to qualifying good and bad design, thus informing better design. For Norman, the perceived affordances of a design could simply be compared to its actual affordances (possible actions). For example, if a door handle is perceived as a structure to push, but only allows the action of pull, then it is a bad design. Norman posits that false affordances can also indicate bad design: if a glass door is perceived to have the affordance of being able to walk right through a clear space, and it does not therefore afford access as perceived, then it is a false affordance. In this case, pain to human actors is the real affordance, thus the false affordance accords bad design. Norman's approach, however, mostly concerns a smaller, more object-oriented design-scale different from the complexities found in urban landscapes.



Affordances, relational dependencies and plurality

"Affordances are relational properties of the environment taken with reference to a specific individual." Quote, Heft (Heft, 2010, p. 17)

Heft elaborates affordances as relational dependencies between human behavior and physical environments, exemplified through outdoor spaces as 'everyday settings'. For example, a ledge can provide the affordance of balancing and sitting to smaller children but not to adults. Heft suggests that using affordances as a lens could enable a modus that distinguishes different domains of physical properties in relation to actors in a way that might not otherwise be perceived if environment and actors were dealt with independently. As such, Heft claims that it is not about relativism but rather pluralism grounded in the relationship between setting and actors (Heft, 2010, pp. 19–24).

Figur 4.5.31: Top: two doors and two doorhandles, provide visual information indicating that the door could be opened by pulling (eventually pushing) these. However, the door only affords entrance, if the actor is capable of reading the sign and decode the arrow.

Bottom: No spatial element informs how to engage the affordance of entering the door.

Function, meaning and aesthetics

Heft states that the concept of affordances is inclusive of function, meaning, and attraction¹ (Heft's term for addressing aesthetics). His point is that conventional accounts of environmental perception have a tendency to fail to embed or even recognise these as 'real' features (ibid:22-25). As with the example of the ledge, affordances accommodate different values but do not in themselves tell of how well, how good or how bad. The value judgment of affordances needs to be situated, furnished with a specific environment and specific actors. From the perspective of urban landscapes and climate adaptation, this leads towards why and how affordances could be a productive concept to aid acknowledgement and discussion of the qualities of our environment based on physical properties, actors and their potential relational interactions.



¹ I do find, however, based on my readings on affordances, that aesthetics might be more usefully described by the field of landscape architecture and its practices.

Figur 4.5.32: Dry day Affordances at the playground on Frederiksbjergskolen, in rain, it functions as water basin.

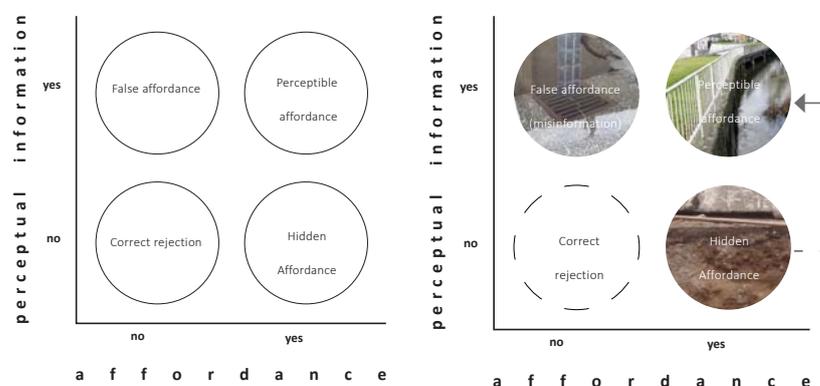
Hidden, nested and sequential affordances

William W. Gaver further contributed to the concept of affordances from the perspective of interface design and user-centred analyses of technologies (Gaver, 1991). He addressed the issue of visibility by stating that affordances existed with or without recognition, introducing some widely referred distinctions² to the perception of affordances, as seen in the diagram at the left. Some affordances, he suggests, are not actual affordances although they are perceived as such. Others are real affordances but not yet visible, thus hidden, and others again were straight-forward perceivable affordances.

Actively exploring affordances

Gaver claims that affordances are not only to be passively perceived but also actively explored (ibid:4), as he elaborates in the concepts of *nested* and *sequential* affordances. *Nested* affordances are affordances grouped in space, and *sequential* affordances address how acting upon one affordance may sequentially lead to another affordance: one action can lead to another possible action. Rietveld takes this a step further by attributing living actors with skills enabling them to perform *better, or worse*, in seeing and enacting affordances (as discussed later in this text). The concepts of nested and sequential affordances accommodate an articulation of affordances with different time and scale perspectives. For example, vegetation provides different affordances over time, nested in past and present affordances. Similarly, different geographical scales and varying levels of information in a masterplan render affordances clear on a larger scale than when looking into a smaller scale, prompting differing affordances.

² false affordances is what Gibson framed as misinformation (McGrenere and Ho, 2000, p. 5).



Figur 4.5.35: Left: Based on William W. Gaver's diagram (Gaver, 1991, p.2). Right: based on Gaver's diagram, modified by author, exemplifying hidden potentials, e.g soil conditions, terrain, and suggesting modes to make such affordances perceivable. From a pro-active departure, the concept of non-perceivable-non-existing affordances seems unnecessary

Visualising affordances

Gaver's concept of *hidden* affordances corresponds to LArch designing as a practice making landscape affordances perceivable. Landscape, as a physical environment, represents complex affordances, some of which are not yet rendered while others are simply invisible on the surface e.g. underground layers and types of soil capable of draining water. These are hidden affordances, sealed off by a surface cover, which can only be perceived with the help of other affordances. This is also what methods of visualisation can reveal. For example, flood maps make the affordances of waters flow in urban landscapes perceivable, although the water is not in the real-world yet. LArch Mapping is another method to make hidden or sequential affordances perceivable. To enact hidden affordances, they need to be perceived.

Affordances - connecting time-space structures in urban landscapes

"[...] the activation of affordances demands the addressing of inter-laced-time-space-structures." Quote, Susana Alves (Alves, 2014, p. 16)

Susana Alves applies the concept of affordances at a larger scale in the context of cultural heritage in urban landscapes, as part of an ecological approach to understanding human interaction with the past (Alves, 2014). Alves suggests examining systems of affordances as a framework to link tangible and intangible³ values with reference to specific places and meanings, together with cultural practices and socio-spatial organisation (Ibid:13). Alves proposes a framework- an affordance analysis- of Historic Urban Landscapes with which to perform value judgments. Her approach goes beyond the limited notion of historic city centres and landmarks, as she attributes value to transition and in-between spaces (ibid:23-24): *"[...] an affordance analysis means to act in the middle – be a mediator – between global and private interests."* (ibid:24)

Tangible and intangible values in urban landscapes

The consideration of tangible and intangible values as meanings or aesthetics across time and space is related to discussions on how to acknowledge and perform value judgments in urban landscapes, in a way that includes narratives of the past as more nuanced values while also providing meaning and coherence to the present and future. By doing this, Alves addresses the concept of commons. Commons were highly integrated into past living conditions, acting as both social 'contracts' and a form of spatial organisation. As we experience more rainwater, it seems timely to discuss in-between spaces and a need for common grounds for dealing with space for water. It there seems like a ripe time for discussion of a renewed role for the concept of the commons as a means to share resources and responsibilities tied to land-use and spatial properties. This is particularly the case in light of the fact that CA|HOW-solutions in urban landscapes often have to be initiated with regard to public or shared land-use. For example, in Case Aaby, the in-between spaces and former wetlands still showed potentials for CA|HOW.

³ The importance of intangible values of cultural heritage was listed by Unesco in 2003 (Alves, 2014), <http://www.unesco.org/culture/ich/en/lists>

4.5.5 AFFORDANCES AND SKILLED PRACTICES

"By virtue of our many abilities, the landscape of affordances we inhabit as humans is very rich and resourceful." Quote, Rietveld and Kiverstein (Rietveld and Kiverstein, 2014, p. 325)

Rietveld and Kiverstein claim that capabilities (actor skills) are influencing the perceivable palette of affordances of our resources (environment). Thus, they suggest that this discussion is not only about environmental possibilities affording actors action; it is also about the *capabilities* of the actor initiating action, e.g. *how well* humans, or animals, can perceive and enact an affordance. One actor might perceive something as an affordance whereas another actor might not have the same ability or skills to do so. They argue that when particular aspects of an environment are engaged, then the performance is subject to a normative assessment, in order to decide upon whether the performance is better or less good according to the situation (ibid:332). They term this situated normativity, as standards of better or worse enacted through skilled practices. They suggest that 'applying skills in unconventional ways' can promote the seeing of new affordances within an existing, familiar environment (ibid:340).

Pushing the skills of detecting affordances

"[...] the relational nature of affordances is important for creative professions because it suggests new ways of increasing our openness to these available resources." Quote, Rietveld and Kiverstein (Rietveld and Kiverstein, 2014, p. 339).

Rietveld brings a multimodal/multi-layered approach to exploring the concept of affordances. For example, in the context of analysing Obsessive Compulsive Disorder (OCD), in teaching designers new skills to inform their capability to see and create new and unconventional affordances as well as in architecture and art with studio RAAAF. By way of an example, in the 'Dutch Atlas of Vacancy' project the affordances of unoccupied buildings were made perceivable at both a building scale and at a societal and national level. Rietveld uses the concept of affordances in an exploratory manner. He connects philosophy, architecture and landscape, providing insights into the potentials of the affordance concept: as an analytic framework, as a skilled practice to be practiced, as design and interaction and as a mode that can render values lucid by pointing towards the potentials afforded by our physical surroundings.

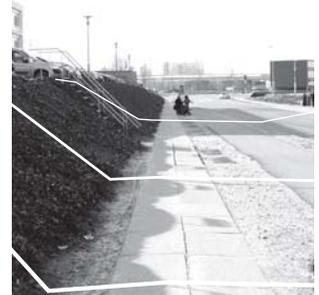


Figur 4.5.36: Affordances are values- though not defined as good or bad, but defined with reference to the perception- and skilled practices- of living actors, thus the concept connects objectivity with subjectivity.

4.5.6 SUM UP – AFFORDANCES, LARCH AND URBAN LANDSCAPES OF CA|HOW

AFFORDANCES OF CHANGING WATERSCAPES AND SETTLEMENT PATTERNS

Climate Adaptation and the handling of water are, in their very essence, about creating new affordances in urban landscapes with reference to human interests. Affordances of urban landscapes are not necessarily visible on the surface at present; some are currently hidden. In contemporary urban landscapes, the affordances of the landform and soil conditions have not been enacted. Technological developments have provided us with new, alternative affordances such as large-scale road systems and the drainage of wetlands, thus creating affordances of mobility and flexible settlement patterns. Changing waterscapes provide our current settlement patterns with the alternative affordances of flooded low-lying settlements and infrastructure. These are affordances of the urban landscapes of the Anthropocene. In the cases, I discuss how the associated urban landscapes are designed with the affordance of flooding human interests.



Making affordances perceivable – Design Comments and Mapping

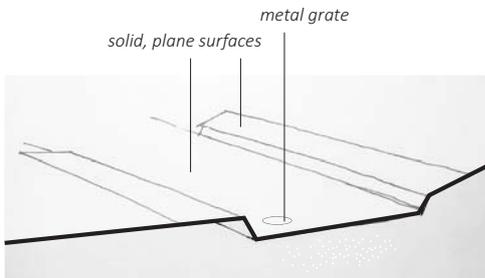
Learning from the concept of affordances, I found that the material element of the Design Comments had acted as a modus for visualising alternative affordances. The mappings and diagramming of the Design Comments were not targeted at one type of value or agenda. Rather, they explored different affordances as a time-space interlacing, just as suggested by Alves, where the shifting between geographical scales established a dialogue between different affordances. I propose that the foremost potential of affordances in the Design Comments context of dialogical interaction was the ability to illustrate affordances without necessarily imposing a value judgment, but rather setting the stage for it. Rendering visible previously hidden or sequential affordances is not merely a matter of concern for landscape architecture. In the context of CA|HOW, it connects to transdisciplinarity and the co-creation of knowledge. What landscape architectures methods can provide is the ability to make hidden or potential affordances perceivable, thus opening up for alternative affordances. In themselves, affordances do not tell of good or bad, but instead provide the possibility to articulate values as a foundation for discussing what is good or how well.

Figur 4.5.37: diagrammed photo from Skejby, Case 2.

PERCEIVED SURFACES AND HIDDEN/NESTED AFFORDANCES

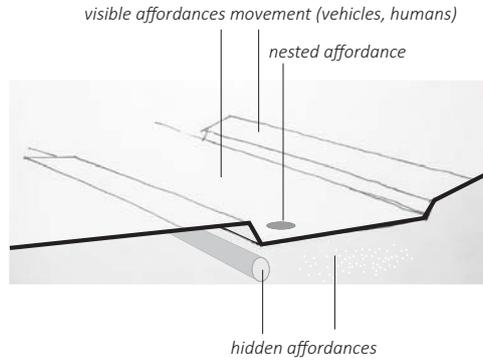
SURFACE PROPERTIES

Dry day Roadscape

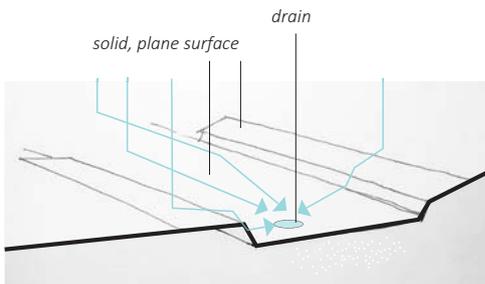


VISIBLE AND HIDDEN/NESTED AFFORDANCES

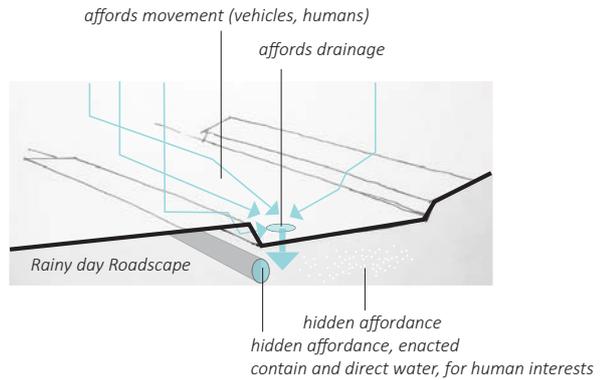
Dry day Roadscape



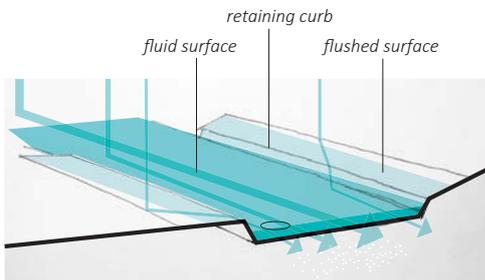
Rainy day Roadscape



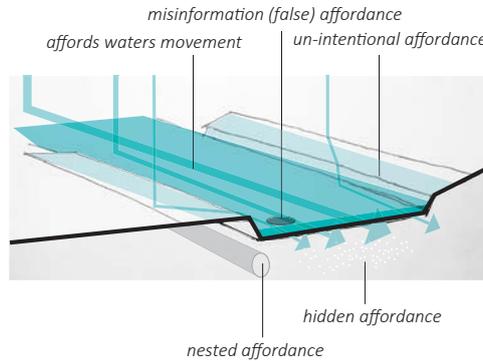
Rainy day Roadscape



Extreme Rain Roadscape



Extreme Rain Roadscape



Figur 4.5.39: The diagrams show surface properties and affordances in a diagrammatic roadscape situation in dry, rainy and extreme rain weather, exemplifying visible, hidden and nested affordances

SURFACE PROPERTIES AND AFFORDANCES

PHYSICAL SURFACE PROPERTIES

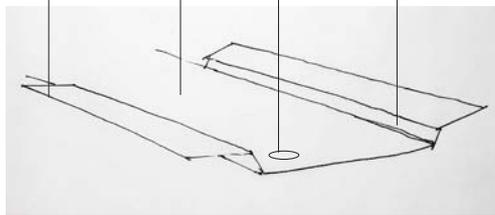
Dry day Roadscape

tiles, solid, impermeable quite plane

asphalt, solid, impermeable quite plane

metal grate permeable

stone edge solid, impermeable



AFFORDANCES

with reference to **human actors' mobility**

Dry day Roadscape

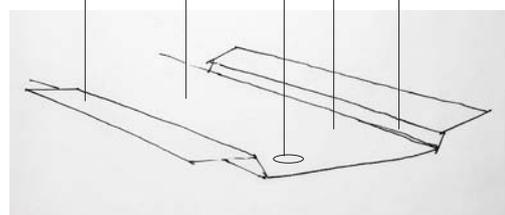
drain affords underground access for small elements, animals, fluids

sidewalk affords safe human movement

car lane affords low friction, low-impered automotive movement

cycling lane affords low friction, low-impered cycling

edge affords separation between traffic, thus safety



affordances: low friction, movement, traffic separation, wayfinding, directional, speed to human actors

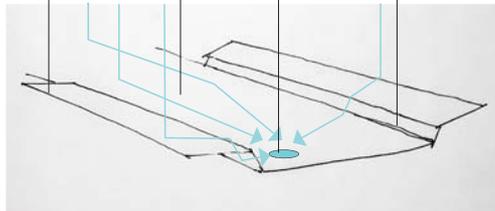
Rainy day Roadscape

solid, impermeable grade towards drain

solid, impermeable grade towards drain

drain permeable

curbline edge, solid, impermeable



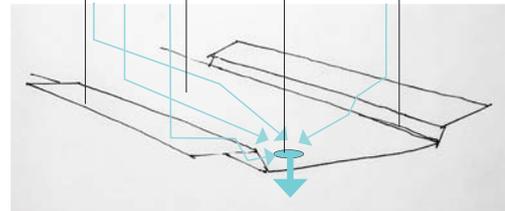
Rainy day Roadscape

sidewalk affords safe human movement

car lane affords low friction, low-impered automotive movement

drain affords water and small elements to move underground affording sidewalk and car lane not to flood

edge affords separation between traffic, thus safety



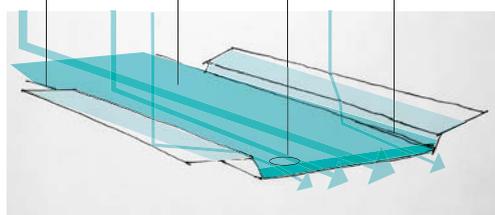
Extreme Rain Roadscape

flushed impermeable grade downwards

fluid impermeable grade downwards

metal grate

solid, directional edge



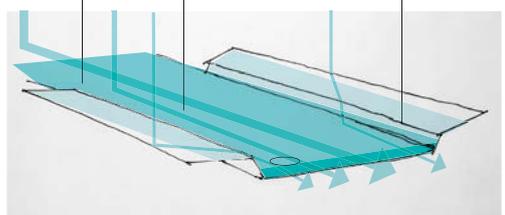
Extreme Rain Roadscape

Affordances: low friction movement, traffic separation, wayfinding, speed, direction to water, drainage

hard edge brink leading water to canal

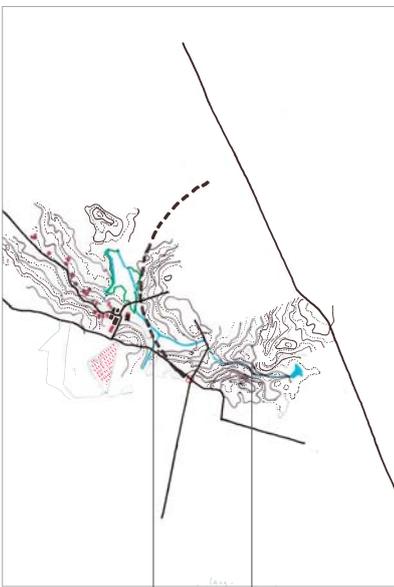
hard edge canal, containing and directing water to lower point

hard edge retaining brink keeping water in canal



Affordances: low friction to water movement/speed, collecting, containing and putting direction to water downwards

PAST-PRESENT-FUTURE AFFORDANCES



Past-present-future affordances of water and terrain

The past terrain and larger landform provides hidden/nested affordances of flood control with reference to humans

Present nested/hidden affordances of landscape connectivity

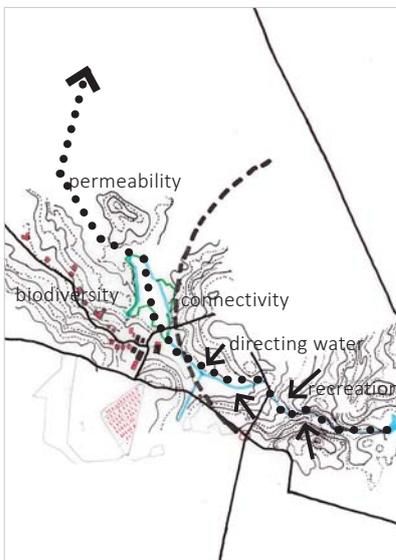
The present green spaces provides hidden/nested affordances of flood control with reference to humans

Future affordances of flooding

The future waterscapes with the constructed urban landscape provides affordances of water resources - or flooding

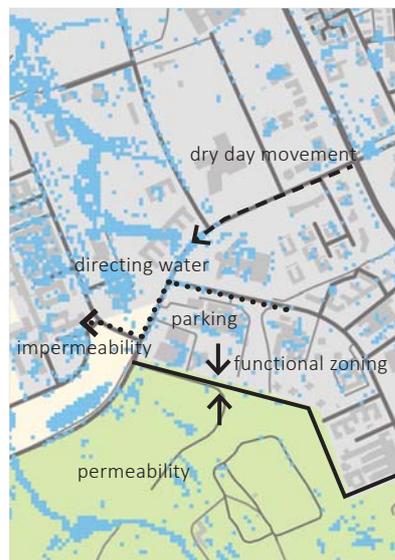
Figur 4.5.41: Examples of past-present-future affordances in the context of the larger landform, local urban landscape, and building practices (Case 2)

PAST-PRESENT-FUTURE AFFORDANCES



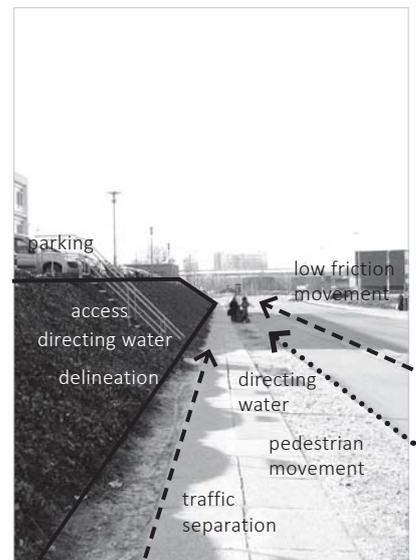
Affording connectivity

Examples on larger scale affordances of the terrain and soil, with reference to:
 water: affording to direct and delay surface water on its way to the larger recipient
 biodiversity: affords connecting corridors for vegetation and animals
 humans: hidden/sequential affordances of avoiding flooding of properties, recreational stretches, sensory sensations/aesthetics as scents, tactility, safe movement pedestrians and bicyclists, connectivity between different functions/zonings



Affording flooding of human interests

Examples on medium scale affordances of the settlement patterns, terrain works and zoning, with reference to:
 water: roads and paved surfaces affords to lead water downwards
 biodiversity: densely built and separated areas affords enclaves for vegetation and animals
 humans: upstream properties are likely to afford the flooding of downstream properties, roads affords automotive movement and directs pedestrians and bicyclists movements,



Affording separation of functions and movement, directing water

Examples on small scale affordances of the functional zoning and material usage, with reference to:
 water: roads and paved surfaces affords to lead water downwards
 biodiversity: not afforded
 humans: pedestrians and bicyclists movement in spaces with crude aesthetic/sensory sensations. Automotive movement and parking is afforded. Properties' terrain work affords to keep pedestrians from intuitively trespassing

Figur 4.5.42: Examples of potential affordances of the urban landscapes and open spaces at different scales, with diverse affordances (Case 2)

AFFORDANCES AND LANDSCAPE ARCHITECTURAL PRACTICES

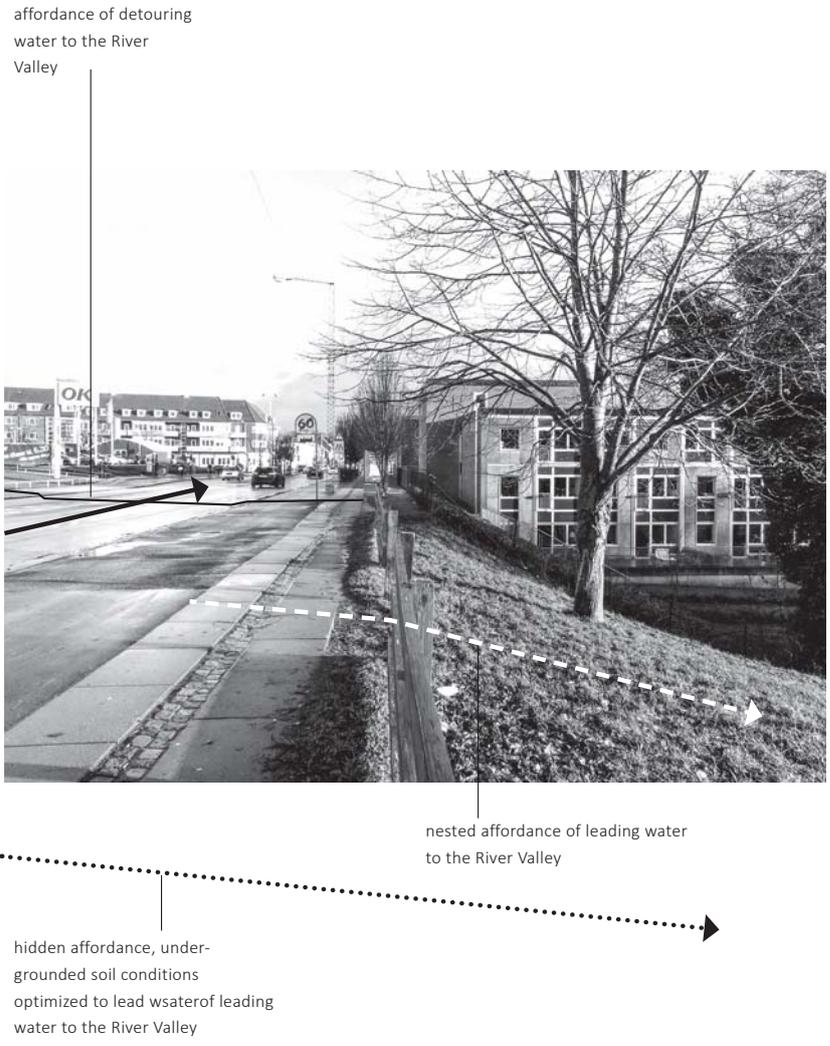
The concept of affordances closely relates to the field and existing methods of LArch, e.g. modes of visualising and creating knowledge in reference to landscape. For example, sketching a plaza with the affordances of socialising, playing and aesthetics; plans for the outdoor area in front of a mall, which designate affordances of parking cars and moving goods; mappings as communicating affordances over time, e.g. showing bio-corridors and future aesthetics. Moreover, planning could be seen as distributing affordances attached to land-use e.g. infrastructure, open spaces and protected areas that facilitate affordances of drinking water to citizens and so forth.

Based on my readings, experiences in practice, and the case experiences in this research project, I find that the practices of landscape architecture already implicitly/intuitively embed the concept of affordances. My proposal to use the concept of affordances in landscape architecture is not, therefore, a proposal to change practices. Rather, I am suggesting that emphasising the concept could support the articulation of existing affordance-based content in landscape architecture, as a productive concept in the urban landscapes of the Anthropocene.

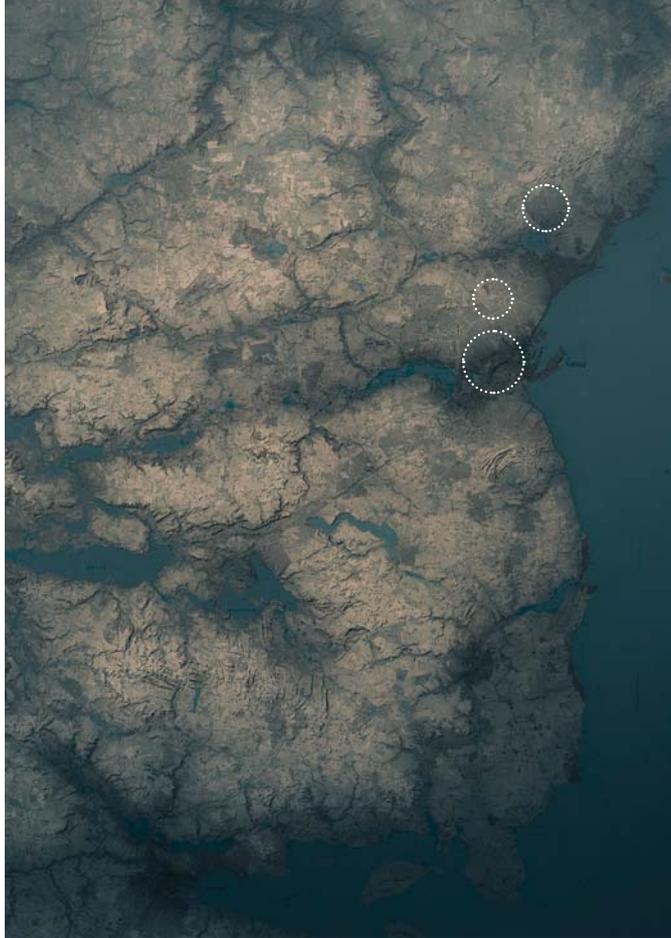
Affordances, plurality and cross-scale dependencies

As Rietveld suggests, pointing to the unexpected can form new, alternative affordances. From the perspective of value pluralism, the concept of affordances could be productive alongside the framework of 6 Regimes of Justification, as guiding attention to different justifications.

Affordances entail plurality and the possibility of influencing different geographical scales simultaneously. For example, in Case Skejby, local, in-property terrain alterations afforded more parking spaces, but at a larger scale, the same affordances created flooding downstream properties. The same physical properties, therefore, enabled different affordances depending on geographical scale. What was deemed a 'good' affordance locally became a negative affordance in other places, as I discuss further within the chapter on Case Skejby. Furthermore, in Case Aaby I discuss how the local and the neighbourhood scale can both benefit from using the shared affordances of the underlying terrain. However, in summary, it is important to note that making cross-scale relations perceivable can be supportive of affordances but can also create conflicts as well.



Figur 4.5.43: Hidden and nested affordances (Case 3)



PART 5

CASES

PART 5 CASES

CHAPTER 5.1

CASE LYSTRUP

CA|HOW IN THE EVERYDAY LANDSCAPES OF SUBURBIA

Case Lystrup is a real-time case of CA|HOW in early pre-public phases.
(See Chapters on methods and criteria)

Followed: December 2013 – August 2015 with main encounters from
Dec. 2013-Sept. 2014.

5.1.1 Intro

5.1.2 Contextualisation Case Lystrup

5.1.3 The elephant and the retention basin

5.1.4 Visible vs. Undergrounded

5.1.5 Urban vs. Rural

5.1.6 Weak geometries and the Amoeba

5.1.7 Sum up – Propositional Reflections



Figur 5.1.1:



P5_C1

CASE LYSTRUP

5.1.1 INTRODUCTION

Abstract - approach and key discussions

Case Lystrup investigates potential value creation in the everyday CA|HOW-landscapes of suburbia. The empirical knowledge derived from the case has been the driver of LArch based discussions and propositional reflections. Though situated in a Lystrup-actor-project context, these relate to more general aspects of CA|HOW, not least because case Lystrup drew my attention to the concept of justification. Beforehand, I framed the search for value creation as *added-value*, and the shift to *plural values* and *justification* that this case prompted became a turning point in the research approach. In this chapter, I employ the framework 6 Regimes of Justification (see Part 4, Chapter4 Justification) as a lens to analyse justifications of the CA|HOW project. A core discussion in Case Lystrup is settlement patterns, planning distinctions and their relation to landscape properties and changing waterscapes. At a smaller scale, I discuss the design of retention basins, paying attention to future affordances. During this case, the research methods have developed and my interactions have become more targeted at actively using LArch material externally in transdisciplinary encounters as Design Comments (see Chapter DeCs and Case Skejby).



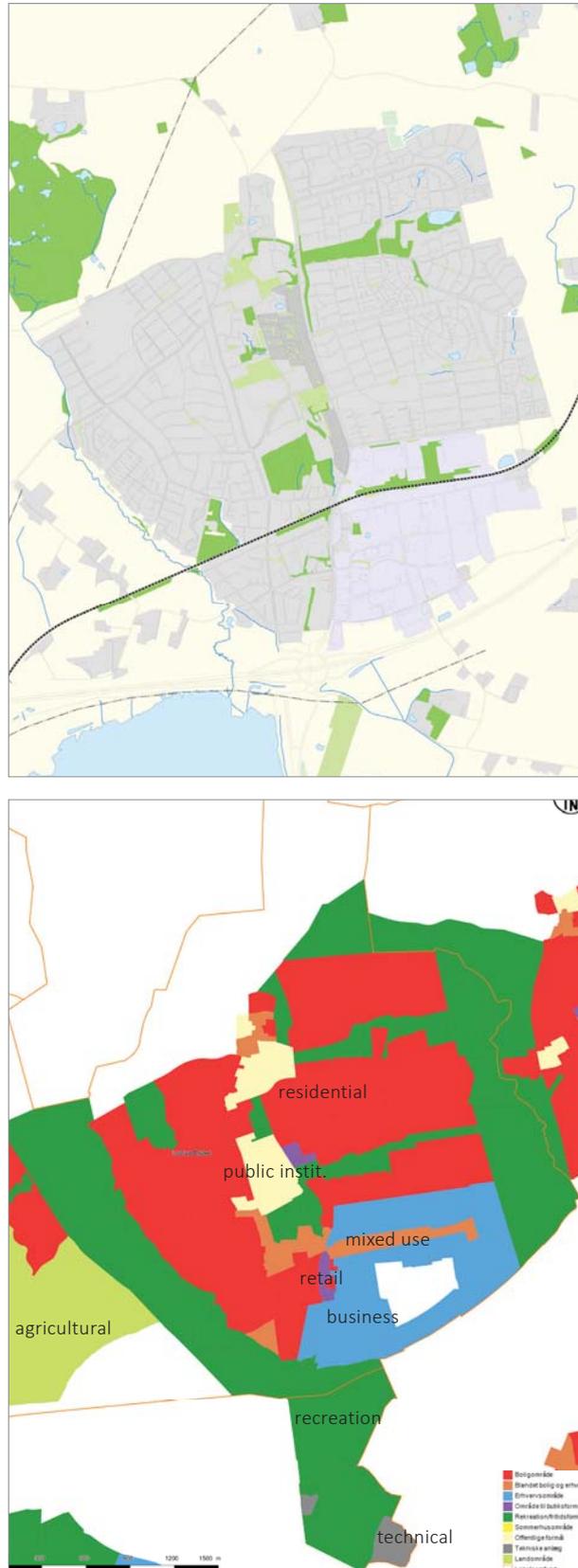
Meeting encounters as leads

In this case, I draw upon selected meeting encounters that particularly influenced the research. See Appendix 2 for a full list of encounters. I unfold the case with attention to the non-human aspects e.g. aerial photos, maps, flood maps, visualisations and detailed project drawings together with LArch methods as field trips, mapping and diagramming. To underline the emerging themes, I use excerpted quotes and link these to the urban landscapes of Lystrup and the Design Comments. Clearly, quotes do not provide full credit to the case actors dedication, intentions, collaboration skills or professional competencies: they are a de-contextualisation of dialogue or text per se. However, the format serves another contextualisation: to explore potentials of LArch in promoting value creation in CA|HOW.

Structure of this chapter

Firstly, I provide contextualised background knowledge on Lystrup town with attention to its general spatial and functional characteristics, followed by an introduction to the CA|HOW project, the meeting encounters and interactions. Secondly, I provide a description and a reflection on the LArch leads that I followed during the case. During the chapter, I discuss the case through propositional reflections as a LArch approach to qualify the case learnings. The 'Sum up' discusses the overall knowledge outcomes of the case.

Figur 5.1.2: Top: Aerial photo, thin white line indicates municipal border, thicker white line indicates the Lystrup town area. Bottom: map showing Lystrup and its infrastructural connection and relative size to Aarhus. Source: GST; diagram KW



Figur 5.1.3: Lystrup planning maps. Top: Zoning rural and urban. Bottom: Planning classes. Source: AKO Webgis.

5.1.2 CONTEXTUALISATION CASE LYSTRUP

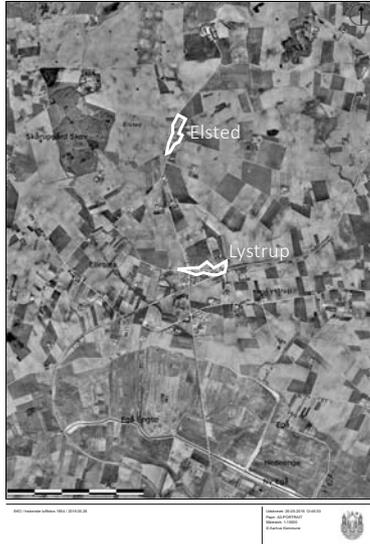
BACKGROUND ON LYSTRUP TOWN

Appearance and generic settlement patterns of suburbia

Lystrup has approximately 10,500 inhabitants and it is growing. It is part of Aarhus Municipality and 10 km from Aarhus city. Lystrup grew from the two small villages of Elsted and Lystrup after they expanded into former farmland and merged into a suburban satellite town surrounded by fields and infrastructure. Most of Lystrup's growth has taken place since WWII. One of its attractions is its proximity to Aarhus combined with its rail connections and the nearby motorway, meaning that it is a location well suited for commuting. In planning terms, Lystrup primarily consists of residential areas, a larger business area, and some smaller mixed-use areas with e.g. shops, churches, schools and a small train station. The largest recipient is the restored wetland, Egå Engsø (Oakstream Wetfield) just south of the town, leading to Aarhus Bay. Lystrup is primarily residential, typified by enclaves of detached, single-family houses. The buildings showcase contemporary trends in material usage and aesthetics. It has a car-based settlement pattern, characterised by a vast road network and large amounts of impermeable surfaces. In general, Lystrup has a homogeneous appearance reflecting its overall suburban mono-functionality. Around Bygaden and the railway station, there is a subtle feeling of 'small town main street'. Lystrup is, however, distinguished by its large, green areas and a clear delineation between the urban and rural. In many respects, the main characteristics of location, settlement patterns, functions and visual appearance of the built environment resemble that of other Danish post-WWII suburban developments.

A self-referencing urban fabric

Lystrup demonstrates a self-referencing and generic land-use pattern, which, in many ways, excludes what existed before development. The urban fabric of Lystrup appears self-referencing and disconnected from contextual readings of landscape properties such as terrain, orientation towards the sun, or waterscape relations. This could be seen as a mere matter of *choice*. As I will discuss later, if any of the climate change scenarios prove to be even partly correct, this 'choice' is likely to provide or enforce negative implications in the future urban landscapes of Lystrup.



Aerial photo 1954



Aerial photo 1995



Aerial photo 2015

Figur 5.1.4: Aerial photos, white line indicates the expansion of Elsted and Lystrup. Source Aarhus Municipality websource

LYSTRUP CHARACTERISTICS

Residential houses and Lystrup building styles



Roads, right of way and inbetween spaces



Businesses and parking landscapes



AN ORDINARY DAY IN LYSTRUP
extensive road grids and
building styles
low lying houses

Figur 5.1.5:

LYSTRUP CHARACTERISTICS

Edge of Lystrup town



green stretches



Retention basins



Figur 5.1.6:

THE CLOUDBURST AND THE CA|HOW PILOT-PROJECT

Motivation for adaptation

Lystrup experienced a cloudburst on the 26th of August, 2012. In less than 3 hours, the area received 70-80 mm of rain: equivalent to a statistical 70-year rain event. The cloudburst caused severe flooding and damage to residential buildings and infrastructure, including the motorway just south of the town. This cloudburst event prompted Aarhus Municipality to use Lystrup as a case for a general CA|HOW investigation and concern: a concern shared by the water utility company Aarhus Vand (Aarhus Water), which is responsible for the sewer systems. It is notable that the actual flood-pattern, e.g. level of water, locations of flood and direction of flow paths, corresponded with current municipal flood risk projections.

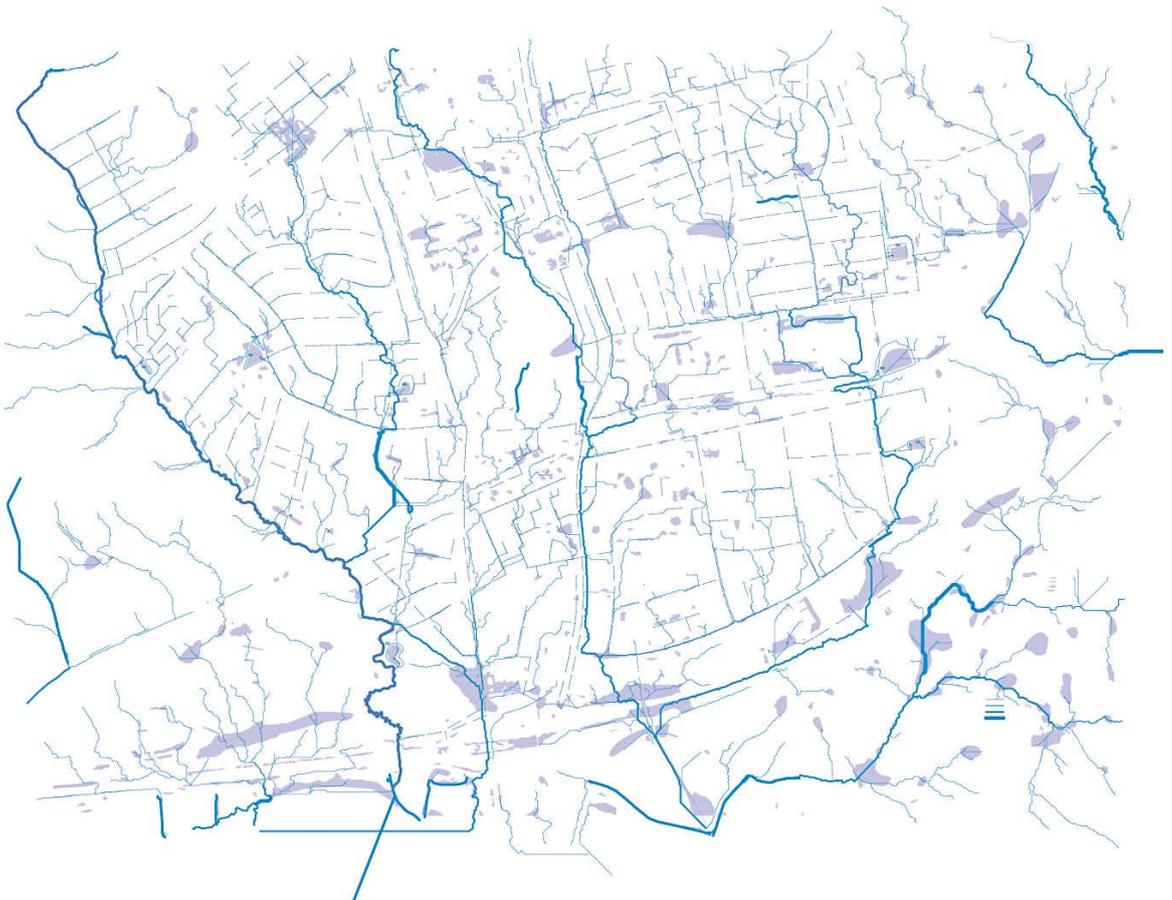
The Lystrup cloudburst thus became the catalyst for a CA|HOW Pilot project. At that time, it was one of the largest coherent climate adaptation projects in Denmark, and it was the first of its kind to adapt an entire suburb¹ (Orbicon). The purpose of the project was two-fold: to adapt Lystrup to cloudbursts and, in doing so, provide learning experiences regarding CA|HOW within the municipality more generally. The project was framed as a 'pilot project' as it was important to gain this knowledge without necessarily being forced to equally adapt the rest of the municipality to the same high 'service level'². The fundamental approach was to handle as much surface water as possible above ground. This would lower the economic costs considerably compared to expanding the capacity of the underground sewer system (Aarhus Kommune, 2014, pp. 27–33). The cost of the pilot project was estimated to be 30 million DKK. For comparison, a new rainwater-sewer system with the equivalent capacity was estimated to cost 280 million DKK (Laustsen et al., 2014).

The CA|HOW set-up

The Lystrup CA|HOW project consisted of 12 subprojects with the capacity to handle a 100-year rain event in the year 2110 (Laustsen, 2013, p. 3) The project was a collaboration between Aarhus Municipality and Aarhus Vand, involving The Danish Road Directorate, external consultants, and citizens at certain points. For sectoral, judicial and economic reasons, each sub-project was designated a 'project owner' from either a municipal department or the utility company. This way, the overall coherence of the CA|HOW strategy consisted of sub-projects affiliated with different constellations of stakeholders and project managers. The project combined soft engineering, like on-ground retention, with hard engineering, such as underground piping.

¹ According to Orbicon website and the municipal DWA actors

² According to DWA and AWC



Figur 5.1.7: Top: After the cloudburst Lystrup, august 2012. Bottom: Lystrup, flowpaths and flood map. Source floodmap and photo: Aarhus Municipality

FIRST ENCOUNTERS WITH THE CA|HOW PROJECT

Generic project material

Due to employing real-time cases in their early phases, it has been a fundamental condition of these cases to accept incomplete, in-progress project material. In the following, I introduce the project material available for my first interactions.

Re-mapping the locations

My first project-material encounter was the official, overview map, which marked and named the locations of the 12 subprojects upon an aerial photograph. Consultants had visualised the on-ground facilities and produced a small movie clip showing the facilities in their dry and wet condition. This material was used to communicate the CA|HOW project to a broader audience of citizens, media and politicians. The visualisations showed that at least eight of the projects were on-ground retention, e.g. basins, wadis and an offset of an existing open watercourse. The subprojects were mainly located in Right of Way (ROW) and public green areas. Underground piping were only used to direct water beneath roads.

The overview map marked the location of each CA|HOW-facility as a dot with a figurative shading of the surrounding area. On the map, it seemed that these were generic markings and that each facility was inscribed in different contexts of the urban landscapes. As a response, I studied the locations from the perspective of urban functions and spatial qualities. To do this, I studied planning maps, aerial photos and went on field trips to gain an embodied experience of the locations. Based on this, I re-mapped the overview map, proposing four, simple, urban spatial-functional categories, named using common terms in urban design.

-Green areas (green, public accessible areas)

-Infrastructure (the road network, junctions, Right of Way,)

-Edge of town (the border between urban and rural)

-Town Centre (the railway station and the area around 'Main St.')

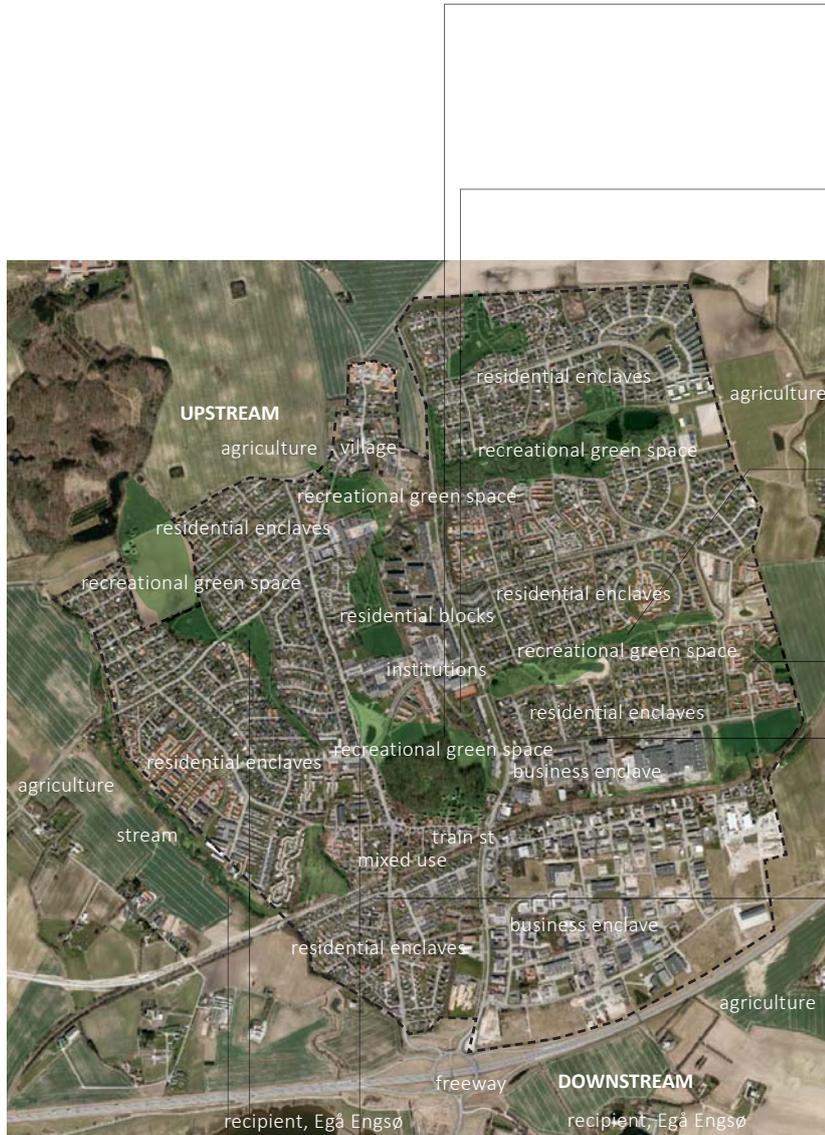
These categories could, of course, be refined in much more depth.

However, the aim of the re-mapping was to visually indicate how even the simplest articulation of the contextual differences between the locations might inform the CA|HOW strategy, as opposed to a generic approach. The alternative overview map visualised how each of the 12 subprojects were inscribed in either one or two of the categories.



Figur 5.1.8: The 12 sub-projects of the Lystrup CA|HOW plan
Official overview map
Source: Aarhus Municipality

LOCATIONS - FUNCTIONS, SPACE AND SPATIAL APPEARANCE



Figur 5.1.9:

green, recreational



infrastructure



green recreational



edge



edge



town centre



infrastructure



green recreational



edge



Diagramming the CA|HOW facilities

Secondly, I studied the spatial qualities of the facilities as seen in the visualisations and the movie clips of the subprojects. What seemed distinctive was the generic quality of the CA|HOW facilities as ‘space and aesthetics’. At a conceptual level, terms like Wadi, basin and stream were used. However, the facilities shared the same spatial typology. The Fig. 5.2.11-12 visualisations show how the aesthetics of the green trenches resemble that of the basin. The proposed CA|HOW facilities shared the same design of technical slopes (1:2, 1:4) associated with simple, low cost construction methods accommodating already known workflows, covered by mono-sort grass, easy to maintain by machinery. The designs did not render spatial, aesthetic or contextual considerations and appeared to have a variety in shape for the sake of variety itself, bound to administrative boundaries. All in all, the designs offered an array of weak, geometric shapes distributed within the urban landscape. During a cloud burst, this could, possibly, be irrelevant. However, most days are dry days, leaving the facilities as empty hollows in the urban landscapes. From the perspective of LArch, I suspected that these generic qualities, unintentionally, limited or impeded future affordances of value creation. Potential design responses are further discussed in Section Amoeba. To approach the design of the CA|HOW facilities, I diagrammed the visualisations by tracing the facilities’ forms with simple lines to visually indicate the generic, technical appearance. The on-ground facilities represented three design types:

A: ROW (Right of Way; roadside trenches)

B: Tech Pond (wet/dry basins in public accessible green spaces)

C: Edge (facilities at the urban-rural border)

Exercises of re-mapping and diagramming

The field trip, re-mappings, and diagrammed visualisations provided a specific commentary to the aesthetics and functionality of the CA|HOW facilities in Lystrup. It was my first pro-active LArch approach to gaining knowledge. It provided me with specific knowledge on the CA|HOW-project in Lystrup and influenced my interactions at the meeting encounters. Later, I used this material to interact with the actors from the DWA. This modus of interacting developed into the Design Comments (see DeCs Chapter).

LOCATIONS - RE-MAPPING



Figur 5.1.10: The locations of the CAHOW measures in relation to their urban characteristics and appearance

VISUALISED DESIGN OF 8 SUBPROJECTS



Hovmarksparken
wadi



Hovmarkspark- Hovmarken
wadi



Sønderskovvej
dry retention



Hovmarksparken
Wet basin



Lystrup centervej
Dry retention & wet basin
changed roads course



Majsmarken
Wet basin



Ellebæk Stream
Dike
parrallel watercourse



Elsted Village
Dike
field retention

Figur 5.1.11: Visualisations of the retention basins of the Lystrup CA|HOW plan.
Source: Orbicon for Aarhus Municipality

DIAGRAMMED DESIGN - OF 8 SUBPROJECTS



ROW1 (Right of way)



ROW2 (Right of way)



ROW3 (Right of way)



Tech Pond1



Tech Pond2



Tech Pond3



Edge1 (dike)



Edge2 (dike)

Figur 5.1.12: Diagrammed visualisations of the retention basin-design.
Source: Orbicon for Aarhus Municipality
Diagram: KW

5.1.3 THE ELEPHANT AND THE RETENTION BASIN

JUSTIFICATIONS AND INCOMPATIBLE ARGUMENTATIONS

"Water has its flow – the circus wagon has to go."

Quote, Project manager Road & Traffic.

This meeting took place at a municipal city office in Aarhus, January 2014. The participants were five actors from the Water & Agricultural Department and the Road & Traffic Department of Aarhus Municipality, two actors from Aarhus Water, two external consultants and me. The agenda for the meeting was related to coordination and decision-making, particularly with regards to hard fact issues. As the project was still in its early phases, the final decisions on the designs and locations of the CA|HOW-facilities were still somewhat up for discussion. All decision-making had to be aligned with hydrological calculations, ownership and administrative boundaries, costs, stakeholders and internal responsibilities within the project. At this meeting, a discussion arose: one of the retention basins was located on a site called Festpladsen (a fair-ground), which in summertime also functions as a circus field. The actors explained how this was not just a circus field: each summer the circus let their elephants run free in the adjacent town forest: a big event in a small town. The project manager from the water company mentioned that the retention basin should be re-located. She found the coinciding functions of cloudburst basin and circus field critical and prone to public dispute.

Municipal Road Traffic (MRT): "Yes, it is in conflict with Festpladsen"

DWA, actor 3: "This is a very sensitive area for the citizens."

MRT: "But water has its flow- the circus wagon has to go! This is the best location.[...]"

DWA, actor 3: "Could the basin be incorporated as part of the [adjacent] forest...a forest lake?"

MRT: "But they [the Lystrup residents/citizens] did see the material – nobody mentioned anything."

AWC: "This is an important place. This is not good: You cannot have a circus in a cloudburst basin. This must be a misunderstanding."

DWA, actor 3: "[...] This [the circus field] is where the [citizen] sympathy lies".

Best vs. Important - a Good Blackbird valuation

As described in the Value chapter, Hans Fink elaborates on how it is not possible to qualify a value judgment based on the unspecified adjectives of 'best' and 'important'. In themselves, the adjectives do not provide a logic comparison to inform the value judgment. In this context, the valuation of the *best* and *important* location becomes a 'Good Black Bird' standard of measurement.

At the meeting, the location of the retention basin led to a discussion. 'Best' location was justified by hydrological calculations, administrative boundaries, property lines and cost efficiency. '*Important-place*' was justified through citizen interests- and public Opinion. In the context of the meeting, both claims of '*best*' and '*important*' seemed meaningful and justifiable, but the degree of legitimacy was neither obvious nor self-explanatory. The evaluation criteria were too incompatible to qualify a value judgment: Hydrology and elephants do not produce consistent, comparable valuation criteria.

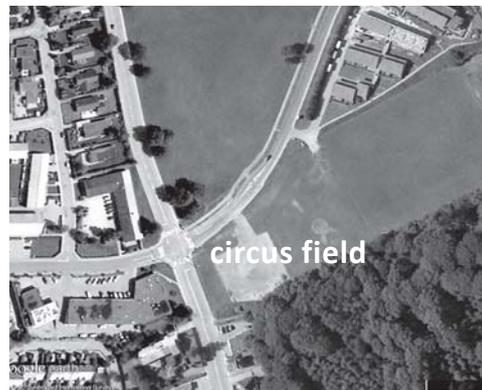
Testing and solving

In the dispute, diverging justifications were used to test and legitimise a specific priority. The *best* location was mainly argued through justifications of the Industrial regime, with standard measurements of costs, ownership and waters flow as a final result, thus becoming end values. The *important* place was argued in terms of Civic justifications, e.g. local knowledge, citizen behaviour, and local public engagements. At one point, the Civic justification was taken up by the Road & Traffic project manager, claiming that the citizens already saw the project without complaining. This argument did not, however, receive any response, possibly because it was considered out of its relevant context: the present professionals were likely to know that all lay men are not necessarily capable of grasping the full implications and technical information at first glance.

The discussion was resolved, but not through the qualities of justification or an alternative compromise. It was settled through power relations: the project manager from the water company finally claimed that it had to be revised. The result of the dispute did not reveal what was actually the most important or best or if any of the arguments had more legitimacy than the other. I later received new project drawings: The retention basin had been moved. Festpladsen and the elephants stayed. Water apparently had other flows too.

Objectivity, justification and alternative compromises

Seen from the perspective of skilled practices as described in the affordance chapter, the dispute and the combination of the basin, water and elephants could likely have informed new affordances. Please note, that a municipal actor suggested that the retention basin could be part of a forest lake. The suggestion of an alternative location, a little further south in the adjacent forest, was an effort to bridge diverging values by creation an alternative. As a solution, this would have acknowledged the water's flow as proposed and left the Festpladsen as it was. The incompatible justifications were put forward as objective truths. *If* they had been discussed with a focus on finding alternative compromises, a new opportunity could have been created. Furthermore, the objectivity of the justificatory claims is disputable. Hydrological calculations are based on accurate measures and have a notion of objectivity. Still, the resulting projections are dependent on the chosen modelling tools and inputs, together with local and upstream spatial decisions. In urban landscapes, a change in curb heights or slope on the road can easily influence the intensity and direction of flow paths. On the other hand, the importance of the circus field is not entirely objective or static either. The circus is a free enterprise, and it could be questioned whether it would continue to come to this exact suburb letting their elephants run free— or if elephants are even allowed as circus animals in years to come. At a general CA|HOW level, the incompatible valuations of best and important places are likely transferable to other contexts. With or without exotic animals involved.



Figur 5.1.13: Aerial photo of the disputed location.
Source: Google Maps

PURPOSE, APPROACHES AND JUSTIFICATIONS

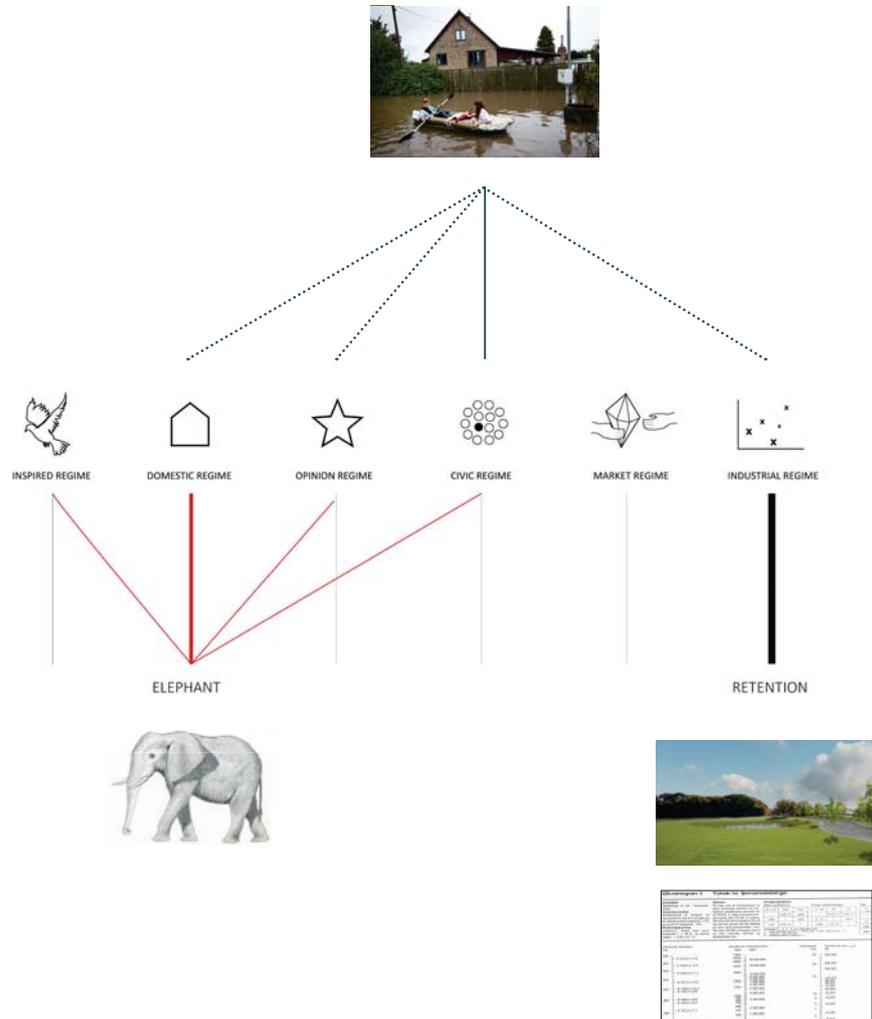


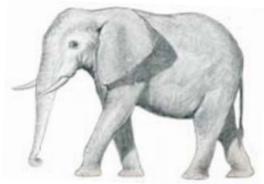
Figure 5.1.14: The retention basin is made to accommodate the Civic regime, and designed based on Industrial justifications but conflict is prone due to other values of the inhabitants of the urban landscapes, The Inspired regime is the only regime not present.

Field trip to the 'best location' and 'important place'

In the situation of a dispute, I could not navigate in the argumentations. It seemed useless to add another layer of incompatible values, and I did not interact with LArch suggestions of potential added-values.

Instead, I investigated the urban landscape of dispute. The information levels of maps did not reveal the importance of place. The collective, visual memory of Google Maps revealed remains of a circle in the grass, indicating that at least some event had been going on. I went to experience the location. At first, I passed by the site before realising that this was *the best-important* place. It appeared as an excess lot with varying grass cover, gravel, and tyre traces, mostly characterised by its emptiness and the adjacent infrastructural junction. Opposite the field, a church on a small hillside was framed towards the sky, leaving the circus location with a sense of leftover space. The on-site experience did not provide knowledge enabling me to perform a value judgment. There was no trace of either waters-flow or elephants.





Figur 5.1.15: The best place for the basin and the important place for the elephants.

FROM ADDED-VALUE TO JUSTIFICATION

The dispute regarding the circus field exemplified how clear lines of reasoning do not necessarily provide compatible argumentations or clarify legitimacy on the same subject matter. This was when I realised that using the concept of added-value as being 'more good', was hardly useful to the research objective. Adding more values to the dispute would hardly qualify value creation. Rather it would likely provide further incompatible values, and therefore focusing on justification seemed a more useful approach.



Scalar and contextual flexibility

As described in the Value chapter, the framework of 6RJ is inclusive of both subjective and objective world views and does not subscribe to any specific value typology. Rather, it acknowledges diverging values through different justifications, connected through the notion of a shared humanity and the common good. Furthermore, the 6RJ provides contextualised scalar flexibility: actors are not boxed in classes or segments and they are attributed with the competencies of choosing the appropriate justification of the situation.

Justification, case actors and work fields

To exemplify the dynamic potentials of the regimes, please note that the actor from the water company represented the Industrial regime in combination with the Market regime. Still, she highlighted that the circus field was important to citizens, thus providing justifications related to the Civic and Domestic regimes. The reason could be that the Danish water companies have a responsibility for the common good, including how water-tax money is spent. Her justifications could also be internal, business considerations relating to expenses: dissatisfied citizens can impede or halt process, thus making the project more costly. The engineer in charge of the 'Right of Way' retention basins justified actions and priorities by providing 'proof' concerning waters flow, the technical functionality of the retention basin, all of which justifications of the Industrial regime.

The retention basins in Lystrup were calculated to endure and fulfil the needed capacity for surface water for the coming 75 years of rain. 75 years, of which most of the time they would be dry. On dry days, their spatial qualities would be that of green, mono-functional hollows with no alternative use or sensory experiences. On a dry day, they would, at best, be excess spaces. Considering that the projects take up public land in the urban landscapes, it appears to be relevant to the citizens at more levels than mere flooding.

Figur 5.1.16: Top: the layout of the junction with the circus field next to the forest.

Source: Google maps

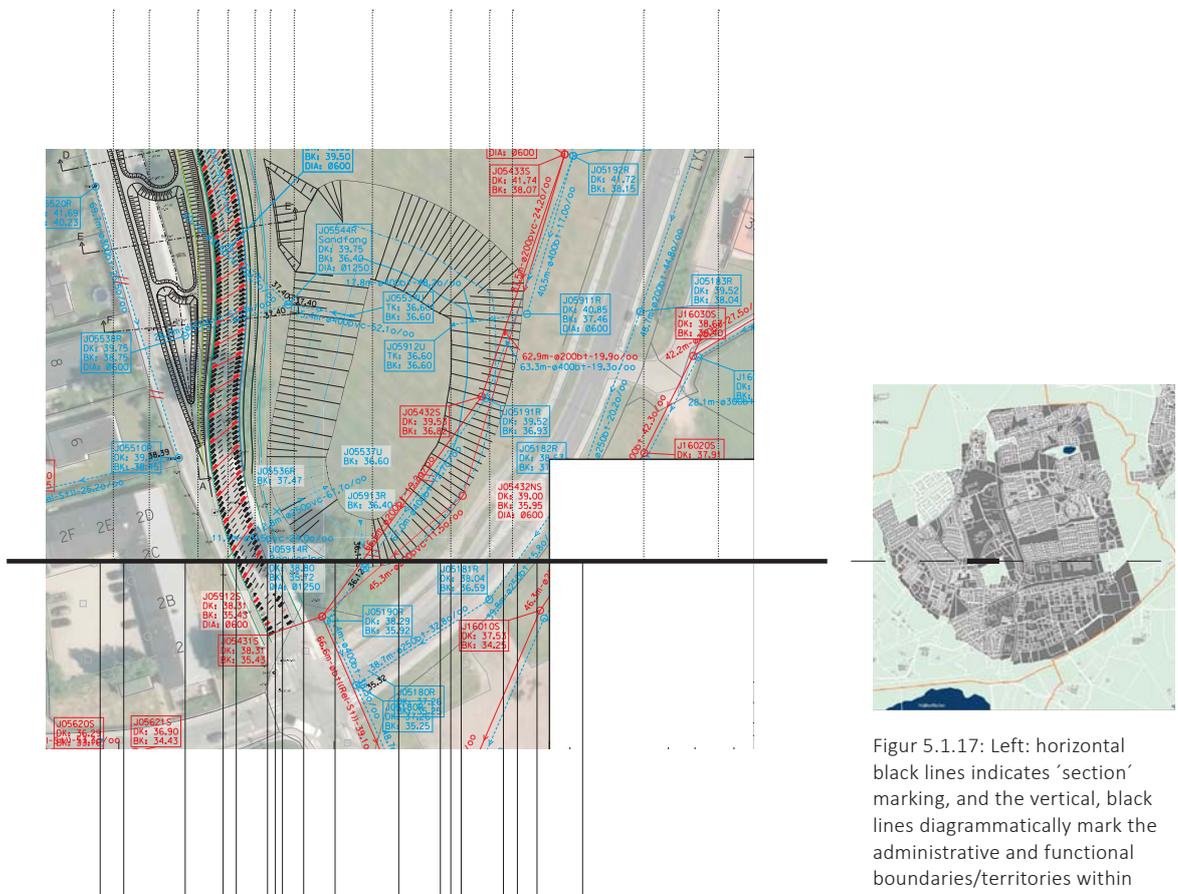
Bottom: after the CA|HOW project was changed. The final project implied a reconstruction of the road that was given a curve and the retention basin was located in a larger, green area just north of the circus field location.

