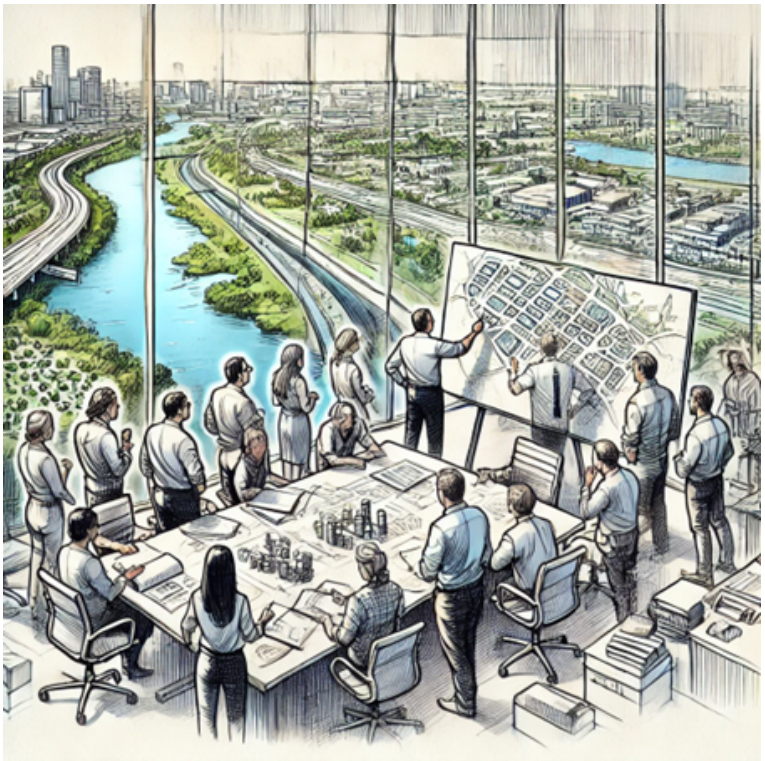
Thesis Report

TU Delft Department of Design & Integration
APPM

Adaptive Urbanism

The Role of Collaboration in Water-Adaptive Design



Max Verberne 4458168

Committee:	prof. dr. ir. M.J.C.M Hertogh	TU Delft, Chair
	dr. J. Ninan	TU Delft, 1st supervisor
	dr. L. Iuorio	TU Delft, 2nd supervisor
	F. van der Heijden, MSc	APPM
	ir. J. van der Hoeven, MSc	APPM

10th December 2024, Delft

Preface

Submitting this master's thesis marks the end of my time at TU Delft. Over the past years, I have gained significant knowledge in civil engineering and construction management, but more importantly, I have grown on a personal level. The research presented in this report combines my interests in water management, urban development, and social skills.

During my bachelor's in civil engineering and master's programme, I noticed that my attention was not drawn to the technical, engineering side, but rather to the social, softer aspects. Although there was less room for this focus during the bachelor's programme, I found plenty of opportunities to develop these interests during the master's, which was a welcome change. Over the past two years, I have been able to delve into the soft skills I wanted to develop, which are essential for project management, as this research also demonstrates. Inter-organisational collaboration is becoming increasingly crucial in urban development, a field that will only grow in complexity in the coming years. Through this research, I hope that the Netherlands will continue to be developed beautifully and sustainably, with all participants joining forces in these processes.

I would like to thank my supervisors at TU Delft, Marcel, Luca, and Johan, for their critical perspectives and feedback. Marcel's sharp insights helped me refine my own approach to the research. The bi-weekly meetings with Johan were invaluable in guiding the research throughout the process. Additionally, the meetings with Luca were essential in helping me turn my struggles into action and gain confidence in a successful outcome.

Furthermore, I would like to thank Floor for giving me the opportunity to do my graduation internship at APPM and for the amazing guidance, both on professional and personal level. Graduating at APPM has been a truly enjoyable experience thanks to the wonderful colleagues, fun land and water activities, and, of course, the 'bami schijven' on Fridays.

I would also like to express my gratitude to my friends, family, and my girlfriend, all of whom supported me over the past six months. Without their support, this report would not have been what it is today. In particular, I want to thank my brother for sacrificing his time between jobs to help me shape this report and to brainstorm with me whenever I needed it.

Finally, I wish you, the reader, a pleasant read. I hope you find it an engaging story and that you can draw valuable insights from it to contribute to a better future.

Executive Summary

Urban development is essential to deal with the current housing crisis in the Netherlands, while simultaneously changing water conditions in the country due to climate change require a solution. One possibility to deal with this, can be found in water adaptive urban development. Water-adaptive urban development refers to the process of designing and constructing urban areas that integrate sustainable, flexible water management strategies to address challenges such as flooding, water scarcity, and climate change impacts while ensuring long-term resilience and livability. This in itself is already complex and as "easy" locations have already been used, this complexity is increasing. To deal with this, stakeholders need to adapt their current way of involvement and approach. In order to contribute to this transition, this research focuses on collaboration in water adaptive urban development, specifically in the location selection at the beginning of the development process and the involvement of the water boards. The research resolves around the research question:

> *How to design an effective collaboration between key stakeholders in the location selection process of water adaptive urban development projects?*

To answer this question, the research is split into four parts. The first part focuses on the state of the art knowledge on collaboration as well as the current form of collaboration that are applied in water adaptive housing projects in the Netherlands. The second part of this study explores the location selection process for residential development in Dutch regions facing significant water management challenges. This is conducted through a case study, drawing insights from interviews that are qualitatively analyses. Using the same data collection and analysis methods, the third part delves into the obstacles encountered in this selection process, along with the strategies applied to address these issues. Additionally, this section considers participants' expressed preferences and suggested improvements regarding the current process. The fourth section of the research combines the insights and results from the previous sections into a framework, which can be used to answer the main research question.

The literature synthesis focused on the different elements of collaboration and frameworks how collaboration can be implemented in water-adaptive urban development. It defined urban development as:

> *"development that meets the needs of a community without compromising the ability of future generations to meet their own needs. It prioritizes economic, environmental and social sustainability"* - (Hager, 2023)

The literature highlighted the multi-faceted aspects of urban development, highlighting the current complexities and challenges. One major challenge that this research addresses, is the issue of standardization versus localization as stated by Caprotti et al. (2017). Standardization is highlighted as a challenge that needs to be addressed, while simultaneously maintaining a tailored approach to reduce the chances that minorities and smaller communities are marginalized.

The literature then delved into the existing frameworks and theories on collaboration that are implemented in urban design, world wide and in the Netherlands. Ultimately, the collaborative governance framework by Ansell and Gash (2008) emerged as the most promising and suited for the process this research focuses on. It establishes starting conditions considering trust, incentives for collaboration and power-resource-knowledge asymmetries, after which a collaborative loop is started. This loop consists of face-to-face dialogue, trust building, commitment to process, shared understanding and intermediate wins, with side inputs from institutional design and facilitative leadership. Facilitative leadership is described as coaching, guiding leadership from an independent party. Together, participants can come to a process outcome by collaboratively working around the loop, increasing each element every time it passes. Trust and communication are emphasized

as essential to develop and improve throughout the process, while increasing commitment to the process and shared understanding lead to more confidence in the process itself among participants.

Several sources were also found on water-adaptive urban development. Integrated Water Management (IWM) is recognized as important element in water-adaptive urban development by Koop et al. (2022). It is essential for flood risk mitigation, resilient urban planning, sustainable development, community engagement and adaption to climate change, which are all elements that need to be implemented in water-adaptive development designs. Koop advocates for a holistic approach to address all these elements to its full potential. Additionally, Koop presents the concept of Water-Sensitive Urban Design (WSUD), incorporating water management principles in a strategic way by placing infrastructure and residential areas in such a way that flood risks are minimized and land use is optimized.

Finally, the literature presents examples on how stakeholder engagement is essential in IWM, by highlighting its role in the successes of IWM in projects world wide. The "Room for the River" project in the Netherlands is highlighted, emphasizing the importance of multi-stakeholder participation for a successful outcome. Additionally, a project in Victoria, Australia is mentioned which implements the Dutch practices in stakeholder engagement. This implementation proves to be highly effective, as it incorporates a strong engagement as well as forward-thinking, achieving sustainable water management.

As mentioned before, the second and third part of the research are done through a case study in which interviews are used to gather data. In total, 10 interviews were conducted with stakeholders active in the location selection of the Gnephoek, a soon to be realized area in the municipality of Alphen aan den Rijn, next to the protected Groene Hart area. The selection of this process started in 2017 and is at the moment of writing in its final stage, only needing formal approval of the Provincial Council. Stakeholders involved in this process were the municipality, province of South Holland, water board Rijnland, regional accord Holland-Rijnland, developer BPD and the Ministry of Internal Affairs. The insights and results from this case study highlighted patterns regarding the moment of involvement as well as the role and position of each participant. Key findings are highlighted below:

- The need for early involvement of the water boards is felt throughout the field, as the increasing complexity on water-adaptive development requires their expertise. In their current role, water boards are struggling with this position shift, as their role has historically always been consulting throughout and assessing at the end of the process. Specific knowledge on urban planning is often found not up-to-date at the water boards, while this is essential when communicating demands on water safety and quality to other participants.
- Stakeholders, such as municipalities, water boards, provinces and regional accords, experience a need for guidance from the national government, with the emphasis on a tailored approach. Right now, no blueprint on how to collaborate in the location selection process exists, leading to an inefficient process with participants not always involved at the right moment and in the right way.
- Stakeholders express the need for a shared process ownership, as the municipality is currently sole owner. This puts all responsibility with the municipality, leaving the water boards and provinces to watch from the sidelines. Having a shared process ownership aligns stakeholders and leads to a cooperative approach in reaching a suitable outcome.
- Facilitative leadership is recognized as highly potential to improve the current location selection process, in combination with a stronger institutional design. Facilitative leadership is best explained as supportive leadership, often executed by an independent party, to help guide stakeholders reaching a consensus and or collaborative decision. By implementing facilitative

leadership from the start, the process itself has the potential to become a smooth ride. The importance of leadership emphasizes the essence of "soft" skills in an environment where technical "hard" skills are predominantly present.

In the final part of the research, these insights were combined to develop a framework to improve collaboration in the location selection process. The challenges, strategies and desires expressed by interview participants are linked to each other through the collaborative governance model by Ansell and Gash, to highlight the elements of the framework that are of importance to the location selection process. Based on the network produced by this analysis, the collaborative governance model by Ansell and Gash is adjusted to meet the needs of the location selection process for water-adaptive urban development. It implements the insights mentioned before and can be seen in Figure 1.

The framework provides guidance to recognize who to involve at what moment and in which way, acknowledging roles and power positions, while being guided by a facilitative leader and with increased institutional desing. Implementing the framework should lead to an improved cooperative outcome of the process.

After the research was conducted, several practical recommendations were made. It is suggested to actually involve the water boards from the earliest moments of the process, as well as to construct a set of guidelines for the process which increase institutional design. Moreover, the appointment of a facilitative leader is highly recommended. Other recommendations include co-ownership of the process, a formal starting moment on administrative level and extra investments on planning knowledge on the water boards side. The main recommendations are listed and elaborated below.

- **Early involvement of the water boards**: Water boards should be engaged from the start of the location selection process. Their expertise is essential for the implementation of water adaptive designs, as they can identify risks and propose solutions. Early participation ensures that the urban planning aligns with water management requirements, reducing conflicts and delays later in the project. However, it is noted that in order to be effectively involved in this process.
- **Implementing a Collective Approach with Co-Ownership**: Shared ownership of the planning process among municipalities, provinces, and water boards ensures collaborative decision-making. This reduces the current burden on municipalities and ensures that each stakeholder contributes actively. A collective approach aligns interests, encourages cooperation, and leads to more durable and widely accepted outcomes. It is recommended to formally establish this co-ownership at the very start of the process, in order to ensure commitment throughout the whole process.
- **Appointing a Facilitative Leader**: A facilitative leader, preferably an independent entity, can guide stakeholders through discussions and negotiations. This leader would help resolve conflicts, build trust, and maintain focus on shared goals. His or her involvement improves collaboration and decision making processes. This facilitative leader should be appointed at the beginning of the process to maximize its potential.
- **Strengthening the Institutional Design**: The national government should enhance institutional frameworks to guide collaboration. By establishing a set of clear guidelines, the government can strengthen its institutional designs and reduce inefficiencies and ambiguities in stakeholder involvement. This creates a more structured approach to location selection, balancing local needs with national priorities.

Additionally, the theoretical contributions of the research are highlighted. The research contributes by mapping the fragmented current location selection process for water-adaptive urban development in the Netherlands and designing a collaborative framework that adapts the Ansell and Gash

model to suit collaboration in the location selection process, explicitly incorporating the role of the water boards and water governance. The framework integrates tailored approaches to prevent marginalization of smaller groups. Additionally, the study underscores the critical role of facilitative leadership in bridging technical challenges and collaborative needs, highlighting the importance of soft skills in enhancing stakeholder engagement and navigating the complexities of urban planning.

The study also suggests directions for future research: testing the framework's implementation through research by design, using its iterative approach to tackle complex urban planning issues. Examining multiple case studies across Dutch provinces could reveal regional differences in spatial planning and water management, as well as the impact of governance structures on decision making. Further research should address internal trust-building within stakeholder organisations, which the framework currently overlooks. Lastly, investigating the role of regional bodies as facilitators without legal authority could guide policy on governance adaptability in inter-municipal projects.

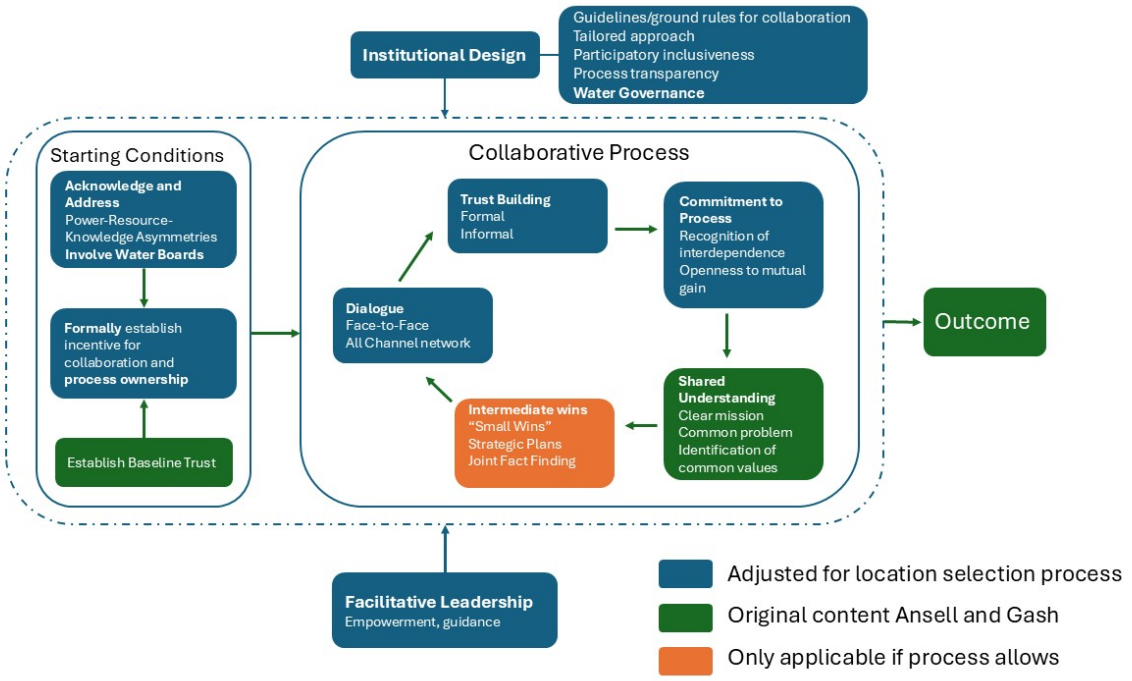


Figure 1: Collaborative Governance model by Ansell and Gash (2008) adjusted for location selection process of large scale residential urban development projects

Contents

List of Figures

List of Tables

Glossary

Table 1: Glossary of terms and their Dutch translations

Term	**Dutch Translation**
BSD	Bestaand Stads- en Dorpsgezicht
Challenge in water and soil management	opgave op water en bodem sturend vlak
Contour plan	Contourenplan
Deputy	Gedeputeerde
Environmental Regulation	Omgevingsverordening
Environmental vision	Omgevingsvisie
Estimation of volume	Raming
Feasibility study	Haalbaarheidsstudie
Green Heart	Groene Hart
GS	Gedeputeerde Staten
Ministry of Economic Affairs	Ministerie van Economische Zaken
Ministry of Infrastructure and Water Management	Ministerie van Infrastructuur en Watermanagement
Ministry of Internal Affairs	Ministerie van Binnenlandse Zaken
Ministry of VROM	Ministerie van Volkshuisvestiging, Ruimtelijke Ordening en Milieubeheer
Municipality	Gemeente
Nature development	Natuurontwikkeling
Participation	Participatie
Province	de Provincie
Provincial policy	Provinciaal Beleid
PS	Provinciale Staten
Regional Accord	De Regio
Urban development	Stedelijke ontwikkeling
Water board	Waterschap
Water Board Regulation	Waterschapsverordening
Water exam	Watertoets
Water-adaptive environments	Water-adaptieve omgevingen

1 | Introduction

1.1 Context and problem analysis

The Netherlands, a densely populated country, faces complex challenges. Currently, there is a need for a million extra houses in already densely populated areas due to both an increase in population in general as well as a growing migration movement towards the cities (Arentshorst et al., 2019; De Vos & Spoormans, 2022). Simultaneously, there is an ongoing battle against the rising water levels, which has been fought for ages (Babe, 2022), intensifying due to climate change (Garcia-Fuentes, 2018). Not only is there a threat of flooding increasing due to seawater level (SWL) rise, but peak discharges in rivers also increase, creating a double threat for lower areas (Slager, 2021). These rising water levels limit the space that urban developers can use for the creation of new living areas (Sengupta et al., 2023).

The Dutch government is currently attempting to tackle this problem. The current policy in existing cities focuses on densification, but this brings along significant urban challenges, such as a lack of space, an increased urban heat island effect, and a heightened risk profile due to more people living within the same square kilometers. As a result, there is also a consideration to develop areas outside the existing urban and village boundaries for housing construction. However, locations with attractive geographical positions in the Randstad region have a high risk profile for water-related issues, as illustrated in the water and soil management map published by the Ministry of Infrastructure and Water Management, shown in Figure 1.1.

Several projects are already underway or completed in these higher-risk areas. Examples include the development of Westergouwe and the Vijfde Dorp, located in areas up to 6 metres below sea level (Weesies, 2021). The realisation of these projects requires an innovative approach due to the higher risk profile. This approach differs from traditional methods, leading to regular resistance and misunderstanding from society and stakeholders (Nijenhuis, 2024).

This additional complexity highlights the "wickedness" of the situation. As described by Rittel and Webber (1973), wicked problems are situations where no clear, one-sided solution exists, and each solution brings new challenges and problems. There is no best solution, emphasising the complexity of the situation. If development outside existing urban and village boundaries is to relieve cities of the urban challenges associated with densification, numerous complications arise. The realisation of projects like those in Westergouwe and the Vijfde Dorp involves lengthy and multifaceted processes (Gouwe IJssel Nieuws, 2023). The realisation of these projects marks the shift and necessity of water-adaptive urban development, while simultaneously indicating the complexity of such projects.

In an attempt to reduce resistance and facilitate a quicker shift towards water-adaptive residential area development, this research focuses on collaboration in the initial stages of this process, specifically the location selection process. The location selection process is the first process that starts after the acknowledgement of the need for more houses. Other stages involve the planning, construction and final realisation of the residential area. Choosing the right location for these kind of developments is challenging, since it would involve allowing development in areas with a higher risk profile. This changed risk profile requires an integrated approach from stakeholders such as municipalities, provinces, water boards and developers. These stakeholders are involved throughout the whole process from A to Z. If collaboration between these stakeholders is not optimal from the beginning, it can have consequences for the partnership throughout the entire process.

There is significant attention surrounding the specific location selection for residential development, particularly for locations with substantial water and soil management challenges. As previously mentioned, the higher risk profile of sites in these areas can create resistance among stakeholders.

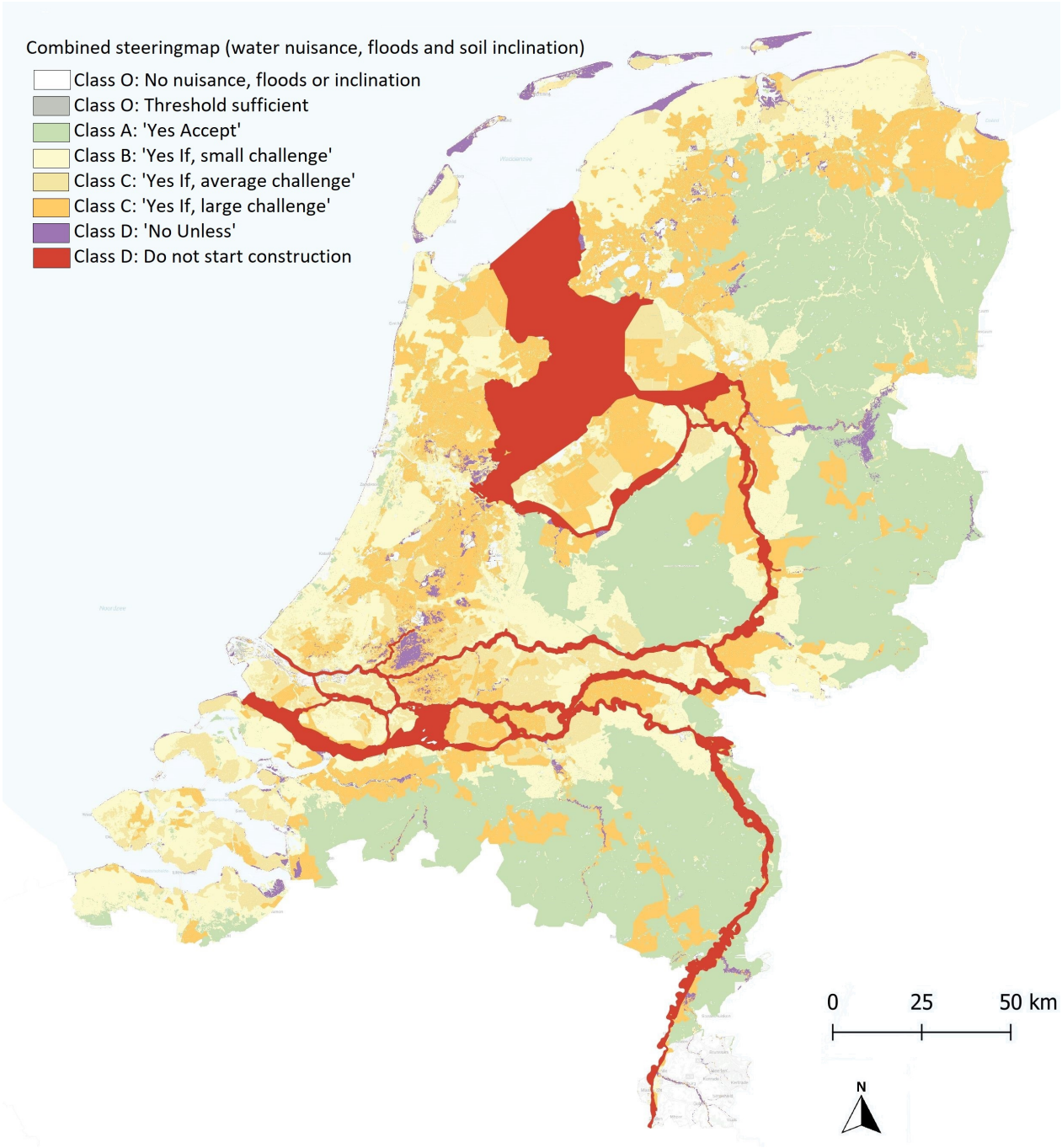


Figure 1.1: Steering map based on spatial assessment framework for the built environment (Ministerie van Infrastructuur en Waterstaat, 2024)

By mapping the current location selection process, properly identifying stakeholders, and finding ways to enable these stakeholders to collaborate effectively through various methods such as communication strategies, trust building and facilitative leadership, a solution can be found for a process that is currently progressing slowly. This, in turn, contributes to addressing the dual problem of the housing crisis in the Netherlands.

1.2 Problem statement

Like mentioned above, the root causes of the current urban development challenge in the Netherlands are twofold: a housing shortage that is not likely to come to an end soon and an increasing threat of flooding due to rising sea levels and higher peak river discharges. This complex situation has led municipalities to push for development in areas where stakeholders responsible for dealing with the water issue would advise against, often getting into conflict with these stakeholders (Wessels, 2021). As a consequence, water boards, tasked with ensuring water safety, are protesting, leading to tense relations (Schilthuizen, 2024). This friction complicates a collaboration crucial for crafting sustainable policies.

A potential solution lies in a paradigm shift towards water adaptive residential development in areas that have a higher risk profile towards flooding. The focus of this thesis revolves around exploring how key stakeholders like municipalities and water boards can collaborate effectively to select a suited location for this type of development. One element of this issue appears to be rooted in the collaborative process itself, which is currently met with resistance from all sides, hindering progress towards a solution (Schilthuizen, 2024). There lies a significant opportunity in applying state of the art knowledge on collaboration to smooth out this process.

1.3 Research Objective

The primary aim of this thesis is to explore various forms of collaboration and partnerships within the location selection process of residential development projects. The goal is to provide a tool, in the form of a framework, that key stakeholders can use to improve collaboration when it comes to the site selection of water-adaptive urban development. This objective is achieved through multiple research objectives, which are:

- To identify and analyse the existing knowledge in literature on collaboration between waterboards and municipalities in the Netherlands.
- To identify and analyse the current practices of collaboration in the Netherlands regarding water adaptive urban development for residential development.
- To create a framework that contributes to designing an effective collaboration between key stakeholders in urban development projects with water related issues.

Once these research goals are achieved, a proposal can be presented regarding collaboration in order to obtain a constructive, smooth collaboration that contributes in a sustainable, durable way to finding a solution for the housing crisis in fashioned time.

1.4 Research Questions

In order to achieve the goal of this thesis, the following research question will be answered:

How to design an effective collaboration between key stakeholders in the location selection process of water adaptive urban development projects?

1.4.1 Research Sub-Questions

The answer to the main research will be reached through multiple sub-questions. These questions all aim to tackle a different angle to the issue. The sub-questions are:

1. What are the current collaborations and partnerships in water adaptive urban development?
   (a) What is the state of the art knowledge on collaborations?
   (b) Which forms of collaboration are applied in housing projects in water adaptive environments in the Netherlands?
2. How have recent locations for water adaptive projects in urban housing development been selected in the Netherlands?
3. What is the practice of collaboration in the Netherlands in terms of water adaptive urban development?
   (a) Who are the key stakeholders, what are their interests and how do they practice collaboration?
   (b) How do key stakeholders want to be involved in the location selection process?
   (c) What obstacles are stakeholders facing when it comes to location selection of water adaptive urban development and how do they deal with it?
   (d) What desires do stakeholders express regarding collaboration in the current process and how can they be implemented to improve collaboration?
4. How can the insights gained from the research contribute to a framework that can guide collaboration in the location selection process?

1.5 Research design

In the research design, the objectives and research questions are systematically linked to data sources that facilitate answering the research questions and producing the desired research output. The main research question was approached through a qualitative data analysis. This section explains which different elements in the research are connected to which data source. Detailed information about the data types and collection methods, together with further details on the qualitative data analysis method are provided in section 2.4.

The literature synthesis, which represents the first step in the research, offered preliminary data and insights into the current practices of collaboration and particularly in water-adaptive projects. It evaluates the state of the art knowledge on collaboration and the application of various forms of collaboration in urban development and water-adaptive projects. The outcomes of the literature review formed the initial basis of interview questions and protocols.

Qualitative data was obtained from a case study, which will be further detailed in chapter 4. Initial case study information was obtained from official documents issued by governmental bodies, including the province and municipality involved. This information guided the structure of the interview questions. Additional insights from these documents contributed to the construction of the interview protocols.

The primary data for the qualitative analysis was obtained from interview transcripts. The interviews were conducted during the final stages of data collection. As previously mentioned, the literature review, along with official documents, formed the foundation for the interview protocols.

Following the data collection, a qualitative data analysis was conducted. The results of this analysis reveal overarching themes and patterns, which are utilised to create a framework. This framework

is developed and elaborated upon in the latter stages of the research. As the framework is intended to be used by governmental instances nation-wide, the data analysis is set up to diverge, leading to a broad interpretation of the results.

Starting with a broad literature synthesis, followed by a more specific data collection in the form of a case study and finally a broad analysis, follows the design suggested by Chan (2020). The authors suggest this design reflects the typical logic of a research article and argue for each step that:

1. **Broad Start**: Research starts by exploring the general field to understand the wider context. This phase helps identify knowledge gaps and formulate research questions. A broad approach ensures the research is rooted in the existing body of knowledge and shows how the current study contributes to ongoing academic conversations.
2. **Convergence During Data Gathering**: Once the research question is established, the process narrows to focus on specific methods and data collection. This is the point where the research becomes highly structured and systematic, allowing for precision and depth. By converging on specific data, it can be ensured that the findings are relevant to the question and offer valid insights.
3. **Divergence in Data Analysis**: After gathering data, the analysis broadens to interpret findings in a wider context. The goal is to derive general themes, patterns, and insights from specific data points. This divergence is crucial because it ties the specific findings back to the broader context, showing the study's significance and proposing implications for future research or practice.

In this research, this approach is implemented and visualized in Figure 1.2.

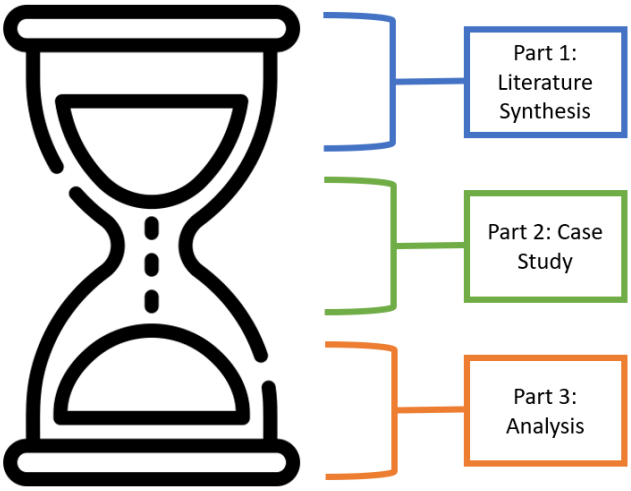


Figure 1.2: Research Design following the hourglass model by Chan (2020)

1.6 Scope

While there are examples of water adaptive urban development to be found in the Netherlands and other countries, the collaboration between stakeholders can often be improved. As mentioned before, the main goal of this thesis is to investigate and improve current collaboration forms between stakeholders when it comes down to water adaptive urban development, in order to unlock new possibilities in urban development and help with an answer to the increasing housing demand. In order to define collaboration at the beginning of the research, the collaboration between municipalities and waterboards is chosen. Collaboration between these key stakeholders is essential

to obtain a resilient, future proof result when it comes to water adaptive urban development in the coming decades. The precise scope for this process is mentioned in the paragraph before.

2 | Methodology

This chapter describes the methodology used in this research in order to obtain the stated research objectives. First, the research design is described. The design includes the overall setup of the research as well as how it progresses in time. Next, different types of methodologies used are discussed as well as why these methodologies were chosen for this research. Finally, the applied methodologies in the design are presented.

2.1 Literature Synthesis

As mentioned in section 1.5, the research starts with a literature synthesis in order to obtain initial insights in the state of the art knowledge on collaboration. The synthesis follows a structured and methodical approach, designed to explore the current state of knowledge on collaboration in water-adaptive urban development. The primary goal of this synthesis is to identify existing collaborative practices and frameworks that can inform the development of a location selection process for residential projects in water-sensitive environments.

The literature search and selection process for this synthesis is designed to systematically explore the breadth and depth of existing knowledge on collaboration in water-adaptive urban development. The process begins by employing broad search terms, such as "urban development," "collaboration," and "sustainable development," in academic databases and search engines such as ScienceDirect, Google Scholar and Scopus. These terms are strategically chosen to cast a wide net over the available academic and professional literature, gathering a comprehensive overview of existing research on foundational concepts in urban development and various collaborative approaches. This initial step is crucial for identifying a diverse range of sources, including theoretical frameworks, historical perspectives, and general discussions on collaboration in urban planning.

As the search progresses, the focus gradually narrows, and more specific search terms are introduced to converge towards the core topic of the research. Terms like "integrated water management," "water-sensitive urban design," and "collaborative planning in water-adaptive environments" are employed. These more focused keywords allow for the identification of literature that directly addresses the intersection of urban development and water management, particularly in the context of collaboration between key stakeholders.

The search strategy also includes the use of Boolean operators (e.g., AND, OR) to combine these terms, ensuring that the search results are as relevant as possible. For example, searches like "urban development AND water-adaptive environments" or "collaboration AND integrated water management" help to filter the results to those most pertinent to the research objectives.

Throughout this process, the literature is carefully selected based on its relevance to the research questions, with priority given to peer-reviewed journal articles, books, and authoritative reports. This approach ensures that the synthesis is grounded in robust and credible sources. As the search terms become more specific, the literature collected becomes increasingly focused on the practical applications of collaborative frameworks in water-sensitive urban development, leading to a targeted and effective synthesis of the available knowledge.

This systematic approach to literature search and selection enables the identification of key themes and gaps in the current research, laying the foundation for interview protocols used in the study, as well as the creation of an initial framework.

2.2 Case Study

To investigate the current processes and stakeholder management approaches applied in the Netherlands, a case study is conducted. This case study functions as the primary data collection for this research. Coombs (2022) suggests that a case study is a methodological approach that enables researchers to generate an in-depth understanding of contemporary issues within a bounded system. This method is particularly beneficial when research questions focus on *"how"*, *"why"*, and *"what"* aspects of a phenomenon. This aligns well with the investigative needs of the research on stakeholder involvement in residential projects. The case study approach allows for data collection from multiple sources such as interviews, observations, and documents, providing a rich, detailed view of the processes and interactions involved (Coombs, 2022).

Priya (2021) further supports the suitability of case studies for this type of research. Case studies are not merely a method of data collection but a comprehensive research strategy encompassing various techniques to study a phenomenon in its natural setting. This approach is effective for capturing the contextual elements and the interplay of factors influencing stakeholder involvement and decision making processes in residential projects (Priya, 2021). Additionally, Priya (2021) notes that case studies can accommodate both qualitative and quantitative data, offering a holistic view of the research problem.
Moreover, case studies are instrumental in theory generation and hypothesis testing, providing insights that can be generalised to broader contexts through analytic generalisations rather than statistical ones (Priya, 2021). Understanding the specific dynamics within Dutch residential projects can inform broader theoretical frameworks applicable to similar contexts in other regions or countries, which is particularly relevant for this research.
This research implements the use of a single case study rather than using multiple, primarily due to the connections available. As the case is approached through the channels of APPM, only cases with available connections are suited. It turned out that only one case was at hand at the moment of the research, therefore a single case study was the result. On one hand, this means the case can be investigated thouroughly, on the other hand the insights might be limited due to limited perspectives. In the following section, the characteristics and benefits of a single case study is elaborated.

Single case studies offer unique advantages for researchers, particularly in fields requiring in-depth, context-specific analysis. These studies are less costly and time-intensive compared to multiple case studies, while still allowing researchers to generate rich, high-quality theories (Gustafsson, 2017). Because a single case study enables a deep exploration of a phenomenon, it allows researchers to question existing theoretical relationships and potentially develop new ones. The thoroughness of this approach is particularly advantageous for examining complex, real-life scenarios where nuanced insights are essential (Gaya & Smith, 2016). Moreover, the understanding obtained by the researcher goes beyond the information documented in the case study, including the tacit insights the author gains from the experience of closely observing the phenomenon (Mariotto et al., 2014). The authors also mention the form of knowledge diffusion in single case studies, which takes place when the found results are tested in another situation. This transferability of insights is essential in fields such as strategic management, where empirical evidence grounded in real-life complexity is necessary to address multifaceted challenges. Gaya and Smith (2016) highlight that single case studies, especially when combined with qualitative research, are particularly powerful for theory development, enabling the creation of nuanced, context-specific data often missed in quantitative studies. This approach supports theory generation and extension by capturing the dynamics of strategic interactions in actual settings. By employing qualitative methods within single case studies, researchers produce robust data that strengthen the empirical foundation of comprehensive analysis, offering a framework for interpreting and transferring findings across contexts—a process critical for advancing strategic management research. As this thesis resolves around qualitative data analysis, a single case study design can prove beneficial.

In order to find a suitable case, a list of criteria is created. If the case meets all criteria, it can be used for this thesis. The criteria are:

1. The location is recently selected (<5 years) or is in the final moments of official selection. This makes sure that the information gathered is still fresh in the memory of the people involved and the most recent policies and procedures are applied, as well as up to date knowledge on collaboration with key stakeholders.

2. The location selected is in the Netherlands. This research focuses on collaboration during the location selection process in the Netherlands, selecting a case in a different country does not make sense.

3. The locations is addressed as a "big" location for development by the province. Per province, requirements to call a project "big" can differ. When looking at possible suited locations, the relevant provincial policy is checked to see what these specific requirements are. Since one of the goals of this research is to actively contribute to the current housing problem in the Netherlands, the focus is on larger projects rather than smaller ones. Investigating larger projects can contribute more to the problem.

4. The location selected is in an area with a large(r) challenge on soil and water management. This required an adaptive strategy to realize construction, which in turn requires extensive collaboration between key stakeholders such as the provincial government, municipality and water boards. The Ministry of Infrastructure and Water management (I&W) has published a map indicating in which areas in the Netherlands such a challenge can arise, as shown in Figure 1.1.

5. APPM has connections to participants involved in the case. Existing connections with participants make data collection easier. Participants are more likely to respond promptly to interview requests, and the preparation of interviews can be more effectively tailored to each individual participant.

While searching for a suited case, a map was published by the Ministries of Internal Affairs, Economic Affairs and Infrastructure and Water management in collaboration with APPM, seen in Figure 2.1. This map is used to select possible cases. Each location is held against the previously mentioned criteria to see whether it is fit for the research and checks all the boxes. In the end, only one case matched sufficient with all criteria. The availability of connections with participants proved to be the decisive factor. While several potential locations met the technical and policy requirements mentioned above, only one had sufficient connections to potential interview participants.

Figure 2.1: Visual representation of the possible locations (Ministerie van Binnenlandse Zaken et al., 2024)

2.3 Data Collection

In order to obtain data from the selected case, interviews are conducted with relevant stakeholders, who are identified via preliminary reading and consultation from APPM. This section elaborates on the structure of those interviews, the protocol used to prepare for the interviews, the participant selection and finally the data management plan regarding the obtained data. In the end, 10 interviews were conducted.

2.3.1 Interviews

The interviews conducted are set up as semi-structured interviews. The semi-structured interview is a qualitative research method that involves guided, yet flexible, conversation between the interviewer and interviewee (Hadrian Petrescu et al., 2017). It combines pre-determined, open-ended questions with the freedom to explore and ask further based on the responses given. This approach allows researchers to gather in-depth data while maintaining a level of consistency across interviews (Magaldi & Berler, 2020). The structure provides a framework for key topics while offering the flexibility to delve deeper into specific areas based on the interviewees' responses. This balance provides comprehensive data collection and simultaneously allows for a deeper understanding of the research topic.

One of the main advantages of semi-structured interviews is their flexibility. They provide a framework to ensure that key topics are covered while allowing interviewees to express their thoughts and experiences in their own words. This flexibility can lead to the discovery of unexpected insights and deeper understanding of the subject matter.Additionally, the open-ended nature of the questions helps to gather more detailed responses than a structured interview, which can often be limited to yes/no answers or short statements (Hadrian Petrescu et al., 2017). As a result, researchers can capture a richer and more nuanced picture of the participant's perspectives.

However, semi-structured interviews also come with challenges. The flexibility that allows for rich data collection can also lead to variability in the data, making it harder to compare responses directly. This variability can complicate the analysis and interpretation process. Moreover, the quality of the data depends significantly on the skill of the interviewer, who must be adept at steering the conversation without leading the interviewee or introducing bias. Ethical considerations, such as maintaining confidentiality and managing personal biases, are crucial to ensure the integrity of the data (Magaldi & Berler, 2020). These factors highlight the importance of thorough preparation for the interviewer. In this thesis, this preparation is done through the literature study and examination of official documents regarding the case, which form the basis for the interview protocols.

2.3.2 Interview protocol

In order to obtain the right data from the interviews, an interview protocol is constructed before each interview. Having a protocol ensures consistent and reliable data, as stated by Castillo-Montoya (2016). The main themes discussed in each interview are the same, but because each participant plays a different role in the location selection process or works for his/her own organization, the protocol is personalized per interviewee. Before each interview starts, the interviewee is asked to sign a consent form, ensuring that the data gathered during the interview is stored appropriately and the interviewee has agreed with it, as well as with the interview itself.

Before each interview, a list of approximately 15 questions is constructed for guidance. This number is used as an indication, the actual protocol list can be longer or shorter. These questions focus on the main themes involved in the interview:

- The precise role the participant plays in the organization he/she works for;
- The structure of said organization;
- The way the participant and the organization he/she works for is involved in the case;
- Collaboration of the organization with other stakeholder organizations;
- Challenges faced during the location selection process in this case.

By addressing these themes, the precise role of the organization and the way it works becomes clear, as well as its interest and involvement in the project. This can justify the moment of involvement in the process or give an indication to whether the moment of involvement in the current process is the right one. The themes and questions relate to the research sub-questions 2 and 3: How the current location selection process works, the challenges faced and strategies used during the process and the desires regarding the process. Questions asked in the interview include, but are not limited to:

- “Describe your role in the organization and how you are involved in the project?”
- “How do you manage other stakeholders interests?”
- “What are the major challenges you face in these kind of processes?”

As the interviews are semi-structured, the follow-up questions on these questions are not prepared. However, it is possible to give examples of follow-up questions that were asked during the interviews. For example, when asked about the challenges faced during the process, questions such as "What is the origin of that challenge?" can be asked.

Addressing all the themes in each interview is essential for the continuity and validity of the interviews, which is why the themes are all incorporated in the interview protocols. The used interview protocols can be found in Appendix A.

2.3.3 Participant Selection

Participant selection is an essential aspect of qualitative research, significantly impacting the study's validity and depth of understanding. As Sargeant (2012) explains, qualitative research relies on purposeful selection, choosing participants who can best inform the research questions and enhance the understanding of the phenomenon under study. This approach ensures that the sample includes diverse perspectives relevant to the research context, such as different roles, experiences, and backgrounds within different stakeholder groups, which is essential in order to understand the whole picture. Participant selection is, therefore, crucial in producing authentic and trustworthy qualitative research findings, as it directly influences the quality and relevance of the data obtained. After stakeholder groups are identified, interview participants are selected based on their involvement in the location selection process. Criteria include their role, expertise, and relevance to the case study.

2.3.4 Data Management Plan

At this point in the research, a data management plan is created to deal with sensitive information shared by interview participants. The plan (ID 152179) is approved by the TU Delft Data Management support staff before the data gathering process started. The plan, which can be found in Appendix B, describes the type of data collected as well as how it is stored and protected.

The consent form and data anonymisation are two critical elements in the process. A consent form is signed prior to each interview. The consent form in Appendix B outlines the objective of the interview, potential hazards, and publication/use of anonymized data. All signed consent forms are saved to a TU Delft OneDrive and removed once the research is completed.

The interviewees are requested for permission to record the interview. The recording was made using Microsoft Teams and stored to the APPM OneDrive. After that, the interview is transcribed, with anonymised and personal comments added.

2.4 Qualitative Data Analysis

Each interview recorded through MS Teams or via a microphone is transcribed literally via MS Word. To get rid of all the speaking words, such as "... yes, yes", "yes, of course", "like" and repeating words, which often occur in a conversation, ChatGPT is used to rewrite the transcripts to reading language. This filters out all speaking terms and constructs coherent sentences, which helps to read the transcript faster and understanding it better. It is essential, however, to reread the rewritten paragraphs whilst listening to the corresponding section in the recorded audio in order to maintain the integrity of the participants terminology and meaning of their words. As a last step, the rewritten transcripts are translated to English in order to be coded properly.

When transcribed, the transcript is coded using the Gioia methodology. The Gioia Method, as outlined by Gioia et al. (2013), is designed to ensure a systematic concept development through a structured approach for qualitative data. The Gioia Method involves three primary stages: first-order concepts, second-order themes and the development of aggregate dimensions, enabling for a structured analysis. An example of how this structure can be implemented, is seen in Figure 2.2. The stages are elaborated upon below.

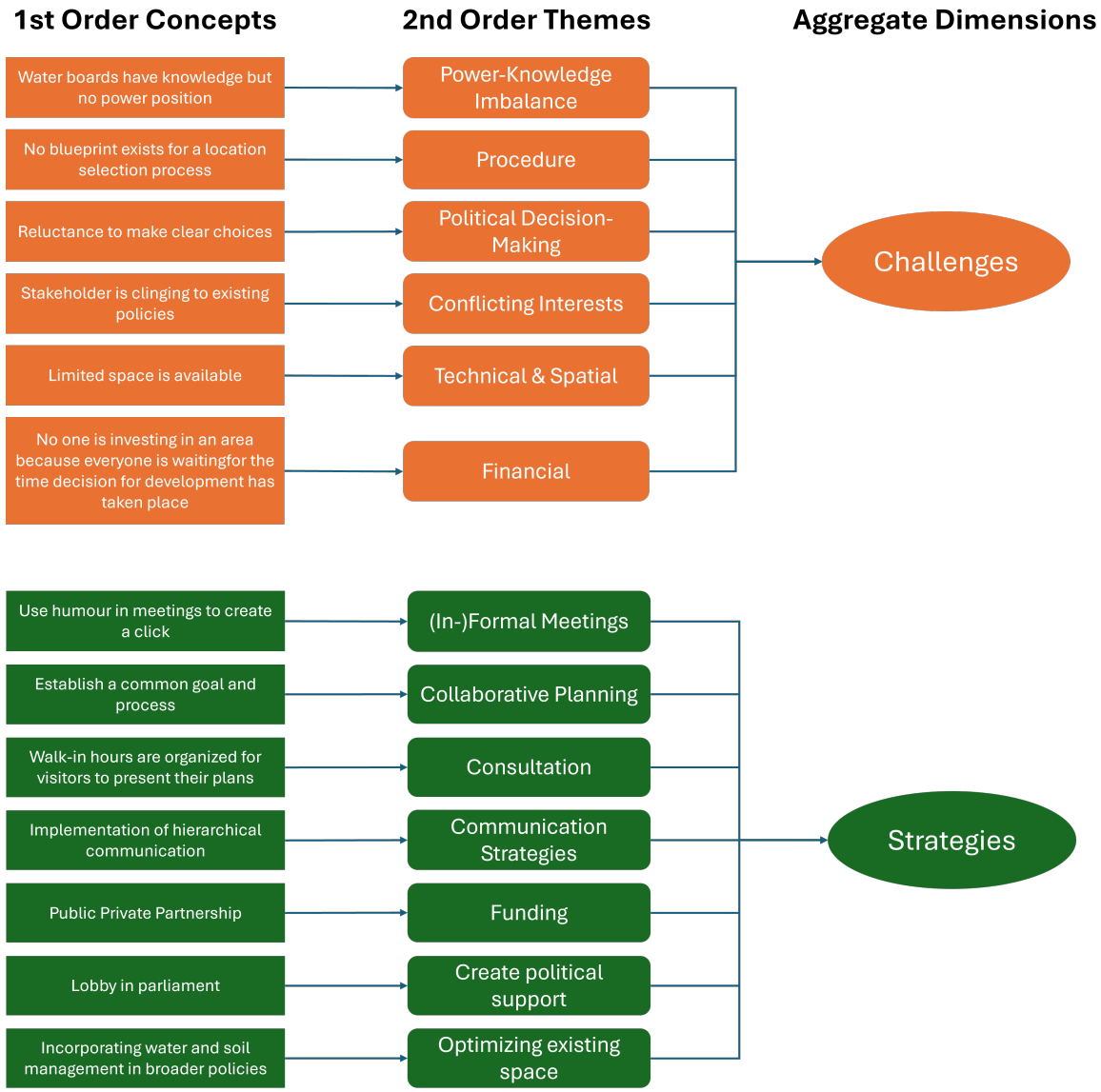


Figure 2.2: Example data structure of the Gioia method (Gioia et al., 2013)

The initial phase, first-order coding, focuses on identifying informant-centric phrases and concepts. This stage is exploratory, aiming to generate a wide range of descriptive codes that reflect the participants' language and perspectives (Gioia et al., 2013). By maintaining the integrity of the informants' terminology, the researcher ensures that the data is closely tied to the participants' views and experiences.

In the second-order coding phase, the focus shifts to the development of theoretical concepts and themes. This stage involves grouping the first-order codes into broader categories and interpreting them. The researcher seeks to identify patterns, relationships, and underlying themes within the data. This iterative process helps in refining the initial codes into more abstract and theoretically significant categories (Gioia et al., 2013). The aim is to move beyond mere description to uncover deeper insights and constructs.

The final stage involves integrating the second-order categories into higher-order aggregate dimensions. This process helps in synthesizing the findings into broader themes that encapsulate the essence of the data. The development of these aggregate dimensions is crucial for building a coherent theoretical framework that explains the phenomena under study. The Gioia Method emphasizes the creation of a data structure that visually represents the relationships between first-

order codes, second-order categories, and aggregate dimensions, ensuring a clear and systematic progression from raw data to theoretical insights (Gioia et al., 2013). In this thesis, the previously mentioned research sub questions are moulded into the aggregate dimensions.

The application of the Gioia Method in this study enabled a qualitative and transparent analysis process, facilitating the development of new concepts and theories grounded in the data. This methodological approach ensures that the analysis remained closely tied to the participants' perspectives while also achieving a high level of theoretical abstraction and coherence.

Once the data was collected, it was qualitatively analysed through a thematic analysis. This was mainly done with the help of ATLAS.ti, a qualitative analysis tool, that helped to identify patterns and finally helped to identify practical guidelines to implement public participation in the context of the new Environment and Planning Act. The steps of the qualitative research are briefly mentioned below:

1. **Data Import**
   By importing and categorising the data in ATLAS.ti, the program served as a data manager.

2. **Coding**
   By coding the data, the first insights into the data were obtained. The codes are organised in families or groups, forming a structure of the data.

3. **Categorising Data in Instances**
   Once all the data was coded, it was reviewed again to identify important aspects and quotes, which were then compiled into a catalogue. Instances were found by relating the data to specific research questions to create a deeper understanding of the data. Specific research questions 2 and 3 were of relevance in this part of the research. The data was finally gathered in a table with different themes.

4. **Interpretation of Findings**
   Based on the given results, overarching themes, patterns and other observations were interpreted. This interpretation took place in the discussion and formed a mix of findings from data, relevant literature and personal observations.

5. **Incorporation in Framework**
   Based on the analysed data, a framework was constructed on views of the public participation process of Dutch infrastructural and spatial projects. This concluding theory consisted of findings from the data and it showed a relation between the important aspects of participation. It moreover showed how the framework can be incorporated and what the meaning of the framework is.

3 | Literature Synthesis

This literature synthesis explores the evolving landscape of water-adaptive urban development, focusing on the collaborations and partnerships in water adaptive urban development projects. Based on those possible forms of collaborations, it seeks to construct a theoretical framework to guide a location selection process for residential development near or with water. The framework integrates insights from various global and local contexts with a detailed analysis of comparable environments in select cases. In order to do so, the synthesis resolves around the first sub-question:

What are current collaborations and partnerships in water adaptive urban development?

This research question is split up into two sub questions:

1. What is the state of the art knowledge on collaborations?
2. Which forms of collaboration are applied in housing projects in water adaptive environments in the Netherlands?

Existing literature on collaborations in urban development is vastly extensive. Therefore, a structured approach is necessary to get the desired answers to the above mentioned research questions. As a result, the synthesis is constructed as follows.

First, urban development is defined, the historical perspective is briefly addressed as well as the current challenges the sector faces and the advances made in water-adaptive environments. Secondly, the current theoretical frameworks and key theories that inform collaborative approaches in urban planning and development are discussed. Furthermore, multi-disciplinary collaborations and stakeholder management approaches are elaborated upon, as well as the collaborative practices in water-adaptive urban development projects. Additionally, the concept of integrated water management is defined, as well as the indication of its relevance. Finally, current forms of collaboration in water-adaptive urban development projects are addressed after which an initial framework for location selection in residential housing developments with or near water is constructed.

3.1 Understanding Urban Development

Brenner and Schmid (2015) describe urban development as a multifaceted and dynamic process that shapes the physical, economic, and social landscapes of cities and urban areas. In the contemporary context, urban development is understood not as a static or uniform series of events but as an ongoing, complex interplay of socio-spatial transformations that transcend traditional geographic and administrative boundaries. This definition emphasizes urban development as a fluid process at various scales. Hager (2023) defines sustainable urban development as "*development that meets the needs of a community without compromising the ability of future generations to meet their own needs. It prioritizes economic, environmental and social sustainability*". This definition emphasizes the sustainability goals often accompanying urban development projects as well as its impact on social environments. Haghani et al. (2023) refer to urban development as town development or city planning, and underscore its political and technical characteristics.

Historically, the conception of urban development has evolved significantly. Initially, post-war planning predominantly followed a technical-rational approach, prioritizing reconstruction and the provision of basic needs through highly structured and top-down methods (Rauws & De Roo, 2016). Planners of this era leaned heavily on technical expertise to craft urban environments, focusing on control and predictability. However, by the 1970s, the limitations of this model became evident, particularly its inability to adapt to the complex realities of urban issues influenced by diverse

public perceptions. This realization paved the way for incremental and communicative planning approaches, which placed greater emphasis on continuous adjustment of spatial objectives based on their social relevance and collaborative decision making processes (Rauws & De Roo, 2016).

As urban challenges grew in complexity and uncertainty, the focus of urban planning shifted towards more strategic and integrative methods. These modern approaches recognize the dynamic nature of urban development and strive to incorporate a diverse range of stakeholders and localized needs into the planning process. Such strategies aim to balance sector-specific policies with the broader goals of urban growth, often requiring a nuanced understanding of various urban functions such as traffic, transport, and water management. This shift has also involved acknowledging the inherent complexities and uncertainties of urban development, integrating principles from complexity theory such as non-linearity, self-organization, and adaptivity (Rauws & De Roo, 2016).

In recent times, urban planning has increasingly adopted evolutionary and participatory approaches, viewing itself more as a facilitator of urban qualities rather than a stringent controller of urban forms. This perspective aligns with broader democratic values and multicultural considerations, advocating for a planning ethos that supports the autonomy of urban developments and guides them towards sustainable and inclusive growth (Rauws & De Roo, 2016).

This historical progression from controlled, predictable planning to more adaptive, inclusive, and integrated urban development practices reflects a broader transformation in the understanding of urbanization itself. Urban development is now seen not just as a series of physical expansions or contractions within city boundaries but as a part of a global phenomenon that involves complex, interconnected processes affecting diverse territories and populations (Brenner & Schmid, 2015).

Urban development today is conceptualized as a dynamic, ongoing process of change, deeply embedded in the socio-economic and environmental contexts of the globalized world. This modern understanding encourages urban planners and policymakers to think beyond traditional boundaries and to embrace the complexities and uncertainties that define contemporary urban life.

3.1.1 Current Challenges in Urban Development

Urban development today faces a multitude of challenges that reflect the complex, interwoven fabric of modern societal, environmental, and economic dynamics. As cities continue to evolve under the pressures of globalization, technological advancements, and changing demographic profiles, urban planners and policymakers must address these multifaceted issues to foster sustainable and inclusive urban growth. This section dives deeper into the current challenges urban development projects are facing.

Managing the new geographies of unequal spatial growth is one of the main issues facing urban development. The lines separating urban and rural areas as well as central and marginal zones are frequently blurred by rapid urbanization, which often results in conditions of growth and stagnation. As a result, traditional planning models become more complex due to the increasingly interconnected and multidimensional urban reality (Brenner & Schmid, 2015).

Caprotti et al. (2017) define three major areas in urban development that face significant challenges. These are:

1. **Planning and infrastructure**
   Urban planning has to deal with the realities of informal settlements in places like the Global South, where social services, housing, and employment possibilities are vital but frequently unstable. Traditional planning approaches, which are constrained by antiquated land laws and arbitrary policy guidelines, are unable to sufficiently support these communities.

2. **Standardization vs. Localization**
   The New Urban Agenda and its associated practices (like Sustainable Development Goal 11) often emphasize the use of standardized indicators and metrics. However, these may not always capture the nuanced realities of urban development, particularly in diverse urban settings across different regions. This raises concerns about the potential marginalization of areas and communities that do not fit into the standardized frameworks of urban development.

3. **Technocratic governance versus local needs**
   The shift towards a technocratic approach in urban development, driven by standardized indicators and metrics, can lead to a disconnection from local urban realities. This emphasis on measurable outcomes may overlook the underlying social, economic, and environmental needs of urban areas, potentially marginalizing communities that do not fit the standardized frameworks.

Albrechts (2010) states that the complexity of urban environments is further increased by technological changes, the crisis of representative democracy, globalization of culture and economy, and the rising cost of energy. Even though his statements on crisis in democratic environments are not applicable everywhere, it does make sense that sudden shifts in governments, as often seen in the USA‘s democratic versus republican shift, contribute to increasing complexity. The democratic struggle is not only visible in the USA, the populist wave currently going through Europe also complicates the realisation of urban development projects (Meeus, 2024). This democratic struggle demands innovative approaches beyond traditional urban planning and development.

Grimm et al. (2008) identify environmental challenges such as global warming as a challenge that requires urban development to adapt and incorporate sustainable practices that minimize environmental impact while improving quality of life. This includes addressing sustainability and resilience in the face of increasing urbanization, as well as managing resources effectively to prevent ecological degradation. Additionally, the authors point out that equity and inclusiveness remain significant hurdles, with persistent issues of social inequality, spatial segregation, and unequal access to services and opportunities. Effective governance systems are crucial for overcoming these challenges, requiring enhancements in institutional capacities and fostering greater public participation and collaboration among stakeholders.

Urban planning must navigate the resistance to change often present in established urban and environmental policies. The rise of neo-liberal politics and the globalized economy necessitate a shift towards more localized, diversified approaches to urban planning, which involves breaking away from entrenched institutional practices and embracing more strategic, transformative planning that is responsive to rapidly changing urban dynamics (Rauws & De Roo, 2016). Additionally, Rauws and De Roo (2016) indicate that technological and demographic shifts also demand that urban planning adapts to changes in how people live and work. As lifestyles become more digital and less centralized, this transformation impacts transportation, housing, and urban design, requiring a rethinking of urban spaces to accommodate these new modes of living.
Woltjer (2014) highlights the challenges that come with the development of peri-urban areas. He defines peri-urban areas as “locations where urban and rural life meets”. The necessity of developing these areas is increasing due to the growing demand of housing in cities. Cities have two options to deal with this: either they densify the current built-up area or they expanse towards these peri-urban areas located at the edge of the city. If the latter is chosen, challenges arise due to the fast growth in the area, seen in the expansion of existing infrastructure, social strains, economic hiccups and environmental issues. Woltjer pleads for accessibility in these areas as a key element for success.

Mazutis and Sweet (2022) discuss the challenges the private sector experience in sustainable urban development (SUD) projects. They argue that SUD encounters significant obstacles when private sector actors are reluctant to engage. A primary issue is the lack of economic incentives. Private sector players often view SUD projects as high-risk and low-return investments. The

substantial upfront costs, combined with slow investment recovery and a perceived lack of demand for sustainable developments, make traditional projects more attractive. Developers tend to choose projects that promise quicker and higher returns, leaving sustainable alternatives underfunded. Slow bureaucracy and increasingly complex regulations further complicate the situation. The inefficiency and complexity of bureaucratic processes create lengthy processes, which in turn cost private actors money. Overlapping and sometimes contradictory rules from various levels of government create a challenging environment for businesses when approval documents are needed for example. These regulations often lack clarity and specificity, making it difficult for private actors to navigate the approval process efficiently. Subjective interpretations of planning rules further hinder effective decision making and conflict resolution, complicating private sector involvement.

The current challenges in urban development are characterized by a need to address complex, interconnected issues that span social, economic, and environmental dimensions, which in turn contribute to the increasing bureaucratic challenges. Urban planners and policymakers must employ innovative, flexible strategies that are inclusive and sustainable to effectively manage the dynamic and ever evolving nature of urban development projects. The increased complexity of these projects calls for more and more expertise in the urban development processes, which underscores the importance of this thesis.

3.1.2 Advances in Water-Adaptive Urban Development

Water-adaptive urban development has emerged as a critical approach in response to the increasing water-related challenges faced by built environments worldwide. These challenges, including contamination of water sources, flood risk, and the effects of climate change, demand innovative strategies for sustainable urban development. Several methodologies and advances globally have showcased the potential of integrated, adaptive water management systems, which can be compared to initiatives in the Netherlands. Implementing this water-adaptive management system in urban development, contributes greatly to the sustainability goals that come with urban development as mentioned before.

According to Hillen (2015), one of the significant global advances in water-adaptive urban development is the comprehensive urban water strategy employed in the United States, specifically in areas like New York and New Jersey. This strategy, summarized by the actions "Resist-Delay-Store-Discharge," aims to manage both disaster response and long-term growth through a multifaceted approach. This includes enhancing civic, cultural, recreational, and commercial amenities that improve the quality of the built environment. It underscores the need for a coalition of stakeholders, collaborative funding frameworks, and an umbrella of communication and education, integrated into multi-faceted design solutions. In London, the planning for "urban green-blue grids" highlights an approach to increasing resilience and managing risks through integrating water management with urban planning. This method focuses on green infrastructure and the strategic positioning of water bodies to enhance the city's ability to live safely with water, promoting a water-sensitive community that is dynamically integrated with its water systems. The Dutch city of Rotterdam presents an great model of water-adaptive urban development. Known for its robust measures to protect against flooding and water-related challenges, Rotterdam has implemented systems that keep the city safe and dry while continuing to adapt to new threats like extreme rainfall and the broader impacts of climate change. The city's success lies in its advanced and continuous adaptation measures, which ensure it remains one of the safest delta cities in the world.