Source: GST

PURPOSE OF USING JUSTIFICATION AS A PRE-PROJECT ANALYSIS-FRAMEWORK

In the following, I employ the 6 regimes of justification as a lens to interpret the dispute regarding the elephants and the retention basin at a practical project-level. I focus on the non-human actors of the project; project drawings and visualisations. In other words, I address the affordances of the pre-physical project with reference to the six common, but diverging, justifications as provided in the 6RJ.

I suggest that a Justification Analysis of the project material could be used to render dominant justifications as indicators of unilateral (fragile) justifications and also as a speculative mode to identify potential conflicts and asymmetries as a modus to promote ‘seeing’ alternative compromises. I explore this at the level of the location and design of the retention basin in the Elephant dispute. In the Justification Analysis, I use the visualisations, project drawings, and my field trip to identify embedded justifications as seen in the physical design (layout and form) of the CA|HOW facilities. Finally, I investigate the 6RJ in the context of a meeting. It is important to stress that using the framework this way was not the original intention of Thévenot and Boltanski, as also described in the Justification chapter.



Figur 5.1.17: Left: horizontal black lines indicates ‘section’ marking, and the vertical, black lines diagrammatically mark the administrative and functional boundaries/territories within the area. Right: The area of the retention basin at the circus field is marked with a thicker black line to indicate its location at the townscape. Source: technical drawing Orbicon/AKO, map AKO, diagramming KW

JUSTIFICATION ANALYSIS

Location and design of the CA|HOW facilities

The Lystrup CA|HOW strategy was initiated to accommodate the Civic and Domestic regimes: to prevent flooded houses and infrastructure. In addition to this, there were Market and Opinion concerns, as politicians and taxpayers would be attentive to costs and results. A fundamental justificatory issue is that it requires another cloud burst to hit Lystrup to prove that the strategy was right. On dry days, the only proof can be found in Industrial justifications like hydrological calculations, costs efficiency and reference to due diligence. The complexity of hydrology and ownership of land cannot be publicly justified based on assumptions or beliefs. However, these same dry days are also when the CA|HOW-facilities provide green, excess hollows in the urban landscapes.

Looking for diverse justifications

At this phase in the Lystrup CA|HOW project, I did not find justifications of the Domestic regime, e.g. recreational opportunities, as well as the Civic regime, e.g. meeting places or biodiversity, or the Inspired regime, e.g. aesthetics. Please see the overview map and re-mapping together with the photos from the locations. The capacity of the retention basins was initially intended to accommodate water volume and flow in a specific, projected cloudburst. Their function was strictly based on affording room and time for water, meaning that the facilities did not allow additional affordances over time e.g. the emergence of diverse vegetation, recreation or local initiatives. The Row facilities share the same characteristics, despite the fact that one is located at a road junction, another in a residential area connecting a green, recreational area. All ROW facilities share the same physical affordances constituted by a technical design.

Studying the project drawings and visualisations gives the impression that Industrial justifications stated as water flow and volume, together with administrative boundaries, have been translated into a design. The design of the CA|HOW facilities and their locations do not show contextual considerations for the urban landscapes that host them. The layout and design could be read as if the project development had taken place without 'meeting' justifications of any regimes other than the Industrial. From this perspective, unilateral justifications have formed the physical design of the project. The ruling justification – the qualifying capacity to retain and direct water in heavy rain- prevails in the spatial characteristics and design.

CONFLICT SCENARIO- JUSTIFICATION AND POSSIBLE COUNTERACTIONS

May Industrial justifications stand alone

The overall vision of the Lystrup CA|HOW-project was to support the Civic, Domestic and Opinion regimes. In heavy rain it does. However, the physical project was, to a large extent, formed by Industrial justifications. At this stage, very close to actual implementation, it seemed as if unilateral justification had ruled the projects physical shape and affordances. In the CA|HOW project of Lystrup, the residents could be expected to represent justifications from the Civic and, in particular, the Domestic regime. They probably want to avoid flooded basements and infrastructure. But citizens also attach value and meaning to circus elephants in the urban forest. Lystrup Town is where the residents live their daily lives and cloudbursts do not happen on a daily basis.

The only justification that was not represented either as physical project or concern at the meeting was the Inspired Regime. In a justification project analysis, this negligence might be important. As a conflict scenario, the suspension of the circus field influences values from the Domestic, Civic, Opinion and Inspired regimes. As the actor from the water company pointed out, this could have caused public dispute, and the residents could have responded with counter-action. As a scenario, the citizens could have employed justifications from the Inspired regime to suggest new, creative alternatives, or used justifications from the Industrial regime. For example, alternative hydrologic calculations, providing justificatory equivalence could possibly outmatch the Industrial justifications within its own logic. Such conflict scenarios would likely involve the Opinion regime, e.g. support from local politicians seeking votes or local media searching viewers support in a good-feeling-case: 'sweet elephants versus crude retention basin'. The circus dispute exemplified why it might be important to go beyond unilateral justifications.

6RJ AS A LENS TO INVESTIGATE THE MEETING LX1 ENCOUNTER

Justification in the pre-public realms of the meeting encounters

As described in the Justification Chapter, the actor-project-context revealed a high level of public-societal consciousness. Even technical decisions had a pre-public notion. Simultaneously, the actors' work fields as well as departmental and sectoral affiliations relate to Industrial justifications, in other words, what they as professionals are accountable for at the end of the day. In the pre-public phases of public CA|HOW works, measurability seemed to be the most powerful argument to promote or legitimise actions, accompanied by Civic and Market justification on costs (Market and the Civic come together in the sense that tax payers money funds a public project).

To gain an overview and explore prevailing justifications, I made a list of themes discussed at the meeting. I distributed these topics in a diagram, according to regimes of justification. Fig.5.1.14, 5.1.19 shows keywords from discussions: red lines attach the topic to its associated regime of justification. Black lines connect to the justificatory *concern* of the subject. This does not reveal whether a single argument held priority over other arguments; rather, it visualises the themes and concerns in the meeting discussions. Here, I found that, even though the meeting actors were discussing hard fact topics, using Industrial justifications, they continuously expressed considerations for justifications related to the Civic, Domestic, and Opinion regimes together with attention to the common good. Please see the diagram Fig. 5.1.14, 5.1.19. Moreover, it points out what was *not* present at the meeting: justifications of the Inspired Regime: aesthetics and sensitivity to sensory values. In coordinating low cost CA|HOW, as in this case, the Inspired Regime could be seen as irrelevant and subjective. On the other hand, if we accept the premise that the 6 regimes of justification represent commonly acknowledged justifications (please see the chapter on Justification), one could ask, if leaving out 'a set' of justifications, could weaken the project. For example, as seen in Fig.5.1.19, the case actors paid attention to how citizens' negative responses could halt the project. In the dispute of the elephants, the public is expected to respond negatively exactly because of a lack of sensitivity to justifications of the Inspired Regime. Secondly, the new solution seemed to be considerably more expensive.

Public responsibilities, assumptions and justification

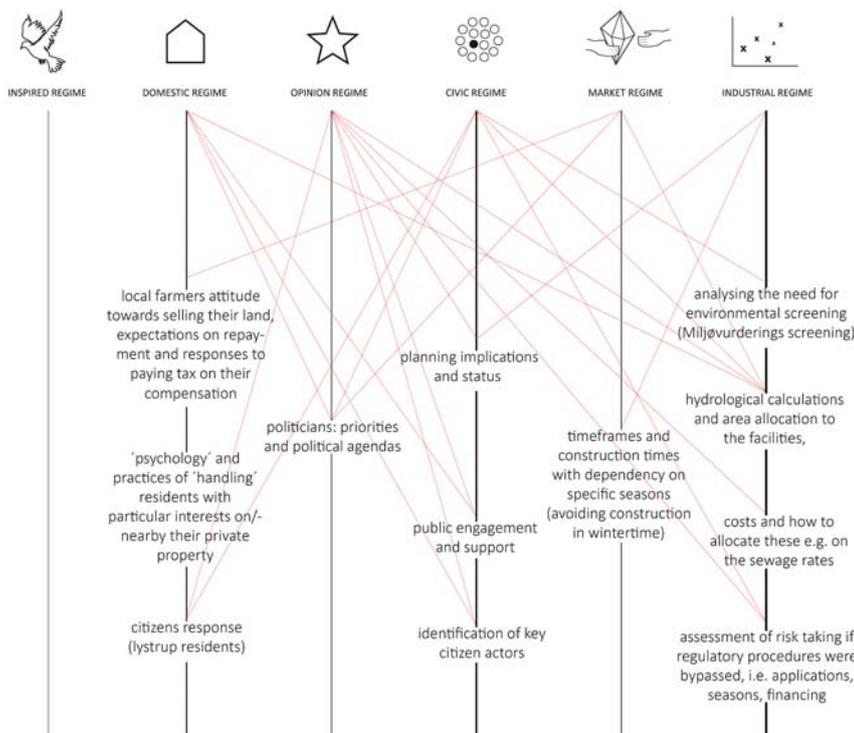
What might be important to note in case Lystrup is that the key actors may not fully provide plural justifications by themselves. Not because the actors cannot think of them themselves, but rather because they have to justify their actions in a public realm by providing measurability related to their responsibilities, work field and public sector, assuring fairness and transparency in their distribution of tax money into urban landscapes. If the rain does not come, these actors should be able to provide evidence of why and how well the money was spent.

The actor arguing that 'water has its flow' was likely to facilitate interests of his department, e.g. workflows, practices and saving time and money

as they had already put work into the subproject. It is hard to imagine an engineer from a Road & Traffic Department in a municipal context providing justifications for the Inspired regime as 'proof'. For example, "I feel that the capacity of the basin is adequate and wildflowers would provide a beautiful space."

Costs, responsibilities and workfields

Finally, I have to stress that questioning the designs and their lack of contextualisation is not a criticism of the overall project or the competences of the project actors. The municipal actors have to openly justify how tax-payers money is spent, likely in comparison with general cut-downs on services. Furthermore, they have to comply with administrative issues in planning, land-use and ownership as well as facilitate disputes between private and public interests. The water company has to comply with regulations on water taxing and cannot allocate any expenses to softer values e.g. vegetation or recreational facilities. The discussion here solely addresses the issue of location and design to comply with the research objective. The Larch based critique and analysis is to be seen as a propositional discussion aimed at pointing towards new potentials.



Figur 5.1.19: Justification Analysis of meeting topics; vertical, black lines indicates the justifications put forward regarding the topic, the thicker the black line, the more often this type of justification was used. Red lines indicates what seemed to be the underlying concern in each topic, e.g. a civic concern argued through Industrial justifications.

PROPOSITIONAL REFLECTION ON USING THE 6RJ

Justification Analysis as a Litmus Test

A Justification analysis of the locations and designs of the CA|HOW-project could have pointed to the unilateral justification and revealed how the Inspired Regime was not present. One could also ask: how solitary may justifications from one regime act in urban landscapes? With climate change and changing waterscapes, it seems feasible to question whether similar justifications hold enough diversity and robustness to engage with the uncertainty, complexity and broad perspectives of these changes. The history of water and urban settlements provide some insight into the sensitivity of relying on systems based on mono-functionality and singular justifications (see the chapter on water history). In addition to this, urban landscapes of public interests are entangled with various practices, likely entailing different value judgments and priorities. Low-cost CA|HOW in everyday landscapes is likely to happen within strict budgets. This could be the reason why the layout and design of the CA|HOW facilities in Lystrup became a translation of calculations and administrative boundaries into form. Based on the case experiences, I find that the linkage between Industrial justifications and designing could be improved in the early phases of planning low-cost CA|HOW facilities. A Justification Analysis could inform the project with knowledge on conflict scenarios and point to potential affordances. I discuss this at a smaller scale in Section Amoeba. Project-embedded justifications and their conflict scenarios could be used to explore a larger span of situated affordances within the project. The incompatible justifications of elephants and waters flow could have informed each other: alternative compromises and new affordances, based on plural justifications. For example, does the circus field hold end-value or does the town have other areas that could even benefit from elephants trashing the vegetation and soil? Suggesting a Justification Analysis does not, however, tell of *how well*. Rather, it could enable a pro-active approach to acknowledging diversity. If we use the concept of affordances, then a diversity of justifications could inform a project on three levels.

-Firstly, to establish a foundation for alternative compromises.

-Secondly, explicitly acknowledging that different justification could enforce the skilled practices of seeing affordances.

-Thirdly, the historical trajectory of HOW together with climate change scenarios point towards the need for adaptive systems as, historically, mono-functional systems have not provided flexible responses to accommodate uncertain climatic conditions.

Plurality does not tell of how well

As a reflective LArch proposition, I suggest that the 6 regimes of justification could inform CA|HOW practices by helping to explicate and develop situated affordances beyond habit of practices. This said, to transport the framework of 6 Regimes of Justification into a practical method depends on a high level of specificity: situated contexts with specific actors, a specific project, tied to specific locations and responsibilities.

Furthermore, this cannot be seen as a toolbox, 'tick-all-regimes-and-all-values-are-favoured-thus-the-project-is-valuable': it is necessary to acknowledge variable degrees of legitimacy within any project. For example, the notion of the common good- clean drinking water for future generations- might be superior to most other interests

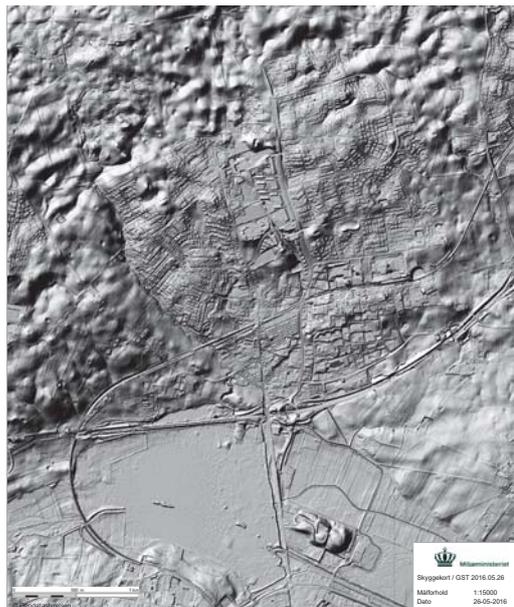
I do have to stress, that by suggesting employing the 6RJ in a project-based, propositional-analytic, the errand is neither to schematise nor mainstream, as if all 6 regimes always should be equally favoured. This would not qualify 'better' or tell of how well urban landscapes are transformed into everyday landscapes of CA|HOW. The purpose is rather the opposite: to further qualify CA|HOW through plurality and contextualisation, drawing attention to plural values and informing a direction for action.

5.1.4 VISIBLE VS. UNDERGROUNDED HIDDEN WATER AND SURFACE LOGICS

Complex waterscapes of urban landscapes

Meeting³, discussing piped streams, uncertainty and responsibility, municipal actor, quote: "[...] A piped stream on a private property equals a private problem. The formal solution is to follow the administrative delineations⁴ so that the sub-projects are divided into administrative and legal terms of responsibilities. E.g. open streams are an entity with one [public] owner; piped streams on private property are [legally] something else. The same water is received further downstream by the utility company. This could be seen as an unofficial 'catalogue' of the mixed nature of piped streams. The water was there before the town; the piping came before the building that came on top. The accumulated hydrological effect is uncertain. Don't go into that."

Waterscapes cannot be fully understood in a visible surface context. What is carefully read as on-ground waterscapes do not necessarily relate to underground waterscapes and vice versa. Together with changing rainfall patterns, this forms highly complex hydraulic systems. The flow of surface water does, of course, respond to visible, surface elements like the permeability of the surface cover, friction, gradient, and physical barriers like buildings and curbs. At the same time, handling of surface water is terminally bound to all of the hidden (and sometimes forgotten) water infrastructures below ground, natural or constructed. Beneath the surface in Lystrup is an intricate water system. Parts of this are human constructions of extensive piping meshes forming controlled, underground waterways. Or at least in control until the occurrence of a local piping-collapse or an extreme rain event.



Figur 5.1.20: Topographic 3D model, showing the terrain of moraine hillsides sloping towards the Southlying wetland. The topography shows the imprint of human alterations of the urban landscapes.
Source: GST

3 2014. 30th of January
4 Vandløbsregulativer, spildevandsplan

Lystrup and the weakest link

As Lystrup town is relatively newly-built for the most (see aerial photos 1945-2012), it is mainly separately-piped⁵ (Laustsen, 2013, p. 11). This means that the extent and state of the sewer system⁶ are quite well-known. As an addition to this system there is an array of hidden waterways.

Some of the hidden waterways are piped streams conveniently underground. Some go below residential buildings, and the present owners might not necessarily know that their home is situated on top of a stream. Furthermore, they might not be aware that they are responsible for maintaining their hidden pipes. Clearly, the state and capacity of such pipes are likely unresolved, providing the weakest link in the accuracy of the hydrological calculations regarding flow, volume and speed. In addition to this there are complex patterns of drainage systems⁷ within farmland. Of the old drainage pipes, some are known, others might be in unresolved conditions, and others have fallen into oblivion. This means that even though Lystrup is relatively well-defined regarding its underground water systems, parts of these interconnected waterscapes remain unknown or in unknown conditions, as missing links of knowledge within the system.

Unknown parameters in hydraulic calculations

Knowledge of piping and their extent and conditions forms an important part of hydrological calculations in combination with e.g. knowledge on gradients, surface permeability, soil conditions, groundwater table, open waterways, infrastructure, curb heights and barrier elements, recipient capacity, precipitation patterns, friction, speed, volume, and flow. The complex system of surface and underground waterscapes reveals why hydrological calculations are qualified *projections* and how they cannot be considered as final or as having an absolute truth value. Chosen calculation models and software further influence the output, including the human aspect: a professional's assessment of how to place a numerical value on partly incomplete levels of information. Furthermore, the physical properties of the surface landscapes are also subject to change: curb heights might be lowered, lawns might be paved, buildings might be demolished, and new buildings might be reoriented and thereby direct surface water in new directions.

5 Notat_Lystrup_Klimatilpasning_2014.pdf, p.11, engelsk ord?

6 Største delen af Lystrup er dobbeltstrenget/separat kloakeret, vidensniveau 1, Vidensniveau 1 er højest, dernæst Videnniveau2. "Det samlede kloakerede areal udgør 70.000 hektar svarende til ca. fem pct. af Danmarks areal. Der findes to kloakeringsystemer: Fællessystemer, hvor spildevand og regnvand samles og Separatsystemer, hvor spildevand og regnvand føres i separate ledninger til henholdsvis rensesanlæg og recipient". Kilde: Naturstyrelsen. <http://naturstyrelsen.dk/vandmiljoe/vand-i-hverdagen/spildevand/kloaknettet/kommunernes-kloakfornyelse/>

7 I sidste halvdel af 1800 tallet havde DK flere hundrede tusinder km underjordiske drænrør

WATER, LANDSCAPE PROPERTIES AND SETTLEMENT PATTERNS

Former and projected waterscapes in Kildehaven

In the following, I studied the connection between former and undergrounded waterscapes and their relation to flood maps. The aim was to investigate if the hydrological calculations could be complemented by attaching this knowledge to different geographical scales and landscape properties.

I studied the historical HMB and contemporary maps for information on topography, vegetation, parish boundaries, land-use, sewer systems⁸, zoning, programmes and ownership, together with the development of settlement patterns and surface covers. The contour lines of recent and historical maps rendered some of the stories of water's movement from the past to present time. Thus, connecting the local scale with larger landscape logics shed some light on the relation between underground and surface water. For example, the maps of Kildehaven (Streamgarden) show how historical waterscapes have been underground, and the surface has been built upon and partly sealed. The sewer system map tells of the connection between the historical surface water and the undergrounded water. The recent capacity to turn wet land into dryland has enabled us to construct buildings and roads on a former blue-green passage, creating new affordances of, e.g. mobility, to the urban landscapes. The municipal flow paths projection from CAP14 show how larger flow paths still seem to respond to the larger landform and its 'natural' properties⁹. Though the visible, physical characteristics of the urban landscape have changed drastically, the underlying landscape properties show their influence in the case of extreme rain. The implication of this for the residential area of Kildehaven is that it is flood prone. This made me look more carefully into the larger landform and recent historical waterscapes of Lystrup.

Figur 5.1.21: The red rectangle on the map, this page (a) shows the section of the right page maps. The black dot marks the location of Kildehaven (Source Garden). Part of the settlement is placed on top of a former blue-green passage and a spring (a) (b), the map of the underground pipingsystem tells the story of the settlement pattern together with the slope of the terrain southwards (as the sewersystem is gravitational based) (d). The contemporary settlement pattern demonstrates how the former wet land has been sealed with asphalt and buildings (c). The flood map shows how the former passage is resurfacing in extreme rain (e).

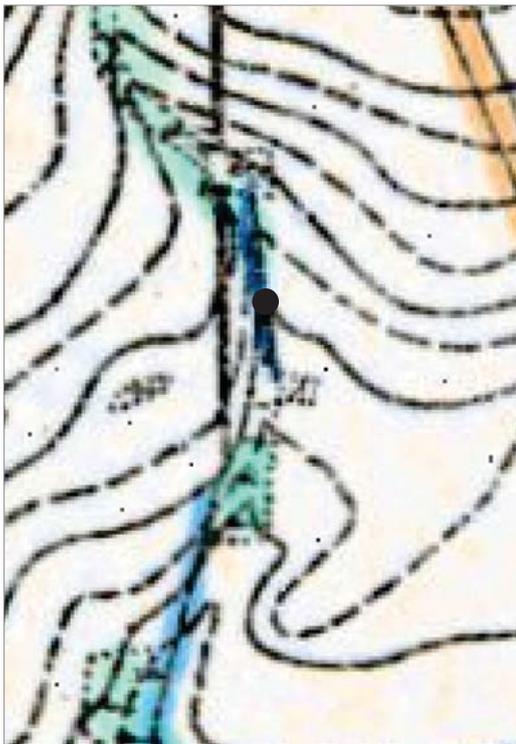
- (a) Flood map, source: AKO
- (b) HMB map, source: GST
- (c) Aerial, source: EKF Ministry
- (d) Flood map, source: AKO
- (e) Sewer piping and administrative boundaries, source: AKO



(a) The location of Kildehaven, Lystrup

⁸ In Denmark, the sewer system is based on a gravitational system. This means that the main piping system is inscribed in the larger landform, thus related to the terrain and former blue-green corridors.

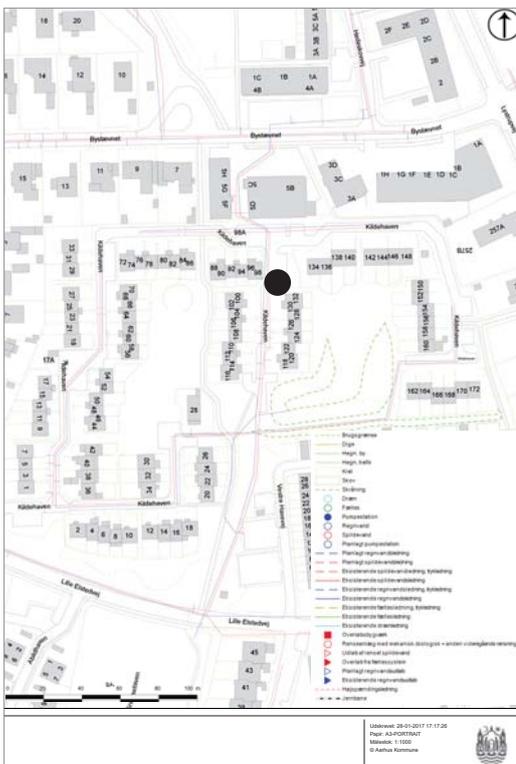
⁹ Deep structures



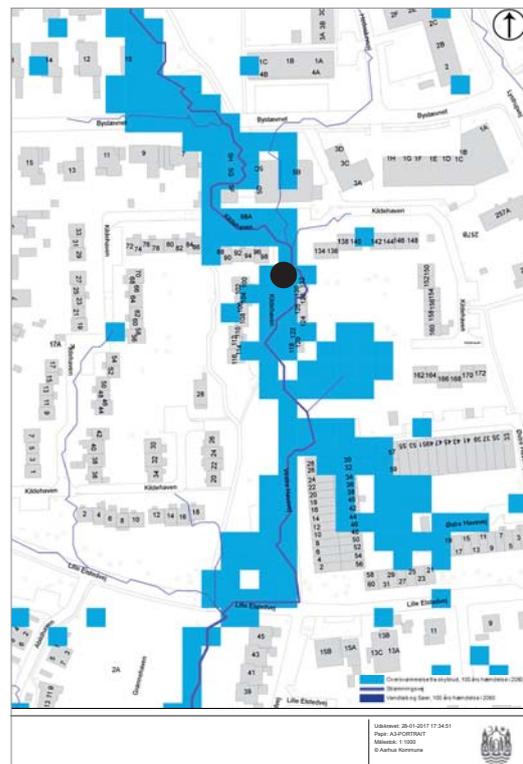
(b) Past terrain,, blue-green passages and surface water



(c) Contemporary surface cover



(d) Administrative boundaries and sewer piping



(e) Contemporary settlement patterns and future water

Lystrup – the three stream town

Fig.5.1.22,top, is a tracing of the waterscape and terrain from the historical HMB map, showing how the area formerly was defined by three blue-green passages and how the settlement pattern mainly followed the *sides* of these passages. In Lystrup, the three blue-green passages seem particularly relevant to inform CA|HOW. They run from the sub catchment delineation north of the urban border, moving south, down to the larger recipient. The below map, Fig.5.1.22, is a superimposition of the above together with the current road net and delineation of the urban zone.

The superimpositions provide a visual time-interlacing, rendering some of the stories of waters flow over time. Formerly, the three blue-green corridors received and directed water on its way to the downstream recipient. When looking into Lystrup's contemporary urban landscapes, the passages are blurred as visible readings even though disconnected remnants exist as recreational areas. Seen from the mappings, one could have expected the settlement patterns of Lystrup town to be defined by its three streams. The connection between historical waterscapes, contemporary settlement patterns and future water seen in flow path projections is discussed further in Case Aaby.

Natural and human catchments

In the world of natural watersystems, catchments are divisioned into topographical catchments and groundwater catchments. These are interrelated, but they do not necessarily cover the same area. Humans introduced another catchment: the sewer catchment, provisioning the excess of grey and black water in undergrounded systems. However, flood projections and current extreme rain experiences in Denmark suggest that the sewer system is likely overruled in a cloud burst event. In extreme rain, the topographical catchment rules. This is not only due to the amount and intensity of precipitation reaching the surface. Surfaces in an urban area like Lystrup have become designed to rapidly move water on the surface. The superimpositions and flood maps led me to look further into settlement patterns and their relation to CA|HOW, and thus leave the focus on CA|HOW facilities for a while in favour of the human design of the urban landscapes.



Figur 5.1.22: Top: Historical contourlines, water and blue-green passages. The red squares represent late 19th Century settlements, purple is forest and down below is the larger recipient of Egå Engso. Bottom: Light blue indicates historical surface waterscapes and blue-green corridors together with superimposition of current roads infrastructure. Red line marks the rural-urban zoning. Source: HMB, AKO maps, KW mapping

5.1.5 URBAN VS. RURAL

SETTLEMENT PATTERNS AND PLANNING DISTINCTIONS

Industrial notions of water and water-unwise settlements



The Industrial Revolution was the departure point for large-scale water control by pumps and underground piping (see Chapter 3.3.1 on Water History). This trajectory facilitated settlement patterns that were released from contextual readings and instead became based on cost, proximity to other infrastructure or workplaces, or simply conveniences in buying the land. Climate change now challenges these relatively new practices. In waterscapes of the Anthropocene, this leaves some newer settlements in questionable locations. This is also the case in Lystrup. *Explanatory comment at meeting, municipal project manager:* “ [...] there is still a distinction between urban and rural zoning, meaning that, within the municipality, as a sector, there exists an array of administrative divisions, which complicates more holistic solutions.”

Danish planning is regulated by the Planning Act (Planloven), which acts as an overarching national planning document. The Planning Act defines three land-use distinctions: Urban Zone, Recreational buildings Zone, and the Rural Zone (rural covers everything that is not in the first two zones). Urban zones are further sub-divided into programmatic entities like industry, harbour activities, retail, residential, public institutions, infrastructure, traffic and so forth. Fig.5.1.3, 5.1.23 shows the clear distinction between the urban and rural zone and the programmatic planning of Lystrup. The flood maps of Lystrup challenge these static delineations. The sub-catchment of Lystrup starts just north of the urban zone in a farmer’s field, leading the water down south. The rural water of the upper sub-catchment becomes urban water on its passage through Lystrup town and, eventually, when reaching another farmer’s field, it becomes rural water again on its way to the wetland Egå Engso. In this way, the surface water in its descent continually shifts in its relation to planning zones. Physical matter overflows the programmatic delineations between residential, infrastructure, public and private property.

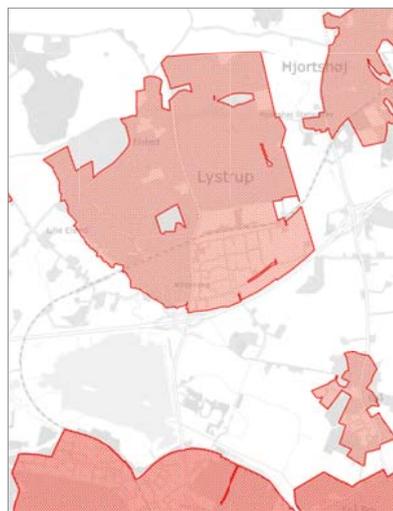
Zoning and dependencies

Water is ignorant matter without care for property lines, economy, functions, planning, or land-use distinctions. From this perspective, the contemporary planning distinctions are not as pragmatic as intended, or, possibly, they reflect a dry-day planning modus. Increasing extreme rain events push the relational dependencies of rural and urban zones. As seen on the permeability map, the urban zones in Lystrup have extensive impermeable surfaces that keep water *on* the surface and give speed to water’s flow. Construction practices in urban zones *create* the affordance

of flood risk to human interests and settlements. In contrast, rural zoning generally provides larger areas of permeability and friction, affording to slow down or even store water. From the point of view of surface water, the level of permeability is what designates the distinction between urban and rural. On a dry-day, the planning distinction of land-use is urban-rural, but on a wet day, the distinction is between permeable or impermeable. These are implications enforced by human constructions and connect to using the Anthropocene as a lens. This is discussed further in Case Aaby.



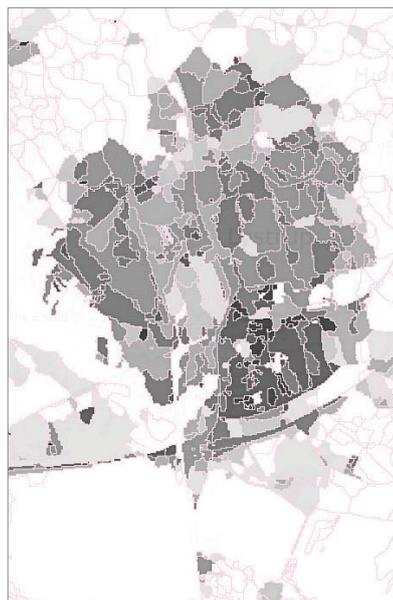
(a)



(b)



(c)



(d)

Figur 5.1.23: (a) sewer catchment (b) urban zoning Lystrup (c) degrees of surface cover (belægningsgrader) town (d) hollows map (lavning kort).
Source: GST, MiljøGIS

Two CA|HOW measures connecting the urban-rural

Water crops

The rural zones around Lystrup afford the time and space to slow down water, whereas the surface characteristics of the urban do the exact opposite. Comparing the flood maps to planning maps of Lystrup, a physical relationship between the urban and the rural renders where the urban is dependent of the rural. For example, In Lystrup, the uppermost CA|HOW facility is located in a farmer's field at the border of the urban area, thus protecting lower-lying, residential houses from flood. The historical maps show that this area is part of a former blue-green passage and the old village of Elsted (Alderplace) is located at its *sides*. The CA|HOW-facility is a small dike that retains water in the field, together with an agreement with the farmer. In Denmark, expropriation is preferably avoided, and the farmer had to agree to host the CA|HOW-measure. In exchange for agreeing to this, the farmer was compensated and receives compensation if retained water damages his crops. In extreme rain, the farmer's earnings from rape and barley changes and water becomes the temporary crop.

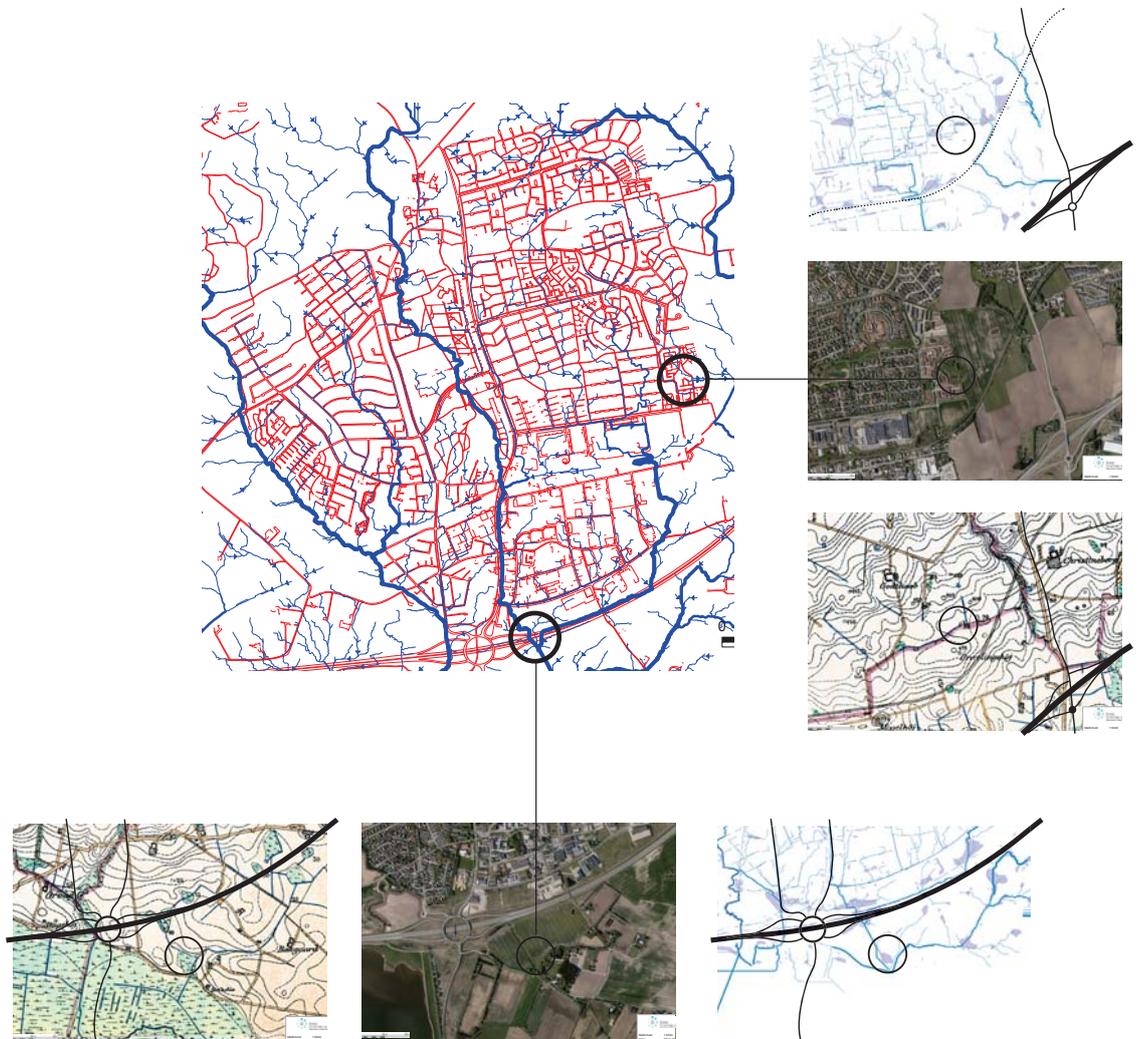
Wet land prospects

Just south of Lystrup, between Egåvej (Oakstream Road) and Egå Mosevej (Oakstream Marsh Road) there lies another rural area that was prudent for the overall CA|HOW strategy. However, in this case the farmer did not consent to selling, and, due to regulations, the municipality could not raise the financial offer. This farmer saw a prospect in the field being close to the urban zone and was hoping to sell it for urban development in line with contemporary practices of selling wet land for settlements. However, at a meeting, a municipal actor explained to me that the days where one could get building permissions on wet land just next to a noisy freeway are over. Apparently, the farmer still believed in the efficiency of the command and control water paradigm. As a result, the CA|HOW-facility became a combination of pipes and canals. The farmer keeps farming, though the aerial photo suggests that the crops seem to suffer from water already without him making earnings on water.

A dry day's notion of water

Water does not acknowledge delineations and distinctions on a map. With changing waterscapes, planning distinctions lose their static delineation in favour of a spatial and functional relationship with regards to water. Water physically pushes the notion of local administrative entities as ownership, interests, and functions, and instead turns into an upstream- and downstream relationship. This means that areas divided by different planning statuses and provided for by underground waterscapes enter a water-based connection in the wet city. As described earlier, the convenient sewer catchment becomes a dry day's notion: The topographical sub-catchments are back, and we are in need of changing our notion of water, settlement patterns and zoning.

WATER CROPS - PAST PRESENT-FUTURE WATER



Figur 5.1.24: Center: Flow paths (blue) and infrastructure (red), black circles mark the eastern retention basin Majsmarken and the most southern CA|HOW project. Black lines with circles points out the approx. location on the aerial photos. Each aerial photo is supported by an equivalent section of the area on a flood map and a historical map (HMB) Right and Bottom: Maps and aerial show the past-, and contemporary landscape and future flow paths (left to right), past and future are marked with the highway and access roads of the present. Sources: HMB map and aerial: GST, flood maps: AKO

CHANGING WATERSCAPES AND RESPONSIBILITIES

Water as matter and notions of water

Municipal actor: "We need to be open about the fact that water moves downwards...moreover, often on the surface".



This quote was, of course, meant as a humorous comment from the municipal actor. However, in the context of the meeting, it represented more than this: it was a public sector, water-professional's comment on how water is expected to be controlled by public institutions. In this comment lies a discussion on how we, the water-laymen and non-professionals on hydrology, might have forgotten the power of water by trusting the command and control regime to an extent where someone or something else is held responsible for an all-inclusive water management. In Denmark, the regulations on who is responsible and who is to pay eventual damages or CA|HOW costs are quite well defined and based on ownership, thus attached to land-use. However, this might not fully correspond to a public notion of water, yet.

Changing waterscapes, static settlement patterns

So far, current cloudburst events support what is forecasted in climate change projections: Denmark should expect to receive more frequent and heavier rainfalls. This raises the question of who is responsible, who is to pay and who is to act: is it the state, the municipality, the water company, the private insurance company or the individual property owner? What is equally important in a Danish context, is that this is not only about receiving more rainwater it is also about settlement patterns and building styles that bring about flood prone areas. In the following, I discuss the settlement patterns of Lystrup and their relation to changing waterscapes.

Figur 5.1.25: After the cloudburst in Lystrup 2012. Source: Aarhus Municipality

PRACTICES OF SETTLING WITH WATER

‘Åvangen’ - a toponym going from informative to narrative

Lystrup has an array of road names with reference to water (hydro-place reference). After the Lystrup cloudburst, this gained attention from the media: one of the reoccurring pictures was that of kids, standing on a flooded road named ‘Åvangen’ (Streamfield). The coincidence of flood and *hydrotponyms*¹⁰ is hardly a surprise to professions working with water, climate adaptation or landscape in a deeper sense, including the professionals at the DWA and Aarhus Water. As mentioned, the flooding of the 2012 Lystrup cloudburst corresponded well with later flood map projections of the area. Nonetheless, the Åvangen photo rendered a place specific meaning, which on a dry day would not be self-explanatory to water-laymen. Herein lies a professional responsibility to explicate how the command and control paradigm is no longer the autocrat of water, and how buildings and surface covers are integrated parts of the terrain as urban landscapes. With changing waterscapes, the heyday of urban vs. nature is over: the Anthropocene has surpassed such human-nature dualism. The intertwinement between human and nature is further discussed in Case Aaby as methodological LArch response to changing waterscapes in the Anthropocene.



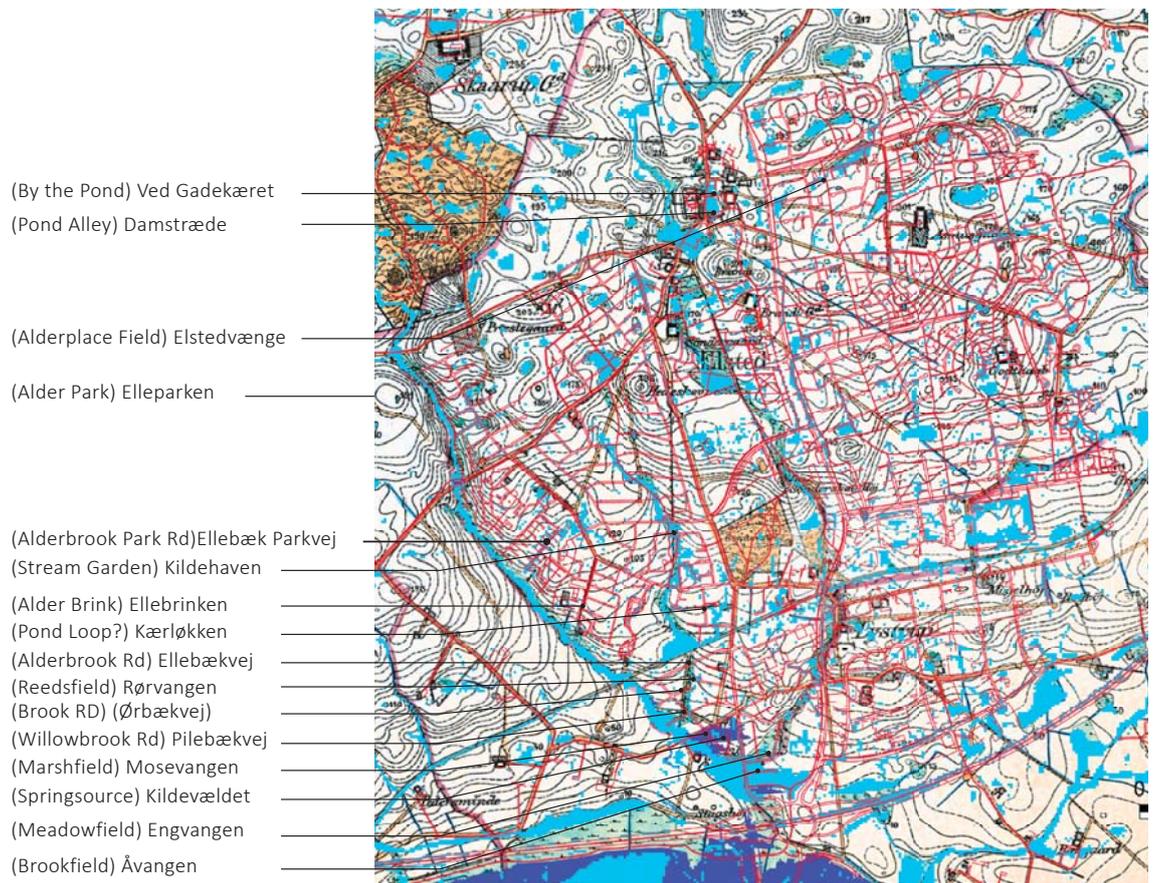
Figur 5.1.26: This photo gained a lot of attention after the cloudburst in Lystrup August 2012. At this stage, water was not only a threat, it also became an event before the personal and monetary costs were set. The water was likely mixed with sewerwater. Source photo: Fyens Stiftstidende

¹⁰ I later found out that Freitas et al suggested the term hydrotponym in a multidisciplinary hydrohistorical study on ‘(i) historical mapping of sources and groundwater data from scientific reports spanning the late 17th century to the early 20th; and (ii) hydrogeologic and hydrotponymical field inventory performed under current conditions’ (Freitas et al., 2014)

Hydrotoponyms and meaning

To further investigate the implications of settlement patterns and flooding in Lystrup, I mapped all Lystrup road names with connotations to water, e.g. vegetation like Alder trees¹¹, terrain like 'brink' and soil conditions like 'marsh' and so forth. The map at Fig.5.1.28 shows the topography and blue-green passages as seen on the HMB historical map. The information is superimposed on current roads together with the flood maps. Though the mapping is straightforward, it crosses vast timespans. The HMB is approximately 120 years old and the landscape formations of the blue-green passages were created in the last glacial period 11,700 years ago and continuously formed by water until today. The roads are contemporary of 2015, and the flow paths are projected as in the year 2050. Despite the large timespan, the layers of the mapping represent real situations and physical properties that meet due to being attached to a specific geographic location. The mapping shows how many of the present hydrotoponyms in contemporary Lystrup correspond to historical landscape properties of wet or humid areas. The hydro-toponyms appear to represent a local recognition of landscape properties. However, the settlement patterns of buildings and roads do not comply with any considerations of water or natural terrain: they are freely and autonomously configured onto the former terrain. The photographs in Fig.5.1.29 show the hydrotoponyms for roads that I found on the field trips and maps, such as Kildehaven, Mosevangen, Engvangen and Åvangen (Spring/Source-garden, Marsh-enclosure, Meadow-enclosure, Stream-enclosure). By marking the location of these toponyms and their relation to the historical terrain and future flow paths, a pattern is made visual: the former blue-green passages now host hard surfaces. On a dry day, this is a hidden property of the overall landform. In heavy rain, local alterations are flooded and water renders a larger picture of landscape-based connectivity.

11 In Denmark, Alder trees are the species most suited for wet soil and standing in water



Figur 5.1.28: Correlations between former waterscapes, future flood and present place names The above map shows residential areas in Lystrup with water-related place names; hydrotoponyms, marked on historical map with contemporary roads and flood projections. Source: underlying map AKO.

Old knowledge and informative hydrotoponyms

The above is not entirely the case in the early village of Elsted (Alder-Place). Here, the application of hydro-toponyms reflects a *relation* between settlement and waterscapes. What makes the Elsted village different is its very location. In Elsted, hydrotoponyms are used as a functional reference to locate the settlement close to natural resources- not on them- and to locate buildings in terms of water. Here, the settlement is gathered *around* the village pond and *along* but not *in or on* the blue-green corridor. As such, the waterscape and landscape properties were determining factors for the settlement. The road Elstedvej (Alder Road), leading to Elsted, reflects navigation: the road leading to Elsted. This is different to the contemporary, suburban use of hydrotoponyms. These still reference a local landscape property, but without consideration for the meaning of it. Rather, they seem to reflect a nostalgic narrative of what was *before* constructing buildings and infrastructure on top of it. The consequences of these toponyms and their associated settlement patterns reflect the trust in the command and control paradigm, as opposed to acknowledging water as a resource and an actor that influences land-use. The flow paths now tell that there are still tight bonds between landform, landscape properties and waterscapes, built upon or not.



Figur 5.1.29: The photoseries shows examples of how Lystrup presents an array of hydrotoponyms as street names. Comparing these place names to the previous map of flood risk correlation, these represent not only a narrative but also real landscape properties of the present.
 Photo Åvangen streetsign: Camilla Bank Andersen

5.1.6 WEAK GEOMETRIES AND THE AMOEBA

CA|HOW CAPACITY AND DESIGN PRACTICES

Translating Industrial calculations into design

Quote Consultant: "...the questions [from KW on the design] have made me nervous...now I hardly dare to show it [the detailed project drawings]."

At a meeting Lx1 on the current designs of the CA|HOW facilities, I posed questions relating to the design of the retention basins. I did not intend to make anybody nervous, and I posed the questions in a non-offensive manner. My questions were regarding whether the location of the CA|HOW facilities had been considered in relation to the urban fabric and if there was a reason for their distinct technical appearance. The collective answer was no, and the above quote might reflect how the design had been addressed solely from the logics used in calculating capacity, flow, ownership and costs.

Room for water only

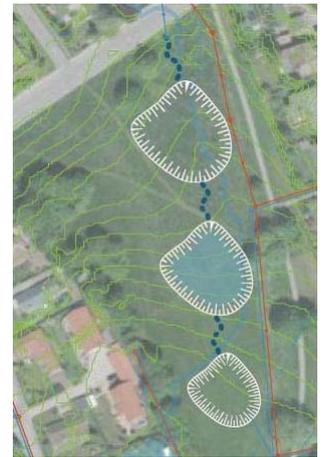
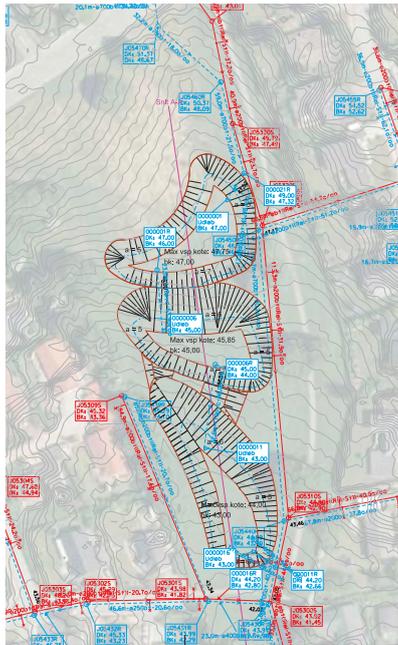
Quotes: KW: "Do green lawns in themselves provide biodiversity? Is it allowed to add other types of vegetation in the retention basins later on, in the years to come?"

Answer, municipal project manager: "No and No."

I asked if it would be possible, in the future, and if citizens were interested, to add more vegetation or alternative functions to the dry basins – or whether it would reduce the capacity negatively. The answer was that adding other vegetation would alter the capacity and thus, would not be possible. I have to emphasise that the answer does not suggest that the actors did not care or think about e.g. biodiversity or recreational areas. Rather, it reflects the consequences of turning calculations into design. However, from a design perspective, the facilities could provide plural values in urban landscapes and still be low-cost, efficient CA|HOW-facilities. This encounter prompted an on-going reflection during the research: how to design for affordances without altering the here & now cost. This led to investigating how to design for values *to be: designing for future affordances*.

Technical solutions as introvert design

In the following, I refer to the design of the wet and dry basins as 'weak geometries' to express how the form (curves, slopes, and the relation to the spatial characteristics and programmes of the surrounding urban landscapes) seems to follow its own introverted geometrical logic. The volume of water is a calculable design parameter, but the form does not disclose the reasoning behind its geometric curvature. Visually and spatially, the design does not allow affordances of sensory sensations or dry-day functions. It is a weak geometry designed for wet day concerns. Fig.5.1.31 shows a more detailed drawing of retention basins in Lystrup. The shapes are inscribed within the administrative boundaries with a little 'twist'. This is not only seen in the designs for Lystrup; they are common elements in the everyday landscapes of Denmark.



Figur 5.1.30: Hedeskovparken retention basins.
 Top: drawing from the application for the project.
 Left: Project drawing from the early processes, 2014.
 Right: work-in-progress, implementing the design of the retention basins.
 Source: application AWA; drawing: Orbicon, AKO; aerial: GST



Figur 5.1.31: Sønderskovvej, generic design with technical slopes that are offset from administrative boundaries and variations on the amoeba
 Left: project drawings, 2014.
 Right: ariel photo from the implementation.
 Source: drawing: Orbicon, AKO; aerial: GST

Geometries and design logics

To understand the design logics, I questioned the seemingly de-contextualised, rigid geometries used to design retention basins in the everyday landscapes of CA|HOW on a different occasion¹². Here, an engineer explained to me how the rigid geometries were of the past and how they always designed 'the amoeba' now. In its essence, 'the amoeba' is a weak geometry with soft curves. This did not shed light on the reasoning behind the design, as the answer could not only lie within the restricted economy. Even low-cost retention basins entail several design iterations before actual implementation. For example, the drawing, Fig.5.1.30, shows how the basins in Hedeskovparken had different designs during the early phases and the aerial photo reveals that the final design is again different. Also, in the dispute between the elephant and the retention basin, the project was relocated to keep the elephants free. The new chosen location required the offsetting, and thus reconstruction, of part of the main road. Thus, this re-locating necessarily demanded redrawing the design. All of which is costly. With respect to costs, when the machinery is finally out there doing earthworks, it is not costly to dig the basin a bit larger or in a different form or direction.

Future affordances and connectivity

Quote, Municipal actor: "Here we thought that we were innovative and now you come calling it technical solutions."

At the following meeting encounter, attended by two municipal actors, I brought the diagrammed visualisations of the retention basins and the re-mapping of the overview map, which I have already described in the Contextualisation 5.1.1. This formed part of developing the Design Comments as interactions with LArch based, tangible material. The intention was to visually support my questions relating to the technical slopes and generic locations. The above quote was a witty response but points to how the material sparked more dialogue than expected, which was more in depth than when I had interacted by posing questions. In the following, I exemplify how a design can be generous of future affordances by using specific landscape properties to inform the design and support affordances at a strategic level. The aim is to embed a contextualised openness to the designing.

Static property lines and designing generously

For example, the newly built retention basin, Fig.5.1.32 at Majsmarken is located in the shared green areas of a terraced building enclave at the edge of Lystrup, bordered by an agricultural field. This area had experienced several floods. The local waterscape pattern and landscape properties as seen on the historical HMB map show that a canal formerly had its passage through the residential area and further out into the field, connecting to the Eastern of Lystrup's three blue-green passages. The straight canal is a classic pattern in fields subjected to local (in-property) water management after the Enclosure. The projected flow paths

¹² In autumn 2014 I attended a course lecture (Klimatilpasning og Innovation af steder/ Climate adaptation and Innovation of places) at The Danish Town Planning Institute (Dansk Byplan Laboratorium). The participating actors were all involved in current CA|HOW projects in a municipal/utility company context. This made the actor-project constellation interesting as it resembled the constellation in my cases



Retention basin as a weak geometry; technical slopes, maximizing capacity within administrative lines forming design parametres



Former wetland- crossing the urban-rural border, the area still seems humid



Retention basin- the amoeba as an introvert design logic



Retention basin (weak geometry) at the edge of the city- the urban and the rural are connected by underground/ drained canals. The retention basin is bounded by the neighbouring agricultural field (urban-rural zoning), the area was formerly connected by water that is now neglected through the urban-rural zoning



Figur 5.1.32: Weak geometries and the amoeba. Lystrup retention basins anno 2015 diagrammed with the rural-urban border and former surface water-scapes are marked, based on the HMB map. Source: aerial photo GST; diagramming KW

on Fig. 5.1.21-22, show how the water in Kildehaven follows the larger landform, leading water down to the housing enclave, connecting to the former canal and into the field. In this context, designing for affordances could simply mean to use the local waterscape and terrain more pro-actively by connecting the urban-rural zone water-wise. Water does that already. As described, static property lines and the planning distinctions between urban and rural still impede more holistic solutions. However, a design could *prepare* to connect this area water-wise, so that in time, if the static distinction between urban and rural softens, or the practices of farming changes, then the facility could take up this development and provide further affordances. On a small scale, the basin could be oversized to allow for dry day affordances for the present, and, at a larger scale, it could be a low-cost design with the capacity to 'reap the free' potentials of the landscape properties that are already capable of leading water.

Another example is the retention basins at Hedekovparken. This area is a green recreational area, a fragment of one of the blue-green passages. Here the design of retention basins could, also, prepare for future affordances by taking on board knowledge of the historical, now hidden, waterscapes in conjunction with current topography and settlement patterns. Integrating the landscape's curvature with the gradient of the basins in a more generous manner could allow for recreation. Similarly, the brinks could be extended to promote a wider ecotone, thus promoting biodiversity and so forth.

Larger- and small scale considerations

The former blue-green passages could be used to reconnect the Lystrup waterscapes while simultaneously connecting its green spaces. At a low cost, it would be possible to design for a deliberate 'oversized' capacity. The purpose should not be to expand the room for water, but rather to provide a spatial generosity towards affordances not thought of, needed, or paid for yet: spaces of affordances to human and non-human actors. In itself, designing for future affordances does not necessarily rule out the amoeba as a shape. The reason for questioning these designs is that the amoeba reflects a static design approach relying on singular justifications that do not allow for un-calculated affordances. By designing for open-endedness and future potentials, even low-cost CA|HOW facilities could provide for plural and future value-creation. The design of the each basin could provide future affordances. However, water is a cross-scale actor and to integrate the landscape-based potentials a larger, more coherent strategy is needed. This I discuss in the following and develop further in Case Aaby where I examine pre-strategic potential in urban landscapes of CA|HOW.

5.1.7 SUM UP—PROPOSITIONAL REFLECTIONS

SETTLE CAREFULLY FOR UNCERTAINTY

Justification and plural values

In the early stages of CA|HOW projects, I suggest a project-based Justification Analysis as an approach that acknowledges plural and diverging values. A Justification Analysis could function as a litmus test, as well as an entry point to gague potential disputes and alternative compromises.

Settlements are never permanent

Studying the CA|HOW-project in Case Lystrup made me question whether the actual problem is receiving more precipitation. Water is a resource, per se, and what seems to cause the negative implications for humans in this case are settlement patterns, material usage, planning boundaries, ownership and land-use. With the current climate change prognosis, it might be the time to reevaluate the settlement patterns of suburban Lystrup and discuss contemporary land-use boundaries and planning terms.

Learning from Case Lystrup

The knowledge drawn from Case Lystrup became a little different from what I set out to investigate. By re-mapping the locations of the CA|HOW facilities and looking into value creation by contextualising their design, I found that the most significant opportunity for creating plural values in CA|HOW was that of a larger, landscape based strategy connected to small scale, local alterations. Learning form Case Lystrup, I would say that climate change projections are a call to reconcile the surface landscapes of suburbia with its underlying landscape properties and larger landforms, in order to guide future settlement patterns and affordances through CA|HOW. Lystrup is, of course, a specific local context. Still, its urban landscapes have similarities to Danish suburbia. They are connected by their expansion mode, physical layout and inscribed within the same administrative boundaries too. In this way, the findings relate to other suburban contexts in Denmark.

Hydrological calculations and old knowledge

To act as informed by CA|HOW, it seems necessary to proactively use hydrological calculations together with 'old' knowledge on catchments and landscape properties in order to qualify CA|HOW in relation to land-use and settlement patterns. This includes acknowledging up- and downstream relationships and urban-rural interdependencies on a larger scale. This is further discussed in Case Skejby as catchment neighbourhoods.

Demolition and the provision of the common good

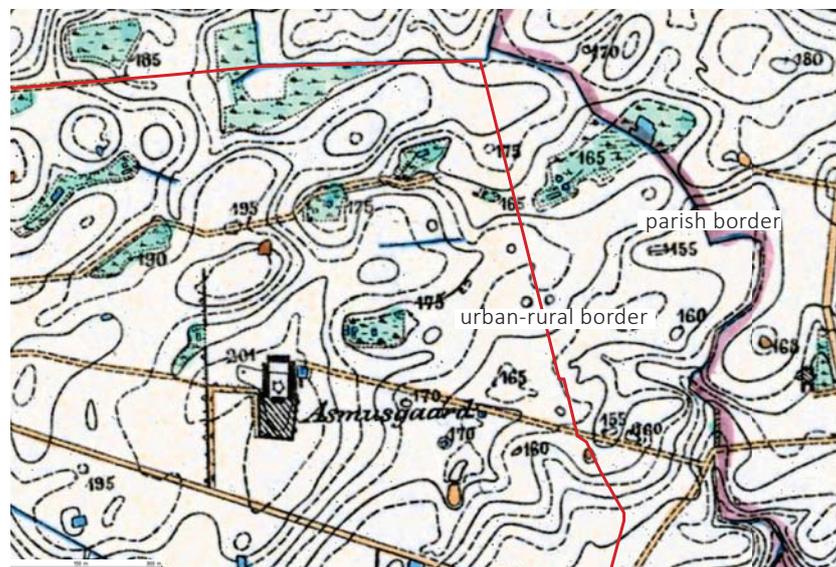
The Lystrup case showed that buildings are often placed *on* former wetlands and that with increasing extreme rain events these soils are likely to reveal their properties once again. The flood maps and the 2012 cloudburst support that this is the case. From this perspective, it might



Figur 5.1.33: Foster Floodplain, Portland, 2015 Former wetland, recent residential area, now returned to water and 'natural' wilderness, the natural forces were allowed back and water given space on the former properties. Top: Portland resident visiting the area. Middle: traces of former building. Bottom: space for water and vegetation

be the time to discuss what to keep and what to (radically) change. This would, however, require the courage to question the almost fundamental right of private property: does a generic single family house from the 1980s that is blocking the flow of water or is placed on top of a piped stream have enough qualities to keep in a long-term perspective? This consideration includes discussions on land-use and zoning: should the rural zone that neighbours the urban zone continue as agricultural monocrop systems or should it rather become integrated into larger water-scape schemes for the common good?

Private property is a sensitive issue for both citizens and politicians. However, the expense of flood damage might feed the incentive to more openly discuss whether all settlements should stay in their current location. This is not a speculative stance in the context of Lystrup. In Portland, they have executed such a strategy: the Foster Floodplain was an area repeatedly experiencing flooding (Chapter 3.4 Best Practice). This was not just inconvenient to the residents of the area; it also impeded the mobility of the city, as an access road to Portland was flooding too. Furthermore, the flood events had environmental implications. The businesses on the other side of the road had polluted surfaces, and, when flooded, the pollutants were flushed into the larger recipient with consequences to the water environment. The flood problem was handled by a visionary and proactive approach: over some years, the residents were convinced to sell their properties, and the area is now a recreational and wilderness area with time and space for water. The strategy solved the flood problem while accommodating the common good on a larger scale (Fig.5.1.33). In order to acknowledge environmental, material and human resources, it could be useful to discuss the current layout of, and settlement priorities in, suburbia. In Lystrup, a demolition strategy could be a possibility, although it would likely cause dispute too. From the perspective of a Justification Analysis, the Domestic and Opinion regime would presumably provide rather intense dispute. From the viewpoint of a justification conflict scenario, it could be useful to explicate plural affordances, clearly rendering values that accommodate the Domestic and Opinion regime.



Figur 5.1.34: The historical map, showing the parish boundary which follows the blue-green passage/stream. The red line indicates the urban-rural planning division.

Sources: HMB map: GST; diagramming KW

LANDSCAPE BASED APPROACHES TO CA|HOW

In the context of low-cost CA|HOW in everyday landscapes, I suggest introducing an affordance-based design approach with a specific focus on designing with landscape properties and paying attention to future affordances.

Smaller scale design strategy

At a smaller scale, I suggest developing the concept of designing for future affordances, as a strategic design approach focused on open-endedness, ambiguity and generosity informed by landscape properties. For example, to design CA|HOW generously, beyond calculated water capacity on a wet day, in order to allow for wider ecotones and biodiversity and, particularly, affordances to come.

Medium scale strategies

A water-wise planning strategy could include anticipating the demolition of selected buildings in flood-prone locations with low-lying terrain and wet soils. At a planning level, this could be to prepare for more integrated planning terms between what is zoned rural and urban. Such landscape based strategic measures would not only address CA|HOW but promote environmental and societal values, e.g. biodiversity, livability and aesthetics. A key element would be studying underlying landscape properties, current surface landscapes and flood projections together with local opportunities for value creation in the contemporary urban landscape.

Larger scale strategies

At a larger scale, I suggest landscape-based planning strategies as an integrated element of CA|HOW in urban landscapes. In Lystrup, there is considerable potential in reconnecting the remnants of green-blue passages that used to form natural waterscapes. For planning and low-cost objectives, this could be done at a smaller scale by *preparing* to connect when already carrying out smaller scale alterations, repair works and so forth. This is developed further and exemplified in Case Aaby.



Figur 5.1.35: Using landscape based affordances for designing generously to future needs and the unexpected through open-endedness and flexibility departing in landscape properties. Historical wet lands are marked with blue and green, red indicates urban-rural planning zoning, yellow dotted lines suggest connectivity with potential for designing for future affordances across the planning zones. Sources: aerial: GST; diagramming KW

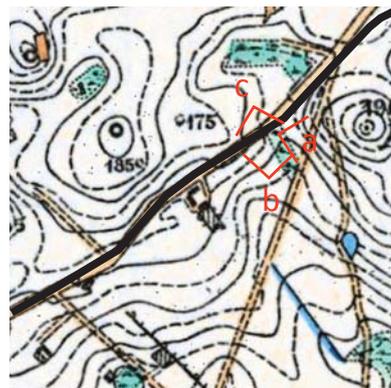
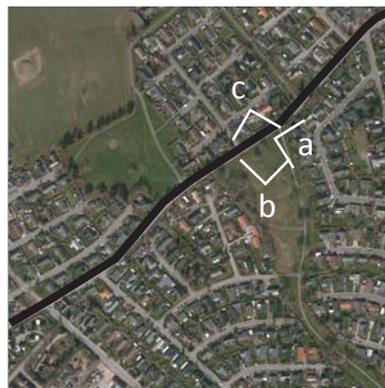
Lystrup examples of LArch approaches to CA|HOW

In the example of Lystrup, the northern part of the recreational area called Hedeskovparken is a remnant of a former blue-green passage. On its course downwards, it connects with two green wedges forming a larger blue-green corridor (see Fig.5.1.22, 5.1.28). In the eastern residential area alongside the park, some houses are located on plateaus along the passage. However, at the North (A) and South (B) part of the passage, there are low-lying residential houses, built on former wet land. According to the flood projections, these buildings are flood-prone (see fig.5.1.36).

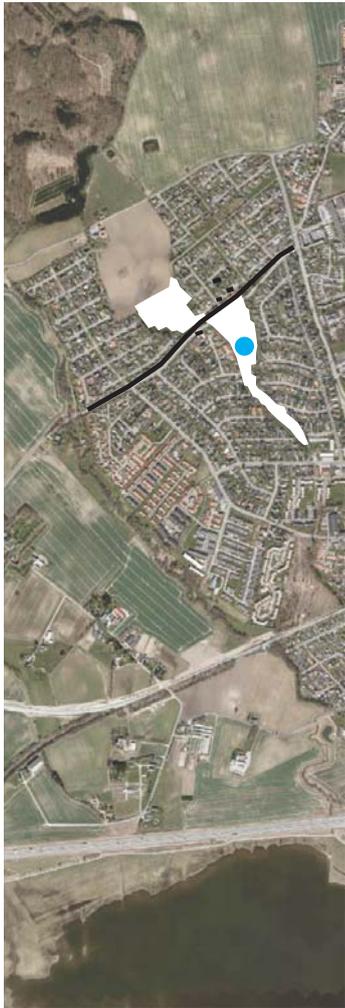


In the residential areas around Hedeskovparken, CA|HOW could be strategically designed as foreseeing the demolition of these houses within the coming 10-30 years, thereby releasing the landscape's properties for the common good (see fig.5.1.37). This could possibly be in dialogue with insurance companies, which may not keep insuring houses that due to their very location are critically flood prone. From the perspective of future affordances at the scale of Lystrup, the citizens of future Lystrup could benefit from the affordances provided in recreational spaces and connectivity in the urban fabric while also diminishing flood risk and damages. At present, small-scale alterations could prepare for integrating a Landscape based CA|HOW strategy on a larger scale and within a longer time perspective, for example by designing CA|HOW retention basins with larger connectivity in mind and allowing for the unexpected. Together, the small and large scale could provide connectivity in the urban fabric, and thus mobility, recreation and health for the citizens, as well as- and not least- enhancing aesthetic, sensory experiences.

Figur 5.1.36: Top: the photos show Hedeskovparken and residential enclaves. Top: (a) the Eastern enclave is situated on a plint. (b) the Northern area is low-lying (white arrow) in the former blue-green passage. (c) from the top of Hedeskovparken, the direction and slope towards the recipient Egå Engsø. Right: photo spots marked on contemporary aerial and historical map. Source: aerial and HMB: GST; diagramming KW, based on field trip, HMB and flood maps



LANDSCAPE-BASED STRATEGIC CA|HOW POTENTIAL



(a) Internal solutions
 - acknowledging administrative boundaries
 - retention basin located inside current, fragmented green space



(b) Re-Considering
 - settlement patterns and private property rights
 - water-unwise locations part of a future blue-green solution?