Parallel to these city-specific initiatives, the framework outlined by Wong and Brown (2009) (Figure 3.1) for water-sensitive cities offers a broader, theoretical approach that can be applied globally, including in Dutch contexts. This framework consists of three interdependent pillars: diversifying water sources, providing ecosystem services, and fostering water-sensitive communities. These pillars are aimed at enhancing the socio-technical resilience of urban water systems to adapt

to environmental changes and urban demands effectively.

- **Diversifying Water Sources**
  Both the global initiatives and Rotterdam's approach emphasize the importance of accessing a variety of water sources through centralized and decentralized infrastructure. This strategy increases the resilience of water supply systems, incorporating alternative sources like stormwater, groundwater, and recycled wastewater.
- **Providing Ecosystem Services**
  Similar to London's green-blue grids, this pillar focuses on incorporating natural processes and green infrastructure into urban planning. This not only helps in managing water resources but also enhances microclimate regulation, biodiversity, and overall ecological benefits.
- **Fostering Water-Sensitive Communities**
  The emphasis on community engagement and socio-political capital in Rotterdam mirrors this global approach. Encouraging active participation in water management practices ensures the successful implementation of water-sensitive strategies, reinforcing the community's role in sustainable water management.

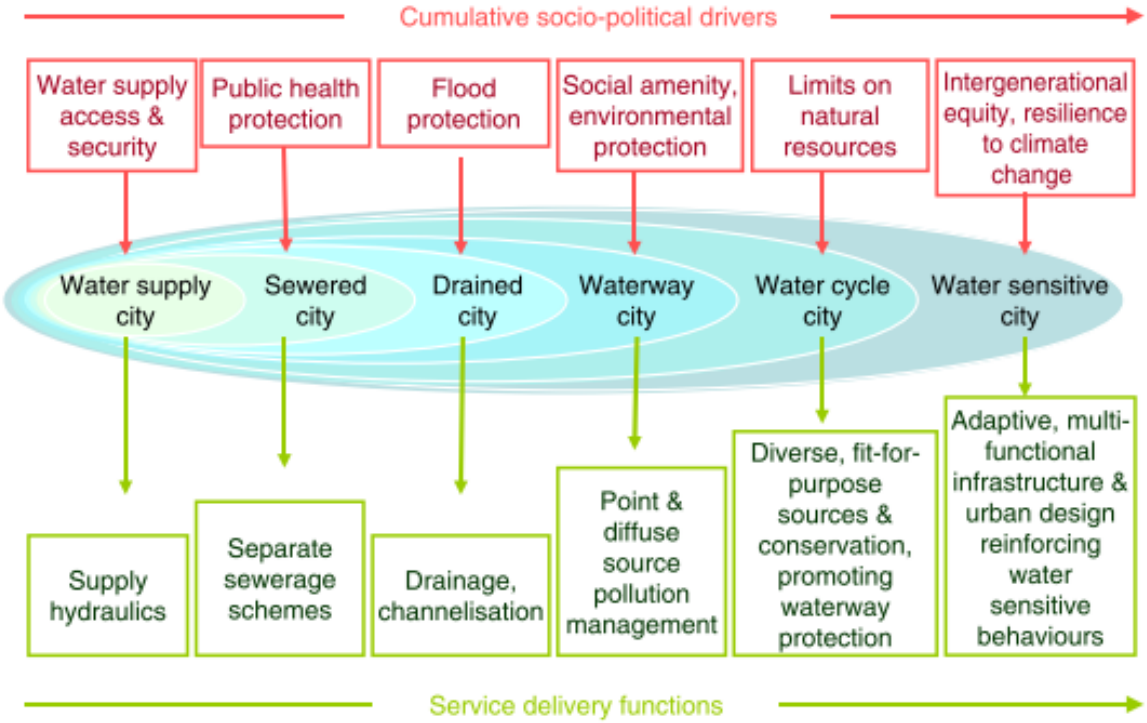


Figure 3.1: Framework towards a water sensitive city (Wong & Brown, 2009)

Bruns-Berentelg et al. (2022) discuss the recent urban development projects in Copenhagen and Hamburg, which incorporated water-adaptive methods. In Hamburg, the HafenCity project stands out as a pioneering example. HafenCity Hamburg GmbH, a publicly owned but privately managed entity, spearheads the redevelopment of the former port area into a vibrant mixed-use district. The project emphasizes flood protection through elevated buildings and innovative drainage systems. HafenCity integrates green roofs and open spaces designed to absorb and manage rainwater, reducing the risk of flooding while enhancing urban quality. The strategic use of Blue-Green Infrastructure (BGI) in HafenCity, including water squares and permeable surfaces, showcases Hamburg's commitment to creating a resilient urban environment that can adapt to changing climatic conditions.

Similarly, Copenhagen‘s approach to water-adaptive urban development is exemplified by the Nordhavn project. Nordhavn, a significant waterfront redevelopment, is designed to be climate-resilient and sustainable. The project incorporates extensive use of BGI, such as green roofs, rain gardens, and permeable pavements, which help manage stormwater and mitigate flooding. Copenhagen‘s strategy includes the creation of a robust drainage system that channels excess water to designated retention areas, ensuring that urban spaces remain functional even during heavy rainfall. The city‘s focus on integrating water management into urban planning highlights its proactive stance in addressing climate change impacts. Both cities demonstrate that water-adaptive methods are crucial for sustainable urban development. By prioritizing flood protection, efficient water management, and the integration of natural elements into the urban fabric, Hamburg and Copenhagen not only enhance their resilience to climate change but also improve the quality of urban life. However, the fact that HafenCity Hamburg GmbH is still publicly owned underscores the struggles the private sector has in getting involved.

Analysing the literature on urban development, it becomes clear that it is a multifaceted, dynamic process shaped by socio-economic, environmental, and political factors. To incorporate all these factors into urban development projects, multi-stakeholder collaboration is essential. In the next section, the frameworks and theories on collaboration are elaborated.

3.2 Frameworks and Theories on Collaboration

3.2.1 Theoretical Underpinnings of Collaboration

This section addresses the key theories and frameworks that inform collaborative approaches in urban planning and development, both in water-adaptive cities as in urban development in general.

Hillen (2015), again with the aim on water-adaptive cities, argues that it is crucial to incorporate Water Sensitive Urban Design (WSUD) principles and ensure their integration into standard practice (Hillen, 2015). He suggests several activities to achieve this. First, engaging and managing dialogue between stakeholders is essential to address diverse interests and build consensus. Second, developing a widely supported master plan that includes a comprehensive water management strategy ensures alignment and commitment across all parties. Finally, stimulating new public-private partnerships can provide the necessary financing and implementation capabilities to realize innovative solutions. Collaborative planning is a critical component of long-term urban and regional development. According to Allmendinger and Tewdwr-Jones (2005) , it involves democratic management and control of urban environments, aiming to design less oppressive planning mechanisms. Healey (1997) emphasizes that collaborative planning is about enhancing the quality of urban regions through organized political communities focused on social, economic, and environmental policy. The key elements of communicative planning theory are listed in Table 3.1.

Table 3.1: Emphasis in communicative planning theory (Healey, 1997)

(a)	Recognition of the social construction of knowledge and the exercise of both practical reason and scientific knowledge.
(b)	Acknowledgment of different forms for the development and communication of knowledge (analysis, storytelling, expression).
(c)	Internal within social contexts acknowledged as of importance.
(d)	Identification of diverse interests and the subordination of interests through relations of power.
(e)	The concept of stakeholding, spreading ownership and the range of knowledge and reasoning.
(f)	A shift from competitive interest bargaining to collaborative consensus building.
(g)	Recognition of planning actively as being embedded in day-to-day relations; the linking of practice and context.

Effective collaboration requires clear frameworks and strategies. Patel et al. (2012) define collaboration as an interaction between two or more people working towards common goals. By examining a case example (the CoSpaces project), the authors created a framework that presents an iterative process for collaboration. The framework shows an collaborative, iterative process that results in an output that suits the wishes of the participants and is presented in Figure 3.2.

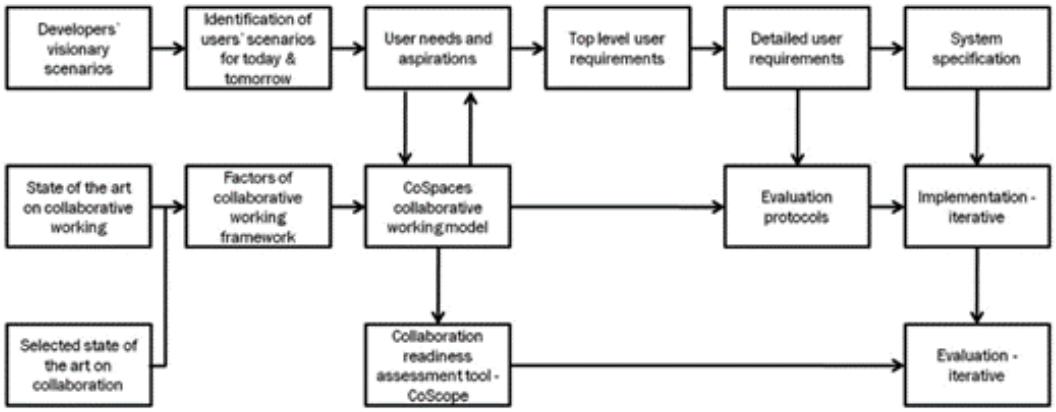


Figure 3.2: Collaborative technology development using an iterative process (Patel et al., 2012)

Barker Scott and Manning (2024) expand on this definition by highlighting the importance of cross-boundary competencies, suggesting that urban planning can benefit from interdisciplinary teams comprising urban designers, policymakers, and community stakeholders. They advocate for a dual lens approach, balancing detailed project-specific collaborations with broader strategic city planning initiatives. Furthermore, designing collaborative work involves clear role distributions and accountable leadership, ensuring alignment towards common urban development goals. Supportive contextual conditions, such as a social-relational climate of trust and inclusivity, are also critical. Urban planners can enhance collaborative efforts by fostering trust among government agencies, private developers, and community members. Utilizing both physical and virtual spaces can

maximize stakeholder interaction and inclusivity, while learning-oriented approaches can involve community members in data gathering, problem identification, and solution generation.

Nezami et al. (2022) emphasize horizontal collaboration in interconnected infrastructure projects, focusing on knowledge and resource sharing among organizational entities to foster innovation and manage uncertainties. A multidisciplinary approach enhances stakeholder equity, reduces risks, and facilitates innovative solutions. Critical factors influencing inter-organizational collaboration include commitment, communication, mutual understanding, and top management support, which are essential for achieving common project goals.

Xu et al. (2021) focusses on Copenhagen again, highlighting its strategy for building climate resilience through multilevel governance. This involves balancing expert-driven large-scale water management with community-based projects. Collaborative urban planning integrates climate resilience into planning through public participation, effective data use, and the integration of landscape design with stormwater management. Adaptive management strategies ensure responsive adjustments to design and execution based on evolving environmental conditions and stakeholder feedback.

3.2.2 State of the Art in Collaborative Practices

This section elaborates on the state of the art theories in collaborative practices.

Puchol-Salort et al. (2021) write on the potential of a systems approach for green urban design. This includes water adaptive design as well. The authors state that the effectiveness of a systems approach in green urban design lies in its holistic integration of various urban elements to enhance sustainability. This approach, exemplified by the Urban Planning Sustainability Framework (UPSUF), addresses the complexities of urban growth by linking design solutions with evaluation metrics through Geographic Information Systems (GIS). By viewing a city as a 'system of systems', the framework incorporates multiple aspects of sustainability, including social, built, and natural systems.

The UPSUF theory integrates three key components to guide planning and evaluation processes. The Planning System Process, Design Solutions and an Integrated Evaluation Toolkit. As the UPSUF theory provides a promising framework, these three components are elaborated further.

The Planning System Process forms the initial phase of the UPSUF. This stage requires early engagement with local planning authorities and stakeholders, ensuring that development proposals are assessed for sustainability at the earliest stages. Key stakeholders include both public and private sector actors, such as developers, local authorities, and water companies. The process begins with the establishment of baseline site conditions, including land use, hydrology, and existing infrastructure, before moving into the submission and evaluation of planning applications. By integrating input from various stakeholders early on, the Planning System Process ensures that all perspectives are considered in moving towards sustainable development.

The next critical component of the UPSUF is the formulation of Design Solutions. These are based on sustainable urban form principles and aim to balance grey infrastructure with Blue Green Infrastructure (BGI), such as permeable surfaces, green spaces, and stormwater management systems. A core aspect of this stage is determining the right mix between built structures and natural spaces to optimise Urban Ecosystem Services (UES), including air quality, flood mitigation, and biodiversity. Design Solutions focus on creating compact, mixed-use buildings surrounded by green space, while incorporating natural materials and resource-efficient practices throughout the projects life cycle. This component aims to maximise the long-term environmental and social

benefits of urban projects, integrating nature into urban settings to enhance sustainability.

The final component of the UPSUF is the Integrated Evaluation Toolkit, which evaluates whether a proposed urban development meets sustainability criteria. This toolkit is adaptable and allows for the integration of tools like the Natural Capital Planning Tool (NCPT) and Benefits Estimation Tool (B£ST) to assess the value of ecosystem services and other sustainability metrics. The evaluation process is dynamic, involving GIS-supported spatial representation of both pre- and post-development scenarios to visually demonstrate the impact of the proposed changes. This iterative evaluation process ensures that if the proposed solutions do not meet sustainability standards, feedback is provided to adjust the design accordingly, allowing for continuous refinement towards an optimal sustainable outcome.

The framework uses five steps for implementation. The first step involves establishing the baseline scenario by assessing current site conditions, such as land use, infrastructure, and ecological factors. In the second step, design solutions are created by integrating sustainable urban form and Blue Green Infrastructure (BGI) with the existing conditions. Step three involves applying the integrated evaluation toolkit to assess whether the proposed design meets sustainability criteria using tools like the Natural Capital Planning Tool (NCPT). In a fourth step and if necessary, the design can be modified based on feedback from the evaluation, refining the project to better meet sustainability targets. Finally, step five compares the outcomes with established sustainability metrics, determining if the project is ready for approval or requires further adjustment, ensuring an iterative process towards optimal design.

This integrated method enables improved decision making and planning, facilitating a comprehensive understanding of urban interdependencies and operational risks. Besides the emphasis on technical elements related to green urban development, the systems approach promotes collaboration among stakeholders, aligning their objectives and ensuring that urban developments are evaluated against shared sustainability metrics. This not only enhances the efficiency and reliability of sustainable urban design but also fosters long-term environmental benefits and resilience. By bridging the gap between policy and practical implementation, the systems approach ensures that sustainable urban development is both achievable and measurable, supporting the creation of liveable, resilient cities. In Figure 3.3 the framework is visualized.

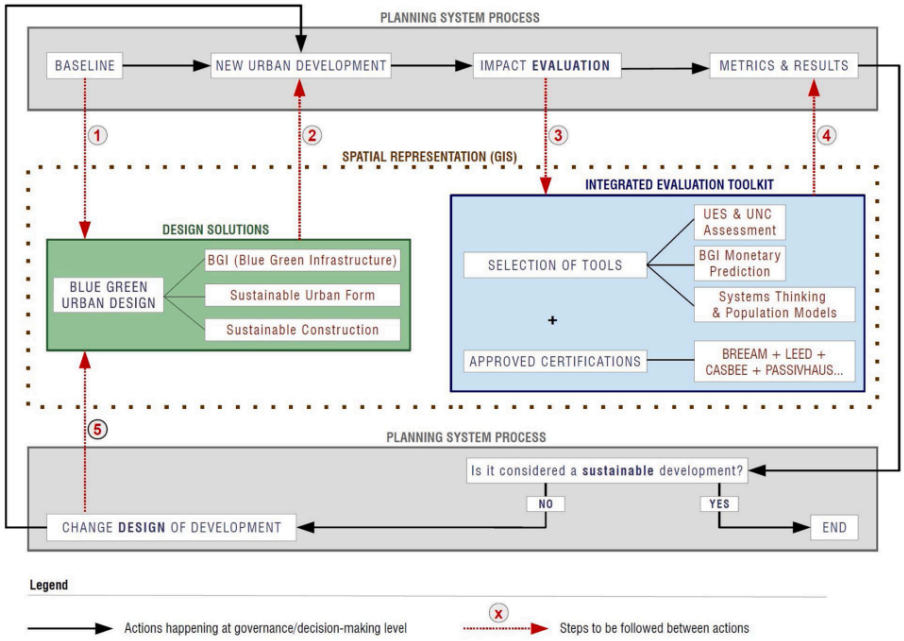


Figure 3.3: Diagram of the Urban Planning Sustainability Framework (UPSUF) in three sections: 1) the Planning System Process (grey), 2) Design Solutions (green), and 3) the Integrated Evaluation Toolkit (blue). Governance and decision making actions are indicated by black arrows, while the five stages of the framework are marked by numbered red arrows (Puchol-Salort et al., 2021).

Another proven method of collaboration is collaborative governance, described by Ansell and Gash (2008). The authors define collaborative governance as *"a governing arrangement where one or more public agencies directly engage non-state"* (Ansell & Gash, 2008). In their paper, a framework on collaborative governance is presented. The framework provides a structured approach for integrating diverse stakeholders into public decision making processes, particularly in complex policy areas. It emphasises key components such as inclusive participation, trust-building, and the mitigation of power imbalances to ensure equitable contributions from all stakeholders. The framework identifies four essential elements: starting conditions, institutional design, leadership, and the collaborative process itself. Effective collaboration depends on the presence of clear institutional rules, facilitative leadership, and shared goals, which foster open dialogue and cooperative decision making. Additionally, trust and mutual respect among stakeholders are seen as crucial for overcoming pre-existing conflicts and encouraging long-term commitment to the collaborative process. These elements exist in a collaborative loop in the framework, as seen in Figure 3.4, and are elaborated below.

Trust-Building

This element focuses on fostering relationships based on mutual respect and understanding among diverse stakeholders. Trust is a fundamental aspect of collaborative governance, as it enables stakeholders to engage in open dialogue, share information, and work towards shared goals without fear of exploitation or conflict. The process of trust-building requires time, consistency, and the presence of facilitative leadership that encourages cooperation and ensures transparency in decision making. Building trust can allow overcoming any prehistory of conflict identified in the initial stage. However, the bigger the initial conflict or distrust is, the more time is needed to establish a healthy baseline of trust.

Commitment to Process

This element refers to the dedication of stakeholders to actively participate in the collaborative effort over time. This step involves more than initial agreement; it requires a mutual recognition of interdependence, a shared ownership of process and openness to exploring mutual gains. Recognizing

interdependence refers to stakeholders understanding and acknowledging that they rely on one another to achieve shared goals, particularly when managing complex issues like water governance, urban planning, or natural resource management. Shared ownership makes sure everyone involved is as determined to bring the process to a successful outcome as much as the next one. Finally, openness to exploring mutual gains helps find common ground where all parties involved can gain compared to the situation they are in at the start of the process.

Shared Understanding
The shared understanding element focuses on setting a clear mission and a common problem definition, as well as identifying common values. Having a clear, shared mission in mind helps to get everyone aligned and moving in the same direction. Additionally, a clear definition of the issue at hand leaves little to the imagination, ensuring that everyone knows exactly what they are working towards. Finally, the identification of common values make one understand what drives a partner in the process which helps empathising with other stakeholders.

Intermediate Outcomes
Identifying and praising "small wins", generates the sentiment among stakeholders that steps are being made towards the final outcome of the process. It generates positive attitude towards the process itself, which makes stakeholders more actively involved. Strategic plans and joint fact-finding further establish a collaborative approach towards a successful outcome.

Face-to-Face Dialogue
Face-to-face dialogue is essential for participants to stay together. If face-to-face dialogue is lost and everyone only communicates indirectly or through digital communication levels like email or text message, all non-verbal communication like body language is lost. As non-verbal communication can reach up to 93% of total communication (London Image Institute, 2021), it goes without saying that face-to-face communication is a must for any form of collaboration whatsoever.

Facilitative Leadership
Facilitative leadership plays a critical role in collaborative governance, guiding parties through difficult stages of the process. While "unassisted" negotiations can sometimes succeed, the authors state that facilitative leadership is essential for bringing stakeholders together and promoting collaboration. Facilitation is seen as the least intrusive form of assistance, focusing on maintaining the integrity of the consensus-building process. More interventionist methods, like mediation, can help when stakeholders struggle to reach win-win outcomes. Leadership is essential for establishing clear rules, building trust, and promoting open dialogue, all of which are necessary for a successful collaborative effort. The authors highlight the need for collaborative leaders who can empower stakeholders, manage the process, and ensure that decisions are credible and acceptable to all participants.
Leadership also plays a key role in addressing power imbalances and promoting participation, especially in contexts where incentives are weak, power is asymmetrical, or trust is low. In such situations, the leader may need to act as an honest broker, maintaining neutrality while facilitating discussions. However, in cases where power imbalances are more pronounced, a strong "organic" leader from within the community may be more effective. This type of leader is respected and trusted by all stakeholders, helping to build confidence in the process. The success of collaborative governance, therefore, can be contingent on the presence of appropriate leadership, and in some cases, a lack of strong leadership may constrain the potential for effective collaboration.

Institutional Design
Institutional design in collaborative governance focuses on establishing protocols and ground rules that ensure procedural legitimacy. One of the most fundamental design elements is determining who has access to the collaborative process. The authors emphasises that collaboration must be open and inclusive, as only stakeholders who feel they have had a legitimate opportunity to participate

are likely to commit to the process. Successful collaborations actively seek broad participation, even from stakeholders who may seem difficult. Exclusion of critical stakeholders can threaten the legitimacy of the process, as seen in various case studies where such exclusion undermined efforts. Inclusiveness is central not just to the spirit of collaboration but to the legitimacy of outcomes, reflecting a broad consensus. The collaborative process should provide stakeholders with the opportunity to deliberate on policy and ensure that their voices are genuinely heard.
Clear ground rules and process transparency are also vital components of institutional design, helping to build trust and ensure stakeholders perceive the process as fair and equitable. When stakeholders enter a collaborative process, they are often sceptical and sensitive to power dynamics, so ensuring that rules are applied consistently reassures participants of the process's legitimacy. Transparency, in turn, ensures that negotiations are not seen as merely a front for hidden deals. Although the literature diverges on the necessity of strict consensus rules, there is agreement that they promote cooperation, though they can also lead to stalemates. The use of deadlines in collaborative processes is debated as well; while deadlines can keep discussions on track, they might limit the depth of collaboration. Thus, deadlines should be realistic and not undermine the long-term incentives for cooperation.

By iterative looping around in the first five elements and implementing Institutional Design, for example clear ground rules and process transparency, as well as Facilitative Leadership, such as a mediator representing "weaker" stakeholders and balancing power, a desired outcome is created. This framework for collaborative governance has been widely recognised for its potential to enhance policy outcomes through consensus-driven and transparent decision making.

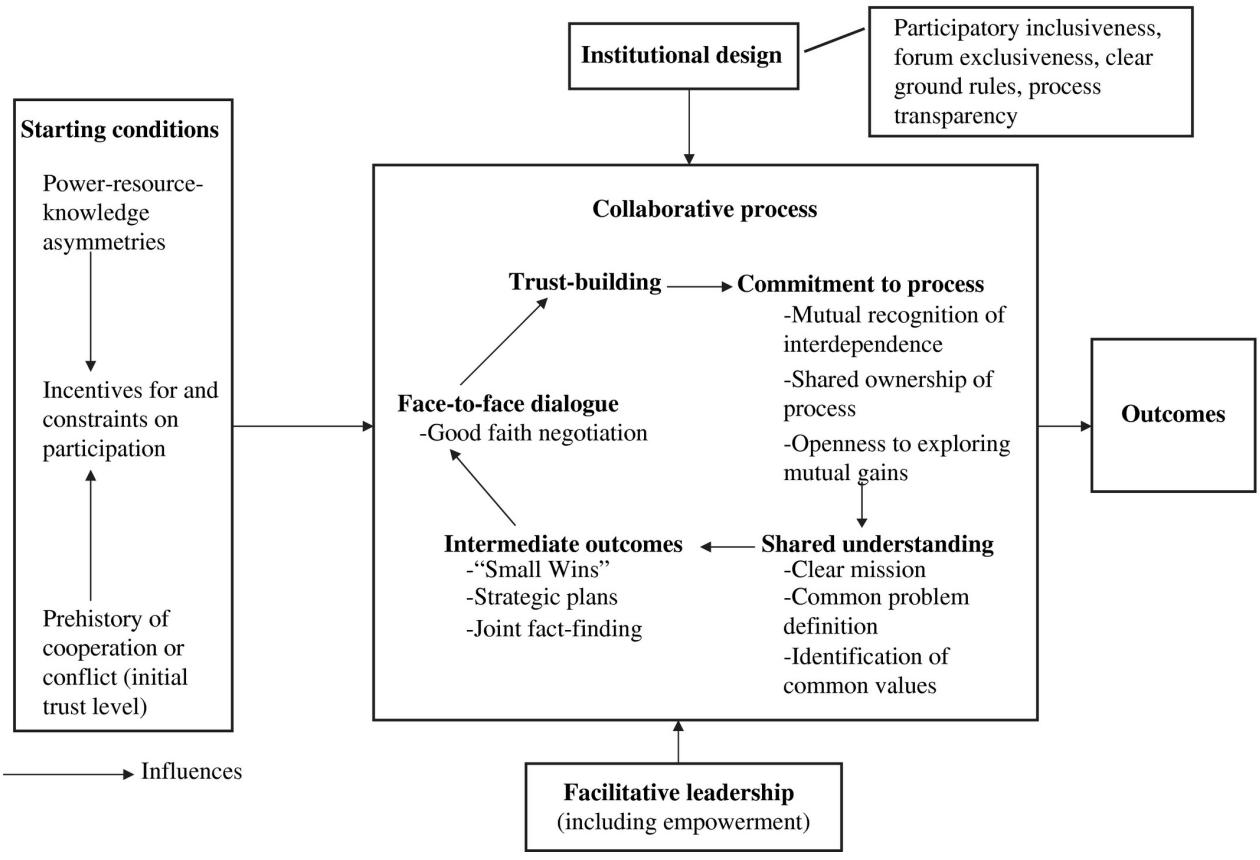


Figure 3.4: Collaborative governance framework designed by Ansell and Gash (2008)

This framework promotes the involvement of diverse stakeholders in decision making processes, creating trust and addressing power imbalances. The framework identifies critical factors such as starting conditions, facilitating leadership, and institutional design, which are essential for the

success of collaborative governance. These elements create a foundation for inclusive dialogue, where stakeholders can engage in joint decision making and strategic planning. The focus is on recognising interdependence and shared goals among stakeholders, facilitating open communication and building commitment to the process (Ansell & Gash, 2008). The implementation of Ansell and Gash's collaborative governance framework has been further developed by various scholars, such as Rojas et al. (2020) and Galvez and Rojas (2019), to develop its application in integrated water resources management (IWRM).

Building on this framework, recent research applied it to complex water governance contexts, such as the Rapel River Basin in Chile, where tools like Stakeholder Analysis (SA), Social Network Analysis (SNA), and Participatory Processes (PP) were employed to enhance collaboration. Adapting Ansell and Gash's collaborative governance framework to local contexts, stakeholders can better understand the interactions within governance structures. Engaging stakeholders through structured participatory processes, such as using tools like circles of influence, helps identify key players and their roles, facilitating effective contributions. Social network analysis further aids in mapping relationships, collaboration ties, information flows, and financial exchanges, providing insights into the structure and dynamics of stakeholder networks. Developing a shared vision through iterative workshops, surveys, and engagement sessions ensures alignment towards common goals. Addressing implementation challenges, such as lack of leadership, coordination, and adaptive capacity, offers valuable lessons for similar water governance challenges. The authors emphasize the scalability and adaptability of governance frameworks based on local conditions and stakeholder dynamics, making the core concepts applicable to different scales and scopes of water governance issues. A visual representation of the Rojas et al. (2020) framework on collaborative governance can be found in Figure 3.5.

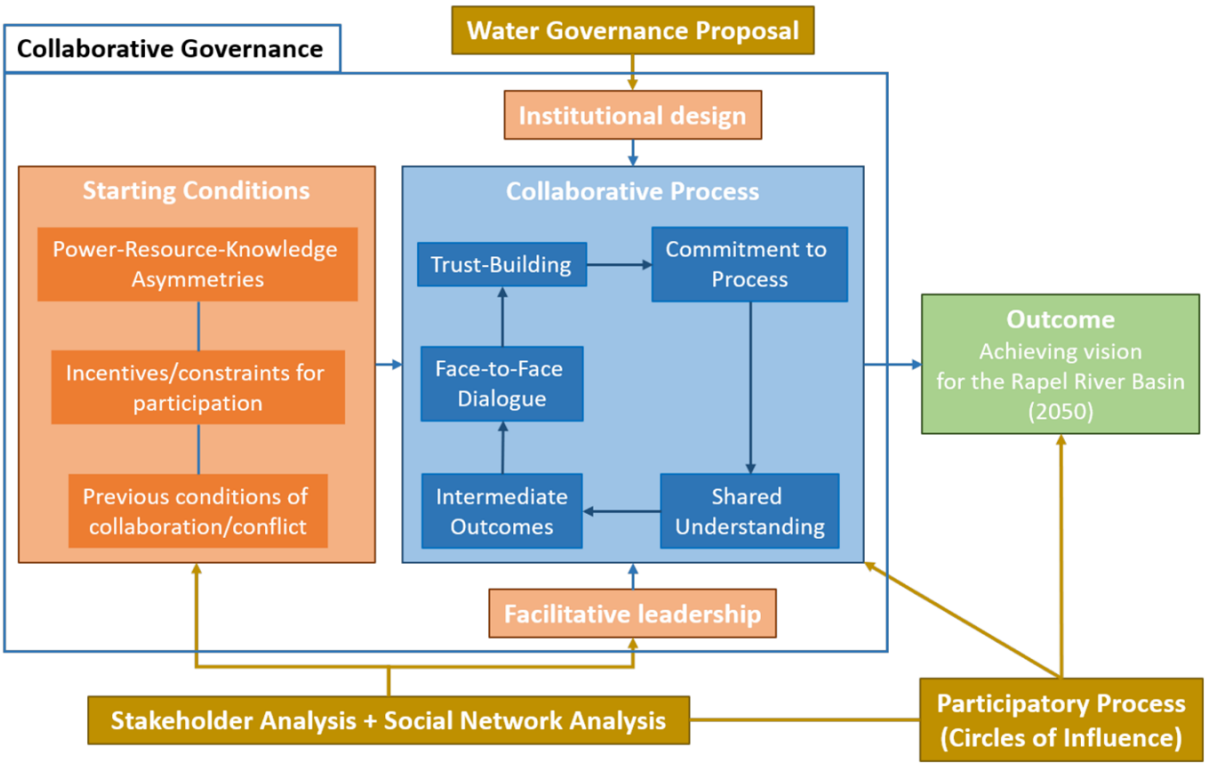


Figure 3.5: Collaborative governance framework (Rojas et al., 2020)

Further analysis of collaborative governance within IWRM contexts underscores the importance of collaboration in addressing "wicked" water problems. Scholars argue that collaboration allows for balancing economic, social, and environmental interests within a basin. However, collaboration

should not be seen as a universal solution but as a strategic approach, particularly in situations where stakeholder involvement can lead to more sustainable water management outcomes. The success of IWRM depends heavily on the effective implementation of collaborative governance, which facilitates conflict resolution and the management of shared water resources (Galvez & Rojas, 2019). The integration of collaborative processes into IWRM, therefore, remains essential for fostering long-term sustainability and addressing complex water governance challenges.

In the evolving landscape of urban design, smart technology platforms play a crucial role in fostering collaborative urban development and sustainable resource sharing. Hayes et al. (2021) discuss how platforms leveraging IoT, AI, and blockchain technology enable interactive urban management systems, promoting sustainable interactions between urban environments and resources. Peer-to-peer sharing models, such as energy trading platforms, empower local energy generation and management, supporting sustainable practices and reducing urban footprints. These platforms also facilitate restorative sustainability practices, focusing on regenerative solutions that foster a co-creative partnership between humans and their environment, driving large-scale sustainable urban development.

Collaborative urban platforms and tools, such as living labs and digital twins, enhance participatory urban planning and community engagement. Demonstrations exemplify the practical application of these platforms, demonstrating their effectiveness in smart city solutions and community engagement in urban planning.

Community engagement is critical for sustainable urban development. Anthony (2023) highlights that universities, citizens, and enterprises are often excluded from urban development initiatives. Effective community engagement can increase societal acceptance, avert negative reactions, develop services based on real needs, and strengthen residents' interest in urban development. This engagement supports the co-creation of urban innovations, contributing to resilient, technology-driven, and socially inclusive urban spaces.

Kee (2019) points out the essential contribution of collaborative design in SUD. This approach integrates multiple disciplines and stakeholders, including government bodies, community members, and professionals, facilitating a holistic approach to urban development. It promotes an environment where stakeholders share ideas and learn from each other, leading to innovative solutions sensitive to social, economic, and political contexts. Participatory planning ensures that urban development incorporates community feedback, leading to more accepted and relevant solutions. By engaging various stakeholders, collaborative design builds social, intellectual, and political capital, transforming these into new institutional assets that support sustainable development. Case studies from Hong Kong illustrate how collaborative processes can lead to innovative urban solutions that respect and enhance community dynamics.

Purbani (2017) also points out collaborative design as an essential aspect of urban development, but from the perspective of an urban planner. She emphasizes the importance of strong leadership in the political aspect of urban development. Planners must be able to manoeuvre through the bureaucratic and political landscape in order to reach their goals. Collaborative design helps doing so, by keeping in touch with important stakeholders.

Xue et al. (2020) identify the main modes of multi-sector partnerships in urban development, including multi-stakeholder, community-organizational, end-user-oriented, public-private, and public-private-people partnerships. These partnerships involve diverse sectors, from urban planning institutions to residents, each contributing unique resources and expertise. The benefits of these collaborations include utilizing various sectors' resources, facilitating information flow, and increasing opportunities for urban renewal.

All the above mentioned frameworks provide good examples on how to collaborate. Especially the collaborative governance model by Ansell and Gash is promising for the problem this research is looking into. What is not discussed in this literature, is how this framework translates to the Dutch culture, where water boards play a distinct role in urban development processes. This interdisciplinary collaboration, amongst others, is described in the following sections.

3.3 Interdisciplinary and Stakeholder Collaboration

3.3.1 Interdisciplinary Collaborations

Interdisciplinary collaborations are essential in urban development, especially for transitioning to water-sensitive cities. These collaborations integrate expertise from e.g. urban planning, civil engineering, hydrology, and sociology to develop comprehensive solutions tailored to specific urban challenges (Hillen, 2015). Stakeholder engagement is crucial as well, involving communities, authorities, and industries in developing water management strategies and master plans, which are vital for successful implementation. Various case studies worldwide demonstrate the effectiveness of these collaborative, multidisciplinary efforts in tackling water-related challenges.

Adem Esmail and Suleiman (2020) emphasize that multidisciplinary collaboration is crucial for implementing Sustainable Urban Water Management (SUWM) systems (Adem Esmail & Suleiman, 2020). They highlight the involvement of diverse stakeholders, including water engineers, landscape planners, social scientists, urban planners, and governmental bodies. The integration of technical, environmental, and social expertise facilitates comprehensive planning and implementation strategies, effectively addressing the complex challenges of urban water management. Governance and management instruments, such as policy making and participatory approaches, ensure diverse perspectives are included in decision making processes. These collaborative efforts enhance technical and social capacities, improve decision making processes, and better align urban water management practices with sustainability goals.

Hasan et al. (2023) reflect on the importance of interdisciplinary collaboration in urban development decision making. They describe the TRUUD project, which involves researchers from multiple disciplines, including public health, urban planning, policy studies, and environmental economics, working together to incorporate health outcomes into urban development practices. The project underscores the necessity of integrating insights from different fields to develop a shared understanding of complex urban systems. The use of online platforms facilitated regular interactions among team members, allowing for productive discussions and the development of a shared conceptual framework.

3.3.2 Stakeholder Engagement

To collaborate effectively, it is important that participants are engaged throughout the process rather than just informed or consulted. Engagement is a part of collaboration, which makes stakeholder engagement essential for fruitful urban development projects. As mentioned before, projects involve increasingly more stakeholders that need to be kept on board. This section dives deeper in the possible ways to manage and engage these stakeholders in order to do so.

Kujala et al. (2022) define stakeholder engagement as practices undertaken by organizations to involve stakeholders positively in organizational activities, fostering mutual respect, dialogue, and change. Benefits of stakeholder engagement include enhancing Corporate Social Responsibility (CSR) practices, increasing transparency, fostering trust, and driving value creation by incorporating diverse perspectives into strategic planning and decision making. It facilitates innovation

through stakeholder knowledge and expertise and strengthens legitimacy and trust between the organization and its stakeholders, enhancing brand reputation and stability. Stakeholder engagement can be achieved through participatory spaces, CSR initiatives, continuous dialogue, leveraging digital platforms, and collaborative projects addressing common goals and challenges.

The continuous dialogue Kujala et al. (2022) mention is part of effective communication. Effective communication is essential for fruitful stakeholder management, as outlined by Chinyio and Olomolaiye (2010). Communication can be verbal (oral, written, electronic) or nonverbal (expressive behaviours, body language). The flow of communication can be formal, moving along regulated pathways, or informal. Formal communication includes downward (from top management to lower levels), upward (from lower levels to top management), and horizontal (between employees or between stakeholders such as owners and subcontractors). It requires appropriate timing, simplicity, clarity, relevance, credibility, and style. An all-channel network, promoting free-flow communication within a group, encourages involvement in decision making and produces high satisfaction among members. The authors visualize the all-channel communication network as follows:

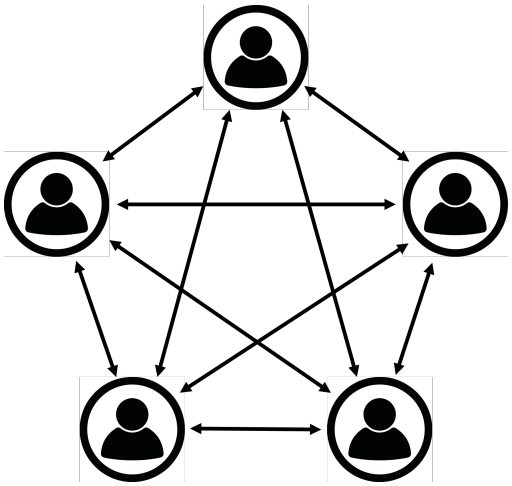


Figure 3.6: All-channel communication network (Chinyio & Olomolaiye, 2010)

As visible in Figure 3.6, all actors communicate with one another. This contributes to the engagement of the actors. However, the authors note that it is a more complex way of communicating compared to a streamlined, hierarchical communication. Hierarchical communication works faster, but can lead to actors losing contact with the projects. This can lead to a result where certain stakeholders are less content with.

Ingvarsson et al. (2023) discuss how stakeholder engagement is essential for successful project management but challenging due to the evolving nature of stakeholder landscapes. Not all stakeholders are the same, and their varying interests need to be acknowledged. Gamification can be a strategy to address these challenges by using game-based mechanics, aesthetics, and thinking to engage people, motivate action, promote learning, and solve problems (Kapp, 2012). Gamification can engage stakeholders by overcoming communication barriers, motivate them to take active roles through reward systems, promote learning through simulations and game-like situations, and solve problems collaboratively.

Ferreira et al. (2020) review methods and frameworks for stakeholder engagement in Nature-Based Solutions (NBS). Methods such as surveys, participatory mapping, workshops, digital platforms, and visual simulations help gather insights, preferences, and feedback to optimize NBS projects. Frameworks like collaborative governance, adaptive management, stakeholder analysis, and learning alliances establish structures for multi-stakeholder involvement, continuous learning, and adaptive strategies. Stakeholders are motivated by environmental, social, and economic benefits, regulatory

compliance, and corporate responsibility. Effective engagement strategies include aligning project goals with stakeholder values, clear communication of benefits, active participation opportunities, establishing partnerships, fostering long-term relationships, and providing incentives.

3.4 Collaborative Practices in Water-Adaptive Urban Development

This section dives deeper into the collaborative practices in water-adaptive development projects by looking at case studies and looking at the collaborative processes and forms of collaboration in those cases.

3.4.1 Case Studies of Collaborative Urban Development

In the Dutch context, Wang et al. (2018) describe the high degree of integration among different government levels and private stakeholders in water management practices. In their article, the authors compare the partnerships involved in the Yangtze river delta to those in the so called “Euro Delta”, which encompasses the Rhine, Meuse and Scheldt deltas. The Dutch approach to Integrated Water Resource Management (IWRM) ensures comprehensive consideration of all aspects of the water cycle, from supply and flood protection to environmental and recreational aspects. Public-Private Partnerships (PPPs) are a hallmark of Dutch water management, facilitating the sharing of knowledge, resources, and risks in large-scale projects, leading to innovative and efficient solutions. Forms of collaborations like PPP‘s are elaborated upon in the next section.

Additionally to the Dutch context, the role of the water boards in the Netherlands is explained. Water boards are primarily responsible for flood risk management, water quality and water supply in an appointed area (Ministerie van Infrastructuur en Waterstaat, 2019). In this role, they have an advising and assessing position in urban development projects. Water boards are heavily involved in projects where water safety is a priority, such as flood prevention, managing water levels, and ensuring infrastructure is built to handle water flow and drainage effectively. They act as important stakeholders during the planning phase, advising municipalities and developers on how to account for water-related challenges in their projects (Reinhard & Folmer, 2009). In this phase, the real juridical power of the water boards lies within the "*Watertoets*", a so called water exam. The Watertoets is an instrument that explicitly and equitably incorporates water management interests into the formulation of spatial plans and decisions by the national government, provinces, and municipalities. This applies to both urban and rural areas. The water management interests include water safety, water quantity, and water quality. The Watertoets is not only a final assessment but also a process where the initiator of a spatial plan engages in discussions with the water manager at the earliest possible stage (Waterschap Drents Overijsselse Delta, 2020). However, the moment the check, or exam, is taken, is the moment in which the real juridical power lies. The importance of this moment has recently been emphasized by the national government in the implementation of a new law, which extends the importance of the Watertoets and its influence (Ministerie BZK, 2024).

Regular community consultations and informational meetings help gain public support and understanding of water management projects. Education and awareness campaigns are also essential for maintaining public support, educating the public about water management challenges, and promoting sustainable practices like water conservation and pollution prevention. These methods increase the knowledge on how to deal with water related issues. To develop areas with water, understanding how it can affect urban development is essential.

These examples demonstrate the importance of stakeholder collaboration and integration in water-adaptive urban development. By combining different disciplines, engaging stakeholders, and fostering public-private partnerships, water management projects can achieve more sustainable and

resilient outcomes. The methodologies and frameworks used in the RRB and Dutch contexts can be adapted to various geographical settings, emphasizing the universality of these collaborative approaches in addressing water management challenges.

3.4.2 Forms of Collaboration

In projects combining (S)UD and water management, various forms of collaboration have been identified, each playing a crucial role in achieving holistic and sustainable outcomes. Nong (2022) identifies multiple forms of collaboration in projects combining water related issues and urban development. The three most impactful are:

- **Public-Private Partnerships (PPPs)** are a notable model, where public sector authorities collaborate with private entities to finance, design, build, and sometimes operate infrastructure projects. In urban water management, PPPs harness the efficiency, expertise, and capital of the private sector, while the public sector maintains oversight and regulatory functions. Such partnerships are particularly effective for large-scale projects that require substantial investment and technological innovation, leading to improved service delivery and infrastructure management. However, careful contractual agreements are essential to safeguard public interests and meet sustainability goals. Additionally, Osei-Kyei and Chan (2015) mention critical factors for the success of PPP projects. These include appropriate risk allocation, a strong private consortium, support of both politicians as well as the public and transparent procurement.

- **Multi-Stakeholder Collaboration** is another critical approach, involving the engagement of various parties, including governmental agencies, private companies, NGOs, community organizations, and sometimes international bodies. As discussed before, this type of collaboration is vital for creating inclusive and comprehensive strategies that address the diverse needs of all stakeholders. It promotes transparency, accountability, and shared responsibility, resulting in more sustainable and widely accepted solutions. Nong (2022) emphasizes the importance of communication and clear role distribution.

- **Cross-Sectoral Integration** involves coordinating policies and actions across different sectors that impact water resources, such as agriculture, urban development, energy, and environmental management. This integration is crucial for addressing interdependencies and optimizing resource use across sectors. By aligning goals and pooling resources, sectors can work together to mitigate the impacts of urban development on water bodies, improve water quality, and enhance the resilience of water systems against climate variability and other stresses. Effective cross-sectoral integration requires institutional frameworks that facilitate cooperation, as well as integrated planning and management practices (Nong, 2022). Moreover, cross-sectoral integration has got potential in, amongst other aspects, synergies between secotrs, ecosystem-baserd adaptation, green infrastructure and local scale implementation (Berry et al., 2015). Especially the combination of ecosystem-based adaptation and local scale implementaton provides a great starting point for water-adaptive urban development projects. An overview of cross-sectoral integration according to Nong (2022) is given in Figure 3.7.

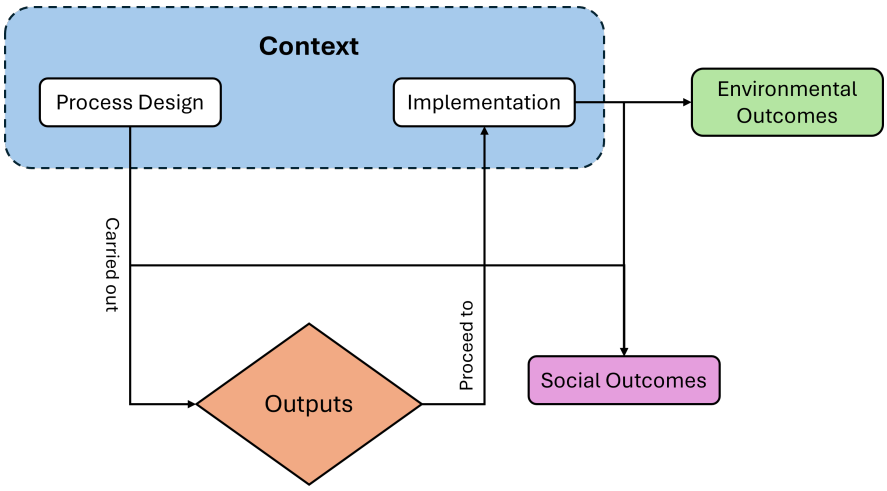


Figure 3.7: Cross-sectoral integration in collaborations (Nong, 2022)

Ferreira et al. (2020) elaborate on community engagement and collaborative governance as possible forms of collaboration.

Community engagement is fundamental to SUD, as it ensures that various perspectives and expertise are incorporated into the planning and decision making processes. Engaging local communities fosters greater commitment to outcomes and ensures that projects are directly aligned with the needs and capabilities of the community. Effective community engagement requires transparent communication, both formal and informal interactions, and capacity-building initiatives. Community engagement is considered a sustainable form of partnership, especially in environments where co-operation is needed (Hands, 2023).

Collaborative Governance embodies these principles by involving multiple stakeholders, facilitating joint decision making, ensuring transparency, and promoting both formal and informal interactions. It involves establishing formal governance structures such as steering committees, developing legal frameworks that support collaboration, and integrating capacity building and conflict resolution mechanisms. This method guarantees the longevity and durability of initiatives, encourages innovation, and strengthens the legitimacy and credibility of judgments. As mentioned before, Ansell and Gash (2008) have developed a framework for collaborative governance. This framework emphasizes several critical points that need to be focused on in order to create a foundation for collaborative government and include inclusiveness, trust building, leadership and iterative processes.

3.5 Integrated Water Management and Collaborative Approaches

3.5.1 Concepts and Strategies of Integrated Water Management

Integrated Water Management (IWM) is characterised by a coordinated development and management approach that recognises the interdependencies between different water management sectors (Nong, 2022). IWM has been applied for years. In his paper “Integrated water management: emerging issues and challenges”, Bouwer (2000) states that IWM involves managing water resources holistically while striking a balance between social, economic, and environmental needs. Back in 2000, Bouwer already underscored the challenges IWM faced on urbanization and climate change. These challenges remain relevant to date, and underscore the need for comprehensive planning, interdisciplinary research, and international collaboration to implement successful integrated water management practices.

In the SUD context, IWM is particularly relevant as an integrated part of the development process and execution. Flood-prone urban areas face unique challenges that necessitate a comprehensive and adaptive water management strategy. The relevance of IWM in such contexts can be understood through several key aspects, described by Koop et al. (2022) in their article, listed below.

- **Flood Risk Mitigation**
  IWM is crucial in flood-prone urban areas as it incorporates comprehensive flood risk management strategies. By managing the entire water cycle holistically, IWM facilitates the implementation of both grey infrastructure (such as levees and floodwalls) and green infrastructure (such as wetlands and permeable surfaces) to mitigate flood risks.

- **Resilient Urban Planning**
  IWM supports resilient urban planning by ensuring that water management is integrated into broader urban development strategies. This includes planning for sufficient drainage, flood pathways, and emergency response capabilities that are crucial for reducing the vulnerability of urban areas to flooding.

- **Sustainable Development**
  IWM promotes sustainable urban development by enhancing water efficiency and ensuring the sustainable use of water resources. In flood-prone areas, this means not only managing excess water during floods but also optimising water use during dry periods to reduce pressure on urban water systems.

- **Community Engagement and Preparedness**
  A key aspect of IWM is the participatory approach that involves local communities in the planning and decision making processes. This is particularly important in flood-prone areas where community awareness, preparedness, and resilience are critical for effective flood management.

- **Adaptation to Climate Change**
  With the increasing unpredictability of weather patterns due to climate change, IWM provides a flexible and adaptive framework that can adjust to changing conditions. This adaptability is vital for flood-prone urban areas, where traditional water management strategies may no longer be sufficient to cope with the new flood risks posed by climate change.

Wei et al. (2020) stress the importance of IWM in sustainable development goals. The authors reason that future SUD goals are realized more effectively due to several key aspects of IWM. IWM involves a coordinated development and management of water, land and related resources, which leads to a balance in social, economic and ecological needs. Additionally, IWM enhances water supply security by harvesting rainwater and reusing wastewater. Finally, water conflicts between societal needs and ecosystem preservation pose significant challenges to SUD. IWM provides a framework for resolving these conflicts by ensuring that water allocation decisions consider both human and ecological demands. The holistic approach combined with flexibility IWM provides, helps reaching SUD goals set by governments.

Koop et al. (2022) dive deeper in combination of urban planning with water management and the concept of Water-Sensitive Urban Design (WSUD). Urban planning that incorporates water management principles strategically places infrastructure and residential areas to minimise flood risks and optimise land use concerning water resources. This practice involves designing flood-resistant infrastructure, such as elevated buildings and robust drainage systems, that can withstand high water levels during flooding events. Furthermore, integrating green and blue infrastructure into urban landscapes—such as parks, gardens, rivers, and canals—serves multiple functions. These natural elements not only provide recreational spaces and enhance biodiversity but also play a critical role in absorbing excess rainwater and reducing surface runoff, thus mitigating flood impacts. By

strategically integrating these elements, urban areas become more resilient to flooding and more livable for their residents.

The concept of WSUD is pivotal in integrating water cycle management with urban planning. This includes the implementation of sustainable techniques like rain gardens, permeable pavements, and bio-swales, which effectively manage rainwater runoff and relieve the pressure on urban drainage systems. Additionally, this integrated approach promotes the conservation of water resources and encourages strategies for rainwater harvesting and reuse within urban settings, leading to significant reductions in water consumption and wastewater generation. Through WSUD, cities not only enhance their flood resilience but also make strides towards more sustainable water use practices.

Achieving an integrated approach requires the cooperation of various stakeholders including city planners, water managers, developers, and local communities. This collaboration ensures that multiple perspectives are considered in the planning process, leading to more comprehensive and widely supported urban development plans. Moreover, it necessitates coherent policies and regulatory frameworks that support sustainable development and effective flood risk management, demonstrating the need for a unified policy environment that facilitates the maintenance and execution of integrated planning principles. Stakeholder collaboration and supportive policies are essential for the successful implementation of integrated urban water management strategies.

Examples from cities that have successfully adopted integrated approaches to water management in their urban planning show how these practices not only mitigate the impacts of flooding but also contribute to the broader sustainability and resilience of communities. These cities have utilised green infrastructure to combat urban heat islands and improve storm water management, and they have re-envisioned urban spaces to accommodate both water management facilities and public areas, creating multi-functional landscapes that serve the needs of their populations. These case studies highlight the tangible benefits of integrated urban water management.

Integrating spatial planning with water management is essential for creating sustainable and resilient urban environments, particularly in regions susceptible to flooding. This approach is crucial for the strategic development of cities, allowing for more effective flood risk management and sustainable use of water resources. It offers a proactive approach to urban development that addresses both the immediate needs for flood mitigation and the long-term sustainability challenges posed by urbanisation and climate change. As cities continue to grow and face increased water-related risks, adopting these integrated strategies becomes ever more crucial for ensuring their resilience and sustainability (Koop et al., 2022).

3.5.2 Collaborative Integrated Water Management

Integrated Water Management (IWM) in urban planning projects involves multi-faceted approaches that emphasize stakeholder involvement, policy integration, and technological innovations to address the complexities of urban water systems. Across the globe, and especially in the Netherlands, multiple case examples of IWM projects exist. This section looks at those examples and evaluates the importance of the implementation of collaborative IWM.

Rotterdam is a prime example of a city implementing IWM through collaborative efforts. The "Rotterdam Climate Initiative" focuses on enhancing the city's climate resilience, particularly against flooding, by integrating water management with urban planning. This initiative includes the development of multifunctional flood defences, such as the "Water Squares," which serve both as recreational areas and temporary water storage during heavy rainfall (Özerol et al., 2020).

The Netherlands' approach to Integrated Water Management (IWM) shares similarities with other international initiatives, reflecting the principles of participatory, adaptive, and integrated urban

water management. The "Room for the River" project in the Netherlands, as described by Koop et al. (2022) is a national initiative aimed at reducing flood risks by giving rivers more space to manage high water levels. This is achieved through methods such as relocating dikes, creating floodplains, and constructing secondary channels. Emphasising stakeholder participation, the project involves local communities, environmental groups, and governmental bodies to ensure that interventions not only enhance flood protection but also improve spatial quality and biodiversity. By engaging various stakeholders, the project promotes a comprehensive approach to water management that balances safety and environmental considerations.

Similarly, Amsterdam's "Rainproof" initiative seeks to create a water-resilient city by promoting green infrastructure and sustainable urban drainage systems (Nong, 2022). The project encourages the use of permeable pavements, green roofs, and rain gardens to manage storm-water effectively. Collaborative efforts with residents, businesses, and local authorities play a crucial role in the project's success, fostering a sense of shared responsibility and collective action. This initiative demonstrates how urban areas can adapt to increasing rainfall and mitigate flooding risks through community involvement and innovative design solutions.

In Victoria, Australia, the IWM Framework guides urban water sector planning through collaborative platforms involving water planners, local governments, and communities. This framework supports the identification and prioritisation of integrated solutions, providing guidelines and tools for collaborative planning and economic evaluation. Reflecting Dutch practices in stakeholder engagement and multi-level governance, the framework ensures that water management strategies are inclusive and adaptive, addressing both current and future challenges. By incorporating these principles, Victoria's approach highlights the importance of cooperation and forward-thinking in achieving sustainable water management. The SWITCH Project, funded by the European Union, aimed to facilitate a paradigm shift towards sustainability in urban water management. It involved a cross-disciplinary team of 33 partners worldwide and established collaborative research platforms called 'learning alliances' across twelve cities, including cities in the Netherlands. These alliances promoted the adoption of sustainable water solutions through stakeholder engagement and long-term planning (Nong, 2022).

The collaborative implementation of IWM in the Netherlands, particularly in urban areas like Rotterdam and through national projects like "Room for the River," exemplifies how multi-stakeholder engagement, policy integration, and innovative practices can create resilient and sustainable urban water landscapes. These efforts demonstrate the effectiveness of integrated approaches in managing the complexities of urban water systems, providing valuable lessons for other cities worldwide facing similar challenges.

When taking a look at the governance structures in the Netherlands, it can be deducted why these examples prove to be effective in the Netherlands. The Netherlands operates as a decentralised unitary state, combining centralised control by the central government with delegated authority to regional and local governments such as provinces, water boards, and municipalities (Andeweg & Irwin, 2005). National water policies are formed through intensive deliberations between the responsible ministry, related ministries, and representative organisations of subnational authorities. The actual implementation of these policies occurs at the regional and local levels, executed by water boards and municipalities, and for major national water bodies, by the State Department for Infrastructure and Water Management (Rijkswaterstaat) (Totaro, 2022).

This multi-level governance model ensures that areas prone to flooding are managed by various political authorities, necessitating joint decision making and cooperative efforts (Nong, 2022). Political boundaries in flood risk management have been adjusted, redistributing responsibilities among national, regional, and local authorities as well as concerned citizens (Bressers & Lulofs, 2010).

3.6 Summary of Findings and Knowledge Gap

The purpose of this literature synthesis was to gather information on collaborations in the evolving landscape of water-adaptive urban development and to create a theoretical framework based on the information in the literature. In this concluding section, a brief review of the chapter is provided by summarizing the components, highlighting the elements relevant to later stages of the research, and emphasizing the resulting knowledge gap, which this thesis aims to fill.

3.6.1 Summary of Findings

The first part of the literature synthesis resolved around the definition of urban development, by defining urban development, describing the current major challenges and the advances are made in the adaptive urban development department. The history of urban development provides as background information in order to understand the current challenges, like the increased complexity of the projects, and the advancements made towards adaptive development better.

The second part resolved around the current frameworks and theories on collaboration available. It introduced the collaborative governance model by Ansell and Gash as a proven model on collaborative practices. This model forms the foundation for the development of the final results of this research. Additionally, this part of the literature review provides multiple forms of collaboration in combination with water management. Intertwining collaboration and water management provide knowledge that can be transferred to points of attention later on in the research.

Thirdly, the literature on interdisciplinary and stakeholder collaboration are discussed. As interdisciplinary collaboration is essential in adaptive urban development, knowledge on how to get interdisciplinary experts to work together is of great importance. The theories mentioned in this section are used to construct the interview protocols in later stages of the research.

The fourth section looked at existing case studies to understand better how the theories mentioned earlier are actually implemented in real life. It looked at known challenges and opportunities in international and national context. Insights from this literature serve as input for the interview protocols as well.

In the fifth section, the literature on collaborative approaches of integrated water management are elaborated further in order to understand more of the water management aspects needed to adapt urban development according to the problem statement in this research. Integrating spatial planning with water management is essential for creating sustainable and resilient urban environments, particularly in regions susceptible to flooding like the Netherlands. As with the former sections, insights from the approaches mentioned in this section provide input for the interview protocols.

3.6.2 Knowledge Gap

The existing literature on collaborative frameworks, particularly Ansell and Gash's model, suggests a promising foundation for effective governance in water-adaptive urban development. While adaptations to this model, such as those proposed by Rojas (2020), address key aspects like stakeholder analysis and water management integration within institutional design, they fall short in application to the specific needs of location selection for out-of-city residential projects. These adaptations primarily focus on enhancing stakeholder identification and understanding within the current institutional frameworks, yet lack guidance on synchronizing stakeholder interactions and establishing a clear road map for timely engagement. This gap creates uncertainty regarding the roles and responsibilities of involved parties, potentially hindering collaboration at crucial stages of

the process.

Further, the literature offers limited clarity on the location selection process itself, particularly regarding the sequence and manner of stakeholder involvement. It remains uncertain who participates at each stage and how decisions are made collaboratively, which is critical in complex, water-sensitive environments. Moreover, in cooperative development processes, existing studies emphasize the importance of shared ownership to create a collaborative environment. However, the literature does not address who assumes leadership when diverging perspectives or conflicting interests arise, leaving unresolved how consensus can be achieved in the face of potential friction or even stalemate among co-owners.

This knowledge gap indicates a need for a refined collaborative framework tailored to location selection in water-adaptive, out-of-city developments. Such a framework would ideally clarify roles and phases of engagement, specify mechanisms for coordinated stakeholder interaction, and provide guidance on possible forms of leadership to help navigate a shared ownership process. Addressing these elements could lead to a more efficient and aligned approach, thereby accelerating sustainable, water-adaptive development.

4 | Case Study

As mentioned in chapter 2, an important part of the research is done through a case study. Examining how the location selection process of new construction projects works, especially in areas with a larger water management challenge, is crucial to understand what can be improved. The case that is analysed is still in the selection phase, nearing the official end of the process. This type of case was chosen because it is still ongoing, but the hard choices, working together and smoothing out all the mutual creases has already been done. The case selected to analyse is the development of the Gnephoek, an area next to Alphem aan den Rijn in the Groene Hart area.

4.1 The Gnephoek

In the province of South Holland, there is a dire need for more houses in an already densely populated area. In this province lies Alphen aan den Rijn, a city next to the Groene Hart and under the influence of Amsterdam, Utrecht, and The Hague. It is a strategically located area for housing development, but the natural environment of the Groene Hart presents a significant challenge in terms of water and soil management. Within the existing city limits, space is becoming scarce, and to construct the necessary houses, the municipality has expressed a preference to build in the Gnephoek. The Gnephoek is located next to the western part of Alphen aan den Rijn, as depicted in Figure 4.1.

Figure 4.1: Location of Gnephoek next to Alphen aan den Rijn (Stadszaken, 2024)

Based on initial information provided by APPM and initial reading, it became clear that the Gnephoek meets the criteria set for the case study. The province of South Holland, in which the Gnephoek is located, states in their policy that residential developments consisting of 11 houses or more and containing an area of 3 acres or more is labeled as "big" (Provincie Zuid-holland, 2021). The plans for the Gnephoek contain 5500 houses (Stadszaken, 2024) and the area exceeds 3 acres, so the project is rightfully classified as "big". Additionally, there is also a big task on water and soil management, as the area is located at the edge of the Groene Hart area (Brink, 2023). The challenge on water management is also confirmed by the location of Alpen aan den Rijn in Figure 1.1. The location on this map, zoomed in, is seen in Figure 4.2.