(c) Re-Connecting
 - citizens, water and green spaces (biodiversity), urban-rural
 -from upstream watershed line to downstream recipient as recreational space

Figur 5.1.37: Diagram of potential CA|HOW strategy using the former blue-green passage and discussing of all buildings located in former wet lands and in high flood risk, need to stay in the future (see Fig. 5.1.33) (a) present remnant of blue-green passage, blue indicates new retention basins (b) left red is flood prone agricultural field, middle red is road, disconnecting the passage, right red is flood prone residential area located in wet land (c) is proposing future -reversing of settlement patterns (remove buildings and reconnect the passage) to benefit human interests. Source: aerial photo GST; diagramming KW, based on field trip, HMB and flood maps

PART 5 CASES

CHAPTER 5.2

CASE SKEJBY- THE CATCHMENT OF SKEJBY BUSINESS PARK

Case Skejby is a real-time case of CA|HOW in early pre-public phases.

(See Chapters on Methods and Case Criteria)

Followed: May 2014- September 2015 with main encounters occurring between April-Sept. 2015

5.2.1 Intro

5.2.2 Contextualisation

5.2.3 Pushing Skilled Practices

5.2.4 Water as an Actor

5.2.5 Flood Risk relations

5.2.6 Catchment Neighbourhood

5.2.7 Sum-up Propositional LArch Reflections Case Skejby



Figur 5.2.39:



P5_C2

CASE SKEJBY

5.2.1 INTRODUCTION

Abstract - approach and key discussions

Case Skejby is different from Case Lystrup, as it concerns the early phases *before* the development of a CA|HOW project. The CAP14 flood maps revealed that a hospital was critically flood-prone and the municipality contacted local stakeholders to inform them about their risk. In this case, I followed the pre-project phases, when the municipality and water company informed and guided stakeholders regarding addressing this flood-prone area with societal interests. The emergent leads and themes of Case Skejby became a study of how flood risk projections and CA|HOW question land-use distinctions based on ownership and current practices relating to the on-property handling of water in Skejby. Furthermore, it provoked discussion on how changing waterscapes influence the understanding of a neighbourhood, and promoted a suggestion as to how a conceptualisation of a (sub) Catchment Neighbourhood could be productive to planning and local CA|HOW collaborations. In terms of methods and approach, during Case Skejby, my interactions became further targeted on the use of LArch material as a dialogical tool in trans-disciplinary contexts. I also started to use the term Design Comments to frame my research approach (see Chapter 2.3 design Comments). As in Case Lystrup, the actor-project encounters and the Skejby urban landscapes have functioned as the driver of propositional reflections. Finally, it is important to note that although situated in a specific context, the discussions relate to broader CA|HOW issues.



Meeting encounters as leads

In this case, I particularly refer to three meeting encounters held by the municipality (see Appendix 2 for a full list of encounters). One meeting was a 'full' Design Comment encounter, as LArch responses were the only agenda. The other two meetings referred to were with actors from the municipality, utility company and stakeholders from Skejby. These meetings were confidential for a start, as I gained access to knowledge on sensitive flood risk. As in Case Lystrup, I use excerpted quotes to highlight the leads that I followed.

Structure of this chapter

This chapter begins with a contextualisation of the spatial and functional characteristics of the urban landscapes in the Skejby area. I then introduce the key discussions that derived from the case, drawing upon the meeting encounters in relation to the appertaining Design Comments. Finally, I provide a sum up, reflecting upon the propositional LArch approach concerning the overall research objective.

Figur 5.2.40: Top: extent of Central region Denmark. Bottom: The area of Aarhus Municipality with marking of the Skejby Catchment case study area. Source: aerial: GST; diagram KW



Figur 5.2.41: Source: aerial photo GST



5.2.2 CONTEXTUALISATION

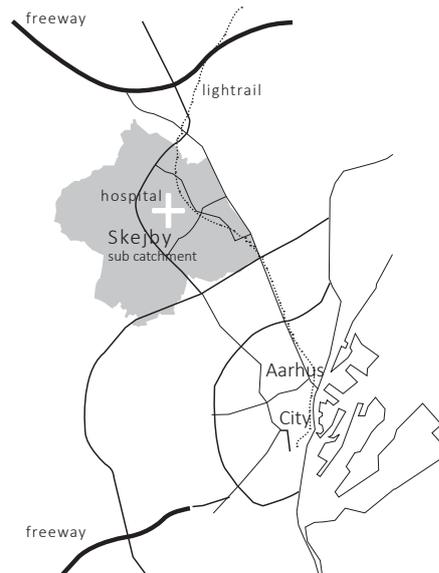
BACKGROUND OF THE SKEJBY AREA

Location and functions

Skejby is a mixed-used area at the North-Western fringe of Aarhus, 4-6 km from Aarhus city centre. The name Skejby is borrowed from a small village in the area. The majority of Skejby's growth has taken place since the 1990s, and the area is now part of the urban fabric of Aarhus. Construction activities still define the area. Skejby is well-appointed for automotive commuting, as it is very close to a larger motorway system. As of 2017, a light-rail also serves the area.

Skejby consists of enclaves with different functions, including the 'Skejby Business Park' with businesses, educational- and public institutions. The main driver of this enclave is a large public hospital (from now on AUH¹). Since its opening in 1987/1988, the hospital has expanded and continues to do so, now becoming the largest hospital in the Danish Central Region² and the biggest hospital in Northern Europe. It serves central Jutland in a band from the East coast to the West coast. The hospital signifies the vital societal and regional interests of the area, which stretch beyond those of the city and outside of municipal borders.

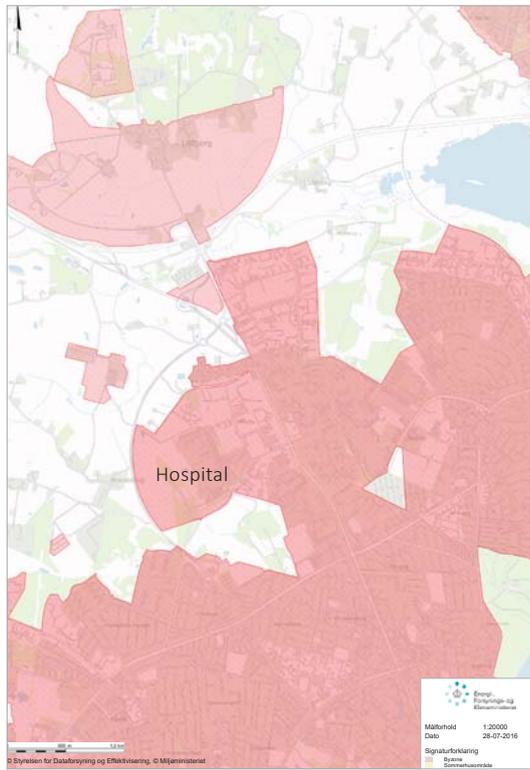
The geographical area designation of Case Skejby is defined by the Koldkær Bæk (Coldpond Stream) sub-catchment, covering approximately 850ha / 8.5 km². In planning terms, the Skejby sub-catchment is zoned as approximately 1/3 Rural Zone and 2/3 Urban Zone. The Urban Zone primarily consists of public institutions together with businesses. In addition to this, the sub catchment includes some residential areas, which are not part of this case as the municipal flood concern related specifically to the hospital.



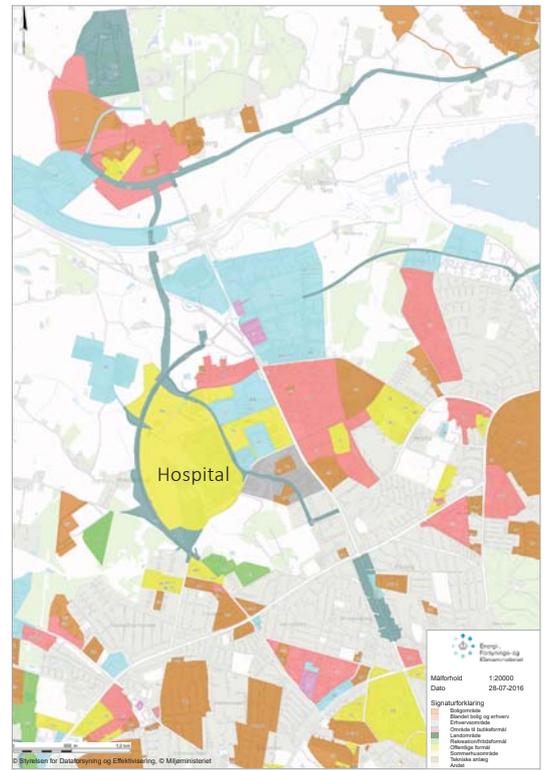
Figur 5.2.42: Leftside, top: construction activities at the new hospital. Leftside bottom: preparations for the lightrail tracks. Right: location and scale of Skejby and its catchment in relation to Aarhus.

¹ The hospital has more than one name; Skejby hospital, Aarhus University Hospital and DNU (The New University Hospital). For the sake of simplicity I refer to it as hospital and AUH.

² In Denmark, public hospitals are run by what are called Regions. Denmark is divided into 5 regions covering the 98 municipalities, meaning that hospitals cover geographical areas across many municipalities. Skejby Hospital is run by the Central Region (Region Midt) covering central Jutland. It is the second largest region in inhabitants and the largest in area.



(a)



(b)

Figur 5.2.43: : planning zones in the Skejby area (a) Planning zoning urban- rural (b) Planning classes in local plans; business, industrial, residential, recreational, public . Source planning maps: GST

CAP14 AND SKEJBY AS A CA|HOW FOCUS AREA

Motivation for adaptation

“Focus areas for climate adaptation: In connection with the Climate Adaptation planning, flood-prone areas have been identified, and the value in these areas is determined based on the costs of damages in case of flooding and via designation of so-called hotspots. Hotspots are buildings or facilities whose value to a high extent is associated with function rather than actual material value. On this basis, areas have been identified where climate adaptation should be implemented soon or where supplementary mapping and fact finding is required”. Climate Adaptation Plan 2014 Aarhus Municipality (Aarhus Kommune, 2014a, p. 21) (printed, english version)

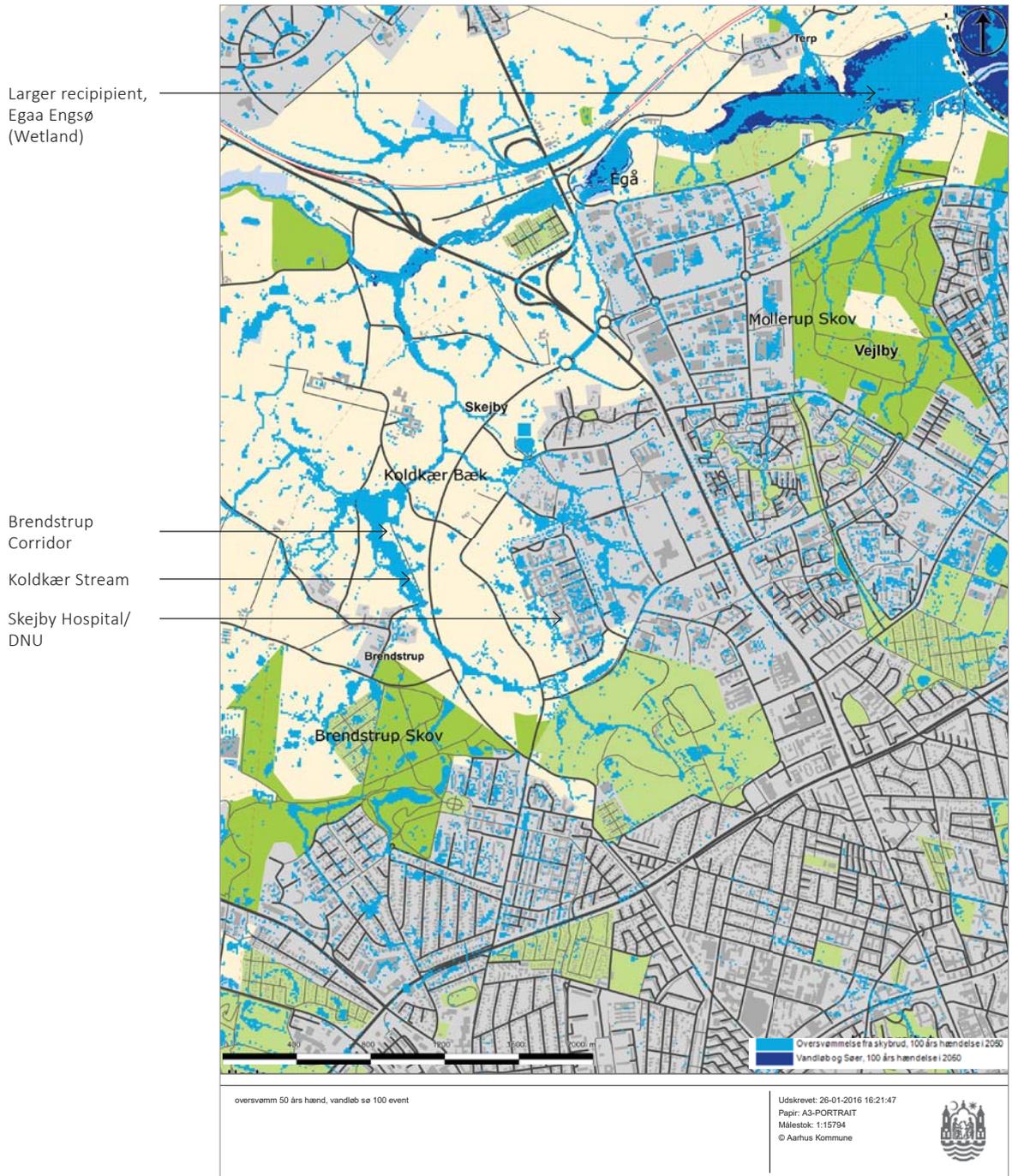
During work with the Climate Adaptation Plan (CAP14) for Aarhus Municipality, the flood maps exposed that the Skejby area and its hospital were critically flood-prone. The area was thereby designated a CA|HOW focus area (Aarhus Kommune, 2014a, pp. 27–29). As the function of the hospital was of vital societal interests, the municipality and water company instigated supplementary hydrological calculations³ to establish more detailed knowledge on the flood risk. A drone survey provided terrain data that was as up-to-date as possible. This led to the delineation of the local sub-catchment area and a virtual terrain model upon which hydrological scenarios could be tested. The correlative result was projected onto an aerial photograph and a movie clip communicated waters direction, volume and speed.

The resulting output revealed that in a cloud burst event, the area was at even higher flooding risk than suggested by the CAP14 maps: the hospital’s emergency generators were flood-prone, as were the light rail tracks and power generator. Criticality was further stressed by on-going construction activities, adding another level of uncertainty to the equation. The construction works also meant that new buildings, roads and parking lots further increased the amount of impermeable surfaces, thus giving speed to surface water. Despite societal interests, the responsibility of initiating CA|HOW-measures mainly fell to stakeholders other than the municipality and the water company. The reason for this was that the flooding problems occurred inside private properties, which, by law, are responsible for their own adaptation.



Figur 5.2.44: Based on risk and value maps; Skejby is a designated Hot-spot and Focus area with regard to flood risk in the Climate Adaptation Plan. Source: CAP14

³ surface water in case of an extreme event Based on climate change scenario A1B, IPCC 2007, a 100 year flood event in year 2050 (Aarhus Kommune, 2014a, p. 8)



Figur 5.2.45: Floodmap from the municipal website providing public accessible floodmaps. This map is based on a 100 years event in IPCC scenario A1B in 2050- flow paths and flood. Source: AKO

SKEJBY SPATIAL CHARACTERISTICS

Development and settlement patterns

In many respects, the urban landscapes of Skejby Business Park resemble the development of many other business parks in Denmark since WWII. They share in common a choice of location based on proximity to cities and larger infrastructure, a development pattern, and a generic land-use pattern, which is to say a main infrastructural spine and no visual hierarchy.

The layout of buildings in Skejby Business Park shows no consideration for the flow of water or orientation to sun and prevailing winds. The development is reminiscent of Lystrup in its confidence about water control; former streams, wet fields and constructed canals have to a large extent been undergrounded. As in Case Lystrup, the development of Skejby does not take the larger landform and its more local context of terrain and soil conditions into account. The settlement patterns are disconnected from contextual readings and up-and downstream considerations. Property lines are superimposed with no sensitivity to the affordances of the landscape and terrain modifications are constructed as if each property had no relation to the outside of the ownership line. The movement of surface water has been taken into consideration purely as local gradients towards the in-property sewers.

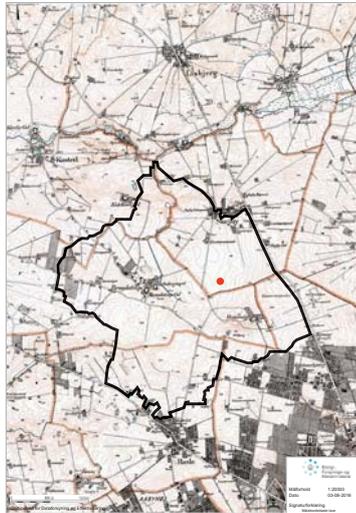
The larger landform was created at the end of last glacial period, and terrain and soil have continuously been formed by water ever since. In very few decades, these properties have been partly erased through local alterations aiming for planed, hard surfaces. This decision to neglect natural properties is not solely based on ignorance. Rather, it reflects a practical stance on how water and terrain have been (perceived) to be under control through the means of piping, pumping and earthwork machinery.

Considerations of contextual readings could, of course, be seen as soft values provided by a landscape architect. However, with climate change and changing waterscapes the era of local, in-property-independency is challenged. In this way, the urban landscapes of Skejby relate to Lystrup and other contemporary, suburban settlements that are now in need of CA|HOW. In the following, I describe Skejby's spatial characteristics together with my 'sense of place-experiences' from field trips to the area.

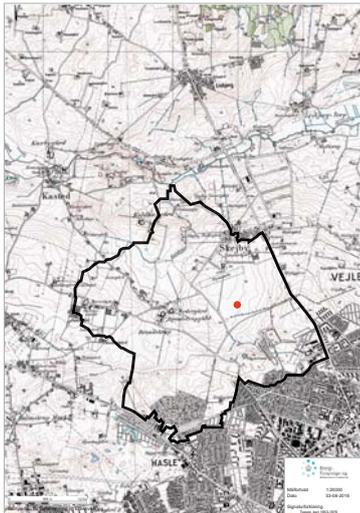
URBAN DEVELOPMENT IN THE SKEJBY CATCHMENT



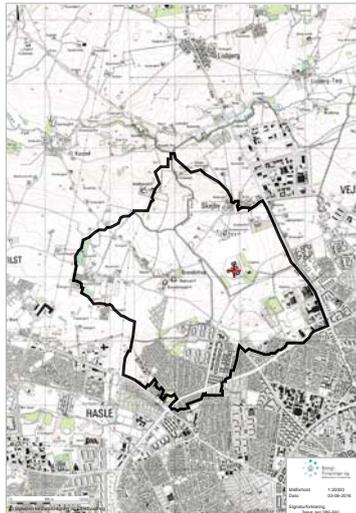
Historical map 1842-1899 (HMB)



Historical map 1877-1920 (LMB)



Topographic map 1953-1976



Topographic map 1980-2001



Aerial photo appr. 2005



Aerial photo 2015

Figur 5.2.46: Skejby sub catchment area is indicated with black outline. A red dot marks the location of the future hospital, a red plus marks the hospital Source maps and aerial: GST; catchment: AKO; diagram KW

EXPERIENCING THE EVERYDAY LANDSCAPES OF SKEJBY

The hard surface topography of Skejby Business Park

Skejby Business Park (from now SBP) affords as much indoor commercial space and outdoor parking space as possible, as well as low-maintenance outdoor areas promoting low-friction automotive movement.

Monolithic buildings placed on flat, hard asphalt surfaces is the primary spatial characteristic of the area. Though each building is designed with different layouts and façade compositions, the area appears homogeneous: the de-contextualised, self-referential style and its utilitarian characteristics become the spatial collateral.

The buildings in SBP share a common denominator of large building ratios. This uniformity has been instigated through a combination of building practices and planning: each building maximises its allowed plot coverage to accommodate as many users as possible. In turn, the number of car parking spaces provided must increase to comply with planning regulations. As a consequence, very little of the plot is neither building nor asphalt.

In more detail, the terrain has undergone significant on-site alterations and is characterised by steep, technical slopes that spatially define the properties. The vegetation is low-maintenance, mainly consisting of strips of lawn and rows of beech hedges as a green-brown trait that defines parking spaces and demarcates ownership. Outside of the private properties, the public urban landscapes are defined by wide roadscapes, forming asphalt rivers of traffic.



The Skejby Business Area and a sense of place

The photographic series, Fig.5.2.53-54, aim to visualise some of the sensory experiences of the urban landscapes at a human scale. When walking in the area, it becomes quite clear that the area is planned and constructed for automotive transportation. Infrastructure for vulnerable road users is provided via pavements and bicycle lanes alongside the roads: movement is structured accordingly to techno-infrastructural-ownership logics. As a sense of space, this is supported by the technical slopes and strips of vegetation.

Road junctions and crossings are spatially and functionally generous to the motorist, but as a pedestrian they rather seem like wide, car-based asphalt rivers. As a sensory space, the urban landscape does not acknowledge the human scale nor provide sensory sensitivity in its layout, spatial characteristics and materiality. The 'sense of place' provokes a rather desolate feeling (at least to this author) of not being in the right place, and a feeling of being 'out of scale' with the surrounding urban landscape of buildings and parking lots. Aesthetic acknowledgement of the sensory system is not perceivable, and the urban landscape does not provide spaces catering for walking, recreation or socialisation. The urban landscapes do not provide generous affordances with reference to actors including humans, animals, biodiversity or water. Seen from a Justification Analysis, the urban landscapes appear to be formed by Industrial and Market justifications. Justifications of the Inspired Regime, e.g. tactile sensitivity, creativity, holistic thinking, and the Civic Regime, e.g. ecological concern, health, recreation, clean water cleansing, are not present.



Figur 5.2.47: Sense of place as pedestrian in Skejby Business park. Technical slopes with evergreen defines the wide road-scapes aligned with bicycle lanes and sidewalk punctuated with solitary bus-stops.

SKEJBY SPATIAL CHARACTERISTICS

hard surface urban landscapes



Beech hedges flanks parking and mark property lines



hard-surfaces, vertical and horizontal, technical appearance



Wide roadscape, monolithic buildings



Apartment blocks in divided landscape with technical terrain



Landscape of asphalt and hard surfaces, extensive parking areas delineated by strips of green



technical terrains delineate facades and frame the roadscape



Maaive, autonomuos facades emphasizes the wide roadscape

Figur 5.2.49:



delineating property lines by technical terrains



delineating property lines by walls



Evergreen, parking and technical slope, marking the parking



strips of green, vast asphalt spaces



strips of green- introducing curves in vast asphalt spaces



vertical meets horizontal / building meets ground

Figur 5.2.50:

SKEJBY SPATIAL CHARACTERISTICS
neighbouring permeable urban landscapes
- from Vestereng to the Brendstrup Corridor



roads for soft traficants



water surfaces, interacts with vegetation and soil



Water and newly constructed land-forms west of the hospital



Figur 5.2.51:



larger views connecting brendstrup and Vestereng by landform and vista

trees framing spaces- easonal changes in spatial delineation, frame, clusters and close-up tactility

small-scale buildings from different times, with different material/construction suggesting different life-spans

Figur 5.2.52:

The sub catchment and open spaces

The sub catchment of Koldkær Bæk also consists of larger, permeable areas (see Fig.5.2.55-58). Just in the backyard of SBP lies the green area of Vestereng, the hospital's recreational area, as well as a rural zone just north of the SBP and the hospital. Vestereng (West Meadow) is a relatively large, publically accessible green area owned by the municipality. From the hills at Vestereng, one can see how the Business Park and Vestereng is part of a larger landform: the blue-green corridor of Brendstrup Kilen. Visually, the terrain has a noticeable slope and direction, forming the larger catchment and ushering the movement of water to its recipient, Egaa Engsø (the same as Lystrup) and into the Aarhus Bay. The northern area is in the rural planning zone with agriculture, forestation projects, small villages, allotment gardens, and clusters of trees. It is a mosaic landscape in contrast with the monolithic landscape of SBP.

The relationship between the built area, the open spaces and their joint catchment is, however, vague at a local scale. From the Vestereng hills, the larger landform suggests landscape affordances that are impeded at the smaller scale. Numerous cross-terrain alterations disconnect the spatial connectivity of the landform's overall direction. At a local scale, the direction of the corridor and its catchment is divided into a series of spaces cut-off by buildings, roads, parking lots, trenches and steep slopes. The direction of the subdivisions is detached from landscape properties, illustrating that the area has been developed out of cartographic delineations concerning planning zones and contemporary economic interests. This not only blocks human movement or vision, but is also a barrier to biodiversity and water's flow, with consequences for CA|HOW solutions. Disconnected or not, the flood maps suggest that the sub catchment reconnects with the larger landform in extreme rain. I discuss the implications of this together with propositional LArch reflections further in this Chapter.



Figur 5.2.53: Photos Left, from top. 1, 2: construction works at the edge of Vestereng close to the hospital area. The relation between the hospital and Vestereng is defined by infrastructures (trench, bicycle lane, road and parking). 3: delineating open space with parking at the northern edge of Vestereng. Top 4: the hospital area is defined to the North by a primary road on a 'dike' perpendicular to the direction of the Brendstrup Corridor. 5: Tunnel south of the hospital area connects the hospital area/Skejby Business Park with its Brendstrup corridor, forming the visible connection and access between the waterscapes of Vestereng, the hospital area and the Koldkær Bæk / the Brendstrup Corridor. Right: underground connection to the larger landscape traits north of the hospital



LARGER LANDFORMS



The Hospital building site and new landforms. Looking East from the Brendstrup Corridor towards the hospital and its newly constructed landscapes



The Hospital building site and adjacent landscape. Looking North-West from Vestereng towards the Brendstrup Corridor.



Just North of the Hospital. Rural-area, agriculture and smaller scale buildings, just north-west of the hospital and largerscale Business Park

5.2.3 PUSHING SKILLED PRACTICES DESIGN COMMENTS IN ACTION

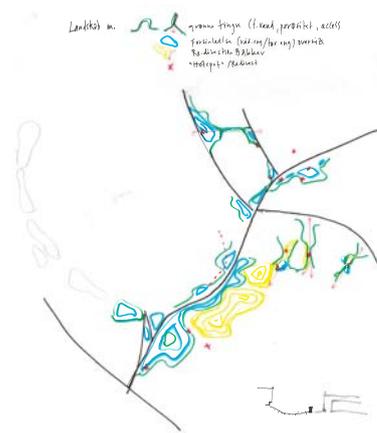
Internal LArch modus of knowledge production

The LArch approach to the urban landscapes of Case Skejby emerged through field trips, mappings and diagrammed photographs, which together explored and visualised a combinatory sense of place and spatial characteristics relevant to CA|HOW. The field trip experiences, aerial photographs and maps were studied from the starting point of considering the buildings and the outdoor areas as equally shaping of the urban landscape topography. For example, investigating the relations between the landscape as seen on the HMB maps and the current footprints of the buildings in the business area, and then taking it a step further by removing all impermeable surfaces. This was an effort to study the terrain from the 'perspective' of water, visualising how settlement practices are an integrated part of our urban landscapes: when urban landscapes meet the logics of water, dualisms between natural landscape and human constructions are dissolved into a human practicality. This, in turn, relates to the discussions of the Anthropocene. I further discuss these points at a conceptual and methodological level of landscape architecture in Case Aaby and Chapter 6.1-6.2.

Landscape affordances in DeCs and formatting

In the internal phases of the Design Comments, mappings provided a working modus of logical, practical and intuitive operations. I superimposed flood maps on to historical maps, and applied tracings from contemporary maps such as building layouts, property lines and planning zones, in order to push the creation of combinatory knowledge. In retrospect, this material became a mapping of affordances, focusing on the physical properties of the environment and its encounters with surface water with reference to human actors.

In the external Design Comment phases, I brought mappings showing land-use and surface permeability, characteristics of terrain modifications and contemporary building style. Landscape properties and affordances were the visual main themes, particularly the connection between the larger blue-green corridor and small scale, local spatial qualities of in-between spaces together with narratives based on own sensory experiences.



Figur 5.2.55: Mapping, studying the Skejby Business Park with regard to porosity, access, retention potentials and hot spots from the flood map.

PUSHING COLLECTIVE KNOWLEDGE CREATION

Design Comments encounters - transdisciplinary Interactions with LArch material

MeetingS1. quote, municipal project manager: "we wanted to 'harvest' your input early in the process this time so that climate adaptation did not become all technical solutions".

This meeting was initiated by DWA ⁴, as they had expressed interest in my entries on value creation through CA|HOW in Skejby. Thus, Design Comments and the use of mappings and diagrams were an integrated part of the encounter. My own intention was to see if alternative visualisations of the urban landscapes could prompt discussions in a transdisciplinary context. I brought formatted material showing e.g. landscape affordances as spatial characteristics, permeability and actor interdependencies, larger landscape traits and local aesthetic affordances in the urban landscapes of Skejby. This varied material was linked through the shared Linkage of Relevance regarding water and flood maps of Skejby.

From shrubs to mosaic landscape

From Logbook, ME1: I brought mappings showing the blue-green corridor in relation to the SBP. DWA told me that other municipal departments saw the green corridor as green shrubs and a potential of urban development (buildings). I described some of the qualities that I saw: the larger landform, small-scale buildings, livestock, deer, crooked trees, bending, oblique streams and personalised allotment gardens...mosaics on a human scale with a high level of sensory tactility. DWA said that they would never have thought to articulate these as qualities and in particular not in this manner.

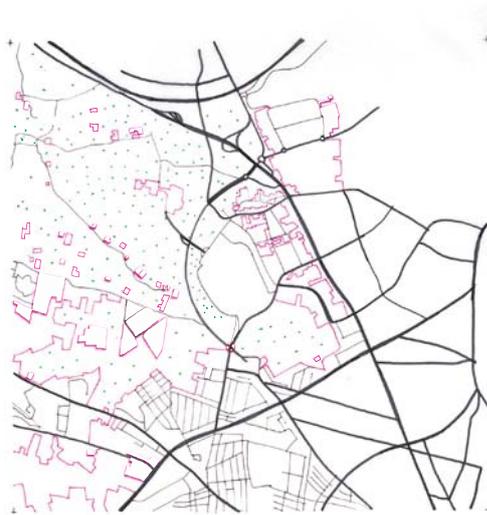
Please note that the actors were professionals in landscape, water and environmental issues. Though they claimed that they would never have thought of addressing the landscape this way, they were indeed attentive and knowledgeable on landscape qualities beforehand. At this meeting, the dialogical objective was further emphasised from my side. I narrated and visualised affordances that I saw in the area, commented on the neglect of the human scale and how vast parking lots defined Skejby Business Park. The visualisation of affordances in alternative manners prompted discussions on planning, landscape based potentials and alternative solutions (alternative compared to the information provided in planning, GIS or flood maps). One of the themes became how the Brendstrup Corridor connected the larger catchment area. Value discussions arose regarding how short-term and long-term values could work together and how political interests were influenced by election periods, differentiating interdepartmental interests and their various responsibilities.

4 Meeting 9th April 2015, ME-S1, M1

INITIAL MAPPINGS EXPLORING THE AREA



Figur 5.2.56: Investigating relations and patterns; mapping layers of, e.g. land-based functions within defined areas, infrastructure, marking local points of interest.



Primary infrastructure (roads)
directions and scale of build
structures , open spaces

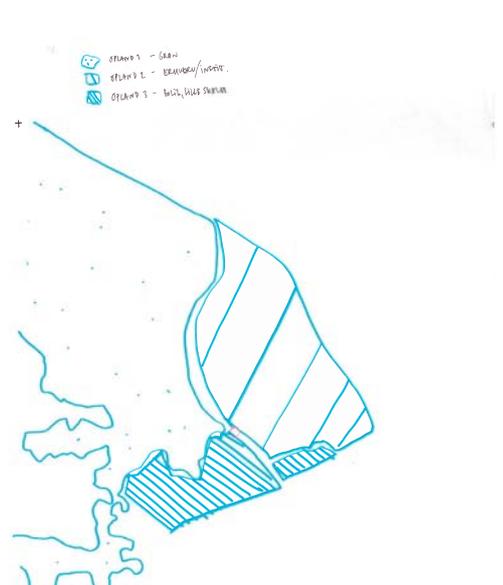


SKEJBYMINDS ORLAND (OPPER side ÅBO FV.16)

Primary infrastructure of
Skejby and its subcatchment
area



'The larger stretch' and 'Islands'
'Frayed edges', 'trimmings' and
'avenue' edges



Scale and functions as clusters
1. primarily business/institutions,
larger scale buildings
2. Primarily residential/smaller scale
buildings
3. Larger open, permeable spaces
(agriculture, recreation)

INVESTIGATING STRUCTURES; PATTERNS, SCALE AND CONNECTIVITY



Figur 5.2.57: Top: Looking north-west from Vestereng to the Brendstrup Corridor: The directional connectivity of the larger landscape stretch is still sensed despite the expansion of the Hospital and SBP.
Bottom: Hospital and SBP building sites as large scale elements almost perpendicular to the direction the subtle curvature of Vestereng sloping towards the north-west.



Figur 5.2.58: Top: Hospital building site, new infrastructure and new landforms. Looking East from the Brendstrup Corridor towards the hospital and its newly constructed landscapes, visible water is led through tunnel marked with a white circle. Bottom: 'Rural' is just north-west of the hospital and largescale Business Park: agriculture and smaller scale buildings encompass a mosaic landscape where the small scale elements is situated within the larger stretch.

From hot-spot to waterscape relations

Commentary by municipal actors: "Once we have marked 'the red dots' [of hot-spots] as a principle, then they usually becomes static, and solutions are made from this departure. It is important to get this kind of information/approach into the work; maybe we have to see things differently."

In the mapping phases, I was concerned with water's flow in relation to property lines, criticality and stakeholder interdependencies. The mappings emerged as simple visualisations of geographically-bound relationships established by the relationships between water, surface properties, and human practices of building and ownership. The mappings visualised relationships despite adversarial economic, spatial and functional interests: 'neighbours of water and mutual interdependence.' As such, the mappings built upon facts that are not news to a hydrologist, planner or professional in water environmental issues. What the mappings did, however, was providing perceptible linkages between different levels of technical, 'objective' map information. At the meeting⁵, an actor working with local planning was especially interested in how the specific properties were connected by surface water and two actors claimed that this kind of mapping was a new approach to how to 'see' in their working field.

SPATIAL CHARACTERISTICS

Surface water affordances of Skejby Business Park



Diagrammed photos from Skejby Business Park showing terrains which in cloud-bursts pass on surface-water to other properties. The terrain modifications with steep, technical slope is marked with lines.



Diagrammed photos from Skejby Business Park. The buildings rely on command and control water management. Top row: the buildings express no sensory sensitivity on a human scale. Bottom row: The impermeable materials are marked with black, semi-permeable is marked with hatch.

Figur 5.2.59: Diagrammed photos Design Comments for interaction in the Dialogical Space with case actors

Design Comments and collective skilled practices

An essential element in the interaction was that it was not only about entering the dialogue as a landscape architect and visualising affordances: it was also about establishing openness and trust during the interactions. Furthermore, the Linkage of Relevance was determining: the shared flood maps and the specific geographical area referred to their working area. This trust, combined with the clear linkage of relevance, seemed to promote dialogue, even though our working methods were very different.

Visualising affordances is one thing, but what was particularly productive to knowledge creation was how the Dialogical Space seemed to promote the mutual sharing of knowledge. In this context, the actors were highly skilled professionals from different disciplines and work fields relevant to CA|HOW. For example, one actor had in-depth knowledge about the Brendstrup Corridor and the larger recipient, Egå Engsø and the processual history of the area and its planning disputes, and thus knew much more about this domain than I did. Another actor knew the urban landscapes of SBP from personal experiences working in the environment. A third was a specialist in soil conditions and the CAP14, another was a local planning professional and so forth. In addition to this, they were all skilled in using maps and GIS in their daily work, thus well-experienced in navigating numerous layers of information. Their knowledge combined with my landscape architectural approach released something over and above the accumulated collective knowledge. The mappings I brought with me were developed out of knowledge that the actors had beforehand. What was different was that this information was visualised as affordances and relationships in alternative configurations. The format itself opened up the possibility for transdisciplinary discussion and the encounters functioned as an informal mediator to unleash pre-existing knowledge. The interactions exemplified how different and unaligned methods and tools could inform each other in a transdisciplinary context and how objective and subjective approaches are capable of meeting through tangible visualisations and dialogue. The DeC interaction pushed our collective, skilled practices to see affordances as Rietveld suggests (Chapter 4.5 Affordances).

The DeCs seemed to particularly effect knowledge creation on three levels:

-The LArch material as such combined knowledge in alternative modes, making affordances perceivable, thus discussable.

-The DeCs promoted dialogue that opened up to actor's personal and professional knowledge, promoting a shared knowledge creation. As a researcher, the actors provided extended knowledge on e.g. hydrology, soil, planning practices and contingency that influenced my approach to CA|HOW.

-In the research process, the encounters functioned as on-going peering.

5.2.4 WATER AS AN ACTOR

WATERSCAPES AND SETTLEMENT PATTERNS IN SKEJBY

The placement of the early village of Skejby, carefully informed by water and terrain, is traceable on the HMB maps. 100 years later, the settlement pattern of Skejby Business Park shows a rather arbitrary configuration regarding the same matter: any informed relationship between water, terrain and settlement pattern has been dismissed. Contemporary Skejby seems to embrace independence from water and landscape properties by trusting in the command & control paradigm.

As described, Skejby Business Park showcases technical terrain modifications, autonomous orientation and layout of buildings, extensive amounts of impermeable paving and a general neglect of inherent landscape properties. This is also often the case in other contemporary suburban settlements built since the 1950s. The extent of suburbia is rather large and represents considerable resources and efforts. This means that we have to instigate CA|HOW from the perspective of retrofitting urban landscapes with regard to what is already there. With water as a visible actor and the current need for CA|HOW, it could be useful to re-conceptualise the autonomy of single properties, starting with (re) acknowledging water as an actor and the value of landscape properties.



Figur 5.2.60: Mapping of the late 19th century surface water, buildings, roads, and access to open land (based on HMB); investigating structures, patterns, function, and scale relations of the late 19th Century villages, roads, canals and parish lines, Skejby is seen with its 'Stjerneudskiftning' which is common in East-Jutland. A red dot locates the coming hospital

LOCATING VITAL FUNCTIONS IN HOLLOWES

Gathering Skejby stakeholders - when risk pushes incentives



DWA and AWC invited stakeholders from Skejby Business Park to a series of meetings based on the risk revealed in the CAP14 flood-maps. The municipality started a 'campaign' informing the Skejby stakeholders of flood-prone properties. For societal reasons, there was an emphasis on actors from the hospital and light rail. The purpose was to help qualify their knowledge on flood-risk and consequences as well as to open up for collaboration in the hope that collecting the stakeholders in the same room would give rise to collective solutions that could be useful to all stakeholders. However, at the first meeting, there were quite a few no-shows: apparently not all stakeholders recognised the risk to their own property or had looked into the CAP14. For the participating stakeholders, the meetings functioned as a wake-up call.

Hospital actor, when seeing the flood maps, quote⁶: "Within this flooded area lies the NRGi [energy company] emergency generator!"

Consultant presenting an animation of the calculated flood risk, quote⁷: "Yes, The hospital emergency generator is flooded. Formerly, the Brendstrup trench received part of the water. The trench is now gone [because of construction works], and the water is deflected towards the west, respectively towards the ditch and Palle Juul Jensen Boulevard. The water pools in the hollow. This is a hot-spot... or wet-spot [laughter] with 50-100 cm of surface water. The emergency⁷ responders can accept a maximum of 10 cm [surface water on the road]. Palle Juul Jensen Boulevard is also flooded at some places. When there is 20 cm of water on the terrain, the forensic ward is flooded. Here, they are also digging to construct new buildings. The northern ambulance road will have 50 cm of surface water on it."



At the second meeting (M3), the new and detailed flood maps were presented, and the potential consequences of flooding became apparent. As seen in the quote, the stakeholders from the hospital were quite concerned when they understood the critical flood-risk to vital hospital functions. These stakeholders were further troubled when they realised that it was *their* responsibility to solve this.

Figur 5.2.61: Top: White rectangle indicates the area of the hydrologic map on the opposite page. Black lines indicates a field trip. Light blue is the catchment. Middle: shows the area with hospital buildings. Bottom: shows surface water's overall direction towards the larger recipient. Source: AKO, made by Orbicon; black outline, white arrows: KW

⁶ Meeting 3, 21st September 2015, DNU actor points to that there is a challenge as NRGi owns the building, but DNU owns the land.

⁷ 10 cm of surface water is the maximum to be sure that emergency responders get through.

CRITICALITY



Ambulance road

Emergency generator

Lightrail

Forensic

Coming particle Generator

Emergency Generator

Former, natural waterflow

Figur 5.2.62: Top: The critical area, visualised with flood risk projections based on the refined hydrological calculations. The colours indicate calculated depth of surface water (green-yellow-orange-red, red is the highest level of water). The blue lines (with arrows) indicate speed and volume intensity. Upon this, I have marked the critical functions as discussed in the quote; forensic ward, emergency generator, ambulance road, light rail, and transformer. Source: AKO, made by Orbicon; black outline, white arrows: KW

STATISTICAL TERMS AND LOCAL RESPONSIBILITIES



Incentives to act

Quote, Hospital: "Why is the emergency/ambulance road not on the flood maps?"

Municipal actor 1: "We asked for updated info on terrain from all stakeholders. We did not receive info on the ambulance road. This is why."

The flood maps from the previous meeting had an impact, and attendance was consequently higher at a later meeting between DWA, Aarhus water and stakeholders in SBP. Until this meeting, the stakeholders did not fully comprehend the importance of delivering the most accurate data on terrain and surface properties within their property boundaries to feed the terrain modelling. Nevertheless, this was considered the final meeting before the stakeholders had to find solutions on their own. The municipality's task was over, as they were not responsible for implementing the CA|HOW measures.

Water professionals and water-lays

Quotes, Meeting M3, Case Skejby.

Consultants explain that the starting point for the projection is a 100-years event in the year 2050, calculated according to a climate change prognosis of a type recommended by the Ministry.

Municipal actor 1: "These events are not in the far future."

Hospital: "Then why say 100-years event? People think it is something that will happen in the future. It would be more comprehensible if it happened every 6 years."

Beredskab: "Copenhagen had a 100-years event five times in two years."

Municipal actor 2: "Extreme rain might be a useful common name, as opposed to talking about statistics."

Municipal actor 3: "Statistics are useful for mapping."

Hospital: "The other language [extreme rain as opposed to the term 100-years event] is better for those who have to pay."

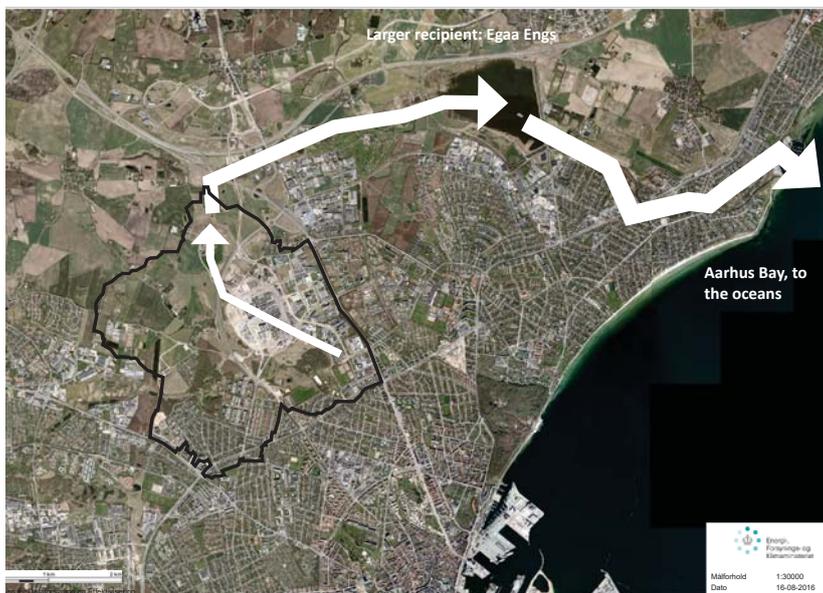
The new flood map, Fig.5.2.62, sparked debate. The truth-value of climate scenarios and the reliability of the hydrological model became hot topics. The Skejby stakeholders pointed out that they found the



Figur 5.2.63: Top: Expansion of the hospital in progress. Right: Preparing for the light rail.

statistical terms misleading. As seen in the quotes above, the term ‘100-years event in the year 2050’ is not necessarily an incentive to instigate CA|HOW today- water-lays may hope that a 100-years event literally means an event occurring every 100 years. One actor claimed that it would be hard to convince the ‘backing decision-makers⁸’ of the necessity of spending money on CA|HOW: “the term ‘100-year event’ does not sound relevant to those that have to pay.”

Among the water professionals, there is an embedded understanding that a 100-years event might as well be tomorrow *and* next month too, perhaps even followed by a 1000-year⁹-rain event within the next couple of years. The term is the qualification of what to expect in the future, expressing how hydrological calculations and climate scenarios need to be calculable, measureable and comparable from the very outset. In Skejby, vital practices of the Region Hospital were at stake due to flood-risk. At the same time, the highly complex practices of constructing a larger hospital were not likely to change their overall course easily, due to timeframes and economic resources. This leaves the region with a primary hospital, located in proximity to a disconnected blue-green corridor, low-lying vital hospital functions and upstream neighbours passing on their rainwater via levelled, impermeable surfaces. These conditions are further exacerbated by ongoing construction activities, which continue to implement urban landscapes prone to flooding.



Figur 5.2.64: The overall direction from SBP to the recipient of Egå Engsø and then, Aarhus Bay, still influences the SBP at the larger scale. Source: aerial photo: GST Diagramming: KW

8 ‘baglandet’

9 Copenhagen experienced three 1000-year events within 3 years

WATER TRANSGRESSES BOUNDARIES

Flood-maps visualise water as an actor

Meeting¹⁰ quote, Hospital: "...but the basement...this is where the server and the emergency generator is!"

Flood maps expose water as an actor, making it perceivable how surface water transgresses administrative boundaries at a scale ranging from the single property to larger quarters. The above quote was a response to a movie-clip that illustrated the projected flow of water in Skejby. The flood map visualised how water connected and disconnected areas: extreme rain events challenge the indisputable right of ownership and the very concept of a neighbourhood or quarter as being defined by a notion of cohesion prescribed by socio-economic parameters, planning practices and building typologies. Water as an actor challenges contemporary land-use and planning practices by transcending zoning, functions, ownership, and human interests. The ignorance of water raises the question of up- and downstream relations: not as a notion of coherence, but as a physical interdependency attached to land-use. Water as an actor does not respect lines on a map.

Do not only blame water - designing for flood damages

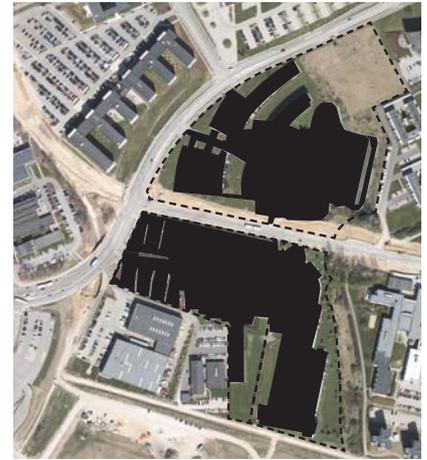
The Skejby flood map illuminates how settlement patterns increase flood risk at the scale of the SBP as a quarter. Within properties, the flood map questions the logic of placing essential hospital functions in a basement and energy generators on low-lying terrain. The consequences of neglecting landscape properties and upstream terrain become apparent: water interconnects the urban landscape so that in-property considerations can no longer stand alone.

Figures 5.2.61-2, 5.2.65 show how the hospital buildings and its outdoor areas would be flooded by surface water in a cloud burst. The yellow, orange and red areas indicate levels of pooling water and the blue lines indicate flow paths by direction and intensity. Upon studying the flood map in detail – and with the knowledge of the spatial qualities of SBP in mind – it becomes clear how local terrain alterations and impermeable surfaces of upstream buildings and infrastructure pass on the water to the hospital area. The cumulative volume of water pools up and enters the hospital buildings, and in addition to this, the design of the hospital area affords to direct and pool water in-between buildings and waters flow into basements. Fig.5.2.63 shows photos from the construction of the new hospital extension, including some building elements that are located underground, as well as new outdoor areas which create passages, thereby providing in-property space and time for water.

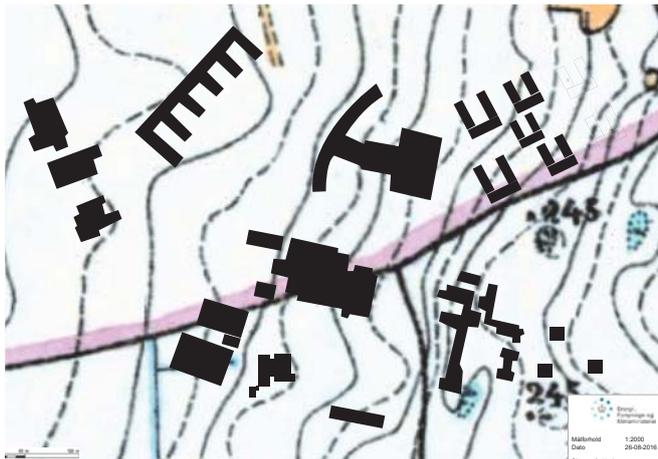
AUTONOMOUS BUILDING LAYOUTS



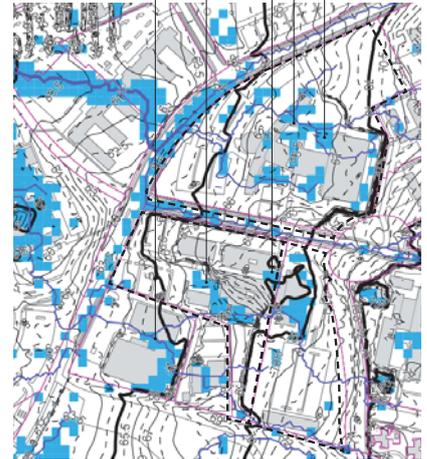
Autonomous Building style. The aerial photo is diagrammed with the extent of impermeable surfaces and their geometry related to the property lines, visualising how buildings are autonomously oriented towards and internal logic. When looking at the terrain, it shows how the underlying logics of landform and its properties are not taken into consideration but rather modified out of in-property conveniences.



Buildings store, delay, diffract water



Superimposition contemporary SBP building-footprints related to flood risk, on the late 19th century map (HMB). The underlying landscape properties such as gradient/slope, direction, soil and waterscapes are neglected. source: HMB map: GST; diagram KW



Buildings and their appurtenant surface cover, function as hardscape, landscape elements which store, catch and/ or re-direct surface water. This flood map from the municipal website marks the property line, thus showing how properties are flood-prone and how the building style, material usage and settlement patterns strengthen flood-risk. The buildings come to function as barrier to water and impermeable surfaces will help to pass the water rapidly to other areas.

Figur 5.2.65: Source: aerial , HMB map: GST; floodmap: AKO; Diagramming: KW

In-property design and the larger landform

Quote, meeting ME-S2, water company: "The problems one has created within own property, one has to solve oneself, including trampoline pits and basements."

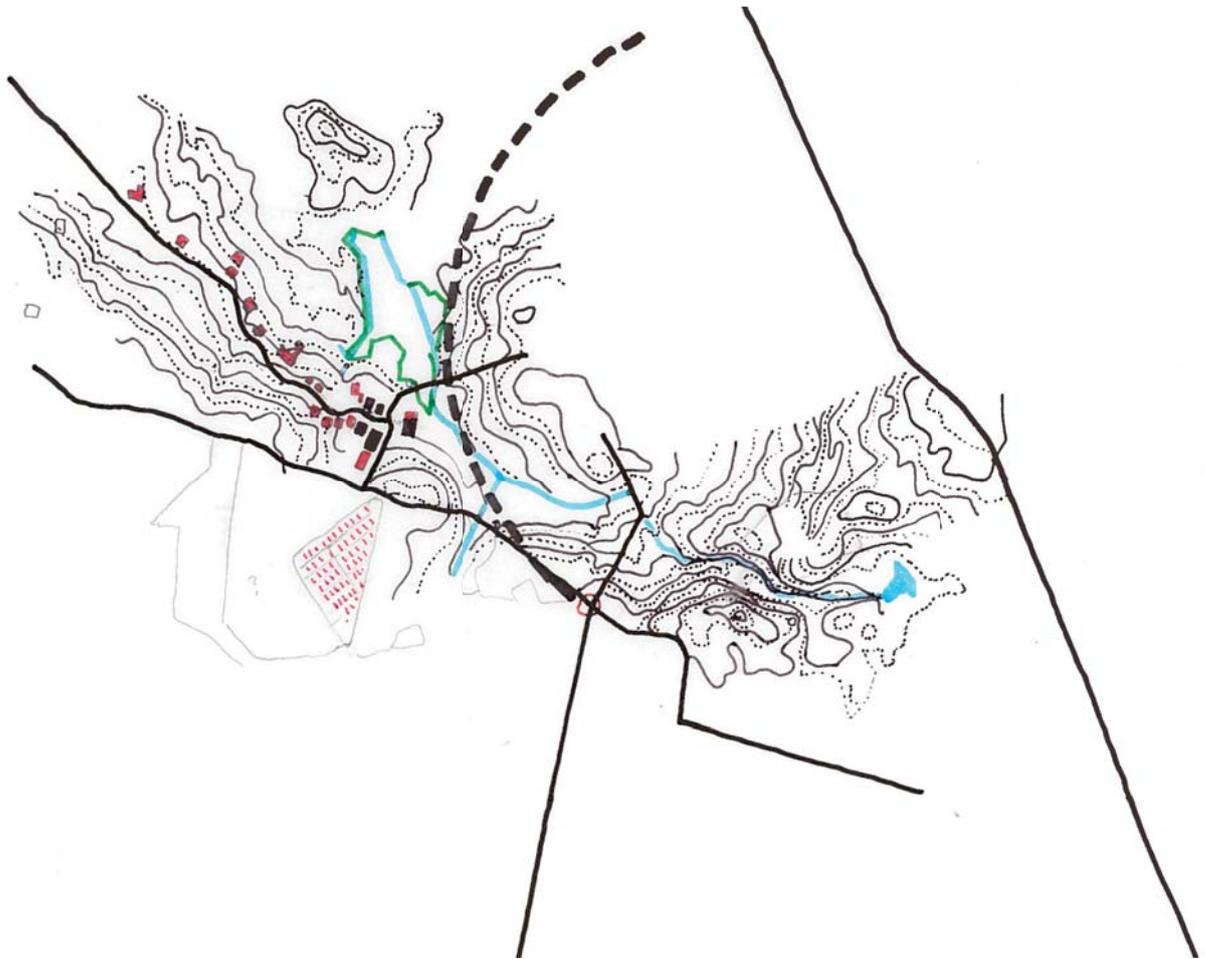
A rough Justification Analysis of the urban landscapes in Skejby would indicate that the urban landscapes have been designed with justifications of the Industrial regime (command and control) in collaboration with the market regime (maximising usage within the property). Flood maps¹¹ render the vulnerability of unilateral, decontextualised justifications in these urban landscapes.

In the event of a Skejby cloud burst, the autonomous building layout, material usage and land-use are vulnerable to water. Through the agency of water, the flood maps visualise the urban landscapes as topographic surfaces with buildings functioning as barriers that re-direct water to their downstream neighbours, and local terrain modifications and impermeable surfaces functioning as 'mirrors' that rapidly pass on surface water, exacerbating flood damage. The flow of water connects to the spatial characteristics of the urban landscapes, which in many respects are designed by humans. When comparing the flood map to the historical map and aerial photos, the relationship to the overall direction of the sub catchment, leading towards the larger recipient (North-North-East) is revealed. This points to how the very local scale demands larger scale considerations within CA|HOW.

11 based on projections of climate change in year 2050, IPCC 2007/A1B scenario

THE LARGER LANDFORM

Investigating structures, patterns, function, scale



Figur 5.2.67: Mapping, connecting different scales and times. Small and larger scale systems; mapping of the contemporary primary infrastructure, the historical terrain of the Brendstrup Corridor as a larger stretch/landform, together with contemporary smaller scale buildings north-west of the Skejby Business Park

5.2.5 FLOOD-RISK RELATIONS

RELATIONAL INTERDEPENDENCIES

Pushing costs forward

Meeting¹² quote, Downstream Business: "...all the water ends at us and our new extension!![...] is the Northern [hospital] area also to be paved and build upon?"

Upstream Hospital: "Yes, this area is bought, and the plan is to use it for parking, buildings, solar collectors, and a rainwater system."

Downstream response: "[Establishing more] surface cover in other areas – this will influence the flow of water in other places...then what about us? The local plans and so forth? What about us when we receive so much water from outside [our property]? Are we the ones left holding the baby¹³?"

The quotes show some of the controversies and uncertainties emerging from the need to retrofit existing urban landscapes. In the introduction quote, the downstream actor has become aware how the actions of *others*, on other properties, have consequences for their downstream property. At some point, the actor had the notion that maybe the local plan, thus the municipality, would have the answer as to how to solve this. During these meetings, it was becoming clear to the stakeholders that each time an upstream property changed its amount of impermeable paving, constructed buildings, walls or trenches it would likely also influence water's flow, and possibly therefore put downstream properties at flood-risk. The realisation that water-based interdependency goes beyond property rights, function or sense of neighbourhood was surfacing among the Skejby stakeholders.

For example, the hospital is flood-prone partly because of the upstream terrains. However, the hospital is upstream to others and in turn itself passes water on to other downstream actors. In this way, the urban landscape of Skejby Business Park becomes a terrain that is pushing costs and damages forward.

¹² ME-S3

¹³ 'at sidde med aben'

Constructing affordances for waters passage

As described above, the *vulnerability* of Skejby is afforded by building practices and pecuniary priorities relating to maximising the 'use' of the property. These characteristics are further consolidated through contemporary planning practices and building codes. For example, in Skejby Business Park, the municipal regulations¹⁴ require one car-parking space per gross 50 m². This is a common practice and, obviously, it means that the larger the building, the more parking area is required, and therefore the less area is left for extensive use or as space for water. With current building practices, this often results in further impermeable surface cover. In Skejby, a considerable part of CA|HOW has to be implemented as a retrofitting of existing settlement. Such a reconfiguration of built structures raises questions of responsibility, legitimacy and, in particular, 'who is to pay'. This is similar to other everyday landscapes in contemporary Danish settlements. The discussion on cost might be particularly important in suburbia as 'everyday' landscapes might entail low cost solutions. From this perspective there emerges a need to establish new modes of collaboration and distribution of costs and efforts.

As shown in Figs.5.2.65-66, 5.2.68, 5.2.80-81, the flood map together with land-use/functions visualises cross-scale and cross-functional interdependency. Zooming in, Fig. 5.2.69 shows how the orientation and layout of buildings unintentionally 'store' and redirect water. Together, buildings and their surroundings form a terrain that impacts water's flow and prompts consequences in the urban landscapes, including on other properties.



Figur 5.2.68: Critical flow paths towards the hospital are shown with white lines, arrows indicate direction of water. Parking landscapes and technical slopes are forwarding surface water.

14 Aarhus Municipality, Retningslinjer for anlæg af parkeringsarealer 2012, p.5, Bilparkering i erhvervsområder (kontor, mv.) Zone 2, 1 stk pr 50m² bruttoetagemeter

UPSTREAM-DOWNSTREAM CONFLICT AND ALLIANCES

Meeting, quotes.

Municipal actor 3: You cannot count on anything before the others have taken decisions – EVERYTHING influences the flow paths e.g. how dense you can build."

Water Company: "Solution, south of DNU; lower the road or ditch and use it as a cloudburst road. The emergency road is the first priority. Another solution could be an alternative routing."

Maintenance, Hospital: "The idea has to be created within the next three weeks?!"

AWC: "Yes."

Maintenance, DNU: "How do we do this?!"

AWC: "In smaller fora, it is necessary to take it project-wise; first generator, then road and so forth."

Maintenance, Hospital: "Is NRG1¹⁵ in on this?"

Municipal actor 3: "You now have to make bilateral agreements AND merge the three projects – they influence each other."

AWC: "We [...] can conduct the hydraulic projections, and calculate the consequences elsewhere. However, this only applies to projects where AWC is allowed to participate [projects with common good interests]."

Municipal actor 3: "Solitary solutions can increase the problem."

Municipal actor 1: "Where are upstream property owners in this? Let's keep the water uphill...they also have large paved parking areas."

The dilemma of up- and downstream decision-making became evident at this meeting: where to start when the efficiency of one's 'own' CA|HOW-solutions are dependent on other stakeholders CA|HOW solutions. Not to mention the challenge of ongoing construction works, which at their outset were independent of CA|HOW. In the above quote, the stakeholders have realised some of the complexity inherent in CA|HOW- retrofitting and the fact that it does not easily correspond to current practices of ownership. They are advised that CA|HOW solutions ought to be integrated with each other. However, at the same time, they are informed that they need to start in one place and retrieve updated hydraulic calculations on consequences before they move on to solve the next area. This is somehow arbitrary advice, while at the same time also being a core aspect of retrofitting existing urban landscapes.

The quotes also tell of how societal functions and safety- the common good- is the only area where the municipality and water company are allowed to spend resources on CA|HOW. In Skejby, the flood-prone hospital is a demonstrable example of risk to the common good. This solves the issue of priority. However, it does not solve the issues to downstream actors or elucidate regarding the eventual responsibility of upstream actors.

15 NRG1 is the energy company, not present to the meeting

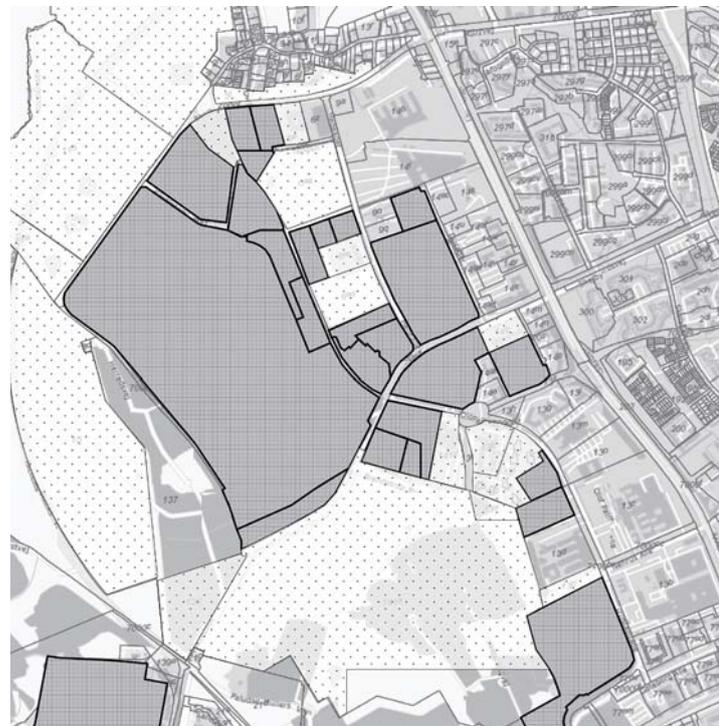
Relational interdependence and incentives

Downstream business: "When the interim roads [of the hospital construction site] are removed then the problem is pushed further out to us – can the stream even take this?"

The above downstream quote expresses how the flood-risk visualisations provided a notion of relationship beyond ownership. I studied the discussions surrounding property and up- and downstream relations further by mapping the flow paths in relation to property lines. This was followed by looking into whether the projected surface water was critical or not with regard to property function and its surface properties: could the property be expected to revitalise without considerable damage? For example, marking how the open spaces of Vestereng can be flooded without criticality whereas, in contrast, the hospital would experience critical flood damages.

The mappings formed part of the Design Comments in the dialogical interaction with DWA. One of their responses was that they would remove some of the stakeholders from their list of property owners to contact in Skejby Business Park. Although these properties shared the same sub-catchment as the others, they did not receive or pass on water, however, this does not necessarily mean that they could or should not be part of a solution. But it is recognised that with no flood-risk, the incentive to act or collaborate would expectedly be rather low. No risk, no gain.

COLLECTIVE, GRADUAL POTENTIALS FOR RETROFITTING SKEJBY BUSINESS PARK TO CA|HOW



Figur 5.2.69: Mapping of Skejby and property-owners' actor interdependencies, based on the flood maps. Used as Design Comments in the dialogical Space.

Top: original map

Bottom: the properties negatively affected by flooding is marked with grey, square hatch, the properties affected without negative consequences are marked with light, dotted hatch.

Source: background map: GST; mapping and graphics KW

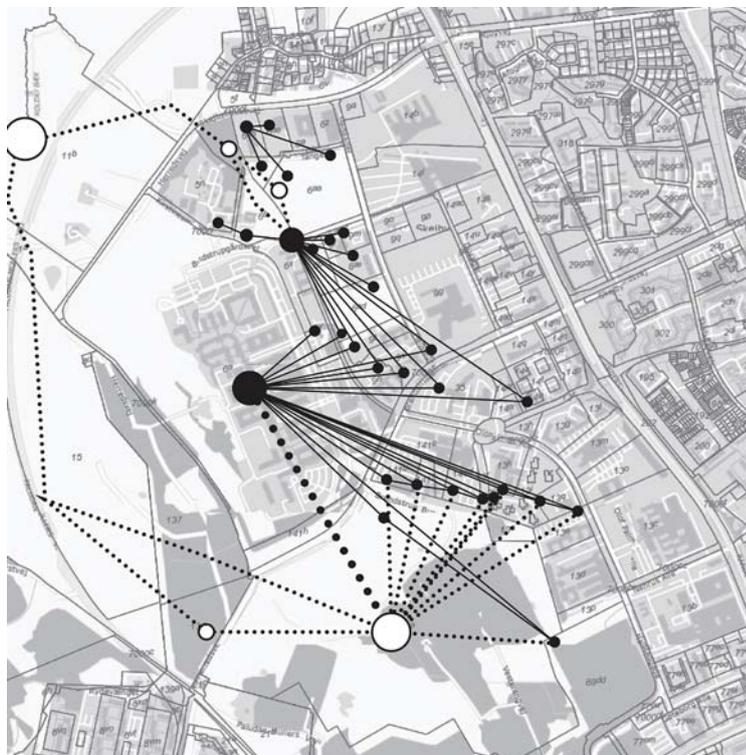
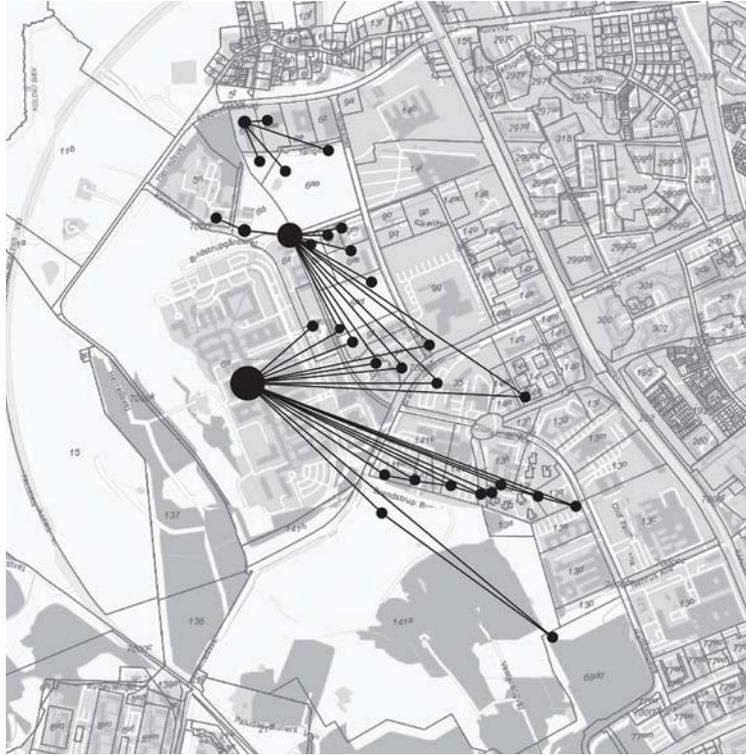


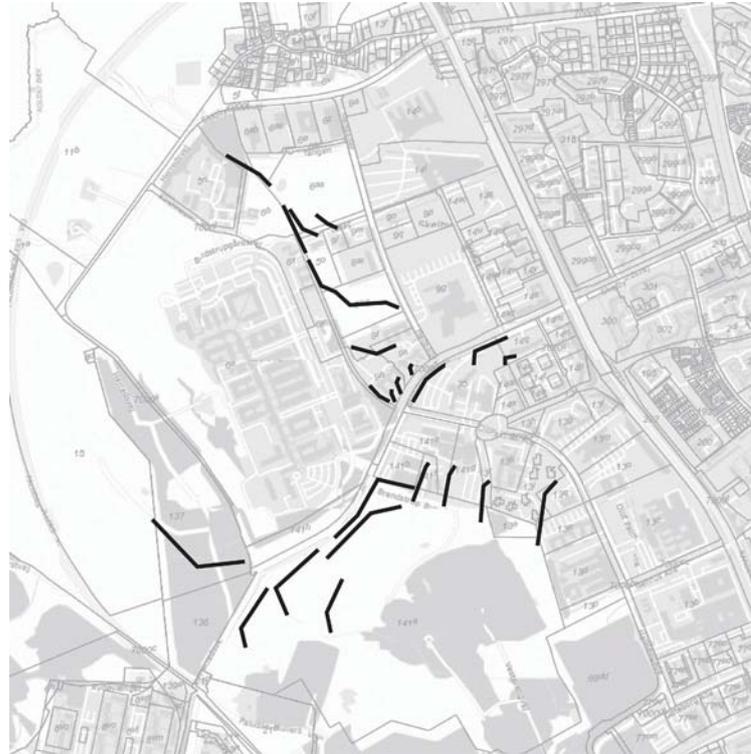
Figure 5.2.70: Mapping of Skejby and property-owners' actor interdependencies, based on the flood maps. Used as Design Comments in the dialogical Space.