4.1.1 Process Background

The process of the actual selection of the Gnephoek for the needed residential developments in the municipality of Alphen aan den Rijn, has been long up for debate. In 2017, the official process of selecting a new location for residential development outside the existing city walls (BSD) started

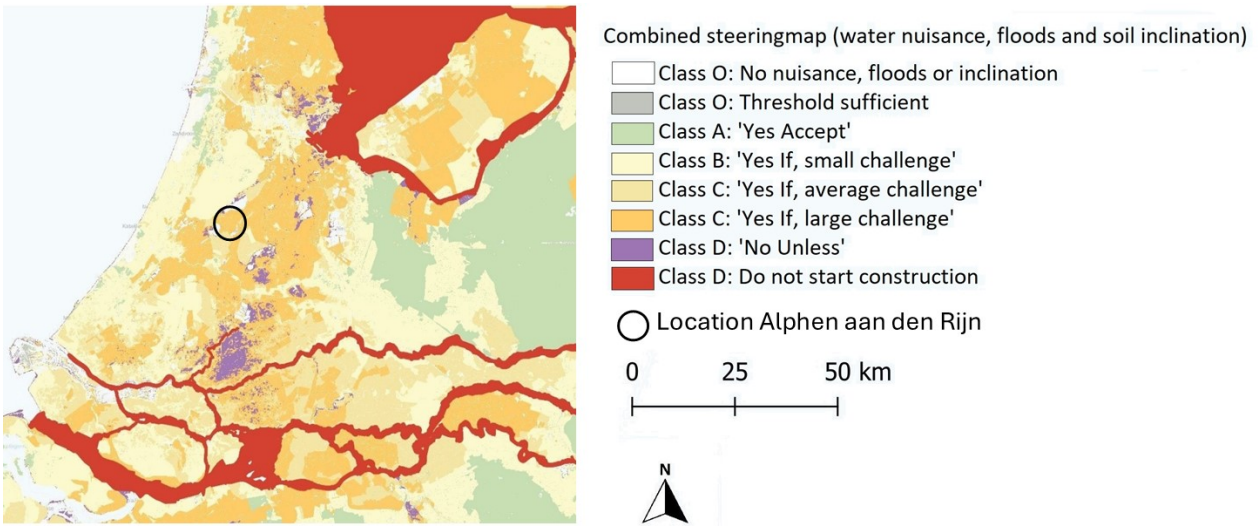


Figure 4.2: Location Gnephoek on spatial assessment framework (Ministerie van Infrastructuur en Waterstaat, 2024)

when the municipality decided that within BSD, no sufficient space for the realization of the needed houses was left.

In 2019, the municipality of Alphen aan den Rijn started exploring the feasibility of developing the Gnephoek as a housing location, focusing on aspects such as financial viability, water, and soil management. After an initial multi criteria analysis, the Gnephoek emerged as the location which best suited the demands of the municipality as well as the interests of directly affected stakeholders such as local inhabitants and commercially involved parties like farmers and developers. As the plans progressed, it became apparent that this development conflicted with the stringent regulations set by the Province of South Holland, which are designed to protect areas like the Gnephoek in its current state under the provincial environmental regulation. Despite these challenges, the municipality incorporated the Gnephoek into its environmental vision by January 2021, showing a clear commitment to moving forward.

The province initially resisted this decision due to its cautious approach toward protecting the Groene Hart's ecological values. This resistance created a stalemate, as provincial approval was essential for moving forward with any development in the area. Eventually, the matter gained national attention, and Minister Hugo de Jonge stepped in, recognizing the importance of the Gnephoek for addressing regional housing needs. He appointed Wim Kuijken as an independent advisor to find a way forward, resulting in a plan to build 5,500 homes with provisions for nature development, a solution that balanced housing demands with environmental considerations.

With this proposal momentum built and the municipality, province, water board, and regional authorities worked together on the next steps. By July 2023, the province, the Rijnland Water Board, and the Holland Rijnland region expressed their appreciation for the municipality's contour plan, which outlined the development of the Gnephoek. Minister De Jonge praised this as a step towards formal decision-making, emphasizing the plan's importance for affordable housing. He highlighted the project as a potential model for outlying area development that integrates housing with considerations for water and soil systems.

In November 2023, the Provincial Executive of South Holland gave a positive recommendation for the outline plan submitted by the municipality, following a positive assessment by the Holland-Rijnland water board. This allowed the development in Gnephoek to be included in the regional housing program, approved by the province in March 2024. The only remaining step for official

approval by the Provincial Council was the necessary financial contribution from the national government.

In the summer of 2024, the Minister of Internal Affairs decided to allocate 50 million euros towards the development of Gnephoek, closing the financial gap. This contribution provided sufficient budget to make the area's accessibility feasible, which was a requirement from the province for official approval.

In October 2024, the green light was officially given to proceed with large-scale housing and nature development in the Gnephoek, with all involved parties officially agreeing on the development plan. The project is expected to serve as an example for how to harmonize housing, nature, and environmental considerations, with a focus on 60% affordable housing, including social and mid-range rental options, thus creating a more livable neighborhood.

In total, the whole process took 7 years to complete, mainly due to the discussions between municipality, province and water boards. It proved difficult and time consuming to reach a consensus among those three, leading to a timely process. Only when the minister intervened and installed an independent advisor to help these three stakeholders to make a cooperative decision, the process smoothened out and steps were made.

4.1.2 Stakeholders

A stakeholder analysis to understand the participants and to recognize who to interview was done, based on preliminary reading and information provided by APPM. The municipality of Alphen aan den Rijn, Province of South Holland, Water board Rijnland, developer BPD and the Ministry of Internal Affairs (BZK) are identified as key stakeholders involved in the case. Additionally, the regional accord of Holland-Rijnland played a role in mediating between the municipality and province, which is why they are included in this study as well. The stakeholders, together with their interests and influence, are presented in Table 4.1.

Table 4.1: Stakeholders involved in the realisation of the Gnephoek

Stakeholder	**Role**	**Interest**	**Influence**
Municipality	Central Role	Getting approval for their desired location, which takes into account the interests of their residents and economic position	Decide on what happens in their own municipality
Province	Assessing role	Environmental regulation must be maintained, keep municipalities in line with provincial policy and views	Can block plans if not in line with environmental regulations
Water board	Assessing role	Ensure water safety at all times, control impact of development on the full area. Maintain water quality	Can block plans if not meeting the criteria from the Water Exam
Regional Accord	Mediating and consulting role	Fruitful collaboration between municipalities to create a voice of unity towards the province	Little, the regional accord is a voluntary collaboration front
National Government	Supervising	Make sure sufficient locations are developed to meet the housing demand	Can give fiat or block plans
Developers	Executing	Develop as many houses as possible for profit	Provide insights into what is feasible and what is not. Can influence through lobbying

From each of these stakeholder groups, interview participants are selected based on criteria mentioned in chapter 2. The participants are presented in Table 4.2.

Table 4.2: Overview of the interview participants

Participant	**Employer**	**Job role**	**Duration Interview**
1	Municipality Alphen aan den Rijn	Urban Planner	1h
2	Municipality Alphen aan den Rijn	Strategist	1h
3	Province South Holland	Strategic Policy Advisor for Spatial Development	1.5h
4	Province South Holland	Regional Minister	45 min
5	Province South Holland	Director of Spatial Environment	1h
6	Ministry of Internal Affairs	Senior Policy Officer, Mooi NL	1h
7	Waterboard Rijnland	Process Leader in Area Development/Landscape Architect	1h
8	Province South Holland	Regional Minister	30 min
9	Regional Accord Holland Rijnland	Manager of Strategy and Policy	1.5h
10	Regional Accord Holland Rijnland	Junior Strategic Advisor	1.5h

5 | Results

This chapter presents the findings of this study on the current location selection process for construction projects, highlighting the roles, collaboration methods, and experiences of the involved stakeholders. The chapter first elaborates on the process itself, explaining who is doing what at what moment, after which the challenges faced in the process are discussed. Hereafter, the strategies implemented to overcome these challenges are discussed. Finally, the remaining desires regarding the process expressed by stakeholders are presented. The found instances regarding challenges faced, strategies implemented and desires expressed are all summarized in Table 5.2, Table 5.3 and Table 5.4.

5.1 The Current Location Selection Process

In order to get a comprehensive understanding of the challenges stakeholders face in the location selection process, the process itself is explained in this section. Based on information obtained from the interview transcripts, a swim lane diagram of the process is created. This diagram can be seen in Figure 5.1 and visualizes the key moments during the process. In the diagram, the timeline as seen in the Gnephoek case is added to show which elements encompass what time in the process. Moreover, a distinction is made between five different types of activities, which are marked by different colors.

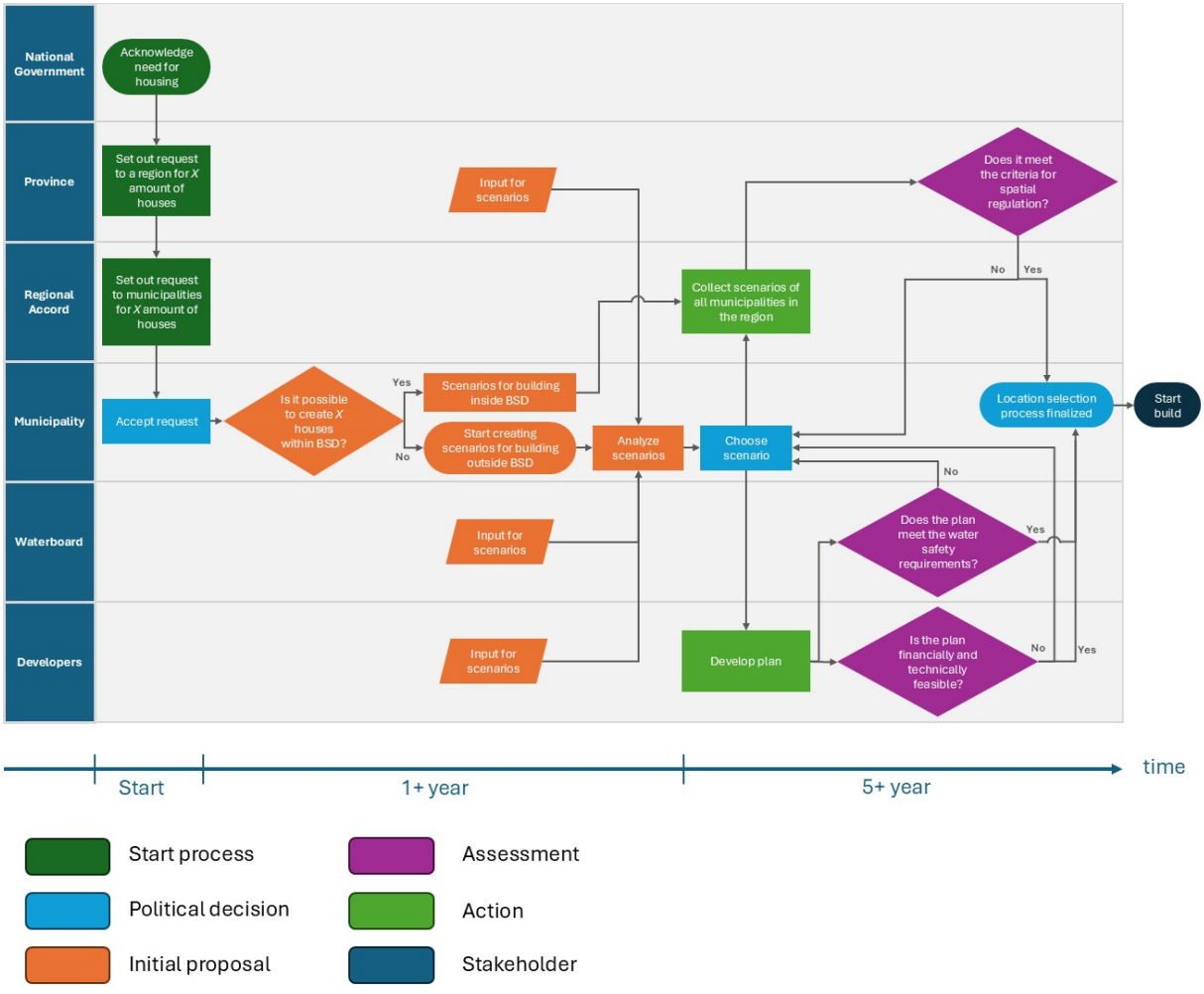


Figure 5.1: Simplified flowchart of location selection process

The location selection is done via a multi-stakeholder process involving various phases and activities of collaboration, consultation and negotiation. These phases, as seen in the Gnephoek case and together with their corresponding color code in Figure 5.1, are elaborated below.

Concerning the Gnephoek case, the process began with the national government acknowledging the need for extra housing and informing the provinces that action should be taken. Each province, in this case the province of South Holland, then makes an estimation on the volume of the needed houses per region, and communicate this to the relevant municipalities. This is indicated with the dark green activity blocks. The municipalities then choose to accept whether they want to construct a certain amount of houses. This is a political decision, made by the municipal council, and is marked light blue. These municipalities then start to investigate where in their area residential development is possible. According to existing policy, it is mandatory to first check if construction can take place within the existing city walls. Only if the municipality can sufficiently substantiate that there is not enough space within existing town and village boundaries to start building the required houses, there is the possibility of developing outside them. The strategic spatial advisor and other municipal officers undertake preliminary scans to identify possible locations, assessing them on multiple factors such as water and soil management, ecological connectivity, climate adaptation, and social value. These activities are all leading up to the first proposal of a location and are marked orange.

The process of selecting an initial scenario and completing the orange steps typically takes about a year, often extending by a few months. In the Gnephoek case, this process lasted slightly over a year, aligning with the time frame generally allocated for such procedure. A strategist of the municipality of Alphen aan den Rijn stated that in the Gnephoek case, this part of the process was actually done quite fast, taking into account the thorough analysis performed:

> *"The whole process took a year, which is actually not that long. In fact, we did thorough research [...], which made the process more time consuming."*

Once potential locations are identified, a detailed assessment is conducted. In this case, the municipality carried out comprehensive analyses, which included SWOT analyses of possible sites. This can be done via different multi-criteria methods as well. Such analyses are crucial in establishing it as the most viable location for development. This criteria involve examining aspects such as financial feasibility, soil stability, water management, and ecological impact, as well as political support within the municipality.

Once the municipality has made a decision on the location they want, again political so highlighted in light blue, the province becomes involved. The municipalities seeks approval for developing locations outside existing city limits, as development needs to match with existing environmental regulation and policy. The provincial role is pivotal, especially in regions like the Groene Hart, where strict environmental policies limit construction. A strategic policy advisor from the province of South Holland underscores the role of the province in this process, highlighting the impact of spatial guidelines:

> *"Our policy includes the spatial quality guideline, so you have to demonstrate in your previous zoning plan, current environment plan or amended environment plan that you meet these guideline points and how you do so. For example, if you are going to build in a parcel landscape and you are going to fill in all the ditches and develop a kind of structure that is at right angles to that parcel landscape, that goes against the reference points. We assume that as a designer you take into account the spatial quality that is already there and add new spatial quality. Let me say right away that this is actually easier to assess when incorporating and adapting than when transforming."*

In the case of the Gnephoek, the Province of South Holland initially held a rigid position against any development, viewing the Groene Hart area as protected where construction was undesirable.

Provincial involvement ensures that any proposed development aligns with broader spatial planning and environmental objectives.

The involvement of water boards like the Rijnland Water Board is crucial as well, given their responsibility for water management in planning processes. Traditionally, water boards were only involved towards the end of the planning phase. However, recent practices show the benefit of involving them earlier, allowing water and soil considerations to be integrated from the outset. In the Gnephoek case, the Water Board Rijnland became actively involved when the municipality of Alphen aan den Rijn requested their expertise in 2021, marking a shift towards more water-conscious urban planning. This shift in responsibility is positively described by a landscape architect from the water board:

> *"We provided feedback on the locations envisioned by the municipality, which was verified by an independent agency. This process went well. However, at the provincial level, our involvement was less until recently. Thanks to the focus on water bottom steering policies, this is changing. South Holland and North Holland have created suitability maps in recent years, which are good tools."*

The assessing role of both water board and province, together with the feasibility assessment of the developers, is marked purple in Figure 5.1. If existing plans are not meeting the criteria in these assessments, a feedback loop starts, initiating either an adjustment to the original plan or negotiations regarding existing policies and regulations.

In the end, an administrative agreement is drawn up, involving the province, municipality, regional accords (such as Holland Rijnland), and the water board, to align strategies and ensure a cohesive approach in the realization of the project. In the Gnephoek, this step was crucial in moving forward, as it ensured that all stakeholders agreed on the development's scope, nature, and objectives. The regional accord, Holland Rijnland, plays a role in representing the collective interests of smaller municipalities, acting as a unifying force in negotiations with the province. This step, however, only takes place after the initial plans of the municipality have met the criteria set by the water board and province, and if the plan is still feasible after incorporating these criteria to the correct extent.

In total, the period of time between the first chosen scenario and the actual start of realization can vary. Depending on the assessments, the process can go quite fast and smoothly or take up several years due to the need of iteration or negotiations about the chosen plan. In the case of the Gnephoek, it took over 5 years to get every stakeholder aligned and the necessary approvals to start realization. Comparing this to similar development projects from the past decade, as mentioned in chapter 1, this process is more likely to be very time consuming than going smooth and fast.

A unique aspect of the Gnephoek case that is worth mentioning was the need for external mediation, ordered by the minister of Internal Affairs to break deadlocks between stakeholders. In the Gnephoek's case, tensions between the municipality and the province were alleviated through the intervention of an independent advisor. By mediating between the province and municipality, the advisor created an environment where both parties were able to collaborate and compromise, resulting in the final plan of 5500 houses in the area. The need for this advisor arose during negotiations following a negative advise from both water boards as well as the province in the purple assessments, which started the feedback loop

Once stakeholders agree on the preferred scenario, the next step is to create a contour plan that outlines the development's details. The Gnephoek project's contour plan involved planning for 5,500 homes, integrating considerations for water and soil management, and establishing nature development alongside urban expansion. The final approval process requires that this plan aligns with the province's spatial policy and receives endorsement from all involved parties.

5.2 Challenges, Strategies and Desires

This section presents the challenges faced, strategies implemented and desires to improve the process, all expressed by interview respondents.

5.2.1 Challenges in the Location Selection Process

The challenges faced by stakeholders of the location selection process can be split into six categories:

1. Power/Knowledge Imbalance
2. Procedure
3. Political Decision Making
4. Conflicting Interests
5. Technical & Spatial
6. Financial

Using the instances in Table 5.2, these challenges are discussed in the presented order of 2nd order themes.

Power/Knowledge Imbalance
Power/knowledge imbalances were mentioned by interview participants as challenges that came forward throughout the full duration of the process. A lack of recognition in the house of Thorbecke was mentioned by participants of the regional accord (instance 1). Not being allocated a power position between key stakeholders who do have such a position, creates an imbalance where the regional accord is only recognized as a partner when it suits the other party. A member of the regional accord put it like this:

"[The] problem with this structure is that we as a region don't exist for the province if it doesn't suit them. When it does suit them, it is terribly convenient."

Additionally, essential knowledge with those who have little or no power is indicated as a challenge (instance 2). In the case of the Gnephoek, the water boards possess essential knowledge. However, the only juridical power of the waterboards is at the end of the process in the form of the water exam. In this specific case, the water boards are consulted earlier on in the process. However, it is emphasized by interview participants that this is not common and usually happens only at later stages in the process.

Procedure
Multiple participants express the challenges they face regarding the current procedures involved in the selection of a new location. Currently, no blueprint exists for (collaboration in) the location selection process of new construction projects in areas with a larger challenge on water management (instance 3), as stated quite literally by a strategist from the municipality of Alphen aan den Rijn:

"There is no road map, there is no blueprint for area development."

Moreover, existing policy and procedures can be disrupted by the effects of elections (instance 4). Municipalities also express the challenges they face due to the fact that they are bound by state regulations who, they state, are sometimes outdated or not sufficient for their projects, who are increasingly becoming more complex (instances 5 & 6). Furthermore, the current procedures are found to be lengthy and take up a lot of time (instance 7). For example, the mere multi-criteria analysis needed for the listing of possible locations can take up more than a year.

Political Decision Making
Challenges created due to politics and the decision making within come forward from the data as well. It is perceived by participants that politicians are reluctant to really make decisions (instance 8), which causes hesitation among participants themselves (instance 9). This is related to the political support needed for these decisions which is not always found for locations that, based on technical evaluations alone, are possibly suited for the project in mind (instance 10). A Director of Spatial Environment from the province of South Holland expresses it as follows:

> *"The political-administrative aspect is just as important as the factual and technical foundations. You need to secure solid support, especially from the city council, because if a plan isn't backed by them, we're not going to move forward with putting it on the map"*

Additionally, it can be challenging to generate internal support as well (instance 11). It is difficult to speak on behalf of an organization when the internal consensus regarding the process or project is not yet reached.

Conflicting Interests
Interests among stakeholders and participants can conflict, leading to challenges that need to be overcome. In the Gnephoek case, conflicts arose regarding environmental interests in the Groene Hart area (instance 12). Additionally, interests are looked after by politicians. If these interests conflict, the politicians can collide as well, leading to tricky situations (instance 13). This can accumulate in stakeholders clinging to existing policies and taking a rigid stance, which can even lead to deadlocks (instance 14). An example of this was given by an urban planner of the municipality Alphen aan den Rijn:

> *"What greatly delayed was because of the dogmatic attitude of the province [regarding their policies and interests], which did not want to enter into talks with us."*

Technical and Spatial
The technical challenges discussed in the interviews focused on the lack of existing space and infrastructure needs of new residential areas. One of the primary issues is the limited space, especially in urban areas, where finding suitable land for development is increasingly difficult (instance 15). A Regional Minister of the province of South Holland puts it quite plainly:

> *"The easier sites have mostly been used up, so now we're moving into the more challenging areas, like the Fifth Village and Gnephoek."*

Other technical challenges involve accounting for the necessary infrastructure (instance 16) and energy grid and sewage systems (instance 17), which must both be planned and integrated into the existing infrastructure. Border constraints, such as geographic or regulatory limits, add another layer of difficulty, making technical feasibility feel overwhelming for project developers (instance 18). These constraints complicate the design and implementation phases, forcing planners to balance numerous logistical and community needs.

Financial Financial challenges were highlighted as a significant barrier in the interviews. A major issue (instances 19) is the lack of investment in the area, primarily because stakeholders are waiting for political decisions before committing financially. This is explained by a senior policy officer of the Ministry of Internal Affairs:

> *"The province will not simply release money for nature development, especially if it is not under their management or in their interest. This leads to an impasse: no one is investing in the area because everyone is waiting for the time when construction can actually take place."*

Additionally, the costs of development are only rising due to the multi-layered safety requirements that are applicable on soft soil environments or areas with larger tasks for water management and safety (instance 20), compounding the financial challenge at hand in the process.

Looking at these challenges through a broader lens reveals that the power/knowledge imbalance is felt throughout the whole process. This imbalance, while recognized by some, has yet to be adequately addressed or managed at the outset. Moreover, procedural challenges originate in the absence of a blueprint of collaboration, leading to each party making their own procedures which increases complexity. These procedures take the interests of the writing party into account, but can also increase the occurrence of conflicting interests. These conflicting interests therefore frequently coincide with political influences, which were consistently highlighted by interview participants. The political factor appears to hinder and delay the process, adding complexity to the already significant challenges.

5.2.2 Strategies in the Location Selection Process

This section further elaborates on the strategies used by interview respondents to deal with the challenges mentioned in the previous section. The strategies applied can be found in Table 5.3 and are categorized in the following themes:

1. (In-)Formal Meetings
2. Finding Solutions for Financing Project
3. Collaborative Planning
4. Consultation
5. Generating Political Support
6. Optimizing Existing Space

Each strategy corresponds with one or more challenges faced. This relation is depicted in Table 5.1 at the end of this section.

(In-)Formal Meetings
Interview participants state that they make use of formal and informal meetings to generate commitment and trust to the process. One of the strategies used by interview respondents resolves around creating a less "stiff" environment by using humour in meetings to create a positive atmosphere, which helps build rapport and a sense of connection among participants (instance 21). Organising casual, fun meetings, such as barbecues or coffee rounds, also contributes to establishing trust and softening the relationship between stakeholders. Additionally, it is emphasized to regularly check if made promises are still being carried out in both formal and informal style (instance 22). Another vital approach to trust-building is addressing and ironing out mistrust through ensuring equal knowledge sharing (instance 23) in both formal and informal setting. By ensuring that all stakeholders have an equal level of knowledge, misunderstandings and suspicions can be minimised, enabling everyone to participate fully and confidently in discussions. This can be particularly important when dealing with technical or complex information that might otherwise create power imbalances. When stakeholders see that commitments are fulfilled, it reinforces their belief in the reliability and integrity of the process, making future cooperation smoother and more transparent. To that, participants are actively involved in informal meetings such as barbeques and cofee rounds to establish trust (instance 24). A professional from the municipality of Alphen aan den Rijn expressed the amount of informal meetings attended or organized in order to gain trust:

> *"... we undertook various initiatives: for instance, we went to their annual barbecue to give a presentation, visited all groups that wanted to do so to tell our substantive story,*

and even hosted groups here that could not come to us, involving people from provincial groups as well. We organised closed meetings, held informal "legs-to-table" sessions, and basically did anything outside the regular structure of an information fair, council committee, or council meeting."

Finding Solutions for Financing Project

To overcome the financial challenges mentioned earlier, interview participants use several strategies. One key approach is securing additional funding from the national government, which can provide substantial financial support for large-scale projects that might otherwise struggle to get off the ground (instance 25). It does, however, need to be motivated sufficiently to convince the national government this investment is necessary. Additionally, establishing a regional investment fund can help finance projects that improve the region, ensuring that local development is aligned with broader regional goals (instance 26). In the case of the Gnephoek, such a fund was created by the regional accord to fund projects in the region where the region as a whole can profit from.
Private parties can also play a crucial role by contributing capital, often through public-private partnerships, which can reduce the financial burden on public institutions (instance 27). Lastly, planning to build more expensive houses is a strategy that can increase profitability, ensuring that development projects remain financially viable by generating higher returns, thereby offsetting some of the upfront costs (instance 28). A director of spatial environment within the province of South Holland highlights these methods of resolving financial challenges:

"Sometimes, even when there's political support, financing may not yet be fully in place. In such cases, you need to bring in partners, such as a building consortium or the state, to fill in those gaps."

Collaborative Planning

Collaborative planning is used by process participants to ensure that diverse stakeholders can effectively work together towards shared outcomes. One approach involves having stakeholders work in parallel, each contributing their expertise to reach a common goal (instance 29). This allows different parties to focus on their strengths while ensuring that their work aligns with the broader objectives of the project. A strategist of the municipality of Alphen aan den Rijn highlights this by stating the following:

"For me, it is about cooperation, with everyone working together within their own duties, responsibilities and powers towards a common goal. In this case, that goal is to achieve sufficient housing, improve natural values and create a healthy living environment. Ideally, everyone contributes to that area development in their own way, within their own role and responsibility."

Additionally, the implementation of multi-stakeholder-designed strategies ensures that the perspectives and input of all involved are considered in decision making processes (instance 30). To further strengthen collaboration, interview participants establish a common goal and process (instance 31). This ensures that all stakeholders have a unified direction and a clear framework for working together. Moreover, the establishment of joint visions and agreements in strategic cooperation agendas (instance 32) allows different parties to align their priorities and objectives while simultaneously creating a foundation for their collaboration. This approach creates long-term collaboration by providing a shared platform for decision making. The necessity of creating such joint agreements is mentioned by a urban planner of the municipality Alphen aan den Rijn:

"We recently drew up a management agreement with the province of South Holland, the Rhineland Water Board and the Holland Rijnland region. This was necessary because the development of Gnephoek is part of the regional housing program, which has to be approved by the province."

Furthermore, participants contribute their expertise to general policies (instance 33), ensuring that the governance process benefits from specialised knowledge and is informed by practical experience, which enhances the overall effectiveness and adaptability of the policies.
When disagreements arise, participants are willing to compromise in order to move forward (instance 34), which is vital in maintaining momentum and ensuring that progress is not hindered by rigid positions.

Consultation
Extensive consultation back and forth between stakeholders with expertise knowledge or a key position in the process is used as well by process participants. Interview participants emphasize the importance of gathering the right expertise at the right moment for consultation to be effective (instance 35). This ensures that the consultation process is informed by relevant knowledge and expertise, enabling more accurate and feasible decision making. Additionally, the implementation of a round table where stakeholders can present issues and discuss possible solutions (instance 36) is considered a valuable strategy. This round table format allows for open dialogue and encourages the exploration of multiple perspectives, creating a collaborative environment where innovative solutions can emerge. It is an initiative of the regional accord, who state that it has still a lot of potential which is not capitalized upon, as municipalities are still hesitant to use it. A strategy and policy manager from the Holland Rijnland region expressed the versatility of the table as follows:

> *"The acceleration table deals with issues such as problems with permits, delays in realization, arranging financing, and contains the entire chain. Besides those parties, there are also the utility providers, representatives of municipalities, BouwNED, IVBN, water drinking company, utility parties, really everyone. You get together on a bottleneck basis with no strings attached. Together, you analyze the bottlenecks and see if you can get out of it."*

Mediating by an independent advisor (instance 37) is another possible practice identified by respondents. It has proven extremely fruitful in the case study, however participants express that this was a last resort and may not be needed in all processes.

The waterboard implements walk-in hours for visitors to present their plans and get expectations on how certain issues are dealt with (instance 38), offering a direct and accessible method for public consultation. This can be implemented by other stakeholders as well, to further clarify the complexities and challenges of a project to stakeholders.

Furthermore, the implementation of iterative communication loops to identify possibilities (instance 39) is a dynamic strategy that allows for ongoing feedback and adjustments throughout the consultation process. These loops help ensure that decisions are refined and adapted to new insights, improving overall outcomes.

Generating Political Support
Generating or even forcing political support can involve several strategic actions. One approach found in the case study is to lobby in parliament to let the minister intervene (instance 40), which applies direct pressure on decision-makers by elevating the issue to higher governmental levels. This can be particularly effective when local or regional stakeholders are unable to resolve disputes or when swift action is required.

Another method is to use a layered or holistic approach to address all interests and generate political support (instance 41). An example of this approach is provided by a strategist from the municipality of Alphen aan den Rijn:

> *"We use an approach based on three layers: the base layer (soil), the network layer (roads, energy pipelines, access), and the occupation layer (how the land is*

used—whether it's agricultural, industrial, or residential). These layers help build political and public support by ensuring all factors are considered"

By considering the diverse concerns of stakeholders and integrating them into a cohesive strategy, this method ensures that political backing is gained through broad-based appeal. In the meantime, maintaining continuous dialogue to ensure commitment (instance 42) is crucial for keeping all parties engaged and ensuring that support is sustained over time. By maintaining ongoing communication, stakeholders can address emerging issues and prevent disengagement, ensuring that political will remains aligned with project goals.

Communication Strategies
Different communication strategies are found in the data. Horizontal communication (instance 43) involves a more collaborative and informal exchange of information between peers or stakeholders at similar levels, fostering open dialogue and quick feedback. This type of communication allows for the sharing of knowledge and ideas across different teams or departments, which is crucial for innovation and problem-solving. In contrast, hierarchical communication (instance 44) follows a top-down structure, ensuring that directives and decisions are clearly conveyed from higher management to lower levels. An example of this hierarchical communication form was given by a Strategic Policy Advisor for Spatial Development within the province of South Holland:

"This took place at a stage when the House of Representatives had imposed a motion on us and the Municipal Executive had sent a letter directly to PS, outside GS, asking for the Gnephoek to be included in the environmental regulation via an amendment. At the time, therefore, relations were still quite hierarchical."

Finally, the importance of transparency in governance and communication as a whole is emphasized by interview participants (instance 45).

Optimizing Existing Space
A recurring strategy used by stakeholders is making smart use of existing space when planning new developments. One way to achieve this is by incorporating water and soil management into broader policies (instance 46). Integrating these environmental considerations into higher-level planning ensures that space is used more effectively while addressing sustainability concerns. This is explained by Spatial Environment director for the province of South Holland:

"As space becomes scarcer, our assessments are becoming more thorough. For example, at Gnephoek, Ridderkerk-Noord, and Zuidplas, we've been transparent with municipalities through letters, explaining that we are now also considering water and soil management, ensuring that new districts are future-proof."

Moreover, stakeholders suggest adapting existing construction strategies to the current spatial and environmental challenges (instance 47). By rethinking traditional construction methods, planners can create solutions that not only fit within the existing space but also align with environmental and logistical challenges faced.

When examining all strategies together, several patterns emerge. Different strategies are applied depending on relationships and the process stage. Initially, open communication is used to build trust, often through informal gatherings, but this approach shifts as pressure mounts. In more stressful periods, a hierarchical and distant stance is adopted to assert priorities. Additionally, consultation is frequently used. Extensive information is gathered, allowing stakeholders to voice their interests; however, the final decision on how to incorporate these interests rests with a central player—in this case, the municipality.

Table 5.1: Challenges and corresponding Strategies

Challenges Faced by Stakeholders	**Corresponding Strategies**
Power/Knowledge Imbalance	(In-)Formal Meetings, Communication Strategies, Creating Political Support
Procedure	Consultation, Communication Strategies, Creating Political Support
Political Decision Making	Creating Political Support, Collaborative Planning
Conflicting Interests	Collaborative Planning
Technical & Spatial	Optimising Existing Space
Financial	Finding Solutions for Financing Project

5.2.3 Desires in the Location Selection Process

Interview participants highlight that not all applied strategies are yet sufficient to deal with the challenges faced. They express desires on how to further improve the process. The expressed desires are presented in this section and in Table 5.4 and resolve around these themes:

1. Moment of Involvement
2. Guidance
3. Ownership

Moment of Involvement
A key desire expressed by several stakeholders is the involvement of water boards at an earlier stage in the planning process (instance 48). By engaging water boards from the beginning, stakeholders believe that water management can be more effectively integrated into the development plans.
However, there are also dissenting voices for this, stating the water boards can be risk averse and simply dismiss "higher risk" proposals. One regional minister for the province of South Holland states:

> *"There's a strong case for involving them [the water boards] because they have a lot of expertise. However, I also know them as quite a risk-averse, highly technical layer of governance. For example, you could say,* 1,000 people are going to live here*, and they might respond with concerns about a dike or other technical issues, saying,* stay away.*"*

Another desire is to maintain the involvement of civil servants at the start of the process, delaying the involvement of politicians until a later stage (instance 49). This approach is seen as a way to reduce political influences during the initial planning and focus on technical and administrative decisions. Additionally, stakeholders emphasised the importance of clear communication of demands early in the process, allowing all involved parties to adjust their expectations accordingly (instance 50). Finally, some stakeholders prefer a gradual progression, beginning with discussions focused on specific areas and working upwards to broader, high-level discussions as the planning develops (instance 51). This gradual approach is seen as a way to ensure that all stakeholders are on the same page before making key decisions.

Guidance
The call for guidance is often heard in the data, as stakeholders experience a need for clarity and a clear division of tasks and responsibilities (instance 52). To that is the instance added that more guidance should come from the national government, in clear rules, policies or guidelines (instance 53). Furthermore, stakeholders desire a level of personality to their problems (instance 54), which leads to the desire for regional frameworks and tailored approaches in which roles are incorporated (instance 55). A strategic spatial advisor for the Municipality of Alphen aan den Rijn formulates this as follows:

"I believe we are moving towards a more graduated, area-based approach for long-term planning, possibly using updated area maps. These will serve as a tool we are developing because spatial planning is never truly finished. We need a mechanism to collectively make trade-offs, determining what municipalities pick up as local interests, what the province handles as provincial concerns, and what the national government or water boards contribute to this puzzle."

Ownership

According to interview respondents, the current process ownership is not distributed in a desired manner. Interview participants call for a more evenly distributed ownership of the process (instance 57). However, when it comes down to it, participants want to be autonomous in the areas they are responsible for (instance 58). A spatial advisor for the Municipality of Alphen aan den Rijn states this desire for autonomy, while simultaneously acknowledging the collective ownership of processes, as such:

"If you ask about my ideal image: ultimately, of course, the municipality has the final say on what happens within the municipality. But you see that other authorities also have a role to play in getting everything legally right. So it really is something you have to do together."

When these desires are layered together, a few points stand out. Participants express a desire for a collaborative approach in the process, with the municipality, province, and water board playing a central role. However, they also wish for greater autonomy in their own areas. This presents a conflict, further illustrating the complexity of the situation and the reality that not all wishes can be easily fulfilled.

5.3 Overview of Found Instances

A summary of all findings and instances from the interviews are presented in Table 5.2 to 5.4. The findings are sorted per aggregate dimension, and each aggregate dimension is sorted in 2nd order themes, as per the Gioia method explained in chapter 2.

Table 5.2: Summary of insights from interviews Gnephoek case study for the aggregate dimension 'Challenges'

Aggregate dimension: Challenges		
#	**1st order instances**	**2nd order themes**
1	If the stakeholder is not in the house of Thorbecke, it is not always acknowledged by the province	Power/Knowledge Imbalance
2	Water boards have knowledge but no power position	
3	No blueprint exists for a location selection process	Procedure
4	Elections can create a different political environment, creating uncertainty about projects that are still on the table	
5	Bound by state regulations	
6	Existing policy is not sufficient for housing need	
7	Procedures are lengthy and take up a lot of time	
8	Reluctance to make clear choices	Political Decision Making
9	Stakeholders are holding back participation if no clear political decision is made	
10	Political support is needed but not always found for technically challenging locations	
11	Creating internal political support can be a challenge	
12	Conflicting interests about green reservations like Groene Hart	Conflicting Interests
13	Conflicting political desires cause tricky situations	
14	Stakeholder is clinging to existing policies	
15	Limited space is available	Technical & Spatial
16	The location must be sufficiently accessible	
17	Account for needed energy grid and sewage systems	
18	Border constraints make technical feasibility feel overwhelming	
19	No one is investing in an area because everyone is waiting for the time decision for development has taken place	Financial
20	Multi-layer safety measures on soft soil require major investments	

Table 5.3: Summary of insights from interviews Gnephoek case study for the aggregate dimension 'Strategies'

Aggregate dimension: Strategies		
#	**1st order instances**	**2nd order themes**
21	Use humour in meetings to create a click	(In-)Formal meetings
22	Keep promises, which increases existing trust	
23	Iron out mistrust by talking and ensuring level of knowledge is equal amongst stakeholders	
24	Have casual, fun meetings such as barbecues and coffee rounds to establish trust	
25	Funding by National Government	Finding different ways to fund the project
26	Regional investment fund to finance projects that improve the region	
27	Funding by Private Parties	
28	Plan on building more expensive houses	
29	Stakeholders working parallel each on their own expertise to reach a common goal	Collaborative Planning
30	Implementation of multi-stakeholder designed strategies	
31	Establish a common goal and process	
32	Establish joint visions and agreements in strategic cooperation agendas	
33	Adding expertise to general policies	
34	Compromise in order to move forward	
35	Gather the right expertise at the right moment for consultation to be effective	Consultation
36	Implementation of a round table where stakeholders can present issues and discuss possible solutions	
37	Mediating by independent advisor	
38	Walk-in hours are organized for visitors to present their plans and get expectations how certain issues are dealt with	
39	Implementation of iterative communication loops to identify possibilities	
40	Lobby in parliament to let the minister intervene	Create political support
41	Use a layered/holistic approach to address all interests and generate political support	
42	Continuously dialogue to ensure commitment	
43	Implementation of horizontal communication	Communication strategies
44	Implementation of hierarchical communication	
45	Transparent governance	
46	Incorporating water and soil management in broader policies	Making smart use of existing space
47	Adapt existing construction strategies	

Table 5.4: Summary of insights from interviews Gnephoek case study for the aggregate dimension 'Desires'

Aggregate dimension: Desires		
#	**1st order instances**	**2nd order themes**
48	Involve the water boards from the beginning	Moment of Involvement
49	Keep the process initially on civil servant level and wait with the involvement of politicians	
50	Communicate demands clearly as soon as possible	
51	Start with area based discussions, work gradually upwards to the top	
52	Stakeholders experience a need for clarity and a clear division of tasks and responsibilities.	Guidance
53	Need for central steering from National Government	
54	Stakeholders desire a level of personalisation to their problems	
55	Stakeholders express a need for regional frameworks provided by the national government	
56	Distribute process ownership more evenly	Ownership
57	Ultimately, the municipality has a final say what happens within the municipality	

6 | Discussion

This chapter aims to relate the results presented in chapter 5 to the theory presented in chapter 3. The findings are connected to the theoretical frameworks, allowing for a interpretation by the researcher. All results discussed are referred through Table 5.2, Table 5.3 and Table 5.3 found in the previous chapter. As seen in these tables, the found instances are categorized in three aggregate dimensions: Challenges, Strategies and Desires. These three elements are discussed in that order.

Firstly, the Collaborative Governance model (Ansell & Gash, 2008) and the essential aspects for its successful implementation is discussed to identify missing elements. Per element of the framework, the previously mentioned Challenges, Strategies and Desires are discussed. These aggregate dimensions are then linked through the Collaborative Governance model to highlight important elements in the collaborative location selection process. This network is visualised in Figure 6.1. Finally, the network is used, in combination with insights from the research, to create a framework tailored for collaboration in the location selection process in water-adaptive urban development, which can be seen in Figure 6.2.

6.1 A Successful Implementation of the Collaborative Governance Model

This section reflects on the collaborative governance model presented in chapter 3, as well as the necessary conditions for a successful implementation of the model and elements that are missing. The analysis uses the instances presented in the previous chapter to address the elements of the model already in use and identify essential missing elements.

The Collaborative Governance model presented by Ansell and Gash (2008) provides, as discussed in chapter 3, a proven theory on multi-actor governmental collaboration. The conditions the framework is designed for correspond to the process under investigation, as well as the actors involved. The findings in the previous chapter indicate that the model is partially being applied, but not to the full extent of its potential.

Starting Conditions
The starting conditions of the Collaborative Governance model include the acknowledgment of power-resource-knowledge asymmetries and a prehistory of cooperation or conflict, in order to establish a baseline for collaboration. Based on the information provided by respondents, a lack of will to participate in combination with a power position seems to limit collaboration perspectives from the beginning. In addition, a lack of power and resources while having essential knowledge leads to a dependent position towards those who have power and or resources, creating an imbalanced start. In the current location selection process, there is a clear asymmetrical distribution of mainly knowledge and power, in which power lies mainly with the province and partly with the municipality, and the necessary knowledge with developers and water boards. Instance 19 shows the effect this can have. Strategies to deal with this are not yet implemented by process participants, who do acknowledge the situation and express their desire to deal with it. It is suggested to sit down with relevant stakeholders at the start of the process, at an administrative level, to review each other's interests and positions in the process and come to a mutual agreement on the general outcome of the process. This creates a baseline for a process where everyone knows their position and has an understanding and awareness of the position and interests of others. Signing a letter of intent at the beginning of the process can be a strategy to use this. Additionally, it is explicitly argued to incorporate the water boards as early on as possible in order to obtain the desired water-adaptive results.

Face-to-Face Dialogue

Face-to-face dialogue, as noted by Ansell and Gash (2008), is regarded as necessary in collaborative processes. In the current location selection process, participants value face-to-face communication for horizontal exchanges, as instance 44 shows. Process participants express their value to transparent communication as well, and it can be argued that transparent, horizontal communication is a condition for a collaborative process. This corresponds with the theory mentioned by Kujala et al. (2022). However, when tensions rise and participants become more entrenched in their initial positions, interview participants describe their communication to shift towards a more hierarchical structure, predominantly through official letters and emails. When asked about their desires regarding improvement on the location selection process, no participant recognized their form of communication as a potential element to improve. Implementing an all-channel communication network, as Chinyio and Olomolaiye (2010) presents, could improve the current communication strategy.

Trust Building

Trust is an essential element of any collaborative process, as mentioned in chapter 3 by multiple authors including Rojas et al. (2020), Barker Scott and Manning (2024) and Puchol-Salort et al. (2021). Especially the formal and informal interactions mentioned by Hands (2023) set examples of how trust can be created. Its value is underscored by process participants who take action to start building trust, indicated by instance 23. Currently, the initiation of building trust depends on an individual's realisation that this process must begin. On one hand, this makes it difficult to assess whether this realisation comes too late, and on the other hand, it creates a vulnerable point in the process as it is tied to an individual. The researcher of this document argues that a predetermined starting point for building trust is necessary for a healthy location selection process. Ansell and Gash (2008) mention the determination of the initial trust in the starting conditions. It is argued by the author of this document that this moment should not only function as a moment to determine initial trust, it should be used as a kick-start for formal and informal moments to start build trust between stakeholders.

Commitment to Process

Commitment to process is recognized not only by Ansell and Gash (2008) as a critical element in inter-governmental collaboration, but also by Nezami et al. (2022). A shared ownership of process is mentioned by both authors as a strategy to improve collaboration. In the current location selection process, participants state that the municipality is sole owner of the process. It can be argued that adding the province and water boards to this ownership leads to better collaboration. This adjustment in process ownership is a desire expressed by the municipality, as seen in instance 54. Shared ownership increases stakeholder engagement, which in turn increases successful project outcomes, as seen in the examples of Victoria, Australia (Nong, 2022) and those mentioned by Koop et al. (2022). These examples may focus mainly on collaborations during the design, construction and or implementation phases of a water adaptive project, they provide good examples of the effects of engagement in collaborative environments.

Additionally, Ansell and Gash (2008) mention openness to mutual gains as another element of commitment to process. It became clear from the interviews that participants are not always open to these mutual gains, especially when tensions rise. In the Gnephoek case, the process needed intervention from an independent party to get the participants to look at possible mutual gains.

Ansell and Gash (2008) state that commitment to process is characterized by three elements: *mutual recognition of interdependence, shared ownership of the process* and *openness to mutual gains.* The importance of commitment to the process is further underscored by Nezami et al. (2022), who state it as a critical factor of inter-organizational collaboration. Process participants recognise the role of the other party but adopt a mainly self-centred attitude, placing responsibility as much as possible on the problem owner. Presently, the municipality assumes the role of primary problem owner in the site selection process, playing a central role. In contrast, the water boards have an advisory and

supervisory function, while the province acts as a client, as previously discussed. Additionally, this self-centered attitude leaves little room for an openness to exploring mutual gains. This underscores the relevance of this commitment to process element.

Shared Understanding
Shared understanding consists of establishing a clear mission, a common problem definition and the identification of common values as stated by Ansell and Gash (2008). The interview participants mention frequently that these steps are happening throughout the location selection process as seen in instance 30. However, it is the researchers interpretation that the participants are primarily muddling through. There is a lack of formalisation in this part of the process, where a common goal, problem definition, and shared values are established. The researcher suggests to insert such a formalisation by evaluating, at the start and throughout the process at predetermined intervals, both the common goal and problem definition and to adjust them if necessary.

Intermediate Outcomes
Ansell and Gash's framework suggests intermediate outcomes as part of the collaborative loop, where breaking the process into smaller steps and using interim achievements can help build mutual trust and trust in the project. However, the researcher interprets that the interim "wins" in the site selection process examined in this thesis are so significant, and the time intervals between them so long, that it is doubtful whether these intermediate outcomes truly add value to the process.

Institutional Design
Institutional design proves essential for inter-governmental collaboration, as it sets clear ground rules and facilitating dialogue (Ansell & Gash, 2008). From the data it seems that there is a need for a stronger institutional design (instances 55, 56 and 60). The interview participants state that the dissolution of the Ministry of Housing, Spatial Planning and the Environment (VROM) has led to a decentralised approach, where provinces and municipalities gained autonomy in setting their strategies for housing development. This shift has often resulted in conflicting interests among stakeholders, as municipalities, provinces, and water boards have had to navigate the complexities of collaboration without clear national guidance, which has lead to the desires expressed by participants. However, these desires can contradict each other. Participants suggest a stronger steering from the national government (56), but also want a tailored approach (instance 60). Additionally, municipalities express the desire to be more autonomous (instance 53). Taken these desires into account, it is suggested that base guidelines can be of help, providing both steering and a tailored approach. This tailored approach is important to avoid marginalisation of smaller areas and communities, as stated by Caprotti et al. (2017). The autonomous desires of the municipality is considered undesired, as it further complicates the implementation of provincial policy.

Facilitative Leadership
The literature highlights the importance of leadership in multi-governmental collaborative processes, with a particular emphasis on facilitative leadership as essential for bringing stakeholders together and stimulate collaboration (Ansell & Gash, 2008). This is supported by the interview participants, who praised the role of an independent advisor (instance 38). In the exceptional case of the Gnephoek, the national government appointed a facilitative leader to reunite stakeholders and focus on shared goals and a common long-term vision. Interview participants suggest that this could set a precedent for future, similar processes. A formal appointment of a facilitative leader at the start of the process could address and connect with all previously mentioned elements of the location selection process. Such a leader can effectively oversee the initial conditions, assist in setting common goals, establish communication strategies, and determine clear ground rules. However, it is crucial that the appointed individual possesses the necessary skill set. In this process, qualities such as natural leadership are essential, as noted by Ansell and Gash. It emphasizes the importance of soft skills in a technical environment.

Implementation
As the swim lane diagram in Figure 5.1 shows, the largest improvement can be made by smoothening and speeding up the assessment phase after an initial scenario is chosen by a municipality. In order to improve this phase, it is important that the elements elaborated above are implemented from the start on, to ensure optimal effect throughout the whole process.

6.2 Framework

The found instances in Table 5.2 to Table 5.4 are all categorized in themes, who are subsequently categorized in aggregate dimensions *Challenges, Strategies* and *Desires*. Through the elements of the Collaborative Governance model, the themes of each dimension can be linked to the next. *Challenges* can be linked to *Strategies*, who can be linked to *Desires*, who in turn can be linked back to (re-) occurring *Challenges*. In this section, these relations are discussed and presented in a network diagram, as seen in Figure 6.1. The most notable characteristics and insights from the network are described below. At the end of the chapter, the characteristics and insights regarding the network are incorporated in an adjusted collaborative governance framework, tailored for collaboration in the selection process of residential urban development projects.

- **Potential of Facilitative Leadership**: From the framework it becomes clear that facilitative leadership has played a smaller role in the initial stages of the location selection process in the case of the Gnephoek, as mentioned by the interview participants. Challenges indicated by participants, such as a lack of clear blueprints how to collaborate with other stakeholders in a location selection, predominantly lead to strategies through *Commitment to Process*. However, when these strategies are linked to desires, the element of *Facilitative Leadership* is used more frequently. This corresponds with the desires expressed by interview participants, who call for more guidance. In the Gnephoek case, facilitative leadership came quite late to the table in the form of an independent mediator. It's effects are described positively by all interview participants, which further explains the need for more guidance through facilitative leadership. Additionally, the potential of facilitative leadership to help guide the process in clear paths is underscored by the researcher of this thesis.
- **Improved Starting Conditions**: Currently, challenges arise because of unclear starting conditions or even non-existing starting conditions. A power/knowledge imbalance has been noted between stakeholders participating in the process, which is not yet formally addressed during the process. It is stated by participants that it is their desire to have a informal starting moment with all relevant stakeholders, without political interference. This corresponds with multiple connections to the "moment of involvement" theme in the framework, also through the starting conditions element, indicating the desire for an improved starting moment. Combining the theory of Ansell and Gash regarding the starting moment with facilitative leadership can greatly improve the current location selection process. Additionally, by thoroughly evaluating the starting conditions and recognizing stakeholders, the water boards are recognized as important participants to include in this stage. This corresponds with the desires expressed by multiple participants to adjust the moment of involvement of the water boards.
- **Shared Commitment to the Process**: Interview participants link the majority of their challenges through commitment to process in order to get to strategies that deal with these challenges. This underscores the importance of commitment to process in the earlier phases of the process, as that is where challenges are identified by participants. The commitment to process element is further linked to multiple strategies and leads to a desire for more guidance. For clear commitment to process, it is essential to have a shared process ownership. This can be formally addressed at the starting moment, by a facilitative leader. This underscores the interconnections of the elements in the collaborative governance model. These elements are

iterative looped throughout the process, so it makes sense that they are reoccurring when challenges lead to strategies who are in turn leading to desires.

- **Communication structures**: Face-to-face dialogue is mentioned frequently by Ansell and Gash as an essential element in the collaborative governance model. This is seen in Figure 6.1, as it is continuously used throughout the model. However, not only face-to-face communication is needed. An all-channel communication network can greatly improve the collaboration, and it should incorporate face-to-face communication. This way, participants feel heard and equal, leading to improved participation in the process. However, this requires guidance as well. Another note to the importance of (facilitative) leadership in this process.
- **Desires loop back to Challenges**: Desires expressed by participants can come to life by implementing the collaborative governance model. However, these changed conditions in which the desires are actually realised, can create new problems as well. For example, a strong call for guidelines from the national government can be addressed through a more solid institutional design. However, when these guidelines are created, concessions will have to be made as not everyone can get it their way for 100%. This can result in conflicting interests, which need to be addressed.
- **Financial and Technical Challenges and Strategies**: When asked about challenges faced and strategies implemented to deal with these challenges in the current process, interview respondents mention financial and technical themes. However, from this framework it becomes clear that these challenges are not resolved through the collaborative governance model. Additionally, it does not lead to further desires. It seems the strategies implemented by participants are sufficient to deal with the challenges.

It becomes clear from the framework that the challenges, strategies and desires in the current location selection process are connected in a loop, which corresponds with the theory that management is never linear. Management is an iteration that is never finished and can always be improved. To avoid an unclear web when visualizing these relationships as an actual circle, the first and last dimension, "challenges," has been added twice—once at the start and once at the end—creating an iterative loop where the second "challenges" column should be interpreted as the first.

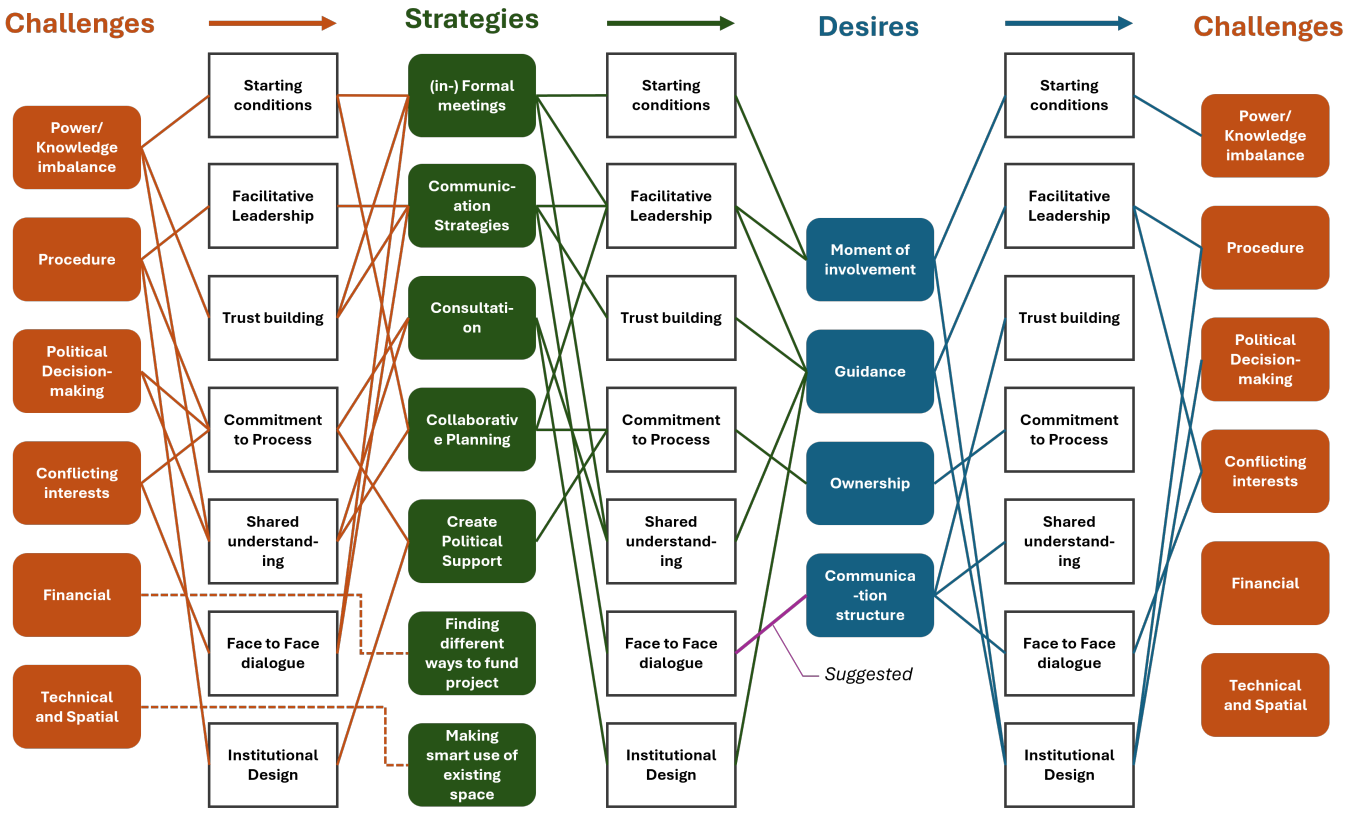


Figure 6.1: A visualisation of the framework connecting Challenges, Strategies and Dimensions through the Collaborative Governance model by Ansell and Gash (2008)

The insights resulting from this analysis can be used to alter the original collaborative governance model in such a way that it provides guidance for collaboration in the location selection process for urban development projects. This framework can be seen in Figure 6.2. Below are the adjustments of the framework elaborated:

- **Starting Conditions**: As stated before, the current starting conditions need to be improved to optimize the current collaboration in the location selection process. The importance of both the establishing of a baseline of trust and the acknowledgement of power-resource-knowledge asymmetries is stressed, especially due to the importance of including the water boards at this moment. It is then recommended to have a formal starting meeting on administrative level, as mentioned before. Having a formal starting meeting is recommended to establish each stakeholders incentive to participation and a shared process ownership.
- **Dialogue**: Rather than just using face-to-face communication, horizontal communication in the form of an all-channel network is added to the diagram, emphasizing transparent and broad communication.
- **Trust Building**: Within the trust building element, the distinction is made between formal and informal moments, which both generate trust. It is emphasized to incorporate both in the collaborative process.
- **Commitment to Process**: Shared process ownership is removed from this element, as it is incorporated in the starting conditions.
- **Intermediate outcomes**: As Ansell and Gash state in their paper, intermediate outcomes may not be suitable for all processes. The location selection process is high likely not suited for this element, as the process leaves little room for "small wins". Each step in the process is rather big. This leads to examining each time whether the element is suited for the process.

- **Facilitative Leadership**: As stated before, the element of facilitative leadership can highly contribute to the effectiveness of collaborative governance. Especially in the case study of the Gnephoek, the importance and potential of facilitative leadership is underscored by interview participants. As its potential is so large, it is suggested to let facilitative leadership not only affect the collaborative process, but the starting conditions as well. Having a leader guide the starting moments of the process, aligning all participants from the beginning on and letting each participant get acquainted to the position of other participants, smooths out the initial challenges, which leads to a more productive collaborative process later on.
- **Institutional Design**: As mentioned by interview participants, a stronger institutional design is highly desired. This design should present guidelines that encompass the whole process, including the starting conditions as they are so important for a fruitful outcome.

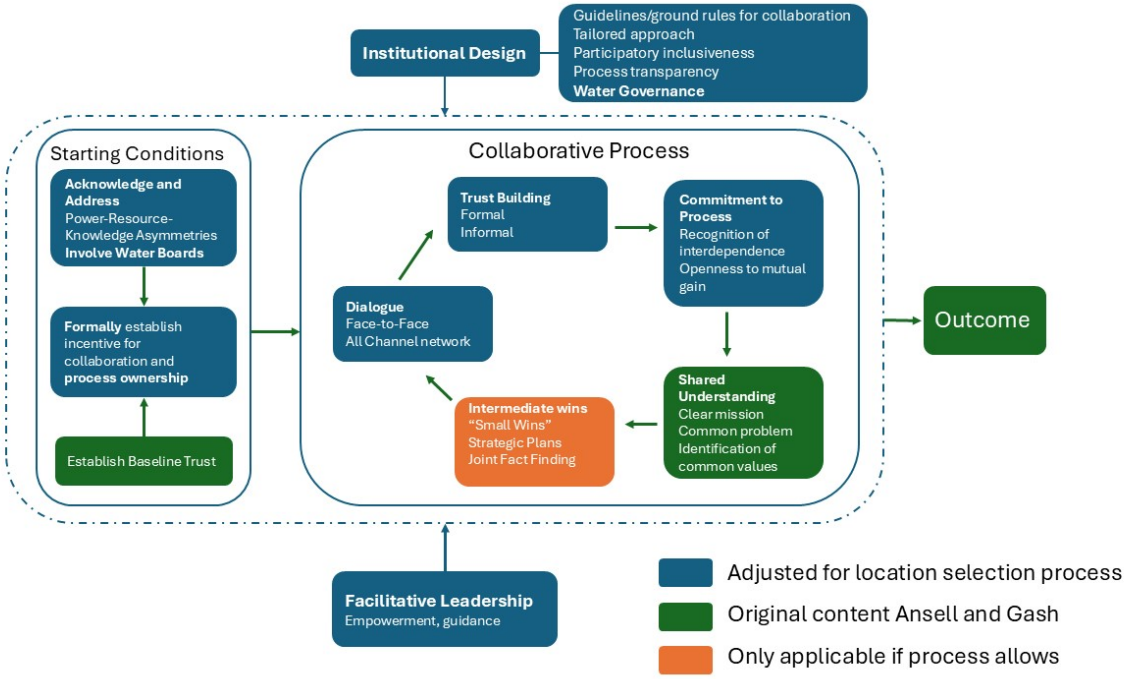


Figure 6.2: Collaborative Governance model by Ansell and Gash (2008) adjusted for location selection process of large scale residential urban development projects

7 | Conclusion

This chapter summarises the output of this study by compiling and writing out the results for each sub-question as presented in chapter 1. The chapter concludes with a summary conclusion to the main question, also found in chapter 1.

7.1 Sub-questions

7.1.1 What are current collaborations and partnerships in water adaptive urban development?

As mentioned before, the first research sub-question is split into two compartments, which together work towards an answer found in the literature. These compartments are:

1. What is the state of the art knowledge on collaborations?
2. Which forms of collaboration are applied in housing projects in water-adaptive environments in the Netherlands?

Per compartment, a summarizing answer is given based on the knowledge found in existing literature.

What is the state of the art knowledge on collaborations?
The state of the art in collaborations within water-adaptive urban development has transitioned from top-down, technical approaches towards more inclusive and adaptive strategies. This shift acknowledges the dynamic and complex nature of urban environments, making stakeholder engagement a crucial element. Participatory planning and interdisciplinary collaboration are now central to modern urban development processes. These collaborative approaches involve continuous dialogue, trust-building, and shared decision making among governmental bodies, private entities, NGOs, and local communities.