Top: The internal interdependencies caused by run-off water causing negative consequences are mapped as black lines. The bigger the black dot, the more water received, thus visualising difference in consequences.

Bottom: Dotted lines indicate potential solutions in terms of open spaces and permeability. The bigger the white dot, the larger permeable area.

Source: background map: GST; mapping and graphics KW

COLLECTIVE, GRADUAL POTENTIALS FOR RETROFITTING SKEJBY BUSINESS PARK TO CA|HOW

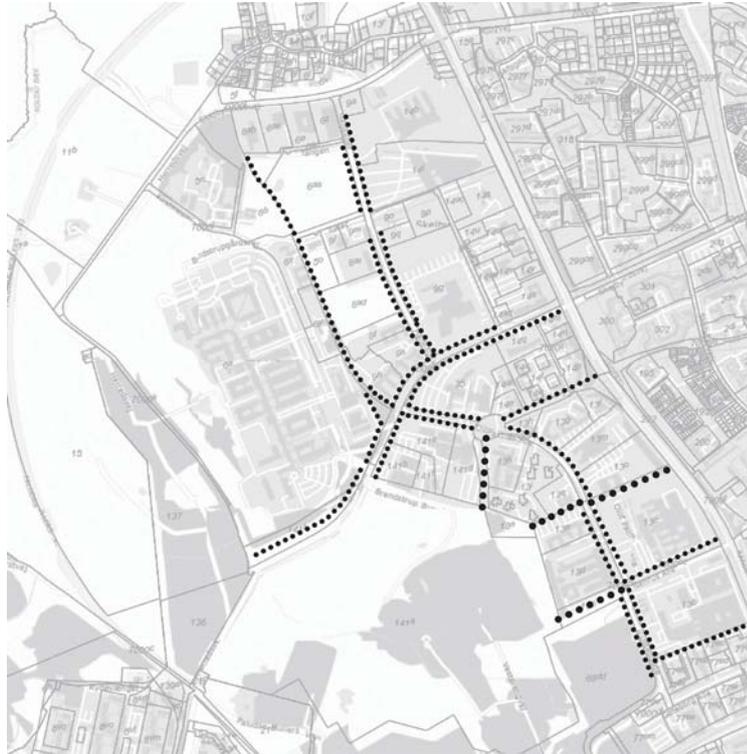


Figur 5.2.71: Mapping of Skejby and property-owners' actor interdependencies, based on the flood maps. Used as Design Comments in the dialogical Space.

Top: Lines of collective diffraction with potentials of redirecting/diverting flow paths, related to place, waters speed. Black lines indicate potentials of where to divert water step-by-step upstream, slowing water gradually. These are 'left-over' spaces that could form part of collective solutions. This as a measure could include values as local identity, better connections in between the properties towards the meadow, design features branding the business.

Bottom: In-between Potentials. Area-based potentials of local retention, small areas suitable for creating time and space for water, connecting water, fauna and vegetation while accommodating movement and recreation on the human scale. Source: background map: GST; mapping and graphics KW





Figur 5.2.72: Mapping of Skejby and property-owners' actor interdependencies, based on the flood maps. Used as Design Comments in the dialogical Space.

Top: blue-infrastructure, roads as temporary waterways, infrastructural potentials for creating space and time for run-off surface water, marked by black, dotted lines. This as a measure could include values as safer routes for pedestrians and bicyclists, identity and connectivity within the area. This requires close dialogue with the beredskab, keeping emergency roads clear of water. Bottom: larger scale areas with potential of connectivity, retention and redirecting water, marked with dark grey. This as a measure could include values as connectivity in the area, sense of place, branding of businesses. Source: background map: GST; mapping and graphics KW

IN-SITU VS EX-SITU SOLUTIONS

Meeting¹⁶ quote, municipal actor 1: "You need to sow the seed in other places than where you harvest, e.g. by investing in upstream retention basins."

As described above, the SBP flood risk pointed to how CA|HOW-measures must be initiated beyond that of in-property decision-making.

As shown in the mappings, the spatial decisions of upstream properties form part of downstream implications (and problems). As a LArch response, I suggest articulating the advantages of strategically combining in-situ and ex-situ CA|HOW-measures, for example through ex-situ solutions that could gradually delay water on its way downwards to the hospital. This seems rather obvious. However, ex-situ solutions are complex and not yet a perfect fit for existing regulations, economies, ownership practices and responsibilities.

Collective solutions require a detailed project set-up. For example, consider if Downstream-Property realises that a CA|HOW measure would be much more beneficial if located upstream. Upstream-Property then agrees to hosting the CA|HOW measure on its property. In contemporary administrative practices, the first workload is the judicial setup so that Upstream-Property, hosting the geographic *location* of the CA|HOW-measure, does not automatically become the full owner too. This requires careful work, including the definition of responsibilities and costs of maintenance over time. Furthermore, Ex-situ solutions require a binding consent from Upstream-Property so that current or future owners do not alter waters flow, e.g. by adding walls, terrain alterations and so forth. In addition to this comes the inconveniences experienced during the construction period and that the 'burden' to apply for eventual co-funding formally lies at Upstream-Property.

Justifications and value creation as an incentive for collaboration

Meeting quote, Water Company: "You need to ask us to dance, we do not have the lead on this. The project owner has the responsibility. AWC will do its very best, but the project owners have work to do. There needs to be a contract".

Collective strategies necessarily involve various actors. However, up- and downstream actors are likely to have different degrees of incentive and thus, diverging values and justifications in such an arrangement. If a property is not at risk of flood, the incentive to act might entail a need to attribute other values. For example, if the CA|HOW spaces could afford plural values, e.g. by facilitating market values via the branding of a business or promoting an attractive working environment etc.

Fig.5.2.73-77 illustrate propositional LArch reflections relating to the themes of the meeting and Skejby urban landscapes. The aim was to find areas able to provide the time and space needed for a gradual, retrofitting adaptation practice, e.g. by delaying surface water in its descent, step-by-step. The proposed areas were in-between properties- middle grounds- with 'available' extensive use spaces capable of creating time and space for water. The starting point for this was that it is not the drop but the sum of water that creates the essential problem for the hospital's functionality: adapting gradually by means of smaller-scale, upstream actions could turn the hot-spot into a 'spot'. The mappings became a study of how Ex-situ solutions could take place on different geographical scales in Skejby: small-scale initiatives in-between buildings, medium-scale interventions by using road infrastructure as a cloud burst road, and at a larger scale through the involvement of green spaces. As a landscape-based entry to value creation, these approaches could promote aesthetic sensitivity in vegetation patterns and provide green, connective tissue for soft road-users.

Ex-situ solutions, public resources and the common good

Aarhus Water: "AWC cannot [and are not allowed to] solve the 'red spots' [the most critical areas of flooding] on private property, e.g. at the hospital. However, AWC is allowed to involve itself in areas concerning the common good, areas with societal importance, e.g. selected areas like the ambulance road, emergency roads and primary road network that have to be functional, including in rain."

The actor explained the above through the example of Egaa EngSø and how it was restored as a wetland with the participation of AWC: the wetland would delay water from the catchment and many citizens would benefit this, thus it was considered in the interest of the common good. For Skejby Business Park, Vestereng holds significant potential to create space and time for water in the middle of the sub-catchment. The municipal actors were fully aware of this but the dilemma was that the area, by its very nature, did not receive or cause flooding problems. Thus, the justification for spending scarce public money on adaptation was weakened: the legitimacy of using tax payers' money on saving local private property owners self-inflicted costs is likely disputable.

Public large-scale CA|HOW-projects are emerging around the world, including in Denmark. Nevertheless, it requires a careful weighing of costs, responsibility and legitimacy. If the municipality agreed to host the CA|HOW-project at Vestereng, a portfolio of cost and responsibilities would easily follow, e.g. involvement processes, project design, management, construction works and future maintenance expenses. Furthermore, spending public money suggests a potential dispute regards how far taxpayers are willing to go in their acceptance of CA|HOW project that serve private stakeholders in one area and not in another area. In Case Skejby, the hospital is a substantial interest for society. However, the responsibility lies with another public actor: the region. In larger nature-based HOW-solutions, the common good also represents relatively long-term values such as future clean water, biodiversity and recreational green spaces. Nevertheless, if not accounted for in terms of public monetary value, the above values could be seen 'only' as inspired justifications and possibly too intangible to compare with pressing 'here-and-now' issues such as funding needed for schools and nursing homes. The standard of measurement would have to be explicit and precise. This relates closely to the discussion of Ecosystem services in the Value chapters. Ecosystem services specifically address a 'means-and-end' approach, calculating the monetary gain of the services of natural systems.

This also points towards the fact that surface water is also politics, and that it might be necessary to address values and justifications that accommodate the Opinion Regime. Here, election periods become important, and, most likely, media coverage too, in order to form the incentive to allocate tax-payers money to larger-scale projects that serve the common good and long-term values. This adds further importance to the creation of values in both short- and long-term perspectives. In the urban landscapes of CA|HOW it seems therefore important to accommodate plural values with different time perspectives and in cross-scale solutions.

COLLECTIVE, GRADUAL POTENTIALS FOR RETROFITTING SKEJBY BUSINESS PARK TO CA|HOW



Figur 5.2.73: The larger scale and connectivity and cumulative potentials.

Top: There is a considerable potential of CAHOW at Vestereng with its permeability and extensive use together with its connection to the larger corridor. Vestereng could provide space for upstream properties water, thus directing the water away from the hospital area. The larger stretch. Larger scale open space with the potential to handle larger amounts of water, marked with light grey. This as a measure could include values as biodiversity, recreation, health and sensory experiences. Bottom: The sum of potentials related to specific territories and landscape opportunities. Source: background map: GST; mapping and graphics KW

5.2.6 CATCHMENT NEIGHBOURHOOD

PLANNING DISTINCTIONS VS. SUB CATCHMENT

Changing waterscapes and new relationships

In aerial photos of the Skejby area (Fig 5.2.77), the land-use division is rather pronounced and supports the distinction between urban and rural zoning in the Aarhus Municipal Plan 2013 (Aarhus Kommune, 2013), at least from a bird's-eye or cartographic point of view on a dry day. In 2014, the clarity of this was subject to change as the flood maps in the Climate Adaptation Plan (Aarhus Kommune, 2014b) altered the division between planning zones. The hydrologic projections of the Skejby area questioned the pragmatic supremacy of contemporary land-use planning. In extreme rain events, agricultural and recreational areas reveal their importance to built areas (see also case Lystrup).

Flood-risk alters the notions of private property, the local, and the neighbourhood, creating alternative interdependencies between actors and land-use. As in Case Lystrup, the new level of information provided by flood maps of Skejby questions the logics of cartographic delineations. However, it also renders new relationships across functional planning distinctions and ownership: waters dynamics and landscape properties emerge as actors of urban landscapes.

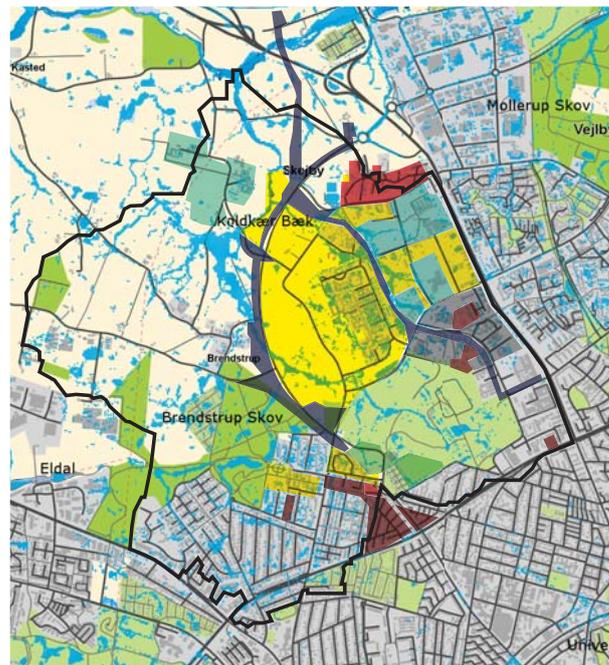
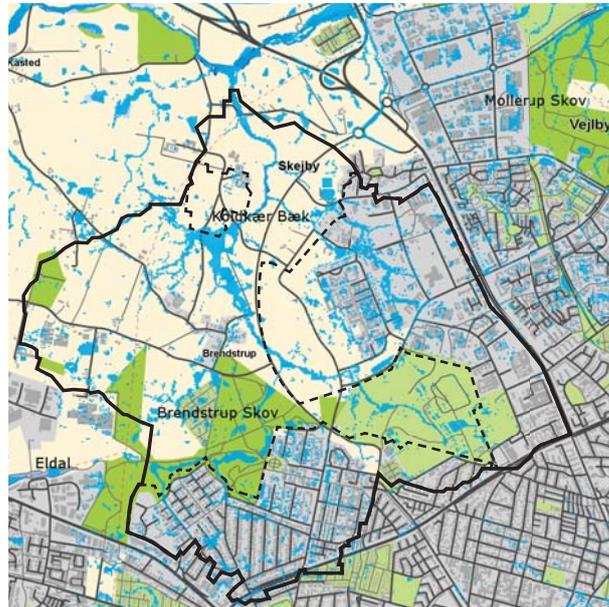
WATERSCAPES AND RELATIONAL NEIGHBOURHOODS

As seen in the stakeholders' quotes, flood maps explicate the interdependency between upstream and downstream. From the perspective of landscape architecture and planning, CA|HOW might be a call to reconsider the premises of how we, as water lays, understand the notion of the neighbourhood as well as how we, as professionals, comply with dry-day planning practices. Land-use planning provides distinctions in terms of functional and regulatory purposes, whereas the concepts of the neighbourhood often build on shared characteristics like building typology, function and cultural or socio-economic reasoning. One way to address this disparity could be to bring the concept of the topographic sub catchment to the table as a common denominator.

(Sub)Catchment Neighbourhood and Actors

Topographic sub catchments are bound to physical parameters and reflect both water logics and the terrain in urban landscapes. Furthermore, catchments are geographically bound to nested area delineations. To connect the sub catchment with the notion of the neighbourhood could be informative for future developments in urban landscapes. At the level of conceptualisation and administration, the sub catchment could provide a parameter of relevance beyond that of dry-day distinctions between urban-rural and common neighbourhood definitions. A (sub) catchment neighbourhood contains a practice-oriented degree of information that could be used to guide municipal planning all the way down to area planning and local plans. Furthermore, it could be informative at a practical level for private property owners, developers and politicians. This approach is further investigated in Case Aaby.

DELINEATIONS - THE SUBCATCHMENT AND PLANNING



Figur 5.2.76:
 Top: Flood map and land-use zoning. Black dotted lines: land-use planning within the sub catchment dividing the urban and rural planning zones.
 Bottom: Flood map with marking of planning classes within the Eastern part of the sub catchment (Skejby Business Park). Coloured areas designates different planning programs, e.g. business, residential, recreational.
 Source: background flood map: AKO; Graphics KW

(Sub) Catchment Neighbourhood and planning levels

The Catchment Neighbourhood could facilitate CA|HOW approaches at different levels. In planning, at an overall level, the Catchment Neighbourhood could be used to address the distinctions between rural and urban zoning. For example, whether rural and urban should continue as a static distinction when it comes to waterscape solutions. At the level of the municipal plan, it could inform general strategies for urban development as well as green strategies. At the level of area planning, it could facilitate area considerations with relevance to the common good (diminishing flood risk). It could inform decisions on new urban developments regarding where and how to build, as well as larger retrofitting and revitalisation schemes. At the level of Local Plans, it could inform local regulations on the layout of buildings, terrain modifications and surface cover with respect to up- and downstream actors. This could also inform decision-making in building applications, e.g. when regulations require an application to perform larger alterations on private property. At the level of the maintenance of public areas, the Catchment Neighbourhood (from now CN) could inform coherent retrofitting in urban landscapes e.g. when a road is repaired, a bicycle lane is added, or a new emergency generator is located. At a judicial level, the concept of CN might be helpful in further developing general judicial schemes that can promote gradual Ex-situ solutions, including that of integrating public areas for larger CA|HOW strategies.

From stastitical terms to common sense-making

Sub-catchment areas have the potential to form specific and meaningful collaboration in urban landscapes. The purpose of framing them as 'Neighbourhoods' is to go beyond the practices of planning and regulations. Framing an area as a neighbourhood is common both in residential, recreational, business and industrial areas. It is a concept that already suggests a notion of local identity and coherence. In this way, a neighbourhood also subtly embeds potentials for value creation. Using an existing land-based term is an effort to address how waterscapes in urban landscapes could be communicated in a meaningful manner to water-lays, whether that be a home owner, the local football club, a developer or politicians. Thus, it acknowledges justifications from the domestic, civic, inspired and opinion regimes. It is an effort to transfer professional hydro-language into the sphere of sensemaking in the public realm of water-lays.

Waterguilds and topographic sub catchments

A Catchment Neighbourhood is different from a Waterguild, although both concepts share foundational issues regarding water. A waterguild is concerned with e.g. water quality and sharing water, thus also the handling of water. A topographic Catchment Neighbourhood is different: water defines it with specific reference to perceivable urban landscapes. CN could provide an understandable parameter when we perform dry-days alterations, while at the same time emphasising the inevitable relationship between up and downstream on wet-days. A CN does not require a particular interest in water beyond that of protecting one's own property and a responsibility not to harm others.

MAPS AND LANDSCAPE- BASED COMMUNICATION



Aerial photo and levels of 'truth' without hierarchy



Land-use planning, urban and rural



Economic map (buildings, infrastructure, land-use)



Flood map, flow paths as black rhizomes



Local sub catchment area, landbased delineation of water territories

Figur 5.2.77: Maps and landscape-based communication. Potentials of different maps to provide different interpretations and understandings. Source: aerial photo: GST; flood map, Kommuneplan Rammer, CAP14: AKO; Map of property lines (Matrikelkort): Plansystem Danmark. Graphics KW

5.2.7 SUM UP – PROPOSITIONAL REFLECTIONS OF CASE SKEJBY

URBAN LANDSCAPES PROMOTING FLOOD RISK

More precipitation is not the sole cause of the flood risks projected in the CAP14. In Skejby, generic and de-contextualised settlement patterns and material practices relating to terrain alterations and impermeable surfaces are what pushes the flood *risk* and potential damages to human interests. To a considerable degree, what turns the water into risk is human-inflicted: the urban landscape has been designed to afford sealed buildings, automotive low-friction movement and car bays stalls. In a cloud burst, the same spatial characteristics transform to afford the retention of water *on* the surface, giving it speed and diffracting it between the constructed monoliths.

In extreme rain, water transgresses administrative and economic boundaries, setting the stage for territorial-based disputes relating to interest and values. The propositional LArch reflections of Case Skejby address how waterscapes can be a mediator, designating neighbourhoods of functional interdependency and collective value creation.

SURFACE WATER AS AREA-DESIGNATION

Sub catchments and notions of neighbourhood

In Case Skejby, a re-occurring theme was the dependencies and responsibilities between up- and downstream actors. As seen in the quotes, the downstream actor understood the water-based dependency and questioned the 'fairness' of downstream receiving the consequences of upstream construction activities. At the meetings, the municipal and water company actors were promoting collective actions and the LArch mappings became a vehicle for studying relationships and specific potentials of the area.

The propositional reflections developed in Case Skejby have developed into a suggestion that Sub catchments function as a territorial denominator to address land- and water based relationships in the area. Learning from Skejby, I suggest that a conceptualisation of the topographic sub-catchment as a Catchment Neighbourhood could be useful. The advantage of such a conceptualisation is that it is land-based, connected to specific geographical locations and that it has practical, calculable implications that can be useful both on dry and wet days.

Design Comments and landscape architectural methods in Case Skejby

During Case Skejby, the municipal actors initiated the discussion of my LArch material. In this way, the Design Comment developed further and the interactions also functioned as on-going peer-review.

Reflecting on the responses from the DWA actors, I find that some of the LArch mapping could be transferable as a means to visualise affordances and relationships in other suburban contexts with comparable settlement patterns. For example, the relationship between mappings and the potentials for gradual Ex-situ solutions.

Although collective Ex-situ solutions may hold long-term perspectives and potentials with multiple benefits, they do not yet always fit perfectly into contemporary planning practices, administrative regulations, or economic evaluations. From this point of departure, the Catchment Neighbourhood could contribute to defining meaningful neighbourhoods linked by waterscapes as well as how water responds to the urban landscape. Design Comment could form part of facilitating this.

The Catchment Neighbourhood and plural justifications

Approaching waterscapes and CA|HOW on a sub-catchment level provides more than water-informing planning and the practical retrofitting approaches of the built environment. The CN provides some degree of specificity to land-use and potentials for value creation e.g. protecting one's property from damage and economic losses, promoting biodiversity, future clean drinking water, recreation, health and encouraging aesthetics and sensory experiences of the outdoor spaces at a human scale.

As seen in the Downstream actor's quote, flood risk is likely to cause land-based disputes regarding responsibilities for taking action and providing economic resources. These are legitimate disputes that need to be acknowledged. This also includes the legitimacy of existing practices vs. meaningfulness in the 'new' situation of flood risk. For example, does the individual interest of a single property owner have enough legitimacy to prevent an area from collective CA|HOW adaptation?

Nevertheless, the Catchment Neighbourhood does not in itself solve disputes regarding values or connect short- and long term values. Here, the 6RJ might be helpful in acknowledging plural values. Taken together, sub-catchment neighbourhoods could be used as a common denominator of land-based waterscape relations, and the 6RJ as a contribution towards the acknowledgment of plural values and diversity.



Figur 5.2.78: Skejby Business Park presents an array a utilitarian hardscapes, rows of pollarded trees in control have been allowed in between the parking bays.

PART 5 CASES

CHAPTER 5.3

TEST CASE AABY – THE HIDDEN PASSAGES

Case Aaby was an assignment concerning real-time CA|HOW in Aarhus at a pre-strategic level, building upon the knowledge from Case 1 and 2. The assignment timeframe was 2-3 months, and what was learned was further studied afterwards.

(See Chapters on Methods and Case Criteria)

Timeframe: September 2015- April 2016

5.3.1 Introduction

5.3.2 Contextualisation

5.3.3 From rings and radials to rhizomes

5.3.4 Transversal passages and the city

5.3.5 Pre-strategic CA|HOW approach

5.3.6 Intentional catchment and flow paths in the Anthropocene

5.3.7 Sum propositional reflections





P5_C3

CASE AABY

5.3.1 INTRODUCTION

CASE AABY - AN ASSIGNMENT BECOMING A 1:1 TEST



The assignment and its relation to the research project

Test Case Aaby is not a case but rather a 1:1 test or example based upon the work in Cases 1 and 2. It consisted of an assignment for DWA, Aarhus Municipality with the purpose of investigating potentials of value creation through CA|HOW in the urban landscapes of Aarhus. Beforehand, the DWA actors had allowed me into the engine room of their CA|HOW processes and projects. They had also interacted open-mindedly when I presented methods different from theirs, such as explorative mappings, or when I posed questions as to their CA|HOW designs. In this way, Case 3 stems from the experiences gained from Cases 1 and 2. In this chapter, I use material from both the process and the result of the assignment. Following the conclusion of the case, I continued to study the emergent themes and findings as propositional reflections. To keep it simple, I refer to this case as both Case Aaby and Case 3 in order to maintain the chronology in how the research and its methods have evolved together over time.

Assignment vs. independent research

The assignment was an opportunity to further explore research objectives regarding value-creation in CA|HOW in a real-life, transdisciplinary context. As it unfolded, the case became a chance to test some of the propositional reflections that evolved during Case Lystrup and Skejby. Clearly, there is a difference between a paid assignment and independent research. Nevertheless, research and practice can inform each other and provide productive outcomes. In the assignment, the set-up of the contract provided an opportunity to use the LArch methods and approaches from my research without strict bindings. Still, there was a key difference between following and interacting with actors in *their* early, pre-public processes of CA|HOW and entering an *initiating* role, in an even earlier, non-specified phase of CA|HOW. The assignment was originally not intended to form part of this thesis. Rather, it was to work as an opportunity to explore the research in practice. However, during the assignment, discussions and findings evolved that influenced my research perspective, and I continued to study this after the conclusion of the assignment, thereby expanding my reflections on Cases 1 and 2. For these reasons, I decided to include Case 3 in the thesis as a chapter on cumulative learnings and discussions deriving from Cases 1-3.

ABSTRACT

The assignment allowed continuity with the research objective, enabling me to further investigate potentials of value creation in everyday CA|HOW-landscapes at the scale of Aarhus and its relations to smaller geographical scales. In this manner, the assignment contributed to forming the thesis' discussions on a cross-scale city level.

Within urban landscapes, 'natural' soil conditions and slope are woven together with human terrain and material alterations, such as paving, buildings and infrastructure. CA|HOW inscribes itself in a context of human activities intertwined with natural processes. In CA|HOW, there is no such thing as a distinction between urban and nature in its purest form: handling water will always include both human constructions and natural processes. This impacts and pushes back on our shared notion of what we expect of the dry-day city and the wet city. On a dry day, the sewer catchment performs its invisible service to the city. In heavy rain, the topographic catchment takes over, demonstrating urban dependency on natural forces: not in the sense of nature seemingly taking over, but as configurations between water and larger landforms together with the settlement practices of the contemporary city. Here, the concept of the Anthropocene became productive in order to interpret contemporary, urban landscapes as gradients of relationships between natural processes and human constructions and practices. As a propositional reflection I discuss the conceptualisation of the Catchment Neighbourhood, studied in terms of Intentional Catchments and flow paths and how it could inform planning and LArch approaches to CA|HOW in the Anthropocene.

STRUCTURE OF THIS CHAPTER

Firstly, I will contextualise the starting point for and result of the assignment. Secondly, I unfold the process and findings of the assignment, particularly with reference to the learnings from cases Lystrup and Skejby. Finally, I discuss Case Aaby through propositional reflections, pointing to potentials in developing Catchment Neighbourhoods, Intentional Catchments and flow paths as a LArch approach to waterscapes of value in the urban landscapes of the Anthropocene.

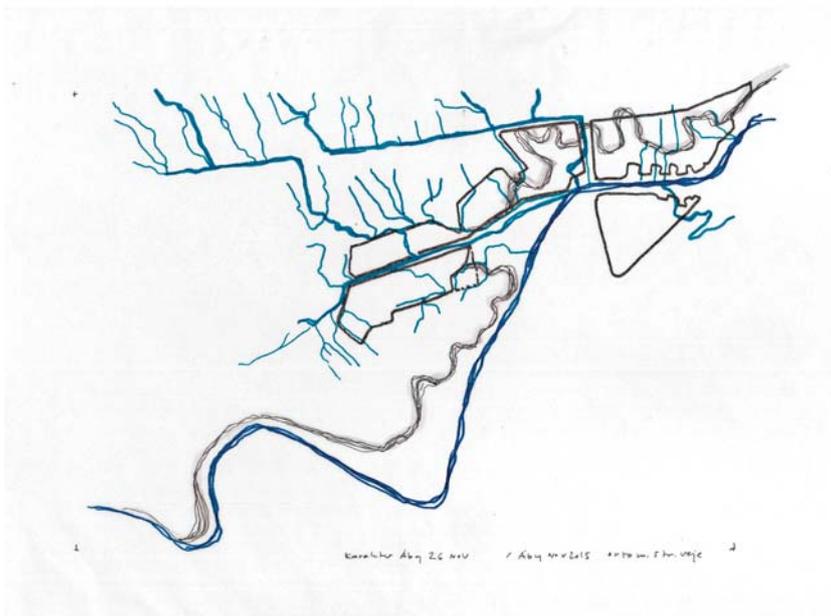
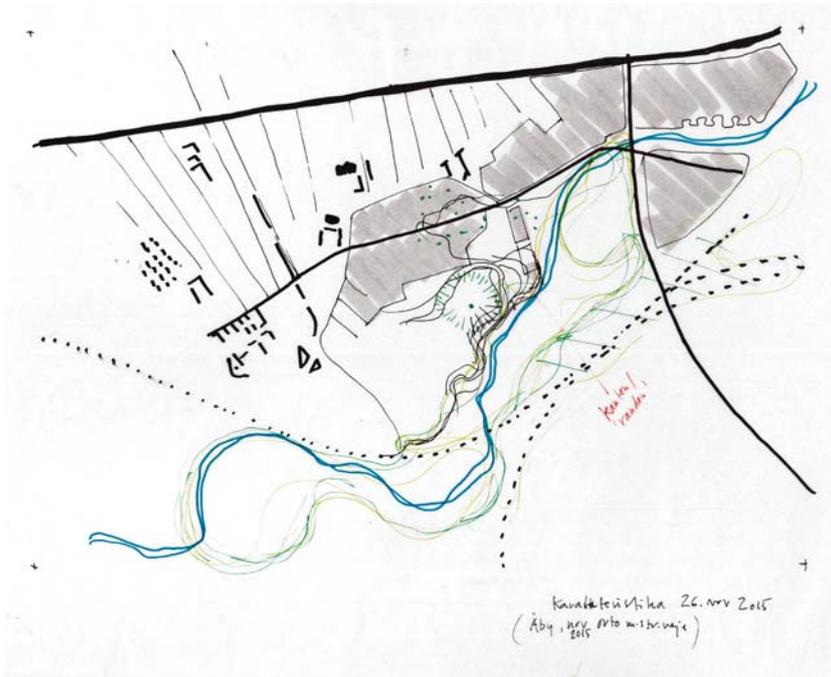
5.3.2 CONTEXTUALISATION

INTREPID CONTRACTING

Quotes, contract: The jumping off point [of the assignment] is a set of landscape architectural methods, and knowledge developed through practice and the above mentioned research project.[...] The purpose of the assignment is to point towards potentials of added-value in urban landscapes in the early project phases when they [urban landscapes] have to implement climate adaptation due to more water, as caused by an increase in cloudburst frequency.

Examples of added value are recreational values, biodiversity, accessibility, play, health, exercise, increase in mobility for vulnerable road users, creative and cultural values as well as aesthetic values like sensory sensations and amenity value. The Potentials of Place are considered as an essential element to define possibilities to create added value in relation to necessary climate adaptation measures.

The contract differed in some ways from the average consultant agreement, as it defined an intrepid approach regarding process, methods and result. The contract obviously stated formalities such as price, timeframe, work hours, responsibilities as well as defining that the client should receive a final product. However, it was accepted that the result was to be the outcome of the *methods and approaches* used in Cases 1 and 2. In this way, the open-ended LArch mappings, diagrams, and discussions on 'place' were formally included in a transdisciplinary real-life CA|HOW context. I expect that the courage for putting this in the contract was based on the previous cases and interactions, as they had provided knowledge 'that swings both ways', illustrating the successful cross-referencing of our various professions and different methods.



Figur 5.3.80: Hand-drawn mappings were used to explore the case area. Various combinations of layering, different tracings and interpretations across time, past, present, and future properties and processes in the urban landscapes, waters flow and landscape properties, infrastructure and relations between functions. By hand-tracing the terrain as seen on historical maps provided a sense of embodied knowledge and understanding of the contemporary urban landscapes.

METHODS AND APPROACHES

Assignment methods

Once again, I studied flood maps, planning maps, historical maps and carried out field trips in the Aarhus area to gain embodied, spatial knowledge. Alongside this process, I interacted with current and former DWA actors, gaining knowledge on e.g. hydrology, soil conditions, planning, municipal practices and Beredskab considerations. At our meetings, I once again brought hand-drawn mappings to enhance the dialogue.

Municipal flood maps and area designation

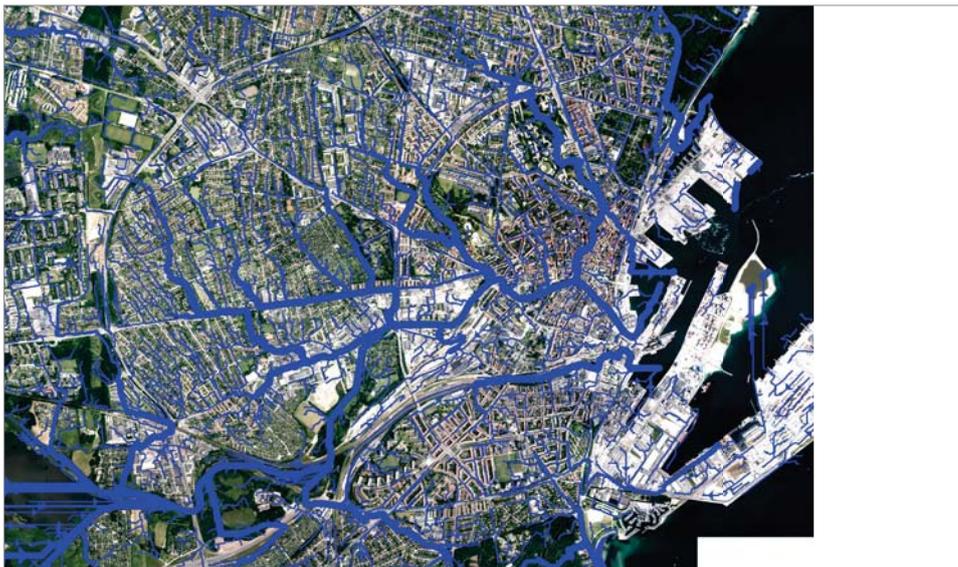
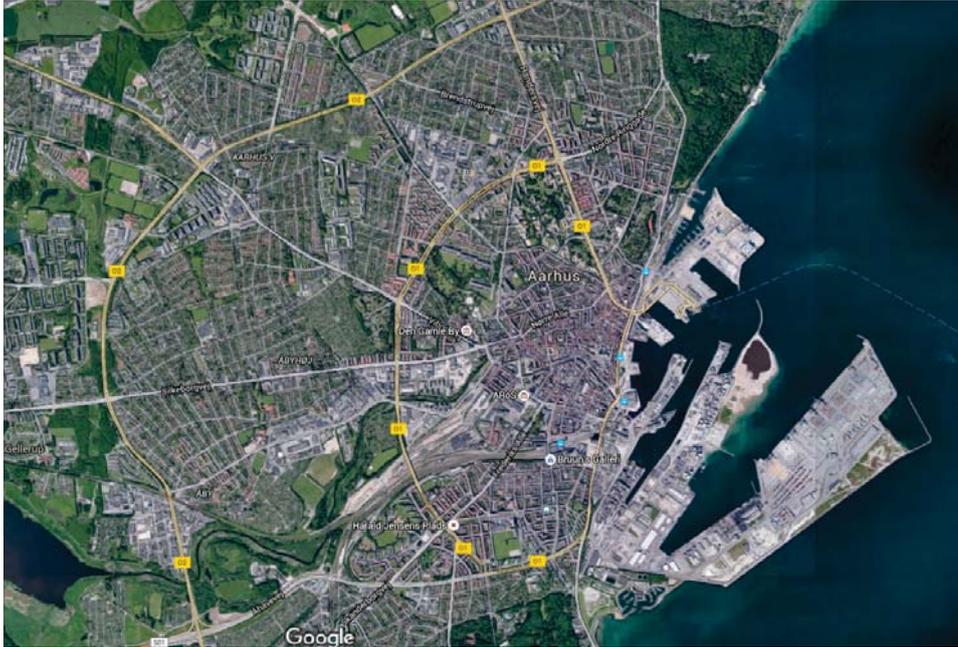
Geographically, I worked with Aarhus city in a broad sense within the Outer Ring Road. At some point, DWA selected the area of Fragtmandscentralen¹ to study in more depth. DWA had a particular interest in Fragtmandscentralen, as they were soon to provide input for its Local Plan² from the perspective of CA|HOW.

The Local Plan area had two key elements of interest for the practices and working domains of DWA: firstly, a general discussion on how to approach the concept of Local Climate Plans. Traditionally, Local Plans designate a geographical area based on e.g. ownership, typology, function and overall urban development strategies. A Local Climate Plan adds the perspective of CA|HOW. The challenge is that a Local Plan has an administrative logic that, as its name suggests, is very local. This does not in itself comply with water's flow on a larger scale, meaning that up- and downstream influences to the flow of water are bound to remain elements outside of the Local Plan.

Secondly, Fragtmandscentralen was designated for new, urban development; one of its attractions being its proximity to the inner city and primary infrastructure. Thus, it was an area of economic interests for investors and developers, encouraging the keenness of politicians to speed up the urban development process. However, moving from flood maps on a larger city scale down to a smaller area does not provide clear linkage to the logics of the delineation of a local plan. As I will demonstrate further on in this thesis, I continued to develop the knowledge accumulated in Case Skejby by studying Fragtmandscentralen from the departure point of its sub-catchment.

¹ Carrier Central/Exchange (trucks)

² 'Lokalplan' is usually translated as District Plan. The English version of CAP14, however, refers to Local Plan and Local Climate Plan in its translation. I therefore use the term Local Plan.



Figur 5.3.81: Aarhus as the Dry City- resembling that of a 'classical' image of the Western European city with rings, radials and historical city centre. The wet hinterlands and the river valleys passage to the bay appears less apparent than the Ringroad structure. From the Inner ring Road and to the harbour, the larger landform becomes almost invisible.

Figur 5.3.82: Aarhus as the Wet City-the flow paths projection from the CAP14 alters the clarity of the rings, radials and centre logic, by rendering a rhizomic pattern that changes the clear structural image of Aarhus

THE RESULT OF THE ASSIGNMENT

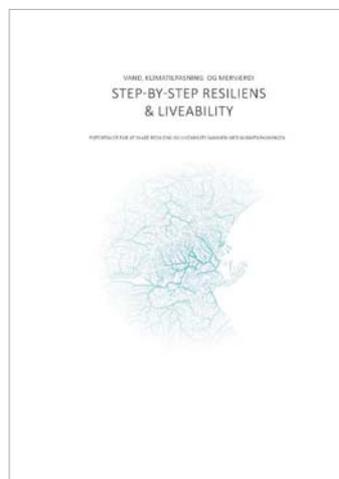
The resulting output of the assignment was two booklets (see Appendix 3a, 3b).

Booklet 1

'*Step-by-step-resilience & liveability: Potentials of resilience and liveability through climate adaptation*'. Booklet 1 (B1) is the over-arching, connecting document, which points towards potentials of resilience and liveability in the urban landscapes of Aarhus through CA|HOW. The reason for framing it within terms of 'resilience' and 'liveability' was that these terms were stated in the Municipal Plan 2013 and my search for value creation in CA|HOW could tap into this. B1 represented an analytical and a propositional approach substantiated through mappings. The mappings employ contemporary characteristics of the urban landscapes with knowledge on historical landscape properties, waters logics and future waterscape challenges. B1 uses mappings as a geographically specific narrative, addressing the everyday landscapes of Aarhus by clearly rendering affordances.

A Step-by-step pre-strategic approach

I framed the approach as *Pre-strategic*, as it consists of intermediary level material that aims to tap into *other* strategies. For example, departmental and sectoral strategies like the green strategy, the mobility strategy and the urban development strategy, as connected to the Municipality Plan³ of 2013. It took a *step-by-step* approach, aiming to exemplify how different actors, fields and interests could enter CA|HOW through value creation in a way that was meaningful for their work areas and practices. Thus, the pre-strategy aimed to include different work fields, such as the maintenance of parks and roads, local community initiatives, public institutions such as nursing homes and public schools as well as the interests of private investors. In common, all of these are urban landscape actors with various engagements, responsibilities, priorities, disciplines, workflows, time perspectives and, of course, economic priorities.



³ Aarhus Kommuneplan 2013, p.12, 22-31, Hovedstruktur. p.87. Ydre Grønne ring, Indre Grønne Ring, Trafik infrastruktur, p.145-146., p.5: "byudviklingsstrategien hviler [...] på at Aarhus Kommunes overordnede vision om, at "Aarhus skal være en god by for alle" [...] at Aarhus skal være en bæredygtig by – en miljø- og energimæssig bæredygtig by, en sund by og en socialt bæredygtig by.

Figur 6.3.1: Booklet 1, frontpage, see Appendix 3a; Step-by-step resiliens & liveability

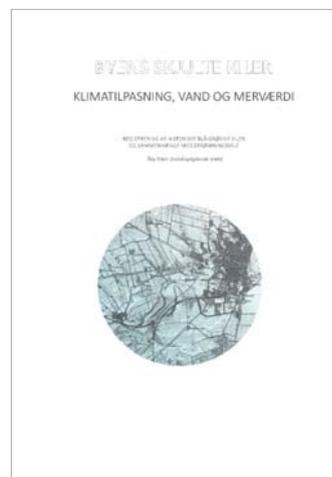
Booklet 2

'The hidden corridors of the city: Recording historical blue-green passages and their connection to flow paths.' Booklet 2 (B2) 'The Hidden Corridors' booklet is a more formal document, which aims to qualify the propositional approach in B1. It was intended as an exemplification of, and internal working paper for, the DWA actors. The B2 document consisted of maps, photographs and small textual pieces, addressing contemporary spatial qualities as found in the urban landscapes of Aaby with potentials for value creation in CA|HOW. B2 provided specificity and exemplification at a local scale.

Result cross-scale potentials and justification

Together, the booklets addressed how projected flow paths connect the larger city scale with the smaller, local scale, by pointing to cross-scale interdependencies. The assignment became a development of the discussions in Case Skejby on Ex-situ solutions and the gradual delay of water through the use of in-between spaces. What became foundational was the cross-time perspective on how the underlying landscape properties still have relevance to the contemporary and future city. In terms of content, the resulting pre-strategy was centred on how past-present-future waterscapes and landscape properties could form part of a step-by-step approach to achieve resilience and liveability: a retrofitting of urban landscapes into CA|HOW with value.

The pre-strategy work and mappings resulting in a visualisation of existing and prospective affordances connected to specific locations and waterscapes, using the Regimes of Justification as a reference for plurality and human priorities. At the end of Booklet 1, I made a concluding but generic diagram with examples of value creation that could be achieved through CA|HOW (Fig.5.3.128). In making the diagram, I used the 6RJ to ensure that I provided values relating to different justifications. I clustered these as *examples* of potential value, in an attempt to provide the reader with graspable access to meaningful value creation.



Figur 6.3.2: Booklet 2, frontpage, see Appendix 3b; 'Byens Skjulte Kiler' (The Hidden Passages of the City)

Affordances and knowledge across boundaries

The assignment provided real-life knowledge on how LArch can contribute to transdisciplinary knowledge creation in CA|HOW. The intrepid contract invited designerly thinking and the capacity for RTD LArch methods to work together with knowledge from the natural sciences as well as administrative practices. The final presentation of the assignment was attended by various municipal and water company actors. For example, municipal departments responsible for parks, planning, green strategies, urban development and roads, together with sectors like the Beredskab and water company. The presentation became a small Litmus Test of whether the effort of visualising plural affordances in the context of CA|HOW and specific urban landscapes actually resonated with diverse work fields, professions, responsibilities, and interests. The responses were surprisingly positive. The planners working with the green municipal strategy said that they would look into the transversal pattern (described in section Transversal passages), commenting that perhaps they had been focusing too much on the infrastructural image. Another actor who was involved in a community group^d in Area 2, with a focus on e.g. improving local, recreational areas, safer routes for school kids and so forth, later instigated CA|HOW as part of their group's work.



Figur 5.3.84: Exploring waters flow, example of hand-drawn tracing of flow paths to use with other layers while also as an effort to provide 'embodied'-knowledge through the act of drawing.



Figur 5.3.85: Mapping layers, investigating the historical terrains, selected roads, former lowlands and the hillsides of the river valley, explored with other layers and maps representing different time periods.

5.3.3 FROM RINGS & RADIALS TO RHIZOMES

RE-VISITING AARHUS WITH WATER AS AN ACTOR

I myself am from Aarhus. I have lived, studied and worked here. I know the city quite well from the inside, including its backsides and in-between spaces. At least, this is what I thought. Approaching Aarhus from the perspective of waterscapes, my personal and professional understanding of the city was slightly altered.

To approach the assignment, I studied the municipal flood maps at the geographical scale of the city, from the inner city centre to the outer Ring Road, as well as on a local scale in smaller areas. During the mapping process, I continuously shifted between larger geographical scales and smaller, more detailed, scales; a common LArch practice. The purpose was two-fold: to render possible relations, structures, patterns and interdependencies between different geographical scales as well as to challenge my own presumptions and biases towards how I saw the urban landscapes of Aarhus. In this context, the process of mapping became a re-mapping of the flood maps and connecting to my embodied knowledge of the everyday landscapes. Taken together, this changed how I saw the structural image of Aarhus.



Figur 5.3.86: Layer from mapping, exploring larger green spaces, flow paths and scale.

FROM CENTRE, RADIALS AND RINGS TO RHIZOME

The Dry City and the Wet City

The structural image of Aarhus is that of the classic configuration of historical, European cities, organised by its harbour, centre, radials and rings. Radials and rings have their functional logic of providing access in and out of the city, and, as physical structures, they have also influenced the location of other city functions. The rings and radials also serve as a navigational tool, associated with local knowledge on socio-economic structures such as where the areas of expensive housing or lower income areas lie. In many respects, the planning strategies of Aarhus rely on its larger infrastructure. For example, the green-ring strategy of Aarhus follows the ring and centre structure.

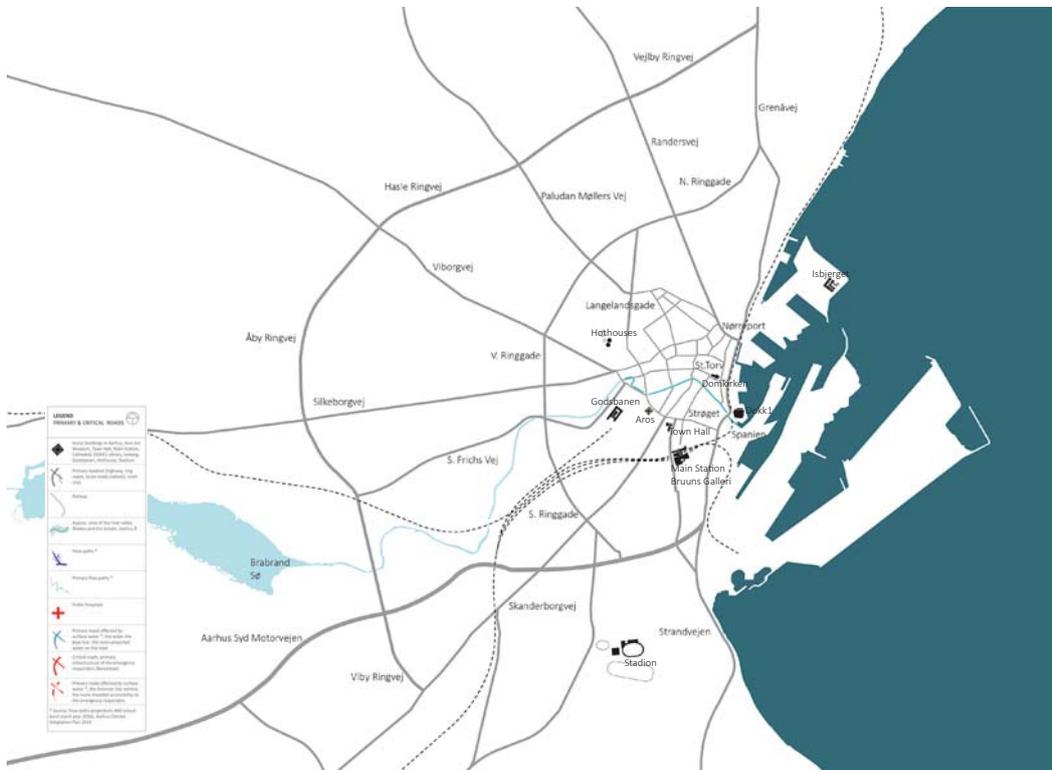
The projected flow paths on the aerial photo change the indisputable logic of Aarhus, making the classic structures less apparent. Instead, the flow paths render a rhizomic pattern that erases the dry city structural rationale. Water becomes a large-scale dissolving actor, transforming Aarhus into a complex network, neglecting functional structures such as primary roads and buildings of societal importance. The flood maps thereby leave the wet city disconnected to some of its vital practices.

Mapping as 'touching' urban landscapes

Working to see Aarhus from the perspective of water and at the same time to provide comprehensible knowledge beyond that of the mesh, I simplified the rhizomic web by obliterating capillary flow paths. I did this through hand tracings, in an effort to grasp the underlying system. This manoeuvre could also have been done in other digital software, however, doing it manually allowed me to 'touch' and reflect upon each location affected in the mappings. Little by little, the overall logic of water's flow was rendered, enabling me to relate the surface water-scapes to the properties of the urban landscapes. It was hardly a surprise that the surface water was heading for the sea, either by moving down the coastal hills or towards the River Valley and Aarhus Stream and then, into the sea. Nevertheless, this exercise not only pointed towards *where* and *how*; it also rendered relationships and interdependencies provided by the meeting of water's logic with the contemporary urban fabric. To explore this further, I superimposed the simplified flow path system onto the urban logics of rings & radials in different manners (see, Appendix 3C for larger scale mappings, and Summary & Lists b.2 for legends).

MOBILITY AND INFRASTRUCTURE, PRIMARY ROADS

Rings, radials and centre



The primary road infrastructure of rings and radials, and main streets of the city centre, Aarhus. In the assignment, I used 9 of the city's more iconic buildings to provide the reader with a familiar, place-specific navigation on the map.



The Inner Ringroad crosses the River valley, connecting the Northern and Southern part of the city

Figur 5.3.87:

MOBILITY AND INFRASTRUCTURE, PRIMARY ROADS

Water's network



Roads or waterscapes,? The primary road infrastructure of Aarhus is dissolved by rhizomic flow paths. The contemporary city meets the projected city: when the Dry city meets the Wet city, a new structural image occurs.



The Inner Ringroad discretely crosses on top of the stream right after the traffic lights.

Aadalen – the River Valley as the spine of the city

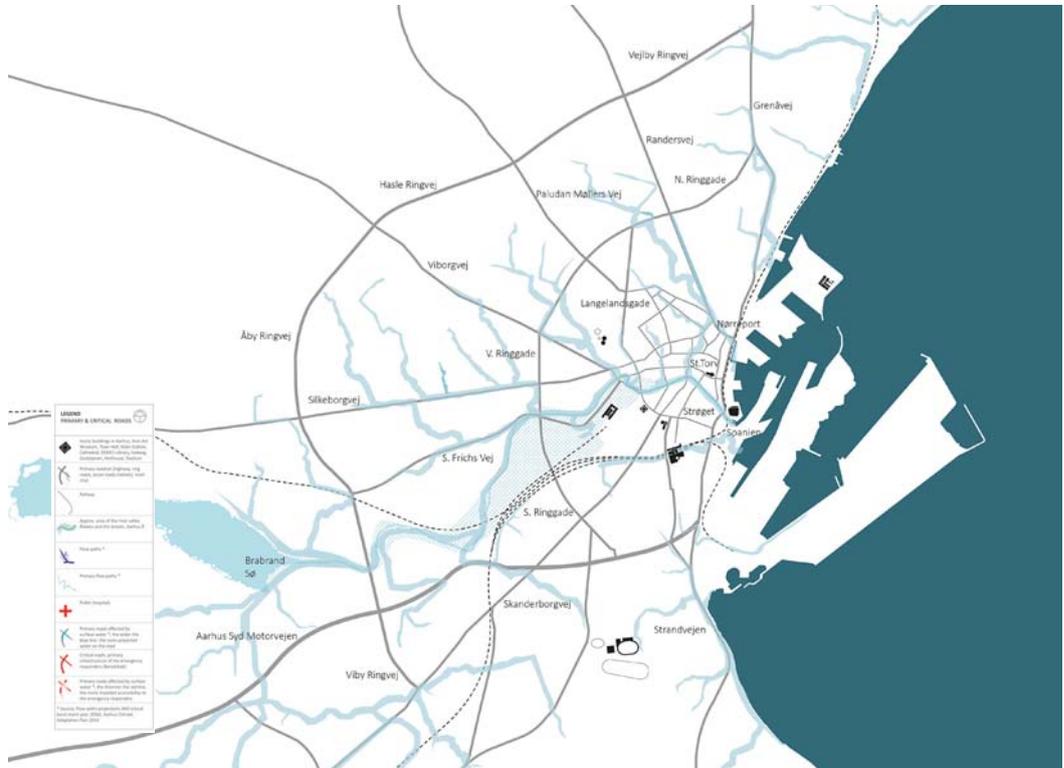
The River Valleys forms a spine between the northern and southern parts of the city. From the point of view of water and a functioning city, the River Valley is crucial to understanding the urban landscapes. Water-wise, on contemporary maps, Aarhus is often shown with a delineation of its harbour piers against the sea, the stream and the hinterland lakes, whereas the River Valley is mainly recognisable by its lower density of buildings. In a cloud burst, the River Valley rises to the occasion and becomes more distinctive than the rings and radials.

Recognition of the slopes of the River Valley and the lower lying areas became an entry to address the structural image of Aarhus, grafting it onto the perspective of water. The Fig.5.3.91-93 show a re-mapping of Aarhus, inclusive of the outline of the River Valley, based on tracing the historical, low-lying terrain (HMB map). Fig.5.3.102-104 integrates the historical terrain further, through a drafted superimposition of the slopes of the River Valley (HMB map) and the simplified, rhizomic flow paths map. The mappings question the structure of centre, rings, and radials as a fixed image by rendering how changing waterscapes suggest a dynamic relation between the dry and the wet city. The mappings, Fig.5.3.91-92, depart from an infrastructural approach where the rings and radials are emphasised as a primary, infrastructural logic of Aarhus, questioning this approach through climate change projections on surface water.



Figur 5.3.89: The larger landform, deep structure, shows the river valley of Aarhus (see Chapter 3.1.4), the white rectangle shows the approx. section of the map Fig. 5.3.94. Source: QGIS; visualisation: Nikolaj Knudsen

MOBILITY AND INFRASTRUCTURE, PRIMARY ROADS
 The river valley as the spine with branches of primary flow paths



The primary road infrastructure of Aarhus together with the projected, primary flow paths. The historical, late 19th Cent., low-lying plain of the River Valley is marked with blue hatch, and the lake is marked with blue. The river valley area forms the spine of Aarhus and its water-scapes. The River Valley continues inland for approx. 50 kms to the Western heath plain of Jutland.



Going west, the canal turn into a stream with low brinks, lakes and wetlands as characteristics of the close hinterlands of the city centre.

Figur 5.3.90:

HOT-SPOT VS. LARGER-WATERSCAPE SYSTEMS

Emergency responders and accumulated risks



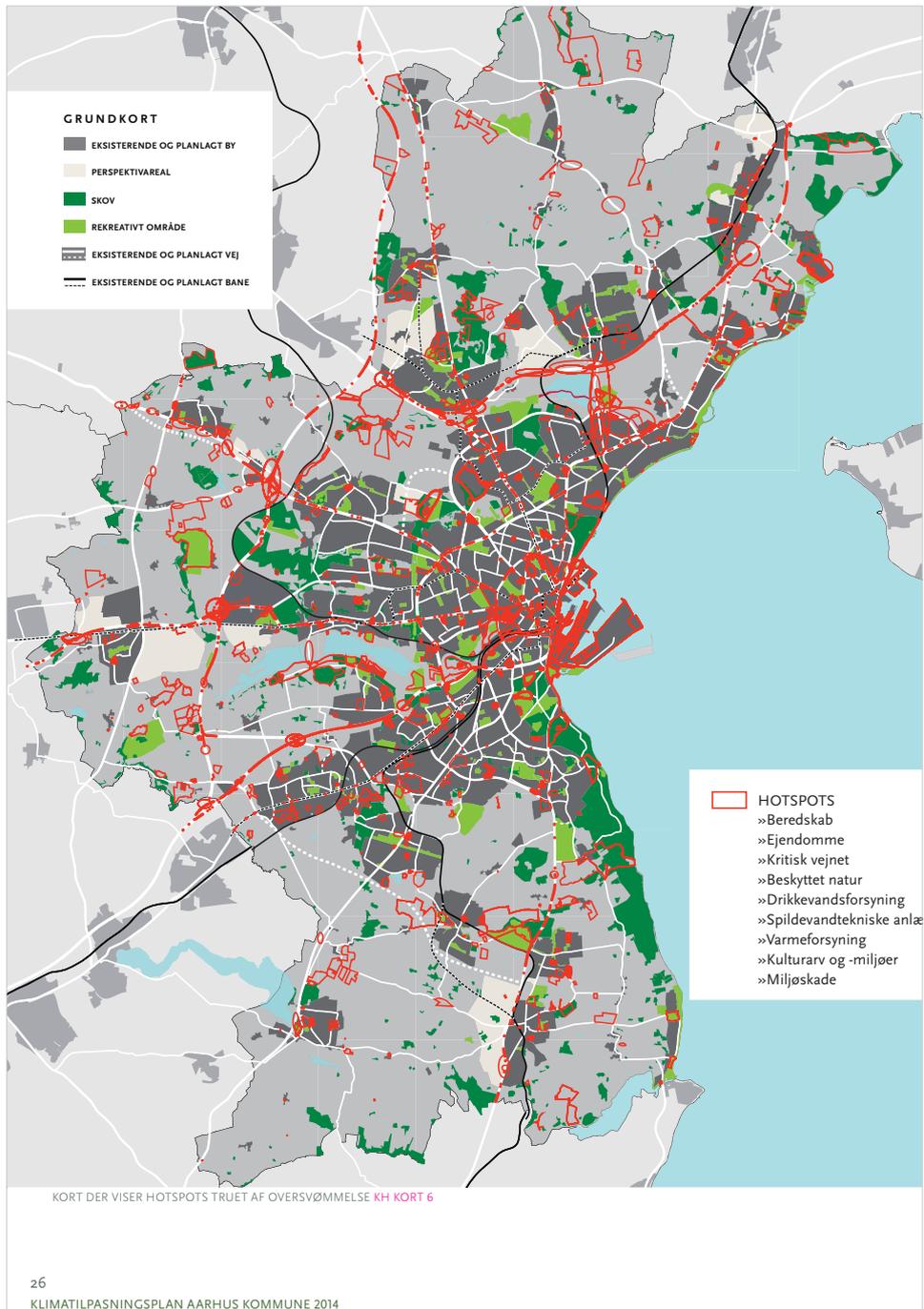
The primary road network is essential for convenient mobility but it is also crucial to the Beredskab⁵ in charge of rescue and diminishing the risk of damage and human losses. This is also the case in the wet city. In CAP14 (Aarhus Kommune, 2014, p. 14), hotspots are shown as red circles demarcating flood risks critical to society, thus also indicating the need for unimpeded mobility for responders. Hotspots are a useful tool in prioritising CA|HOW measures. However, the water creating the hot-spots mostly comes from upstream, passing on and accumulating water on its descent to the larger recipient. To remedy a hotspot, it is also necessary to look upstream and, of course, the actors at DWA and other water professionals are acutely aware of this. However, other actors are likewise forming urban landscapes in the dry city. Water lays are likely to pay less attention to larger scale considerations when they locate and orient new buildings, perform terrain alterations or increase the surface. From this perspective, it seems important to address a broader understanding of waters logics *together* with up- and down-stream relations in urban landscapes.

To address the mobility of the Beredskab, I drew my attention away from the hotspots in favour of mapping where and how much flow paths entered the primary road network as accumulated disturbances. In itself, a flow path does not necessarily prevent mobility, but it is an indicator of a level of uncertainty. The purpose was to more closely study the relationship between the hotspots and the urban landscapes. Fig.5.3.97-98 show a shifting thinning and thickening of blue lines: the thicker the line, the larger the flow path. Thus, the mapping indicates how the primary road network is influenced across larger *stretches*, and, as such, where one can speculate that the accumulation of risk increases to being a broader risk. The mapping was an effort to visualise how CA|HOW has to simultaneously be seen at local and larger scales.

Figur 5.3.91: Tableau at the Aarhus Firestation showing the historical practices of fire rescue-workers with their horse carriages and wooden ladders. The challenges of contingency (rescue) is not new to urban development.

⁵ Beredskab probably translates into Rescue Services. I use the term Beredskab.

Hotspots s seen in the climate adaptation plan



Figur 5.3.92: Map from the Climate Adaptation Plan 2014, showing the hotspot threatened by flooding.
Source: CAP14, p.26, AKO

MOBILITY AND INFRASTRUCTURE, PRIMARY ROADS

Primary roads as water's network, accumulated water

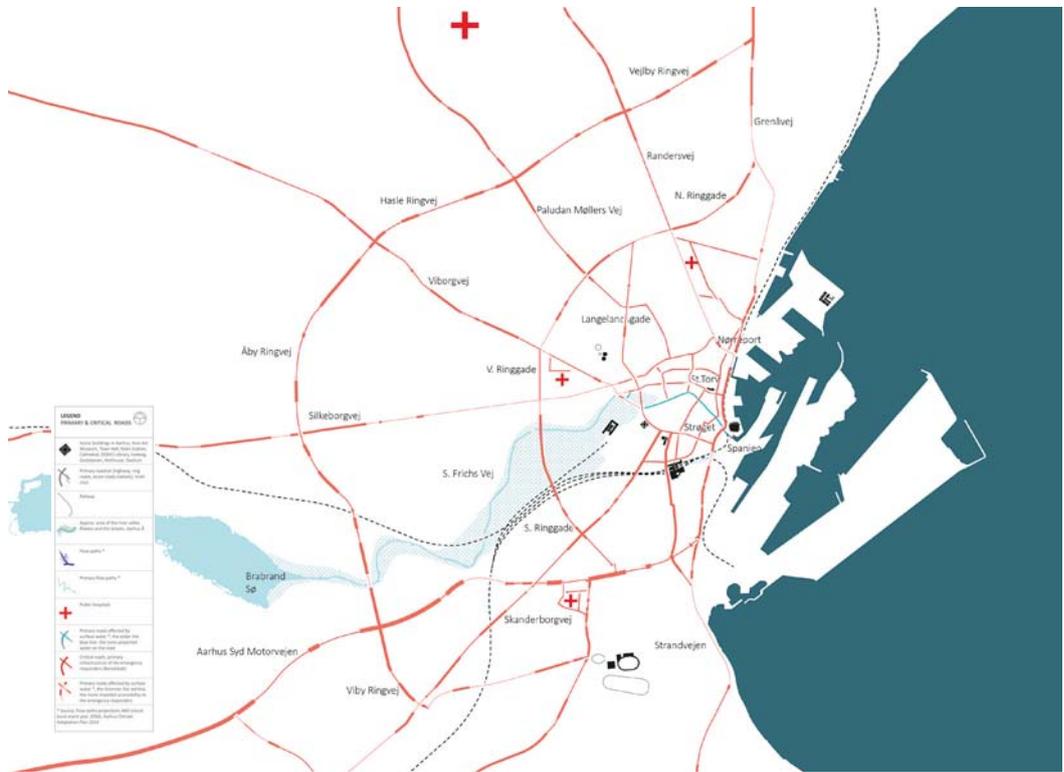


Inverted Roads or waterscapes. When the contemporary dry city meets the projected wet city, a new structural image occurs and the main road infrastructure of Aarhus is dissolved by rhizomic flow paths, here visualized through their appearance on the road infrastructure. The thicker blue line, the more water on the road.



Heavy rain on Silkeborgvej
5th may 2015, turning the
road into a rockbed river.
Photo: Mo Krag

MOBILITY AND INFRASTRUCTURE, PRIMARY CRITICAL ROADS
 From hot-spots to accumulated uncertainties



From hot-spots to stretches of uncertainty: the thinner the red line, the more water on the road, and the less connectivity for the emergency responders, seen as accumulated risk to the Beredskab's mobility. Is the web still to be considered a web?



The firestation of Aarhus, everything is carefully prepared to be ready to go- next step is whether rescue is performed in the dry or the wet city

Figur 5.3.94:

FROM SUB-CATCHMENT TO LOCAL PLAN -RELATIONS BETWEEN PLANNING AND WATER'S LOGIC

The Local Climate Plan and its sub-catchment

In Case Skejby, I discussed how sub-catchments were challenged by planning and ownership practices dividing the urban landscapes into a fine-grain mesh of administrative boundaries, disconnected from the larger landform and water's flow. I suggested the concept of Catchment Neighbourhoods as a denominator of geographical relationships, adding to the notion neighbourhood.

When I was asked to look into the area of Fragtmandscentralen, I investigated this further. At the outset, I asked DWA for an approximate outline of the sub-catchment together with the planning documents of the area. DWA made the approximate delineations of two nested sub-catchments connected to the local plan of Fragtmandscentralen. The purpose was to study whether the Local Plan and the sub catchment could inform each other from a planning perspective, adding to the framework of Local Climate Plans. The aim was not to find new convergences between the delineation of the sub-catchment and the Local Plan. Rather, I explored the relations between the sub-catchment, its associated local plans and the urban landscapes to see if this could help qualify up- and downstream choices when building or renovating, as a way to inform planning.

Aaby sub catchment and its associated Local Plans

The maps in Fig.5.3.100-101 show the sub catchment, and the approved Local Plans (as found on GST) connected to this area. I found no perceivable connection between these documents. Rather, their cross-referencing rendered clear the autonomy of Local Plans regarding their relation to the larger urban landscape and waterscapes. As Local Plans determine where and how much to build, as well as outlining which materials to use, these local decisions influence the flow of water in a way that can likely have downstream implications. This effort to connect the sub-catchment with the delineations of local plan did not illuminate how to approach climate-local planning in the area of Fragtmandscentralen. Rather, it pointed to the futility of simply adding a layer of climate and waterscapes onto a Local Plan. I moved on to investigating whether the relation between the sub catchment and the Local Plan area needed to be qualified differently. Perhaps the relation was not between the sub-catchment and the Local Plan but rather the relation between the sub-catchment's and its urban landscape?

The Aaby sub catchment, Fragtmadscentralen and the local plan area



The low lying river valley close to the city centre was mainly designated for the railway and industrial uses since the mid 19th Century. The area is now valued land for new urban developments.