A key proven method for collaborative governance is the framework developed by Ansell and Gash (2008). This framework focuses on creating trust, building relationships among stakeholders, and ensuring transparency in decision making processes. It involves institutional design, facilitative leadership, and inclusive participation to address power imbalances and foster long-term commitment to the collaborative process. Over time, this framework has proven to be an effective method for governmental collaboration, and it has been adapted in contexts involving complex policy areas such as water governance and urban planning by authors such as Rojas et al. (2020). Its application has been instrumental in aligning diverse stakeholder interests, thus ensuring more democratic and sustainable outcomes. This evolving framework highlights the effectiveness of the theory on creating adaptive strategies that can manage the complexities of urban environments and meet the growing demand for sustainable solutions.

Which forms of collaboration are applied in housing projects in water-adaptive environments in the Netherlands?
Several key forms of collaboration are applied in housing projects within water-adaptive environments in the Netherlands. Public-Private Partnerships (PPPs) are essential, allowing for the pooling of financial and technical resources between public authorities and private entities. This model supports the efficient implementation of large-scale infrastructure projects, particularly in urban environments where water management is critical. Additionally, multi-stakeholder collaborations, which involve governmental agencies, private companies, community organisations, and sometimes international bodies, foster inclusivity and shared responsibility. These collaborations are vital for developing sustainable solutions in water-sensitive areas.

Another important form of collaboration is cross-sectoral integration, which involves coordinating policies and actions across sectors such as agriculture, energy, urban development, and environmental management. This integration ensures that complex interdependencies of water systems and urban planning are effectively managed. Integrated Water Management (IWM) also plays a crucial role in comprehensive water and urban management strategies, incorporating flood resilience and sustainability into urban planning, relying upon the knowledge of Dutch water boards. These collaborative methods have been successfully implemented in several projects, offering models for the integration of water management into urban development.

What are current collaborations and partnerships in water adaptive urban development?
The current state of collaborations and partnerships in water-adaptive urban development demonstrates a strategic shift towards inclusivity and interdisciplinary. Advancements in collaboration models, such as Collaborative Governance, multi-stakeholder engagement, and cross-sectoral integration, are key to addressing the complexities of urban water management. These forms of collaboration enable efficient resource use, improve decision making, and contribute to the development of resilient urban environments. Together, the evolution of collaborative frameworks and their practical application in Dutch housing projects highlight the potential of partnerships in achieving sustainable urban development in water-sensitive contexts.

7.1.2 How have recent locations for water adaptive projects in urban housing development been selected in the Netherlands?

The location selection process for water-adaptive projects, such as Gnephoek, involves a multi-phase, multi-stakeholder approach. It begins with the national government identifying the housing need, which is communicated to provinces. Provinces estimate housing volumes and work with municipalities to identify possible development sites, prioritising within city limits. Only if space is insufficient, external areas may be considered. Preliminary assessments by municipalities evaluate potential locations on factors like water and soil management, ecological connectivity, and climate adaptation.

Once potential locations are identified, municipalities conduct detailed assessments, often using SWOT or multi-criteria analyses. These analyses consider financial, environmental, and political factors. The province plays a crucial role in approving developments, especially in environmentally sensitive regions like the Groene Hart. Provincial guidelines ensure that any proposed development meets spatial quality standards, integrating with existing landscapes. Municipalities and provinces each work parallel to each other, no direct collaboration is involved in the process.

Water boards, are involved in the process in a consulting an assessing manner. Their expertise in water and soil management is crucial, ensuring that urban developments align with environmental needs, which is why development plans are checked by the water boards on water quality and safety aspects. It is common practice to consult the water boards during the process, but not let them actively participate in the selection process. However, in the Gnephoek case, relative earlier involvement from the water board helped incorporate water-conscious urban planning, reflecting a shift in how these projects are handled. Involving the water boards earlier brings challenges in itself, increasing the complexity of the process.

External mediation can be necessary, as seen in Gnephoek, where conflicts between the municipality and province were resolved through an independent mediator. This mediation resulted in a compromise plan, integrating nature development and water management. A final contour plan is created and approved by all stakeholders, ensuring alignment with provincial policies and project goals.

7.1.3 What is the practice of collaboration in the Netherlands in terms of water adaptive urban development?

This sub-question is, again, split in multiple compartments. Per compartment, an answer is given and finally the answer to the sub-question is presented.

Who are the key stakeholders, what are their interests and how do they practice collaboration?
The key stakeholders in water-adaptive urban development include municipalities, provinces, water boards, regional accords, and developers. Each has distinct roles and interests that play a part in the collaborative process. Municipalities, primarily responsible for addressing housing shortages, focus on identifying suitable locations for residential expansion while balancing urban growth with spatial constraints. They collaborate by engaging in early-stage consultations with provinces, and sometimes water boards, to ensure development plans align with environmental regulations. Provinces, such as South Holland, play a broader role in spatial planning and environmental preservation, enforcing spatial guidelines, reviewing municipal plans, and ensuring developments meet sustainability standards. Their collaboration tends to be directive, maintaining oversight to protect natural landscapes.

Water boards are primarily concerned with water safety and quality, aiming to ensure that urban development does not increase flood risks or undermine water resources. Their involvement at earlier stages of planning has proven effective, allowing them to provide technical expertise and feedback on development locations. Regional accords, like Holland Rijnland, act as a collective voice for smaller municipalities, mediating between local and provincial authorities to balance housing demands with environmental concerns. The national government, meanwhile, sets housing targets and sporadically steps in to mediate conflicts, ensuring developments address both housing needs and environmental goals.

How do key stakeholders want to be involved in the location selection process?
Stakeholders have expressed specific preferences regarding their involvement in the location selection process for water-adaptive urban development. One of their primary desires is earlier involvement of water boards in the planning phase. Water boards aim to ensure that water management considerations are integrated into development plans from the beginning, as late-stage involvement limits their capacity to influence outcomes effectively. While some view water boards as risk-averse, their technical expertise in water management remains crucial. Additionally, stakeholders prefer to delay political involvement until after technical assessments are completed. This approach allows more focused discussions on the practical aspects of site selection, preventing political pressures from interfering with technical decisions.

Moreover, stakeholders have expressed a strong desire for proactive and direct involvement in the entire location selection process. They want to be engaged from the early stages, particularly in forming joint visions and strategies that align their interests and set a collaborative foundation for the project. Stakeholders, especially water boards and regional authorities, seek to be continuously involved in key decision making discussions to ensure their expertise and perspectives are considered throughout the process. They support regular dialogue and consultation with other stakeholders, stating that it ensures a more integrated and transparent approach to location selection. By being actively involved in each phase, stakeholders believe they can contribute more effectively to ensuring that both technical and environmental considerations are balanced with development goals.

What obstacles are stakeholders facing when it comes to location selection of water adaptive urban development and how do they deal with it?
Stakeholders in the location selection process for water-adaptive urban development face several significant obstacles. One major challenge is the power and knowledge imbalances between the

different parties involved. For instance, regional accords often lack formal authority and are only acknowledged when convenient, which makes meaningful collaboration difficult. Water boards, although crucial for their technical expertise in water management, are often involved too late in the process to provide effective input. Another key obstacle is the lack of a standardized procedure for collaboration in the location selection process. Without a clear framework or blueprint, the process becomes inefficient and time-consuming, with delays caused by lengthy procedures, which is compounded by outdated regulations that do not account for the growing complexity of modern urban development.

To address these challenges, stakeholders have adopted various strategies. To each challenge faced, the corresponding strategy used can be found in Table 5.1. One effective approach is to involve water boards earlier in the planning process, allowing them to provide input from the outset. This ensures that water management considerations are integrated into the site selection from the beginning. However, water boards struggle with this new role and how to implement their knowledge in urban development projects. Additionally, stakeholders organize both formal and informal meetings to build trust and improve relationships, facilitating smoother communication and decision making. Facilitative leadership in the form of external mediation is also recognized as highly potential to resolve conflicts, especially when negotiations between municipalities and provinces reach deadlock. Finally, stakeholders work together on joint visions and strategic agreements to align their objectives and streamline the decision making process, ensuring that environmental, technical, and political factors are balanced.

What desires do stakeholders express regarding collaboration in the current process and how can they be implemented to improve collaboration?
Stakeholders express several key desires regarding collaboration in the location selection process. One major desire is standardizing the earlier involvement of water boards, as they play a critical role in water management, and their late inclusion often limits the effectiveness of the planning process. Many stakeholders advocate for involving water boards from the beginning to ensure water management is integrated into the development plans. Another expressed desire is the increased use of facilitative leadership to help guide the process, particularly in mediating between parties and ensuring that the collaborative process stays on track. This includes a call for formal leadership roles to be established earlier in the process, ensuring that collaboration is more structured and guided by a common vision.

To implement these desires, stakeholders propose several strategies. One suggested approach is holding informal and formal meetings at the beginning of the process, where all relevant stakeholders can engage without political interference. This would help create a baseline understanding of each party's interests and roles, leading to more efficient collaboration later on. Additionally, establishing clear communication channels and joint cooperation agreements, in which shared ownership is recognized, are seen as essential for improving collaboration. These strategies would create transparency, improve trust, and provide a clearer framework for the process, ensuring that all parties remain engaged and aligned throughout the location selection.

What is the practice of collaboration in the Netherlands in terms of water adaptive urban development?
Summarizing the answers to each compartment of this question, provide the answer to this sub-question. In the Netherlands, the practice of collaboration in water-adaptive urban development involves multiple key stakeholders, including municipalities, provinces, water boards, regional accords, and developers. Each stakeholder has distinct roles, such as municipalities focusing on identifying locations for housing expansion and provinces enforcing spatial and environmental regulations. Water boards play a critical role in ensuring water safety and quality, though their involvement often comes too late in the process. Regional accords represent smaller municipalities and act as a collective mediator in discussions with higher authorities. Collaboration practices

include early-stage consultations between municipalities, provinces, and sometimes water boards, to ensure that development plans align with environmental policies and sustainability standards. Water boards' earlier involvement has been particularly effective in ensuring that technical expertise shapes decisions from the start.

Despite these efforts, stakeholders express a strong desire for more guidance. Clear guidance from the national government that provides regional frameworks for a tailored approach is necessary to align all participants and their interests. Additionally, stakeholders express desires for a shift in involvement, calling for standardized earlier involvement of water boards in processes regarding water sensitive areas. Finally, the participants note that a shift in ownership, from sole ownership with the municipality to shared ownership between stakeholders, will be helpful to align interests and guarantee a strong participation.

7.1.4 How can the insights gained from the research contribute to a framework that can guide collaboration in the location selection process?

In order to implement all gathered information and insights into a framework, multiple key elements are identified. These key elements are discussed through the Collaborative Governance model by Ansell and Gash. First, recognising starting conditions such as power and knowledge imbalances is essential. This can be addressed by engaging all relevant stakeholders early in the process to establish mutual understanding and signing a letter of intent to clarify roles and goals. It can be seen in the framework in Figure 6.1 that this is not yet addressed frequently in the current process. Face-to-face dialogue is another critical component, promoting horizontal communication and transparency. Communication is linked throughout the entire loop in Figure 6.1, emphasizing its importance and impact on the process. Implementing an all-channel communication network helps prevent the shift towards hierarchical communication, which often occurs when tensions rise.

Building trust from the outset is crucial. It is re-occurring as a method to deal with strategies and further improve the process as desired as seen in Figure 6.1. This requires both formal and informal interactions, creating a collaborative environment. Commitment to the process is another key factor, involving shared ownership by all stakeholders, mutual recognition of interdependence, and openness to mutual gains. Clear institutional design is needed to establish ground rules and facilitate dialogue, while facilitative leadership can bring together diverse parties, ensuring a focus on shared goals and common vision. Appointing a facilitative leader early to act throughout the entire process can ensure smooth communication and address challenges effectively, contributing to a successful collaboration.

7.2 Main Research Question

This research resolved around the main research question *How to design an effective collaboration between key stakeholders in the location selection process of water adaptive urban development projects?*. By answering all the above mentioned sub-questions, the answer to the main research question can be formulated.

To effectively collaborate with key stakeholders during the location selection process of water-adaptive residential development, it is essential to employ several strategies. First, early involvement of all stakeholders, particularly water boards, is crucial. Water boards provide critical expertise on water management, and involving them from the outset ensures their input shapes development plans, preventing issues later in the process. It is essential, however, that water boards are able to communicate their demands on water safety and quality clearly and can suggest ways to incorporate these demands in possible designs. Moreover, thorough evaluation of the process in the starting moment is essential for future success. The acknowledgment of participants role in

the process and accompanying responsibilities helps create a shared understanding which generates trust. Additionally, establishing shared ownership in the starting moment of the process improves stakeholder alignment. The potential of facilitative leadership at this stage of the process is highlighted. The need for facilitative leadership from the start of the process is very clear and is seen throughout the created framework in Figure 6.1.

Secondly, establishing trust and transparent communication is essential for collaboration. Regular face-to-face meetings, both formal and informal, facilitate open dialogue and build trust among stakeholders. This communication should remain horizontal to encourage inclusivity and prevent hierarchical structures from disrupting the process and making participants feel unheard. Communication is not mentioned by the participants as possible improvement, indicating that it is either perfect right now or participants are not aware of its importance. However, when looking at the framework in Figure 6.1, it becomes clear that communication is an essential element throughout the process, underscoring its influence and the need to optimize it.

Thirdly, clear frameworks or guidelines established by the national government are desired by all stakeholders, which underscores the need for a strong institutional design. The institutional design should focus on how to collaborate and who to involve at what moment, and function as support for a regional approach in which customization is possible. Maintaining this possibility for customization is crucial to make sure smaller communities or areas are not marginalized.

Finally, the whole process, from the establishing of starting conditions to the final approval of the location, should be guided by a facilitative, supportive leader who does not make decisions him/herself but assists the stakeholders in reaching a consensus. From the data it becomes clear that a facilitative leader has enormous potential to improve the collaborative process, both in decision making as throughout the whole process. Adding this leadership to the process meets the desires expressed by interview participants and, as the literature underscores, improves the collaborative process.

8 | Recommendations and Limitations

This chapter focuses on the recommendations and limitations of the research. First, practical recommendations are presented regarding the collaboration in the location selection process. Secondly, theoretical contributions are presented. Thirdly, recommendations for future research are suggested. Finally, a reflection on the research is presented, stating the limitations of the research.

8.1 Practical Recommendations

In this section, practical suggestions for the collaboration in a location selection process for future residential urban development projects are presented.

First of all, it is recommended to actually involve water boards from the earliest moments of the location selection process. Once a decision has been made within a municipality regarding the construction volume of new houses, the water boards must be informed and involved in the multi-criteria analysis done to identify potential locations. A transparent form of communication in this step is considered essential.

Secondly, it is recommended that the the Ministry of Housing and Spatial Planning, together with experts from the Ministry of Infrastructure and Water management, constructs a *set of guidelines* for a more structured approach in a location selection process. Looking at the data, it is clear that a dire need for such a set of guidelines is amongst stakeholders. The exact implementation and form of these guidelines is outside the scope of this research. However, it is stressed that it incorporates a tailored approach to minimise the chances of marginalisation of smaller areas and communities.

Thirdly, it is recommended that at the beginning of the process, the province, municipality, and water boards come together at an administrative level to hold an initial session where the technical and financial possibilities of realising a project are reviewed in a straightforward manner. By excluding all administrative and political factors at this stage of the process, not only is a clearer picture of the possibilities obtained—without interference from politicians seeking quick wins for their popularity in the electorate—but also a stronger foundation is laid for fruitful collaboration later in the process.

Fourthly, it is strongly recommended that the water boards invest more in planning knowledge, either by further training their own staff or by hiring urban planners. The lack of this expertise is an obstacle in effectively communicating their requirements to municipalities, provinces, and developers. By investing in this knowledge, the water boards' demands regarding residential developments in areas with significant water management challenges will be communicated more clearly to the parties responsible for incorporating these requirements into their plans and designs.

Finally, it was found that participants in the location selection process were not always working as a team but rather focusing on their own interests, working parallel next to each other with one single process owner: the municipality. It is recommended for province, water board and municipality to have co-ownership of the process to evenly incorporate all interests and make sure all three stakeholder groups feel the same need to work towards a collective output.

8.2 Theoretical Contributions

In this section, the main theoretical contributions of this research are listed.

Mapping the current location selection process for water-adaptive urban development in the Netherlands
The research maps the existing location selection process for water-adaptive urban development in the Netherlands for the first time, revealing the complexities of stakeholder interactions. By detailing the roles of key stakeholders, such as municipalities, water boards, and developers, it highlights the fragmented nature of current practices. The analysis uncovers a predominantly consultative approach, where stakeholders are informed but not fully engaged in decision making. This mapping provides an understanding of the procedural and collaborative gaps, serving as a foundation for proposing an improved framework that facilitates cooperative engagement, rather than mere consultation, in urban planning.

Designing a framework for collaboration in the current location selection process
The research contributes to theory by designing a collaborative framework tailored for water-adaptive urban development projects, adapting the Collaborative Governance model by Ansell and Gash (2008) to the unique challenges of location selection in the Netherlands. The revised framework addresses the shortcomings of the existing consultative process by promoting cooperative relationships and shared process ownership among stakeholders. By restructuring the governance model to incorporate early and continuous stakeholder engagement, the framework aims to distribute responsibility equitably, thus enhancing participation and ensuring that diverse perspectives are integrated throughout the planning process.

Incorporating a tailored approach that does not marginalise smaller groups and communities
The proposed framework also addresses the need for inclusiveness by recommending a tailored approach to stakeholder engagement, ensuring that smaller groups and communities are not sidelined in decision making. A challenge that was addressed by Caprotti et al. (2017). It advocates for flexible approaches that acknowledge varying capacities and resources among stakeholders, allowing each group to participate meaningfully. This contribution extends existing theories on participatory planning by explicitly integrating measures to prevent marginalisation, thereby creating more representative processes in urban development projects.

Underscoring the potential of facilitative leadership in collaboration
The research underscores the significance of facilitative leadership in enhancing collaboration within water-adaptive urban development. Given the technical nature of designing and constructing water-adaptive areas, the integration of soft skills, such as conflict resolution, trust-building, and negotiation, becomes crucial. The study illustrates how facilitative leadership can bridge the gap between technical expertise and collaborative practices, enabling stakeholders to navigate the "hard" environment of urban planning with a focus on shared goals. This theoretical contribution highlights the need for leadership that not only directs technical processes but also empowers participants to engage constructively, thereby improving the effectiveness of collaborative governance models.

8.3 Recommendations for Future Research

In this section, recommendations for future research are presented.

Research by design
The actual implementation of the framework is not tested unfortunately. However, by following up this research, this can be done. It is suggested to do a follow up research in the form of research by design. Research by design is a methodological approach that integrates practical design with theoretical research frameworks to generate new knowledge and innovative solutions (Roggema, 2016). This method allows ideas and frameworks to be tested through application and iteration, fostering a continuous dynamic between creative practice and reflective inquiry, thereby producing

new insights through the design process itself.
Typically employed in fields such as architecture and urban planning, research by design is particularly effective in addressing complex, context-specific challenges, often referred to as "wicked problems." These problems are characterised by their complexity, uncertainty, and the involvement of conflicting values, necessitating nuanced and adaptable solutions. As Pietrzyk (2022) notes, research by design allows researchers to create speculative and future-oriented solutions that can adapt to changing contexts and stakeholder needs, thereby reducing epistemic uncertainty and enhancing the methodological robustness of architectural studies.

The process generally begins with the designer-researcher identifying a problem or area of inquiry rooted in practical challenges. An iterative cycle of designing, testing, and refining solutions follows, employing various techniques and analytical methods. Throughout this process, reflection and documentation play a critical role in capturing the evolving insights and theoretical contributions generated by the design activities. This iterative cycle not only advances the design itself but also contributes to the broader body of knowledge within the field. Finally, the concept design is validated by experts and key stakeholders involved in the original project, ensuring the practicality and relevance of the solutions developed.

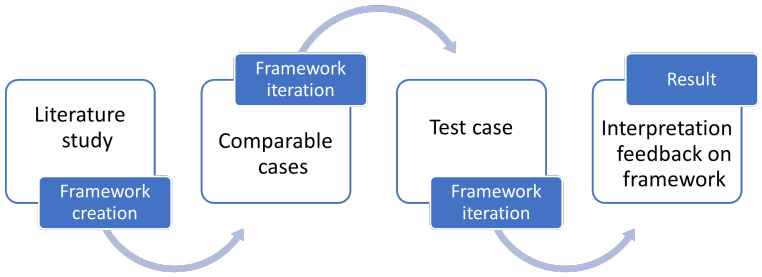


Figure 8.1: Own interpretation of implementation of Research by Design

Multiple Case Studies
For future research, it is recommended to address more case studies in different provinces in the Netherlands. Focusing on multiple cases can gain a broader understanding of how spatial planning and water management collaboration varies regionally. Spatial policies differ significantly between provinces, with each setting their own priorities and regulations that shape the location selection process for residential developments. Additionally, the pre-existing relationships between municipalities, provinces, and water boards can vary, with some regions having experienced long-standing cooperation, while others may have faced friction or miscommunication in the past. By exploring multiple cases, researchers could identify how these initial conditions influence collaboration dynamics, decision making, and the effectiveness of water-adaptive planning.

Furthermore, not all municipalities in the Netherlands operate within a regional governance collaboration like in South Holland. The presence of a regional accord can streamline decision making processes and generate trust across municipalities. However, in regions without such a governance structure, it would be interesting to explore how the absence of a coordinating body is addressed. Future research could examine who takes up the role of coordinator and mediator in these cases—whether it is the provincial government, one of the municipalities, or another stakeholder—and how this affects the location selection process for projects involving water management challenges. Understanding how this gap is filled could provide insights into the adaptability of governance structures and inform future policy making across the country.

Trust Building
Right now, the element of trust building in the generated framework focuses on trust between stakeholder groups. It does not take into account the trust building necessary within these

stakeholder groups. It is essential to have the trust of your organization if you are taking part in the location selection process, but it is outside of the scope of this research to take this internal trust into account as well. In the future, this could be researched.

Appointing the Facilitative Leader
From this research it becomes clear that there is a need for guidance in the collaborative process, but who should be appointed to be that facilitative leader? The regional accord can play a big role in facilitating leadership, as it has the experience of navigating between municipalities and province in a neutral role, while also dealing with the water boards and developers in the realisation of inter-municipal projects. However, as the regional accord is not incorporated in the House of Thorbecke, it has no juridical powers whatsoever. Another possibility is to ask management consultants to pick up the glove of facilitative leader, as they are a neutral party with expertise on the subject. However, they need to be asked to do this, which raises the follow-up question: who invites consultants to joint the project and how should this be done to avoid bias towards this stakeholder? A possibility to deal with this is to integrate the appointment into the institutional design or put the responsibility for appointing this in the hands of the ministry, as it proved effective in the Gnephoek case. the precise details of institutional design are outside of the expertise of the researcher and therefore per definition out of the scope of this research, but it is recommended that future research be devoted to this issue.
Balancing Efficiency and Collaboration in Complex Stakeholder Processes This research shows that urban development projects in the Netherlands are increasingly getting more complex and require a strongly designed collaborative process to improve current practices. However, does a complex collaborative approach always contribute to a better process? It can be argued that an autocratic, hierarchical approach achieves much quicker results that often suit the demands and interests of the majority, obtaining fast results. However, the downside of such an approach is that the results often have a negative effect long term as a strictly hierarchical method risks undermining stakeholder trust, involvement, and the diverse input that typically enhances project outcomes. To optimize the perks of both worlds, further research is recommended to explore methods that balance effective collaboration with process simplification to save time. This balance could streamline decision-making without compromising the inclusivity that the results of this research ensures.

8.4 Research Limitations

Each research has its limitations, which must be acknowledged. In this section, the limitations of this thesis are discussed.

One significant limitation of this research is the focus on a single case study in the province of South Holland. This region is particularly influenced by local human behaviour, environmental factors, and governance structures, which may not be representative of other regions. The implementation of different collaborative practices, the level of political support, and local physical conditions can vary widely in other contexts. Consequently, the findings from this study may not be fully generalisable to other provinces or regions. While this case provides valuable insights, future research could benefit from a comparative analysis involving multiple cases to enhance generalisability.

Another limitation stems from the coding process of the interview data. While every effort was made to apply objective coding principles, some degree of subjectivity inevitably remains, as the creation of codes and labels is influenced by the researcher's interpretation. Although steps were taken to minimise bias, a collaborative coding process involving multiple researchers could have further reduced subjective influence. Involving different perspectives in the coding process would have provided a more balanced and potentially more accurate representation of the data.

Finally, another notable limitation of this research is the limited range of stakeholder perspectives,

particularly due to the absence of input from the developers, BPD. Despite multiple invitations for interviews, BPD did not respond, which prevented the inclusion of their viewpoint in the analysis. Their perspective could have provided valuable insights into the collaboration process from a developer's standpoint, potentially highlighting challenges or strategies not captured by other stakeholders. Consequently, the findings may lack a comprehensive understanding of the dynamics involved in development projects, particularly from the developer's side.

Bibliography

Adem Esmail, B., & Suleiman, L. (2020). Analyzing Evidence of Sustainable Urban Water Management Systems: A Review through the Lenses of Sociotechnical Transitions. *Sustainability*, *12*(11), 4481. https://doi.org/10.3390/su12114481

Albrechts, L. (2010). More of the same is not enough! How could strategic spatial planning be instrumental in dealing with the challenges ahead? *Environment and Planning B: Planning and Design*, *37*(6), 1115–1127. https://doi.org/10.1068/b36068

Allmendinger, P., & Tewdwr-Jones, M. (2005). *Planning Futures: New Directions for Planning Theory* (tech. rep.).

Andeweg, R. B., & Irwin, G. A. (2005). *Governance and Politics of the Netherlands*. Macmillan Education UK. https://doi.org/10.1007/978-1-137-43942-0

Ansell, C., & Gash, A. (2008). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research and Theory*, *18*(4), 543–571. https://doi.org/10.1093/jopart/mum032

Anthony, B. (2023). The Role of Community Engagement in Urban Innovation Towards the Co-Creation of Smart Sustainable Cities. *Journal of the Knowledge Economy*. https://doi.org/10.1007/s13132-023-01176-1

Arentshorst, M. E., Kloet, R. R., & Peine, A. (2019). Intergenerational Housing: The Case of Humanitas Netherlands. *Journal of Housing For the Elderly*, *33*(3), 244–256. https://doi.org/10.1080/02763893.2018.1561592

Babe, A. (2022, February). One country's endless war against water. https://www.bbc.com/travel/article/20160126-the-dutch-war-against-water

Barker Scott, B. A., & Manning, M. R. (2024). Designing the Collaborative Organization: A Framework for how Collaborative Work, Relationships, and Behaviors Generate Collaborative Capacity. *The Journal of Applied Behavioral Science*, *60*(1), 149–193. https://doi.org/10.1177/00218863221106245

Berry, P. M., Brown, S., Chen, M., Kontogianni, A., Rowlands, O., Simpson, G., & Skourtos, M. (2015). Cross-sectoral interactions of adaptation and mitigation measures. *Climatic Change*, *128*(3-4), 381–393. https://doi.org/10.1007/s10584-014-1214-0

Bouwer, H. (2000). Integrated water management: emerging issues and challenges. *Agricultural Water Management*, *45*(3), 217–228. https://doi.org/10.1016/S0378-3774(00)00092-5

Brenner, N., & Schmid, C. (2015). Towards a new epistemology of the urban? *City*, *19*(2-3), 151–182. https://doi.org/10.1080/13604813.2015.1014712

Bressers, H., & Lulofs, K. (2010). Governance and Complexity in Water Management – Creating Cooperation through Boundary-Spanning Strategies. *Management of Environmental Quality: An International Journal*, *21*(6), 868–868. https://doi.org/10.1108/meq.2010.21.6.868.2

Brink. (2023, March). Klimaatadaptieve ontwikkeling Gnephoek Alphen aan den Rijn. https://www.brink.nl/projecten/klimaatadaptieve-ontwikkeling-gnephoek-alphen-aan-den-rijn/

Bruns-Berentelg, J., Noring, L., & Grydehøj, A. (2022). Developing urban growth and urban quality: Entrepreneurial governance and urban redevelopment projects in Copenhagen and Hamburg. *Urban Studies*, *59*(1), 161–177. https://doi.org/10.1177/0042098020951438

Caprotti, F., Cowley, R., Datta, A., Broto, V. C., Gao, E., Georgeson, L., Herrick, C., Odendaal, N., & Joss, S. (2017). The New Urban Agenda: key opportunities and challenges for policy and practice. *Urban Research & Practice*, *10*(3), 367–378. https://doi.org/10.1080/17535069.2016.1275618

Castillo-Montoya, M. (2016). Preparing for interview research: The interview protocol refinement framework. *Qualitative Report*, *21*(5), 811–831. https://doi.org/10.46743/2160-3715/2016.2337

Chan, P. W. C. (2020). *The logic of the research article A critical guide on reading science more effectively* (tech. rep.). https://www.4tu.nl/cee/en/.

Chinyio, E., & Olomolaiye, P. (2010, January). *Construction Stakeholder Management*. Wiley-Blackwell. https://doi.org/10.1002/9781444315349

Coombs, H. (2022). Case Studies Defined. *Utah Journal of Communication*.

De Vos, E., & Spoormans, L. (2022). Collective Housing in Belgium and the Netherlands: A Comparative Analysis. *Urban Planning*, *7*(1), 336–348. https://doi.org/10.17645/up.v7i1.4750

Ferreira, V., Barreira, A. P., Loures, L., Antunes, D., & Panagopoulos, T. (2020, January). Stakeholders' engagement on nature-based solutions: A systematic literature review. https://doi.org/10.3390/su12020640

Galvez, V., & Rojas, R. (2019). Collaboration and integrated water resources management: A literature review. *World Water Policy*, *5*(2), 179–191. https://doi.org/10.1002/wwp2.12013

Garcia-Fuentes, L. (2018, May). Rising sea levels in the Netherlands: the Dutch battle against flooding. https://dutchreview.com/culture/society/rising-sea-levels-in-the-netherlands/

Gaya, H. J., & Smith, E. E. (2016). Developing a Qualitative Single Case Study in the Strategic Management Realm: An Appropriate Research Design? *IJBMER*, (7(2)), 529–538. www.ijbmer.com

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology. *Organizational Research Methods*, *16*(1), 15–31. https://doi.org/10.1177/1094428112452151

Gouwe IJssel Nieuws. (2023, July). Akkoord gemeenten en provincie over mobiliteit Vijfde Dorp Zuidplas. https://gouweijsselnieuws.nl/2023/07/05/akkoord-gemeenten-en-provincie-over-deelmobiliteit-vijfde-dorp-zuidplas/

Grimm, N. B., Faeth, S. H., Golubiewski, N. E., Redman, C. L., Wu, J., Bai, X., & Briggs, J. M. (2008). Global Change and the Ecology of Cities. *Science*, *319*(5864), 756–760. https://doi.org/10.1126/science.1150195

Gustafsson, J. (2017, January). *Single case studies vs. multiple case studies: A comparative study* (tech. rep.). Halmstad University.

Hadrian Petrescu, S., Lazar, A., Cioban, C., & Doroftei, I. (2017). *Chapter 2. Semi-structured Interview* (tech. rep.). https://doi.org/doi.org/10.23740/QUAL{_}METHODS2017

Hager, T. (2023, February). Urban development – a sustainable future. https://toposmagazine.com/sustainable-urban-development/

Haghani, M., Sabri, S., De Gruyter, C., Ardeshiri, A., Shahhoseini, Z., Sanchez, T. W., & Acuto, M. (2023). The landscape and evolution of urban planning science. *Cities*, *136*, 104261. https://doi.org/10.1016/j.cities.2023.104261

Hands, C. M. (2023). *Pathways to Community Engagement in Education* (tech. rep.).