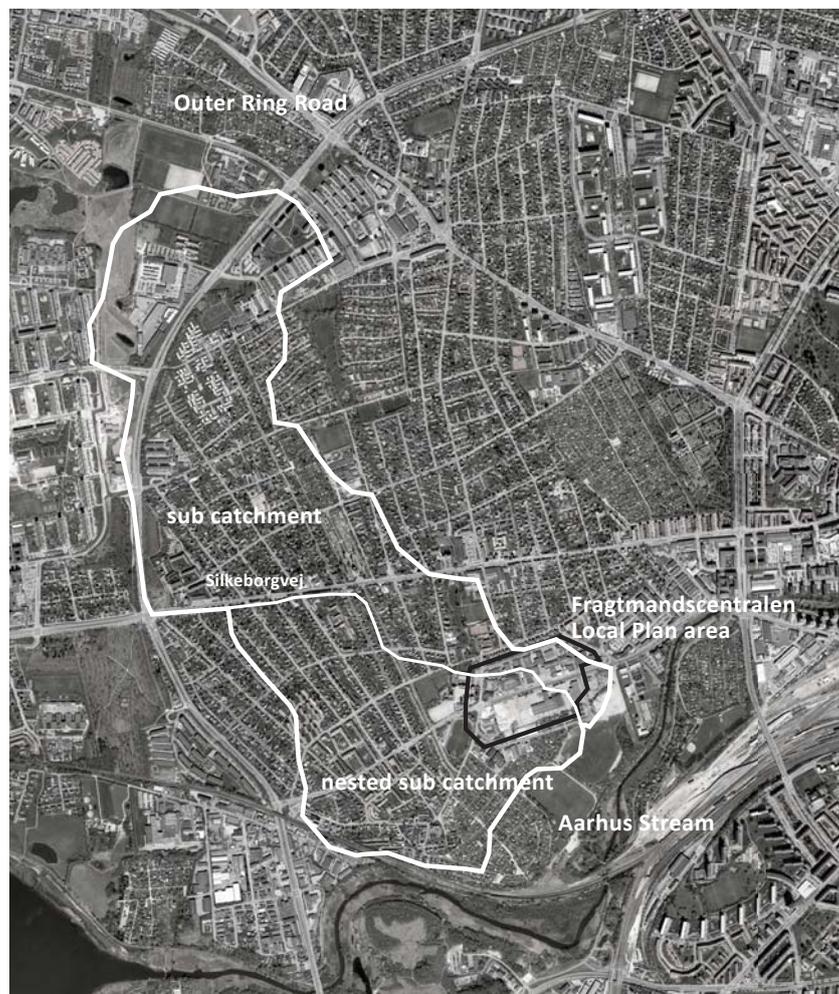


The industrial area 'Fragtmadscentralen' is located in the river valley close to the stream. The area is currently experiencing changes in land-use and new buildings are on their way. The residential areas inhabiting the northern hillsides are visible in the background of the photo

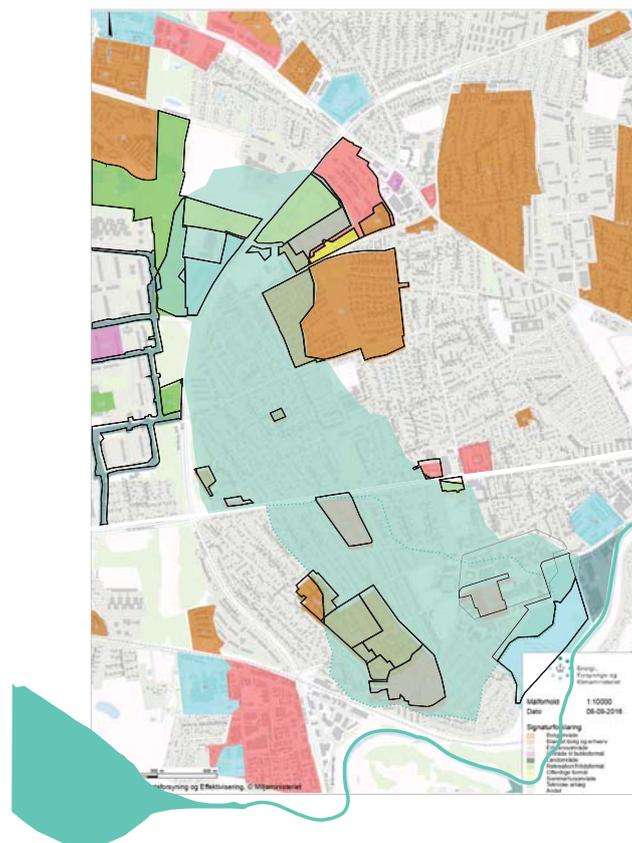


Figur 5.3.95: Mapping exploring relations and programs of the local plan area together with the lower west sub-catchment, cutting through the local plan area.

THE AABY SUBCATCHMENT AND ITS LOCAL PLANS



Figur 5.3.96: The local plan area of Fragtmandscentralen (black line) and the area of the subcatchment with its nested, lower subcatchment (white lines). Source: Aerial photo; GST, appr. sub-catchment areas and local plan area; AKO; modified by KW



Figur 5.3.97: Top: overview map with coloured areas showing the different approved local plans. Bottom: approved local plans and the proposed local plan of Fragtmadscentralen, investigated with reference to the Aaby sub-catchments shown with light blue, the lake and the stream.

Source: map with local plans: GST; appr. subcatchments and Fragtmadscentralen area: AKO; modified by KW

Urban landscapes and inconsistent sub catchments

I studied the primary flow paths of the sub catchment in relation to the surface properties of the urban landscapes. When I compared the delineation of the largest sub-catchment to the terrain and the former wetlands as seen on the historical HMB map, there seemed to be an irregular logic to it. On the one hand, the sub-catchment appeared to have a relation to the terrain found in the historical maps. This pointed to the fact that the catchment was not completely disconnected to the former topography and landscape properties. At the same time, the logic of its delineation was not consistent and the sub catchment appeared with some anomalies or inconsistencies.

Looking into the details of the contemporary maps, the sub catchment appeared sensitive to small-scale alterations such as changes in curb heights, gradients on parking lots or roads, the orientation of larger buildings and so forth. What I mean by inconsistency is, for example, that an element such as a curb is likely to be altered in its height during repair work. This means that larger-scale flow paths might change course due to small-scale alterations, thus possibly influencing the sub-catchment delineation. In consideration of all of the previous and on-going repair work, new developments and alterations carried out in a city, such sensitivity to physical changes creates vulnerability. Even local, small scale alterations may change sub-catchments or flow paths, challenging how to remedy hotspots, e.g. on the critical road network with regards to passability for rescuers or establishing robust Local Climate Plans. Altogether, sensitive sub catchments and flow paths provide uncertainty and make it harder to qualify CA|HOW-measures in a longer time perspective.

Flow paths – disruption and correlation

When comparing the projected primary flow paths with the historical terrain (Fig.5.3.102-104), there seemed to be a correlation with former surface waterscapes. Fig.5.3.105 shows that, despite extensive surface alterations, the overall direction of the primary flow paths were still related to the slopes of the moraine hillsides leading towards the River Valley, albeit partly offset/translated.

This offset could potentially be caused by the fact that I was using different maps. For example, historical maps were drawn using different survey methods than those of contemporary GIS maps. Thus, comparing different maps demand on-site registration to qualify smaller scale details. The overall correlation pattern was, however, quite marked.

HISTORICAL SURFACE WATERSCAPES AND TERRAIN

Water of the past, future flood



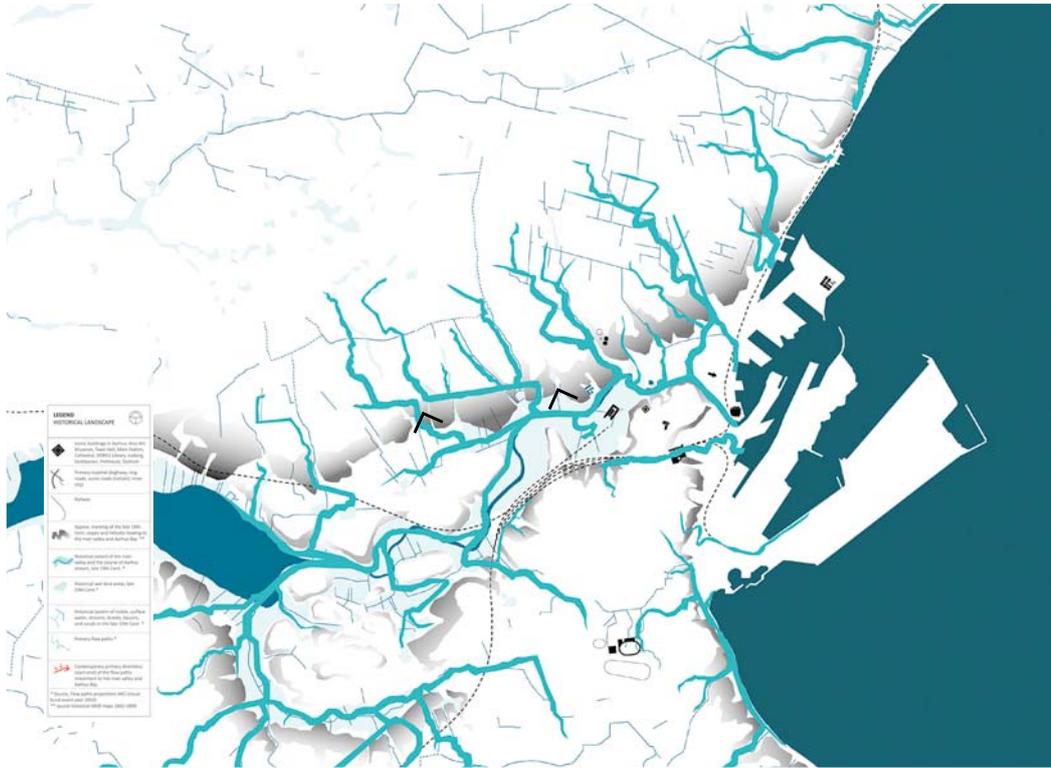
The moraine hills and the late 19th Century surface water as seen on the HMB map. Slopes and corridors are leading to the river valley. The surface waterscapes and wetlands of the past are shown with present day icon buildings and the port.



Contemporary urban landscape in Aabyhøj; descent to the river valley

HISTORICAL SURFACE WATERSCAPES AND TERRAIN

Water of the past, future flood



The moraine hills, past water, and future flow paths, showing the routes of the primary flow paths toward the recipient and their physical relation to the underlying terrain (slope, soil)



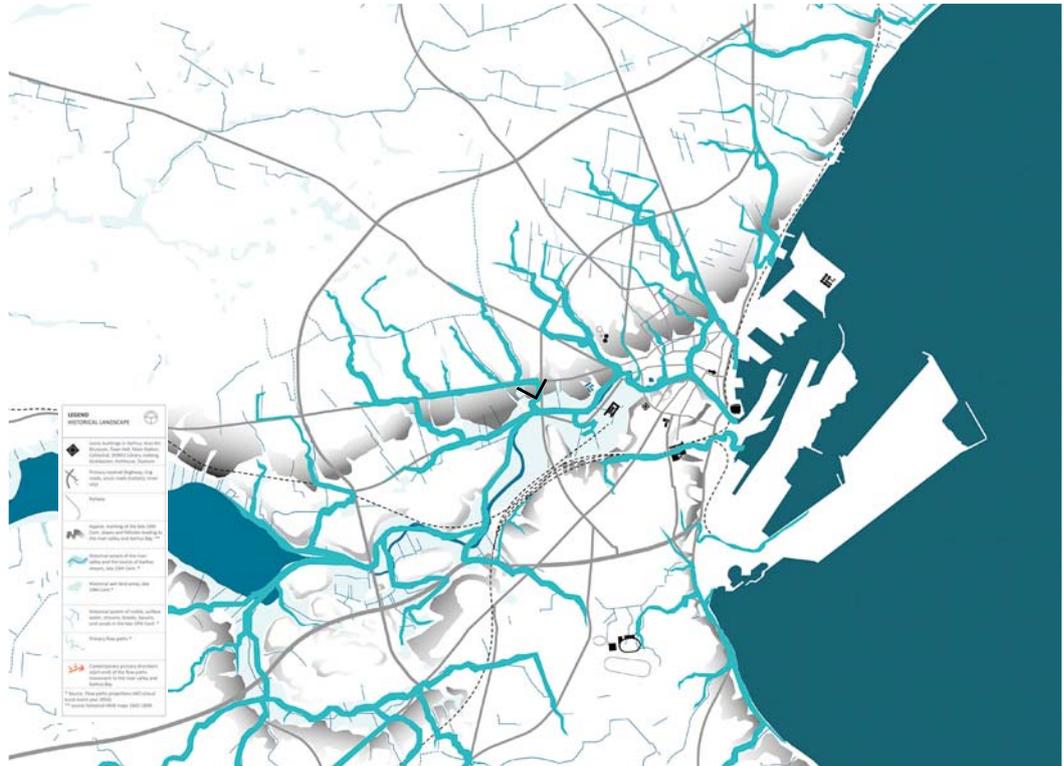
Flow path in former blue-green passage (right black arrow on map)



Ordinary Aabyhøj street that follows the slope down towards the River Valley (left, black arrow on map)

Figur 5.3.99:

HISTORICAL SURFACE WATERSCAPES AND TERRAIN
 Water of the past, future flood, contemporary roads



Flow paths and current primary roads (rings and radials). The flow paths are hijacked by contemporary road infrastructure, passing the water on a detour before it reach the recipient of the river valley, leading it to the Aarhus Bay



In the Dry City, Silkeborgvej is a primary, radial road, in the Wet City it is forming a riverbed, receiving water from multiple upstream tributaries, accumulating water on a detour to the river valley. The left map shows hotspot intensity as seen in the CAP14, the location of the photo is marked by a black arrow.

Figur 5.3.100:

Constructing terrains for waters detour

The map in Fig.5.3.103 shows that compared to the terrain as seen in the late 19th Century, some of the flow paths are just slightly offset/translated from what one would expect them to be. However, in some locations, the flow paths turn almost perpendicularly, due to roads taking over the course of the flow paths. For example, as seen in Fig.5.3.104, Silkeborgvej takes over 4 of the primary flow paths by providing a designated canal, thereby rerouting water to the River Valley.

Water does not care about alternate routing caused by human efforts, but human actors do: the detour has consequences for humans, as it causes the flooding of a primary road and junction on the critical road network. By following Silkeborgvej, water is diverted and a junction designated as a hotspot can become flooded. Detouring water has consequences for human practices and values as it creates a risk of inaccessibility for the Beredskab and, as such, influences mobility in the city. For water, the urban landscape of Aarhus is a terrain that offers rock-bed surfaces, hard-edged canals, alternative gradients and monolithic structures, diffracting and surpassing water. In extreme rain, the resulting flows and their potential damages occur as a combination of natural processes meeting human constructions, ultimately leading water into critical areas. The threat of risk and damage caused by cloud bursts might not merely stem from an increase in precipitation and surface water but also from the contemporary urban landscape. Intensively used areas and their associated contemporary building practices generate inconsistencies for the sub-catchments and flow paths, thus also provoking vulnerability for the city's functionality.

HISTORICAL SURFACE WATERSCAPES AND TERRAIN

Water of the past, future flood, directional descent



Overall flow path directions. The red, straight lines mark the overall direction of the flow path from its origin and its descent to the larger recipient, as an effort to explore and then, emphasise the overall system without local details.



Prospect land in the river valley, waiting for changing land-use. Left in the background, is seen considerable construction works.



The post-glacial landscape with red arrows marking the past and contemporary water's primary directions.

Figur 5.3.101: Source: Per Smed, Geomorphologic map.

The intertwinement of natural and human forces

As seen on the map in Fig.5.3.104, two strong spatial characteristics offer passage to water on its descent: the road and the terrain. The contour lines show that the terrain supports water's logic by creating a north-south pathway down the moraine hills, across Silkeborgvej, and towards the River Valley. The road offers a perpendicular, hard-edged passage, incidentally optimised for channeling water towards the east. Silkeborgvej essentially overrules the properties of the landscape. In this way, water moves more than 1100 meters further eastwards on the critical roadnetwork, until it pools up in the 'Ceres' junction, where it merges with water that has been channelled by another road. This creates the critical hotspot for the beredskab as described earlier. Finally, the water moves southwards to its original destination – the River Valley and the Aarhus Bay.

Fig.5.3.106 shows a contemporary aerial photo with present-day contour lines and future flow paths. Flow paths A and B have a parallel outset and belong to two different sub-catchments. On this map, flow path A is diffracted at an almost 90 degree angle towards the east. This detour obviously influences the sub-catchment delineation. This takes us back to the start of the study: when looking at the affordances of curvature and soil properties, the sub-catchment delineation seems 'wrong'; an anomaly that is sensitive to local alterations of the physical layout of urban landscapes.

The anomalies rendered in the flow path projections could be interpreted as a call to re-connect with sub catchments and flow paths in a strategic manner, and to deliberately integrate the overall properties of landform and soil conditions with our urban landscapes. I investigate the potentials of this further in the section on Transversal passages and the propositional reflection of Intentional Catchments and Flow paths.

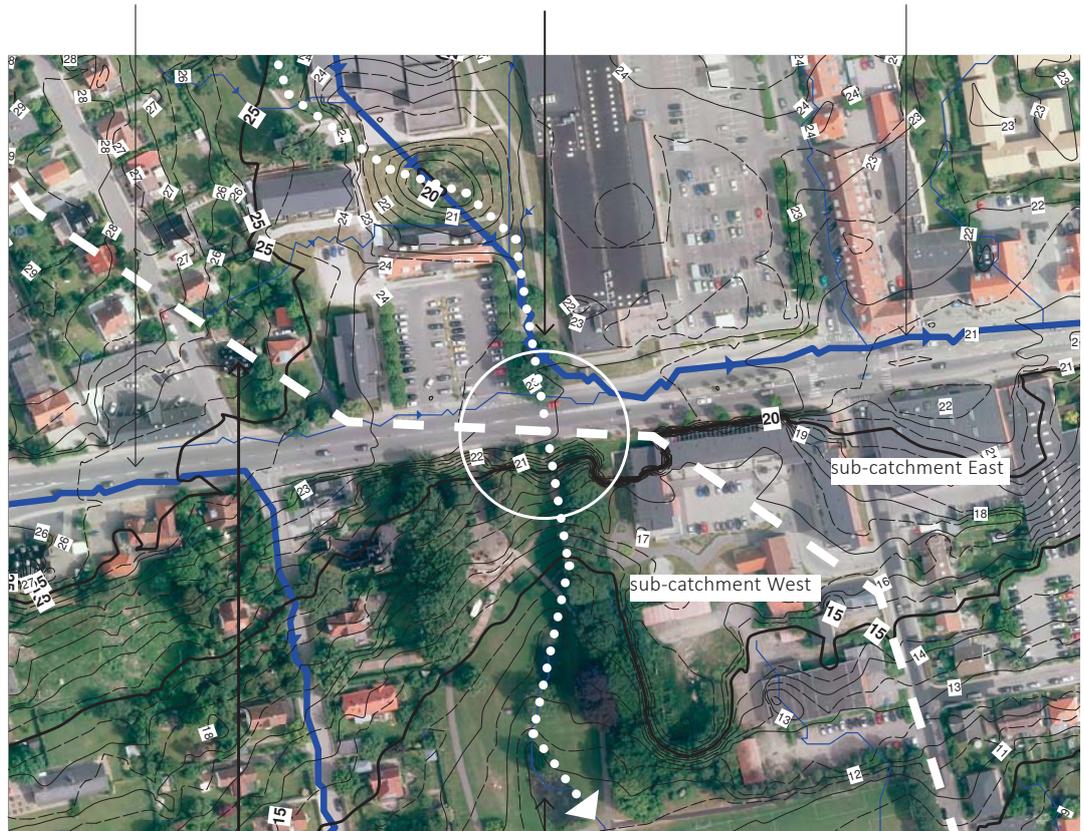
SUBCATCHMENTS, LOCAL TERRAIN, FLOW PATHS AND ANOMALIES



Primary flow path, located in subcatchment West

ANOMALY

Primary flow path, located in subcatchment East



Approx. subcatchment delineation

The terrain's natural slope downwards to the river valley

Figur 5.3.102: source: flow paths map: AKO; diagrammed by KW

5.3.4 TRANSVERSAL PASSAGES AND THE CITY

PROVIDING SPACE AND TIME FOR WATER

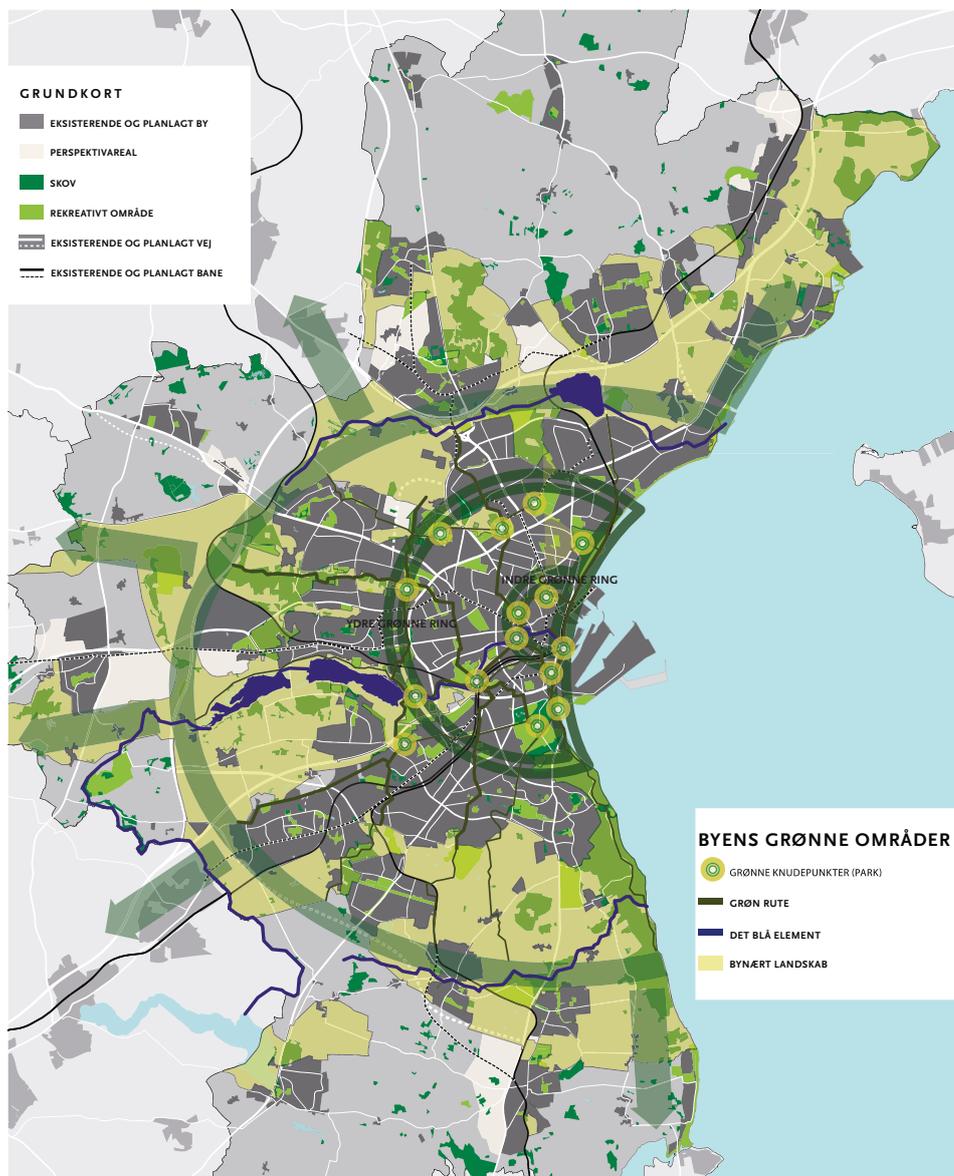
To provide differentiated bodies of knowledge on the subject matter, I moved onto studying the practical aspects of *where* to find time and space for water in the urban landscapes of Aarhus.

As a rule of thumb, green areas are easier to include in CA|HOW measures due to their often extensive usage and lower investments compared with built areas, rendering them capable of accommodating on-ground facilities. Thus green areas are often cheaper and more feasible for retrofitting adaptation.

Paying attention to ownership is critical when locating time and space for water. This is illustrated in the Lystrup Case, where ownership was the foundation for the layout of the CA|HOW-measures e.g. the publicly-owned right of way areas. Areas with private homes represent multiple owners, and thus also many potential disputes. Therefore, I searched for larger-sized property and green areas to ease some of the processual implications of CA|HOW, as well as the capacity for providing space for water. I traced the larger, green, extensive use areas inside the Outer Ring Road of Aarhus. Ostensibly, these green areas function as individual entities. However, when I overlaid these areas with the mappings of the primary flow paths, a distinct correlation occurred: the primary flow paths showed a noticeable connection to these green areas. Just as with the relationship between flow paths and the historical terrain, the flow paths were partly off-set/translated parallel to the green spaces. Still, the overall pattern was noticeable. Convergences continued to appear when the flow paths were connected with the larger greenspaces and the mapping of the River Valley hillsides (HMB map). As already shown, the flow paths are influenced by the larger landform. In addition to this, the contemporary urban landscapes appear to provide green spaces within former blue-green passages. As aforementioned, the historical blue-green passages are likely to provide soil conditions that remain optimised for leading water.

THE GREEN STRATEGY

green ring structure



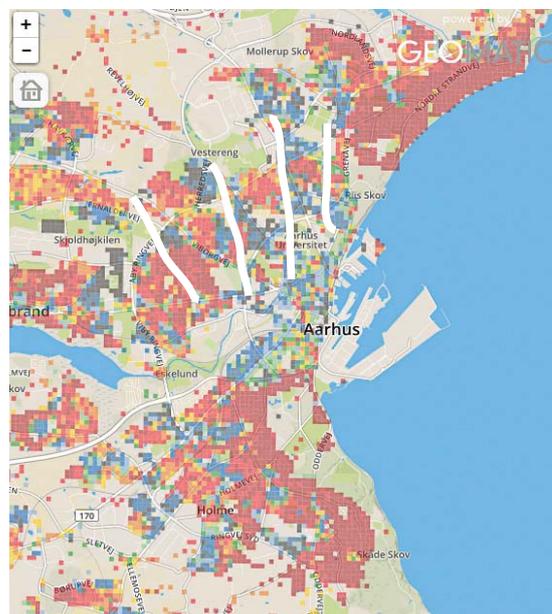
Figur 5.3.104: The overall, green strategy in the Aarhus Municipal Plan 2013, shows a ring structure of green, roughly following the Inner and Outer Ring Road, together with 'green hubs' (Grønne Knudepunkter).
Source: Aarhus Kommuneplan 2013, Hovedstruktur, p.88

SPACE AND FUNCTIONS OF SOCIETAL RELEVANCE

To further study feasibility, I looked into the ownership and functions of the green areas. For the most part, the areas have functions of societal relevance: social housing, allotment gardens, public schools, senior housing, university and educational facilities, outdoor sports fields, parks, botanical garden and cemeteries. This array of functions related to public use is located within the remnants of the blue-green passages. By mapping from the starting point of flood maps, convergences between the historical landscape properties, contemporary green areas and future waterscapes of Aarhus are revealed and further connected through functions of societal relevance. I have to stress that this was not a mapping of all semi-public or public functions in Aarhus. The entry-point was from the other direction; a mapping of larger property sizes in urban landscapes with a focus on CA|HOW.

‘Leftover’ spaces in urban development as future potentials

It is not news to that it is easier to build on dryland as opposed to on wetland. During expansion, the city of Aarhus quite likely deliberately avoided building upon the blue-green passages due to practical reasons. Another reason for avoiding the blue-green corridors could be that they played an important role in sustaining the everyday life of citizens, who were still dependent on local food provisions into the early 20th Century. Perhaps, as the original affordances provided by the blue-green passages lost their value for citizens, and were also expensive to build upon, they therefore became primarily used for less intensive programmes. Unfortunately, it is beyond the scope of this research to investigate the history of planning and the societal and strategic implications of this. Nevertheless, there seems to be a socioeconomic settlement pattern attached to the landscape properties of the blue-green passages with potential for today and tomorrow’s CA|HOW as well as value creation in the everyday landscapes of Aarhus.



Figur 5.3.106: The income map of Aarhus, shows how the landbased distribution of income seems to be related to some of the logic of rings and radials. The white lines marks the approx. locations of the courses of former blue-green passages North of the river valley. Source: Geus, GEOMATIC; diagram KW

TRANSVERSAL SECTION AABY

EXISTING PUBLIC PROGRAMMES LISTED FROM NORTH TO SOUTH

BUILDING TYPOLOGY AND OWNERSHIP

- SFO (after school childcare)
- public park
- kindergarten
- football field
- sports field
- public School
- allotment Gardens
- church/cemetery
- library
- youth club
- local associations
- nursing home
- public park
- kindergarten
- senior housing
- nursing home
- sportsfields
- public School
- sportsfields
- event space (festival)
- allotment Gardens
- recreational trail



Bispehaven, built 1970-1973 social housing association



Single family housing private ownership built 1960-70s



Single family housing private ownership, built 1970-1980s



Left: senior homes, right: single family housing, private ownership, built?



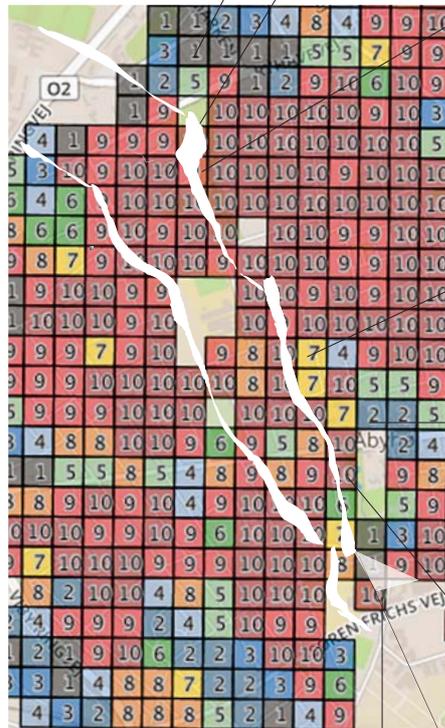
Apartment block, rental built 1940s



Villas, private ownership, built 1900-20s



senior homes, ownership ? built 1970s?



Villas, private ownership built 1900-20s

The map shows the income of the area attached to land. The lowest income is grey, then blue, green, yellow and red as the highest income. The white lines show the appr. course of the former blue-green Aaby passages. The photos show different types of residential dwellings by building typology and ownership. Dwelling and income of these stretches have been further compared to other socio-economic maps, e.g. education, age, number of children. The transversal stretches, provide a relatively large diversity in its programmes and land-based socio-economic pattern. Left is a listing of the public/ semi-public programs traced along the former passages (field trips, maps). Source: income map: GEUS; diagram KW

Figur 5.3.107:

EVERYDAY LANDSCAPES AND THE STRUCTURAL IMAGE OF THE CITY

The above findings add to the notion that the structural image of Aarhus is not solely that of centre, rings and radials. In dry city, Aarhus is also subtly structured by the transversal passages inhabited by public and semi-public functions. Cloud bursts awaken the wet city, accentuating the importance of the River Valley, and allowing the transversal passages to emerge as vital elements in the urban landscape. However, from the point of view of water, Silkeborgvej provides competing affordances. The mapping process changed my perspective on Aarhus from that of the dry day logic of rings, radials and centre, to the inherent logic of Aarhus as a landscape defined by the River Valley and transversal passages. The relations between the former blue-green passages (landform), larger green areas, and future flow paths can be seen as patterns of hidden affordances. If the programmes of the green areas are taken into account, the potentials of value creation for the common good are enhanced.

Disconnected passages as hidden affordances

As seen in Fig.5.3.109, the green areas are currently temporarily connected by flow paths in the wet city. Connecting these areas within an overall CA|HOW strategy opens up for a discussion on how we 'see' our everyday urban landscapes, including how we understand the socio-economic settlement patterns of the city.

By connecting the blue-green passages, a transversal pattern of the city emerges and infuses the logic of rings, radials and centre. The passages could physically connect diverse activities, different age groups from infant to senior citizen, and multiple public interests, while also connecting different socioeconomic living conditions, providing mobility and connectivity for the city. From a societal perspective, transversal blue-green passages could support social cohesion in urban landscapes. As a CA|HOW strategy, this could provide alternative affordances on a city level e.g. provide mobility for vulnerable road users, promote informal spaces for meeting each other across socioeconomic situations,



Figur 5.3.108: Layers from mapping before the field trips.

ON-SITE QUALIFICATIONS OF MAPPING

Searching the hidden passages

I carried out field trips to detect whether the remnants of blue-green passages existed as CA|HOW potentials in the real world. This became a search for the hidden blue-green passages of Aarhus through on-site visual analyses that could qualify the mappings. The aim was to further assess whether it might be possible to re-connect the former passages in the urban landscapes of the present with consideration for local functions and the spatial qualities of urban landscapes. For example, if the larger landform was still readable (perceivable slope) despite local alterations, if there were still traces of water like ponds, specific vegetation or damp constructions, and so forth.

It would be beyond the scope and timeframe of this research to record all of the former blue-green passages of Aarhus. I therefore decided upon a screening approach. At a smaller scale, I selected Area 1, and at a larger scale Area 2, both of which lie on the northern slope of the River Valley as shown in Fig.5.3.113. Together, the two areas are a contiguous part of Aarhus' urban fabric and share Silkeborgvej as a flow path canal. The lower-lying parts of both areas are designated for urban development, that is to say, new buildings and neighbourhoods.

Screening urban landscapes

In Area 1, I chose the lower parts of passages close to the inner city and the lowlands, going up to Silkeborgvej. The area was used for industrial purposes during the 18th and 19th centuries, supplemented by intensive urban development over recent years. Construction activities still define the area. In Area 2, I investigated a transection of the sub catchment, going from the lower area of Aaby (Stream Town) and Fragtmandscentralen, and uphill to Hasle and the northern delineation of the sub catchment. Area 2 partially retained its function as a food-provision area in proximity to Aarhus until urban development took pace after WWII. Following the war, the city centre and former villages became integrated into a contiguous urban fabric, all the way out to what is now the Outer Ring Road (sources, historical maps HMB, LMB, Kort 1953-1976). Currently, construction activities define the former industrial areas in the lower part of the sub catchment.



Figur 5.3.109: Location of Area 1 and Area 2, the local plan area of Fragtmandscentralen is shown with grey fill.

AREA 1



4



5



6



1



7



2



3

Figur 5.3.110: Investigating the contemporary urban landscapes for visible traces of water and openings in the built fabric in the former blue-green passages in the Area 1, at the lower hillsides close to the Inner Ring Road. Source: aerial: GST; modified KW

Area 1 - built landscape characteristics



Figur 5.3.111: Some of the passages were blocked by constructed landscapes. The spatial qualities seen from 'waters point of view' are accentuated on the photos by digrammatic, black lines

Newer urban development close to the stream and the city centre show a technical appearance in its formal landscape design, fit to rapidly pass on, block, detain or diffract water on its descent to the stream. Where the low lying River Valley meets the moraine hillsides, urban development shows humid retention walls, created to maximize local usage by cutting of the slope and levelling the ground within the property, in particular for parking and service areas. The amount of surface cover is high, materials are mainly impermeable.



Area 1 - landscape properties

The Slope/hillside



The Wetland



The Stream



Figur 5.3.112: Left: photos named by their landscape properties (under the surface). Middle top: historical HMB map. Middle low: aerial photo. Right: flow paths map. The photo viewpoints are marked with a red arrow on the historical HMB map, aerial photo 2014 and flow paths map
Sources: HMB, aerial: GST; flow paths map: AKO

AREA 2

The Aaby passage and connectivity

The larger stretch of Area 2 provided a different set of knowledge. As expected, I found parks, small lakes, and public institutions. I also found more water than represented on contemporary maps and aerial photos: wet and dry basins, ponds, streams and a dried-out spring. However, as seen in Fig.5.3.118-119, the area also displayed an array of physical barriers perpendicular to water's flow; sectioning the area into notions of dry day neighbourhoods. The field trips revealed that there are even more public and semi-public programmes and functions- covering all age groups, from nursery to cemetery- than are to be found on maps. Fig.5.3.111, 5.3.117 show how this stretch hosts nurseries, youth clubs, nursing homes, a library, and local sports associations. The area revealed that it would still be feasible to reconnect the former blue-green passages, and thereby to prosper from the inherent landscape properties as part of a larger CA|HOW scheme. In the following section, I look into potentials for plural value creation in the Aaby passage, paying particular attention to the 6 regimes of Justification.

Cross-sectioning socioeconomic statistics

Aarhus Municipality provides socioeconomic statistics (Aarhus Kommune, 2016) relating to specific geographical areas, demonstrating that the northern part of the passage represents lower incomes and lower levels of education; the middle of the passage represents middle class incomes and higher education; and the southern, mixed-use area is seemingly diverse relating to these measures. The statistics on ownership/types of housing, age, children, and employment show that the Aaby passage transverses a patchwork of different living conditions in Aarhus. This offers the potential for CA|HOW to promote social cohesion and the common good in a broader sense. Fig.5.3.111 shows an outline of the Aaby Passage superimposed on an income statistics map. The Passage could become a transversal section of diversity, connectivity and accessibility for water's flow and human interests, connecting the city across interests, socioeconomic situations and age groups. It could physically connect the everyday landscapes of social housing, middle class villas and institutions. From the starting point of the Catchment Neighbourhood, as proposed in Case Skejby, this emphasises how a neighbourhood can be functionally diverse while still sharing the same considerations for water and Civic justifications.



AREA 2



1



2



3



4



5



6



7



8



9



10



11



12



13

- social housing
- kindergarten
- youth club
- public park
- kindergarten
- Nursery
- local society
- soccer field
- allotments gardens
- sports field
- public school
- cemetery
- soccer field
- public library
- local societies
- youth club
- senior housing
- public park
- kindergarten
- nursery
- retirement home
- senior housing
- tennis club
- retirement home
- public school
- sports field

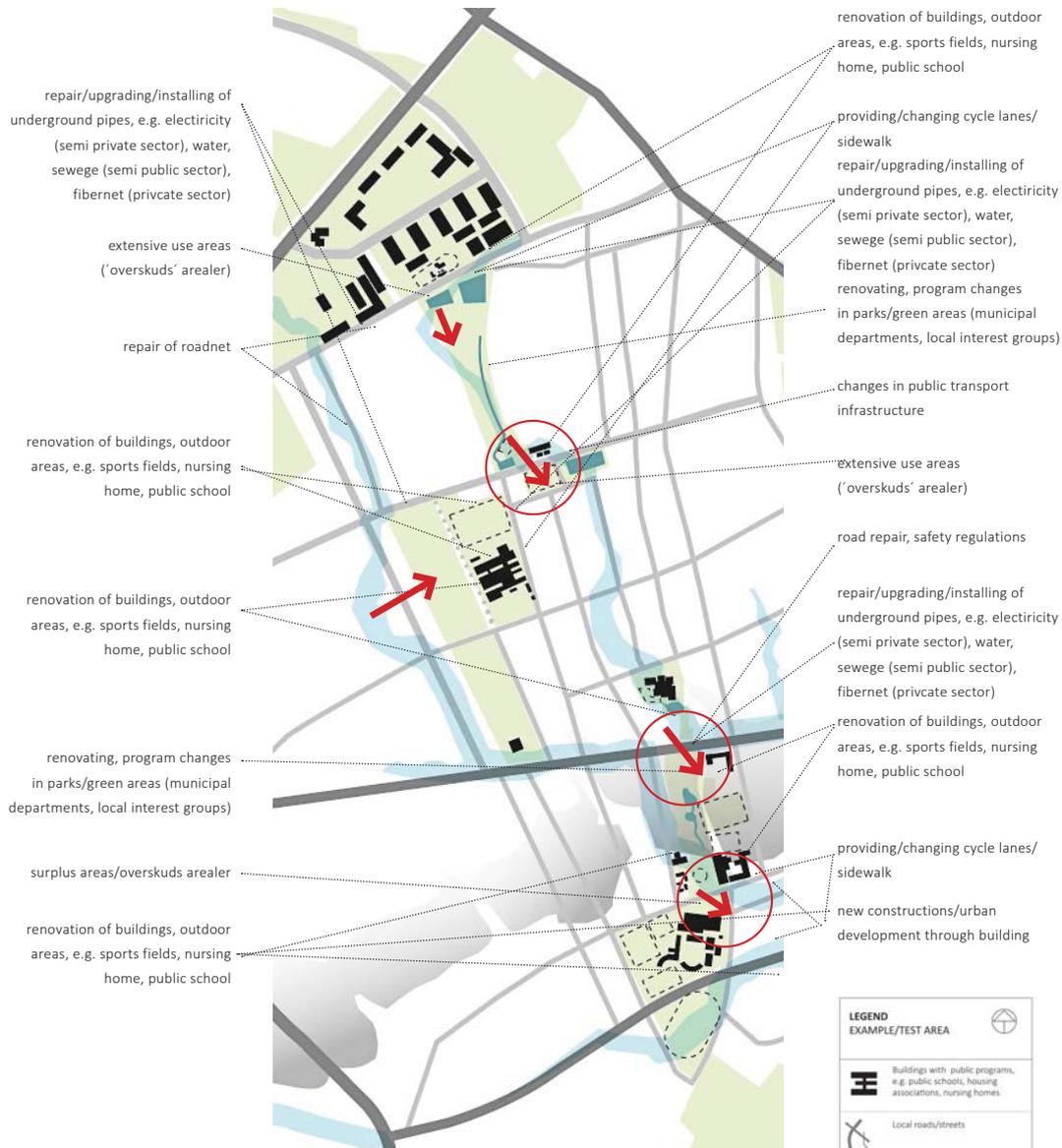


Silkeborgvej

Aarhus Stream

Figur 5.3.113: Aerial photo. White areas mark open spaces, green areas mark former blue-green passages. The listing shows the public-, and semi-public programs of the area from North to South. Source: Aerial: GST; diagramming KW

POTENTIALS IN THE HIDDEN TRANSVERSAL PASSAGES OF AABY
CAHOW and value creation through existing workflows



LEGEND	
EXAMPLE/TEST AREA	
	Buildings with public programs, e.g. public schools, housing associations, nursing homes
	Local roads/streets
	Green areas with room for water and potentials for "mermaid", multiple benefits
	Green-synergy, green areas with potentials for achieving further values as synergy effects
	Outdoor, green areas for sport
	Approx. marking of the late 19th Cent. slopes and hillsides leading to the river valley and Aarhus Bay **
	Primary flow paths *
	Contemporary visible, surface water of the area, e.g. streams, springs, retention basins, lakes
	"Director": directing of flow paths towards the former blue-green passages (flow path to deep structure)
	"Cardinals": crucial potential and attention areas, in order to re-connect flow paths to deep structures, towards the river valley
	"Climate streets": streets with potential side-areas/gardens to retain/delay water and/or potential designation of blue-streets
* Source, Flow paths projections AKD (cloud burnt event year 2050)	
** source historical HMB maps 1842-1899	

Figur 5.3.114: Potential areas for connecting the blue-green passage for CAHOW by tapping into existing functions, practices and workflows. The map shows key locations for re-directing water, pointing to existing workflows and interests that could uptake the CAHOW strategy for local value creation in the urban landscapes.

POTENTIALS IN THE HIDDEN TRANSVERSAL PASSAGES OF AABY Spatial characteristics and sense of place



Right side photos with grey line to map: key locations/ areas for potentially re-connecting the passage. Other photos: spatial characteristics, aesthetics and everyday life in the area. Map: overall potential values to be achieved, marked through 'buzzwords' attached to the area.

Figur 5.3.115:

AFFORDANCES – THE AESTHETICS OF THE DRY AND THE WET CITY



The distinct hillsides of the River Valley provide beautiful views from the top of the sub catchment, as well as from the low-lying parts of the River Valley, visually connecting the landscape relations between the north and south parts of the city. These relations are given form through a continual sequence of heights, hills, hollows, ponds, puddles, lakes, canals, streams, all forming part of existing everyday landscapes. The view makes visible some of the affordances made available by connecting the spaces down to the River Valley; following the logic of landscape and water as the foundational properties of Aarhus.

From an aesthetic point of view, connecting the city transversally could enhance spatial and sensory characteristics attached to the logics of place and water. Besides the functional aspect of human activity, it affords flora and fauna in a contextualised manner. Emphasising the water-based relations of the former passages provides an opportunity to create outdoor spaces with plural sensory affordances such as scents, sounds, colours, shades, tastes and awareness of seasonal changes. For example, the inclusion of vegetation that prospers in moist conditions, thus also with distinct colour tones and shades from dry living conditions, or magnifying the changing of scents when humidity changes, through various plants such as fungi or fallen leaves. From this perspective, the passages could provide aesthetic qualities, nuanced traits, and spatial characteristics: a potential example of water management offering changing sensory experiences due to shifting levels of humidity, as well as functionality.

Larger scale aesthetics and biodiversity

At a larger scale, the Aaby passage has the potential to establish a distinctive 'water's passage' with a relatively wide ecotone. This could promote biological diversity and afford passage to other living creatures from the wetlands, forests and nature-restoration projects of the River Valley. If, at some point in five years or 50 years, it was to be connected to the other side of the Outer Ring Road, it would link the sub catchment to the larger, green areas of Hasle Bakker, Skjoldhøj Kilen, True Forest and the rural zones outside Aarhus.

Figur 5.3.116: Changing vegetation along the passage, from North (top) and down South to the river valley.

TRANSVERSAL PASSAGES AND PLURAL JUSTIFICATIONS

In summary, the transversal passages could qualify the urban landscapes of both the dry and the wet city, addressing different regimes of justification. The practical CA|HOW solutions pay heed to Civic justifications, being inclusive of visions for social cohesion through providing outdoor spaces for informal meetings and learning experiences between citizens of diverse age- and income groups. It would also mean to improve mobility for the Beredskab on the primary roads as well as establish mobility for vulnerable road users within the passages, to create values of enhanced biodiversity and aesthetics, all of which would reference Civic and Inspired justifications. On the very local scale, the passages as attractive, green spaces could provide amenity value and real-estate value for local residents, from domestic and market perspectives. The passages therefore could be seen as a means with plural ends, from the measurable economic value of avoiding flood damages to the more complex, but still measurable, values of using nature-based solutions to improve health and diminish consequences of urban heat islands, as well as an openness for intrinsic values.

When dry city, this could be a passage of diversity; improving the flow of humans, and affording outdoor, informal social activities. As wet city, the movement of water could tell the story of how the landscape has evolved hand-in-hand with water as well as how human settlement now forms part of this dynamic.



Figur 5.3.117: Standing on top of the hill. Left: Looking North across the wet basins towards the social housing blocks. Right: Looking towards the south part of the city, across the River Valley

5.3.5 A PRE-STRATEGIC CA|HOW APPROACH



COLLECTIVE CA|HOW AND PLURAL AFFORDANCES

Re-connecting the blue-green passages would necessarily take a collective effort, inclusive of various existing practices, interests, economic priorities and so forth. Doing this would necessarily require an overall vision, as each division on the stretch, e.g. a school or a local road, would be dependent on what happened further upstream as well as influencing downstream. It is one thing to detect the potentials and communicate these affordances at a larger scale; it is quite another thing to provide meaningful incentives for diverse actors. I therefore paid particular attention to attaching the material to specific locations.

The following mappings were the resulting pre-strategy. The maps show five different strategic key elements as intermediate LArch material, as described by Prominski, Fig.5.3.123-127. As described, the aim was to inform CA|HOW while tapping into other strategies and pro-actively attending to qualities of everyday landscapes. The pre-strategy addressed affordances by configuring and inciting collective and individual actions. The purpose was to 'invite' differentiated agendas by addressing how smaller local measures could tap into the pre-strategy, thereby providing 'here & now' value creation, e.g. safe road passage, the upgrading of playgrounds etc, while also diminishing flood risk and damages and, furthermore, promoting long-term benefits, e.g. biodiversity, social cohesion.

The recognition of Transversal Passages became the overall leading strategic element, supported by four pre-strategies relating to flow paths and urban landscapes, as listed and shown on the following pages.

Figur 5.3.118: From North (top) and down South to the river valley, getting close to the inner city.

Transversal Passages: Please see previous text and mappings.

Cardinal Points: This map marks locations where primary infrastructure blocks the passage of water towards the River Valley. These spots were upstream, ex-situ measures, useful in solving hotspots where water impedes human mobility, including for the Emergency Responders. The Cardinal Points designate crucial areas where the relation between water and infrastructure should be differently connected; where the transversal passages could be useful for CA|HOW.

Directors: This map suggests where to strategically 'push' or 'direct' the offset flow paths back to their former blue-green passage. Directors are in some way the predecessors of Intentional Flow paths of the Anthropocene: a way of defining the potential to strategically make use of the combination of natural forces and human constructions. I discuss Intentional Flow paths of the Anthropocene further in the next section of this thesis.

Synergy: This indicates how blue-green areas can be retained through local measures constructed and designed individually over time, but still in alignment with the passage overall. Essentially, 'Synergy' suggests a principle for how various stakeholders could play a part in delaying and providing time and space for water. This could be e.g. when Aaby School has to renovate their outdoor areas, or when residents need to prevent local flooding.

Blue-Infra: This mapping represents designated roads with either a specific lane for water, e.g. the bicycle lane, or roads that are accepted as being fully 'blue' in wet city. 'Blue-infra' also points towards local potentials along Silkeborgvej, where businesses could use superfluous spaces in front of their buildings to retain water gradually.

PRE-STRATEGIC POTENTIALS

Logics of water - inherent landscape properties: Blue-green passages



In the remnant of the passages, some places, still present water-related aesthetics in their vegetation patterns.

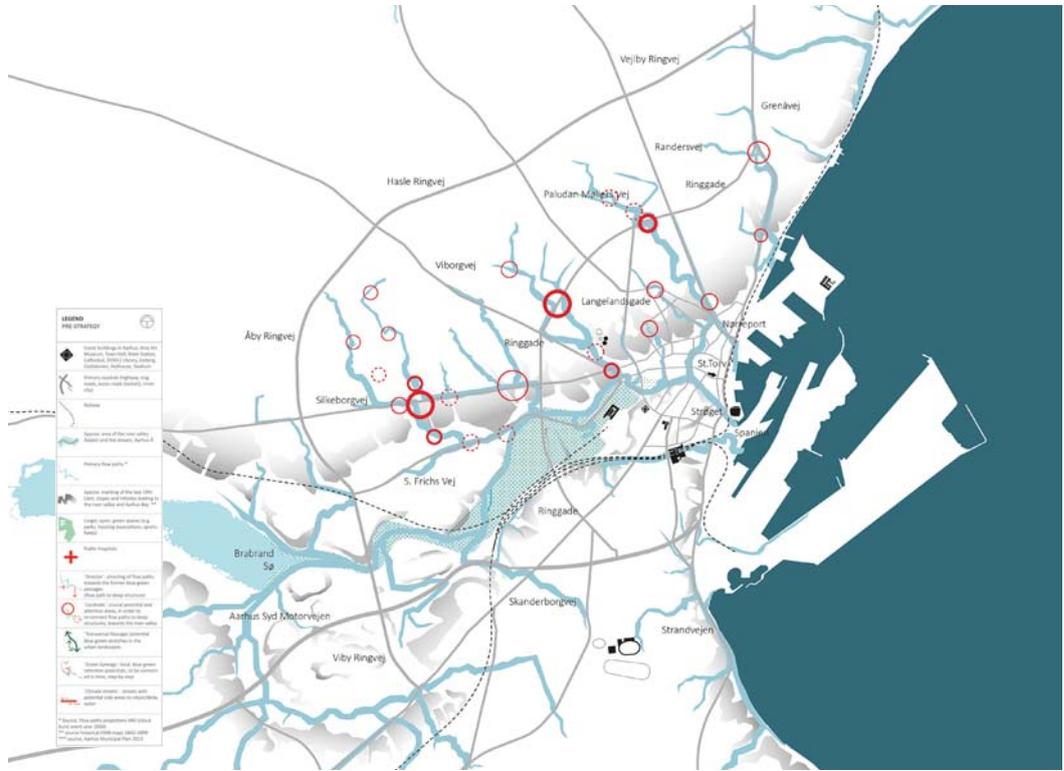


Left-over space with potential for CA|HOW and potentials for value creation in case of renovating the outdoor areas of the public school.

Figur 5.3.119: The overall concept of the pre-strategic approach was based on the finding of the former blue-green passages as a CA|HOW potential at the scale of the city Aarhus. The map shows the Northern passages

PRE-STRATEGIC POTENTIALS

Logics of water - inherent landscape properties: Cardinal points

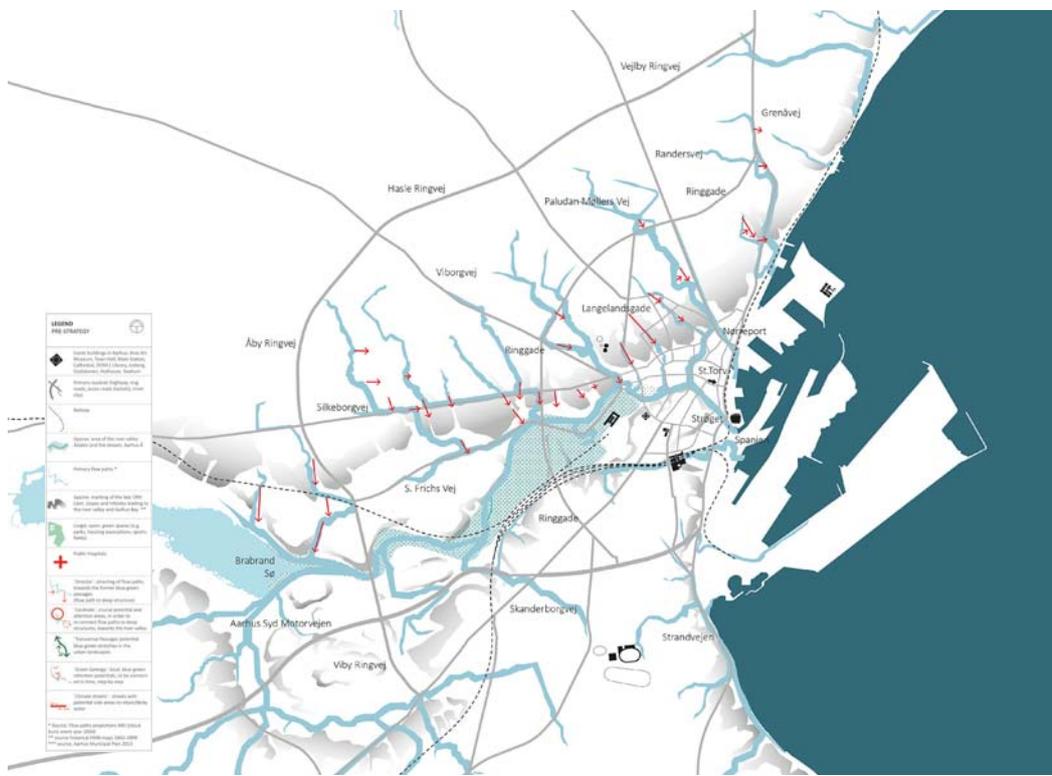


Instead of functioning as a river bed, Silkeborgvej has a potential of allowing waterto passage to the adjacent park and down to the river valley.

Figure 5.3.120: To unfold the potentials, an overall strategy for connectivity was needed. The Cardinal points show barriers, mostly infrastructure, that would need to be altered to allow waters passage. The map shows crucial locations of these barriers as an entry point to integrate CA|HOW strategies into existing work flows, e.g. repair works of the road or when sewer pipes need to be renovated

PRE-STRATEGIC POTENTIALS

Logics of water - inherent landscape properties: Directors -intentional flow paths



Formerly part of a blue-green passage, now howing as a missing block, with a staircase allowing access form the Silkeborg towards the river valley.

Figur 5.3.121: Directors: directing flow paths with intentionality for creating better urban landscapes through CA|HOW. The map points to locations that could benefit from 'directing' the flow paths closer to the former blue-green passage, as it already provides slope and soil conditions optimized for leading water.

PRE-STRATEGIC POTENTIALS

Logics of water - inherent landscape properties: Blue-infrastructure - climate roads



North-south going road, based on its appearance, it seems built upon soft/wet soils. Together with its adjacent, small-scale green areas, such a road could be a potential for a blue-infrastructure of the wet city, supported by local CA|HOW measures on its sides.

Figur 5.3.123: Blue-infrastructure, based on roads, together with small areas ('right of way') and 'left-over' spaces along the road. This is an alternative, add-on strategy. In this, the Beredskab should be carefully consulted. The small-scale areas could provide an array of small-scale retention and/infiltration as raingardens, e.g. in front of local businesses

5.3.6 INTENTIONAL CATCHMENTS AND FLOW PATHS IN THE ANTHROPOCENE

THE DRY AND THE WET CITY IN THE ANTHROPOCENE

During a cloud burst, the structural image of Aarhus changes, questioning how we 'see' our urban landscapes: the wet city does not correspond to human expectations of the dry city. In Lystrup, Skejby, and Aaby, the flood *risk* is to a considerable extent caused by contemporary settlement patterns and buildings practices that are decontextualised from waters' flow and landscape properties. The Anthropocene is precisely about the intertwined relation between human and natural forces, and it seems necessary to acknowledge this interconnectedness in the human practices of reconfiguring urban landscapes. At a conceptual level, the Anthropocene could be useful as a lens for developing approaches that can accommodate both the dry and wet city.

Dry city development in Aarhus

Water deficient settlement patterns are not only an outcome of the recent past. For example, Area 1 is designated for urban development. However, its development is founded on opinion and market justifications of growth, constituted in contemporary logics of planning practices. The new buildings of Area 1 support in-property HOW without regard to its sub catchment or local urban landscape.

As seen in Fig.5.3.115-116, 5.3.131, the buildings are situated and oriented in a manner that disregards landscape properties and the flow of surface water towards the River V alley. From the perspective of water, the area is an autonomous entity, sealing off the larger urban landscape properties. From Silkeborgvej and down to the river valley, new buildings cluster on the lower hillsides on top of former blue-green corridors. Some of the buildings are even located on top of an old water works, but they do not leave room for water nor provide affordances for alternative value creation in urban landscapes over time. At a conceptual level, the area does not acknowledge the Anthropocenic integration of humans and nature. From a practical point of view, it disregards larger-scale considerations of the broader good of the city. To address the autonomy of the dry city, I further studied the concept of Catchment Neighbourhood.

Figur 5.3.126: Underground basins along the stream, on-ground residential buildings on top of the stream. The water trajectory of command and control is still expected to function as confined room for the water.

Photo: Nikolaj Knudsen



New urban development of the dry city



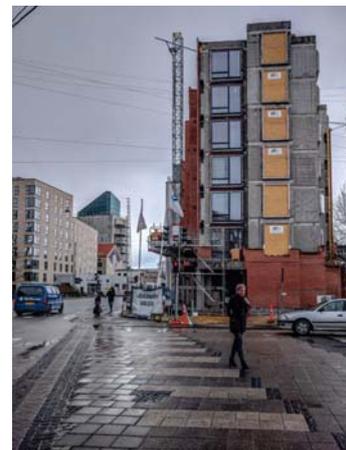
Åhaven, on top of the stream



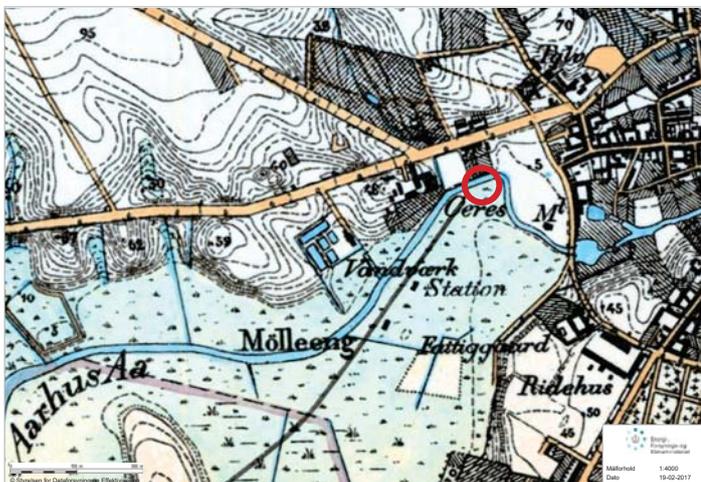
Disintegration of the blue and green; green on top, blue below the surface



Sealing of the surfaces and constructing underground basement close to the stream



Åhaven (Stream Garden)- new urban development. As areal-estate selling point, the advertisement says: "Åhaven- new homes by the city's green passage". Prepositions matter, and someone corrected the statement: "Åhaven- new homes on the city's green passage".



Åhaven, the building location is marked with a red circle.

Figur 5.3.127: Source: HMB map GST, diagram KW
Photo Åhaven: Nikolaj Knudsen
Photo real-estate advertisement: Morten Daugaard

SUB CATCHMENT NEIGHBOURHOODS

Catchment neighbourhoods and the blue-green spine

In Case Aaby, I further explored the concept of Catchment Neighbourhood by looking into how a sub catchment could inform a Local Climate Plan. However, the Local Plan boundaries in the sub catchment were seemingly de-contextualised from its sub catchment. Approaching this the other way around, I studied the landscape properties and affordances of the urban landscapes, rendering visible the hidden blue-green passages of Area 2.

In the Aaby Passage, I analysed the land-use and landscape properties of the sub catchment, paying particular attention to potentials for value creation. I further qualified the landscape affordances by studying and referencing current human activities, functions and socioeconomic parameters in proximity to the transversal passage.

From this point of departure, the sub-catchment and its associated flow paths became a stepping stone to define 'desired' flow paths qualified by affordance analyses. As a propositional approach, I defined the transversal passage as the blue-green spine, crosssectioning the sub catchment from the upper to the lower areas. This became an entry point for forming a Catchment Neighbourhood by qualifying its urban landscapes. In the following, I discuss the pushing of flow paths- the 'directors' of the pre-strategic material- relating this to the sub catchment as a neighbourhood.

Directors or pushing flow paths vs. intentionality

Reflecting on the assignment, I realised that, methodologically, the Aaby Passage was not only defined by water's flow and landscape properties. As part of the pre-strategy I had proposed 'directors', building upon knowledge from Case Skejby, where I had proposed Ex-situ potentials in order to connect the smaller and larger scale. However, in retrospect, I see the 'directors' differently: pushing flow paths has been integrated and refined in the command & control trajectory. In contemporary building projects, this is part of terrain modifications that have the aim of leading surface water to the in-property sewers. It is also what professionals in water management do. As seen in Case Lystrup, water professionals are well experienced in 'pushing' flow paths. What was not part of the pushing-flow-paths-practice in Lystrup was a contextual consideration of the urban landscapes, beyond that of avoiding flooding damages.



Figur 5.3.128: The subcatchment delineations (black line) and indication of flow paths' anomaly (white lines)

Visible landscapes of the Anthropocene Degrees of anthropogenic surface cover



Figur 5.3.129: Anomalies and degrees of anthropogenic surface covers showed on the flow path map.
Source: map AKO, diagram KW.

Intentional Flow paths for creating plural values

From this perspective, it is important to clarify that the Directors are not about 'pushing' or directing. Rather, they aim to qualify a *better* flow path course based on plural parameters. Firstly, by recognising that flood risk is caused by the spatial qualities of the urban landscapes as a configuration of 'natural' landscape properties and human constructions, forming affordances for water's flow. Secondly, by qualifying where space for water could be found (larger extensive use areas), as a practical delimitation. This parameter was addressed by pragmatically considering how to retrofit resources that are already in use by humans (new, large buildings are hardly going to be demolished). This was followed by a thorough qualification of functions and activities of societal relevance (programmes such as schools and nursing homes, as well as factors such as cohesion and socioeconomic considerations) combined with identifying hidden and future affordances e.g. connectivity, biodiversity and aesthetics.

Intentionality, Affordances and Specificity

I have established three key elements, distinct from pushing or directing flow paths, related to the working practices of LArch. Firstly, *Intentionality*, which is used here to describe a clear motivation and objective to create better landscapes. Secondly, an attention to *affordances*, evidenced by an analysis of landscape potentials including both physical properties and 'soft' values such as aesthetics or social cohesion. Thirdly, *Specificity*, which is achieved by addressing *real locations* as opposed to a more generic approach. In the final presentation, the pre-strategy resonated across departments and sectors. I propose that this reaction might have been triggered by the above-mentioned parameters, the combination of which implicitly formed the result. As a LArch approach, 'pushing' is a means to provide plural values: Intentional Flow paths are essential to an approach that aims to qualify what the effort is *good for*. As described in the Aaby Passage, there is an array of plural values that can be achieved in the urban landscapes of CA|HOW. Rietveld suggests how the skilled practice of seeing affordances can be developed, and, based on the experiences in Case Aaby, I find that LArch can facilitate this in transdisciplinary contexts. Based on the case's knowledge outcomes, I suggest that Intentional flow paths could form the skeleton of Catchment Neighbourhoods (CN): a neighbourhood physically connected by intentional flow paths, creating plural values in the shared urban landscapes. Defining Intentional flow paths within a CN is an entry point into relieving the inconsistency, or sensitivity, of the flow paths, and this approach has the capacity to inform Local Climate Plans and urban development with regards to both the up- and the downstream.

Intentional catchment delineation in Skejby

If flow paths are responsive to human terrain modifications, then sub catchment delineations might be similarly sensitive, thus challenging planning in Catchment Neighbourhoods. To form catchment neighbourhoods we might therefore need to also analyse delineations with *intentionality*, with a focus on creating robust sub catchments with plural affordances.

Sub catchments are essentially a nested concept. As described in Case Skejby, they require detailed information on the surface properties of urban landscapes. After studying the Aaby sub catchment (from now on: catchment) I briefly revisited the Skejby sub catchment, this time paying specific attention to the interplay between 'natural' and anthropogenic landscape properties. Studying the historical map (HMB) with the catchment delineation, I found that there seemed to be an anomaly in its outline.

The following is sketchy, but I will use by way of an example. Map 19.43h shows the measured sub catchment of Skejby, which, of course, is nested within a larger catchment leading to the recipient Egå Engsø. When looking closer into the area delineation of the Skejby sub catchment and comparing it to the historical HMB map, it appears to have an anomaly in the south-western corner Y. On the HMB map, area Y seems to have been part of another catchment, leading the water to a different recipient: the Brabrand Lake in the river valley.

The current delineation, however, shows something different; now the area is leading surface water towards the Egå Engsø catchment. There can be several reasons for this, i.e. the water is led underground, the terrain modelling is based on inaccurate information, or surface alterations have changed the water's direction. Even small-scale alterations of the terrain could be the cause of the new the sub-catchment delineation. If this area had been part of the critical hotspots, it might have been analysed further.

To determine whether the recipient-exchange is important or not would require on-site knowledge: if this area is to implement CA|HOW measures, then it might prove useful to analyse whether or not it could be helpful to re-connect it to its former catchment. For example, the landscape properties could possibly provide improved CA|HOW by making use of the imprints from former waterscapes towards the Brabrand Lake. It could also be potentially useful to retain the area in its newer, current sub catchment, i.e. with Engå Engsø as the recipient. If so, then it might be relevant for future alterations in urban landscapes, to acknowledge that even small changes might force the area back to its original catchment.

5.3.7 SUM UP – PROPOSITIONAL REFLECTIONS

REFLECTIONS ON PROCESS, RESULT AND FURTHER KNOWLEDGE OUTCOMES

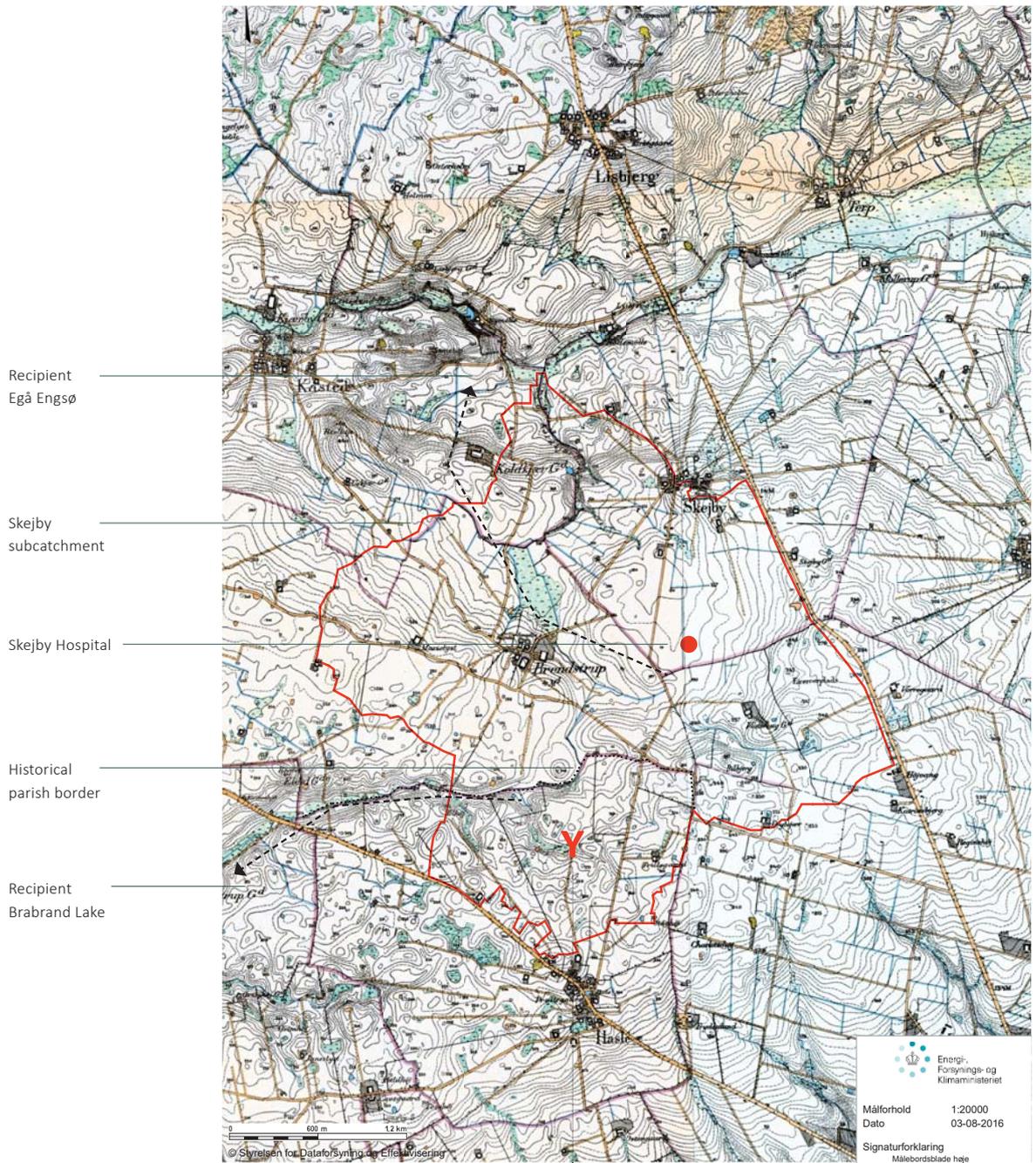
Contemporary urban development and the common good

When only 30 minutes of rain can release 15 mm of water, the structural image of the city is prone to alter dramatically and quickly. The wet city is different from that of the dry city. When precipitation increases, 'natural' landscape properties re-enter urban landscapes as co-actors, side-by-side with human on-ground alterations.

Comparing flood maps and historical maps showed how the landscape properties of Aarhus are of marked potential: future waterscapes are still closely interrelated to the past waterscapes as well as currently almost-hidden landscape properties. On a dry day, the constructed, urban landscapes appear in control – on a wet day, the contours of latent urban landscapes begin to emerge along with larger scale properties

In Aarhus, I found hidden affordances of CA|HOW with considerable potentials for creating plural values in urban landscapes. In Area 2, it appeared feasible to re-connect the blue-green passage, whereas new urban developments blocked water's passage in Area 1. Apparently, the command and control paradigm is still ruling; out of touch with water-scape-reality. Furthermore, this impedes possibilities to diminish flood risk for the common good while also promoting other values that would benefit the city in long-term perspectives. The landscape properties that support the former blue-green passages are not yet clearly visible or treated as a structural element in the everyday landscapes of Aarhus.

INCONSISTENT SUBCATCHMENT ?



Y

Speculative entry as a retrospect, brief analysis of the Skejby subcatchment: is this area within an Inconsistent subcatchment delineation? Is it a future potential (or risk) in CA|HOW?

Figur 5.3.130: Source HMB map GST. Diagram KW

Key themes and knowledge outcomes

During Case Aaby, the below themes particularly informed the research. Although drawing on the result of the assignment, the below discussions were not articulated in the resulting booklets. Instead, I explored these following the conclusion of the assignment, with reference to the knowledge outcomes that emerged in Cases Lystrup and Skejby. To an extent, I expect these outcomes to be transferable to CA|HOW in other Danish urban landscapes.

1. Conceptual learnings

Dry and wet city in the Anthropocene - 'seeing' urban landscapes.

Discussions on the structural image of Aarhus as a dry-city and how changing waterscapes put pressure on the need to reconceptualise urban landscapes inclusive of wet city. In all three cases, the intertwining of natural forces and the built environment was un-acknowledged and thus, complicit in co-producing flood risk. The learnings from the assignment led to further investigation of how the Anthropocene could be a useful concept with which to 'see' our urban landscapes with more nuance, and as a means of paying attention to what is already there. The Anthropocene seems useful as an interpretational LArch modus for understanding urban landscapes with respect to water as an actor and the influences of human constructions.

2. Methodological learnings

LArch methods make affordances perceivable

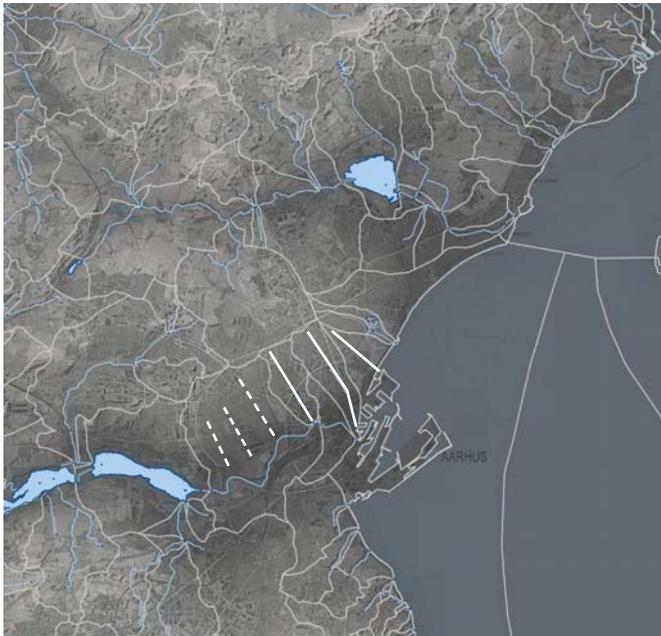
The speculative and open-ended elements of the mapping process proved useful in a practical context as a transdisciplinary communicative modus. Making affordances attached to specific locations perceivable prompted positive responses. The LArch approach seemed suitable for interlacing time-scale issues; connecting past-present-future knowledge by visualising affordances in reference to the real-world.

3. Propositional CA|HOW learnings

Catchment neighbourhood & Intentional flow paths

Catchment neighbourhoods could help to give direction to larger scale CA|HOW strategies; informing local plans and urban developments on up- and downstream implications. Part of the strength of Intentional flow paths is that they are based on measurable facts, e.g. hydro calculations, soil conditions, terrain and field observations *in connection* with affordance analysis; together these approaches provide contextualised knowledge on potential value creation in specific locations.

PAST-PRESENT-FUTURE WATERSCAPES



The catchment map (light, grey lines) shows that some of the transversal, blue-green structures still exist in urban landscapes, whereas in other places, it would require intentional catchments to unfold the landscape affordances once again. White lines exemplifies transversal waterscapes and white dotted lines diagrammatically marks the hidden passages of Aaby



Historical surface waterscapes



Early mapping of the Aaby sub-catchment and passages . Currently these are now partly erased, though still feasible to re-connect.



Former passages- traces of water



Figur 5.3.131:



PART 6

OUTCOMES

PART 6 OUTCOMES

CHAPTER 6.1

KNOWLEDGE PRODUCTION

Part 6 Outcomes consists of 3 chapters targeting knowledge production and methods, reflection, contributions and conclusion. Chapter 6.2 provides a broader contextualisation and a reflection on key themes and their relation to existing discourses.

Chapter 6.4 provides a conclusion and suggestions for further research.

6.1.1 Introduction

6.1.2 Knowledge production- methods and theory

6.1.3 Cumulative Learnings from the case studies

6.1.4 Schematic of Propositional Reflections

6.1.5 Transparency, documentation and transferability

6.1.1 INTRODUCTION

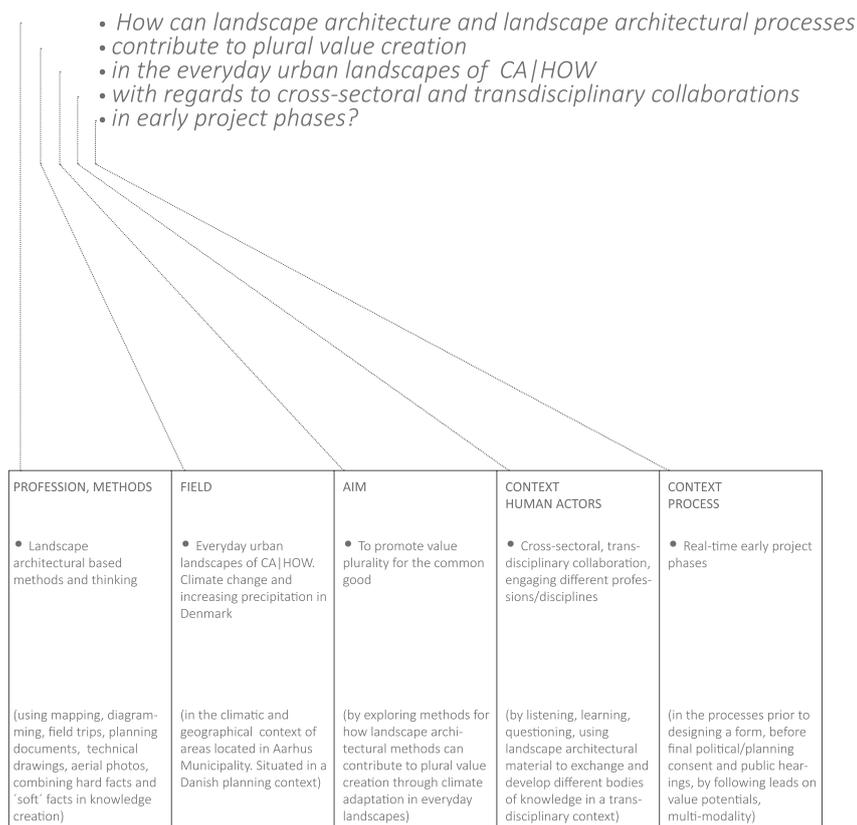
Chapter 6.1 provides an overview of the departure of the research project, its objective, knowledge production and transparency. The chapter attends to how the knowledge production has been formed qua the research design, the chosen methods and theories. This is followed by summing the propositional reflections, concluding with addressing transparency, documentation and transferability.

6.1.2 KNOWLEDGE PRODUCTION – METHODS AND THEORY

THE RESEARCH QUESTION AND OBJECTIVE

- How can landscape architecture and landscape architectural processes contribute to plural value creation in the everyday urban landscapes of low-cost CA|HOW, with regards to cross-sectoral and transdisciplinary collaborations in early project phases?

To investigate the research question and objective, I employed an interventionistic LArch approach. The case studies were employed as vehicles for investigating value creation in the everyday landscapes of CA|HOW. During the research, the research methods developed through the real-time cases by following concurrent leads from human and non-human case actors. This thesis has been structured via concurrent propositional reflections in each of the case chapters. The following focuses on how the case study findings and discussions have informed each other, thereby creating knowledge on the research question and objective. The knowledge outcomes are primarily communicated through the propositional reflections in Part 4 Value, and Part 5 Cases. The following provides a sum up of the propositional reflections and relates these to a broader contextualisation provided in Chapter 6.2. The chapter is ordered by the conceptual and geographical scale implications of the themes. Firstly, I present the larger conceptual discussions regarding value, followed by the various geographical scales of Aarhus and urban landscapes.



Figur 6.1.3: Breaking the research question into its sub-elements. This overview from Chapter 2.1 visualises the context as field, human actors and processes in relation to the research question.

VALUE PLURALISM AND VALUE THEORY

Why employ theory from other fields

The following is a reflection on how the theoretical components have influenced and informed the research. To employ theory from other fields was an effort to understand how come values that seemed obvious from the perspective of landscape architecture did not necessarily seem as obvious to others. The theoretical components of value theory, qualifying value judgments, justification and affordances have been employed in different phases of this thesis, influencing the research at different levels. The theoretical lenses of value were sourced from fields other than landscape architecture with the purpose of exploring perspectives and understandings of values and valuation related to actors outside the profession of landscape architecture. Due to the interactive research approach, the theoretical components were employed during the case studies when the need arose for further reflection. The theoretical elements were sought to be 'translated' into the context of urban landscapes and transdisciplinary collaboration. These components are presented in the chronological order of when the theory entered the research, to provide processual transparency as to where and how the theoretical components influenced the research, as well as how the theories informed each other as interpretational lenses.

The 'Merværði' of the elephant in a transdisciplinary context

The framework of 6 Regimes of Justification was employed due to a need to re-frame the research theme of 'added-value' (Merværði) and thus, my understanding of the concept. As described in Case Lystrup, adding 'more values' to a value dispute on circus elephants and the location of a retention basin became an inadequate approach to exploring the research objective. The 6 Regimes of Justification provided an interpretational lens for looking at justificatory patterns before approaching specific values as such. The 6 Regimes of Justification provided an alternative medium for situated value judgment- and the contextually dependent 6RJ 'categories' enabled practical and interpretational feasibility. Furthermore, employing the 6RJ also held an impact on presumptions on Merværði/value creation embedded in the research question.



Figur 6.1.4: Illustration from Chapter 5.1 (Case 1).

Pushing the 6 Regimes of Justification into a context of making

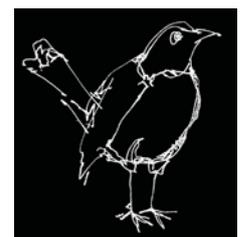
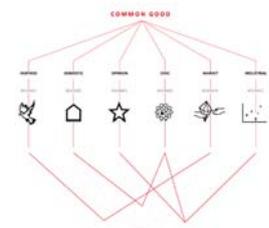
To bring the theory closer to the context of the research, I explored the framework as a project-based Justification Analysis in the practical context of CA|HOW in urban landscapes. As described in the Chapter 4.4 Justification, the intention of the theory as provided by Boltanski and Thévenot was not aiming to push the creation of values pro-actively – or promoting plural values as ‘being good’. In itself, the theory offers much more theoretical complexity than this and is basically without concern for *making*. However, in Case Lystrup, the 6RJ enabled an interpretational framework for how unilateral justifications in early project phases were transported into unilateral designing of CA|HOW measures, even though the actors shared a fundamental concern for the common good (see 6RJ meeting diagram Fig.5.1.19, Chapter 5.1). In this case, the designing and location of the CA|HOW measures had not been questioned with departure in diverse justifications. Particularly the inspired regime was neglected.

Unilateral justifications weaken opportunities in climate adaptation

In Case Lystrup I found that unilateral justifications weakened the CA|HOW pilot-project with regard to value creations: affordances of the urban landscapes were overlooked. For example, the potential affordances of using the deep structures of the historical blue-green passages or potentials of biodiversity and connectivity for soft trafficants. In Case 1 and 2, the contemporary settlement patterns based on expectations of water control showed unilateral, utilitarian trajectories with a lack of flexibility to dynamic waterscapes. In other words: in the case studies, unilateral justifications entailed a risk of designing less-responsive adaptation measures, thus missing out on opportunities. These on-going reflections led to employing the 6RJ, which in turn influenced my attention to open-ended design for future affordances at the smaller scale of, e.g. retention basins in the context of Case Lystrup. Altogether, the 6RJ broadened my practice-based understanding of values and incommensurability, e.g. between a landscape architect proposing aesthetic values (inspired) in project contexts driven by developers and engineers (market and industrial justifications).

The Black Bird and transdisciplinary standards of measurement

As described in Chapter 4.3, Hans Fink’s approach to performing value judgments was included due to a need of reframing my understanding of ‘merværdi’ (added-value). The objective of exploring potentials of value creation in transdisciplinary CA|HOW projects through landscape architectural approaches gave rise to a need for qualifying values. During the research, I participated in climate adaptation conferences and seminars where a majority of actors came from engineering and the sciences (see Chapter 2.2). A re-occurring question was how I intended to measure the so-called added-value. Fink’s approach informed the research on why ‘added value’ lacked a level of precision, while also supporting the idea that value judgment does not necessarily entail numbers or rely solely on emotions. Rather, qualified value judgment relies on precision and specificity, inclusive of both sensed and standardised numerical parameters.



Figur 6.1.5: Illustrations from Chapter 4.4 and 4.3.

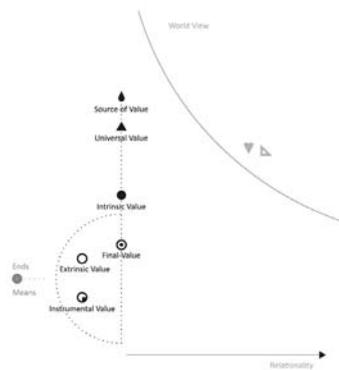


Worldviews - dualisms and expectations of the static performance of the city

The brief venture into value theory was triggered by the case study leads. In Case Lystrup and Skejby, it became apparent that flooding was produced by surface water whereas human constructions and practices produced a significant element of the flood *risk*. In Case Aaby, I found a further discrepancy between human expectations to the wet and dry city that related to the affordances of urban landscapes. The conveniences of the urban landscapes, e.g. the accessibility of the contingency responders, were tied to the notion of the dry city and a fixed image of the city as a supporting, physical structure to human interests and value-systems. In all three cases, the settlement patterns and urban development followed unilateral trajectories rooted in utilitarian value systems. In its essence, the understanding of the interplay between human constructions and natural properties are attached to notions of 'what is nature' and 'what is of value'. From this perspective, the settlement patterns and the flood risk as found in the case studies connect to notions of nature and attributions of value. Here, value theory provided an understanding of the deeply embedded dualism between human <> nature which seemed connected to the distinction between urban <> nature. It seems likely that this influences common modes of 'seeing' the city and urban landscapes and relates to expectations of the unhindered, static 'performance' of the city. It was at this point that the Anthropocene became productive as a concept, as it denotes the interdependencies between human and natural forces in a foundational manner.

Value Compositionals - transporting knowledge from theory to practices

Like with the 6 Regimes of Justification, I found it necessary to operationalise the theoretical knowledge from value theory by bringing it into a practical context, this time by extracting Value Compositionals through diagramming. This exercise provided an understanding on how subjective-objective worldviews and different attributions of value typologies impact the chosen operators (means and ends) of what is deemed 'good' solutions in urban landscapes, thus of value. This way, value theory supported knowledge outcomes of the research at different levels. Firstly, it pointed to how a shared subject of value still can create incommensurability, as in the example of Ecosystem Services and Deep Ecology. Secondly, it provided a level of understanding as to why value pluralism can be useful; acknowledging plural values is an entry point for actor collaboration in CA|HOW, without suggesting that the actors share the same conceptualisations of value typologies or worldviews. Finally, it broadened my understanding of why the 6RJ had proved useful to the research. The 6RJ accurately acknowledges different configurations of the Value Compositionals, while at the same time pointing to how these can be *bridged*, rather than *aligned*, as alternative compromises between different regimes. What is important to note, however, is that, despite acknowledging differences, the 6RJ framework is based on the overall notion of a shared humanity and the common good.

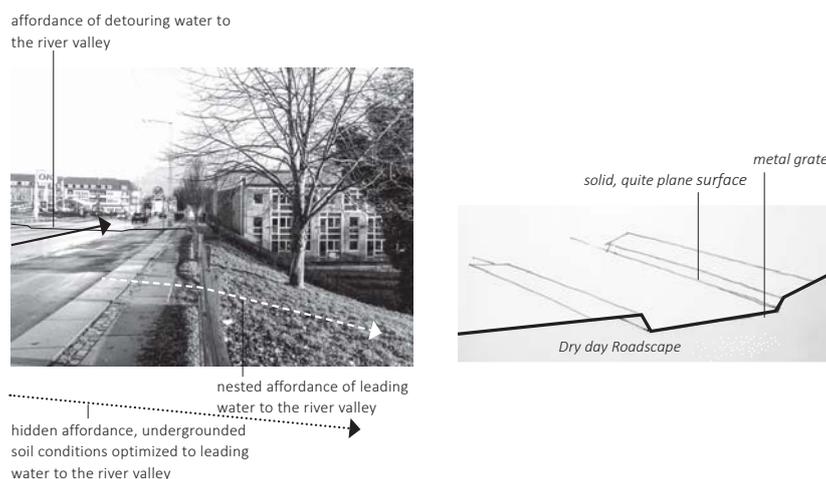
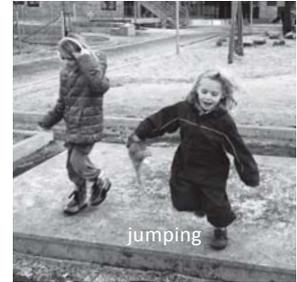


Figur 6.1.6: Top: photo from Case 3. Bottom: vignette of illustration of Value Compositionals from Chapter 4.2.

Ecological psychology, affordances and landscape architectural methods

Gibson's theory of affordances was introduced in the later phases of the research, becoming an interpretational lens for the research methods. Initially, the theory was functional as it concerned potential actions enabled by the interplay between the properties of the environment and perception of living actors. Thus, it could be specifically attached to urban landscapes. In the Dialogical Space encounters of Case Lystrup and Skejby, the mappings and diagrammed photos showing affordances in the urban landscapes resonated with the DWA actors. In the assignment of Case Aaby, the mappings further provided the foundation of the pre-strategic approach that resonated with actors from different municipal departments. Across the cases, the visual material provided *specificity* (specific geographical places together with hard facts from GIS/flood maps) and *openness* that enabled *different* value judgments on the same matter.

The concept of affordances facilitated me as a researcher with a changed perspective on own methods and visual approaches: affordances are specific, they have meaning and value, but the value *judgment* of 'how well' does not occur until referenced to specific actors and situations. For example, the urban landscape affordances in Aarhus of the Dry city are different from those of the Wet City. This way, the concept of affordances influenced my understanding of the methods that I used throughout the research: they were evolving on making affordances perceptible through time and space. For example, making the different affordances of the wet and dry city perceivable through mapping, diagramming the technical terrains of Skejby or connecting the historical terrain with the contemporary settlement patterns. Some of the compatibility between landscape architectural methods and affordances is likely caused by Gibson inventing ecological psychology where the concept of affordances was specifically addressing an 'ecological approach to visual perception'. This is applicable to visual methods and connects to thinking in ecological urbanism. As such, the theoretical component of affordances influenced my reflections on the case learnings and the methods used. Furthermore, Rietveld's contributing concept of *skilled* practices in perceiving affordances related to the intentional core of the research question: to encourage different actors to create plural values it becomes essential to develop the shared, skilled practice of 'seeing' alternative affordances.



Figur 6.1.7: Illustrations on urban landscapes properties leading water on detours, creating affordances of impeding mobility, the nested affordances of soil and slope can provide humans with affordances of, e.g. mobility, recreation and from Chapter 4.5.

Sum up – External theories informing understandings of diverse value systems

By employing theories from other fields such as philosophy, sociology and psychology have informed and pushed the knowledge creation during the research. And arguably, this tactic also developed my skilled practice of 'seeing' affordances in the urban landscapes of CA|HOW. As mentioned in the Methods Chapter, the employed theories share the trait of pragmatism, as they do not subscribe to a subjective-objective dualism. Furthermore, both affordances and justification are set in real-world contexts of human and non-human actors. This is partially why they resonated in the context of LArch. To render the theories productive for the objective, I did, however, have to identify elements within them that I could transport into a practical methodological and physical context, reflected in the Value Compositionals and Justification Analysis. This way, diagramming became the modus for transplanting the theoretical bodies of knowledge into the interpretational context of landscape architecture and the urban landscapes of CA|HOW.

Value theory mainly informed the researchers understanding of external actor approaches to valuing differently and how diverse value systems are deeply rooted in historical trajectories on value. The concept of affordances and framework of justification share a real-world approach related to values through the articulation of justifications and potential actions in the physical surroundings. Together with this, the concept of the Anthropocene came to play a role at both the level of thinking and action as it is questioning what we do and how we evaluate urban landscapes by dissolving dualisms between human and nature. Using the Anthropocene at a conceptual level connects to the Actor-Network Theory approach of the research methods and ecological urbanism. This is further discussed in the Chapter 6.2 Reflection.

Due to what I learned from value theory, I do not expect landscape architecture or landscape architects to be able to change others' worldviews as such. However, the methods and thinking of landscape architecture can provide a situated and visualised understanding of the opportunities of the wet and dry city from the perspective of the practical realm of flood risk (incentive) together with opportunities in the urban landscapes. As a landscape architectural contribution to informing the skilled practices of seeing alternative affordances in transdisciplinary contexts.

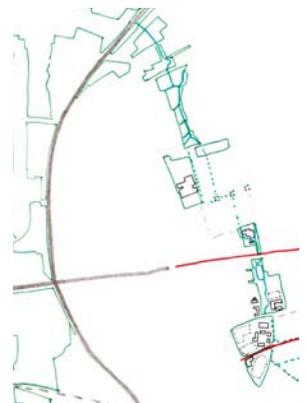
METHODS AND DESIGN COMMENTS

Conceptualising methods in Larch RtD

The objective of the research was to explore how landscape architectural approaches could contribute in transdisciplinary forums of CA|HOW projects. The overall assumption was that diverse types of knowledge from different disciplines could strengthen the creation of plural values in CA|HOW. In this, was the expectation that landscape architectural Research through Designing methods could push knowledge creation through its relational approach combining material, creation and interaction. Conceptualising the interventionistic multi-methods as Design Comments was an effort to articulate and advance the multi-methods in design research themselves – also to external actors. This was explored through using visual material produced out of landscape architectural methods and tools in the transdisciplinary context of the case studies. During the research, the Design Comments developed in the context of real-world problems, concurrently exposed to real-life actors in the CA|HOW case studies. A key element was the transportation of diverse bodies of knowledge from one context to the other through actions of dialogue. The internal LArch Space was a modus based on well-known landscape architectural methods of producing knowledge. As mentioned, during the research, I realised that my landscape architectural material primarily consisted of visualising affordances across time and space. Complementary, the external Dialogical Space promoted a daylighting of different bodies of knowledge within the same time-space constellation. This became a facilitating of sparking transdisciplinary discussions on qualifying value creation in CA|HOW.

An informal Dialogical Space of shared concerns

The Dialogical Space proved productive for discussing an array of value-based dimensions related to CA|HOW. In this informal space, personal and professional knowledge were exchanged around the tangible material and a shared concern, the Linkage of Relevance, of climate adaptation and value creation. In the example of Case Skejby, the Dialogical Space prompted knowledge based on both professional and personal experiences. For example, comments on the sense of place in Skejby and longer-term planning knowledge on how the Brendstrup Corridor had been under pressure for new urban development. Here, the soil specialist, the engineer and the landscape architect were connected by water and situated landscape affordances (please see Affordance chapter). In this research context, the actors represented a municipal department with obligations towards environmental issues, which is a working area requiring strict industrial justifications, e.g. measurability on water quality and so forth. As shown in Case Lystrup, Chapter 5.1, these were actors with a fundamental shared concern for serving the public and the common good. During the Design Comment encounters, I learned how these actors were dedicated to concepts of 'nature', e.g. promoting biodiversity, as well as the well-being of the public beyond that of numbers and measurability. These experiences provided further leads to the research. For example, by directing it towards investigating value creation from the departure point of administrative boundaries and contemporary land use practices.



Figur 6.1.8: Illustrations from Case 2, Skejby.

Temporal considerations and situated spaces

During the case studies, the visual material that I brought to the actor encounters functioned to facilitate a shared exchange of knowledge in a context of professionals. What is important, however, is the temporal aspect of following and interacting with the actors and projects over a longer time span (2013-2016) providing a level of continuance despite some actors were changing during the process. The extended duration created mutual knowledge on differentiating methods and encouraged reciprocal trust. In fact, I expect this kind of knowledge exchange would benefit from even longer engagements. The smaller group sizes and informal atmosphere at the actor encounters are likely to have supported the dialogue too. After Case 2, the actors ventured an intrepid assignment contracting. Their acknowledgement of the research methods points to that the research methods impacted the transdisciplinary forum. Furthermore, my status as an independent researcher, funded by the Aarhus School of Architecture, likely played a role too, as it was clear that I did not represent other agendas or interests beyond that of value creation in CA|HOW. The resulting pre-strategy of the assignment was presented to different municipal departments, thus a broader context without a shared trust or personal relation. Based on my 'education' in Case Aaby regarding 'real' material, I redrew the hand-drawn mappings into vector maps, thus rendering them not as dependent on being situated and less sensitive to being de-contextualised, e.g. emailed without a personal narrative. Although I aimed for an open dialogue, this forum was not a dialogical space of Design Comments but rather a presentation of affordances in urban landscapes that were relevant to the actor's responsibilities.

Everyday landscapes, and the actors that were left out

Though beyond the scope of this research, I have to mention the importance of all of the actor's 'left out' of the research question. Everyday landscapes are formed by both water professionals and water-lays, e.g. residents, the commuting workforce, investors, politicians, institutions, businesses and organisations. These actors form relationships with other driving forces like international trends, financial situations and local pecuniary priorities, traditions or practices. These actors, of course, influence urban landscapes and thus, are part of forming CA|HOW too.

6.1.3 CUMULATIVE LEARNINGS FROM THE CASE STUDIES

WATER AND PRACTICES IN URBAN LANDSCAPES

Image of the dry and wet city

Part of the motivation for this research was an awareness of ever-on-going repair works, new urban developments, and restoration projects: all of these efforts have the capacity to contribute beyond pure functionality- smooth asphalt and updated sewer pipes – and are eligible to create ‘better’ urban landscapes. This latent capacity is only highlighted by the rapidly growing need for CA|HOW solutions. Therefore, in the initial phases of this research, I set out to study CA|HOW measures. However, during the cases, I found that, from the perspective of how LArch could contribute to value creation in CA|HOW, a larger-scale, landscape approach was needed to qualify the objective. The following summation combines reflections on, and conclusions of, this research, taking its departure point in the propositional LArch reflections produced during the writing of this thesis.

Human practices as co-acting flood risk

Studying the flood maps of Lystrup together with the spatial characteristics of its urban landscapes demonstrated how anthropogenic efforts on several levels largely cause Lystrup's flood risk. As prior established, the settlement patterns of post-war Lystrup include residential buildings in low-lying areas, such as Kildevangen and Åvangen, and evidence the practice of settling within/on former blue-green corridors as opposed to on their sides. Comparing the flood maps with the historical maps, and relating them to field-experiences, illustrated how contemporary practices of the urban landscape not only produce flood-risks for individual low-lying buildings but also inflict flood risk to down-stream or neighbouring buildings. Careful consideration of the appropriateness of settling on, and sealing off, a location named Åvangen is not new to LArch. However, such landscape properties might not be recognisable to the actors within such everyday landscapes, nor might they connect these properties with the fact that their own practices are causing a dysfunctional wet city. In relation to flood-risk, water has a dominant co-actor: human practices in urban landscapes. However, inviolable property rights and planning distinctions further support flood risk via dry-day frameworks. For example, Lystrup contains large green areas and surrounding rural areas, which are optimised for leading water across the planning dualism of urban-rural. It seemed feasible to connect these as part of a CA|HOW strategy that could go beyond locating retention basins in green areas. The actors at DWA were aware of this but were constrained by administrative and economic boundaries. This implies larger administrative discussions. I find that LArch has the potential to contribute to these discussions, as LArch methods have the capacity to make cross-scale affordances perceivable in modes that are distinguishable from technical maps, lists, charts or organisational approaches. I unfold this point more in the below text.

MAKING WET AND DRY CITY PERCEIVABLE

In Case Aaby, I visualised the rhizomic network of the Wet city together with the 'classic' structural image of the Dry city. At a diagrammatic, although still place-specific, level, these mappings rendered the discrepancy between the dry and the wet city perceivable. This was exemplified during the final assignment presentation of Aaby. Actors from different municipal departments, including non-water professionals, attended the presentation, and they responded by opening up to see the city differently: the visual articulation of wet and dry city resonated. As described, the planning actors admitted that they possibly had been too focused on the infrastructural (ring) structure of their green strategy. It is important to note that in this context all of the actors were most likely well-acquainted with the flood maps and CAP14 as an important appendix to the municipal plan. My experience in Case Aaby demonstrated that the mappings provided an alternative level of information to the flood maps, contributing in a different way to the fundamental work of the CAP14.

Contributing with knowledge creation from landscape architecture

On reflection, visualising the different affordances of the wet and the dry city as a modus differs significantly from the information contained in the CAP14. The LArch mappings re-map the flood maps, including the risks, and combine this with expectations as to the fundamental functions of the dry city, such as unimpeded mobility and safety. The mappings in case Aaby became a communication of the connection between flooding, the structural image of the city, and associated dry-day affordances. These mappings were followed by showing affordances of potential actions. Connecting the rhizomic pattern of the wet city to specific landscape based potentials of the former blue-green passages provided an entry point for 'seeing' new solutions, new affordances. In this way, the mappings of Case Aaby contributed to existing levels of information through LArch knowledge creation; making relational interdependencies and possibilities for action perceivable. The above mappings pointed towards latent affordances, in, on or under the surface in specific locations.

Based on the cases, I find that the landscape architectural methods to visualise affordances of the wet and dry city, attached to specific urban landscapes, are capable of providing an alternative understanding of urban landscapes in a transdisciplinary, cross-departmental context, useful as a departure point for promoting value creation in CA|HOW.

Exposing flood risk together with potentials of action

At a more general level; flood risk and climate change have been exposed through flood maps, charts and other media that show flooded areas and so forth. However, this might not provide an entry point for 'seeing' the urban landscapes differently. Visualising and narrating the changing affordances of the wet and dry city offers an interpretational level for 'seeing' the city and urban landscapes. The context consisted of actors from different disciplines, departments and sectors, and thus was aligned to the research question. Based on the responses I received regarding the pre-strategic Aaby material, I propose that the methods provide a

specificity that can be productive in transdisciplinary contexts. Though beyond the objective of this research, it could have been useful to study the potential of using landscape architectural methods for rendering the wet and dry city within contexts relating to different actors. For example residents (domestic), politicians (opinion) and developers (market) – they are, of course, foundational in urban landscapes practices. As in the example of case Skejby, the stakeholders of properties at flood risk did not interpret statistical terms as an incentive to allocate money, efforts, and actions.

Retrofitting, planning distinctions, and new urban development in the urban landscapes of the Anthropocene

In Lystrup and Skejby, noticeable parts of the settlement patterns and materiality were suited for the dry city. Obviously, changing all of these patterns and materials is improbable, as these efforts represent resources that are already spent and interests that human actors are likely to find of value. Concerning the already built, I suggest three levels of Larch-based responses with relevance to CA|HOW and value creation, which could be developed as a response to the wet city in the context of Aarhus: Planning distinctions, Retrofitting and New urban developments.

Planning – Landscape-based gradients of the Anthropocene

Contemporary planning distinctions cannot absorb the dynamics of water. In Case Lystrup, I demonstrated how landscape properties with clear potentials to facilitate CA|HOW were divided by the rural-urban planning delineation. Both Lystrup and Skejby illustrated how the distinction between urban and rural dissolved in extreme weather, and how wet-day planning might need to be developed to cross at least some of the same lines as water does regarding landscape properties. Local Planning is also dependent on larger scale planning distinctions. Based on my case studies, I recognise a need for developing contemporary planning distinctions into more sensitive, landscape-based gradients, for example, like those of Erle C. Ellis, as mentioned in the Anthropocene chapter. This could be based on acknowledging the interplay between natural forces and human practices in urban landscapes connecting to larger landform and properties, beyond that of rural-urban notions; planning of the Anthropocene.

Retrofitting for the common good

Regarding retrofitting, I propose performing local alterations in alignment with larger CA|HOW strategies. As exemplified in Lystrup, it could very well be in the interest of the common good to include strategies for the demolition of selected buildings that exacerbate flood risk and block CA|HOW-potentials at the scale of a quarter or town. Through this, I see the potential to facilitate domestic and market interests too, as flooded houses cause personal distress and are likely harder to sell. From a market perspective, insurance companies could, therefore, find interest in such solutions. Furthermore, taking a departure point in underlying landscape properties could provide for the common good by connecting urban landscapes for human and other living matter. In all three cases, a clear potential in this was demonstrated.

Urban developments and the common good

New urban development also plays a vital role. As shown in Case Aaby, Aarhus demonstrates that new urban developments are often located in areas that previously belonged to water, apparently catering for opinion and market justifications, and leaning upon industrial water management of the past. These new urban developments likely prevent in-property flooding according to existing regulations. However, they interfere with CA|HOW on a larger scale with implications for the common good in the wet city. For example 'Åhaven' is located on top of an important connection for water's flow between the larger catchment of the river valley and the recipient, Aarhus Bay. As shown, the two areas where new buildings are located respectively in the river valley close to the stream and on the lower hillsides of the former waterworks. In these locations, they block connections with the former blue-green passages, which could accommodate CA|HOW on a larger scale. Furthermore, they obtrude the potential for providing space and time for water around the stream. From the departure of creating values, and with reference to the common good in a longer time perspective, one could say that this new urban development alters such potentials.

Recent settlement patterns obtrude future affordances

As described in Case Aaby, I found a land-use pattern in Aarhus where the former blue-green passages displayed a noticeable land-use attached to public and semi-public functions such as housing associations, public schools, parks, cemeteries, allotment gardens and so forth. Although currently disconnected, the development of these areas now shows new potentials for the future city, as they provide affordances of CA|HOW strategies together with the creation of other values. However, in both Skejby and Aaby further along the river valley, the new urban developments in Aarhus did not follow this pattern of the former blue-green passages. These newer areas, built since the 1980s, seemingly do not provide the same potential as seen on maps from 1880-1980. From this perspective, new urban development in Aarhus is putting future potentials for CA|HOW at risk.

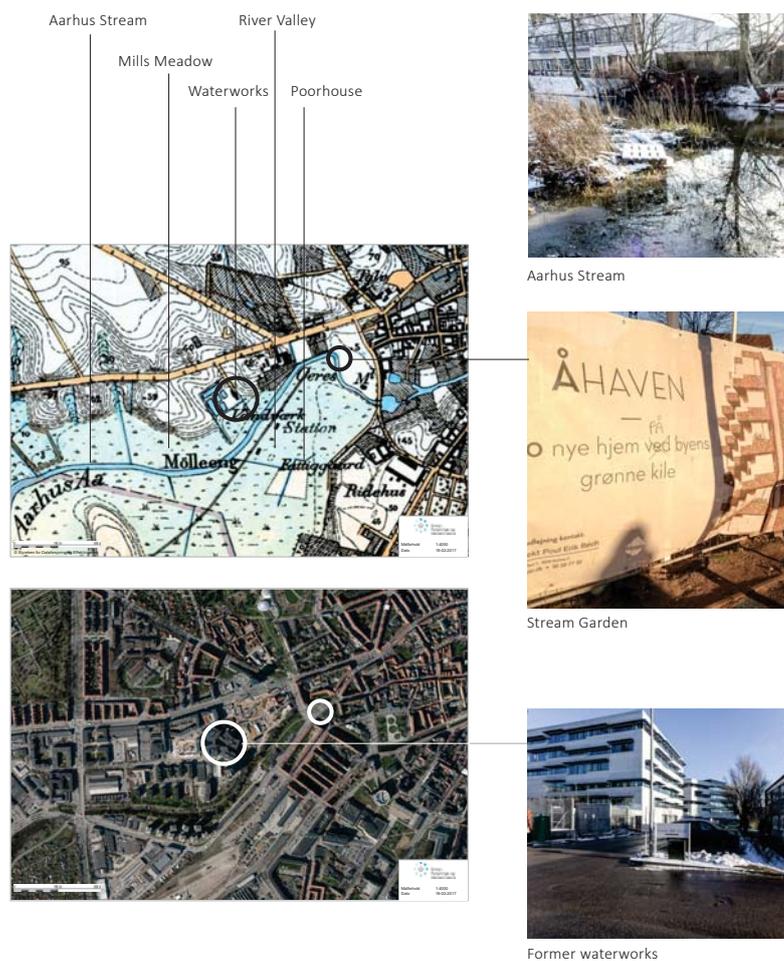
This points towards the importance of also articulating the image of the wet and dry city in the contexts of water lay, particularly decision-makers and developers. It also emphasises the need for providing larger scale CA|HOW strategies that inform new urban development. Here, it could be relevant to study further potentials for accommodating alternative value creation in CA|HOW for the market and opinion regimes. A sketch justification analysis would reveal that the main justifications have belonged to the market and opinion regime, supported by the industrial regime.

Propositional reflections and conclusions

The above are propositional reflections based on the knowledge gained from the cases, suggesting a need for reconceptualising how to 'see' urban landscapes with regards to the wet and dry city, as an understanding of the human-nature interplay. These reflections respond to the three cases, where contemporary settlement patterns, notions of ownership, and planning practices all form a notable element in why increasing precipitation is also a flood risk of human interest.

However, the above primarily discusses landscape potentials about two issues. Firstly, it relates to diminishing flood risk, and thus the likelihood of reducing inconveniences and economic losses at different scales.

Secondly, it speaks to how *not* to block future affordances, thus, keeping the door for value creation open. It does not, however, tell of *how* to create *better* urban landscapes of the dry and wet city. Below, I discuss the propositional LArch reflections produced throughout the cases with particular attention to value creation.



Figur 6.1.9: Reflections upon contemporary urban development in Aarhus related to landscape properties and historical waterscapes, based on learnings from Case 3.

AUTONOMOUS BUILDING STYLE AND LANDSCAPE-BASED AFFORDANCES

Local and larger scale planning in CA|HOW

In each case, I found that the largest potential of CA|HOW in existing settlements was to be found in providing larger scale CA|HOW strategies inclusive of both wet and dry city. In Case Lystrup, I showed how settlement patterns contributed to flooding risk. This was also the case in Skejby. However, as pointed to by the down-stream actor in Skejby, it is challenging to locate and design CA|HOW measures when upstream alterations influence downstream. In Case Aaby, I showed that the concept of Local Climate Plans is challenged by the autonomy of planning delineations with regards to a larger scale, e.g. future upstream alterations.

CA|HOW and landscape affordances of past-present-future

At the same time, all three cases showed landscape-based potentials for instigating CA|HOW measures that connect both the larger and local scale. In Cases Lystrup and Skejby, I studied the urban landscapes from the departure point of landscape properties as found in historical maps, contemporary spatial characteristics, and flood maps. This influenced the research focus. I started to investigate hidden and disconnected landscape affordances and their relation to contemporary leftover and in-between spaces as found in the present urban landscapes. However, making use of these affordances required a larger, landscape-based CA|HOW strategy. In all three cases, however, this seemed feasible. Case Lystrup exemplifies that this is possible, through its coherent CA|HOW strategy that covers the entire suburb and terrain. However, the strategy originated in administrative boundaries rather than qualifying affordances of the past-present-future.

Tapping into existing discourses

Waterscape strategies have a history as long as human settlements. At present, watershed planning, water guilds and larger, nature-based solutions are developing around the world in response to changing waterscapes, entailing revised water management strategies. As aforementioned, common handling water practices push flow paths and change the sub-catchment delineations: in-property solutions lead surface-water to sewer systems or infiltration via LAR facilities. Water companies, municipalities and the Road Directorate are professionals at a larger scale that are also involved in directing flow paths. In the example of Lystrup's retention basin, the road was reconstructed with a curve, redirecting water to avoid the elephant field. In all three cases, I found that LArch can contribute to both well-known and emerging water practices through the conceptualisation of Catchment Neighbourhoods, with a departure point in making affordances perceivable. I unfold this further below.

LANDSCAPE-BASED STRATEGIES FOR CA|HOW VALUE CREATION

Catchment Neighbourhoods- cumulative case experiences forming the propositional reflections

Catchment Neighbourhoods are the result of a propositional reflection that emerged during Case Skejby. Here, the historical maps showed that the larger landform, water's former flow, and the study of building layout, material usage and terrain alterations together showed a settlement pattern that demonstrated contextual neglect. At the same time, mappings of flood risk and relational-interdependencies showed how the autonomous building style of the dry city provoked flood risk in the wet city. And in-property building practices inflicted flood risk relations between up- and downstream properties. The conflictual potential of this was recognisable in the responses of Skejby stakeholders when they realised that they were influenced by upstream decisions, despite having themselves followed all local planning regulations and paid due diligence regarding the handling of normal rain within their property. At the same time, the open space of Vestereng is their neighbour; an area where the larger landform of the catchment was visible. The LArch propositional reflections on the potentials of sub Catchment Neighbourhoods were further developed after the assignment. During the assignment, I found that transversal passages defined the structural image of Aarhus. But when I investigated this more locally, I uncovered affordances at several levels. This ultimately qualified the proposal of the Aaby Passage. After the assignment, I studied this further regarding conceptualising Catchment Neighbourhoods.

Bottom-up landscape strategies, making affordances perceivable

The following is a reflection on what a Catchment Neighbourhood can offer, seen from the perspective of LArch. The Catchment Neighbourhood is a landscape-based, bottom-up strategy for CA|HOW, which accommodates value creation in urban landscapes for a broader common good. It is a landscape-based approach that offers a variety of affordances. As demonstrated in the mappings from all three cases, the historical landscape properties of soil and slope had considerable potential for also leading water in the present day. In Case Skejby and Aaby, I connected the historical properties of terrain and soil to spatial characteristics of the contemporary topography of the urban landscapes. I investigated potential areas for hosting water by locating in-between and leftover spaces as well as larger permeable areas, alongside pointing to hidden affordances under the asphalt. In Skejby, this was developed into mappings that visualised in-situ and ex-situ potentials for CA|HOW measures, connected to plotting relational interdependencies between properties.

Uncovering landscape-based affordances in Aaby

In Aaby, the relation between historical landscape properties and current spatial characteristics was further qualified through a mapping of local programs of public relevance, such as nurseries and nursing homes, local societies, socioeconomic patterns and so forth. Some were found on maps, others on field trips. The list was by no means exhaustive. I further related this to the degree of, e.g. accommodating vulnerable road users and accessibility for the Beredskab. Finally, these studies included exemplifications of aesthetic potentials, e.g. views, variations in vegetation scents, colours and shades provided by changing levels of humidity.

A Catchment Neighbourhood beyond CA|HOW concerns

It is important to note that the multi-modal LArch approach rendered values, meanings and functions across various levels, connecting different geographical scales. In this way, the methods offered place-specific, relational linkages: they became a means of visualising landscape-based affordances attached to specific geographic locations, making new affordances perceivable. A landscape-based, bottom-up strategy is one that takes its departure point in the physical properties of both past and present landscapes. Furthermore, such a strategy can reveal affordances relating to human interests, addressing various values across all regimes of justification. However, it is crucial to note that attention to landscape must come first to provide specificity.

An intermediary approach that offers value pluralism

In Case Aaby, I provided a pre-strategic approach for enacting such affordances. In reference to Prominski, this was an intermediary strategy with the capacity to tap into (or absorb) other practices, visions, work-flows, values and so forth. This strategy contrasts to simply providing each municipal department, local housing association, institution and so forth with lists of where they can integrate CA|HOW: a landscape-based bottom-up approach offers place-specific entry points relating to existing priorities. Furthermore, it provides a deliberate openness towards scrutiny, as well as the ability to adjust for affordances to come. The core potential and foundation of the concept of (sub) Catchment Neighbourhoods is the creation of neighbourhood values via the accommodation of plural interests. Thus, a catchment Neighbourhood does not require a particular interest in water or CA|HOW beyond that of a concern for avoiding flooding and an interest in inhabiting an urban landscape that functions in both wet and dry city.

PROPOSING THE CATCHMENT NEIGHBOURHOOD

Specificity, affordances and Intentionality

About Catchment Neighbourhoods, the foremost potential offered by LArch methods is the capability to integrate and visualise affordances that exist on different levels, e.g. physical properties, programmes and aesthetics. Thus, LArch offers an inclusive approach for acknowledging objective and subjective worldviews and diverse value typologies. This is possible due to Larch's attention to providing landscape-based Specificity, Intentionality and Affordances, as mentioned in Case Aaby.

Specificity

By specificity, I refer to the practice of working with specific geographical areas, focusing on particular landscape properties, including dormant soil conditions and slope, as well as acknowledging the current topography of urban landscapes of buildings, green areas, infrastructure, and so on. The specificity allows any actor to go out in the field and check up upon, question or add new knowledge as a feedback loop to, e.g. the findings of the Aaby Passage. For example, local knowledge on important places, narratives, small initiatives, valued trees, dodgy corners, sledge hills and small-scale, informal practices. Such land-based specificity suggests potential value creation beyond that contained in the concept of 'merværdi', or indeed the practical needs of CA|HOW. As mentioned in case Aaby when I presented the pre-strategy; a local society, wishing to strengthen the neighbourhood's green areas, the range of activities and safety for school children, decided to take CA|HOW on board. During the case encounters the DWA actors commented that they appreciated the specificity of the mappings. And specificity is made possible when landscape affordances attached to certain geographical areas is made perceivable.

Affordances

The concept of Affordances connects with the notion of Specificity: in this LArch context, affordances are likewise about connecting past, present and future through mapping hidden, forgotten or new potentials. As described above, mappings of the structural image of the city can make connections to flood risk explicit, thereby visualising the image of the wet and dry city. Making affordances perceivable can be interpreted as empowering others' knowledge, practices and values, not least because affordances are open to multiple interpretations. Again, specificity is the key, as it provides a practical dimension to affordances, ensuring that this approach goes beyond suggesting a positive, but generic 'merværdi'. And making affordances visible also renders relations across geographical scales and different time perspectives (historical waterscapes, contemporary landscape, future flood) legible and clear. In my DeC encounters and the assignment, I found that mappings that simultaneously communicate very different types of information were not received as being particularly difficult to interpret, nor overly complex or subjective. Rather the opposite: what in text sounds complex, unspecific or ambiguous (e.g. time-scale interlacing) might not be so when transported as knowledge through the medium of mappings and dialogue, particularly when in reference to known locations.

Intentionality

Intentionality is used here to describe a will to 'create better', connected to practical knowledge. For example, intentionality might be evidenced through an effort to re-map flood maps to promote discussions on expectations for the wet and dry city. Intentionality includes the will to integrate aesthetics, sense of place and concerns for the common good as key parameters. Furthermore, intentionality is about creating a foundation for enabling discussions of 'what is good'. By making specific affordances perceivable in specified urban landscapes, the possibility for intentionality through dialogue on priorities emerges. For example, the capacity to discuss what is of most value, a new building or a larger green stretch; or how a wider ecotone can be connected to a nursing home's interest in accessibility, and so forth.



Figur 6.1.10: Reflections upon the relation between the local subcatchment, local planning, and spatial opportunities and qualities found in Case 3.

CATCHMENT NEIGHBOURHOODS AND AFFORDANCE-BASED INTENTIONALITY

Intentional flow paths qualified by local affordances

In Skejby, I analysed leftover spaces that could potentially delay water via diffraction lines. In Case Aaby, I suggested that 'directors' could push flow paths to locations in the urban landscapes where they performed 'better', with reference to assumed human interests. Reflecting upon the 'directors', I found the concept most useful not as a means to push the location of flow paths – an already common practice- but rather as a *qualification* of this practice. An actor in Case Lystrup stated that "Water has its flow..." and this is ultimately correct. However, as demonstrated, water has more than one possible flow. Water professionals know this, of course, but CA|HOW projects do not usually or necessarily entail visualising water's flow together with specific affordances of urban landscapes. In the Aaby passage, the suggested 'directors' originated in the analysis of projected flow paths and hidden landscape properties, but the decision on where to 'direct' was based on considerations of affordances relating to local functions and spatial cohesion (e.g. mobility, bio-corridors, schools that could be connected). In this way, the decision was a qualification of 'better' flow paths based on landscape properties, local functions, aesthetics and programmes. All of these neighbourhood considerations, relating to plural values and justifications, referred to all 6 regimes and the notion of the common good. In practice, each of the flow paths in the Aaby sub-catchment could have been directed at numerous other locations during their descent to the river valley. But taking a point of departure in specificity, affordances and intentionality enabled the ability to *qualify* where the flow paths would do 'better', according to local affordances. Obviously, in the example of Aaby, the very local decisions require a further qualification provided by citizens and stakeholders with local knowledge and attachment.

Intentional sub-catchments

In Case Aaby, I demonstrated the anomalies of two primary flow paths at the point where they changed direction at Silkeborgvej. I discussed this regarding inconsistent flow paths, as the paths seemed sensitive to alterations in the urban landscape. The eastern flow path influenced the sub-catchment delineation, creating what is possibly an inconsistent sub-catchment delineation. As demonstrated on the map, a more robust sub-catchment could likely be achieved, particularly as sub-catchments are nested systems, and thus heavier rain than projected could add flood risk in different locations than those currently mapped. From this perspective, I proposed that inconsistent sub-catchment delineations could benefit from being qualified with intentionality too. A brief/sketch screening of the Skejby sub-catchment indicated that its delineation had possibly changed in the south-western area, meaning that water is led to the recipient of Egå Engsø instead of Brabrand Lake and the river valley. If this is the case, and the area initiates CA|HOW, it could, possibly, benefit from being analysed with regard to intentionality and Affordances. For example, investigating whether the area could benefit from returning to its former catchment or if local affordances pointed to benefits from keeping the delineation. The critical point is that it is only through qualifying the delineation that an opportunity to strengthen local affordances and support the local neighbourhood can be found.

In a Catchment Neighbourhood, an Intentional sub-catchment delineation could be performed in relation to the same qualification parameters as the Intentional flow paths; landscape properties, the current topography of the urban landscapes, functions, relational interdependencies, aesthetics and so forth as the departure point for an intentional delineation. For example, potentially more efficient CA|HOW could be instigated by pushing some areas into another sub-catchment. Such a move could lead to CA|HOW that is better aligned with the larger landform as well as local soil and terrain properties that are better suited for leading water.

The blue-green spine and flow paths

In the example of Aaby, I demonstrated how attention to existing affordances could be a catalyst for the integration of CA|HOW with value creation at various levels. This could be enacted in the urban landscapes in the form of a blue-green passage- the Aaby passage- which could connect the Catchment Neighbourhood transversally, with either one or two blue-green midribs and a number of intentional flow paths acting as veins. Based on my studies of Lystrup and Skejby, I find that they also could potentially benefit from being viewed through the lens of a Catchment Neighbourhood, and thus enabling connectivity through blue-green passages.

VALUE CREATION THROUGH THE CATCHMENT NEIGHBOURHOOD

In all three cases, I found that the landscape-based, bottom-up framework of Catchment Neighbourhoods presented an opportunity to tap into cross-scale value creation in CA|HOW in urban landscapes.

At an overall level, Catchment Neighbourhoods can support city visions. In the example of Aarhus, I attached the pre-strategy to municipal visions of resilience, mobility and liveability, as well as the need to support the mobility of the Beredskab, and thus the safety of the citizens. Furthermore, a Catchment Neighbourhood in the transversal passage of Aaby could connect different socioeconomic situations and biodiversity. Such a passage would naturally lead to the larger recipient (Egå Engsø or the river valley), thus connecting to a larger scale blue-green corridor as well as enhancing 'local' biodiversity via wider ecotones within the passage. At a planning level, the Catchment Neighbourhood could inform local climate plans and decisions for new urban development. At a cross-departmental level, it could tap into decision making regarding roads and traffic, green strategies, social and health departments and so on. At the practical level of public workflows relating to maintaining, repairing and renovating public areas, it could provide a level of intentional direction for on-going works. At the level of citizens, it could provide a framework to support existing or future agendas and activities, for example, nursing homes with a need to encourage senior citizens to access outdoor activities and sensory sensations, or a school's need for providing safe passage to upstream soccer fields and so forth. Based on my studies of landscape affordances in Aaby, and connecting this to the findings in Lystrup and Skejby, I find that a landscape based CN provides the opportunity to reconcile the urban landscapes of the dry and the wet city. It can provide coherent CA|HOW, thus diminishing flood risk, while also offering meaning and value creation to the everyday life of dry city.

generosity and Designing for future affordances

In Case Lystrup, I suggested that consideration of future affordances could act as an entry point for design at the smaller scale of retention basins. Here, I pointed to the potentials of acknowledging landscape properties of landform and soil conditions- e.g. humid areas and open watercourses as seen on historical maps – that might be suitable for accommodating HOW naturally. Design-wise, this could mean designing in a way that prepares for the connection of areas that are currently divided by planning boundaries of urban-rural, or that are blocked by contemporary, flood-prone buildings, while awaiting a landscape-based planning system of the Anthropocene. Furthermore, I called for generosity and deliberate openness through designing for 'over-capacity'. This would ensure that a project would be capable of responding to future needs not yet thought of or paid for, while also providing a wider ecotone from the start. This connects to the above discussions on connecting landscape properties beneath the asphalt with those enacted on the surface through constructions and functions. This approach demands intentionality, specificity and affordances; it takes these efforts to create open-ended, generous designs that can be enacted while waiting for landscape-based planning distinctions of the Anthropocene.

LARGER NATURE BASED-STRATEGIES AND BIODIVERSITY

Looking at the propositional reflections on the physical landscape, a pattern of nature-based solutions emerges. The starting point for this was low-cost CA|HOW, and soil and terrain have always been fundamental in handling water. In this sense, it might not be surprising that both the Catchment neighbourhood and designing for future affordances are strongly attached to natural processes and properties. In this context, I do not find an on-ground retention basin with lawn grass a nature-based solution. If connected to a larger scale and multiple affordances, the real potentials of inviting 'nature' in, including that of facilitating biodiversity and novel eco-systems, emerge. In Case Aaby, it was landscape-based affordances that ultimately offered many affordances relating to human-interests to tap into the blue-green system. Furthermore, nature-based solutions seem to be able to accommodate uncertainty and provide an open-ended approach to future needs, with reference to the common good as a shared value.

Urban landscapes of the Anthropocene

During the cases, the concept of the Anthropocene became a useful lens for recognising that flood risk, in this Danish context of precipitation, is something that we, to a large extent, have enforced upon ourselves. In all three cases, flood risk was accentuated by contemporary spatial and material practices such as impermeable surface coverage, common building layouts, in-property terrain alterations, and road construction. For example, in Case Skejby, the urban landscapes evidenced a design suitable for rapidly passing surface water to downstream neighbours. The surface water on the flood map was closely aligned with spatial, topographic characteristics, and further constituted by administrative boundaries and planning practices. These practices are still going on in the new urban developments of Aarhus: dry city development that does not seem suitable for urban landscapes of the Anthropocene.



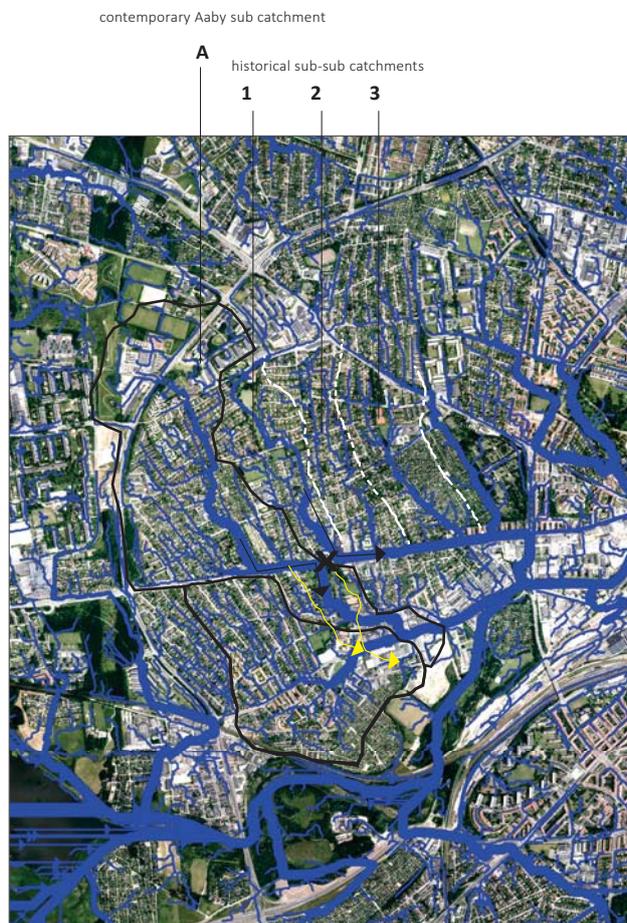
Figur 6.1.11: Water tower on top of the Aaby sub-catchment.

Planning vocabulary & Landscape practices in the Anthropocene

As demonstrated in Case Aaby, and as seen in Fig.5.3.92, which shows contemporary, urban structures superimposed over the rhizomic patterns of projected flow paths, the relationship between anthropogenic practices and natural forces is unresolved with regards to human interests and practices. When projecting changing waterscape patterns onto contemporary urban conditions, it appears as though the higher the degree of anthropogenic alteration of natural landscape properties, the less humankind was in control of the wet city.

The visual tools and multi-modal methods of landscape architecture seem to address such gradients between different forces and properties. However, the common terminology of Danish planning and landscape analyses might not be sensitive enough to such gradients to be capable of capturing the varying degrees of natural and anthropogenic forces in urban landscapes. This is not about a dualism between the natural world and the constructed world; it is a gradient that allows different levels of integration between natural and anthropogenic forces attached to specific land-use practices.

As an aside: during the research, I believed that the term 'urban landscapes' acknowledged the intertwinement of human and natural processes. But now I am to doubt this. In the Anthropocene, the appropriate term is 'just' landscape, supported by different, contextual gradients of influential forces and practices.



Figur 6.1.12: The flow path map with sketchy indication of former (1, 2, 3) subcatchments in relation to the contemporary sub-catchments of the Aaby Passage area. X marks the anomaly created by Silkeborgvej.

6.1.4 SCHEMATIC OF KEY THEMES AND PROPOSITIONAL REFLECTIONS

OVERVIEW OF KEY THEMES AS PROPOSITIONAL REFLECTIONS FROM THE CASE STUDIES

The following summarises the key themes and propositional reflections provided by the case studies. Fig.6.1.14 provides an overview of how the themes and learnings of each case study informed the ensuing case study learnings. Each case promoted an array of learnings at different levels of the research objective – from methods to values and justification, planning practices, settlement patterns and the ‘seeing’ of urban landscapes. The concurrent learnings in the case studies functioned as leads, informing the propositional reflections, as developed throughout the research process. The propositional reflections are provided as a concise list below. This is supplemented by the Fig.6.1.15 Key Themes Schematics, which summarise the key elements of the propositional reflections through reference to level, content, knowledge production and relevance to the research objective. Chapter 6.2.1 further reflects on how the learnings relate to other discourses in research and practice, and Chapter 6.3. provides a schematics on the contributions of the research.

Design Comments – a conceptualisation aiming to advance landscape architectural research through designing. The design Comments connected material, matter and interaction and also acted as an action research component in the transdisciplinary context of professionals. The Design Comments use landscape architectural visual material as the departure point of dialogue.

The Anthropocene – a geological epoch, the Anthropocene is a call for addressing human value systems and actions in urban landscapes beyond the dichotomy of human < > nature. The conceptual strength of the Anthropocene is that it is bound to human landscape practices and ‘how we see and attribute value to urban landscapes. The Anthropocene provides a lens to communicate the interconnected relationship between human and natural processes.

Affordances – the concept of affordances is already embedded in the methods and visual techniques of landscape architecture. In the Dialogical Space of the Design Comments, visualising affordances supported the ‘seeing’ of urban landscapes in the Anthropocene, rendering potentials of the urban landscapes as tangible and advancing the skilled practices of seeing risks and opportunities in urban landscapes.

Justification Analysis – the framework of ‘6 Regimes of Justification’ provided an interpretational lens to decipher diverging value claims through common, public justifications in a Western European context. Transforming the theory from sociology into the practical context of Landscape architectural methods enabled some contributing modus to address and acknowledge diverse justifications and value systems in transdisciplinary contexts with reference to the common good.

Hydrotoponyms¹ – describes the connection between flood, flood risk,
 1 I later found a paper by Freital et al, proposing the term hydrotoponymical (Freitas et al., 2014)

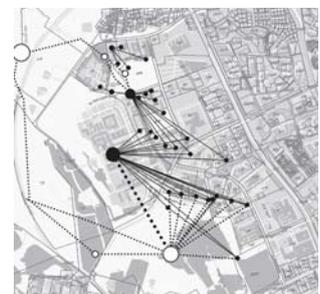
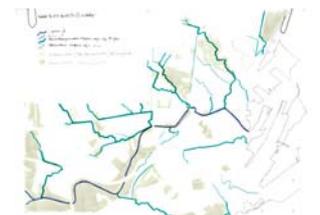
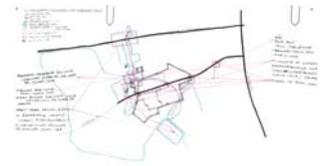
and how flood risk can be increased by human settlement patterns. It does this by 'naming' settlement patterns with place names that tell of water as a nostalgic 'nature' narrative instead of pragmatic information. It offers a simple narrative of the relationship between deep structures and contemporary settlement patterns, communicating landscape practices over time.

Step-by-step pre-strategy— is an incremental, cross-scale strategy set in the context of Aarhus as a CA|HOW approach that could tap into existing municipal strategies. The *pre-strategy* used potentials of value creation as the entry point—as opposed to departing in an obligation to climate adaptation, visualising how specific areas were opportune for creating multiple benefits relevant to different municipal work fields.

Catchment Neighbourhoods — the proposal of strategic CA|HOW planning, enabling up- and downstream relations. The Catchment Neighbourhood address a span in Danish planning between the municipal vision/ municipal plan and local climate plans, with emphasis on community building, social coherence, local spatial and functional qualities, while not requiring specific interests in water as such.

Transversal/Hidden passages of Aaby —a local Aarhus finding of 'room for the water', with the potential to be connected as part of a coherent CA|HOW strategy, with considerable opportunities for creating plural values with reference to the common good. The transversal passages are a break with Aarhus' ring-based green structure strategy.

Designing for future affordances —a proposal for strategic landscape design with generosity for future generations, using landscape affordances in early design and planning phases to design with open-endedness, and sustaining possibilities beyond the single property, the current economy and merely here & now interests. It accommodates value creation that might not be feasible today due to planning regulations, existing buildings or a lack of sufficient funding.