Hasan, M. N., Koksal, C., Montel, L., Le Gouais, A., Barnfield, A., Bates, G., & Kwon, H. R. (2023). Developing shared understanding through online interdisciplinary collaboration: Reflections from a research project on better integration of health outcomes in future urban development practice. *Futures*, *150*. https://doi.org/10.1016/j.futures.2023.103176

Hayes, B., Kamrowska-Zaluska, D., Petrovski, A., & Jiménez-Pulido, C. (2021, May). State of the art in open platforms for collaborative urban design and sharing of resources in districts and cities. https://doi.org/10.3390/su13094875

Healey, P. (1997). *Collaborative Planning*. Macmillan Education UK. https://doi.org/10.1007/978-1-137-08600-6

Hillen, M. (2015). *Towards Water Adaptive Cities* (tech. rep.). Royal HaskoningDHV. https://www.researchgate.net/publication/303895134

Ingvarsson, C., Hallin, A., & Kier, C. (2023). Project stakeholder engagement through gamification: what do we know and where do we go from here? https://doi.org/10.1108/IJMPB-07-2022-0170

Kapp, K. M. (2012). The Gamification of Learning and Instruction/Karl M. Kapp. *San Francisco, CA: Pfeiffer*, *4*(1), 88–100. https://www.researchgate.net/publication/273947281_The_gamification_of_learning_and_instruction_Game-based_methods_and_strategies_for_training_and_education_San_Francisco_CA_Pfeiffer

Kee, T. (2019). FROM INNOVATION TO SUSTAINABLE URBAN DEVELOPMENT. https://doi.org/10.20472/iac.2019.045.020

Koop, S. H., Grison, C., Eisenreich, S. J., Hofman, J., & van Leeuwen, K. J. (2022). Integrated water resources management in cities in the world: Global solutions. *Sustainable Cities and Society*, *86*. https://doi.org/10.1016/j.scs.2022.104137

Kujala, J., Sachs, S., Leinonen, H., Heikkinen, A., & Laude, D. (2022). Stakeholder Engagement: Past, Present, and Future. *Business & Society*, *61*(5), 1136–1196. https://doi.org/10.1177/00076503211066595

London Image Institute. (2021, February). How Much of Communication is Nonverbal? https://londonimageinstitute.com/how-much-of-communication-is-nonverbal/

Magaldi, D., & Berler, M. (2020). *Encyclopedia of personality and individual differences* (tech. rep.).

Mariotto, F. L., Zanni, P. P., & de Moraes, G. H. S. M. (2014). What is the use of a single-case study in management research? *RAE Revista de Administracao de Empresas*, *54*(4), 358–369. https://doi.org/10.1590/S0034-759020140402

Mazutis, D., & Sweet, L. (2022). The business of accelerating sustainable urban development: A systematic review and synthesis. *Journal of Cleaner Production*, *357*, 131871. https://doi.org/10.1016/j.jclepro.2022.131871

Meeus, T.-J. (2024, September). Hoe nationalistische politiek de woningnood in stand houdt. https://www.nrc.nl/nieuws/2024/09/28/hoe-nationalistische-politiek-de-woningnood-in-stand-houdt-a4867420

Ministerie BZK. (2024, March). Wetsvoorstel Versterking regie volkshuisvesting naar Tweede Kamer. https://www.rijksoverheid.nl/actueel/nieuws/2024/03/07/wetsvoorstel-versterking-regie-volkshuisvesting-naar-tweede-kamer

Ministerie van Binnenlandse Zaken, Ministerie van Infrastructuur & Waterstaat, Ministerie van Economische Zaken & APPM. (2024, May). *Quickscan locaties en gebieden met kansen voor grootschalige woningbouw* (tech. rep.). https://open.overheid.nl/documenten/4a6af7c9-d195-4b19-b5fa-7affd6179fa0/file

Ministerie van Infrastructuur en Waterstaat. (2019, September). Water management in The Netherlands. https://www.government.nl/topics/water-management/water-management-in-the-netherlands

Ministerie van Infrastructuur en Waterstaat. (2024, April). Landelijke kaart minister Harbers toont impact water en bodem op nieuwbouwplannen. https://unievanwaterschappen.nl/landelijke-kaart-minister-harbers-toont-impact-water-en-bodem-op-nieuwbouwplannen/

Nezami, M. R., de Bruijne, M. L. C., Hertogh, M. J. C. M., & Bakker, H. L. M. (2022). Collaboration and Data Sharing in Inter-Organizational Infrastructure Construction Projects. *Sustainability*, *14*(24), 16835. https://doi.org/10.3390/su142416835

Nijenhuis, C. (2024, January). Is het hoogmoedig te wonen waar het water ook wil zijn? https://www.nrc.nl/nieuws/2024/01/05/is-het-hoogmoedig-te-wonen-waar-het-water-ook-wil-zijn-a4186084schil

Nong, B. A. (2022). *Participatory Adaptive Integrated Urban Water Management – the Tensions* (tech. rep.).

Osei-Kyei, R., & Chan, A. P. (2015). Review of studies on the critical success factors for public-private partnership (PPP) projects from 1990 to 2013. *International Journal of Project Management*, *33*(6), 1335–1346. https://doi.org/10.1016/j.ijproman.2015.02.008

Özerol, G., Dolman, N., Bormann, H., Bressers, H., Lulofs, K., & Böge, M. (2020). Urban water management and climate change adaptation: A self-assessment study by seven midsize cities in the North Sea Region. *Sustainable Cities and Society*, *55*, 102066. https://doi.org/10.1016/j.scs.2020.102066

Patel, H., Pettitt, M., & Wilson, J. R. (2012). Factors of collaborative working: A framework for a collaboration model. *Applied Ergonomics*, *43*(1), 1–26. https://doi.org/10.1016/j.apergo.2011.04.009

Pietrzyk, K. (2022). Wicked Problems in Architectural Research: The Role of Research by Design. *ARENA Journal of Architectural Research*, *7*(1). https://doi.org/10.5334/ajar.296

Priya, A. (2021). Case Study Methodology of Qualitative Research: Key Attributes and Navigating the Conundrums in Its Application. *Sociological Bulletin*, *70*(1), 94–110. https://doi.org/10.1177/0038022920970318

Provincie Zuid-holland. (2021). Omgevingsverordening Provincie Zuid-Holland. https://ruimtelijkeplannen.zuid-holland.nl/ZHOV-geconsolideerd/

Puchol-Salort, P., O'Keeffe, J., van Reeuwijk, M., & Mijic, A. (2021). An urban planning sustainability framework: Systems approach to blue green urban design. *Sustainable Cities and Society*, *66*, 102677. https://doi.org/10.1016/j.scs.2020.102677

Purbani, K. (2017). Collaborative planning for city development. A perspective from a city planner. https://doi.org/10.22630/PNIKS.2017.26.1.12

Rauws, W., & De Roo, G. (2016). Adaptive planning: Generating conditions for urban adaptability. Lessons from Dutch organic development strategies. *Environment and Planning B: Planning and Design*, *43*(6), 1052–1074. https://doi.org/10.1177/0265813516658886

Reinhard, S., & Folmer, H. (2009). *Water policy in the Netherlands : integrated management in a densely populated delta*. Resources for the Future.

Rittel, H. W. J., & Webber, M. M. (1973). *Dilemmas in a General Theory of Planning** (tech. rep.).

Roggema, R. (2016). Research by Design: Proposition for a Methodological Approach. *Urban Science*, *1*(1), 2. https://doi.org/10.3390/urbansci1010002

Rojas, R., Bennison, G., Gálvez, V., Claro, E., & Castelblanco, G. (2020). Advancing Collaborative Water Governance: Unravelling Stakeholders' Relationships and Influences in Contentious River Basins. *Water*, *12*(12), 3316. https://doi.org/10.3390/w12123316

Sargeant, J. (2012). Qualitative Research Part II: Participants, Analysis, and Quality Assurance. *Journal of Graduate Medical Education*, *4*(1), 1–3. https://doi.org/10.4300/jgme-d-11-00307.1

Schilthuizen, P. (2024, March). Hoogheemraadschap en Zuidplas botsen over Vijfde Dorp, zorgen over aanpak waterhuishouding. https://www.ad.nl/zuidplas/hoogheemraadschap-en-zuidplas-botsen-over-vijfde-dorp-zorgen-over-aanpak-waterhuishouding~a7d934e5/

Sengupta, S., Kovalevsky, D. V., Bouwer, L. M., & Scheffran, J. (2023). Urban Planning of Coastal Adaptation under Sea-Level Rise: An Agent-Based Model in the VIABLE Framework. *Urban Science*, *7*(3), 79. https://doi.org/10.3390/urbansci7030079

Slager, K. (2021, September). Impact of high water in Limburg summer 2021. https://www.deltares.nl/en/news/high-water-in-limburg-in-the-summer-of-2021-had-more-impact-than-river-floods-in-1993-and-1995

Stadszaken. (2024, July). Overheden slaan handen ineen voor ontwikkeling Gnephoek. https://stadszaken.nl/artikel/6405/overheden-slaan-handen-ineen-voor-ontwikkeling-gnephoek

Totaro, A. I. (2022). Circular Water in the Netherlands: An Example Of Resilience, Innovation and Cooperation. *Renewable Matter*.

Wang, Y., Dong, W., & Boelens, L. (2018). The interaction of city and water in the Yangtze River Delta, a natural/artificial comparison with Euro Delta. *Sustainability (Switzerland)*, *10*(1). https://doi.org/10.3390/su10010109

Waterschap Drents Overijsselse Delta. (2020, September). Watertoets. https://www.wdodelta.nl/watertoets

Weesies, R. (2021, May). Komst Vijfde Dorp betekent ook impuls voor polderlandschap. https://architectenweb.nl/nieuws/artikel.aspx?id=49340

Wei, F., Zhang, X., Xu, J., Bing, J., & Pan, G. (2020). Simulation of water resource allocation for sustainable urban development: An integrated optimization approach. *Journal of Cleaner Production*, *273*. https://doi.org/10.1016/j.jclepro.2020.122537

Wessels, J. (2021, July). Waterbeleid op bestuurskundig niveau. https://ziedaar.nl/editie-23/waterbeleid-op-bestuurskundig-niveau/

Woltjer, J. (2014). Jurnal Perencanaan Wilayah dan Kota. *Jurnal Perencanaan Wilayah dan Kota*, *25*(1), 1–16. https://doi.org/10.5614/jpwk.2014.25.1.1

Wong, T. H., & Brown, R. R. (2009). The water sensitive city: Principles for practice. https://doi.org/10.2166/wst.2009.436

Xu, H., Liu, L., & Ding, P. (2021). Building Climate Resilient City through Multiple Scale Cooperative Planning: Experiences from Copenhagen. *IOP Conference Series: Materials Science and Engineering*, *1203*(3), 032063. https://doi.org/10.1088/1757-899X/1203/3/032063

Xue, Y., Temeljotov-Salaj, A., Engebø, A., & Lohne, J. (2020). Multi-sector partnerships in the urban development context: A scoping review. *Journal of Cleaner Production*, *268*, 122291. https://doi.org/10.1016/j.jclepro.2020.122291

A | Interview Protocols

In this section, the various interview protocols tailored to match the role of the interview participants are presented.

A.1 Interview Protocol Deputy Province

General
1. Can you give a brief introduction of yourself and your role within the province of South Holland?
2. What do you know about and how do you define water-adaptive residential area development? What do you think about it?
3. How do you see the role of the province of South Holland in water-adaptive area development for housing?
4. What do you think are the main challenges in developing water-adaptive residential areas in the province?
Collaborations and Partnerships
5. What partnerships currently exist between the province and other stakeholders in the site selection process for water-adaptive area development?
6. What forms of cooperation have proved successful in similar projects within South Holland or other provinces?
7. How will cooperation with municipalities, water boards and property developers shape projects like Gnephoek?
Realisation of projects
8. Can you cite some recent examples of water-adaptive housing projects in South Holland? What were the success factors?
9. How is the site selection for water-adaptive development influenced by provincial policies and which criteria are decisive?
10. What do you think are important lessons that can be learned from previous area development projects in the province?
Local Collaborations and Stakeholders
11. How do you think the interests of different stakeholders, such as farmers, residents and developers, should be balanced during the planning and development of such projects?
12. What do you expect from the role of water managers in water-adaptive projects?
Engagement and Obstacles
13. How and when will different stakeholders be involved in the design and site selection process?
14. What obstacles does the province face in involving stakeholders in the process of water-adaptive area development?
Opportunities and vision for the future
15. What opportunities do you see for innovation and new forms of collaboration within water-adaptive housing development?
16. How can the province of South Holland help exploit these opportunities for more effective cooperation?
17. What policy changes or initiatives is the province considering to encourage water-adaptive housing development?

A.2 Interview Protocol Water Boards

General Process and Parties Involved
1. Can you describe the typical role of the water board in selecting a site for new construction projects outside bsd?
2. Who are the key stakeholders in this process and how do you work with them?
3. How and when is the water board involved in the site selection process?
Is this always at an early stage, or only later?
4. What strategies are used to balance the interests of different stakeholders, such as municipalities, developers and residents, and what is the water board doing to put your own interests forward?
Challenges and Bottlenecks
6. What are the most common challenges or bottlenecks you encounter during the site selection process?
Can you give specific examples?
7. Can you give examples of conflicts that arose during previous projects and how they were resolved?
Regulation
8. What steps is the water board taking to ensure that selected sites comply with water management plans and other regulatory requirements?
9. On what basis is it determined how many houses can be added, given the water management aspects?
What criteria are used for this and in what way?
Communication and transparenc
y 10. How does the water board communicate potential sites to the outside world?
Is there a transparent list of requirements an area must meet regarding water?
11. What levels of communication does the water board use towards other stakeholders (e.g. horizontal, hierarchical, circular)?
Improvement and Innovation
13. What strategies do you think could ease the site selection process and smooth out previously mentioned bottlenecks?
14. For the gneph corner: was the moment the water board got involved the right time?
If not, when would it rather be?
15. What developments are in the pipeline to influence/improve the site selection process for new construction projects in your catchment area?
16. How does the water board incorporate lessons learned from previous projects to improve future processes?
Cooperation and coordination
17. Can you describe successful collaborations with external partners or organisations that have improved the process?
Both in the gnephole and in similar situations 18. What forms of collaboration do you think would add value to the site selection process?
Concluding Questions
19. Is there anything else you think is important to my research that we have not yet discussed?
20. Who else would you recommend speaking to for more insights on this topic?

A.3 Interview Protocol Municipality

1. Who do you think are the key parties to actively collaborate with in order to make a good location choice?
2. How would you describe the current cooperation between the municipality, province, developers, water board, and region?
3. What is the relationship between the municipality and province like now, how has it grown/changed, and how have you experienced that?
4. Are there any specific tools used to promote or stimulate cooperation? (For example, a walk-in consultation hour as used by the water board) Mediator with three questions: Can it be done, is it allowed, and do you want it? Lots of discussions. Very good at pointing out responsibilities to the parties involved.
5. What obstacles have you encountered during the location selection for the Gnephoek? Indecisiveness from the municipality and reluctance from the province. The minister eventually got involved.
6. How did you deal with those obstacles? How do you clear the air when the municipality and province are directly opposed to each other?
7. Process-wise: In 2017, the discussion about a new construction project outside the BSD in Alphen aan den Rijn began. Six locations were identified, four remained after initial criteria, and two were later dropped due to a lack of political support because of the impact on the agricultural sector. In 2018, two possible locations remained. Why does this take a year, and could it be done faster?
8. Agricultural use of the dropped locations around Alphen aan den Rijn was decisive in abandoning those locations. How do you weigh the interests of stakeholders, in this case, farmers, against the interests of stakeholders in the locations you proceed with? How is communication with these stakeholders handled, and how are they involved or informed in the location selection process?
9. A collegue mentioned that the final choice for the Gnephoek was political, after other locations were dropped based on pre-set criteria and political support. What influence do you, as a strategist, have on the final choice?
10. It must be demonstrated that transformation outside the BSD is necessary because it is not possible inside the BSD. How do you demonstrate that? Is the municipality the leading party in this or is it in cooperation with developers?
11. To what extent must local residents be involved in the location selection process under the new participation law?
12. Aside from the Gnephoek, how long does the location selection process typically take for similar projects?
13. Do you feel that now the Gnephoek has been selected, all involved parties will be involved at the right time for a similar future issue? If so, who would you involve and when?
14. In this case, the municipality played a central role in the location selection process. A collegue mentioned that this is not necessarily always the case. What do you think the municipality's role should ideally be in this process?
15. How would you describe the influence of the political factor, and where in the process, in an ideal world where you have influence, would you allow it to come into play?
16. We are focusing a lot on a water and soil-based approach. What opportunities do you see in this for the municipality?
17. Offering integrated spaces instead of just focusing on housing: is this the approach you foresee for the future as well?
18. Strategic advisor Gijs > Would it be relevant for my research to interview him?

A.4 Interview Protocol Regional Board

General
1. Can you provide a brief introduction of yourself and your role within the Holland-Rijnland region?
Organisation
2. What exactly does the organisation 'Holland-Rijnland region' entail?
3. How is the organisation structured?
Could you explain the hierarchy and departments within the organisation?
4. How does the region function as a partnership?
What are your collaboration goals?
Administrative Influences
5. What are the main administrative influences of the Holland-Rijnland region on the municipalities and other partners?
6. How are decisions made within the organisation?
Is there a specific decision-making procedure that must be followed?
Legal Powers
7. What legal powers does the Holland-Rijnland region have?
Can you provide examples of how these powers are applied in practice?
8. Are there specific laws or regulations that directly affect or guide the Holland-Rijnland region?
How are these managed within the organisation?
Housing Construction
9. What role does the region play in the distribution of housing development tasks?
10. What role does the Holland-Rijnland region play in the location selection process for new construction projects outside existing urban and village areas?
11. Can you give examples of recent new construction projects where the region played a significant role?
Collaboration
12. How does the Holland-Rijnland region collaborate with the various municipalities within the region?
Are there fixed protocols or agreements?
13. How is the cooperation with the Province of South Holland?
What are the key consultation moments and forms of collaboration?
14. What role do the water boards play in the collaborations with the Holland-Rijnland region?
Can you provide specific examples of projects where water boards were involved?
15. To what extent and in what way does the region collaborate as a bloc with the water boards and the province?
Conclusion
16. Are there any other aspects of the Holland-Rijnland region that you think are important to mention in the context of this interview?
17. Do you have any recommendations for further collaboration or improvements that you would like to share?

A.5 Interview Protocol Civil Servant Province

General Process and Involved Parties
1. Can you describe the typical process for selecting a location for new construction projects in the province?
2. What is the role of the province in this?
Optional: Who is ultimately responsible for designating a location?
3. Who are the key stakeholders in this process, and how do you collaborate with them?
4. If the province is responsible: Who is involved and when in the process, and why?
If the province is not responsible: When is your involvement in the process, and how does that work out for you?
5. How does the province ensure a balance between the interests of different stakeholders, such as municipalities, developers, and residents?
Challenges and Issues
6. What are the most common challenges or obstacles you encounter during the location selection process, and how was that the case in the Gnephoek?
7. Can you provide examples of conflicts that have arisen during previous projects and how these were resolved?
Regulations
8. What steps are taken to ensure that selected locations comply with zoning plans and other regulatory requirements?
9. On what basis is the number of houses to be built determined?
What criteria are considered and how are they applied?
Communication and Transparency
10. How does the province communicate externally about possible locations?
Is this transparent or not?
Why?
11. Are there mechanisms for public participation and feedback during the decision-making process, and if so, which ones?
12. What communication levels does the province use with other stakeholders?
(Horizontal, hierarchical, circular, etc.) **Improvement and Innovation**
13. What strategies do you think could streamline the location selection process and address previously mentioned obstacles?
14. Have there been recent changes or innovations in the process that have improved efficiency or effectiveness?
15. What developments are in the pipeline to influence or improve the location selection process for new construction projects in the province?
16. How does the provincial government incorporate lessons learned from previous projects to improve future processes?
Collaboration and Coordination
17. Can you describe successful collaborations with external partners or organisations that have improved the process?
18. What forms of collaboration do you believe would add value to the location selection process?
Closing Questions
19. Is there anything else you consider important for my research that we haven't discussed yet?
20. Who else would you recommend speaking with for further insights on this topic?

A.6 Interview Protocol Ministry of Internal Affairs

General Background
1. Can you describe your role at the Ministry of the Interior and how it relates to urban development, particularly urban development in areas with significant challenges in water and soil management?
2. What is the overarching strategy or policy of the Ministry regarding water-adaptive urban development?
3. How does the Ministry collaborate with other governmental and non-governmental organisations in urban development projects?
How did this work in the case of the Gnephoek?
Collaboration and Partnerships
4. How do you see the Ministry's role in facilitating or leading collaborations during the location selection process?
5. You were actively involved in the Gnephoek project. What made the collaborations between you and the stakeholders effective?
Stakeholder Involvement
6. Who do you consider the key stakeholders in the location selection process, and what are their primary interests?
7. From your experience, how do these stakeholders prefer to be involved in the location selection process?
8. What strategies does the Ministry use to ensure that stakeholders are involved at the right time and in the right way during the selection process?
9. Can you identify some common obstacles stakeholders face during the location selection process for water-adaptive urban projects?
How does the Ministry help overcome these challenges?
Opportunities and Challenges
10. What opportunities do you see in the context of water-adaptive urban development that stakeholders may not fully utilise?
11. How can the Ministry support stakeholders in better seizing these opportunities?
12. What lessons have you learned from the Gnephoek project?
Designing Effective Collaboration
13. In your opinion, what are the key elements of effective collaboration during the location selection process for water-adaptive urban projects?
14. How does the Ministry of the Interior contribute to designing or improving these collaborative efforts?
15. What improvements or changes would you suggest to make the location selection process more effective and inclusive in future projects?
Closing
16. Are there any additional aspects that haven't been discussed but would add value to my research?

B | Consent Forms and Data Management Plan

B.1 Consent Form

Delft University of Technology
HUMAN RESEARCH ETHICS
INFORMED CONSENT TEMPLATES
(Dutch Version: January 2022)

The following templates have been developed by the Human Research Ethics Committee (HREC) to assist you in the design of your Informed Consent materials for non-medical research involving human Research Subjects. **It is important to adapt this template to the outline and requirements of your particular study, using the notes and suggestions provided.**

For additional information or specific expertise on preparing your Informed Consent materials you can consult the following:

- The TU Delft Research Ethics webpages,
- Your faculty Data Steward, the TU Delft Privacy Team
- Our brief guide on Completing the HREC checklist
- Our Risk-Planning tool, Managing Risk in Human Research

If you have any questions about applying for HREC approval which are not dealt with on the Research Ethics webpages, please contact HREC@tudelft.nl

You can find guidance on Informed Consent together with **English versions** of the Informed Consent templates in the Informed Consent section of the Research Ethics webpages.

Informatie

U wordt uitgenodigd om deel te nemen aan een onderzoek genaamd Flood-Adaptive Housing: Merging Urban Needs with Water Resilience. Dit onderzoek wordt uitgevoerd door Max Verberne vanuit de TU Delft en APPM.

Het doel van dit onderzoek is om het huidige locatieselectieproces voor residentiële gebiedsontwikkeling in kaar te brengen, specifiek voor gebieden waar op water en bodem sturend vlak een grote uitdaging en zal ongeveer 60 minuten in beslag nemen. De data zal gebruikt worden voor het in kaart brengen van het huidige proces en suggesties voor verbeteringen hiervan. De data wordt gebruikt voor een master thesis. U wordt gevraagd naar het huidige proces, de rol die u en uw werkgever hierin speelt en naar uw mening hierover.

Zoals bij elke online activiteit is het risico van een databreuk aanwezig. Wij doen ons best om uw antwoorden vertrouwelijk te houden. We minimaliseren de risico's door het anonimiseren van de verzamelde data en deze op te slaan in een beschermde omgeving waar men alleen op need to know basis toegang tot heeft.

Uw deelname aan dit onderzoek is volledig vrijwillig, en u kunt zich elk moment terugtrekken zonder reden op te geven. U bent vrij om vragen niet te beantwoorden. De geanonimiseerde data wordt 10 jaar bewaard bij de TU Delft in een beschermde omgeving.

Voor verdere vragen kunt u terecht bij:

Max Verberne (Onderzoeker)	Johan Ninan (supervisor TU Delft)
_____	_____

Signatures

Ik heb bovenstaande informatie gelezen en stem in met deelname.

_____	_____	_____
Naam deelnemer	Handtekening	Datum

_____

Email adres deelnemer

Contactgegevens van de onderzoeker voor verdere informatie: Max Verberne, mjbverberne@gmail.com

B.2 Data Management Plan

Plan Overview

A Data Management Plan created using DMPonline

Title: Location selection process in water-adaptive urban development

Creator: Max Verberne

Affiliation: Delft University of Technology

Template: TU Delft Data Management Plan template (2021)

Project abstract:

Through the lens of research by design, the location selection process of water-adaptive residential development projects is optimized.

ID: 152179

Start date: 10-04-2024

End date: 21-10-2024

Last modified: 14-06-2024

Location selection process in water-adaptive urban development

0. Administrative questions

1. Name of data management support staff consulted during the preparation of this plan.

My faculty data steward, Xinyan Fan, has reviewed this DMP on 14-6-24.

2. Date of consultation with support staff.

2024-06-14

I. Data description and collection or re-use of existing data

3. Provide a general description of the type of data you will be working with, including any re-used data:

Type of data	File format(s)	How will data be collected (for re-used data: source and terms of use)?	Purpose of processing	Storage location	Who will have access to the data
Interview recording	mp4	Conduct face2face if possible, otherwise Teams	To understand the current location selection process, the challenges that come with it and how interviewees deal with these	APPM Onedrive	Thesis team & APPM
Transcribed interviews	.docx	Semi-structured interview	To understand the current location selection process, the challenges that come with it and how interviewees deal with these	APPM Onedrive	Thesis team & APPM
De-identified interview transcription	.docx	Remove personal information from original transcript	To understand the current location selection process, the challenges that come with it and how interviewees deal with these	APPM Onedrive	Thesis team & APPM
Group discussion recording	mp4	Conduct group discussion in real life	To validate created framework	APPM Onedrive	Thesis team & APPM
Transcribed group discussion	.docx	Transcribe group discussion	to validate created framework	APPM Onedrive	Thesis team & APPM
De-identified group discussion	.docx	Remove personal information from original transcript	To validate created framework	APPM Onedrive	Thesis team & APPM
Signed informed consent form (Both 1 on 1 interview and group discussion)	Online signed pdf	Collect signed form in advance	To have consent from participants	APPM Onedrive	Thesis first supervisor and myself
Contact details- Name, email adress, telephone number	.csv	Own network	To contact participants	APPM Onedrive	Myself & APPM
personally identifiable research data, employer, job title, professonal experience, name of projects involved	.csv	During the interview	To validate participants participation	APPM Onedrive	Thesis team & APPM

4. How much data storage will you require during the project lifetime?

- < 250 GB

II. Documentation and data quality

5. What documentation will accompany data?

- Methodology of data collection
- Other - explain below

Data is attached in appendix of thesis

III. Storage and backup during research process

6. Where will the data (and code, if applicable) be stored and backed-up during the project lifetime?

- OneDrive

APPM OneDrive

IV. Legal and ethical requirements, codes of conduct

7. Does your research involve human subjects or 3rd party datasets collected from human participants?

- Yes

8A. Will you work with personal data? (information about an identified or identifiable natural person)

If you are not sure which option to select, first ask your Faculty Data Steward for advice. You can also check with the privacy website . If you would like to contact the privacy team: privacy-tud@tudelft.nl, please bring your DMP.

- Yes

8B. Will you work with any other types of confidential or classified data or code as listed below? (tick all that apply)

If you are not sure which option to select, ask your Faculty Data Steward for advice.

- Yes, I work with other types of confidential or classified data (or code) - please explain below

Location selection process from governmental bodies (municipality, province, ministry, waterboards) as well as developers collected through the interview.

9. How will ownership of the data and intellectual property rights to the data be managed?

For projects involving commercially-sensitive research or research involving third parties, seek advice of your Faculty Contract Manager when answering this question. If this is not the case, you can use the example below.

Data is included in the thesis, accessible through the TU Delft repository. As principle researcher, I will oversee access right to the gathered data throughout the research.

10. Which personal data will you process? Tick all that apply

- Other types of personal data - please explain below
- Photographs, video materials, performance appraisals or student results
- Data collected in Informed Consent form (names and email addresses)
- Signed consent forms
- Email addresses and/or other addresses for digital communication
- Telephone numbers
- Names and addresses

Job title, professional experience, employer collected throughout the interviews.

11. Please list the categories of data subjects

Employees working on development of new construction projects from:

- Municipality Alphen ad Rijn
- Province ZH
- Ministry of I&W
- Waterboards
- Developers

12. Will you be sharing personal data with individuals/organisations outside of the EEA (European Economic Area)?

- No

15. What is the legal ground for personal data processing?

- Informed consent

16. Please describe the informed consent procedure you will follow:

1 on 1 interview and group discussion: send consent form in advance, collect digitally. Make sure to collect signed forms before start of both interviews and group discussion.

17. Where will you store the signed consent forms?

- Other - please explain below
- Same storage solutions as explained in question 6

Consent form is transferred to supervisor at TU Delft after graduation. Saved for at least 10yrs after graduation.

18. Does the processing of the personal data result in a high risk to the data subjects?

If the processing of the personal data results in a high risk to the data subjects, it is required to perform a Data

Protection Impact Assessment (DPIA). In order to determine if there is a high risk for the data subjects, please check if any of the options below that are applicable to the processing of the personal data during your research (check all that apply).
If two or more of the options listed below apply, you will have to complete the DPIA. Please get in touch with the privacy team: privacy-tud@tudelft.nl to receive support with DPIA.
If only one of the options listed below applies, your project might need a DPIA. Please get in touch with the privacy team: privacy-tud@tudelft.nl to get advice as to whether DPIA is necessary.
If you have any additional comments, please add them in the box below.

- None of the above applies

22. What will happen with personal research data after the end of the research project?

- Personal research data will be destroyed after the end of the research project

V. Data sharing and long-term preservation

27. Apart from personal data mentioned in question 22, will any other data be publicly shared?

- No other data can be publicly shared - please explain below why data cannot be publicly shared

Only included in appendix

29. How will you share research data (and code), including the one mentioned in question 22?

- My data will be shared in a different way - please explain below

Added in thesis appendix

30. How much of your data will be shared in a research data repository?

- < 100 GB

31. When will the data (or code) be shared?

- As soon as corresponding results (papers, theses, reports) are published

Data included in thesis appendix

32. Under what licence will be the data/code released?

- Other - Please explain

not relevant

VI. Data management responsibilities and resources

33. Is TU Delft the lead institution for this project?

- Yes, leading the collaboration - please provide details of the type of collaboration and the involved parties below

Collaboration with APPM, signed internship agreement

34. If you leave TU Delft (or are unavailable), who is going to be responsible for the data resulting from this project?

First supervisor Johan Ninan j.ninan@tudelft.nl

35. What resources (for example financial and time) will be dedicated to data management and ensuring that data will be FAIR (Findable, Accessible, Interoperable, Re-usable)?

No budget needed