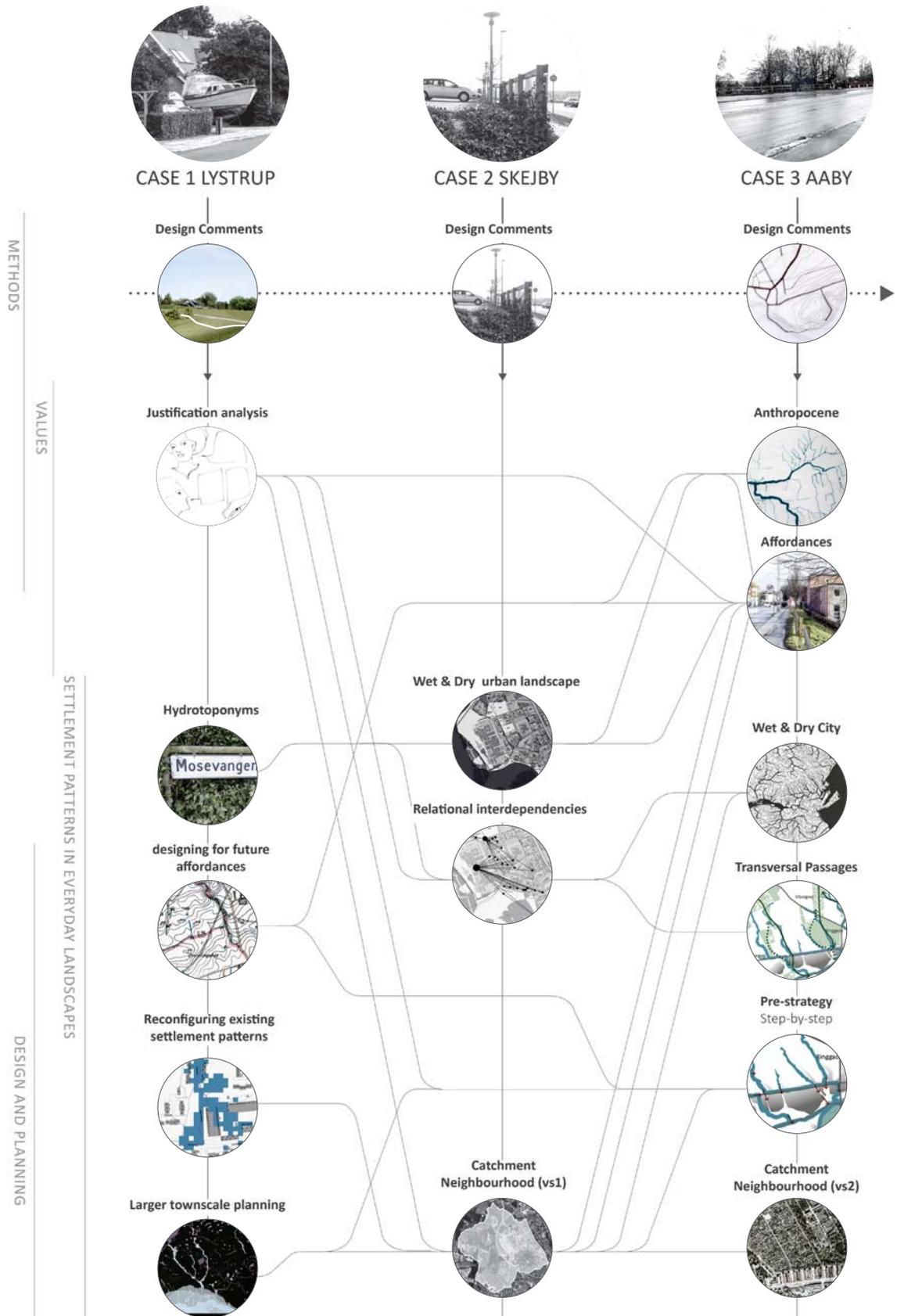
Figur 6.1.13: Mapping layers form Case 3, and mappings of relational interdependencies in Case 2

Methods, values and physical landscapes

In order to provide an overview, the propositional reflections can be divided into the three levels of methods, values, and landscape design/planning. However, in the research, these levels have been interwoven, and each informs the other. For example, the Catchment Neighbourhood is informed by the justifications analysis, the concept of affordances and the learnings on relational dependencies of Case Skejby together with the landscape-based local findings of the disconnected blue-green transversal passages of Aarhus.

The Catchment Neighbourhood, Step-by-step strategy and the transversal passages share the core characteristic of pointing towards settlement patterns and urban developments that are disconnected from the landscape's deep structures. Essentially, in all three cases, the foremost potential for creating plural values through CA|HOW in the landscapes of Aarhus was to use remnants of former blue-green passages as green infrastructures. Secondly, the urban development in the areas of the case studies points in the direction of landscape illiteracy (further discussed in the reflection Chapter 6.2) and a need to reframe the common understanding of the relation between landscape properties and human constructions. In this, both the Anthropocene and affordances became productive concepts, as they enabled a practical dimension of spatial qualities and potential actions. Chapter 6.2 relates this to existing discourses.

OVERVIEW OF CASE LEARNINGS

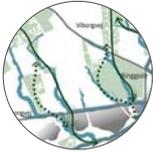
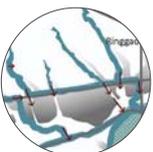


Figur 6.1.14: Overview of case learnings and their main relations in informing each other.

KEY THEMES SCHEMATIC
schematic of propositional reflections
and their knowledge production

PROPOSITIONAL REFLECTION	LEVEL & BACKGROUND	CONTENT	KNOWLEDGE PRODUCTION AND RELEVANCE TO RESEARCH OBJECTIVE
<p>Design Comments</p> 	<p>METHODS</p> <p>A multi-methods/ Design research approach, aiming to connect action, material, hard facts and design knowledge in a dialogical approach in transdisciplinary collaboration. Design Comments uses methodological elements from ANT and action research in the context of landscape architectural Research through Designing.</p>	<p>Design Comments consists of iterative loops with two 'spaces; an internal LArch Space (mapping, field trips, theory) and an external Dialogical Space (interaction, using the LArch material and approach pro-actively in real-time, 1:1 encounters). Between these two phases is a transition phase of Formatting the material. The two spaces are connected through a Linkage of Relevance (a shared subject matter of concern. In this research context the Linkage of Relevance was the concern of CA HOW and interest in value creation, connected by the use of hard factual knowledge from using the same flood map projections and geographic places .</p>	<p>Design Comments formed the knowledge production, while also exploring the methods themselves. The term Design Comments is a conceptualisation of integrating multi-methods in landscape architectural research through designing with focus on interaction and dialogue, aiming to connect and develop the shared knowledge creation among transdisciplinary actors by the use of tangible material. The design Comments have been an exploration of the 'how to' of the research question: <i>How can landscape architecture and landscape architectural processes contribute to plural value creation in the everyday urban landscapes of CA HOW with regards to cross-sectoral and transdisciplinary collaborations in early project phases?</i></p>
<p>Justification Analysis</p> 	<p>VALUE + METHODS</p> <p>The theory of the 6 Regimes of Justification was provided by Boltanski & Thévenot (Boltanski 1991, 2006). This was translated into a practical context as a Justification Analysis.</p>	<p>The Justification Analysis is a transformation of a theory from sociology. The Justification Analysis is a practice-oriented framework used to decode/ understand and acknowledge diverse justifications, (peaceful) conflicts and incommensurability between diverse stakeholders. It is a situated, contextualised approach allowing for compromises and alternative solutions in urban landscapes, with an overarching aim for the common good.</p>	<p>Justification Analysis provided an entry to the knowledge production as a non-exhaustive approach to inform value creation in the context of diverse actors through the acknowledgement of these diverse values and the common good in early phases.</p> <p>Engaging and facilitating different value claims among diverse and transdisciplinary actors is core to the research project</p>
<p>Hydrotoponym</p> 	<p>FACILITATION</p> <p>Hydrotoponym is suggested as a term. The term hydrotoponymy has been suggested by Freital et al 2014 as: a hydrotoponymical classification with the sub categories hydrologic, hydrobiologic and hydroethnographic</p>	<p>Suggesting the term Hydrotoponyms was an effort to articulate the relation between settlement patterns, landscape properties and flood risk in a tangible manner.</p>	<p>The term Hydrotoponyms as a response to the analysis of flood risk and settlement patterns in Lystrup. The correlation between past-present- and future surface waterscapes was then visualised, by the means of photographs of road signs together with a GIS map of flood projections as a narrative on interdependencies, causes, effects and human induced risks found in contemporary settlement patterns. This was named by the term 'hydrotoponyms' to provide a landscape specific narrative. It addresses the 'missed opportunities' investigated in the research question.</p>

PROPOSITIONAL REFLECTION	LEVEL & BACKGROUND	CONTENT	KNOWLEDGE PRODUCTION AND RELEVANCE TO RESEARCH OBJECTIVE
<p>Anthropocene</p> 	<p>CONCEPTUAL + PRACTICAL</p> <p>The Anthropocene is a term coined by ecologist E.F. Stoermer in the 1980s and mainstreamed by P. J. Crutzen in 2000. It is proposed as the current geological epoch, a subdivision of the Geological Time Scale. As a physical and processual premise the Anthropocene is not new to landscape architecture/ecological urbanism.</p>	<p>The Anthropocene can be seen as a questioning of the current distinction in the Danish Planning System between urban and rural zoning, which in its origins shields residential areas from the nuisances of industrial activities. However, findings question whether this zoning is still useful in its current form in the Anthropocene.</p>	<p>The Anthropocene provided at conceptual lens to the knowledge production supporting the 'seeing' of urban landscapes, e.g. the interplay between human constructions and natural forces which together form the physical urban landscapes</p>
<p>Affordances</p> 	<p>CONCEPT + METHODS</p> <p>The concept of affordances was coined in ecological psychology by J. Gibson, 1979.</p> <p>In designing, it has been used in the context of, e.g. qualitative assessments in building architecture and, cultural heritage landscapes, playgrounds, analysing public spaces, object design and interfaces. The term is implicitly embedded in ecological urbanism/ landscape architectural methods, conceptualising and visualising landscape-based affordances.</p>	<p>The mappings and photo diagramming used in the Dialogical Space with transdisciplinary actors, evolved to show affordances of the urban landscapes in each case. Affordances have value as such, however, whether these values are considered 'good', bad or even inherent depends on the specific situation.</p>	<p>Using visual material showing different affordances became productive in the transdisciplinary encounters of the Design Comments. For example, this was productive in visualising relational interdependencies and an outset for discussing 'how well' the spatial qualities worked in relation to, e.g. the retention basins in Lystrup, and the technical terrains and impermeable surfaces in Skejby. The affordances concept proved productive to the research objective by advancing the internal consciousness of the usage of visual methods in landscape architecture. This promoted a renewed 'seeing' of urban landscapes, with different stakeholders 'seeing' urban landscapes and their opportunities differently. For example urban landscapes of the Anthropocene where the Dry and the Wet City provide different affordances.</p>
<p>Designing for future affordances</p> 	<p>STRATEGIC DESIGN AND PLANNING</p>	<p>Designing for future affordances is a response to the case findings where contemporary, short-time development obtruded future affordances. Instead, designing for future affordances is a landscape-based approach to open-ended design for future value creation.</p> <p>Designing retention facilities with departure in 'generosity': accommodating landscape based, future affordances</p>	<p>In the Lystrup Case, the CA HOW measures included retention basins. While these lead downwards to the recipient area, they nevertheless followed the local administrative boundaries more than the landscape properties. In the pilot project, the retention basins were designed by administrative logic and the capacity was based on the expected volume of water. There was no capability to adapt to other uses in the future (e.g. for more water collection) or to support future actors in the urban landscapes, such as community building, aesthetics, and biodiversity.</p>

PROPOSITIONAL REFLECTION	LEVEL & BACKGROUND	CONTENT	KNOWLEDGE PRODUCTION AND RELEVANCE TO RESEARCH OBJECTIVE
<p>Transversal passages</p> 	<p>PLANNING, URBAN DEVELOPMENT</p> <p>The Transversal passages were a local Aarhus finding of opportunities to re-connect former blue-green passages (deep structures) in the contemporary urban landscapes to perform CA HOW and create plural values</p>	<p>The transversal passages showed a considerable, neglected potential with regard to opportunities for value creation through climate adaptation</p> <p>Visualising the transversal passages became an analytical, response to contemporary urban development in Aarhus city's municipal planning with regard to its green-strategies and current urban development.</p>	<p>In all three case areas, the landscape analysis showed that former blue-green passages (deep structures) were creating a hidden structure, transversal to the contemporary settlement patterns and urban development plans.</p> <p>According to the flow path projections, the transversal structures appeared to still influence surface water flows jointly with the constructed urban landscapes. The transversal passages were found at the local/city-scale of the case study areas. They rendered opportunities for creating plural values through CA HOW in the existing urban landscapes.</p>
<p>Catchment Neighbourhood</p> 	<p>PLANNING</p> <p>The Catchment Neighbourhood is a landscape based, strategic planning level aiming to mediate Danish municipal planning, district planning and local climate plans with regard to water. The catchment neighbourhood is based on relations between landscape affordances and community building while also addressing up- and downstream relations and urban development.</p>	<p>The Catchment Neighbourhood is qualified through on-site assessment of local spatial, functional and social potentials together with mapping of deep structures, anthropogenic structures, and flow paths. It operationalises the connections between past-present- and future affordances in a practical planning sense.</p>	<p>The Catchment Neighbourhood evolved from the Skejby Case Skejby with studies superimposing the historic sub-catchment delineation onto the contemporary urban landscape and its sub-catchment delineations. This was then analysed with regard to potential benefits, such as social cohesion, biodiversity, local community initiatives. Based on this, the delineation of the catchment could be qualified and locally adjusted according to practical and meaningful parameters, such as connecting the area as a community, passage for children between sportsfields and public schools and access to green, recreational across age groups. It was a response to the relational interdependencies, administrative planning constraints, and property lines as found in Case 2 and 3, which provided challenges across different disciplines, municipal departments, sectors, and property owners in solving flood risk.</p>
<p>Pre-strategy Step-by-Step</p> 	<p>PLANNING</p> <p>The 'Step-by-Step' is a pre-strategic framework aiming to accommodate transdisciplinary and cross-sectoral actors in 'seeing' opportunities in climate adaptation by relating opportunities to different workfields, practices and responsibilities.</p>	<p>The pre-strategy was anchored in pointing to specific areas with specific functions and focused on showing local spatial qualities and opportunities together with feasible actions to avoid flooding, while creating plural values. The step-by-step strategy informs diverse actors on potential benefits from climate adaptation through existing practices and values</p>	<p>The step-by-step pre-strategy was based on the hidden transversal passages finding, and spatial qualities as found on-site in Aaby Kilen, as well as the dialogues with the transdisciplinary actors of Case Aaby.</p> <p>It connected to the aim of the research question of studying missed opportunities for creating values through CA HOW in urban landscapes in transdisciplinary contexts by addressing early project phases.</p>

6.1.5 TRANSPARENCY, DOCUMENTATION AND TRANSFERABILITY

TRANSPARENCY AND DOCUMENTATION

In the thesis, I have included planning documents and flood maps in their original state. The purpose has been to provide the reader with transparency towards the foundational material- material that was used for original mappings- endowing the reader with access to the underlying notions in the LArch mappings and discussions. This is complemented by photographs from the field trips, once again, to provide transparency.



TRANSFERABILITY

Settlement patterns and water - the local, geomorphologic context of cases

The settlement patterns and material practices of Lystrup and Skejby resemble those of other post-WWII, Danish suburbs. These are connected by their considerable, local alterations such as sealing off the soil or in-property terrain modifications, building layout and orientation. From this perspective, they share the trait of being disconnected from the logics of landscape properties such as terrain and the natural force of water, thus creating or increasing flood *risk*. From this perspective, the consequences of inconsistent sub-catchments and diffracted flow paths are likely transferable to other Danish suburban contexts too. All three cases were located in a physical context with relatively strong landscape properties of the moraine slopes and the river valley. The propositional findings regarding settlement patterns and planning are transferable to other Danish urban landscapes with similar landscape properties hidden beneath the asphalt. The geomorphologic map marking fjord cities along the eastern Jutland coast, Fig.6.1.16 shows that this is likely transferable to the urban landscapes of Randers, Skanderborg, Horsens, Vejle and Kolding. The settlement pattern and planning practice of placing public and semi-public functions in former blue-green passages is, however, not accounted for beyond the Aarhus case studies. These elements are further discussed in Chapter 6.2. In other Danish landscapes with different properties, such as the sandy soils of western Jutland or the flat heath areas of mid-Jutland, the strategic landscape-based affordances of CA|HOW are likely to be different. That said, settlement patterns and landscape properties in such urban landscapes are likely to provide affordances that could be uncovered by using the same methods and approaches of connecting past-present- and future situations and rendering affordances. From the perspective of all surface locations being technically part of a topographic sub-catchment, it seems feasible to suggest that the concept of Catchment Neighbourhoods could be transferable to urbanised contexts in general. In dry areas, water handling could be reversed, e.g. to collect water. The foundational challenge of surface water issues together with potentials for value creation in a neighbourhood seem ultimately transferable to existing discourses. This is further discussed in the Chapter 6.2 Reflection.



Figur 6.1.16: Illustration from Chapter 3.1 and 5.3(Case 3)

SOCIETAL CONTEXT AND TRANSFERABILITY

Responsibilities for a common good

Another relevant factor of transferability is the societal context. This research has been performed in a Danish context, providing quite well-defined actors and responsibilities on both water and planning. The state has legislated the municipal climate adaptation plans. The municipalities share a common responsibility for the public good, and even though most citizens are dependent on privatised water companies, these have a responsibility to the common good. In Denmark, the division between responsibilities regarding surface water is well-defined too. This provides some clarity to CA|HOW – but still, it also provides some difficulties as water does not respond to administrative divisions. Nevertheless, the general emphasis on responsibilities to the common good placed on the state, municipalities and water companies means that employing the notion of the common good and a shared humanity seems feasible to apply as a shared value attribution in a Danish context. In Case Lystrup, I mapped the key discussions about the framework of the 6RJ. As demonstrated, the Industrial regime was represented as the major, appropriate justification in most discussions. Nevertheless, the underlying references relating to justifications of the Civic and Opinion regimes were highly present. For example, as shown in the cases, the case actors repeatedly expressed a general concern to responses from citizens and political agendas, infusing the discussions and decision-making.

Other societal contexts in need of CA|HOW

The objective of promoting value plurality by employing affordances of past-, present-, and future landscape properties, could, in principle, be transferable to most contexts. However, at the level of societal structures and power relations, this might not be the case in all regions of the world. The legal and societal framework of, e.g. the right to water, a place to live, democracy and equity, might not be there to support the approaches suggested in this research. In some nations or regions, the state, market interests or opinion regimes might bypass what could be considered the common good and shared humanity. As mentioned in the UN report (United Nations, 2012), changing waterscapes are likely to impact poor people the most. And in some regions, poor people do not necessarily have the same rights or supportive legislative and infrastructural systems that Danish citizen enjoys.

PART 6 OUTCOMES

CHAPTER 6.2

REFLECTION

6.2.1 Introduction

6.2.2 Urban landscape practices and affordances in the Anthropocene

6.2.3 Green infrastructures as the urban backbone

6.2.4 Facilitating a change of view on urban landscapes

6.2.5 Sum-up: water as an actor and landscape-based planning as a pro-active actor



P6_C2

REFLECTION

6.2.1 INTRODUCTION

Chapter 6.2 provides a reflective contextualisation on the case studies in relation to ecological landscape planning and design, and green infrastructures.

The objective of the research was to explore 'missed-out' potentials for plural value creation in the early- processes of CA|HOW projects in everyday landscapes. The methodological outset of the research was to engage with an exploratory approach by entering the live Engine Room of transdisciplinary collaboration in a Danish, municipal context. Though coming myself from a practice background with a cross-scale approach to landscape, planning and urban design, and despite being attentive to water as a cross-scale actor, I primarily expected findings at a smaller and medium scale. However, the methods themselves embedded ecological thinking, including studying elements from different scale and time perspectives concurrently.

The empirical findings of the case studies were set in the specific geographic and societal context of Aarhus. During the case studies, leads from the actor-encounters pointed to the discrepancy between the flow of surface water and administrative boundaries in urban landscapes. As such, this revealed a discrepancy between the 'natural' force of water and expectations as to the functions of the built environment. This, in turn, was attached to the human perception of urban landscapes and their affordances; a perception that was enacted in the built environment of Aarhus. As a response, a re-occurring theme of the case studies became flood risk and how to 'see' urban landscapes in the Anthropocene. This relates to the concept of landscape (il)literacy provided by Anne Spirn, denoting the 'reading' of landscapes.

In all three case studies, re-connecting remnants of blue-green passages within the existing urban landscapes was a local finding for value creation through CA|HOW. These findings represented an opportune, practical level of (missed-out) potentials of value creation and a local finding of potential green infrastructures, relating to larger discourses in ecological urbanism and green infrastructure.

Structure

The following reflects on how the local findings of the case studies connect to discourses in ecological planning and green infrastructures, and how landscape (il)literacy and the skilled practice of seeing affordances are intertwined with landscape practices in the Anthropocene

6.2.2 URBAN LANDSCAPE PRACTICES & AFFORDANCES IN THE ANTHROPOCENE

EXPECTED AFFORDANCES AND LANDSCAPE PRACTICES

A reoccurring theme in the three case studies and the associated propositional reflections was how contemporary urban development, settlement patterns and landscape practices did not seem conducive with opportunities of value creation through climate adaptation. Rather, contemporary practices seemed to cause obstacles for human interests. The case studies pointed to how human practices in urban landscapes further induced flood risk. This becomes even more critical when seen in the light of the fact that the Anthropocene necessitates a pressing need for adapting to uncertainty, caused by human-induced climate change. In the context of the case studies, settlement patterns and urban development had not entered the epoch of the Anthropocene, and the *expected* affordances of the urban landscapes seemed to be misleading urban development on behalf of flood risk. From this perspective, the case learnings evolved in relation to how we 'see' urban landscapes, and it seems fair to assume that how we 'see' has a direct influence on how we perform our landscape practices. For example, our expectations as to the function of urban landscapes are likely to denote what are considered *good* settlement patterns and urban *development*. From this perspective, the 'seeing' of urban landscapes is bound to how we qualify direction to action.

Early warnings on the consequences of human landscape practices

"Draining and irrigation are habitually regarded as purely agricultural processes, having little or no relation to technical geography; but we shall find that they exert a powerful influence on soil, climate, and animal and vegetable life, and may, therefore, justly claim to be regarded as geographical elements." George Perkins Marsh, on the 'Climatic and Geographical Effects of Surface and Underground Draining, 1864 (Marsh, 1974, p. 306)

The landscape practices of the industrialisation of and spatial logics attached to increasing urbanisation were based on expecting humans to be in control of nature. This trajectory was indeed successful in improving citizens' health, industrial prosperity and facilitating the expansion of urban areas (Chapter 3.1). However, the implications and risks of this trajectory were already pointed towards in the early 19th century by Alexander von Humboldt (Wulf, 2017, pp. 594–595). This was further explicated during the 19th century, particularly in the seminal book 'Man and Nature' by George Perkins Marsh in 1864 (Marsh, 1974; Spirn, 2012, p. 11; Wulf, 2017). Both Humboldt and Marsh were making the case for how human landscape practices were likely to impact the

climate with both local and large-scale negative implications for future generations. For example, they pointed to the consequences of deforestation, soil erosion and impeding local hydrological cycles (Marsh, 1974; Wulf, 2017). In the quote above, Marsh refers to agricultural practices of draining and irrigation. However, the concern about human-induced climate change and seeing human constructions as part of the landscape also reflects a precedent of an understanding of landscape practices in the Anthropocene. With climate change in the Anthropocene, Humboldt's and Marsh's early warnings on how human landscape practices alter our environment at a global scale is becoming real. Nonetheless, in the local context of the case studies, urban landscape practices still rely on assuming humankind to be in control, enforced by administrative boundaries, and static planning distinctions of, e.g. dividing the rural ('nature') and the urban.

A LANDSCAPE ILLITERATE URBAN DEVELOPMENT

Aarhus is situated by- and named after- the mouth of a river. The city has followed the industrial trajectory of urban development by undergrounding streams and building upon former wetlands (see Chapter 3.1). In this sense, Aarhus resembles that of many other cities in Denmark, Europe and the US. With changing waterscapes, this trajectory is becoming a risk to urban development itself. The Lystrup and Skejby case studies pointed towards a discrepancy between land-use practices and the expectations of a well-functioning urban landscape. In the example of Lystrup, suburban settlements were situated *on top* of a source (Kildehaven) and *in* blue-green passages, creating settlement patterns that enforce flood *risk*. In Skejby, local terrain alterations and autonomous buildings played a role in creating flood risk for the region's largest hospital. These are local findings. However, the practice of urban development detached from landscape properties is transferable to a more general level of urban development in a Western context. The discrepancy between landscape properties and land-use practices can be seen as a seeing of false affordances in neglect of hidden affordances (Gaver, 1991) (Chapter 4.5). The opportunities found in the neglected passages were hidden affordances, dependent on the skilled practice of reading affordances – or landscape literacy.

The 'seeing' of landscape properties connects to the learnings of this research regarding the need for advancing the skilled practices of perceiving landscape affordances, as provided by Rietveld (Rietveld and Kiverstein, 2014) (see Chapter 4.5). The capacity of perceiving landscapes of affordances relates to the reading of landscapes, coined by Spirn as *Landscape literacy* (Spirn, 2005a). The term is further elaborated in 'The Language of Landscape' (Spirn, 1998), aiming to advance landscape *literacy* in contrast to *illiteracy*. Landscape illiteracy connects to the assumption of humans that they are in control of nature. With the undergrounding water in the command and control regime, the reading of landscape properties became an obsolete skill in urban development. With climate change, this strikes back, suggesting a need for (re-) enabling the capability of reading landscapes.

Settlement patterns and illiterate landscape practices

Some of the key themes found in the three case studies relate in a manner to Anne Whiston Spirn's long-term work in the Mill Creek area, Philadelphia (Spirn, 2005a), as briefly described below. In the 1980s, Anne Spirn and her students uncovered how the inner-city Mill Creek area had become deprived with abandoned houses, broken communities and low-income households and the relation between this and the fact that it is situated on a buried floodplain (the Mill Creek). The work was conducted via, e.g. mapping abandoned houses and their relation to the former floodplain, and opportune areas of local initiatives. The Mill Creek project provided a landscape-based facilitation of a change of view in regards to water-lays of the urban landscapes, engaging pro-actively at different levels. The project instigated the education of schoolchildren in landscape literacy, enforced community building, and provided a landscape-based strategy for urban development: the West Philadelphia Landscape Plan (Spirn, 1991). The Mill Creek project illustrated the importance of enabling landscape properties to inform urban development, and how ignorance of the deep structures of the landscape is related to negative, societal impacts and social injustice at many levels. A landscape illiterate urban development and the area was even referred to as 'the bottom', elaborated by Spirn as "They are at the bottom, economically, socially and topographically" (Spirn, 1991, 2005b, p. 408).

Though Spirn's work is by far more comprehensive and included a much broader range of actors than this research, there is a striking resemblance with the 'failures and opportunities in urban development' found in the Aarhus case studies. For example, the opportunities of using landscape properties and flood risk to guide urban development while also creating local values such as stronger neighbourhoods with shared, outdoor spaces and activities. It also bears a resemblance regarding the need for facilitating a change of view of a broad range of actors on 'seeing' landscapes. Furthermore, the overall trajectory of urban development assuming control over water and terrain as found in the case studies of this research relates to the Mill Creek Project. However, the local implications differ. In Mill Creek, the settlement on the buried floodplain was related to considerable inequity and disempowered neighbourhoods. This is not the case in the Aarhus case studies. The implication of local flood risk also differs between the three case studies. In Skejby, the flood risk of the hospital was highly critical to society at a regional scale, disregarding socio-economic status. Whereas in Lystrup, the flood of residential houses and infrastructure had personal and economic consequences at a local scale. At a general level, the urban development and settlement patterns as seen in the case studies of this research connect to Spirn's work in Mill Creek, not least in the ignorance of deep structures and landscape literacy as a lost capacity of reading landscape properties and translating these into informing urban development and settlement patterns. These are utilitarian landscape practices with negative impacts in regards to human living conditions.

DESIGNING AND PLANNING TO INCREASE FLOOD-RISK

“There are floods now, and obviously many people will drown in these floods, because every American believes he has an alienable right to build in the floodplain and to be drowned [...]. People really should be prohibited from drowning. It’s a public embarrassment to have to haul these people off [...]; [...] and then help them clean mud out of the basement.” Quote, Ian McHarg, recorded lecture, approx. 1976 (McHarg et al., 2007, pp. 56–57)

The rather provocative quote above by McHarg questions the logics of planning and settlement patterns that willingly inhabit wetlands. This is, of course, not the case for the less economically-privileged wetland inhabitants around the world, e.g. the considerable amount of poor inhabitants in the Bangalore estuary who did not have a choice of where to settle. A study on flood risk and vulnerability in coastal regions, provided by M. Marchand, shows how comparable physical (coastal) environments with different socio-economic contexts cause different vulnerabilities and that the less privileged sections of society are the most vulnerable (Marchand, 2008). Thus, pointing to matters of (in) equity. The UN also reports on how climate change and changing waterscapes will impact poor people the most (UN, 2016), part of which is a vulnerability enforced by where they are settled¹. However, the trajectory pointed at by McHarg almost 50 years ago, later investigated by Spirn in Mill Creek also in a US context, seems disturbingly close to that of present-day Aarhus.

One thing is that opportunities are missed out on when deep structures are ignored, another thing is that it is likely that human interests are therefore reneged, thus values. The discrepancy between administrative lines on a map, contemporary urban development, and notions of growth ignoring the inherent opportunities of deep landscape structures is by no means a new disparity (Spirn, 1993). Ian McHarg’s seminal work - ‘Design with Nature’ of 1969-showcased applicable methods to employ knowledge on deep structures and water’s flow as a means to inform design and planning (McHarg, 1969). McHarg advocated that we need to build *with* nature instead of assuming that humans execute an ultimate control of the environment.

As described in Chapter 3.4, McHarg’s approach and statements were complemented with applicable methods for ecological planning, e.g. methods to analyse where to build and how to design settlement patterns in relation to landscape properties, guiding how to qualify landscape practices to then inform urban development. Part of the work became the origins of the GIS map, now used globally, and of course, also a foundational tool in Danish municipalities. However, the overall purpose of ‘designing with nature’ - to make human/nature benefit in co-existence- has not been as successfully implemented in urban development as the GIS itself has been. The 1:1 application of it’s potential to inform settlement patterns and urban development seems to be underestimated, and, apparently, other driving forces have been stronger or

¹ This is, of course, part of a larger picture, and not only by poor people settling in low-lying areas. This could as well be droughts, lack of water management infrastructure, and that informal settlements outside cities are often built with less stable material.

faster. The relationship between driving forces such as, e.g. economy and the physical environment relates to what Pauleit and Breuste describe in the context of urban ecology: " *The metabolism of cities is largely the result of the concentration of people and economic processes. It is also related to urban form.*" (Pauleit and Breuste, 2011, p. 19) (Spirn, 2005b).

'Designing with Nature' and short-term memories

The Woodlands in Texas is an example of a new town development of the early 1970s that follows the ecological planning principles of McHarg in the context of Wallace, McHarg, Roberts and Todd (Spirn, 2005b, 1973). A recent analysis of Woodlands by Bo Yang shows how the settlement patterns that follow ecological planning principles, e.g. proactively use the deep structures, hydrology and vegetation patterns of the landscape, proved more resilient than comparable neighbouring settlements (Yang et al., 2013; Yang and Li, 2013). In the analysis, Woodlands was found less vulnerable to heavy precipitation and less exposed to urban heat islands effects. However, Yang concludes, present-day property owners, designers, developers and policy-makers seemingly forgot about the *practical* dimensions of the design of the Woodlands area, thus altering the concepts without understanding the consequences (Yang et al., 2015).

History repeating

Both the Lystrup and Skejby areas are relatively newly built on 'bare fields', and the property owners represent middle-class residents and prospering businesses. Thus, they were free to plan and build based on the best knowledge available, including that of the physical landscape properties. For instance, by using the methods provided by Ian McHarg in the 1960s. Another example is the recommendations of 'A Plan for every City', which provide overall guidance for settling with natural forces and landscape properties that can be adapted locally, provided by Spirn in 1984 (McHarg, 1969; Spirn, 1984). As a thought, this would likely have left the CA|HOW pilot-project in Lystrup unnecessary.

From the perspective of it being almost five decades since McHarg provided the principles for ecological design and planning, one may wonder how this can still be the case. Even the critical flood risk to the hospital was only discovered because of the Danish state legislating the provisioning of municipal climate adaptation plans by 2013. A fundamental question is how the knowledge and relationally-based methods of ecological approaches to urban development and ecological planning have not yet been implemented on a larger scale.

In practice, many of the methods for landscape analysis provided earlier in history by, e.g. McHarg, are already implemented, without necessarily knowing the history of the development or origins of the methods.

Possibly, this lack of historical knowledge weakens the methods themselves when engaging with other actors and driving forces. Admittedly, coming myself from a tradition of cross-scale working methods, often departing in landscape analysis and with an inclination to ecological thinking, I, admittedly did not know of such history *repeating* until recently.

6.2.3 GREEN INFRASTRUCTURES AS THE URBAN BACKBONE

THE RING ROADS THRESHOLD BETWEEN URBAN AND NATURE

When studying Aarhus, the disconnected, smaller scale remnants of blue-green passages represent opportunities at a larger scale. Through opportunities created by disparate trajectories of urban development, they now show a considerable potential in the present, and for the future Aarhus. At a larger scale, Aarhus shows sizable green structures, e.g. Skjoldhøj Kilen and Brendstrup Korridoren. However, they stop outside the Ring Roads, functioning as a structural and spatial threshold, detaching 'nature' from urban. This is shown on the green structure map Fig.5.3.104 Chapter 5.3, and planning map of Aarhus, Fig. 6.2.17: one infrastructure is blocking the other. Inside the threshold, the blue-green passages are perceivable as patches, e.g. parks, outdoor areas for social housing, parking lots, sports fields, and 'leftover' spaces, disconnected by primary roads, buildings and so forth (Fig.5.3.118, Chapter 5.3). This division is not only of the past 20th century. The current urban development in Aarhus shows how the hinge between the larger river valley and the stream leading through the inner city to the bay is blocked by a new building (Åhaven). The former Mølleeng (Mill Meadow) and waterworks also show intense land-use by quite new buildings as well (Please see Chapter 5.1, 6.1).

The visions in the municipal planning strategy of 2015, named 'Klog vækst frem mod 2050' (Smart Growth towards 2050) are concerned with livability in the future Aarhus. The strategy particularly addresses this through densification and the benefits of the compact city (Aarhus Kommune, 2015). According to Pauleit and Breuste, aiming for developing a mixed-use, compact city as an answer to future needs '*has become an important goal in current urban planning in the Western world*'. They point towards that both urban sprawl, and densification strategies can have negative impacts on our environment (Pauleit and Breuste, 2011, p. 19,30). As such, the vision of the compact city is not in itself a guarantee for successful urban development regarding livability.

In the Aarhus strategy, it is, however, also claimed that "The local² landscapes and green passages have to be merged with urban functions and run into the city. We want green density!" Quote³, Smart Growth Strategy, 2015 (Aarhus Kommune, 2015, p. 18). When looking at the urban development, it is hard to see how the deep structures that can support this are prioritised, and where the relevant space is allocated. Rather, contemporary changing land-uses on post-industrial sites support dense, new buildings in low-lying areas and former blue-green passages. As an example, the outcomes of the densification strategy can be seen

² 'Bynære', which in Aarhus means 'close-to-the-city centre'

³ Author's translation from "De bynære landskaber og grønne kiler skal samtænkes med byfunktionerne og trækkes ind i byen. Vi vil have grøn fortætning!"

surplus land until built.

A LOCAL OPEN-WINDOW OPPORTUNITY IN AARHUS

The cheap soils and the common good

As in many other cities, urban development in Aarhus went from being integrated with local resources like water and soils, to that of other driving forces, forming the settlement patterns by different logics and needs than earlier in history (Chapter 3.1).

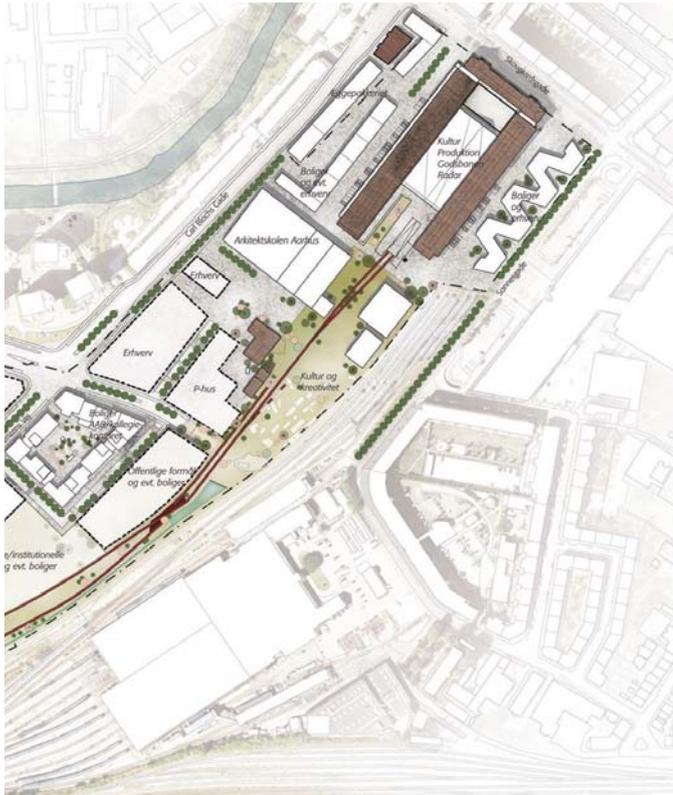
The study of aerial photos and historical maps in Case Aaby showed how the blue-green passages were being built upon during the 20th Century. As their function as supporting the city was no longer evident, their importance decreased, and they became prospects for expanding land-based mobility and expanding suburban developments with residential and business/industrial enclaves as shown in both Case Lystrup and Skejby (Chapters 5.1, 5.3, 6.1). Nevertheless, the Aarhus trajectory of situating public and semi-public programmes has left an unintended open-window opportunity.

Case Aaby revealed how the former blue-green passages now hosted a considerable number of public and semi-public programs with relevance to the broader public from cradle to grave, e.g. nurseries, kindergartens, schools, allotment gardens, nursing homes and cemeteries. These were prioritised functions in the building of the Danish welfare city): "*The planning of the Welfare State and the physical planning of the Welfare city were projects that were closely knit together*".⁵ Tom Nielsen, (Nielsen, 2007, p. 301)(authors translation). Thus, it was a development based on a public priority governed by state and municipalities, supporting the industrial society through a regulated market economy, including the means of providing education, childcare, and social housing. In this sense, it represented an urban development both in and outside the former inner cities, which did not solely followed the logic of free-market growth. The building of the Welfare State provided a considerable array of public building projects, e.g. institution from the 1950s and onwards (Nielsen, 2007, 2001). Nevertheless, broadly, one could say that the settlement patterns of the blue-green passages of Case Aaby render a trajectory of placing 'cheap programs on cheap soils'. Cheap programs understood as the public programs that represent an expense justified by the common good and paid by the Danish taxpayers, thus not resembling a *direct* market gain or *short-term* pecuniary surplus. Cheap soils, in turn, is understood as areas that are not as attractive to build upon as the drier (stable) soils, thus likely representing a lower selling price anyway or owned by the municipality in advance. Whether the pattern of placing public institutions in former blue-green passages is transferable to urban development in other Danish cities with comparable landscape properties could be a relevant study regarding qualifying Danish urban development at a more general level.

As shown in Case Aaby (Chapters 5.3, 6.1), there are considerable

5 "*Planlægningen af velfærdsstaten og den fysiske planlægning af velfærdsbyerne var projekter, der hang tæt sammen.*"

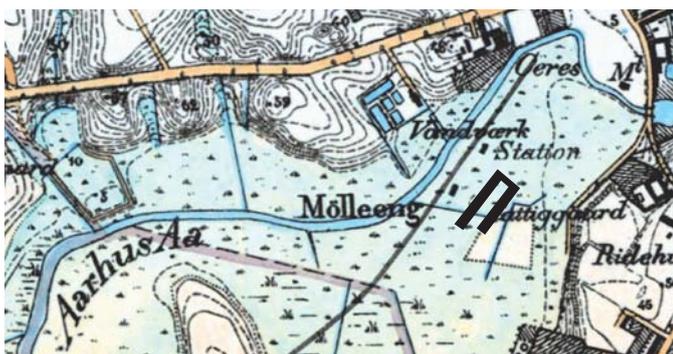
potentials for re-connecting the blue-green passages to accommodate CA|HOW, thus facilitating the city in a long-term perspective through a common good. However, though the 'room for water' can still be found, it requires a change in the perception of the city and its urban landscapes. To make 'room for the water' and support opportunities for future inhabitants is indeed a call for a planning of the Anthropocene where 'smart growth' is also structurally qualified by local landscape



Quotes from the Aarhus Municipal Plan 2017 and the Planstrategi of 2015, emphasizing the city's visions with regard to urban life, green- and blue spaces:

"Kort sagt, skal vi tænke byliv før byrum og byrum før bygninger."
"In sum, we will attend urban life before urban spaces, and urban spaces before buildings."
 (authors translation). Aarhus Municipal Plan 2017, p33

"Vi skal bygge tæt, samtidig med vi sikrer plads til det grønne – og det blå." *"We shall build dense/compact and simultaneously secure room for the green - and the blue."* (authors translation) Planstrategi 2015, p18



Figur 6.2.18: Top: shows the plan for the Godsbane area with new buildings. Middle (HMB) and bottom (LMB): historical maps showing the Godsbane area. The main Godsbane building is marked with black to allow for comparison with the top plan of the new buildings. Sources: quote Planstrategi 2015, p.18, quote Aarhus Municipal Plan 2017, p33. Plan: Godsbanearealerne Aarhus K – kvalitetsprogram" August 2017, Aarhus Municipality, Teknik & Miljø, p. 21. LMB, HMB maps: GST; footprint of Godsbanen: KW

properties and natural forces.

An open-window opportunity at the city and the district scale

As the leftover spaces in case Aaby show, the extensive post-industrial usage of the river valley together with the larger green structures outside the outer ring road offers an open window opportunity for CA|HOW and the livability in future Aarhus. Together, they represent considerable potentials for value creation for the common good in both short- and long-term perspectives. From the perspective of surface water and a broader common-good consideration, the current urban development strategy of filling up low-lying areas and wetlands with buildings, parking lots and roads, is impressively detached from climatic considerations, logics of landscape properties and concern for future generations. At a city scale, this relates to how the 'seeing' of urban landscapes is also political. The open-window opportunity also relates to the Ring Road threshold, where areas are often described as 'urban fringes' while the planning divisions between urban and rural are sharp opposites. These areas are studied by Qviström, employing the term Awaiting Landscapes (Väntans landskap). Qviström argues that these areas have to be seen as both space *and* place *and* in the light of history, suggesting that we have to study the relationship between the landscape of today and the visions of tomorrow (Qviström, 2005).

When reflecting upon ecological planning, the contemporary densification strategy of Aarhus and the propositional reflection in Case Lystrup of Designing for future affordances leads one to consider if the propositional reflection of *designing for future affordances* was possibly seen at a too small a scale. Designing for Future affordances could also serve as a strategic design at the city scale, for example, by a strategic urban design of leaving areas with extensive use to the benefit of the future inhabitants/generations. As a strategy, it reminds of the agricultural Fallow Fields as well as core elements in the preservation and conservation strategies of leaving natural areas/wilderness free of intensive land-use. Danish planning already has the planning tool of 'perspektivarealer'⁶. In Aarhus, these are areas of interest for the urban development after 2029. In the new municipal plan, the 'perspektivarealer' are focalised on future urban development with attention to residential and business areas, and not landscape infrastructures to support the urban development.

As a strategy, this would pose an array of questions. Firstly, to leave selected areas inside the ring roads 'vacant from buildings' would likely pose questioning from a monetary perspective, as selling plots and construction business is associated with growth and a prospering city. However, at an ethical level, building upon potential CA|HOW areas raises a question of how to justify *not* saving space for future generations while knowing of the current climate change prognoses; a questioning of due diligence and how well urban development sits within its present landscape practices. Secondly, this is a strategy known in planning already; area-designation for larger infrastructure, such as roads and high voltage power lines is a well-known strategy that designates areas for 'eventual' land use, provisioning for future needs and decision-making.

⁶ 'Perspektivarealer' means 'perspective/prospect areas'

It is also seen in, e.g. clauses in building regulations and local planning; *if this is the case, then this is binding*. In between the municipal plan and local plans are the 'development plans' 'udviklingsplaner'. These do not have the same planning status as the municipal and local plans, but they fill a gap in between by providing direction to action in urban development and intending a qualitative approach. They do not, however, depart in recognition of landscape properties, the logics of water, or the uncertainty of climate as its pragmatic, foundational level of knowledge. Designing for Future Affordances at a city scale would mean to allocate areas with extensive land-uses for the decision-making of the future. Thus, ring-fencing areas to be taken out of the equation when building new, dense neighbourhoods. In line with discourses in resilient cities (Ahern, 2013; Pickett et al., 2014, 2004) this could allow for future needs and an opening up to uncertainty and non-equilibrium states, while also supporting Aarhus' smart growth strategy regarding liveability.



Figur 6.2.19: Top 1, 2 (photos from Case Aaby, Chapter 5.3): Area between the Aaby Park and the Aaby public school opportune to reconnecting the blue-green passage with regard to CA|HOW and connecting the up-downstream neighbourhood. Bottom: The area is turned into a new, sealed parking space, not generous to waters flow. However, parking lots are more feasible to change in time than new buildings. Photo bottom: Stephan Gustin, 2017

PRE-STRATEGY AND DISCOURSES IN URBAN ECOLOGY

While departing in the specific case study learnings and the assignment of the test-case, the Step-by-Step pre-strategy from case Aaby has a connection to Jack Ahern's formulation of spatial concepts for using landscape ecology in planning. Ahern addresses how it is important to include multi-scaled perspectives together with landscape patterns and process, with attention to relationships and connectivity. He proposes five guidelines in the 'spatial configurations of the landscape' (Ahern, 2007, p. 272) for planning and designing a green urban infrastructure, based on landscape ecology principles. (1) *Articulate a spatial concept* (2) *Strategic Thinking*. (3) *The Greening Infrastructure* (4) *Plan for Multiple Use* (5) *Learn by Doing*. (Ahern, 2007, p. 273). As urban design and planning are context-dependent in their very essence, Ahern addresses the dilemma between the unique and the general. According to Ahern, advancing adaptive (urban) design as an alternative strategy in both the sciences and to the professions, could enable planning and designing inclusive of process, relationships and connectivity, thereby providing for uncertain future states. Adaptive design means that plans and policies are developed with recognition of uncertainty and incomplete knowledge (Ahern, 2013, p. 1209) (though obviously with pro-tanto knowledge). The adaptive approach to planning and urban design, qualified through the contextualised, unique prospects of the local area, relates to elements of the step-by-step strategy as it is based on strategically accommodating uncertain states.

In the case studies of this research, the flow paths projections revealed a disconnection between different scales – such as the larger deep structures, the single property and its downstream neighbours. The disconnection also goes for the level between strategies and local design implementation. Davies et al. (Davies et al., 2015, p. 12) provide an overall scale definition of green infrastructure related to scaling, function and planning implications from the regional, sub-regional/county, borough/district and neighbourhood level. The pre-strategic material provided in this thesis relates to the district and neighbourhood, though with evident linkage to scaling up qua the river valley extending into mid-Jutland, while still being open-ended enough to adapt to local uniqueness and small-scale measures with potential for being linked. This connects to a core in green infrastructure: the connectivity between different scales, capable of up- and downscaling impacts together with potentials of multiple benefits (plural values) at different levels.

THE CATCHMENT NEIGHBOURHOOD AND ITS RELATION TO THE DANISH PLANNING SYSTEM

“The breadth of constituencies and professions that can use watersheds presents a pathway for linkages between planning and design and ecological science” Quote Anne Whiston Spirn (Pickett et al., 2004, p. 376; Spirn, 1984).

Access to water per se defines human settlement, and water control has been a vital matter of seizing power and control (please also see Chapter 1.1). The importance of watersheds is also foundational in discourses on resilient cities, ecosystems and urban ecology. Pickett et al. are explicit on the importance of the watersheds, pointing to how watersheds have considerable potentials in how ecological functions can be used in design and planning (Pickett et al., 2004, p. 376). Though referring to ecological design with attention to architecture, landscape architecture and design, they also address a broad field inclusive of management and policy aspects (Pickett et al., 2014, p. 151). Pickett et al. describe the importance of recognising urban and metropolitan areas as ecological-social systems with spatial heterogeneity, elaborating on the importance of linking planning and ecology (Pickett et al., 2004, pp. 369, 372–373). The suggestion of the Catchment Neighbourhood relates to these discourses, and if further developed, would be a key point of departure.

At both a city and community level, this relates to discourses in water-centric and water sensitive cities (Novotny et al., 2010) on how to integrate sensitive water management as integrated into planning and community building. Currently, the concept of Hydrocitizenship⁷ is used in action research on integrating waterscape’s urban development and community building (“Hydrocitizenship,” 2017). These much larger works connect to the proposal of the Catchment Neighbourhood and ‘living with water’ as a resource. And, if further developed, these works would provide invaluable resources of knowledge for it. Nevertheless, the Catchment Neighbourhood is based on local findings in Aarhus and a Danish planning context. The finding of the inconsistent sub-catchment delineation in two of the cases formed part of the proposal. In Case Skejby, a part of the current sub-catchment appeared to connect to the Egå Engsø Catchment instead of the Ådalen (Chapter 5.3, 6.1). In Case Aaby, the late 19th-century sub-catchments were cut perpendicular to the natural flow path’s direction towards the river valley; a perpendicular cut that created flood risk further downstream. Together with the finding of the transversal passages and the learnings on how local climate plans were challenged by upstream alterations, this led to the suggestion of the Catchment Neighbourhood. The Catchment Neighbourhood is a suggestion combining CA|HOW, coherent urban development and creation of plural values at a local level. The Catchment Neighbourhood is a proposal for using the sub-catchment proactively, including for community building and public spaces for the common good attached to the Danish planning system. In its current form, it would need to be further studied with actors from municipal planning and water companies.

⁷ a development of Ecological Citizenship

An intermediary plan for adaptive planning

As mentioned, making water supply and catchments part of the urban organisation is, by far, not new, although its relation to landscape properties and local settlement patterns has been neglected at a larger scale since industrialisation. The catchment neighbourhood is a suggestion for adaptive planning inclusive of the dynamics of water, contemporary urban functions and spatial qualities, with attention to future affordances; a planning suited for the Anthropocene. In research and works on green infrastructures, adaptive planning that takes departure in landscape properties and opportunities of multiple benefits is rapidly growing in the context of resilient cities and ecosystems services, often attached to green infrastructures as a pivotal point (Ahern, 2007; Ahern et al., 2014). The Catchment Neighbourhood takes its starting point in acknowledging the deep landscape structures beneath the asphalt and the movement of water, together with a qualitative analysis of the contemporary opportunities found in local programs and functions of public interest, e.g. kindergartens, schools, nursing homes, and opportunities for promoting biodiversity, social cohesion, aesthetics and so forth.

The Danish municipal plans have an intermediary level of planning called the 'Rammer/rammebestemmelser' ('frames'). The Catchment Neighbourhood is a proposal at an intermediary planning level between local plans and municipal plans, which in the Danish planning system could be a guiding 'ramme' to frame them all. What is important, is that intentional catchment delineations define the Catchment Neighbourhood. It is neither suggesting to fully follow the 'natural' catchment of 150 years ago bound to the landscape properties nor does it fully submit to the topographic catchment of the contemporary urban landscapes. It is an entry point to use the two together with the real-time qualification of affordances and drivers of the contemporary urban landscapes, such as citizen initiatives, public functions, aesthetic opportunities and so forth, with emphasis on connectivity such as human movement and biodiversity; a qualification led by what is practical, *desirable* and *sense-making* in a long-term perspective. Regarding early phases knowledge creation, the Justification Analysis could be an entry point to qualify intentional catchment delineations.

6.2.4 FACILITATING A CHANGE OF VIEW ON URBAN LANDSCAPES

Constraints of landscape literate actors

In this research, the human case actors were all professionals with a high degree of landscape literacy of (natural) landscape properties and professionals in the planning system. What seemed to be 'missed' was the attention to relations across time and space in a landscape strategic and aesthetic sense. As mentioned, this was not due to ignorance. The actors were inscribed in a professional, municipal context with the specific responsibility of solving, e.g. environmental or adaptation issues, in line with the planning and administrative practices of Aarhus municipality and the Danish Planning System, not to mention compartmental economic practices; practices that do not seem to have re-adjusted to the dynamics of water or entered the epoch of the Anthropocene.

From this perspective, the visualisation of a relational approach to 'seeing' urban landscapes became productive as dialogical facilitation of a change of view. The interactive component of the Design Comments used material showing 'natural' and anthropogenic features an integrated part of urban landscapes, making landscape affordances of the Anthropocene perceivable. For example, by comparing the ring structure city image with the rhizomic flow-paths city image, showing how Silkeborgvej functioned as a riverbed (a landscape narrative in contrast to showing the road as either dry or a hot-spot) and the correlation found in Lystrup, between hydrotoponyms and projected flood and flow paths. The point is that the hard fact knowledge (from, e.g. GIS) was by no means new to these actors. Rather, it was the visualisation of affordances and relational interdependencies that was supportive of expanding the cumulative knowledge base. The experiences from the case studies pointed to how *one* of the obstacles to value creation in the context of early CA|HOW processes was that the professional knowledge of the actors was bound by administrative and planning practices not suitable for the fluid matter. Furthermore, this emphasised a need for also pushing the skilled practices of water-lays such as residents, politicians and developers. This has been outside the scope of this research. However, one can speculate whether the rendering of affordances can also be a means to facilitate the highly professional 'constrained actors' skilled practice in *articulating* this in other contexts.

Different obligations -free bird' research and the common good

In addition to the above, the municipal case actors did not have allocated time to wander the case areas with a non-specified goal, 'just' analysing and sensing opportunities en route or indulging in open-ended mapping. At the level of methods, this points to the opportunities of entering the live engine room as a 'free bird' (financed by the AAA) with time allocated to open-ended studies and no obligation to comply with municipal or developers interests, and with means and ends oriented towards a non-specified common good. In this sense, action research can be supportive of bridging and developing knowledge and methods in existing practices.

The skilled practices of reading landscape affordances of the Anthropocene

“Man, as we have seen, has done much to revolutionize the solid surface of the globe, and to change the distribution and proportions, if not the essential character, of the organisms which inhabit the land and even the waters.” George Perkins Marsh, 1864 (Marsh, 1974, p. 281)

Bearing the Mill Creek and Woodland's examples in mind points towards the importance of facilitating the skilled practice of seeing affordances in our urban landscapes of the Anthropocene, particularly with attention to risk and potentials and emphasis on addressing a broader context of actors. Regarding the learnings from value theory; it has to become meaningful to different actors and attach to different practices, as well as professions. For example, material from the assignment of Case Aaby was included in the new Aarhus Municipal Plan 2016 with two pages showing one of the mappings of the transversal passages together with a field trip photo from 'Aaby Kilen' (Fig.6.2.21) (Aarhus Kommune, 2017, pp. 56–57). However, this is, by far, not enough to make a change in planning priorities and smart growth thinking on urban development in Aarhus. Likely, it is the few who recognise the opportunities – or who realise the potential problems of neglecting the influence of the 'natural' landscape as a structural backbone for our living. The perceived city image of a Dry City might very well continue without connecting to the Wet City. To take the Aaby material further would most likely require further work inclusive of at the levels of politicians, citizens and developers.

A local community group named 'Aktiv Aaby' took on board some of the potentials for value creation through CA|HOW from the step-by-step pre-strategy (please see Chapter 5.3.2). This was instigated by an actor from another municipal department other than DWA that came to the presentation of the step-by-step pre-strategy. She found resonance with the suggestion of a safer-school-crossing and recreational spaces and saw the larger perspective in the local context of the community group. 'Aktiv Aaby' saw the opportunities of the transversal Aaby passage in relation to their on-going efforts to make a better neighbourhood. Shortly after that, they used the (invented) hydrotoponym 'Aaby Kilen' as the headline for a community meeting. Fig.6.2.20 shows a print from the Facebook invitation to meeting. Suddenly, the hydrotoponym existed as a place with a name and an array of potential values. What is even more important is that they included their upstream neighbours north of Silkeborgvej, thus, potentially connecting the up- and downstream neighbours in a community initiative attached to the transversal passage of the urban landscapes and CA|HOW. This points to how the approach of value creation attached to specific places, and the addressing of different justifications in the test-case, were capable of connecting to actors from different professions and departments in the municipality, with the potential of a further outreach. Although the actor was from within the municipality, the core principles were taken further into the civic sciences and the community of Aaby, with the potential for creating new landscape practices.

Synes godt om
Følg
Del



Aktiv Aaby har tilføjet en [begivenhed](#).

14. juni 2016 ·

Kære alle AktivAaby støtter og andre interesserede Åbyhøj'ere.

Vi vil gerne invitere til et debat møde vedr. vores nye oplæg til kommunen om en GRØN ÅBY KILE.

Vores udgangspunktet/idé er at få alle bydele i Åbyhøj til at hænge sammen. Eksisterende med kommende.

Følgende punkter vil vi gerne fortælle om, modtage input og skabe debat og dialog med jer.... [Se mere](#)



JUN.
27

Idé/debat møde vedr. Åby-kilen.
ma. 20:00 · Åby Bibliotek · Åbyhøj
12 personer er interesserede

Interesseret

Figur 6.2.20: The local community group Aktiv Aaby announced a meeting about, and named by, 'Åby-kilen' on the 27th June 2016. Source: Facebook-post (14th June, 2016)

THERE IS NO GOING BACK IN THE ANTHROPOCENE

“The repetitive use of the map, criteria and categories, partial search for noise-free information transmission and last, not least, the public institutionalisation of certain ways of perceiving areas as landscapes, have in sum ignored the growth and state of contemporary society. Reference systems have displaced the analyser’s own ability to perceive an area as landscape and to argue in favour of its values. It seems that an unfortunate outcome of this practice is that the use and reuse of standardised methods has deprived the analyst of the critical act of perception” Quote Marius Fiskevold, 2016 (Fiskevold, 2016, p. 72)

In the quote above, Fiskevold questions practices of relying solely on what is considered ‘hard facts’ in GIS on behalf of ‘the critical act of perception’. This connects to how qualitative assessment could be an underestimated element in the case actor’s professional working methods. Possibly, this is also why the landscape architectural modes for connecting knowledge across time and scale resonated to the municipal actors. Engaging a qualitative approach to support GIS and hard fact knowledge is exactly what they did in the Dutch ‘Room for water’ project. They established a Quality Team, which provided ‘formal (hard fact, measurable) support’ to each sub-projects together with more informal, qualitative support related to (Klijn et al., 2013).

At a general level, the massive amount of knowledge found in GIS maps is foundational to qualifying decision-making and action – but they nevertheless benefit from meeting relational and contextualised modes of qualification. In the Anthropocene, reading urban landscape requires the skill to read natural properties, such as former blue-green passages, soil conditions, and water’s flow in a relational manner inclusive of anthropogenic landscape properties. In the Anthropocene, it is too late to ‘go back’ to historical knowledge on how to settle in accordance with ‘natural’ landscape properties: historical knowledge needs to be qualified through the present and future too.

From the perspective of urban development, this highlights the importance of promoting landscape literacy on ‘how to see the urban landscapes and the city’ together with pushing the skilled practices of seeing affordances. In the case studies, GIS maps provided an indispensable foundation, and the professional actors were already highly skilled in reading GIS maps and landscape properties. However, the case studies also pointed to the fact that, in the context of ‘missed out’ opportunities for value creation, what seemed productive was facilitating a landscape literacy of the Anthropocene. The productive element was the departure in connecting the knowledge of reading the natural landscape properties, calculating flow paths, knowledge on policies and administrative boundaries together with relational knowledge and specificity of visualising plural values as affordances of the urban landscapes. As described, the continuous repeating of landscape illiterate settlement patterns, as found in the case studies, reflect that the dualism of human><nature is still exercised. With climate change in the Anthropocene, this appears risky, or, at best, naive and opportunistic.

6.2.5 SUM UP, WATER AS AN ACTOR AND LANDSCAPE-BASED PLANNING AS A PRO-ACTIVE ACTOR

FLOOD RISK, PLANNING AND SETTLEMENT PATTERNS IN THE ANTHROPOCENE

Climate change in the Anthropocene demands recognition of ecology and ecosystems, which implies a need for ecological thinking and methods as well. However, today this is not proportionally reflected in mainstream understandings of human/nature, either at an ontological or epistemological level nor a methodological or practical level of planning and urban development. Still, current practices in urban development and planning are not yet fully suited for accommodating ecological thinking. This refers to notions of nature, practices and methods in, e.g. economy, law, legislation, policies, administrative boundaries and so forth. For example, current practices of financing a project and calculating 'quality' and a sound economy are often based short-time thinking (less than 30 years), and areas designated for urban development (understood as new buildings) are often chosen due to other driving forces than that of a long-term, landscape-based rationale.

Land-use and expectations to the function of urban landscapes

The Anthropocene is essentially a questioning of whether it is still sense-making to expect clear delineations between human and natural forces, suggesting a change in the thinking and practices of dualistic land-use divisioning into gradients of human and natural forces as relationally dependent in constructing urban landscapes. A thinking of the Anthropocene is already embedded in Ecological Urbanism as well as implicitly in common landscape architectural methods. Case 3 showed how the relationship between the Dry and the Wet city was challenged. Although they shared the same physical properties, they offered different affordances to human actors, e.g. the roads serving the Dry City as primary infrastructure for automobility and the Wet City offering an asphalt riverbed for surface water, thus impeding human mobility. Thus, the landscape-based interconnectedness between past-present-future waterscapes showed a discrepancy with the driving forces of human practices and our expectations to the affordances of the urban landscapes. This was illustrated in the example of Case 1, where flood-prone residential areas could be related to the settlement pattern of inhabiting wetlands, visualised through their hydrotonyms, e.g. Kildehaven and Åvangen. Furthermore, in Case 3, the mapping of waterscapes in the urban landscapes of Aarhus, showed how the ring structure of the municipal green strategy 2013 was structurally different from that of the hidden, transversal blue-green passages.

Landscape practices in the Anthropocene

Contemporary landscape-practices relate to the 'seeing' of urban landscapes. This 'seeing' is detached from acknowledging the interdependency between human processes and land-use practices vs natural forces. This connects to Spirr's concept of landscape (il)literacy and Rietveld's skilled practices in perceiving affordances. The notion of what is considered *good* urban development as seen in the 'Smart Growth towards 2050' Aarhus strategy aligns with this detached trajectory. The plan provides a grand vision with a plurality of values, both soft and hard, possibly accommodating the next generation, but without acknowledging *future* generations. It puts all its eggs in the compact city basket labelled livability, without qualifying the land-use aspects of the underlying landscape properties and natural forces, such as water: a double-edged sword trajectory, as it is our very landscape-practices that enforce the need for integrating ecological thinking in urban development. Not to mention, that it is our landscape practices which are pushing climate change in the first place. Still, the landscape properties in Aarhus offer opportunities with the considerable potential to furnish the urban development for livability and accommodating uncertainty for future generations too.



Figur 6.2.22: Water in the air and covering land. The restored wetland shows traces of former human actions at (almost) straight lines, intertwined with the vegetation taking over.

Changing waterscapes requires changes in value systems and methods

In the climate change of the Anthropocene, changing waterscapes are putting human living conditions at risk. This comes with a need for re-assessing contemporary modes of evaluation, e.g. existing planning practices, modes of actors' collaboration and the evaluation, and attribution, of diverse value systems. This includes that scientists and practitioners can translate diverse bodies of knowledge to inform decision-making, designing and planning on urban development in the landscape practices of the Anthropocene. A planning of the Anthropocene may require a larger amount of money in the earlier phases than existing practices. At the same time, green Infrastructure and ecological design/planning seem to be capable of saving money in longer time perspectives (European Commission, 2013). For example, lower maintenance requirements, longer lifetime cycle, and saving money through positive side effects, such as, e.g. health, community building, saving water for future generations, avoiding flood and diminishing negative Urban Heat Island effects. The Achilles heel is that even though the positive side effects can be measured in monetary terms and benefit a broad range of actors, it might not necessarily benefit the specific developer or property owner, e.g. in saving or earning money. It also might not create tangible pay off within one election period. In this sense, the changing of urban development-, planning-, settlement- and building practices imply acceptance of a time-space redistribution of resources together with models for recalculating benefits of how well money – and other resources – are spent. One could say, that the common good must form an articulated, or measurable, part of the valuation criteria.

Climate change in the Anthropocene is a call for climate adaptation that departs in rethinking urban development and planning. The driving forces of urban development require the prioritised inclusion of complementary value systems and methods so that professionals can point to affordances as well as visualising the 'seeing' of the city to water lays while qualifying climate adaptation and urban development. With water becoming a tangible actor, it seems about time to make landscape-based planning of the Anthropocene becoming a pro-active actor; as a driving force in urban development.

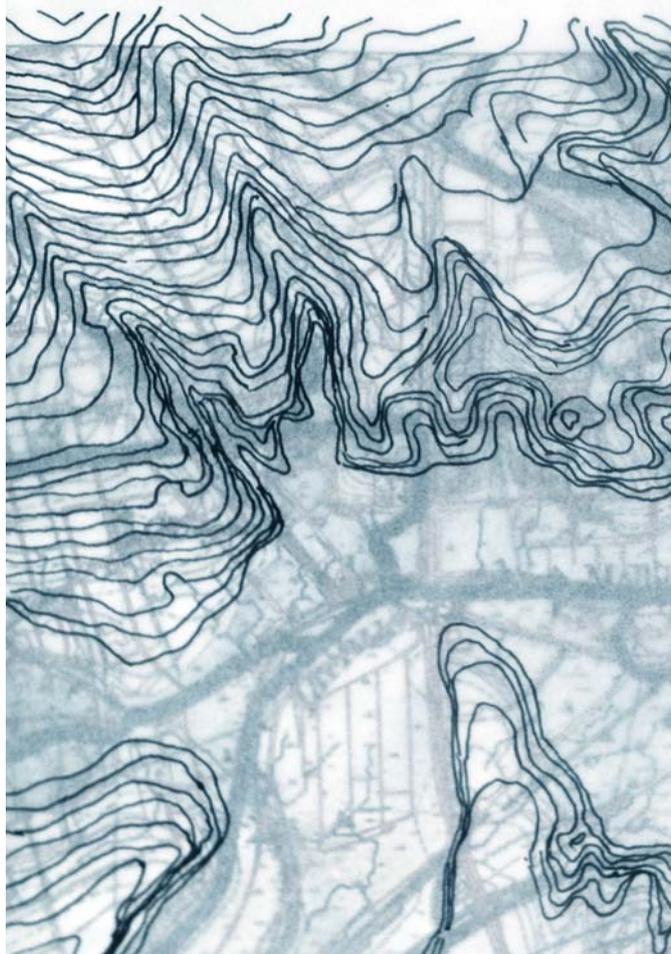
PART 6 OUTCOMES

CHAPTER 6.3

CONTRIBUTIONS

6.3.1 Introduction

6.3.2 Schematics of Contributions



P6_C3

CONTRIBUTIONS

6.3.1 INTRODUCTION

The following is a schematic, providing an overview of contributions of the research with regard to the three case studies and the propositional reflections. The schematic is based on the case study learnings and the associated research methods and relates to Chapter 6.1 'Knowledge production' and 6.2. 'Reflection'

6.3.2 SCHEMATIC OF CONTRIBUTIONS

SCHEMATICS: CONTRIBUTION OF PROPOSITIONAL REFLECTIONS

Though the propositional reflections are interrelated, for reasons of clarity they are separated in Fig.6.3.22 as categories (levels) relating to that of methods and landscape-based planning and design. Each propositional reflection is highlighted with a succinct mention of its content as a finding and connected to related discourses and transferability (see Chapter 6.1 on 'Knowledge Production', Chapter 6.2 'Reflection', and part of this is also seen in the Summary). Fig.6.3.22 is a schematic which provides an overview of the propositional reflections, structured to address the following:

-*Level* (stating if it is for example a method for landscape architectural research or general landscape planning)

-*Finding* (describing the finding with regard to its contexts, such as location, scale and level)

-*Transferability* (describing the transferability with regard to for example geographical location)

-*Related works and discourses* (mention of related references)

-*Contribution* (mention of whether the contribution has the character of being new knowledge; supportive knowledge contributing to existing works, or adding knowledge to existing discourses)

-*Prospects* (potential application and future research)

SCHEMATICS CONTRIBUTIONS

PROPOSITIONAL REFLECTION	LEVEL	FINDING Context (place, scale, level)	TRANSFERABILITY (place, scale, level, range)	
<p>Case Lystrup</p>  <p>Case Skejby</p>  <p>Case Aaby</p> 	EMPIRICAL METHODOLOGICAL	<p>Each case study provided empirical knowledge on the specific case at different levels from the geographical area and landscape properties, settlement patterns, sensual sensations, connectivity and the specific context of the human-actors, municipal practices and the Danish Planning System. The thematic findings are further described in the following schematics of the Propositional Reflections.</p>	<p>The empirical knowledge is situated in the local context of each case. However, particular elements of transferability were found, e.g. settlement patterns and urban development detached from physical landscape properties; the correlation between flow paths and settlement patterns supporting flood risk; opportunities to re-connect to deep structures in CA HOW; diverse values and justification among different actors as well as the foundational premises that all urban landscapes are inscribed in catchments and that all urban landscapes have affordances. These are further described in the following schematics of the Propositional Reflections.</p>	

RELATED WORKS & DISCOURSES (references)	CONTRIBUTION adds to /supportive/new	PROSPECTS (further research)
<p>The propositional reflections derived from each case study are related to different levels within the research objective, e.g. methods, value creation and landscape practices of planning, urban design and landscape architecture. These relate to different discourses (though interconnected) and are mentioned in the following schematics of the Propositional Reflections and discussed in the reflection.</p>	<p>The three case studies contribute with new, empirical knowledge on the Lystrup, Skejby and Aaby area by showing relations between landscape properties, urban development, settlement patterns and flood risk through mappings and interactions in the real-time cases. The propositional reflections provide an array of small contributions at different levels of the research objective.</p>	<p>Please see the following schematics of the Propositional Reflections and the 'Further research' section.</p>

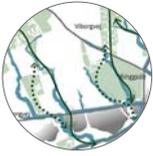
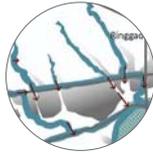
Figur 6.3.23:

PROPOSITIONAL REFLECTION	LEVEL	FINDING Context (place, scale, level)	TRANSFERABILITY (place, scale, level, range)	
<p>Design Comments</p> 	<p>METHODS (LArch RtD)</p> <p>The use of multi methods and the integration of knowledge from, e.g. mapping, together with interaction are developing during the research process</p>	<p>The usage of visual, LArch material as a dialogical tool in action research proved productive in activating/cross-fertilising transdisciplinary knowledge in a situated manner, and the conceptualisation of Design Comments.</p>	<p>The context was specifically the 3 case studies and the actors of the CA HOW-project in Aarhus Municipality, Denmark. This specific approach has not been tested in other contexts.</p> <p>Design Comments as a method has a level of transferability as it is based on landscape architectural tools used internationally. In addition, the need for transdisciplinary collaboration and knowledge creation, as argued in this research, is also a global issue in CA HOW.</p>	
<p>Justification Analysis</p> 	<p>METHODS (facilitation, analysis)</p>	<p>Case study 1 provided insights in how incompatible justifications could obtrude potentials for value creation. By stepping aside, from primarily-focusing on specific claims of value, in favour of decoding justifications, provided a level of explanatory understanding. The Lystrup Case finding was that unilateral justifications were obtruding plural value creation. It also showed how, despite conflict and incommensurability, the overall justification was that of the common good. The Justification Analysis was explored in Case 1 as a situated, contextualised analysis and used to qualify the Step-by-Step pre-strategy.</p>	<p>It is likely transferable to other Danish contexts of CA HOW with the municipality and the water company as primary actors.</p> <p>As the 6 Regimes of Justification was based on a data and literature from a Western European context, it is possibly transferable to other Western European contexts.</p>	
<p>Hydroponym</p> 	<p>CONCEPTUALISATION (term)</p>	<p>The 'Hydroponym' was a local finding in Lystrup of a correlation between flood risk, former water-scapes, landscape properties and contemporary settlement patterns. The term Hydroponym provides a simple modus for articulating complex, but essential, relations in CA HOW in the urban landscapes of Lystrup.</p> <p>* The term 'hydroponymy' has been suggested by Freitas et al. in a research study on hydrohistorical issues in the context of urban groundwater systems. Currently, it does not exist in the Oxford Advanced Learners Dictionary, Nudansk Ordbog or Dansk Fremmedordbog.</p>	<p>Likely to be a local finding, transferable to other Danish contexts (sharing language and patterns of making place names, and settlement patterns), possibly transferable to other western urban landscapes.</p>	

	RELATED WORKS & DISCOURSES (references)	CONTRIBUTION adds to /supportive/new	PROSPECTS (further research)
	<p>The Design Comments relate to existing work on framing contemporary RtD developments, to consolidate the existing research methods in LArch, as well as to frame RtD research and its knowledge production in transdisciplinary contexts.</p> <p>Relates to work on research through designing in landscape architecture (e.g. Martin Prominski, Sanda Lenzholzer)</p>	<p>Design Comments is suggested as a method to conceptualise action-oriented, LArch research through designing. It contributes by developing LArch methods in a real-time context with focus on transdisciplinary knowledge creation. It is rooted in making LArch 'produce' form part of dialogical interaction with a shared subject of concern, to facilitate and push the shared knowledge creation.</p> <p>It contributes by providing knowledge from 1:1 real-time exploration of methods with attention to transdisciplinary actors, collaboration and dialogue. It contributes with new knowledge on the potential values in urban landscapes related to CA HOW in the local case study context and the human case-actors.</p>	<p>The dialogical format could be further developed and tested through further research and application in future case studies.</p>
	<p>Relates to existing research and practices of mainstreaming + facilitating resilient multifunctional development of urban landscapes with attention to the common good.</p>	<p>The transformation of the theoretical framework of the 6 Regimes of Justification into a practical, action-oriented context is a new contribution to the project analysis and facilitation of diverse actors with differentiating values/justifications in early project phases. It contributes by showing an approach at the level of non-comprehensive facilitation of disputes and with regard to promoting solutions and decision-making based on diverse justifications in urban landscapes. The Justification Analysis adds to knowledge on how to move from unilateral, command and control approaches to resilient solutions.</p>	<p>The Justification Analysis could be further researched as an analysis tool of existing CA HOW projects compared to green infrastructure projects and it could be further developed as a facilitation method in the context of engaging with politicians, investors and citizens.</p>
	<p>Mainstreaming (e.g. Jack Ahern STA Pickett)</p> <p>landscape literacy (Anne Spirn)</p> <p>landscape consciousness (Maggie Roe)</p> <p>Hydrotoponymical taxation (Freitas et al.)</p> <p>Relates to work on green infrastructures and resilience, (e.g. STA Pickett, Mark Benedict & Edward McMahon, Jack Ahern, Anne Spirn)</p>	<p>The term Hydrotoponym contributes with new knowledge of the Lystrup area with regard to its flood risks, landscape properties and settlement patterns by expressing the correlation between these in a simple, visual manner related to specific geographic areas and their landscape properties. It is a supportive contribution to works on promoting landscape literacy and facilitating a mainstreaming of knowledge on the interdependencies between human practices, landscape properties and natural forces. The hydrotoponym provides a key, a term, to decode some fundamental, visually graspable land-use relations. The hydrotoponym as used here, adds a new level to Freitas et al's suggestion of the term hydrotoponymy.</p>	<p>The Hydrotoponym could be explored in research on advancing landscape literacy/ the skilled practices of 'seeing' affordances in urban landscapes in the context of informing urban development</p>

PROPOSITIONAL REFLECTION	LEVEL	FINDING Context (place, scale, level)	TRANSFERABILITY (place, scale, level, range)	
<p>Anthropocene</p> 	<p>CONCEPTUAL, METHODOLOGICAL METHODS</p> <p>Eugene F. Stoermer Paul Crutzen</p>	<p>The Anthropocene is a geological epoch and existing concept, thus not a finding. However, use of the term was found to be productive in conceptualising urban landscapes and the relation between the wet and the dry city. While not a finding as such, the Anthropocene is capable of providing a conceptual lens, useful to connect past-present-future landscape knowledge with contemporary human landscape practices in a manner relieved from human>nature dichotomies. At a practical level, the Anthropocene proved useful to study planning and land-use practices, e.g. questioning whether the contemporary, dualistic planning divisions are useful.</p>	<p>The concept and consequences of the Anthropocene is scaleless. It is a local-global precondition of the present which is not yet commonly applied to urban development and planning practices. The way it has been used in this research is likely transferable at a general level.</p>	
<p>Affordances</p> 	<p>CONCEPT METHOD FACILITATION</p> <p>James J. Gibson</p>	<p>In the actor encounters (dialogical spaces), using methods of visualising affordances (as opposed to focusing on good-bad) showed productive. As a methodological lens, the concept of affordances became a productive entry to visually facilitate the transdisciplinary encounters through dialogue on affordances (good or bad) modus. Showing the Wet and the Dry city was an empirical, local finding of affordances in Aarhus.</p>	<p>Affordances is a general term, applicable to all contexts with reference to living actors' visual perception of possibilities in a physical context.</p> <p>While the term does not perfectly translate into Danish, affordances does not depend on whether the term exists, it rather depends on conceptualisation of a visual perception with reference to physical landscapes and potential actions.</p>	
<p>Designing for future affordances</p> 	<p>Method-practical Strategic design</p>	<p>The strategic design approach of 'Designing for future affordances' was based on findings in the specific context of Lystrup and the pilot CA HOW project. In Lystrup there was a disconnection between landscape properties and the design and layout of retention basins. Case 3 found local opportunities to reconnect blue-green passages in extensive use spaces, highlighting that 'Designing for future affordances' addressed the scale of urban development too. Designing for future affordances is a practical, strategic design method at the scale of the retention basin as well as that of urban development. It aims to allow space and place for future uncertain land-use needs, qualified by physical landscape properties, e.g. deep structures.</p>	<p>Given that 'designing for future affordances is a strategic design method that can only work when contextualised in a physical, local context, it is likely transferable to any urban development as the future is uncertain per se. From a common good perspective, any urban development ought to embed generosity to future generations.</p>	

	RELATED WORKS & DISCOURSES (references)	CONTRIBUTION adds to /supportive/new	PROSPECTS (further research)
	<p>Best practice landscape architectural projects already exemplify approaches of the Anthropocene, e.g. Duisburg Nord (DE), Room for the Water (NE), Fresh Kills Park (US)</p> <p>(Dirk Sijmons, Martin Prominski, Anne Spirn, Antje Stokman)</p> <p>(Stefan Darlan Boris, Thomas Clemmensen)</p> <p>(Aura Group, Aarhus University)</p>	<p>The use of the concept in this research contributes by adding to the existing work of landscape architecture and planning in the Anthropocene by using it for showing transdisciplinary actors another 'image of the city' and affordances of the urban landscapes with the lens of the Anthropocene. The methodological usage and conceptualisation of the Anthropocene and affordances contributes to facilitating landscape analysis, planning and informed decision-making through the 'seeing' of opportunities, risks and potential actions.</p> <p>The research contributes to the development of methods and practices in LArch, by 1:1 exploring of how to facilitate the understanding of relations between human practices and landscape properties in urban landscapes in climate change.</p>	<p>Using the Anthropocene as a pro-active concept in planning and landscape architectural methods have the potential to inform approaches to climate change adaptation. For example to inform urban development and planning categories going from strict divisions to gradients as well as to inform a broader audience on the interconnectedness between human actions and natural forces. This could be further developed/articulated in LArch practices and education.</p>
	<p>Skilled practices of seeing affordances (James Gibson, Erik Rietveld)</p> <p>Landscape literacy (Anne Spirn)</p> <p>Landscape consciousness (Maggie Roe)</p>	<p>Using the concept of affordances as a conceptual lens in visualising opportunities and risks in case studies contributed to the case-actors skills in the 'seeing' of urban landscapes by showing affordances (good or bad) visually. The active use of the term in the research contributes by adding to the knowledge provided by Rietveld on landscape affordances and skilled practices, by having conducted 1:1 'testings' in a transdisciplinary forum. It contributes through supporting existing thinking, making and methods in ecological urbanism and ecological planning by exploring a real-time facilitation of shared knowledge on landscape-opportunities and risks rendered through visual Larch methods.</p>	<p>The concept of affordances has potential to be further developed in LArch methods and architectural education, internally in the profession and externally within other disciplines and stakeholders, e.g. citizens, developers and decision-makers.</p> <p>Developing the usage of the concept further in LArch and its associated visual material might be able to inform a broader audience on the risks and opportunities in urban landscapes connected to potential actions in CA HOW of the Anthropocene. The concept of affordances could to be further researched with a broader span of actors (more diverse justifications), e.g. citizens, investors and politicians.</p>
	<p>Resilient cities discourses on design/planning for open-endedness and acknowledgement of non-equilibrium states of (urban) landscapes in the context of adaptive planning and design.</p> <p>Designing with the landscape properties relates to ecological planning and design and strategies for adaptative planning, designing with abundance, relates to work on resilience,</p> <p>(e.g. S.T.A. Pickett, Jack Ahern)</p> <p>Ecological planing and design (Ian Mcharg, Anne Spirn, James Corner, Kate Orff, R.T.T Forman)</p>	<p>Designing for future affordances contributes to the research by suggesting a hands-on, specific, landscape-informed strategic design method that can accommodate the present lack of money or knowledge with attention to uncertain future needs/situations. Furthermore, it offers design strategies inclusive of open-endedness through strategic use of landscape properties and designing for the uncertain un-finished design.</p> <p>It is a supportive contribution at the level of 'practical methods' and to discourses on 'how to' plan and design for resilience and uncertainty. Designing for future affordances is contributing with supportive, practical suggestions for how to design with the landscape properties for abundance in the context of adaptive planning.</p>	<p>Designing for future affordances supports to make the case for a 1:1 testing in the context of municipal planning/urban development or with water companies or the road directorate at both a smaller scale and a larger scale. It could be researched in terms of advancing LArch strategic landscape based methods, supporting ecological approaches, as well as at the larger urban planning and design scale.</p>

PROPOSITIONAL REFLECTION	LEVEL	FINDING Context (place, scale, level)	TRANSFERABILITY (place, scale, level, range)	
<p>Transversal passages</p> 	<p>ANALYSIS PLANNING URBAN DEVELOPMENT</p>	<p>Finding at the local level of Aarhus, inside the Outer Ring Road, north of the river valley. The study showed a transversal structure of disconnected, former blue-green passages which in the present urban landscapes represents considerable opportunities for CA HOW and value creation to Aarhus citizens. The finding is based on studying historical maps, contemporary maps and flow path projections combined with on-site registration of, e.g. slope, vegetation, functions and spatial qualities. The finding showed a discrepancy between the ringbased green structure suggested in the Aarhus Municipal Plan 2013 and the local landscape properties.</p>	<p>The finding is specific to the local geographical context of Aarhus, inside the Outer Ring Road, north of the river valley.</p> <p>The finding might be transferable to cities in the Eastern Jutland coastal region located at a river valleys with moraine hills, with expectedly similar urban development patterns, e.g. Randers, Skanderborg, Horsens, Vejle and Kolding.</p>	
<p>Pre-strategy Step-by-step</p> 	<p>METHOD PLANNING URBAN DEVELOPMENT</p>	<p>The step-by-step pre-strategy is a '1:1 test' set in specific local urban landscapes of Aarhus, with emphasis on the Aaby area, in the context of departments in Aarhus Municipality. It was a framework developed in the context of a contracted assignment, using the methods of this research project. The pre-strategy departed in opportunities for value creation through CA HOW while also addressing different work fields, practices and responsibilities. The finding is that the method resonated to the municipal actors from different departments. Furthermore, a community group found the findings of relevance and included part of it, e.g. including CA HOW in their work for improving Aaby, and upscaling their efforts, to include upper Aaby too.</p>	<p>The finding is specific to case context. However, the approach of addressing different actors through opportunities of value creation in their work/responsibility field may be transferable to other contexts. The approach of visualising potential actions step-by-step may be transferable to other contexts too as it addresses a rather generic level and accommodates a general issue of 'not always having the pecuniary means needed in the present to meet the ends'. The approach of coupling specific urban landscape affordances with potential actions and benefits to different actors (professions, responsibilities, work flows) is likely transferable due to its focus on making opportunities place-specific.</p>	
<p>Catchment Neighbourhood</p> 	<p>METHOD PLANNING URBAN DEVELOPMENT</p>	<p>The analysis of historical and contemporary topographic catchment delineations showed inconsistent sub catchment delineations in the Skejby and Aaby Cases. The Catchment Neighbourhood was derived from a study of the historical catchments, compared to the current catchment area. As a method, it was found that studying of the 'desired, adjusted' catchment could be found in-between these through qualifications based on GIS, contemporary spatial qualities, functions and aesthetic prospects of the present. The Catchment Neighbourhood was supported by mapping the relational interdependencies of actors. At a planning level it was found that there was a missing link between municipal plans and local plans with regard to CA HOW in the Anthropocene. Potentials for community building was found too.</p>	<p>The missing link in the Danish Planning System, as found in the case studies, is likely to be transferable to Denmark as such. However, this is not necessarily present in the planning systems of other countries.</p> <p>Using the Catchment Neighbourhood as a method at a strategic planning level is likely transferable to other urban landscapes as all territories are inscribed in the nested concept of catchments, watersheds, drainage areas and basins.</p>	

	RELATED WORKS & DISCOURSES (references)	CONTRIBUTION adds to /supportive/new	PROSPECTS (further research)
	<p>Green Infrastructures Green Street Programs</p> <p>(Anne Spirn, Ian McHarg)</p>	<p>The transversal passages contribute with new knowledge on the land-use patterns, spatial structure and deep (landscape) structures in contemporary Aarhus by finding and visually showing the transversal passages to inform decision-making on CA HOW, green strategies and urban development in Aarhus. It contributed with new knowledge to the Aarhus Municipal Plan of 2013 (focused on ringbased green structures) to qualify green structures in the Municipal Plan of 2017. It also contributes with new knowledge on land-use and distribution of public and semi-public institutions in Aarhus. It offered new knowledge to the Citizen group Aktiv Aaby. It supports research on Green Infrastructure as a feasible response to climate change adaptation with multiple benefits.</p>	<p>The study has a potential to be further researched and developed in the local context of Aarhus to inform urban development and community building through CA HOW. For example in the context of Catchment Neighbourhoods and pre-strategic approaches. It could be further researched in the similar cities mentioned.</p> <p>The connection between blue-green passages and public-, semi-public institutions could add to the knowledge on the history of urban development and public priorities.</p>
	<p>Step-by-Step strategy relates to existing discourses on facilitating and mainstreaming adaptive and incremental planning, capable of facilitating diverse interests, addressing both bottom-up and top-down strategies (smaller and larger scale geographically) by attaching to existing workflows and landscape properties and functions.</p> <p>Incremental planning adaptive planning intermediary</p> <p>(Jack Ahern, Martin Prominski, STA Pickett)</p>	<p>The step-by-step pre-strategy contributes by adding practical 1:1 knowledge on discourses in CA HOW and resilient cities on adaptive planning by a preliminary testing of a 1:1 framework to engage diverse actors, bridge different levels of knowledge and engagements. Locally, the pre-strategy contributed at a municipal department level to connect knowledge on water flows and spatial qualities in Aaby/Aarhus by visualising potentials for urban development and CA HOW in the context of different professions and how to make use of existing workflows and priorities in the climate adaptation in Aarhus Municipality. In real-life, it contributed to inform the citizen group Aktiv Aaby, and Aarhus Water is studying the potential of connecting Silkeborgvej north/south with a tunnel; the on-going municipal masterplan of Silkeborgvej is considering CA HOW potentials too.</p>	<p>The Step-by-Step pre-strategy could be further developed and tested 1:1 in the context of a municipality and a water company in selected urban landscapes, including citizens, community groups and politicians.</p> <p>It has prospects to be further researched as to how to instigate CA HOW strategies which provide both a general level as well as the specific, unique and situated level of uptaking the local context (local actors, practices, landscape qualities, water flows).</p>
	<p>Hydrocitizenship, Catchment planning Seattle Climate Quarter Copenhagen Green Streets Program Vandlaug</p> <p>Adaptive planning</p> <p>(Anne Spirn, Maggie Roe, Jack Ahern, Nancy Rottle)</p>	<p>It is a local empirical contribution which extends the knowledge of the urban landscapes in Aaby and Skejby with regard to the relation between flow paths, historical waterscapes, soil conditions and slope and contemporary urban settlement patterns, spatial qualities and actor interdependencies with reference to catchment areas and delineations. It contributes by exemplifying how the methods of combining GIS, on-site registrations and projected flow paths can support a qualitative method to planning, urban development and community building through CA HOW. It is contributing by suggesting the Catchment Neighbourhood as an intermediary level to the Danish Planning System, with regard to current municipal challenges of qualifying local climate plans, detached from urban development strategies and the municipal plan, by showing a potential planning-link.</p>	<p>The study could be further researched as 1:1 action research in the context of the case areas or urban landscapes in cities with similar or different landscape properties.</p> <p>The methods of qualifying potential opportunities for the common good beyond that of water management/avoiding flood could be further researched to inform planning and urban development at a general level, particularly with focus on a new planning level.</p>

PART 6 OUTCOMES

CHAPTER 6.4

CONCLUSION

6.4.1 Introduction

6.4.2 Conclusion

6.4.3 Recommendations for further research



P6_C3

CONCLUSION

6.4.1 INTRODUCTION

The conclusion is the final chapter of Part 6, 'Outcomes' and summarises a transversal conclusion based on the learning outcomes of case studies and its methods, related to the research question and objective. This chapter succeeds Chapter 6.1 which described knowledge production; Chapter 6.2 which offered an overall reflection on the learning outcomes of the research, and Chapter 6.3 which provided a schematics of the contributions of the research as 'Propositional Reflections'. Recommendations for further research follow the conclusion.

6.4.2 CONCLUSION

THE NEED FOR CA|HOW IS PUSHED BY HUMAN LANDSCAPE PRACTICES

Climate change and adaptation lead to more water issues originating from a changing hydrological cycle. However, all three case studies showed that a considerable element of the flood *risk* was caused by local human actions. The study of the three case areas highlighted flood risk implications which were pushed by contemporary landscape practices of urban development, settlement patterns, and material usage, such as settling on wetlands and extensive use of impermeable surface covers. This was evidenced by the Lystrup case, which highlighted how flood-prone residential areas were settled on- and even named by- former wetlands, termed Hydrotonyms in this research. In the Skejby case, the layout of buildings, technical terrain alterations and extensive areas of impermeable surface cover formed part of the critical flood risk to the region's largest hospital. And in the Aaby case, it was illustrated how the qualification of a local climate plan was strained because it was disconnected from upstream spatial decisions, and the urban development of Aarhus favoured dense buildings in former wetlands, such as on top of the hinge between the river valley and the stream.

In all cases, these flood risk practices were consolidated through administrative boundaries, such as property lines and planning zones which were arbitrary to the directions of the terrain and incapable of responding to the dynamics of water flow. In the case studies, these landscape practices worked against human interests. These findings were different than expected when the research was set out: one thing is to miss out on opportunities; but altogether different is that these local landscape practices were exacerbating the need for climate adaptation. The Lystrup case showed that, although the departure was a holistic approach to adapting the whole town to more water, the measures themselves were located and designed as off-sets to administrative boundaries. Thus, lines on a map became highly influential actors in the strategic layout and design of the CA|HOW-measures.

With regard to the research objective, a considerable 'missed' opportunity for value creation through CA|HOW was that of neglecting landscape properties and their potential to inform and support urban development and settlement patterns in the case study areas. At an overall level, the case studies highlighted the relevance of including water as an actor when defining administrative boundaries, such as in the parish lines in Denmark which were formerly being associated with the catchments. The extensive drone survey and calculations to define the exact catchment delineation of the Skejby area, showed how the business park and the hospital were still dependent on its local catchment, and its connection to the larger catchment of Brendstrup Kilen and Egå Engsø. These findings lead to the proposition of the Catchment Neighbourhood as a response that could accommodate both planning and neighbourhood values.

EXPECTATIONS OF THE FUNCTIONALITY OF URBAN LANDSCAPES DIVERGES FROM THE ACTUAL AFFORDANCES

The Aaby case showed how the urban development was founded upon Dry-City notions to the functionality of urban landscapes. According to the flood map projections of Aarhus, the expectations of the urban landscapes would fall short in a cloudburst in awakening the Wet City, e.g. the inadequacy of the mobility of the emergency responders. The discrepancy between expectations of the functionality of landscapes and their actual affordances, was also found outside the urban areas. For example, in the rural planning zone of Lystrup, a farmer refused to sell his field to locate a CA|HOW measure, as he still expected to sell his wet field for urban development. These discrepancies pointed to a need for addressing the 'seeing' of urban landscapes. Here, the concept of Affordances was productive in developing visual methods to making affordances in urban landscapes perceivable with reference to potential actions of human actors. In themselves, affordances are neither good nor bad; but they offered a practical foundation for 'seeing' both risks and opportunities in urban landscapes, to inform value judgement on CA|HOW in urban landscapes.

Nevertheless, the Dry City trajectory is not solely a matter of ignorance and clearly this trajectory has supported urban development at many levels for more than a century. However, with climate change in the Anthropocene, the landscape practices of the Dry City no longer are a pragmatic or prosperous way to design our urban landscapes, and especially not in the context of Aarhus with a municipal vision of a resilient and liveable city of the future.

JUSTIFICATION AND WORLDVIEWS

Competing values and value systems are a fundamental premise in the context of retrofitting urban landscapes. This applies to a broad range of levels and scales; from overall worldviews on what is of value, to different modes of interpreting the concepts of urban, landscape and nature, together with varying systems of valuation. All of this adds to the complexity of creating multiple benefits in urban landscapes while also adapting urban landscapes to a changing hydrological cycle. As a response to experiences in the Lystrup Case, the research proposed an action-oriented translation of the 6 Regimes of Justification provided by Boltanski and Thévenot (Boltanski and Thévenot 2013) into a Justification Analysis. The departure was to bypass fixed systems thinking on value by acknowledging and discursively constructing a space that was inclusive of different justifications. The aim was to instigate discussion by 'seeing' different justifications in the same space, and thus also values, without necessarily sharing the same worldview on values. As an effort to address this in a practical sense was using 'Justification Analysis' as a potential facilitator for acknowledging diverse values as one of the propositional reflections of the research. More specifically, the Justification Analysis could shed light on 'missed opportunities' in a project while also opening up the human-actor context to alternative solutions and compromises. This allows the stepping up of the core issue of plural values: from looking at the specific values to proposing the justifications as a lens, allowing a contextualised and situated approach to addressing value plurality. Keeping these together was that the 6 Regimes of Justification, attached to the overarching value of a shared humanity and the common good. In the Lystrup case, the Justification Analysis showed that the CA|HOW measures were justified through, e.g. calculations and capacity with reference to the public, and expected responses from politicians and media; whereas justifications relating to, e.g. aesthetics and soft values, were not present.

THE SOLUTIONS ARE OUT THERE

All three case studies showed considerable landscape-based potentials for CA|HOW and value creation at a strategic level. The Aaby case showed that remnants of former blue-green passages which were transversal to the city image of rings and radials, were likely to be feasible to reconnect in the present urban landscapes. It also highlighted how these could function as green infrastructure accommodating both climate adaptation and value creation. However, these opportunities were currently not integrated into the municipal planning process.

The Propositional Reflections of the case studies related to discourses in resilient cities on adaptive design and planning. In addition they presented strategic, landscape-based methods for enabling the local, dormant landscape properties as affordances; i.e. the proposal for strategic design and planning for future affordances.

LARCH METHODS CAN CONTRIBUTE BY CONNECTING HARD- AND SOFT FACTS AND RENDERING RELATIONAL APPROACHES

The research highlighted that Larch approaches can support and push the shared knowledge creation in transdisciplinary collaborations. Based on the learnings from Case 1-3, the foundation in this was landscape architecture's¹ inclusiveness of connecting hard- and soft facts and different time- and geographical scale perspectives in specific geographical locations. This included supporting the seeing of urban landscapes as formed by human landscape practices, together with natural forces and landscape properties.

As described, the actors in the cases were all professional in GIS, planning, biology etc., thus representing a transdisciplinary constellation with large bodies of knowledge. The landscape architectural contribution to the shared knowledge of the actor encounters relates to what is argued by Fiskevold: GIS maps provide immense, and indispensable, bodies of knowledge, but are in need of '*the analyst of the critical act of perception*' (Fiskevold 2016, 72), thus *qualification* as a skilled practice. Employing landscape architectural methods highlighted that the Larch products used in the Dialogical Space of the Design Comments, contributed relational knowledge to support the essential flood maps. Examples include connecting flood risk with knowledge from historical maps and spatial qualities found on field trips, and visualising land-based relationships between the past-present and future.

While the transdisciplinary actors were evidently inscribed within specific responsibilities, economy and legislation, there was still opportunity to push the methods for locating and designing CA|HOW-measures (e.g. retention basins that promote value creation beyond pure water management). Firstly, this pushing of methods was achieved in the Lystrup case, by being attentive to the urban fabric, such as spatial qualities, function and neighbourhood practices (as opposed to generic designs). Secondly, by attending to intangible values, such as promoting (future) biodiversity, scents, a sense of place or accommodating the interests of future generations. Thirdly, by pro-actively addressing the relational interdependencies between up- and downstream actors. The latter was shown in the Skejby case, where the property owners at some point realised the connection between up- and downstream landscape practices, for example new, upstream buildings would increase flood risk to downstream properties, and a downstream property owner claimed that 'they were left holding the baby'. And lastly, methods were pushed by addressing locally found, landscape-based values and different regimes of justification. For example, in the Aaby Passage (Case 3), the attention towards addressing plural (but geographically specific) value creation, made the step-by-step pre-strategy resonate with actors from the community too.

¹ This places the research in the context of ecological thinking, e.g. ecological urbanism, as opposed to strains in landscape architecture which seek inscription in either the sciences or the arts (see Chapter 1.2)

THREE LEVELS OF FINDINGS

This research provided a range of small-scale contributions to CA|HOW in urban landscapes at the levels of facilitating diverse values, facilitating the seeing of urban landscapes and their affordances in the Anthropocene by making these perceivable, followed by propositions for action. Relating to the research objectives and the research question, the findings of the three case studies roughly categorise as three specific levels of influence and scale. Firstly, the Design Comments as an internal level of landscape architecture, by developing methods with relevance to action-oriented, landscape research through designing in the context of transdisciplinary collaborations. Secondly at an external, practice-oriented level of facilitating ways of 'seeing' values, risks and opportunities in urban landscapes by making affordances of the urban landscape perceivable with reference to human landscape practices. This is using the concepts of the Anthropocene and affordances, suggesting the term hydrotoponym and the Justification Analysis. And, thirdly, at a practical level of landscape-based strategies for value creation through CA|HOW in the Aarhus area; i.e. the transversal passages, the Catchment Neighbourhood, and the Step-by-Step pre-strategy. These three levels address the key discussions found through the case studies and the research methods; the Propositional Reflections offer entries to the practical application of the research learnings.

Together, these three levels represent a more general level transferable to the broader context of Danish urban development of the command and control of the water regime. Furthermore, the key themes are inscribed in larger discussions of climate adaptation and urbanisation in the context of resilient cities and green infrastructures. In this, the Propositional Reflections offer contributions of strategic relevance, which can be transferable to the level of research methods.

The research findings show that landscape architectural methods and processes can play a more active role in the early, pre-public processes in transdisciplinary contexts with regard to value creation. This particularly relates to ecological thinking used in visual methods of investigating past-present- and future knowledge on land-uses, sense of place, and acknowledgement of deep structures in specific geographic areas. Altogether, this render affordances of both the dry and the wet city. While outside the scope of this research, the findings also suggest the importance of facilitating a change of view in the skilled practice of seeing landscape affordances and a landscape literacy specifically for decision-makers, investors and the civic sciences.

This research highlighted that changing waterscapes emphasise the need for 'seeing' the interplay between human landscape practices and natural forces. During the case study, a recurring comment was that of 'water is going down', as in the humorous quote by a municipal actor in Case 1: "*We need to be open about the fact that water moves downwards...moreover, often on the surface*". In the urban landscapes of the Anthropocene, it is critical to take this into account in urban development. The case study findings feature a need – or an opportunity- to adjust the Danish planning system and urban development to include the dynamic actor of water. Water is going down, what we need to qualify is *how well* water is going down.

6.4.3 RECOMMENDATIONS FOR FURTHER RESEARCH

Some recommendations for further research are suggested below, based on the main findings in the research (see chapter 6.3 Schematics too). The recommendations for further research are listed separately for the sake of clarity, but it is recommended to interrelate some of them in a research design. At an overall level, the recommendations suggest research set-ups that include 1:1 testing, For example as pilot projects, and exchange with transdisciplinary actors and stakeholders from municipalities and water companies, and preferably also citizens, investors and politicians.

Design Comments: Further research on the conceptualisation of the Design comments as a landscape architectural Research through Designing (LArch RtD) method is recommended to further develop this as an RtD method and in general, to advance LArch RtD methods in knowledge creation of real-world problems. This area could benefit from being tested 1:1 in other municipal or water company contexts.

The concepts of the Anthropocene and affordances could be further researched within landscape architecture to support visualisation of the 'seeing' of affordances in the Anthropocene in the context of actors outside landscape architecture, informing qualification of urban development. These concepts could also be applied as fundamental elements in further research on the Transversal passages, the Catchment Neighbourhood and Step-by-step pre-strategy.

Hydrotoponyms could be further researched as 1:1 testing in the context of discussing how to retrofit existing urban landscapes, e.g. with municipal actors, citizens, investors and insurance companies.

Justification Analysis could be further researched with regard to its application as a 'hand-held'/in-situ framework on value creation in contexts that includes the presence of citizens, politicians and investors. Thus, contexts with a direct representation of different regimes and values. Firstly, this would include studying the operability in terms of bridging and acknowledging diverse interests and value systems, while also studying how this could promote alternative solutions and compromises.

Designing for Future Affordances: Further research is recommended on how to actually design for future affordances, while also giving form to the approach (formal design). Not as a style, but as a contextualised, ecological design. Further research in a specific context, attending to both the very local and the city scale, could offer different examples of how to engage this. The design strategy is, in principle, transferable to any other context. However, it demands the courage at a municipal level to test such a design strategy as it will necessarily cross administrative boundaries.

The Transversal Passages- the finding of the transversal passages in Aarhus suggests further research is needed to understand if similar patterns occur in urban developments in other Danish cities (including that of the correlation between public- and semi-public institutions in the former green passages). Exploring the pattern of urban development and the potential of hidden, blue-green passages might benefit from engaging knowledge from resilience theory, green infrastructure and patch dynamics discourses (Ahern, Pickett, Forman).

Catchment Neighbourhood: Further research could include testing of the design approach in an actual 1:1 case study, inclusive of water lay actors from civic sciences, politicians and investors and this would contribute new knowledge to inform planning practices of the Anthropocene. This could be within the municipal Frame Plans, demanding the courage at a municipal level to test such a design strategy as it will necessarily cross administrative boundaries.

Step-by-step pre-strategy: Further research is recommended to draw upon the knowledge from, e.g. Mill Creek and, Seattle, Hydrocitizenship etc. This could be performed in Aarhus, other locations in Denmark or internationally. The Step-by-step pre-strategy could be further researched 1:1 as a pilot project to develop and test CA|HOW with regard to urban development and resilience theory, to inform Danish Planning. The potential of the Catchment Neighbourhood and the Step-by-step pre-strategy is recommended to be researched in the context of municipal 'Rammeplaner' (Frame Plans) and 'Udviklingsplaner' (developments plans) as an opportunity for a 'leading 'Ramme', and an integrated part of the Udviklingsplaner, departing in specific landscape-based affordances informing urban development locally as well as providing knowledge to the overall planning system.

SUMMARY & LISTS

SUMMARIES, SOURCES AND REFERENCES

- (a) Summary
 - (a.1) English summary
 - (a.2) Dansk resume

- (b) Illustration information
 - (b.1) Sources and copyright information
 - (b.2) Legends from mappings Case Aaby Assignment

- (c) Appendices (listing of appendices submitted as pdfs)

- (d) Bibliography
 - (d.1) References and literature

SUMMARY

English Summary

Dansk Resumé

ENGLISH SUMMARY

Abbreviations:

CA|HOW = Climate Adaptation and Handling of Water

LArch= Landscape Architecture

WATERSCAPES OF VALUE

Value creation through climate adaptation in everyday urban landscapes

Changing waterscapes and retrofitting urban landscapes

Climate change and changing waterscapes signal uncertainty in relation to practices of living and settling (IPCC, 2013; Rockström et al., 2014). As more than half of the Earth's population now lives in urban areas, and as urbanisation is still increasing (United Nations Population Division, 2014), space for climate adaptation with regard to water has to be found in urban landscapes (IPCC, 2014). This means that CA|HOW entails the spatial retrofitting of urban landscapes, thereby questioning current contemporary landscape practices in urban development. This, therefore, implies and implicates diverse interests and diverging value judgments, making changing waterscapes and CA|HOW prone to land-based value disputes.

Water as a common good and CA|HOW as a resource

This research considers water as a common good, taking the approach that climate adaptation is of societal and public relevance. The underlying construct proposes that the physical measures of CA|HOW can be a positive resource and a potential opportunity for valuable changes in everyday landscapes. The research approach is also a response to the recent history of underground water control based on unilateral justifications, which now shows a lack of capacity to respond to uncertain conditions. Therefore, the research takes a stance on promoting a plurality of values¹, as an effort to provide for a broad common good while also embedding flexible solutions supported by engaging plural values as the point of departure.

Climate adaptation in everyday landscapes

This research study is a landscape architectural response to climate adaptation related to precipitation and surface water in everyday, urban landscapes in the climatic context of Denmark. The starting point is value creation through CA|HOW in everyday urban landscapes; the ordinary places that sometimes go less noticed, likely engaging CA|HOW with a limited project economy. To accommodate the constraints of ordinary CA|HOW-projects, the point of departure was to engage the early project phases, by exploring 'missed' opportunities which could form the basis and strategy for value creation without necessarily being costly. Not as cost-benefit analysis, but at a strategic level of qualitative approaches considering transdisciplinary knowledge creation as key in climate adaptation

1 The research departed in the concept of 'Merværði' (added-value), contemporarily a popular term in Denmark in the context of climate adaptation to more water.

Research design –multi-methods and real-time case studies

The objective was to explore how the thinking and methods of landscape architecture, inclusive of both tangible and intangible values, could contribute to plural value creation in early processes of CA|HOW-projects. As such, this thesis research posed the question: *How can landscape architecture and landscape architectural processes contribute to plural value creation in the everyday urban landscapes of CA|HOW, with regards to cross-sectoral and transdisciplinary collaborations in early project phases?*

The research was conducted as landscape architectural Research through Designing (RtD), engaging a real-world problem. The research design included multi-methods with elements of action research, in three real-time CA|HOW case studies in the context of Aarhus, Denmark. The research outcomes consist of a range of landscape architectural *propositional reflections*, based upon the case study learnings, providing an array of cumulative findings relating to different levels: firstly there are conceptual entries of facilitating the 'seeing' of urban landscapes and plural values in a transdisciplinary context; secondly the developing of research methods, and finally, findings that relate to landscape-based, practical propositions for design and planning strategies for value creation through CA|HOW.

Design Comments as a method

At the heart of the research design was the exploration of using landscape architects' material to create a transdisciplinary, dialogical space, as the platform for interaction in the real-time case studies. The objective was to enable different bodies of knowledge and data, e.g. hard and soft facts, to inform each other with cumulative effects on a shared level of knowledge creation in a transdisciplinary 'live-setting'. This research study developed the conceptualisation of a preliminary Research through Designing (RtD) method, based on existing landscape architectural methods and tools as the vehicle for action research: i.e. *Design Comments*. The Design Comments consists of 4 components; an internal *Landscape Architectural Space* (e.g. mapping, field trips), a *Dialogical Space* (interaction with transdisciplinary actors, using material from the Landscape Architectural Space), a *Formatting* (deciding upon dialogical format, e.g. drawings on the table instead of projector, sketches instead of 'finished' drawings) and the foundational *Linkage of Relevance* (a subject matter of a shared concern). In this research, the Linkage of Relevance was that of specific flood maps and places, and interest in value creation beyond that of pure water management. The finding of Design Comments is an integrated conceptualisation of the research methods.

Engaging value plurality through justifications

Elements from the theoretical framework 'The 6 Regimes of Justification' by French sociologists Boltanski and Thévenot (Boltanski and Thévenot, 2006) was used to open up an exchange about differing values and value disputes. This research study explored Boltanski and Thévenot's theory in a practical context, using it as an interpretational lens for preliminary design analyses; i.e. the Justification Analysis. The Justification Analysis supported the finding that instead of examining values, looking into justifications could inform the understanding of differentiating value claims.

The unresolved relationship between the wet and dry city

In the case studies, the dry city and the wet city showed an unresolved relationship, related to a landscape illiterate (Spirn, 2005) trajectory in urban development. For example, on a dry day, the sewer catchment performs its invisible service to the city, and the urban landscapes afford everyday human practices. In heavy rain, the topographic catchment takes over, showing the relationships between water, landform and contemporary settlement practices of the urban landscapes. A key shared finding in the three case studies highlighted how contemporary settlement patterns and material usage increased the flood risk. This finding underlined that the city of Aarhus showed an array of flood-risk landscape practices, accounted for through planning divisions and exacerbated by contemporary trajectories and actors of urban development.

Flood risk, settlement patterns and hydrotoponyms

All three case studies pointed to a need for reconceptualising how to 'see' urban landscapes as an interplay between human-natural processes. Hence, the concept of the Anthropocene was productive in the interpretation of contemporary, urban landscapes as denoting relationships between natural processes and human practices. The correlation between flood risk and settlement patterns in the Lystrup Case was visualised through the means of suggesting the term *hydrotoponyms*. This finding was giving a name to the relationship between human settlement practices, landscape properties and waterscapes in a place-specific manner.

Urban landscape affordances of the Anthropocene

The case studies highlighted how contemporary settlement patterns within the frame of urban development and planning were enhancing flood risk. The findings highlight the need for an articulation of the image of the wet and dry city. Gibson's concept of affordances (Gibson, 2015) was employed as an entry point to rendering landscape affordances perceivable in the real-time actor encounters. In the process of mapping and diagramming (the LArch Space), the concept of affordances served to render the intertwinement between human constructions and natural properties as a landscape of the Anthropocene beyond human><nature dichotomies perceivable to human actors.

Designing with the yet unknown

In line with this, a propositional reflection was a strategic design approach; i.e. *designing for future affordances*, aiming to provision the future with opportunities for value creation, even though the present might not have the knowledge, priorities, or economic resources. At the smaller scale, this could be locating and designing retention basins with regard to landscape properties and extra capacity to leave room for future value creation, and at the city scale, to designate former wetland areas in urban development as extensive use areas, as land-based opportunities for future generations. Thus, this reflection is about an adaptive design strategy that makes room for the yet unknown.

Disconnected blue-green passages as hidden affordances

In one of the case studies, disconnected remnants of former blue-green passages were found as a hidden and forgotten transversal pattern of Aarhus, infusing the city logic of rings, radials and a centre. Furthermore, the studies demonstrated that it was feasible to re-connect some of these passages into blue-green infrastructures for strategic CA|HOW in the wet city, while also offering passages for the dry city, e.g. connecting activities and age groups from infant to senior citizen, and public interests across socio-economic situations. From a societal perspective, this finding offered a broad span of landscape affordances to promote the common good in both short- and long-term perspectives in the everyday landscapes of Aarhus.

Pre-strategy for step-by-step value creation through CA|HOW

In Case 3, a *step-by-step pre-strategy* was developed, as a landscape-based, bottom-up strategy, addressing multiple justifications and values, by making (visible or hidden) landscape affordances perceivable. The step-by-step pre-strategy provided place-specific entry points, aiming to tap into plural engagements and existing workflows, e.g. municipal departments, institutions, businesses, local societies and individual actors. This finding presented place-specific opportunities for connecting CA|HOW with diverse actors and values.

The Catchment Neighbourhood – linking planning levels

By studying flood maps in relation to historical maps and current spatial qualities of the urban landscapes, a pattern was found of inconsistent flow paths and sub-catchment delineations, which increased vulnerability to human interests in urban landscapes. The research explored how the blue-green passages, when connected to a sub-catchment approach, could further shape strategic CA|HOW. From this, a propositional reflection and finding were that of the *Catchment Neighbourhood*, connecting climate adaptation, planning and community building, starting from local landscape affordances. At a planning level, this finding and application of the 'Catchment Neighbourhood' could inform urban development in Aarhus by linking the planning levels of the municipal plan and visions with local planning, connecting up- and downstream landscape practices.

Sum up - case studies and propositional reflections

This research highlighted that landscape architectural methods could facilitate transdisciplinary collaborations in exchanging and building up cumulative knowledge of hard- and soft facts in real-time encounters, facilitating a change of view in 'seeing' urban landscape affordances differently. The case studies further supported existing research on how nature-based solutions as green infrastructures can provide a significant potential for handling uncertainty and enabling an open-endedness to future needs while maintaining the common good as a shared value. The propositional reflections make it clear that it is often landscape-based affordances that furnish human-interests, whereas human landscape practices appeared to put human interests at risk.

The learnings from the real-time case studies were accompanied by landscape architectural responses for actions, with departure in the research objective; i.e. the propositional reflections: (1) *Design Comments*, (described earlier), (2) proactively using the concept of the *Anthropocene* in 'seeing' urban landscapes, (3) proactively using the concept of *affordances* in LArch methods, to make the affordances of the wet and dry city perceivable, (4) *Justification Analysis* as an analysis to enable value plurality through acknowledging justifications, (5) the term *hydrotonyms* made the correlation between landscape properties, settlement patterns and flood risk perceivable as a simple, place specific narrative, (6) *designing for future affordances* offered a landscape-based, adaptive design strategy, making room for priorities of future generations, (7) the *transversal passages* was a finding of existing, hidden potentials in the urban landscapes, (8) the *Catchment Neighbourhood*, showed a potential to connect up- and downstream actors of the urban landscapes within a frame of CA|HOW, planning and community building, and (9) the *step-by-step pre-strategy* connected diverse actor interests through value creation, departing from local landscape affordances and existing work flows and practices.

At the overall level of methods, the Design Comments is likely transferable, as it developed out of international landscape architectural methods. The Justification Analysis is likely transferable to other Western European contexts, where the original theory was formed. The use of the concepts Anthropocene and affordances, generally seems transferable, as the Anthropocene, urbanisation and the basic principles of human physiology are global. The landscape-based propositional reflections are local findings of the Aarhus area. However, the Catchment Neighbourhood is transferable to the larger context of the Danish planning system, and possibly to other urban landscapes and planning systems, as all areas are per se inscribed in a catchment. The concept of designing for future affordances is a locally adaptive strategy, related to ecological thinking and not a matter of a formal design or style, thus likely transferable. As such, the findings are situated in the case studies and local to the context of Aarhus, and further research on its applications would be needed to advance knowledge on the propositional reflections.

DANSK RESUMÉ

Forkortelser:

Kt|Hv = Klimatilpasning/Håndtering af vand

WATERSCAPES OF VALUE

Værdiskabelse i hverdagslandskaber igennem klimatilpasning

Forandringer af 'vandskaber' og retrofitting af urbane landskaber

Klimaforandringer og forandringer af 'vandskaber' indikerer usikkerheder i forhold til vores praktiserede leve- og bosætningsmønstre (Rockström et al. 2014; IPCC 2013). Idet 54 % af Jordens befolkning nu lever i byområder under en stadigt stigende urbanisering (FN's Populations Division 2014), vil selve pladsen til klimatilpasning nødvendigvis også skulle findes i urbane landskaber (IPCC 2014). Det betyder, at Kt/Hv vil indebære en spatial retrofitting der udfordrer samtidens landskabspraksisser og tilgang til byudvikling. Dette peger på, at klimatilpasning i urbane landskaber vil medføre forskellige interesser og divergerende værdisæt i relation to specifikke steder, hvormed Kt/Hv indebærer værdiskussioner i relation til arealanvendelse og værdier i urbane landskaber.

Vand som et fælles gode og klimatilpasning som en ressource

Dette forskningsprojekt anskuer vand som et fælles gode og antager, at klimatilpasning er af samfundsmæssig og almen relevans. Forskningsprojektet bygger på den antagelse, at de fysiske tiltag vedrørende Kt/Hv kan udgøre en positiv ressource og potentielt give mulighed for værdifulde forandringer af hverdagslandskaber. Forskningsprojektet er endvidere en respons på den nyere histories kontrol af vand under overfladen, der nu udviser en manglende evne til alene at kunne klare de usikkerheder, som klimaforandringer forventes at medføre. Dette forskningsprojekt advokerer derfor for fleksible løsninger med afsæt i værdipluralitet¹ i en bestræbelse på at tjene et bredt fælles gode; værdipluralitet som afsæt for klimatilpasning.

Klimatilpasning i hverdagslandskaber

Dette forskningsprojekt er en landskabsarkitektonisk respons på den klimatilpasning, der relaterer til nedbør og overfladevand i urbane landskaber i en dansk klimakontekst. Udgangspunktet er værdiskabelse gennem klimatilpasning til mere vand i urbane hverdagslandskaber; altså de almindelige steder, som ofte går upågtede hen, og som gerne har begrænsede projektressourcer i forbindelse med Kt-/Hv-tiltag. For at imødekomme begrænsningerne af denne type Kt-/Hv-projekter var afsættet for dette forskningsprojekt rettet mod de tidlige Kt/Hv projektfaser, med fokus på at undersøge upågtede muigheder, som kunne danne basis for strategier til værdiskabelse, uden nødvendigvis at være omkostningsfulde. Ikke som en cost-benefit analyse, men som en kvalitativ tilgang på et strategisk niveau ud fra den antagelse at tværfaglig videnskabelse er et centralt aspekt i klimatilpasning med 'mer' værdi.

1 Forskningsprojektet tog afsæt i begrebet 'merværdi', her betragtet som en pluralitet af værdier.

Multi-methods og real-tids case studier

Formålet var at undersøge, hvordan landskabsarkitektonisk tænkning og metoder, der integrerer både målbare og immaterielle værdier, kan bidrage i de tidlige Kt-|Hv-projektfaser til skabelse af værdipluralitet.

Følgende stiller denne afhandling spørgsmålet:

Hvordan kan landskabsarkitektur og landskabsarkitektoniske processer bidrage til skabelse af plurale værdier (merværdi) gennem Kt/Hv i urbane hverdagslandskaber, i de tidlige projekt faser af tværfaglige og tværsektorielle samarbejder?

Forskningen er udført som landskabsarkitektonisk Research through Designing, omhandlende en 'real-world' problemstilling. Forskningsdesignet gør brug af *multi-methods* med elementer af aktionsforskning i tre real-tids Kt-/Hv-case studier i Aarhus, Danmark.

Forskningsresultaterne består af en række landskabsarkitektoniske, forslagsstillelser, '*propositional reflections*', baseret på indsigterne fra case studierne. Disse relaterer sig til forskellige niveauer: for det første konceptuelle tilgange til i en tværfaglig kontekst at facilitere måden at 'se' urbane landskaber og plurale værdier på; for det andet en videreudvikling af selve forskningsmetoderne; og for det tredje, landskabsbaserede forslagsstillelser til design- og planstrategier for værdiskabelse gennem klimatilpasning.

Designkommentarer som metode

Et hovedelement i forskningsprocessen var en afprøvning af landskabsarkitektoniske metoders egnethed til at skabe et tværfagligt, dialogisk rum som platform for interaktion i real-tids case studierne. Formålet var, at få forskellige typer viden og data, e.g. hårde og bløde fakta, til præge hinanden sideløbende, og dermed påvirke den samlede videnskabelse i en tværfaglig 'live-setting'.

Forskningen udviklede en konceptualisering af en RtD-metode, *Designkommentarer* (Design Comments), baseret på eksisterende landskabsarkitektoniske tilgange og redskaber brugt i aktionsforskning i en tværfaglig kontekst. Designkommentarerne består af fire komponenter, hhv. et internt *Landscape Architectural Space* (f.eks. mapping, feltstudier), et *Dialogical Space* (interaktion med tværfaglige aktører vha. landskabsarkitektonisk materiale), en *Formatering* (design af det dialogiske format, fx tegninger på bordet i stedet for brug af projektor, skitser i stedet for 'færdige' tegninger) samt det helt grundlæggende *Linkage of Relevance* (Relevanskriterium i form af en fælles problemstilling og en fælles interesse). Det samlede relevanskriterium var i denne forskningskontekst specifikke oversvømmelseskort og steder samt en interesse i værdiskabelse ud over beregningen af f.eks. kapacitet i forsinkelsesbassin. Designkommentarer tilbyder en integreret konceptualisering af forskningsmetoderne.

Kvalificering af værdipluralitet gennem retfærdiggørelse

For at tilføre værdidiskussionen et pluralistisk tilsnit og anerkende uenighed, anvendte dette forskningsprojekt elementer fra en teoretisk

ramme fremsat af de franske sociologer Boltanski og Thévenot, 'The 6 Regimes of Justification' (Boltanski and Thévenot 2006). Dette forskningsprojekt anvendte og omsatte Boltanski og Thévenots teori til en praksisnær fortolkningsoptik til indledende designanalyser; *Justification Analysis*. The Justification Analysis understøttede forståelsen af divergerende værdisæt, ved at se på *retfærdiggørelser* frem for at den enkelte værdi.

Misforholdet mellem 'den våde by og den tørre by'

Case studierne viste et misforhold mellem den tørre by og den våde by, der relaterede sig til en byudvikling blind overfor 'at læse landskabet' (landscape illiteracy) (Anne Whiston Spirn 2005) . F.eks. på en tør dag udfører kloakoplandet dets usynlige service for byen, og det urbane landskab understøtter hverdagslige praksisser. Ved skybrud overtager det topografiske afstrømningsopland håndteringen af overfladevand og synliggør relationen mellem vand, de større landskabsformer og samtidens bebyggelsesmønstre i urbane landskaber. En gennemgående erkendelse i case studierne var, at samtidens bebyggelsesmønstre samt materialeanvendelser medvirkede til oversvømmelses risiko. Undersøgelserne viste, landskabspraksisser i Aarhus by afstedkom oversvømmelsesrisici, konstitueret gennem by- og landskabsplanlægningen og underbygget igennem byudviklingen af byens mange forskellige aktører.

Oversvømmelsesrisiko, bebyggelsesmønstre og hydrotoponymer

Alle tre case studier pegede på et behov for at revidere måden at 'se' urbane landskaber på, der inkluderer relationen mellem det menneskeskabte og det 'naturlige'. I løbet af forskningen blev det Antropocæne et produktivt begreb til tolkning af samtidens urbane landskaber som et samspil mellem naturlige processer og menneskets landskabspraksisser. Lystrup-casen visualiserede sammenhænge mellem oversvømmelsesrisiko og bebyggelsesmønstre. Som en respons, en propositional reflection, foreslog denne forskning termen *hydropotonymer*— som en betegnelse der kunne formidle relationen mellem bebyggelsesmønstre, landskab og 'vandskaber' i en stedsspecifik sammenhæng.

Urbane landskabs 'affordances' i det Anthropocæne

Case studierne viste, at samtidens bebyggelsesmønstre, byudvikling og planlægning forstærkede risikoen for oversvømmelse i de undersøgte områder. Undersøgelserne pegede på et behov for at artikulere forståelsen af forholdet mellem den våde og den tørre by. Til dette, brugtes Gibsons begreb om 'affordances' (Gibson 2015) som indgangsvinkel til at gøre landskabs-'affordances' forståelige i real-tids møderne med tværfaglige aktører (the Dialogical Space). I selve den landskabsarkitektoniske process med 'mapping' og 'diagramming' (the Landscape Architectural Space) blev 'affordance'-begrebet brugt til at visualisere samspillet mellem menneskeskabte- og 'naturlige' konstruktioner som ét Antropocænt landskab der ligger ud over den menneske-<natur-dikotomi.

At designe med det endnu ukendte

I forlængelse af dette var en af de fremsatte 'propositional reflections' en strategisk design tilgang; *designing for future affordances*. Formålet var, at imødekomme fremtidige muligheder for værdiskabelse, også selv om nutiden ikke nødvendigvis har viden, prioriteter eller økonomiske ressourcer dertil. I mindre skala kunne dette være at lokalisere, og designe forsinkelsesbassiner, som tager højde for landskabets egen-skaber og tilbyder ekstra rumlig kapacitet, for derved at give plads til fremtidig værdiskabelse. I byskala kunne det være at udpege tidligere vådområder i byudvikling som områder reserveret til ekstensiv brug, som mulighedsrum for fremtidige generationer. Denne 'propositional reflection' er derfor en forslagsstilling om en landskabs-baseret, adaptiv designstrategi, der skaber plads til det endnu ukendte.

Fragmenterede blå-grønne passager som skjulte 'affordances'

I et af de tre case studier blev reminiscenser af tidligere blå-grønne passager fundet i form af et skjult og glemt transversalt mønster i Aarhus. Et mønster, der brød med byens visuelle og funktionelle logik af ringe, radialer og centrum. Endvidere demonstrerede case studiet, at det var muligt at reetablere og genanvende visse af disse passager som blå-grønne infrastrukturer som strategisk klimatilpasning i den våde by, og samtidigt tilbyde passage for den tørre by, f.eks. ved fysisk at forbinde aktiviteter på tværs af aldersgrupper, fra børn til seniorborgere, og på tværs af forskellige socio-økonomiske interesser. Betragtet ud fra et samfundsmæssigt perspektiv, tilbyder denne viden en bred vifte af landskabs-'affordances' i Aarhus' hverdagslandskab, der kan tilgodese og bidrage til 'det fælles bedste' i et både kort- og langvarigt tidsmæssigt perspektiv.

En pre-strategisk tilgang til step-by-step værdiskabelse igennem klimatilpasningen

I case 3 blev en step-by-step pre-strategi udviklet som en landskabsbaseret, bottom-up strategi, der kunne imødekomme forskellige retfærdiggørelser og værdier, ved at synliggøre landskabs-’affordances’. Denne step-by-step pre-strategi tilbød stedsspecifikke tilgange, der adresserede forskellige interesser og eksisterende arbejdsområder, f.eks. kommunale afdelinger, institutioner, erhvervsliv, lokalsamfund, foreninger og privatpersoner. Step-by-step pre-strategien tilbød stedsspecifikke potentialer for værdiskabelse der kunne forbinde Klimatilpasning med diverse aktører og arbejdsområder.

Oplandskvarteret – en forbindelse mellem planlægningsniveauer

Studier af oversvømmelseskort sammenholdt med historiske kort og nuværende rumlige kvaliteter i de urbane landskaber pegede på mønstre af inkonsistente strømningsveje og vandoplande, som forhøjede sårbarheden overfor menneskelige interesser i byens landskaber. Undersøgelsen viste, hvordan de blå-grønne passager, såfremt de forbandtes til en vandoplandsstrategi, kunne forme strategisk klimatilpasning. Som respons på dette, blev en propositional reflection foreslået om the *Catchment Neighbourhood* (Oplandskvarteret) som kan forbinde klimatilpasning, planlægning og lokalsamfunds interesser med udgangspunkt i lokale landskabs-’affordances’. På planlægningsniveau, kan Oplandskvarteret kvalificere byudviklingen i Aarhus ved at fungere som det planmæssige bindeled mellem by-vision og kommuneplan og lokalplaner. Oplandskvarteret adresserer ligeledes forbindelsen mellem op- og nedstrøms landskabspraksisser.

Opsummering – case studier og ’propositional reflections’

Nærværende forskning peger på, at landskabsarkitektoniske metoder kan bidrage til at facilitere tværfaglige samarbejder med fokus på at udveksle og opbygge et samlet vidensniveau, der inkluderer både de målbare og de mere ’bløde’ værdier i real-tids møder. Blandt andet ved at facilitere måden at ’se’ urbane landskabs-’affordances’ på. Case studierne bekræfter desuden eksisterende forskning omkring natur-baserede løsninger som grønne infrastrukturer, der kan imødekomme usikkerheder og tilvejebringe mulighedsrum i forhold til fremtidens behov og samtidigt tjene almenvellet som fælles værdi. De ’propositional reflections’ tydeliggør, at landskabsbaserede ’affordances’ kan underbygge menneskelige interesser, hvorimod samtidens landskabspraksisser synes at sætte menneskets interesser over styr.

Real-tids case studierne ledsages af landskabsarkitektoniske forslagstillelser (propositional reflections) med udgangspunkt i forskningens formål: (1) Designkommentarer, (beskrevet ovenfor), (2) aktiv anvendelse af det Anthropocæne som begreb i forhold til at ’se’ urbane landskaber, (3) aktiv anvendelse af begrebet om ’affordances’ i landskabsarkitektoniske-metoder for at gøre ’affordances’ i den våde og den tørre by forståelige, (4) Justification Analysis som en analyse til at muliggøre værddipluralisme gennem forståelse af retfærdiggørelser, (5) Forslag om termen *hydrotoponym* til at gøre det gensidige forhold mellem

landskabsegenskaber, bebyggelsesmønstre og oversvømmelsesrisiko forståelige som et simpelt stedsspecifikt narrativ, (6) 'Designing for future affordances' som en landskabsbaseret, adaptiv designstrategi, der giver plads til fremtidige generationers værdier og behov (7) De *transversale passager* som en fundet forekomst af eksisterende, glemte potentialer i de urbane landskaber, (8) Oplandskvarteret som et planstrategisk redskab med potentialer for at forbinde op- og nedstrøms aktører i forbindelse med klimatilpasning, planlægning og lokal samfunds interesser, (9) step-by-step pre-strategien til at forbinde forskellige aktørers interesser gennem værdiskabelse med udgangspunkt i lokale landskabs-'affordances' og eksisterende arbejdsområder og praksisser.

På et overordnet metodeniveau, er Designkommentarer overførbare, da de er udviklet ud fra internationale landskabsarkitektoniske metoder. Justification Analysen kan formentligt overføres til andre vesteuropæiske kontekster, hvor den oprindelige teori er forankret. Anvendelsen af begreberne det Antropocæne og 'affordances' synes overordnet set at kunne overføres, eftersom det Antropocæne, urbaniseringen og de grundliggende principper om den menneskelige fysik er globale. De landskabsbaserede 'propositional reflections' er lokalt forankrede i Aarhus. Oplandskvarteret kan sandsynligvis overføres til en større kontekst som det danske plansystem, og muligvis til andre urbane landskaber og plansystemer, idet alle geografiske områder som sådan er indskrevet i et opland. Forslagsstillingen om Designing for future affordances, er en design-strategisk tilgang og tænkning, der kan tilpasses det lokale, uden at være et særligt formsprog eller stil, hvilket gør den let overførbar. Som sådan er erkendelserne situeret i case studierne og i den lokale kontekst, Aarhus, og yderligere forskning vil kunne udbygge denne viden.

ILLUSTRATIONS

Illustration information

b.1) Sources and copyright information

(b.2) Legends from mappings Case Aaby Assignment

(B.1) SOURCES AND COPYRIGHT INFORMATION

All sources for the visual material are primarily mentioned 'locally' in the relevant caption.

Maps that have been used and referenced as GST, are downloaded from the Geodatastyrelsen (Danish State) online mapviewer

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Part 1, 3 and 6, Chapter 1.2, 3.2, 3.5, 4.5, 6.2 and 6.3: Nikolaj Knudsen

Part 2: Anne Corlin

Non-referenced photos are taken by the author (KW).

Mappings and diagramming performed by the author are not mentioned, occasionally referenced to as 'KW' to accommodate GST regulations on use.

(b.2) Legends from mappings Case Aaby Assignment

LEGEND PRIMARY & CRITICAL ROADS 	
	Iconic buildings in Aarhus; Aros Art Museum, Town Hall, Main Station, Cathedral, DOKK1 Library, Iceberg, Godsbanen, Hothouse, Stadium
	Primary roadnet (highway, ring roads, access roads (radials), inner city)
	Railway
	Approx. area of the river valley Ådalen and the stream, Aarhus Å
	Flow paths *
	Primary flow paths *
	Public hospitals
	Primary roads effected by surface water *, the wider the blue line- the more projected water on the road
	Critical roads, primary infrastructure of the emergency responders (Beredskab)
	Primary roads effected by surface water *, the thinner the red line, the more impeded accessibility to the emergency responders
* Source, Flow paths projections AKO (cloud burst event year 2050), Aarhus Climate Adaptation Plan 2014	

LEGEND HISTORICAL LANDSCAPE 	
	Iconic buildings in Aarhus; Aros Art Museum, Town Hall, Main Station, Cathedral, DOKK1 Library, Iceberg, Godsbanen, Hothouse, Stadium
	Primary roadnet (highway, ring roads, access roads (radials), inner city)
	Railway
	Approx. marking of the late 19th Cent. slopes and hillsides leading to the river valley and Aarhus Bay **
	Historical extent of the river valley and the course of Aarhus stream, late 19th Cent. *
	Historical wet land areas, late 19th Cent. *
	Historical system of visible, surface water; streams, brooks, bassins, and canals in the late 19th Cent. *
	Primary flow paths *
	Contemporary primary directions (start-end) of the flow paths movement to the river valley and Aarhus Bay
* Source, Flow paths projections AKO (cloud burst event year 2050) ** source historical HMB maps 1842-1899	

LEGEND GREEN AREAS 	
	Iconic buildings in Aarhus; Aros Art Museum, Town Hall, Main Station, Cathedral, DOKK1 Library, Iceberg, Godsbanen, Hothouse, Stadium
	Primary roadnet (highway, ring roads, access roads (radials), inner city)
	Railway
	Approx. area of the river valley Ådalen and the stream, Aarhus Å
	Primary flow paths *
	Approx. marking of the late 19th Cent. slopes and hillsides leading to the river valley and Aarhus Bay **
	Larger, open, green spaces (e.g. parks, housing associations, sports-fields)
	Green areas with room for water and potentials for 'merværdi', multiple benefits
	Green-synergy; green areas with potentials for achieving further values as synergy effects
	Outer and Inner Green Rings***
	Green stretches and waterscapes, and their overall direction towards the river valley
* Source, Flow paths projections AKO (cloud burst event year 2050) ** source historical HMB maps 1842-1899 *** source, Aarhus Municipal Plan 2013	

LEGEND PRE-STRATEGY		
	Iconic buildings in Aarhus; Aros Art Museum, Town Hall, Main Station, Cathedral, DOKK1 Library, Iceberg, Godsbanen, Hothouse, Stadium	
	Primary roadnet (highway, ring roads, access roads (radials), inner city)	
	Railway	
	Approx. area of the river valley Ådalen and the stream, Aarhus Å	
	Primary flow paths *	
	Approx. marking of the late 19th Cent. slopes and hillsides leading to the river valley and Aarhus Bay **	
	Larger, open, green spaces (e.g. parks, housing associations, sports-fields)	
	Public hospitals	
	'Director': directing of flow paths towards the former blue-green passages (flow path to deep structure)	
	'Cardinals': crucial potential and attention areas, in order to re-connect flow paths to deep structures, towards the river valley	
	'Transversal Passages' potential blue-green stretches in the urban landscapes	
	'Green Synergy': local, blue-green retention potentials, to be connected in time, step-by-step	
	'Climate streets': streets with potential side-areas to retain/delay water	
<p>* Source, Flow paths projections AKO (cloud burst event year 2050) ** source historical HMB maps 1842-1899 *** source, Aarhus Municipal Plan 2013</p>		

LEGEND EXAMPLE/TEST AREA		
	Buildings with public programs, e.g. public schools, housing associations, nursing homes	
	Local roads/streets	
	Green areas with room for water and potentials for 'merværdi', multiple benefits	
	Green-synergy; green areas with potentials for achieving further values as synergy effects	
	Outdoor, green areas for sport	
	Approx. marking of the late 19th Cent. slopes and hillsides leading to the river valley and Aarhus Bay **	
	Primary flow paths *	
	Contemporary visible, surface water of the area, e.g. streams, springs, retention basins, lakes	
	'Director': directing of flow paths towards the former blue-green passages (flow path to deep structure)	
	'Cardinals': crucial potential and attention areas, in order to re-connect flow paths to deep structures, towards the river valley	
	'Climate streets': streets with potential side-areas/gardens to retain/delay water and/or potential designation of blue-streets	
<p>* Source, Flow paths projections AKO (cloud burst event year 2050) ** source historical HMB maps 1842-1899</p>		

(C) APPENDICES

Listing of appendices submitted as pdfs

Appendix_1_List_PracticeScreening.pdf

Appendix_2_List_CaseMeetings.pdf

Appendix_3A_Step-by-step_ResiliensLiveability.pdf

Appendix_3B_ByensSkjulteKiler.pdf
(The Hidden Passages of the City)

Appendix_3C_Step-by-step_SamledeMappings.pdf
(all Aaby assignment mappings)

Appendix_4_CAP14_Klimatilpasningsplan-2014.pdf
(Climate Adaptation Plan 2014, Aarhus Municipality)

Appendix_5_Maps_Aerial_CaseArea1-2-3_GST.pdf
(Aerial photo, contemporary-, and historical map of Case area 1, 2, 3, scale 1:12000/A3. Source: GST)

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